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NAILING AEROCRETE AND METHOD OF PRODUCING THE SAME

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My invention relates to an improved porous concrete or so-called aerocrete, capable of holding nails driven into the same and to a method of making the improved product. Porous concrete is made according to the method disclosed in U. S. Patent No. 1,087,098, dated February 14, 1914, granted to Aylsworth and Dyer. According to said patent a cement mixture, with water, is subjected to expansion caused by the development of gas therein due to the dissociation of the water, by means of powdered aluminum, powdered aluminum alloys, powdered zinc or in any other suitable and convenient way. Usually a small amount of lime is added to facilitate the reaction and a suitable aggregate such as sand may be employed. In this way a porous body is obtained consisting to a large extent of small uniformly distributed cells and possessing desirable commercial advantages due to its cheapness, lightness, and fire-proofing qualities.

Although nails can be driven into the porous cement or concrete as so formed, the fragile nature of the latter prevents a firm grip or hold on the nails which therefore can be easily pulled out. Porous concrete has found wide use as a material for roofing slabs due to its lightness, insulation value, and considerable strength when reinforced. It is not practicable, however, to expose the surface of the porous concrete to the influence of weather owing to the fact that water is partly absorbed resulting in surface disintegration. For this reason when the material is employed for roofing purposes, it is the practice to cover and protect the surface in some manner, as for instance, by applying shingles or sheets of copper or other weather resisting materials that will prevent the absorption of water.

It has heretofore been necessary to apply an intermediate layer of semi-plastic material, capable of holding nails driven into it in order that the shingles, copper sheets, or other protective covering may be satisfactorily and permanently applied on top of the roof. This separate operation is costly and increases the weight of the roof unnecessarily.

The present invention consists of a method of making and an improved product comprising precast slabs of porous concrete into which nails can be driven and held firmly in place, thus permitting an outer protective covering to be applied permanently thereto.

In carrying out my invention in practice, I use a mixture of one part of Portland or other hydraulic cement, one to two parts of ordinary mortar sand and add thereto from one-fifth of one part to two parts of wooden shavings by volume, together with the necessary water. To this mixture is added a small quantity of powdered aluminum or powdered alloys of aluminum and zinc, aluminum and tin or zinc and tin as indicated in the patent to Aylsworth and Dyer above identified. If desired, a small proportion of free lime can also be employed.

Owing to the reaction between the metal powder and the alkaline constituents in the mix, the water will be dissociated and hydrogen bubbles developed, which in expanding will result in the production of small substantially uniform cells in the mass in very much the same way as the action of yeast in causing dough to rise. The proportions above given are illustrative only and may be substantially varied according to the product desired. Also it will be understood that the expansion of the mass may be effected in other ways now known to the art.

In the practical manufacture of porous concrete or aerocrete as now practiced, the mass is allowed to expand over the top of the mold or form and when the mass has taken its initial set, the surface is then screeded off by means of a straight edge or other suitable tool in order that exact dimensions may be obtained and a smooth continuous surface be secured. However, if this usual method were employed with a mix containing shavings the result would be that the screeded top surface would be rough and weak, making it an unsuitable base for nailing since the shavings from the top layer would be pulled up from the concrete by the action of the straight edge.

In order to avoid this, a sheet of paper is placed on top of the form and by means of a roller the material expanded above the edge

of the form or mold is pressed level. In this way the upper zone of the slab will be compressed into a hard strong substantially non-porous crust with a smooth finished top surface. I find it necessary to employ a sheet of paper on top of the mass in order to prevent adhesion of the same to the roller. Any suitable grade of paper may be employed sufficiently strong and flexible for the purpose, preferably having a smooth calendared surface to facilitate subsequent removal.

The operation of thus compressing the top surface of the slab is performed when the initial set of the cement, concrete or aerocrete has taken place, but before the actual hardening has commenced. It has been found that the most suitable time to perform this operation is from two to four hours after the expanded concrete has been poured. After rolling, as explained, the sheet of paper is removed.

By pressing the top layer into a hard surface a suitable base for nailing is obtained due to the fact that nails driven into the wooden shavings are held in the same way as when driven into solid wood, since the shavings are firmly sustained within the layer of compressed concrete. At the same time a smooth even surface of the slab is secured making it suitable as a base for shingles, copper sheets or the like covering employed on top as a protective coating.

Instead of employing wood shavings, other fibrous material may be used such as asbestos, sugar cane fibre, and other fibres of vegetable origin. In using the expression "wood shavings" in my claims, I wish to have the same understood as comprehending wood shavings per se or other equivalent vegetable or mineral fibres. Wood shavings, however, are preferred on account of their cheapness and desirable physical characteristics.

Having now described my invention what I claim is new therein is as follows:

1. As a new article of manufacture a porous concrete product containing wood shavings, the major portion of which product contains numerous cells or pores and the top layer thereof being dense and non-porous and in which the wood shavings predominate to such an extent as to hold nails driven therein.

2. The process of making nailable porous cement or concrete products which consists in introducing a mixture of hydraulic cement, wood shavings, and an aerating agent in a form or mold, permitting the mixture to expand above the mold or form so as to result in the production of pores or cells therein and finally compressing the expanded mixture to form a hard integral substantially non-porous top layer in which the wood shavings predominate to such an extent as to permit nailing.

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