

Dec. 9, 1958

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2,863,405

ASPHALT SHINGLE WITH SEALING ELEMENTS

Filed Jan. 17, 1957

2 Sheets-Sheet 1

FIG. 1.

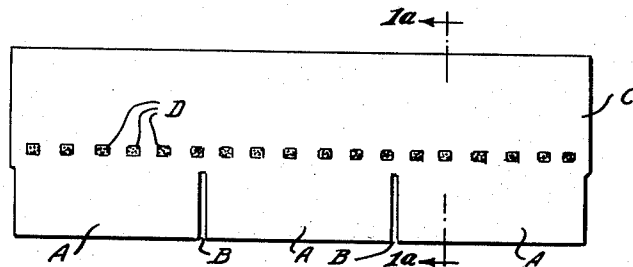


FIG. 2.

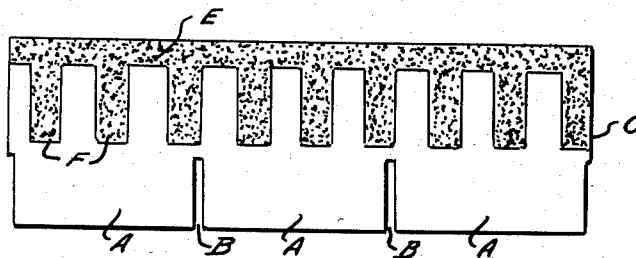


FIG. 3.

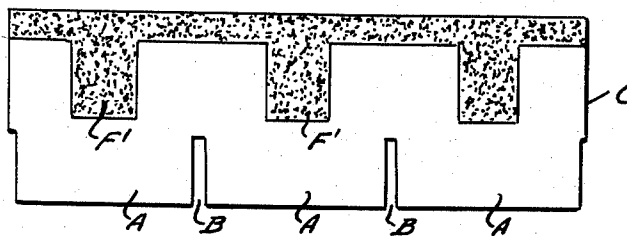


FIG. 4.

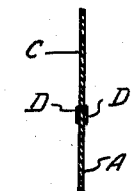
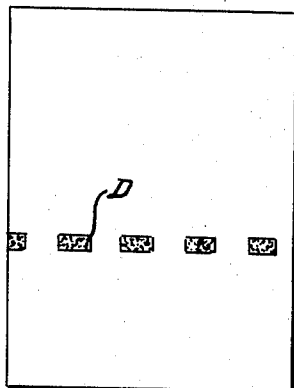


FIG. 1a.

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FIG. 5.

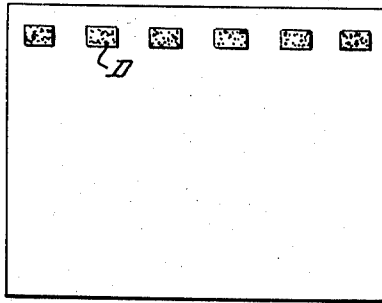
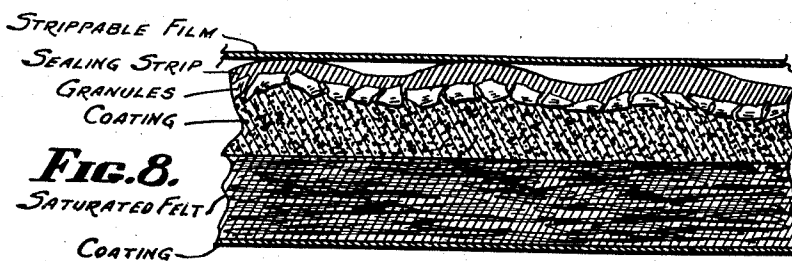
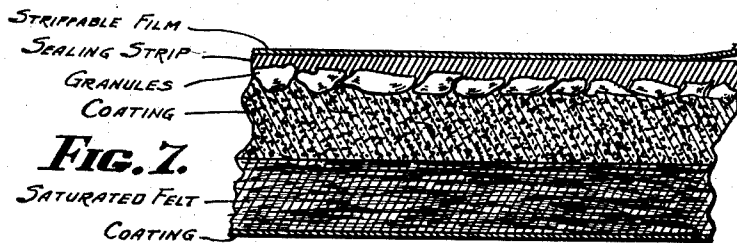
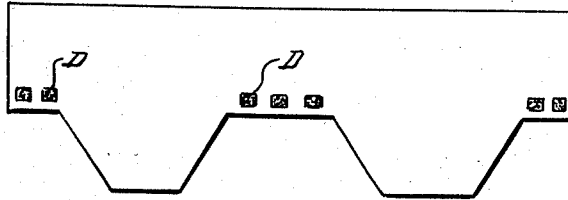


FIG. 6.



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ASPHALT SHINGLE WITH SEALING ELEMENTS

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Application January 17, 1957, Serial No. 634,708

4 Claims. (Cl. 108—7)

This invention relates to asphalt shingles provided with sealing elements so that when the shingles are laid the sealing elements hold down the shingle butts and prevent lifting thereof under high winds and also prevent lifting of the shingle butts when the roofs are subjected to low temperatures such as 0° F.

This application is a continuation-in-part of our co-pending application Serial No. 597,278, filed July 11, 1956 and now abandoned, which in turn is a continuation-in-part of Serial No. 506,796 filed May 9, 1955, now abandoned.

When shingles are laid on a roof in the normal conventional manner, the exposure portions of the shingles of one course are not in any way secured to the underlying unexposed portions of shingles in the next lower course. For this reason, under high wind conditions the shingle butts can lift and if the wind conditions are severe enough, severe damage to the roof can result. Furthermore, under the influence of very low temperatures the exposed shingle butts have a tendency to lift and again permit winds to further lift the shingles.

In order to overcome the foregoing objections, it has been proposed to provide asphalt shingles with sealing strips which the heat of the sun will soften and adhesively secure the shingle butts to the unexposed portions of the underlying shingles. The application to the shingles of an adhesive material of a tacky nature, such that it will adhere on contact, introduces a problem in connection with packing and shipment of the shingles. In order for the adhesive portions to be capable of adhering properly in placement on the roof, the adhering surface must be kept clean, so that some sort of protective surface must be provided for in packing and shipment. At the same time, it is necessary to provide for the exposure of the tacky surface for use.

The principal way in which this problem has been solved in the past is to provide along the butt edges on the underside of the shingle a strip or patches of adhesive material and then to pack the shingles back to back with the tacky elements of one shingle engaging the tacky element of the other shingle, so that a pair of shingles are adhered together. When it is desired to apply the shingles, they must be manually broken apart and it is of course intended that the break shall take place in the body of the adhesive material so that some adhesive material will remain on each of the shingles. This desired effect is not always and uniformly obtained and furthermore after the shingles are separated, every other shingle must be turned over before it is applied. Thus, the application of shingles of this type is a cumbersome and awkward operation and has not always been successful. The difficulty in the separation of shingles increases with the temperature and the hotter the day, the more difficult it is to separate the shingles.

With the foregoing considerations in mind, it is an object of the present invention to provide asphalt shingles with carefully controlled areas of applied adhesive, which areas may be protected for purposes of packaging and

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shipment, so that when the protection is removed the adhesively coated areas of the shingles will adhere without additional heating. Because the adhesive is such that immediate sealing is obtained, it is very important that the adhesive surface be protected during shipment and handling so that when the protection is removed a clean tacky surface is exposed.

It is another object of our invention to arrange the areas of adhesive material so that water will not collect under the shingles and cause blistering.

It is another object of the invention in one embodiment to provide an adhesive area for shingles such that when they are used on ranch-type low pitched roofs, the necessity of underlaying the shingles with layers of saturated felt becomes unnecessary.

It is yet another object of the invention to provide shingles which, in any event, have the adhesive areas on the top side of the shingle, but wherein the adhesive areas are protected in one of two ways. It is therefore, in one aspect, an ancillary object to provide shingles wherein the protection is in the form of a strippable film covering the adhesive areas on the top side of the shingle, which film is readily strippable or removable to prepare the shingle for use. In another aspect it is an ancillary object to provide a protective film on the underside of each shingle and positioned so that when shingles are packed facing in the same direction, the protective film on the underside of one shingle protects the adhesive area on the top side of the next shingle.

It is still another object of the invention to provide shingles having the adhesive areas on the top side of the shingle, so that if the protective strip is on the top side thereof the shingle may be laid with the removable film in place and whereby it is only necessary to strip the removable film at the time that the next shingle above is to be laid in place. In this manner the shingles are uniform and it becomes unnecessary to turn over every other shingle and the protection of the adhesive areas may be maintained until substantially the moment when adhesion is required.

These and other objects of the invention which will become apparent hereinafter or which we shall describe in greater detail, we accomplish by that certain construction and arrangement of parts of which we shall now describe certain exemplary embodiments.

Reference is made to the drawings forming a part hereof and in which;

Figure 1 is a plan view of a strip shingle showing the upper surface thereof and showing adhesive areas according to our invention.

Figure 1a is a cross-sectional view taken on the line 1a—1a of Figure 1, showing one embodiment.

Figure 2 is a plan view of a modification suitable for ranch-type multiple strip shingles and showing a modification of the invention. Again the top side of the shingle is illustrated.

Figure 3 is a view similar to Figure 2 showing a modification thereof.

Figures 4 and 5 are plan views of the upper side of the individual shingles showing the application of the invention therefor.

Figure 6 is a plan view of the upper side of a hexagonal type of strip shingle showing the application of the invention thereto.

Figure 7 is a sectional view, highly magnified, of a typical shingle having the invention applied thereto.

Figure 8 is a view similar to Figure 7 where the shingle has been corrugated and the strippable film extends across the peaks of the corrugation.

Briefly, in the practice of the invention we provide areas of adhesive material which is preferably a rubber-asphalt pressure sensitive adhesive, and we arrange these

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areas adjacent the lower limit of the unexposed portion of the shingle on the upper or granule side thereof, so that they will engage the undersides of the butt edges of shingles in the next higher course. We provide in one embodiment a strippable protective film to cover the adhesive areas so that the shingle may be nailed to the roof without removing the strippable film. The film need only be removed at the time the next higher shingle is to be nailed in place. In this way, the adhesive areas are protected until substantially the moment of use. In another embodiment we provide protection for the adhesive areas on the underside of each shingle and disposed so that, when shingles are packed all facing in the same direction, the adhesive area of each shingle lies against the protective material on the underside of the adjacent shingle. The adhesive areas, at least in the lower portions thereof, are spaced so that any rain water driven in edgewise of the shingle can drain out and will not become trapped whereby it can cause blistering. For shingles for ranch-type homes having a low-pitch roof, it is the part of our invention to form the upper portion of the adhesive area in a continuous manner whereby we can eliminate the necessity of underlaying the shingles with layers of saturated felt for waterproofing purposes.

Referring now in greater detail to the drawings, the strip shingles of Figures 1, 2 and 3 are of conventional configuration having exposure areas A separated by slots or cutouts B to simulate a plurality of individual shingle butts. The unexposed areas of the shingle are indicated at C. The adhesive material is applied to the unexposed area C in various ways.

In the strip shingle of Figure 1, the adhesive is applied in rectangular areas or spots which, for example, may be about $\frac{1}{4}$ inch by 1 inch with a spacing of about 1 inch between spots. The line of spots D is preferably located about $\frac{1}{2}$ inch above a line extending across the tips of the slots or cutouts B.

In the strip shingle of Figure 2, which is particularly adaptable for use on low pitch roofs on ranch-type homes, we provide a solid or continuous band of adhesive material at E and from the band E we provide the downwardly extending stripes F. The stripes F may be about 2 inches wide and spaced apart about 2 inches and the band or stripe E may be about 2 inches wide. The stripes F again terminate preferably about $\frac{1}{2}$ inch above the ends of the slots B. With the arrangement of Figure 2, underlying layers of saturated felts can be eliminated.

The shingle of Figure 3 is very similar to that of Figure 2 except here the stripes F' are shown as being about 4 inches wide and spaced apart about 8 inches. The embodiment of Figure 3, like that of Figure 2, eliminates the underlying saturated felt layer.

The invention may be applied to individual shingles as shown in Figures 4 and 5. The adhesive material there is again indicated at D and is of the same type as shown in Figure 1. The difference between the two shingles is that that of Figure 4 is what is known as a triple-coverage shingle, whereas that of Figure 5 is a single coverage shingle.

Figure 6 is a strip shingle of the type which produces a hexagonal design when applied to the roof and here again the adhesive is applied in the manner of Figures 1, 4 and 5 and as indicated at D.

Recovery shingles requiring clips or staples to hold down the exposed edge can be applied without clips or staples by the application of the adhesive material to the unexposed edge.

In Figure 7, we have shown in cross-section on a greatly enlarged scale a shingle composed of a roofing fabric coated with granules and provided with an adhesive layer. If desired, this shingle material may be corrugated with hot corrugating rollers and will then appear as shown in Figure 8. The strippable film may then be applied as shown in Figure 8 after the corrugation has taken place. Certainly, it would be possible to perform

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the corrugating operation after the strippable film is in place, in which event the film would follow the curvature of the corrugations. We, however, prefer the arrangement shown in Figure 8 because of the ease with which the strippable film may be pulled off.

The adhesive material is applied to the granular unexposed area of the shingle in accordance with the desired pattern, either continuously or discontinuously.

The preferred adhesive material is a rubber-asphalt mixture in which the rubber component furnishes the initial quick tack for this pressure sensitive adhesive. A suitable composition which we prefer is as follows:

	Percent
GRS-1000 rubber-----	6.2
Reclaim rubber-----	17.9
Soft tar-----	14.3
Asphalt flux-----	22.1
187°-192° F. S. P. asphalt-----	39.5

The GRS 1000 rubber is a copolymer of butadiene and styrene described in Reconstruction Finance Corporation Specification Book 1000-1, 9-15-52. The reclaimed rubber is composed of approximately 50% rubber hydrocarbon. The soft tar has a float of 50 to 100 seconds at 32° C. The asphalt flux has a furol viscosity of 65 to 80 seconds at 210° F. The air oxidized asphalt is a pliable asphalt and has a softening point of 187 to 192° F. ring and ball method and a penetration at 77° F. of 1.5 to 3.0 millimeters.

The strippable film is highly important to the commercial success of this type of shingle. The basic web of the strippable film must have adequate tear strength so that it can be torn from the adhesive on the shingle without itself tearing and the film must be coated with a material which will separate readily from the above outlined type of adhesive material.

Preferably the basic web is Fourdrinier base saturating paper made from long fibered bleached pulp impregnated with synthetic rubber latex in sufficient amount to obtain the necessary edge tear, pliability, and internal bonding strength. Preferably, the paper is in the weight range of 40 to 70 pounds for 500 sheets 24" x 36", or 3000 square feet. The impregnating rubber is preferably in the range of 25 to 70% and may be any of the synthetics, such as Buna N or GRS types or combinations thereof. The web should have a high wet strength, and under some conditions it may be necessary to use a web saturated with asphalt or other waterproofing agent.

The web of paper of the above type is then coated with a film forming coating which is incompatible with the adhesive. We prefer as a coating a latex type blend and particularly butadiene acrylonitrile copolymers. We find that this material is the most satisfactory for our purposes. We have also found it possible to use a silicone treated paper. The paper may be a parchment paper treated with glycerine and a silicone emulsion. The parchment paper may be made as disclosed in the Dictionary of Applied Chemistry, volume V, pages 80-81. Kraft paper is first treated with 66° Baumé sulphuric acid, rinsed with water, treated with a dilute ammonium hydroxide solution, rinsed, treated with glycerol, dried and calendered. The imparchmentized paper may then be treated with a mixture of 15 parts water, one part glycerol and one part LE-45 silicone. This is an emulsion manufactured by Linde Air Products Co. and sold under the trade name LE-45 silicone. The paper may be a paper manufactured by Kalamazoo Vegetable Parchment Company and identified as No. 60 Brown Whalehide Silicone Treated.

In connection with shingles as shown in Figures 1, 4, 5 and 6 the strippable film may be a band about one-half inch wide, although it need not be the same width as the adhesive strip. For use with a shingle according to Figures 2 and 3, the strippable film will be about 7 inches wide.

As pointed out above, it is not necessary to provide a strippable film on the adhesive on the top side of the shingle, and protection may be applied to the underside of the shingle so that when the shingles are packed all facing in the same direction, protection for the adhesive area on the top side of one shingle is provided by the protecting area on the underside of the adjacent shingle.

The protection on the underside of the shingle may be provided as shown at D' in Figure 1a. It may be in the form of a film of soap, silicone or the like, which will not adhere, or it may be in the form of a strip of paper treated as above described, or aluminum foil or similar material which has been coated or treated on one side with silicone or other material which is incompatible with the adhesive, so that it will not adhere to the adhesive material. It will be understood that if a film of soap, silicone or the like is used, it will be applied to the shingles at a point in their manufacture after the mica or sand has been applied thereto. If a strip of foil or paper is used, it will be applied at a stage in the manufacture of the shingles while the asphalt is still hot and before the mica or sand is applied, whereby the strip will adhere to the shingles in the proper location without requiring additional adhesive. It will be understood that in some cases it may be desirable to treat the side of the strip which is to adhere to the back of the shingle with an agent to make it more compatible with the asphalt on the shingle back.

It will also be understood that where the protection is applied to the underside of the shingle it may simply remain in place when the shingle is laid on the roof. If it is a paper or foil strip, it need not be removed because it is on the underside and will not show in the finished roof. This feature saves considerable time in the shingling of a roof.

When 12 x 36 three-tab shingles are applied to a roof in a normal way either with sealing strips according to the prior art, or without sealing strips, the exposure heights are limited by Underwriters Laboratories, Inc. to 5 inches. With the sealing arrangement disclosed herein, Underwriters Laboratories, Inc. have approved an exposure height of 7 inches for one type of shingle, and 10½ inches for another type. This produces a considerable economy in that a total of 240 square feet per square is required to obtain double coverage with the conventional 12 inch by 36 inch strip shingle. With strip shingles according to the present invention having a 2 inch headlap and having an exposed tab 7 inches in height, double coverage of the same area can be obtained with 228.57 square feet per square. With individual shingles having a 3 inch headlap and an exposed tab 10½ inches in height, double coverage of the same area can be obtained with 226.5 square feet per square.

It will be clear that various modifications may be made without departing from the spirit of the invention and we therefore do not intend to limit ourselves otherwise than as set forth in the claims which follow.

Having now fully described our invention, what we claim as new and desire to secure by Letters Patent is:

1. A self sealing asphalt granule coated strip shingle having an unexposed area and an exposure area which is divided with vertical slots to simulate individual shingles and having a band of pressure sensitive adhesive overlaying the granule coated shingle surface in the unexposed portion, said adhesive having a rubber component which furnishes an initial quick tack and in which the adhesive composition contains from 15 to 35 percent rubber, from 8 to 20 percent soft tar, from 15 to 30 percent asphalt flux and from 35 to 50 percent air oxydized pliable asphalt, and associated with said shingle in such manner as to maintain the quick tack and adhesive properties

of the band of adhesive until the time of laying the shingle in a roof, a pliable strip having high edge tear resistance, resistance to delamination when wet, and said strip being coated with a film forming coating which is incompatible with the adhesive.

2. A self sealing asphalt granule coated strip shingle having an unexposed area and an exposure area which is divided with vertical slots to simulate individual shingles and having a band of pressure sensitive adhesive overlaying the granule coated shingle surface in the unexposed portion, said adhesive having a rubber component which furnishes an initial quick tack and in which the adhesive composition contains from 15 to 35 percent rubber, from 8 to 20 percent soft tar, from 15 to 30 percent asphalt flux and from 35 to 50 percent air oxydized pliable asphalt, and associated with said shingle in such manner as to maintain the quick tack and adhesive properties of the band of adhesive until the time of laying the shingle in a roof, a pliable strip having high edge tear resistance and resistance to delamination when wet and said strip being coated with a film forming coating which is incompatible with the adhesive, said pliable strip being applied as a covering overlying the pressure sensitive adhesive and being readily strip-pable therefrom when the shingle is laid in a roof.

3. A self sealing asphalt granule coated strip shingle having an unexposed area and an exposure area which is divided with vertical slots to simulate individual shingles and having a band of pressure sensitive adhesive overlaying the granule coated shingle surface in the unexposed portion, said adhesive having a rubber component which furnishes an initial quick tack and in which the adhesive composition contains from 15 to 35 percent rubber, from 8 to 20 percent soft tar, from 15 to 30 percent asphalt flux and from 35 to 50 percent air oxydized pliable asphalt, and associated with said shingle in such manner as to maintain the quick tack and adhesive properties of the band of adhesive until the time of laying the shingle in a roof, a pliable strip having high edge tear resistance and resistance to delamination when wet and said strip being coated with a film forming coating which is incompatible with the adhesive, said pliable strip composed of paper impregnated with synthetic rubber latex in sufficient amount to obtain the necessary edge tear resistance, pliability and internal bonding strength.

4. A self sealing asphalt granule coated strip shingle having an unexposed area and an exposure area which is divided with vertical slots to simulate individual shingles and having a band of pressure sensitive adhesive overlaying the granule coated shingle surface in the unexposed portion, said adhesive having a rubber component which furnishes an initial quick tack and in which the adhesive composition contains from 15 to 35 percent rubber, from 8 to 20 percent soft tar, from 15 to 30 percent asphalt flux and from 35 to 50 percent air oxydized pliable asphalt, and associated with said shingle in such manner as to maintain the quick tack and adhesive properties of the band of adhesive until the time of laying the shingle in a roof, a pliable strip having high edge tear resistance and resistance to delamination when wet and said strip being coated with a film forming coating which is incompatible with the adhesive, said pliable strip composed of paper impregnated with a silicone emulsion.

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