Feb. 26, 1929. 1,703,558

R. B. SUTTER

ACOUSTIC INSULATION

Filed Dec. 12, 1925

Fig. 1.

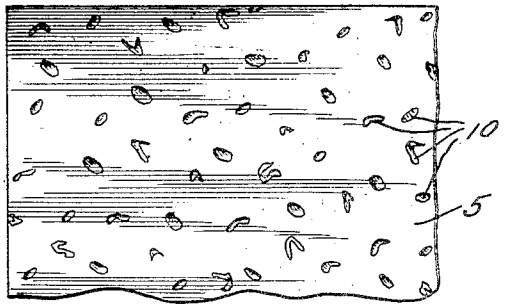


Fig. 2.

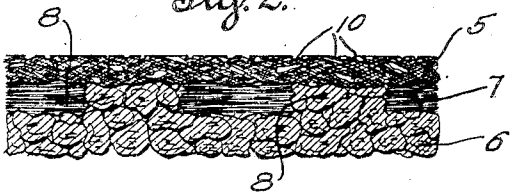


Fig. 3.

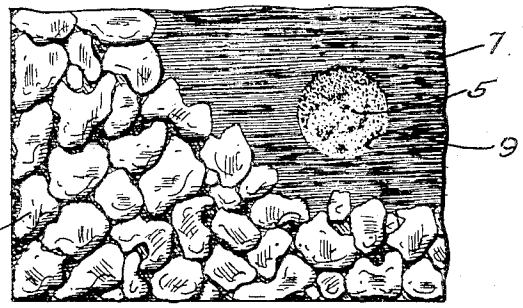
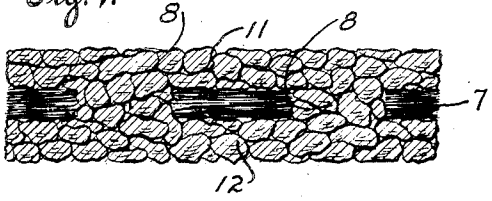


Fig. 4.



INVENTOR
Roser B. Sutter
BY
Mitchell & Becket
ATTORNEYS

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UNITED STATES PATENT OFFICE.

ROSER B. SUTTER, OF NEWARK, NEW JERSEY.

ACOUSTIC INSULATION.

Application filed December 12, 1925. Serial No. 75,000.

My invention relates to an acoustical or sound deadening insulation particularly adapted for use on walls, floors, partitions, and the like, wherever it is desirable or necessary to reduce the transmission of sound and heat.

There are now on the market several good sound deadening and heat insulating materials among which may be mentioned hair felt and cork, the latter principally in the form of manufactured cork board. While these materials have been used to a large extent, there have been certain difficulties and objections connected with their use, and it has been usual heretofore in treating walls, floors, and the like, to lessen the transmission of sound, to place the acoustical material on the inside, that is between the walls and beneath the floors, etc., so that the acoustical insulation is usually a separate entity and not of itself a structural material.

It is the general object of my invention to provide an improved, practical, serviceable and efficient sound and heat insulation construction for use on or as walls, partitions, floors and the like.

Among other and more specific objects are:

To provide an insulation construction of the character indicated which may be effectively used on or as floors, partitions, and the like, as a structural building material which will sustain relatively great loads without injury or damage to the insulation, and without serious impairment of insulating efficiency;

To provide an insulation construction in which hair felt is employed and so arranged as to be held in place and so as to avoid undue compacting of the same;

To provide an improved method of forming an efficient acoustic structural insulation of the character indicated.

Briefly stated, in the preferred form of the invention I employ two panels preferably of relatively rigid material which may be, and preferably are, both of such material as to materially lessen the transmission of sound and heat. Between these panels is held an intermediate or middle layer of efficient sound deadening and heat insulating material. Spacing supports are provided and preferably extend from one outside panel to the other panel and may pass through suitable openings in the intermediate layer of acoustical material. The outer layers may or may not be of the same material, but I prefer to form them of material including particles of vegetable matter such as wood and cork cemented or held together by a suitable cement preferably of fire resistant character.

In constructing my improved insulation in accordance with the preferred method, I may first place a layer of material, which will afterwards set into a relatively rigid mass, into a mold or form. This material may be composed of particles of vegetable matter combined with a cement material preferably of fire resistant character. On this layer of material before it sets, I superpose a layer of acoustical or sound deadening material, such as hair felt, which has previously been prepared by forming openings therethrough. On top of the hair felt or other acoustical material, I next place a layer of material which may be the same as the first layer laid down, but I prefer to employ for at least one of the outer layers, a composition of granulated cork the particles of which are held together by a suitable cement of the character above indicated. Some of the material of one or the other or both of the outside layers will pass through the openings in the intermediate layer and when set will form rigid spacers or supports. Before the material sets, a pressing operation may be performed on the three layer construction so as to compact the outer layers somewhat, and so as to assure the rigid and complete formation of the spacers or supports previously mentioned. This pressure, if a pressing operation is performed, should not be so great, however, as to unduly compact the hair felt so as to materially impair its insulating efficiency. When the material forming the outer layers has set, the insulation unit formed of the three layers all held together in proper spaced relation, is removed from the mold and after drying or other treatment is ready for use.

In the drawings which show, for illustrative purposes only, preferred forms of the invention—

Fig. 1 is a fragmentary view of the face of a construction embodying the invention;

Fig. 2 is a sectional view of the construction shown in Fig. 1;

Fig. 3 is a rear or bottom plan view of the construction shown in Fig. 1;

Fig. 4 is a view similar to Fig. 2 but illustrating a modification.

In said drawings, 5 indicates a relatively rigid face panel preferably composed of particles of wood and a suitable cement so as to render the panel fire and moisture resistant.

6 indicates a rear panel which is preferably formed of particles of cork held together by a suitable cement as indicated above. An intermediate layer of acoustical and heat insulating material 7, such as hair felt, is interposed between the panels 5—6 and spacing supports 8—8 extend through openings such as 9, in the layer 7 and serve to hold the panels 5—6 in predetermined spaced relation.

In constructing my insulation I may form a mixture of wood shavings or the like and a suitable cement which will later set or harden. This material may be placed in a mold so as to form the panel 5 of the requisite thickness. The layer 7 of hair felt or other acoustical material is then placed on the layer 5 before the latter has set. The layer 6, preferably formed of cork particles and a cement material, is then placed on top of the layer 7 and some of the cement coated cork particles or some of the mixture, or some of the material of the layer 5, or some of the material of both layers, will pass into or through the openings 9 in the layer 7 and since the layers 5—6 have not yet set nor taken permanent form, the spacing supports or projections 8 thus formed will be integrally united to both the layers 5 and 6. The layer 6 may be smoothed off somewhat to give a slab of fairly uniform thickness, and the panels and spacing supports then permitted to set. In some instances it will be desirable to place a top on the mold and compress the slab so as to compact the layers slightly and insure formation of rigid spacers 8, but the pressure should not be sufficient to unduly compact the intermediate layer 7, for undue compression of this fibrous layer would materially impair its efficiency in retarding the transmission of sound and heat. After the material forming the layer 5—6 and the spacing supports 8 has set, the entire unit may be removed from the mold and dried, or given any further treatment desired.

It will be found that the layers 5—6 are definitely held in predetermined spaced relation and the intermediate layer 7 will likewise be held in position on both the layers 5—6 by means of the spacing supports 8. The fibrous layer 7 may adhere somewhat to the material of the panels 5—6 so as to further assure the positioning of the hair felt. The material forming the layers 5—6 may be fire and water resistant as formed but, if desired, any further treatment to render the same water-proof and fire-proof may be given if found necessary or desirable.

Obviously the spacing supports 8—8 may be placed at any practicable distance apart so that the spans between these supports or dowels are relatively short and great loads may therefore be sustained by my construction even though the panels be made relatively thin.

It will be found that the material of the character indicated may be so formed that it may be worked like wood, and therefore that blocks of insulation formed of this material may be nailed in place on walls, floors or the like. However, I prefer to leave the layer 6 relatively rough, as indicated, so that a good bond may be obtained with a foundation of concrete, cement, plaster or whatever other foundation is to support the insulating blocks formed according to my plan.

The panel 5 may, and preferably will, be made quite smooth and will have the appearance of stone. It is therefore desirable that the panel 5 be on the exposed side of the wall, floor, or the like and when so exposed is of pleasing appearance. While the face of the panel 5 if desired may be made perfectly smooth, it is desirable to form, on such surface, slight depressions or pockmarks 10—10 for, by so doing, the surface is somewhat broken and the depressions act somewhat like aural cavities to catch the sound waves reaching the surface. While some of the sound is absorbed in the face layer 5, much of the sound is transmitted therethrough and is absorbed in the next layers 7 and 6. The projections 8 may serve to transmit some sound from the panel 5 and into the intermediate panel 7 where most of the sound waves are dissipated.

In Fig. 4 is indicated a slightly modified form of construction in which the outer layers 11—12 may both be formed of cork or other relatively coarse material and both the outer surfaces left rough so as to provide many crevices or irregularities such as are preferably present in the face of the panel 6, previously described. The panels 11—12 may be definitely held in predetermined spaced relation by the spacing supports shown, substantially the same as in the previous form. The particular use indicated for that form of the invention illustrated in Fig. 4 is for partition walls wherein the material may be self supporting, that is need not be supported on any previously formed wall. The rough or creviced surface offers an admirable base for the application of plaster or the like which will adhere to the projections between crevices with great tenacity. The material illustrated in Fig. 4 may also be used for floors and set in a concrete or other foundation, and a plaster or stone-like surface of any desired character applied while the material is in place.

Obviously, in my insulation construction the thickness of the panels, and the intermediate layers 7, as well as the size and spacing of the spacing supports or dowels, will be such as to provide the requisite strength and other characteristics desired for any particular use to which the material is to be put.

My improved material, as intimated hereinbefore, is preferably made in the form of blocks or slabs of convenient size for han-

dling, and in the form of ornamental designs, columns, cornice moldings, etc., and may be set or applied in much the same manner as stone, tile, or the like.

While I consider the constructions as descriged to be practical and efficient, I do not wish to be limited to the materials indicated therein, nor to the method of making. Other sound deadening or heat insulating material may be substituted for the hair felt 7; likewise other material may be employed in either or both of the layers 5—6 and the spacers 8 need not necessarily be, though they preferably are, integral with and of the same material as at least one of the panels. There are several cements or binders which might be used with the wood particles, cork, or other material of the panels, and, by way of example, I may mention Sorel's cement made by mixing magnesia and a solution of magnesium chloride. For most purposes I prefer to use little more cement than is required to superficially coat the base particles and cause them to adhere together in a relatively rigid mass. It may also be possible that one of the panels 5—6 could be omitted and the hair felt laid directly upon a base or foundation in which case the spacing supports 8 would support the single panel and prevent the main body of the felt from becoming unduly compacted. This slight modification will be obvious without further illustration. The panel 6, for example, could be considered a base or foundation upon which the hair felt is laid, and the facing panel 5 is supported in spaced relation to the base panel 6.

A construction of the character herein disclosed is an excellent sound and heat insulation. The blocks or boards are rigid and may be readily handled and applied without the usual difficulties encountered in applying other sound deadening insulations with which I am familiar.

The spacing supports for holding the outer panels in predetermined spaced relation I consider of great importance in that the finished blocks are relatively rigid and soft fibrous material may be employed between the outer panels, without danger of unduly compacting the soft material, and yet the complete block will be strong enough to withstand the strains put upon building material of this character.

While the invention has been described in great detail and one preferred method of making it described, I do not wish to be limited to the forms, materials, or method herein disclosed except as may be required by the appended claims.

I claim:

1. In an insulation construction, a panel formed of particles of wood and a binder including mineral matter, a second panel formed of particles of cork and a binder including mineral matter, spacing supports formed integrally with said two panels for holding the same in spaced relation, and a layer of hair felt between said panels, said hair felt having openings therein for the passage of said spacing supports.

2. In an insulation body, a layer of relatively soft insulating material, a panel of relatively rigid material on each side of said insulating material, and spaced apart spacing supports between said panels for holding the latter in predetermined spaced relation, at least one of said panels being formed of relatively coarse particles and cement, the outer surface being rough to form a good bond with soft material, said insulating material being exposed at the edges of said body.

3. In the combination defined in claim 2, said spacing supports being formed of the same material as at least one of said panels and integrally united to both panels.

4. An insulating building block including relatively rigid outer panels, an intermediate layer of soft, fibrous, sound deadening material, said intermediate layer being of substantially the same size as said outer panels, and rigid spacing supports extending through said intermediate layer and rigidly united to said outer panels.

5. An insulating building block including relatively rigid outer panels including granulated vegetable matter and fire resistant cement, an intermediate layer of soft, fibrous, sound deadening material, and rigid spacing supports extending through said intermediate layer and rigidly secured to said outer panels, said supports including granulated vegetable matter and fire resistant cement.

6. An insulating building block including relatively rigid outer panels, an intermediate layer of soft, fibrous, sound deadening material, rigid spacing supports between said outer panels and extending through said intermediate layer, at least one of said outer panels including granulated cork held in rigid panel form with fire resistant cement.

ROSER B. SUTTER.