Jan. 19, 1954 G. W. CLARVOE 2,666,402

SELF-SEALING SHINGLE

Filed Aug. 10, 1948

Fig. 1.

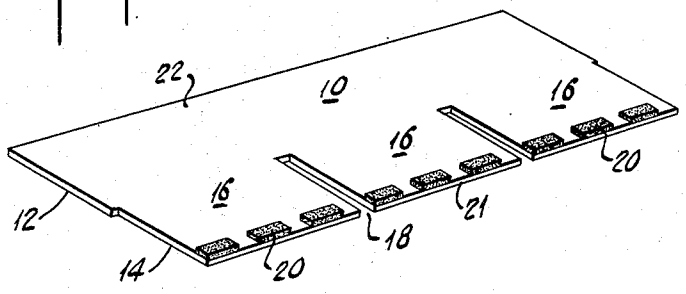


Fig. 2.

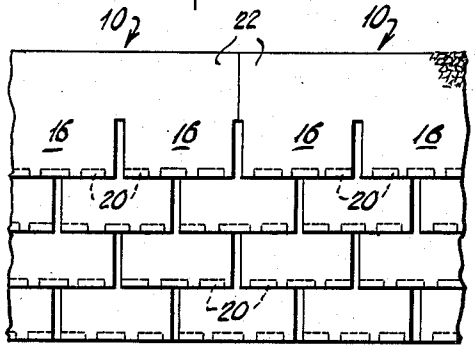


Fig. 5.

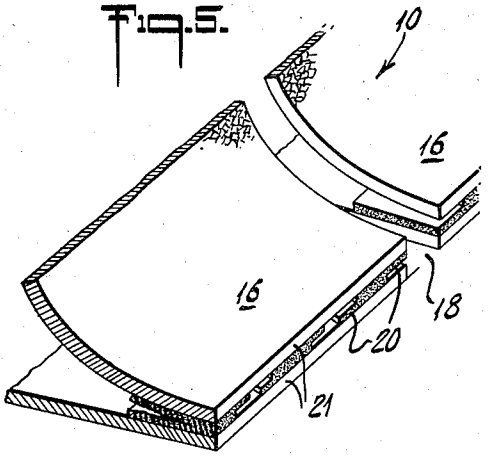


Fig. 3.

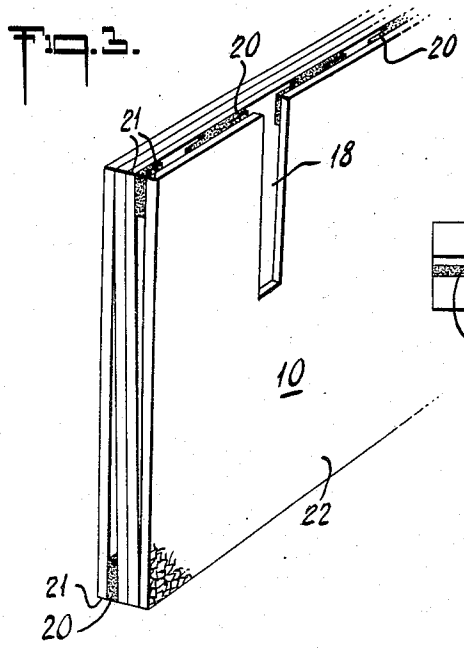
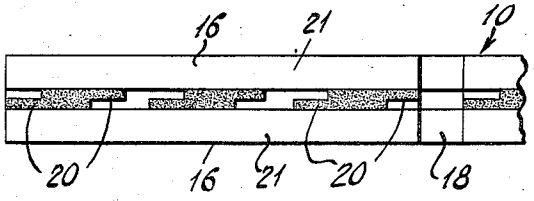


Fig. 4.



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SELF-SEALING SHINGLE

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6 Claims. (Cl. 108—7)

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The instant invention relates to flexible roofing or siding shingles and like covering elements and more particularly to improved shingles of the type including a stripe or lane of cementing compound on the underside of the shingle or shingle tabs adjacent the butt edge, whereby the butts are adapted to become self-sealed to the underlying shingles or roof structure to prevent lifting under adverse weather conditions. The invention is applicable to either individual shingles or strip shingles but, inasmuch as the problem of curling or lifting is more prevalent with the latter type, the invention will be described particularly in their connection. Such shingles conventionally constitute an integral head portion and a plurality of exposure tabs or butt portions extending from the head portion and separated by spaces or slots.

In the prior application of Clarvoe and Pomeroy, Serial No. 721,598, filed January 11, 1947, which has been abandoned in favor of a continuation in part application, S. N. 56,932, filed October 28, 1948, disclosing the subject matter of the earlier application, there is disclosed a construction which has proved effective in the solution of this problem and which, at the same time, has eliminated the disadvantages of prior proposals attempting similar results. According to said prior disclosure a readily fracturable adhesive is used as the sealing medium which, when fractured, presents bright, clean surfaces having wetting and adhesive properties. The adhesive is applied in the form of lanes or stripes on the under surfaces of the shingles adjacent the butt edges. The shingles are packed back to back in pairs, the adhesive forming a single, homogeneous lane adhered to both shingles of the pair. When the shingles are to be laid, they are removed from the bundles and bent apart to fracture the lane intermediate their thickness to leave cementing lanes on each shingle.

It has been determined that, due to the effectiveness of the sealing action, the adhesive lane forms a barrier which prevents drainage or ventilation of the backs of the shingles when rain is driven underneath the shingles through spaces at the uncemented side edges. The instant invention has for its principal object the provision of an improved construction of the Clarvoe and Pomeroy type which will overcome this difficulty by providing for adequate drainage without detracting from the effectiveness of the seal.

More specifically an object of the invention is the provision of a construction which has the

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adhesive material applied in spaced patches to define drainage openings. At the same time the construction insures an adequate thickness of the adhesive compound on each shingle and provides, at least on portions of the patches, the bright, clean, fractured surfaces desired for effective and prompt sealing.

Briefly stated, the objects of the invention are attained by a shingle having the cementing material lying in spaced patches forming a discontinuous lane, the spaces between the patches being of lesser extent than the patches whereby, when the shingles are packaged in pairs, at least portions of the patches on opposed shingles will necessarily be in contact and will weld together to form a homogeneous, double thickness layer which fractures when the shingles are separated.

My invention will be more fully understood and further objects and advantages thereof will become apparent when reference is made to the more detailed description of a preferred embodiment of the invention which is to follow and to the accompanying drawings in which:

Fig. 1 is a perspective view of a shingle embodying the instant invention, the shingle being inverted to show its under face;

Fig. 2 is a view of a section of a roof covered with shingles of the instant invention;

Fig. 3 is a perspective view illustrating the arrangement of the shingles in a bundle or package;

Fig. 4 is an edge view on a greatly enlarged scale illustrating the butt edges of a pair of shingles before separation; and

Fig. 5 is a perspective view, partly in section, illustrating the manner of separating the shingles of a pair in preparation for laying.

Referring now to the drawings, the invention is shown as embodied in an otherwise conventional strip shingle 10. Such shingle, as is well known in the art, is usually prepared from a roofing felt 12 as a base, the felt being saturated with a waterproofing compound such as a relatively low melt point asphalt. On the surface to be placed uppermost a suitable weather protecting covering 14 is used which may take different specific forms but in the usual form consists of one or more coatings of a relatively high melt point asphalt, each coating layer carrying a surfacing of mineral grit such as crushed slate. The under surface of the shingle may carry a thin back coating of asphalt and a surfacing of mica, talc, or the like (not shown). The exposure area of the shingle is divided into a plurality of tabs 16 by slots or cut-outs 18 ex-

tending from the butt edge 21 to a headlap area 22 whereby, when the shingles are laid as illustrated in Fig. 2 they simulate the appearance of a plurality of individual shingles. Due to the flexible characteristics of a shingle of this type, if the tabs are unsecured, it frequently happens that they are lifted or curled back and sometimes completely torn off under the action of high winds. To avoid this difficulty it has been proposed, as previously mentioned, to provide lanes of adhesive material on the under surface of the butts of the shingles, the adhesive being of a character which will self-adhere to the underlying roof structure. The construction shown and claimed in the said Clarvoe and Pomeroy co-pending application is of this type and includes a stripe of fracturable adhesive of a character to wet and adhere to a juxtaposed surface when the shingle is subjected to solar radiation at normal temperatures. The shingles are packaged in pairs with the stripes in contact whereby they become welded together. The fracturable nature of the adhesive is utilized to permit the shingles to be readily separated and to provide, when fractured, the bright, clean surfaces needed to secure adherence to the surface of a structure such as the granular surface of overlapped shingles. Adhesives employed for this purpose are petroleum resins, pressure still pitches, coal tar pitches and related bitumens of similar characteristics, with or without additional modifiers, such as various types of petroleum, coal tar, or synthetic resins, the compounds having physical properties lying within or substantially within the limits given below:

	Min.	Max.
Melting Point, Ring and Ball ..... °F.	175	200
Penetration at 77° F., 100 grams, 5 seconds	1	8
Penetration at 115° F., 50 grams, 5 seconds	5	20
Flow at 160° F., 6 hours 45° angle, ½" cube, Barrett Test ..... inches ..	½	4
Saybolt Furol Viscosity at 350° F., seconds	100	250
Asphalt Viscosity Index	3.5	6.5
Impact Test—¼" x 3" Diameter Disc Single Blow at 115° F., inch-pounds	.....	5.0

Typical examples of specific compounds meeting the above requirements are as follows:

Example 1

	Percent
Petroleum resin	100

Example 2

Petroleum resin	20
Asphalt (150–155° F., M. P.)	20
Pressure still pitch (210–220° F., M. P.)	60

Example 3

Blended steam refined asphalt (140–150° F., M. P.)	40
Pressure still pitch (210–220° F., M. P.)	60

Example 4

Petroleum resin	25
Residual asphalt (220–250° F., M. P.)	37½
Pressure still pitch (210–220° F., M. P.)	37½

Compounds meeting these requirements are hard and frangible at normal temperatures whereby they may be readily fractured but still have the ability to wet and adhere to other surfaces They are inexpensive and may be easily applied.

In accordance with the instant invention the adhesive or cementing compound, instead of being applied in a continuous stripe or in widely

spaced areas, as shown in the prior co-pending application, is applied in patches 20, the patches forming discontinuous lanes on the under surfaces of the shingles adjacent and preferably parallel to the butt edges. The patches are so arranged that the spaces between the patches are of lesser extent than the patches, as clearly illustrated in Figs. 1, 3 and 4.

The shingles are paired, as before, with their backs adjacent. Due to the greater extent of the patches 20 as compared to the spaces between them, the patches of opposed shingles of a pair necessarily overlap, as clearly illustrated in Figs. 3 and 4, the overlapping portions welding together to form an integral, homogeneous layer, cementing the shingles together. It will be appreciated that, inasmuch as the adhesive is preferably applied during the manufacture of the shingles and suitably before they are separated from the roofing sheets, it is not possible to insure that widely separated spots of adhesive on different shingles will coincide when the shingles are paired. Where, however, the construction of the instant invention is used with the adhesive patches longer than the spaces between them, at least partial coincidence is insured. The pairs of shingles are bundled, preferably as illustrated in Fig. 3. When they are to be laid, they are separated by grasping them adjacent their unsecured edges and pulling them apart (see Fig. 5), the single, homogeneous layer formed by the overlapping portions of the patches fracturing intermediate its depth whereby each shingle is provided with an adequate thickness of the cementing material and the adhesive, at least in part, has the bright, clean surfaces which insure rapid adherence to the underlying structure. The unfractured areas of the patches, while slower in operation, will eventually seal, the fractured surfaces in the meantime adequately preventing curling of the tabs. As illustrated in Fig. 2, the spaces between the patches permit drainage and ventilation of any spaces beneath the shingles.

Having thus described my invention in rather full detail, it will be understood that these details need not be strictly adhered to but that various changes and modifications may suggest themselves to one skilled in the art, all falling within the scope of the invention as defined by the subjoined claims.

What I claim is:

1. A pair of prepared asphaltic exterior covering sheets each having front and back surfaces and arranged with one of said surfaces of one sheet facing one of said surfaces of the other sheet, said facing surfaces each having spaced patches of cementing material so arranged that the patches of the respective surfaces are partially in register with each other, the registering cementing material of the patches forming integral cementing layers connecting the sheets together, said cementing material comprising a bituminous compound fracturable at normal ambient temperatures and having high wetting characteristics and high adhesive characteristics under solar radiation at normal temperatures, said compound having a ring and ball softening point of the order of 175° F. to 200° F. and a penetration at 115° F., 50 grams, 5 seconds, in the range 5–20.

2. A pair of prepared asphaltic exterior covering sheets each having front and back surfaces and arranged with one of said surfaces of one sheet facing one of said surfaces of the other

sheet, said facing surfaces each having spaced patches of cementing material forming opposite discontinuous lanes with the patches of the respective sheets in partial register with each other, the registering cementing material of the patches forming integral cementing layers connecting the sheets together at the registering portions, said cementing material comprising a bituminous compound fracturable at normal ambient temperatures and having high wetting characteristics and high adhesive characteristics under solar radiation at normal temperatures, said compound having a ring and ball softening point of the order of 175° F. to 200° F. and a penetration at 115° F., 50 grams, 5 seconds, in the range 5–20.

3. The invention as defined in claim 2, in which the spaces between the patches are of lesser extent than the patches.

4. A pair of shingles placed back to back with their butt edges adjacent, the backs of the shingles having spaced patches of cementing material forming opposite discontinuous lanes adjacent their butt edges, the patches of the respective lanes being in partial register and overlapping and forming integral cementing layers connecting the shingles together at the overlapping portions, said cementing material comprising a bituminous compound fracturable at normal ambient temperatures and having high wetting characteristics and high adhesive characteristics under solar radiation at normal temperatures, said compound having a ring and ball softening point of the order of 175° F. to 200° F. and a penetration at 115° F., 50 grams, 5 seconds, in the range 5–20.

5. The invention as defined in claim 4, in which said lanes are approximately parallel to the butt edges and the spaces between the patches are of lesser extent than the patches.

6. A pair of shingles placed back to back with their butt edges adjacent, the backs of the

shingles adjacent said butt edges having spaced patches of cementing material forming opposite discontinuous lanes approximately parallel with the butt edges, the spaces between the patches being of lesser extent than the patches and the opposed patches overlapping and forming integral cementing layers connecting the shingles together at the overlapping portions, said cementing material comprising a bituminous compound fracturable at normal ambient temperatures and having high wetting characteristics and high adhesive characteristics under solar radiation at normal temperatures, such as to enable the compound to adhere firmly to substances, such as a cement-free surface portion of a like covering element, having a different composition than said compound, as well as to the compound itself, said compound having a ring and ball softening point of the order of 175° F. to 200° F., a penetration at 115° F. in the range 5–20, a viscosity, Saybolt Furol at 350° F. of 100–250 seconds, and an impact resistance (impact test ¼'' x 3'' diameter disc single blow at 115° F.) of a maximum of 5.0 inch-pounds, whereby said elements are held securely together as a pair but are readily separable by fracture of the integral layer at the overlapping portions of the patches to present bright, clean adhesive surfaces on each element over the area of fracture.

GEORGE W. CLARVOE.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,848,076	Fischer	Mar. 1, 1932
2,210,209	Kirschbraun	Aug. 6, 1940
2,300,488	Cuno	Nov. 3, 1942
2,390,697	Eason	Dec. 11, 1945
2,418,135	Moore	Apr. 1, 1947
2,421,892	Kirschbraun	June 10, 1947