Mar. 20, 1923. 1,449,058.

T. ROBINSON.

ROOFING ELEMENT.

FILED JUNE 9, 1922.

Fig. 1,

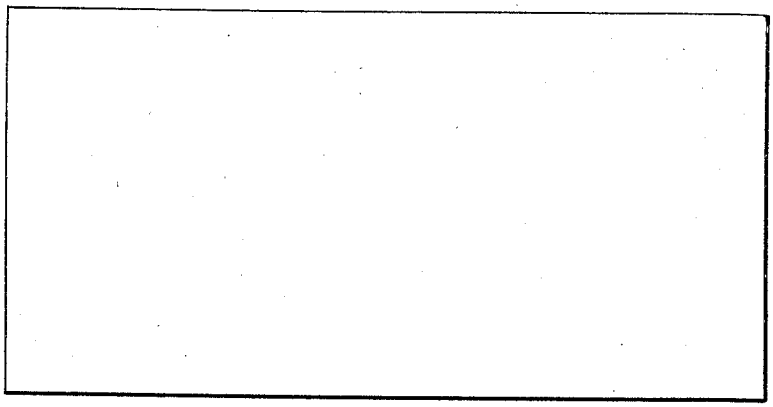


Fig. 2,

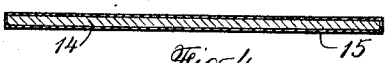
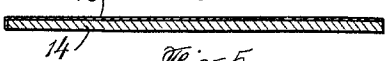


Fig. 3



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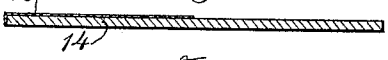

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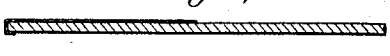


Fig. 6,

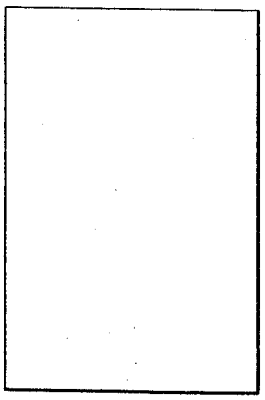


Fig. 7, Fig. 8, Fig. 9, Fig. 10

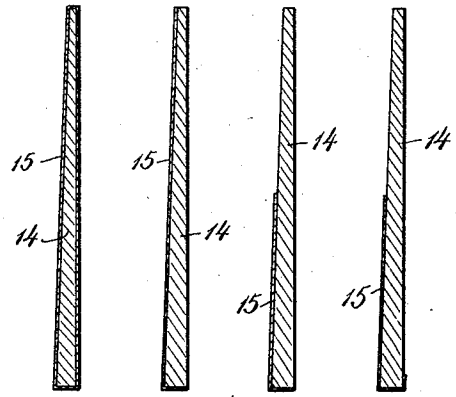


Fig. 11,

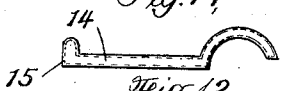


Fig. 12

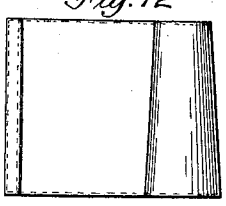
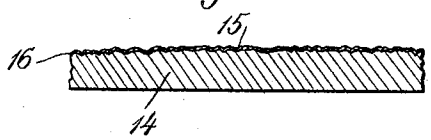


Fig. 13



INVENTOR

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BY

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ATTORNEYS

Patented Mar. 20, 1923. 1,449,058

UNITED STATES PATENT OFFICE.

THOMAS ROBINSON, OF BABYLON, NEW YORK.

ROOFING ELEMENT.

Application filed June 9, 1922. Serial No. 566,948.

To all whom it may concern:

Be it known that I, THOMAS ROBINSON, a subject of the King of Great Britain, residing at Babylon, Long Island, in the county of Suffolk, State of New York, have invented certain new and useful Improvements in Roofing Elements; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to roofing elements such as shingles, tiles and the like. The invention is directed to the provision of a roofing element of an improved construction which is non-hygroscopic, which is unaffected by climatic or weather conditions, which will not warp, shrink or expand detrimentally, which is fire-proof and vermin-proof, which is of light weight, which possesses good heat insulating properties, which can be sawn and nailed like wood and which may be manufactured and installed at low cost.

These objects are attained in accordance with the invention by the provision of a roofing element consisting of a base, of a moldable, heat-resisting composition and a metallic coating upon this base applied directly to the surface of the base and adhering thereto, the metallic coating being preferably applied by electro-deposition.

The base employed is made of a non-metallic composition such that when it is molded into form and hardened, it will form a non-hygroscopic, heat-resistant rigid sheet which will not warp, which may be sawn as may be necessary and which may be nailed in position. A composition suitable for the purpose is one consisting of granulated cork or wood fiber or asbestos fiber, fire proof cement, such as magnesium oxide, and a suitable fire proof binder such as one having a magnesium chloride base. With such a non-metallic, non-hygroscopic, and non-warping base, the heat resisting properties practically eliminate the fire hazard and make the roof more effective by conserving the heat within the building in winter and resisting the entrance of heat in summer. Also, such a non-hygroscopic base will not deteriorate to any great extent should defects or abrasures in the metallic coating occur; and the fact that it will not warp increases the endurance and life of the roof under extreme conditions of weather.

The combination, in suitable proportions, of the ingredients mentioned is particularly suitable as the base for a roofing element because its coefficient of expansion with variations in temperature and moisture is practically zero. In a roofing element of the character constituting the present invention having a metallic coating applied directly to the surface of the base, it is important that the coefficient of expansion of the base with changes of temperature be very low so as to eliminate the danger of detachment of the metal coating from the base resulting from expansion and contraction with changes of temperature.

The base may be of any form suitable for application of the roofing elements to a roof; preferably the base is molded into the form of a rectangular shingle provided with a groove or depression upon its under surface and a ridge or projection of a corresponding form upon its upper surface, such that when the shingles are laid in courses the projections upon the upper surfaces of the shingles of one course will be received in the grooves of the under surfaces of the shingles of the next higher course.

The base of moldable material made as above outlined has the coating of metal applied to it in such a manner as to cause it to adhere directly to the surface of the base, as by electro-deposition thereon. For the purpose of applying such a coating by electro-deposition, the surface of the molded base should be made electrically conducting as is usual, as for instance by applying a thin film of graphite, plumbago or the like thereto. The metal applied to the base takes into all of the irregularities of the surface of the base and thus becomes a closely adherent thin metallic coating covering and protecting the base. It may be applied over the entire superficial area of the base but that is not essential and the metal coating may if desired be confined to that portion of the base which would otherwise be exposed when the roofing elements are assembled upon a roof. The material which I prefer to use for the metal coating is copper but some other metal may be employed instead such for instance as zinc.

Several embodiments and variations of

my invention are illustrated in the accompanying drawings. In these drawings,

Figs. 1 to 5, inclusive, show the roofing element of my invention as embodied in a relatively large slab;

Fig. 6 to 10, inclusive, show the roofing element of my invention constructed in the form of an ordinary shingle of varying thickness.

Figs. 11 and 12 illustrate a Spanish tile made in accordance with my invention.

Fig. 13 is a greatly enlarged sectional view of a portion of the metal coated surface of any of the roofing elements.

In these drawings, the base made of a non-metallic, non-hygroscopic, heat-resistant composition molded into form and hardened is indicated at 14 and the coating of metal which has been applied thereto at 15. This metal coating is preferably of a thickness corresponding substantially to that ordinarily employed in electro-plating, but for the sake of clearness it has been shown in the drawings as being much thicker than is really necessary.

Referring particularly to Fig. 13, the surface 16 of the base has been shown as being greatly enlarged or magnified in order to bring out the natural irregularities or undulations which occur. In other words, it is intended to show in this figure that the surface of the base, although apparently smooth, is in fact not absolutely uniform, but contains many small ridges and depressions. When, therefore, a thin coating of metal is applied directly to the surface by electrodecomposition the layer or coating of metal 15 will conform substantially to these irregularities in the surface. Even if there were some small difference between the coefficients of expansion of the base material and of the metal coating, this will not seriously impair the roofing element, as I have found that any relative expansion which does take place is taken care of by the continually changing direction of the metal coating which is caused by the irregularities in the composite base.

In Figs. 2 and 7 there will be seen roofing elements which have the metal coating applied to the entire surface thereof.

In Figs. 3 and 8 the entire upper surface and outer end of the roofing elements have been coated with metal.

Figs. 4 and 9 illustrate roofing elements wherein the metal coating covers only a part of their top surfaces and the exposed ends.

In Figs. 5 and 10 the metal coating has been carried around the exposed ends and covers a portion of the under surfaces.

In Figs. 12 and 13 a Spanish tile has been shown and the metal coating thereon extends over its entire surface, although of course this might be restricted to any portion as above described.

The physical properties of the composite base are such that ordinary nails may be easily driven through it, and it may be sawn like wood. The roofing elements of my invention may, therefore, be nailed to the roof structure just as shingles made of wood; in particular, it is immaterial what the spacing of the battens to which the shingles are secured is as the nails may be driven through the shingles at any points thereon.

By the employment of these materials in constructing a roofing element having a composite base which is given a protective coating of metal, the metal coating being applied directly to the surface of the base so as to conform to the irregularities therein and adhere thereto, the coating will have no tendency to crack or peel. A roofing element constructed in this manner will withstand severe weather conditons, extreme changes in temperature, will not warp, is fireproof, and is a good heat insulator. Moreover, it is light in weight and inexpensive.

Although I have described my invention in connection with the best embodiments of which I know at present, it is not intended to limit it beyond the scope of the appended claims.

I claim:

1. A roofing element comprising a non-hygroscopic, heat-resistant, non-warping base of a hardened plastic material, and a metallic coating electro-deposited upon the base.

2. A roofing element comprising a non-hydroscopic, heat-resistant, and substantially rigid base of a hardened plastic material having small irregularities over substantially its entire surface and a thin metallic coating applied to the base and conforming to the irregularities of its surface.

3. A roofing element comprising a non-hydroscopic, heat-resistant and substantially rigid base formed of a moldable composition of a fibrous substance and a binder, the base having small irregularities over substantially its entire surface and a thin metallic coating applied to the surface of the base and conforming to the irregularities thereof.

In testimony whereof I affix my signature.

THOMAS ROBINSON.