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PROCESS OF MAKING ROOFING ELEMENTS.

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This invention relates to the manufacture of roofing elements in the form of boards, strip, tiles, and the like, and especially elements which consist of a base of various materials, commonly referred to as an asphaltic base, which is provided with a protective metal coating applied to the weather surface thereof.

Elements of a similar construction are shown and described in Letters Patent No. 1,449,058, issued March 20, 1923, to Thomas Robinson, and also in a somewhat modified form in an application of Robinson, filed February 10, 1923, and bearing the Serial Number 618,246.

Ordinary composition shingles such as are now in general use are satisfactory for many purposes, but when laid in place on the roof and exposed to the weather they have a tendency to warp or curl in such a way as to impair the appearance of the roof and also to render it less water-tight. Continued exposure to the weather sometimes results in deterioration of the roofing material, especially when the latter contains oils with volatilize when in the hot sun. Shingles made wholly of metal have been used, and overcome the above disadvantages, but these metal shingles transmit heat rapidly and consequently it is necessary to provide heavy sheathing layers underneath them in order to make the roofing a good heat insulator. Also metal shingles are quite expensive and when held in place by nails which pass through them the continued expansion and contraction, due to changes in temperature, sometimes produces leaks at the points where the nails enter the metal.

In the above Letters Patent there is disclosed a composite shingle which consists of a base of various materials which is provided with a thin coating of a non-corrodible metal applied to the base and conforming to the irregularities thereof. This metal may be applied in various ways and electrodeposition is a convenient method.

In manufacturing composite shingles of the type above generally referred to, by electrolytic processes, it is necessary to treat the base so that it is electrically conducting and the object of this invention is to provide a process by which this step in the preparation of the composite type of element may be readily and satisfactorily carried on.

Ordinarily the base employed will contain asphalt or other bituminous compositions of a similar nature, and a conducting material such a graphite or powdered metal is applied to this base and held in place thereon by means of an adhesive. The bases so treated are then placed in electrolytic cells and the metal, usually copper, is deposited thereon by well-known methods. Since the elements are produced in large quantities, it is desirable that the adhesive material which is employed should be comparatively quick-drying, and also inexpensive so that it does not add materially to the final cost of the product. It is also desirable that it may be applied in a thin film with rapidity and should spread well so that there will be no portions of the base which are not covered. Furthermore, the adhesive should be such as to hold the conducting material firmly in place. This is important because the bases so treated are exposed to a considerable amount of handling prior to the application of the metal coating and should any of the conducting material be displaced this would result in a portion of the base being unplated and the element would therefore be defective. It is also necessary of course, that the adhesive should be such as not to be affected by the electrolyte and should neither be freed from the base by the electrolyte nor should it go into solution in the electrolyte and thus render the latter impure.

I have found that an adhesive which fulfills the requirements above set forth may be made by producing an emulsion of asphalt in water. This emulsion will contain varying proportions of asphalt, depending upon the nature of the surface to which it is to be applied. I have found that with composition bases of some types a solution having as small an amount as 1% of asphalt is satisfactory, while in solutions satisfactory for other bases it is necessary to use as high as 35%. Probably the proportion which is of widest general use will lie between 5 and 10% of asphalt but I do not desire to be limited to such proportions since, as I have indicated, the amount of asphalt present will vary according to the kind of base material and the roughness of the surface. Such an emulsion as this will remain stable for a sufficient length of time to permit its use in

the manner presently to be described, but in some instances it is desirable to add a small quantity of an alkali which improves the character of the emulsion.

In treating the elements for the purpose of producing a conducting surface thereon, they will first be conveyed to treating tanks where the emulsion may be applied by brushing, splashing or dipping. Ordinarily the metallic coating which is to be deposited is only to cover a portion of the surface, and it is therefore not necessary to apply the emulsion except on the particular surface where deposition is to occur. However, the emulsion is so inexpensive that it is easier to cover the entire surface of the element rather than to attempt to confine the adhesive to any portion of the surface. When the liquid has been applied over the surface the elements will be allowed to drain and will then be partially dried. This latter step may take place in the open air or else the elements may be passed through a drying chamber or exposed to a hot air blast. When the surface is still sticky the conducting material is applied thereto.

Various materials may be employed for the conducting layer but it has been found that powdered graphite is quite satisfactory and is inexpensive. This powdered graphite is a good conductor and the particles may be applied and spread over the sticky surface so as to form a thin coating. The use of graphite, which has a lubricating quality, permits of brushing graphite over the element without abrading the surface, and thus a thin conducting coating of the graphite may be produced by the use of soft brushes and the film so formed will adhere firmly to the sticky asphalt. While other materials such as finely divided or powdered metal, may also be used, and will serve the purpose equally well, the graphite is in many respects preferable.

The elements so coated are now conveyed to the electrolytic tanks ands are usually mounted in such a way as to expose to the electrolyte only that portion of the surface upon which the electrodeposition is to take place. For instance, the elements may be mounted in a clamp made of a non-conducting material, or else they may be placed in position in the cell and the anode masked in such a way as to prevent the deposition over any portion except that where it is desired. The elements are left in the electrolytic tanks until the deposition has attained the requisite thickness, whereupon they are removed and, after drying, the metal may be subjected to a process for giving it a color.

The use of this asphalt emulsion is particularly satisfactory since the base itself ordinarily contains asphaltic material and the adhesive layer becomes substantially homogenous with the base and has no tendency to separate from it upon exposure of the element to the weather. The asphalt emulsion, however, may be applied with satisfactory results to other base materials and since it is quite inexpensive this step in the process does not add materially to the cost of the finished product. The graphite also is inexpensive and ordinarily one pound will cover an area of approximately 140 to 150 square feet. The application of the conducting coating requires no high degree of skill, and may be carried on by ordinary workmen. Also the preparation of the emulsion in the proper proportions, which, as has been previously described, will depend on the character of the base material used and also the character of the surface, is a matter which may be quickly determined after a little experience.

I claim:

1. A process for the manufacture of roofing elements, which comprises applying to the surface of a base treated with a water-proofing material an emulsion containing this water-proofing material, applying thereto a conducting material, and electrodepositing a metallic coating thereover.

2. A process for the manufacture of roofing elements which comprises applying to a base an emulsion of asphalt in water, applying thereto a conducting material, and electrodepositing a metallic coating thereover.

3. A process for the manufacture of roofing elements which comprises applying to a base an emulsion of water and asphalt containing 1 to 35% of asphalt, partially drying the coating of emulsion, applying thereto a thin layer of conducting material, and electrodepositing a metallic coating thereover.

4. A process for the manufacture of roofing elements which comprises applying to a base an emulsion of a bituminous material in water, applying thereto a conducting material and electrodepositing a metallic coating thereover.

5. A process for the manufacture of roofing elements which comprises applying to a base an emulsion of bituminous material in water containing from 1 to 35% of the bituminous material, applying thereto a conducting material, and electrodepositing a metallic coating thereover.

6. A process for the manufacture of roofing elements which comprises applying to a base an emulsion of a bituminous material in water, partially evaporating the water, applying a conducting material to the base while the surface thereof is still tacky, and electrodepositing a metallic coating thereover.

7. A process for the manufacture of roofing elements which comprises applying to a base an emulsion of asphalt in water, partially drying this emulsion, applying a non-

abrasive conducting material to the base while the surface thereof is tacky, and then depositing a metallic coating thereover by electrolysis.

8. A process of manufacturing roofing elements which comprises applying to a base an emulsion of asphalt in water, partially evaporating the water, applying graphite to the base while the surface thereof is still tacky, and electrodepositing a metallic coating thereover.

In testimony whereof I affix my signature.

JULIUS H. GILLIS.