Jan. 6, 1959 L. B. ASHBAUGH 2,867,181

INDIVIDUAL SHINGLE AND ROOFING FORMED THEREWITH

Filed Nov. 30, 1953

FIG. 1

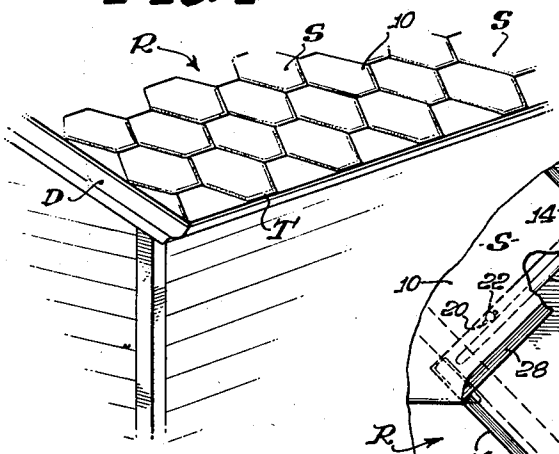


FIG. 3.

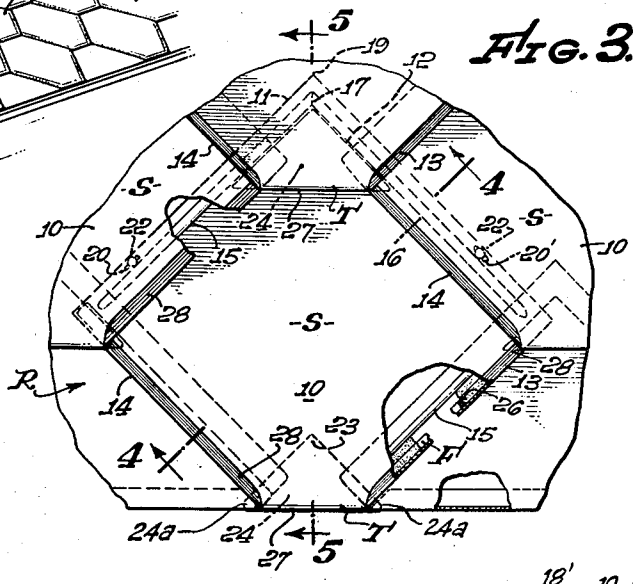


FIG. 2.

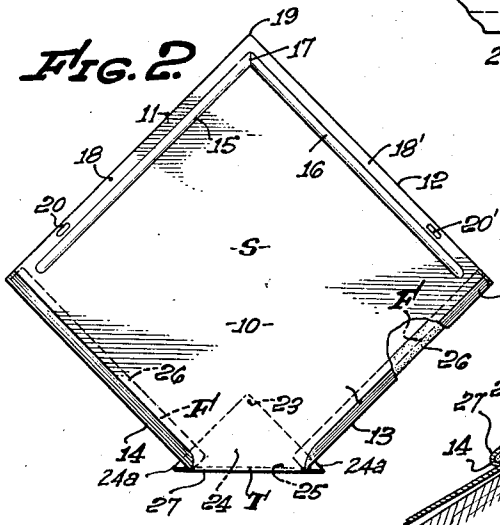


FIG. 4.

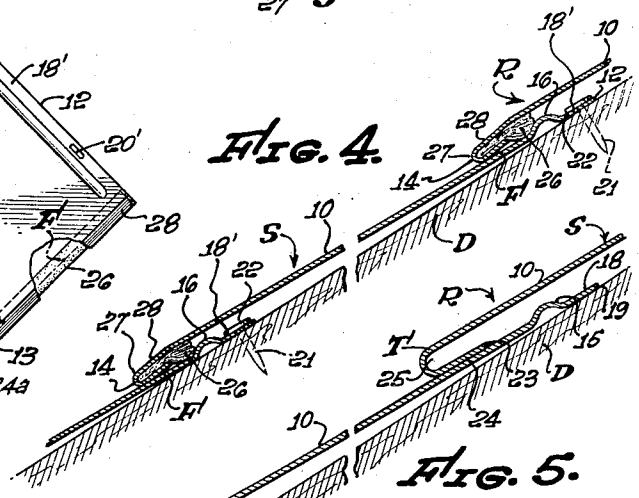


FIG. 5.

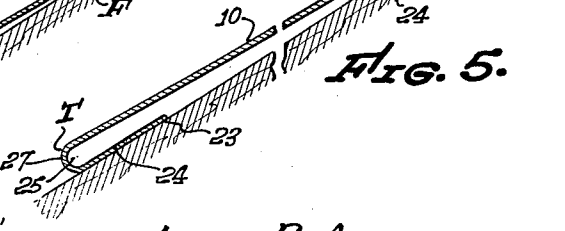
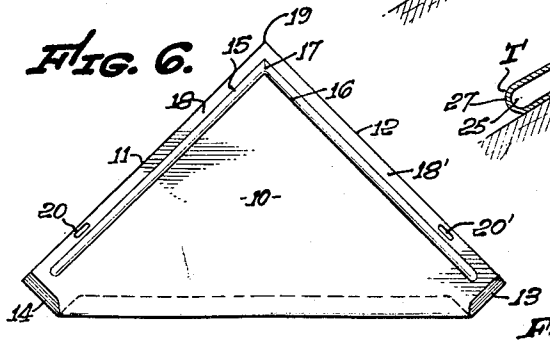


FIG. 6.



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INDIVIDUAL SHINGLE AND ROOFING FORMED THEREWITH

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1 Claim. (Cl. 108—17)

The present invention relates generally to the field of roofing, and more particularly to a metallic shingle, and a roof formed of same.

For many years it has been realized by experts in the roofing field that metal shingles have many advantages over the wooden type, or those fabricated from other roofing materials, for metal shingles are more durable, fireproof, and require a minimum of maintenance attention.

In order for metallic shingles to successfully compete with wooden or other type shingles, as well as the asbestos, tile, or cement and slate roofings, they must meet severe requirements, particularly when used for residential roofings. Not only must a metal shingle roofing be attractive in appearance when installed on a home, but it must be structurally designed so as to be readily affixed to the roof deck by a roofer having a minimum of instruction, yet be simple and rugged in construction whereby it may have a long and useful life, and may be retailed in a price range to compare favorably to other forms of roofing in order to create a market demand therefor over roofing formerly available.

The principal reasons for the limited commercial success met with by previously available metal shingle roofings resides in the fact that at most, each type met but one of the above mentioned requirements, or were of such design as to be rejected by the practical roofing man because of the difficulties encountered in installation.

The applicant has devised a metal shingle roofing which not only meets the severe requirements previously mentioned, but which provides numerous other advantages heretofore unattainable by means of any other type of commercially available roofing. As a result applicant has evolved a metal shingle which will provide an integral roofing having the following advantages over those previously available: (*a*) has insulating qualities throughout year; (*b*) is watertight, weatherproof and fireproof; (*c*) is lightweight and interlocks with adjacent shingles to allow for expansion and contraction thereof; (*d*) completely eliminates noise due to vibration of singles; and (*e*) resists deterioration.

The major object of the present invention is to provide a metal shingle substantially as an integral unit that can be applied to a roof deck by an ordinary roofer by means of the same equipment and same methods used in installing other singles, whereby a roof of attractive and distinctive appearance will be provided.

Another object of the invention is to supply a substantially rectangular metal shingle adapted to be laid diagonally relative to the ridge and eaves of the roof, whereby the outline of the exposed shingle portion is clearly defined by shadow areas or shadow lines as such areas are usually referred to in the roofing trade.

A further object of the invention is to furnish a shingle that may be fabricated from coiled sheet metal such as aluminum, magnesium, copper or an alloy thereof, or nonmetallic materials such as various of the synthetic plastics that are resistant to weathering action, which shingle embodies integral ribs that are formed on the upper surface thereof, as well as flanges, a tab, and tapered shadow areas.

Another object of the invention is to provide a shingle adapted to interlock with adjoining shingles, as well as with strips and ribs of these shingles, to provide a weather-tight roofing.

Yet another object of the invention is to supply a shingle, the major portion of which is vertically spaced from the roof deck on which it is mounted due to its supporting tab and flange construction, with said vertical spacing permitting circulation of air between the roof deck and shingles to substantially eliminate condensation of moisture therebetween.

A still further object of the invention is to provide a shingle which may be directly affixed to a wooden roof deck by nails which pass through elongate openings formed therein, said shingle when so affixed permitting expansion and contraction of the roof deck due to changes in the moisture content of the wood without such variations in the roof deck in any way disturbing the waterproof connections between adjoining shingles or causing said shingles to separate or buckle.

Another object of the invention is to furnish a shingle roofing wherein the securing nails therefor are completely covered by overlapping portions of adjoining shingles.

A yet further object of the invention is to supply a metal shingle which will provide a moderately priced roof in that the necessity for utilizing a felt roofing between the shingles and roof deck is eliminated, and the shingles are of such design that a greater roof area may be covered by the individual shingle than heretofore attained.

A still further object of the invention is to supply shingles which may be directly overlaid upon old roofs, are self-spacing, and very simple and easy to mount, and provide an attractive, smooth and secure roofing.

These and other objects and advantages of the invention will become apparent from the following description of a preferred form thereof, and from the drawing illustrating that form in which:

Figure 1 is a perspective view of a roof fabricated from shingles of the present invention;

Figure 2 is a top plan view of one shingle showing the raised ribs thereof and the elongate openings provided for movably affixing the shingle to a roof deck;

Figure 3 is a top plan view of the invention when mounted on a roof deck, showing the manner in which a movable interlock is achieved with adjoining shingles;

Figure 4 is a vertical cross-sectional view of one shingle taken on line **4—4** of Figure 3;

Figure 5 is a second vertical cross-sectional view of the invention taken on line **5—5** of Figure 3; and

Figure 6 is a plan view of a half shingle mounted on the eaves of a roof.

Referring now to the drawing for the general arrangement of the invention, it will be seen that a plurality of shingles S, as shown in detail in Figures 2, 4, and 5, may be directly affixed to a roof deck D in an interlocking configuration, (see Figures 1 and 2) to provide a roof R.

Each shingle S is preferably fabricated from a rectangular sheet **10** of aluminum, magnesium, or an alloy thereof, that is not only light in weight, but is not adversely affected when exposed for a prolonged period of time to the weather. Aluminum has been found to be particularly well adapted for this purpose in that it may be easily worked in the fabrication of sheet **10** to provide the shingle structure hereinafter described in detail, and after exposure to the atmosphere it assumes a thin film of an oxide or other reaction products which will protect the metal from any appreciable action by the weather.

For ease in describing the structural features of shingle

S, the four edges of sheet **10** are identified by numerals **11**, **12**, **13** and **14**. In Figures 1, 2, 4, and 5, it will be seen that two longitudinally extending raised ribs **15** and **16** that meet at an apex point **17** are pressed or otherwise formed in sheet **10**. Rib **15** is spaced inwardly from edge **11**, and rib **16** is likewise spaced inwardly from edge **12** a substantially equal distance. Edge **11** and rib **15** define an elongate area **18**, and edge **12** and rib **16** define an area **18'** identical to area **18**. Edges **11** and **12** meet at apex point **19**.

As seen in Figure 2, elongate openings **20** and **20'** are formed in areas **18** and **18'** respectively that are spaced a considerable distance from apex **19**. Openings **20** and **20'** are of such width as to slidably engage the shank of a nail **21** that passes therethrough (Figure 4). The head **22** of nail **21** is disposed adjacent to the upper surface of area **18** or **18'** in which opening **20** or **20'** is formed, but is so positioned above the surface as to permit movement of sheet **10** relative to the nails. Free movement of sheet **10** relative to nails **21** is highly desirable in order that the sheet may expand or contract with the temperatures to which it is subjected without stress or strain. It will be particularly noted that the openings **20** and **20'**, as well as nails **21** passing therethrough, are completely sealed from the weather by overlapping portions of adjoining shingles S.

One of the steps required in forming sheet **10** into a shingle S is that of bending a triangularly shaped segment **24** adjacent an apex **23** upwardly and under the sheet. The segment is bent so as to be separated from the underside of the sheet by a space **25** to provide a tab T, as may best be seen in Figure 5. Space **25** is such as to permit tab T and a portion of sheet **10** situated thereabove to slidably and pivotally engage corner or apex portions of adjoining shingles S as shown in Figure 3. Segment **24** and sheet **10** are integrally connected by a web **27**. Due to flanges F being bent under sheet S, portions of the segment **24** project outwardly beyond sides **13** and **14** as may best be seen in Figures 2 and 3. These projecting segment portions **24***a* assure a positive interlock with adjoining shingles as may be seen in Figure 3.

The outer portions of edges **13** and **14** are bent inwardly and under sheet **10** to form two identical narrow flanges F which serve to grip the outer portions of two strips **26** of felt, or other resilient material which dampens any noise made if the shingles vibrate. Strips **26** are so tightly gripped between flanges F and sheet **10** that they are compressed to substantially one-half their normal thickness. When properly installed, the inner edge of each strip **26** abuts against either rib **15** or **16** of that shingle which is overlapped, as may best be seen in Figure 3. In this manner these resilient strips provide weather-tight interlocks which allow for limited movement of the shingle to which they are affixed as the shingle expands or contracts due to temperature variations.

Ribs **15** and **16** serve a dual function in that they not only provide a weather-tight seal in conjunction with strips **26**, but maintain the overlapping shingle portions at a sufficient elevation to prevent binding on the nail heads **22** during expansion and contraction of the shingles. The outer edge portions of flanges F develop into an upwardly extending web **27** that is an integral part of a downwardly tapered, longitudinally extending rectangular area **28**, which areas serve as shadow areas in defining the exposed portion of each shingle S when mounted on a building to provide the roof R.

Application of shingles S in forming a roof R is extremely simple. A row comprising alternately laid half shingles and full shingles, as shown in Figure 1, is extended over the roof deck adjacent the eaves thereof and affixed thereto by nails **21** which project downwardly through openings **20**. Although but two nails are employed in affixing each shingle S to the roof deck, it has been found by experience that they will movably remain in place indefinitely and due to the strips associated therewith, will be free from vibration noise. After this first row of shingles in affixed, the next higher row of shingles is mounted with the tabs T thereof pivotally and slidably engaging the corner portions of adjacent shingles at positions identified by numerals **27** in Figure 1 of the drawings. As the second row of shingles is positioned on the roof deck, the strips **26** will abut ribs **15** and **16** of the first row of shingles. As mentioned hereinabove, the nails used in affixing the shingles S to the roof deck R are not driven downwardly so far that the lower surface of the heads **22** thereof will bind against the upper surface of sheet **10**. Due to the manner in which the shingles interlock and are affixed to the roof deck D, a continuous water-proof roofing is provided, but one in which each shingle forming same is free to expand and contract due to temperature variations without in any way disturbing the water tightness thereof. It should be noted that the strips **26** abut against the ribs **15** and **16** or adjoining, overlapping shingles S, and that the ribs likewise contact strips **26** of adjoining shingles that overlap. Thus, a continuous waterproof roof surface R is provided comprised of individually movable shingles S.

As described, it will be seen that the shingle S of the present invention is ideally suited to be fabricated from a metal such as aluminum, but is not restricted thereto, and could be formed of any material whether metallic or non-metallic, having weather resistant qualities, which is adapted to be shaped as described and will not be so heavy as to be excessive when affixed to a supporting roof deck.

Although the shingle and roof formed from same has been found to fulfill the objects and provide the advantages hereinbefore mentioned, it is to be understood that they are merely the presently preferred embodiments of the invention, and that there is no intention to limit the invention to the details of construction herein shown and described other than as defined by the appended claim.

I claim:

A joint interposed between first and second adjoining shingles comprising: an upstanding rib formed along an edge of said first shingle; an elongated resilient strip of waterproof material; and a folded-under flange formed along the edge of said second shingle gripping a portion of the width of said strip with the remaining portion of the width of said strip being unconfined and with said unconfined portion of said strip abutting said rib.

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