Cl. 92

Published May 4, 1943

Serial No. 291,499

ALIEN PROPERTY CUSTODIAN

HEAT CONDUCTING FIBRE BOARD

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No Drawing. Application filed August 23, 1939

This invention relates to composition fibre boards and the method of their manufacture and particularly to heat-conducting fibre boards for structural purposes.

Heretofore metal impregnated heat-conducting composition boards have been made by mixing metal pieces or particles into a mash consisting of organic or inorganic fibres and a suitable binder such as synthetic resins, oxidizing oils, pitch, etc. However, I have found that a useful metal impregnated product can be made without the use of such binders; and it is an object of this invention to provide a new heat-conducting composition fibre board product having an uninterrupted metallic skeleton uniformly distributed throughout its mass, which product will be stronger than fibre boards heretofore produced and yet of less weight per cubic unit. Other objects of this invention are to provide a cheaper metal impregnated fibre board and to provide a simplified method of making the same.

In practicing my invention I first produce a semi-liquid mash of water and fibres, either organic or inorganic, such as is done in the known manner for making such products as Masonite, Insulite, Beaverboard, Celotex and other such well-known materials. I vary the usual procedure for such products however, by mixing into the mash shredded, ground, or otherwise divided, broken-up or comminuted metal pieces such as aluminum, iron, copper, or other suitable metals, and I stir or otherwise mix a sufficient quantity of such metal pieces into the mash until the metal particles are substantially uniformly distributed throughout the entire mash mass, so as to provide an uninterrupted metal skeleton imbedded in the material, the consistency of the mash being maintained like a thick mush so as to hold the metal pieces in suspension therein and prevent their settling out. I then mold this metal impregnated mash into board, sheet or slab form in any of the several well-known methods for forming composition fibre board, such for example as that disclosed in my United States Patent No. 2,095,118, during which most of the free water or moisture is removed from the material and after which the board or sheet is dried in the usual manner.

The result is a heat-conducting fibre board having an uninterrupted internal skeleton of metal woven throughout its mass and extending from face to face of the board so as to greatly enhance its strength, durability and heat-conductivity and yet having a mass weight that is considerably less than heat-conducting boards heretofore produced. Furthermore, my improved heat-conducting fibre boards have the softness or yieldability of the usual composition boards used for insulating purposes and are thus to a great extent sound absorbing.

Formerly it was believed necessary to employ a synthetic resin or other suitable relatively heavy binder in the mash mixture, whenever metal particles were to be added or mixed in, in order to fix the metal pieces and give solidity to the board body. This necessity I have eliminated. I may in some cases, however, employ a suitable sizer in the known manner to improve the waterproof qualities of the material and it must be understood that in this respect the sizing that I may employ is not a binder. Sizing is a waterproofer only, and may be omitted; and though, when used, it might serve to a minor extent as a binding agent, that function is only incidental and is not its primary purpose.

The main advantages of my improved produce reside in the lower cost of manufacture and in the simplification of the manufacturing process through the elimination of heavy, relatively expensive binding agents. Other advantages are found in the comparatively lighter weight of the product and in the increased strength and durability thereof as compared with ordinary fibre boards such as those before mentioned. Also, my improved heat-conducting boards may be made in thin, light sheets without material sacrifice of strength and durability.

Among the many purposes of my improved product is its use as flooring or wall boards and particularly its use in certain modern arrangements for heating and air conditioning occupied spaces. The heat conductivity of the material permits its use as a heat radiating medium thus allowing wall constructions wherein a heating or cooling means is enclosed within the wall and the outer wall surface serves as the heat radiating and distributing means. Also walls may be constructed of this material which walls of themselves, serve as ducts for passage therethrough of a heating or cooling medium. Similarly the material may be used for flooring and for ceilings and for the floor boards of automobiles, etc. Any desired color or surface finish may be imparted to the material and as flooring, the metal skeleton greatly reduces wear.

The conductivity of the improved material depends mainly upon the amount of metal used to form the internal skeleton and may thus be varied to suit various uses or conditions. In any event, however, sufficient metal must be employed so that the metal pieces will contact each other to provide an uninterrupted skeleton extending from face to face of the board or sheets. The particular metal used will depend also upon the manner and conditions of use of the improved boards, aluminum for light weight and low cost; copper for high conductivity, etc.

Also the improved boards or sheets are readily adaptable as electric conductors and may be used as electric heating elements.

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