March 31, 1936. H. C. HARVEY 2,035,884

COMPOSITE FLOORING MATERIAL

Filed Jan. 24, 1935

Fig. 1.

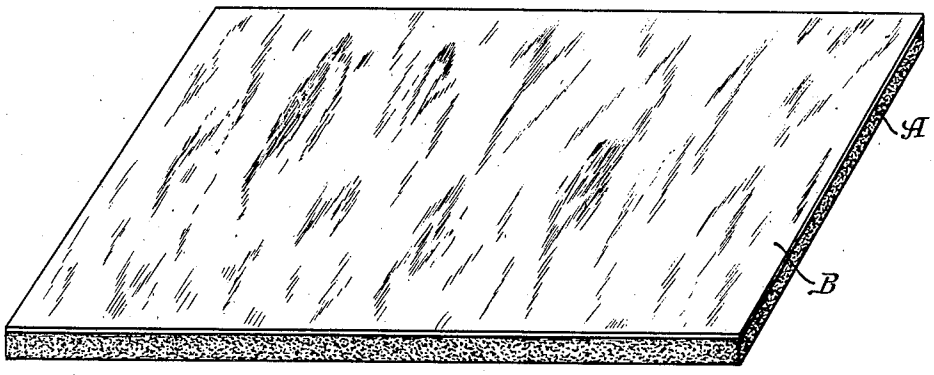
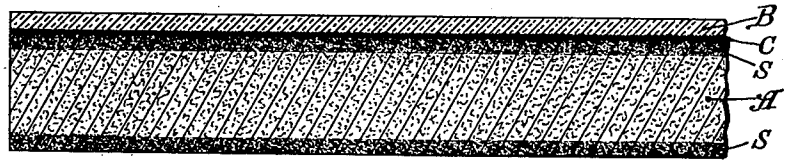


Fig. 2.



WITNESS

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COMPOSITE FLOORING MATERIAL

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2 Claims. (Cl. 154—49)

My invention relates to a composite flooring material consisting of an aggregate of a substantially rigid base board of fibrous material, having resiliency and high heat and sound insulating characteristics, at least one face portion of which is impregnated with sulfur, upon which sulfur-impregnated face there is superimposed a comparatively thin sheet of impervious covering material such as rubber, the base board and covering material being joined by a cementitious material.

One of the objects of my invention is to provide a sheet of a composite flooring material having strength and rigidity, while being at the same time elastic, and one of the particular objects of my invention is to create a flooring adapted to support comparatively heavy furniture, such as desks or bureaus, without being permanently marked, at least to any substantial degree. When I refer to flooring material, I include in this term wall material as my composite flooring is suitable for use also as a wall board.

The fibrous material constituting the rigid base or base board of my composite flooring material is of the type known in the art as "pulp board". Such pulp board is usually made by running paper pulp, wood pulp or the like into a mold and, by means of pressure or otherwise, removing the majority of the water (see, for instance, United States Patents No. 971,936, dated October 4, 1910, and No. 1,272,566, dated July 16, 1918), and subsequently drying out the remainder of the water by the application of heat, preferably in a suitably constructed dryer.

When pulp board has been produced in this manner, it is a commercial article (except possibly for subsequent shaping operations or subsequent surfacing operations) such as has been known on the market for many years. The board may be of fireproof composition, for instance, as disclosed in United States patent to Hubert L. Becher, No. 1,907,711, May 9, 1933. Such a board may be, and preferably is, provided with a suitable binder, for instance, by incorporating with the pulp in the beater a paraffin wax emulsion, such as disclosed in United States Letters Patent to Hubert L. Becher, No. 1,939,616, December 12, 1933. The elasticity and extent of porosity of the board will depend somewhat upon the extent to which the water has been removed therefrom by pressure, or otherwise, prior to the drying operation, although for my purposes a board from which as much water as has thus been removed by pressure is suitable, and is preferable as it involves the application of the least amount of heat for drying.

In accordance with my invention, this board, after it has been dried, is impregnated with sulfur to a short distance from at least one face thereof, the depth of impregnation depending somewhat upon the use to which the flooring is to be put, and the density of the board. For a board manufactured as above described, when it has a thickness of slightly less than one-half inch, the depth of impregnation may be one-sixteenth of an inch. The most practicable method of impregnation known to me is that of placing the board in a suitable vessel containing molten sulfur. The sulfur may, however, be applied in any other suitable manner. After the sulfur has dried, I apply to the impregnated face of the board (or to one such face, if both have been impregnated) a sheet of rubber or other suitable material, preferably very thin as compared to the thickness of the base board, the thickness of the two elements being preferably, but not necessarily, in the ratio of 8 to 1, so that, for instance, if the base board is one-half an inch thick, the sheet of rubber is one-sixteenth of an inch thick. This ratio of rubber to fibre board may, of course, be varied within wide limits, and is herein given by way of illustration rather than by way of limitation, it being, however, one of the objects of my invention to produce a very inexpensive flooring material, and therefore to use a practical maximum of the less expensive material, namely the base board, and a minimum of the more expensive material, namely, the rubber or other covering. In place of rubber, I may use, for instance, linoleum, but prefer to use a linoleum whose backing consists, not of burlap but of a felt-like fabric base such, for instance, as disclosed in United States patent to Edwin L. Blabon, No. 1,132,647, dated March 23, 1915.

In the accompanying drawing, I show by way of illustration, but not of limitation, an embodiment of my invention. In such drawing, Fig. 1 is a perspective view of a sheet of my composite material, and Fig. 2 is a vertical section on an enlarged scale through such sheet. In Fig. 1, which is drawn on a small scale, the showing of the sulfur-impregnated portion of the base board has been omitted, but such portion is clearly shown in Fig. 2.

In such drawing, A is the substantially rigid base board of fibrous material, constituting the pulp board hereinabove described, and B is a comparatively thin sheet of rubber which is se-

cured by a suitable cementitious material C to the base board. S, S represent sulfur-impregnated portions of the base board.

When a piece of base board is dipped in sulfur, of course, the edge portions will also be impregnated with sulfur. As, however, such base board is most economically manufactured in the form of sheets of very large size, for instance, 14 feet in length, such sheets may for many purposes have to be trimmed to a definite size, and therefore the sulfur-impregnated edge portions may have to be trimmed off: I have therefore not shown them in the drawing. Obviously the flooring may be used either in the form of larger sheets or smaller sheets. My material, may, for instance, be cut into squares or other shapes, and provided with coverings of contrasting colors, and then laid in position to form an imitation of a tessellated marble flooring.

The sulfur is preferably maintained at a temperature of from 280°–300° F. during the impregnation process. The sulfur in the impregnated portion of the board will be in crystalline form; it should not be rendered amorphous.

Care must be taken not to impregnate the board too deeply, as the presence of sulfur in the board hardens the same and therefore destroys its inherent elasticity. It is not within the scope of my claims to employ a base board entirely impregnated with sulfur, or impregnated to such an extent as to deprive such board as a whole of its natural elasticity which makes it agreeable to the tread.

It is the primary object of my invention to prevent, at least as far as possible, the permanent deformation of the base board by pressure brought to bear upon the flooring, so that when the pressure is released, the rubber or other covering which is cemented to the base board, will not show a permanent marking. Such pressure is frequently applied to a floor either by a heavy object of furniture concentrating its pressure through four legs, or by a chair tilted so as to rest upon two legs and concentrating all of the weight of the occupant upon two comparatively sharp edges. An elastic flooring material, such as rubber or linoleum, would, if left to itself, in most cases be automatically restored to an even surface, but if the base board to which it is cemented is distorted, for instance, by suffering an indentation, the surface material is not capable of overcoming the pull of the more substantial base board, and will not be able to compensate for the indentation. In the preferred form of my invention, therefore, I refrain from impregnating the base board with sulfur to such an extent as to destroy its elasticity, and I use only enough sulfur to accomplish the object of my invention, which is primarily that of preventing, at least to a substantial extent, a deformation of the base board. The depth of impregnation will therefore depend upon a number of factors, the most important being the pressure to which the finished flooring is to be subjected over a limited area. If the pressure is so great as to call for a comparatively deep impregnation, the elasticity factor will have to be preserved by using a thicker base board. By way of practical example: If the base board is approximately a half inch in thickness, the depth of impregnation might be one-sixteenth of an inch, and the thickness of the rubber coating about one-sixteenth of an inch. Of course, the thicker, and therefore the more expensive, the rubber coating, the less need be the depth of impregnation because the rubber coating itself protects the base board, to a certain extent, from deformation. However, the exact proportions can readily be determined by simple tests under working conditions. The depth of impregnation will depend, of course, also upon the transverse strength of the base board, the stronger the base board the more deformation will be resisted by it, and the thinner may be the sulfur-impregnated layer.

When a base board of pulp material is subjected to pressure over a comparatively small area, it will, if the pressure is great enough, yield thereto and suffer an indentation, but the natural tendency of the fibres which have been dried after they were felted in a moist condition, is to resume as far as possible their original shape and therefore to restore the board as a whole to its original shape. While the original shape can perhaps never be fully restored, unless the pressure was extremely light, there is at least a partial restoration, and this is, of course, an important factor in an aggregate of base board and covering material cemented thereto. It is one of the advantages of the use of sulfur, in the formation of a protective impregnated surface portion, that not only will such portion resist distortion but will be permitted to attain a partial restoration, after pressure has been removed, of the original shape of the board. At this time I am unable to account for this phenomenon, but it is my theory, to which I do not desire to stand committed, that the sulfur, being in the form of more or less discrete crystals, will not offer a great amount of resistance to at least partial restoration by re-alignment of the fibres. That the addition of sulfur imparts hardness to paper material is apparently a well recognized fact. See, for instance, United States patents to Crehore No. 74,996, March 3, 1868, and Gray and Case No. 589,256, August 31, 1897; and Paper Trade Journal, Nov. 13, 1934 (vol. 69, No. 19), page 32.

It has already been indicated that the preferable method of impregnating the board is by dipping the same into a bath of molten sulfur. This results, of course, in impregnating the board at a certain depth at both face portions. There is an advantage in having the portion of the base board not provided with covering material so impregnated, because, when used as a flooring, or even as a wall material, the sulfur-impregnated portion will be water-repellant and will be distasteful to such insects and other pests as have an aversion for sulfur, and thus serve to protect the board as a whole, at least to a certain extent, against the ravages thereof.

I claim:

1. A composite flooring material comprising a sheet of substantially rigid base board of fibrous mateial, having a degree of resiliency, said base board being of substantial thickness and being impregnated with respect to at least one surface portion thereof with crystalline sulfur, and an impervious covering material secured by a cementitious substance to the impregnated surface portion of such board, the depth of the impregnation being sufficient to afford substantial resistance to deformation by pressure to which the flooring material is to be subjected, but not so deep as to destroy the essential resiliency of the base board.

2. A composite flooring material as described in claim 1 in which the impervious covering material is of greater resiliency than the base board.

HAROLD C. HARVEY.