

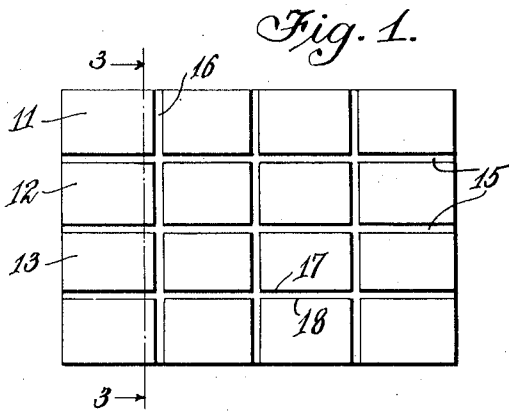
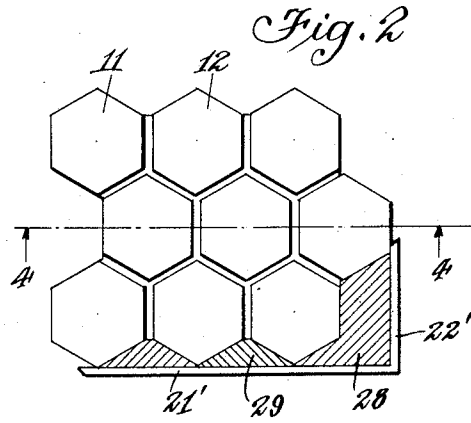
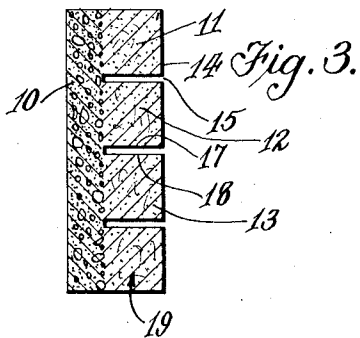
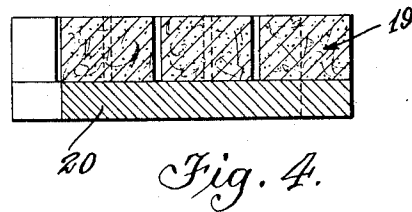
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ACOUSTICAL MATERIAL

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ACOUSTICAL MATERIAL

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This invention relates to a unitary acoustical material made from cementitious material and adapted to be used as a surfacing for walls, ceilings and the like. A simple but effective method of producing the acoustical bodies embraced by this invention is also described.

It has been well known that porous materials such as for example, loosely felted boards or sheets of woven materials such as different types of cloth effectively absorb sound waves when such materials are applied as surfacing materials to interior walls of structures, such as halls, auditoriums, dining rooms, etc. The materials of the prior art have, as a rule, been made of organic materials such as hair, vegetable fibres and the like, and are unsatisfactory as they are not fireproof. Furthermore, it has been impractical to finish these materials so as to present an artistic surface.

It has been found, for example, that if paint or other coating is applied to a loosely felted fibrous board, the paint produces a continuous surface on the material which substantially reduces the sound absorption characteristics of the material. Attempts have been made to employ porous plaster as coating material, but when such plasters are made sufficiently porous to actually absorb sound and prevent reverberation, they are unsatisfactory because of their inherent structural weakness, difficulty of application to walls and particularly to ceilings, and by reason of the tendency for the various cavities and porosities at the surface of the coating to collect dirt.

This invention particularly relates to an acoustical material in unit form, thereby making it possible to apply the acoustical material in the form of units to walls or ceiling. The difficulties of endeavoring to obtain a porous sound absorbing cementitious layer on walls by applying a plastic cementitious material to a suitable foundation is thus obviated.

The invention also relates to a unitary sound absorbing tile capable of receiving a finished surface which can be washed, painted or otherwise treated, and in this

manner obviates the disadvantages of the porous, dirt collecting surfaces of the prior art.

Inasmuch as the tile made in accordance with this invention is composed of cementitious inorganic materials, it is substantially fireproof and not subject to attack by organisms, insects, rodents and the like.

An object of this invention is to disclose and provide a unitary tile body having a smooth outer surface but having high sound absorption characteristics.

Another object is to disclose and provide a unitary cementitious tile of novel construction, said tile having enhanced sound absorption characteristics.

Another object is to disclose and provide a cementitious sound absorbing tile subdivided into a plurality of ornamental units capable of being employed for purposes of ornamentation as well as sound absorption.

A still further object is to disclose and provide a unitary tile body comprising a structural base, a sound absorbing material carried by the base, and a smooth outer surface.

In describing the invention, reference will be had to the appended drawing, in which:

Fig. 1 is a plan view of one form of tile embraced by this invention.

Fig. 2 is a plan view of another form of tile embraced by this invention.

Fig. 3 is a transverse section taken along the plane 3—3 indicated in Fig. 1.

Fig. 4 is a transverse section taken along the plane 4—4 in Fig. 2.

As shown in Figs. 1 and 3, the unitary tile may consist of a base member, such as the layer 10 of cementitious material. This cementitious material is preferably fairly dense and strong. If desired, reinforcing material may be embedded therein. By "cementitious material" as used herein, reference may be had to various compositions containing Portland cement, gypsum, magnesium oxy-chloride cements, and similar substances moldable in plastic form and capable of setting to form a substantially rigid and strong body.

The base layer 10 preferably carries a plu-

5 rality of what may be called bosses, such
 as the bosses 11, 12 and 13, presenting a
 smooth outer face 14 which is rendered dis-
 continuous by means of grooves or openings
 15 separating the bosses 11, 12, 13 and the
 like. As shown in Fig. 1, the grooves 15
 may be intersected by means of grooves 16
 at right angles thereto, thereby forming the
 bosses 11, 12, 13 and the like. The bosses 11,
 10 12 and 13 are preferably made of a cementi-
 tious material which may be weaker than
 and preferably more porous than the base
 layer 10. For example, the bosses 11, 12
 and 13 constituting the outer layer carried
 15 by the base member or layer 10, may be
 made of a gypsum composition containing
 diatomaceous earth, pumice, sawdust or arti-
 ficially generated porosities.

20 Porosities of an artificial nature may be
 obtained by employing suitable chemicals,
 such as for example, sodium carbonate and
 an acid salt such as alum, these ingredients
 being added to the gypsum together with a
 suitable quantity of borax so as to produce
 25 a plastic cementitious mass, the sodium car-
 bonate being dissociated and liberating car-
 bon dioxide during the formation of the
 bosses 11, 12 and 13, thus producing a porous
 light-weight mass. The outer surface 14 is
 30 preferably troweled so as to present a
 smooth surface. The inner walls or oppos-
 ing surfaces 17 and 18 of the grooves or
 openings between the individual bosses act
 as sound absorbing surfaces.

35 The depth of the grooves 15 may depend
 entirely upon the conditions under which it
 is desired to employ the tile, and normally
 such depth may vary from one-half to two
 inches. The bosses 11 and 12 may be of any
 40 desired shape and size. As shown in Fig. 1,
 the bosses 11, 12 and 13 are square. Said
 squares may range in size from about one
 inch to six inches. The grooves 15 and 16
 may vary in width (that is, the distance
 45 separating the opposed faces 17 and 18),
 from about one-eighth inch to three-eighths
 of an inch.

50 As shown in Figs. 2 and 4, the tile may
 be subdivided into a plurality of hexagons
 or any other geometrical figure. When
 hexagons or octagons are employed, the
 outer contour of the tile unit may follow
 the contour of the individual bosses formed
 or carried by the base. In this manner the
 55 tile may be said to be interlocking in char-
 acter. As shown in Fig. 4, the layer of
 cementitious material 19 constituting the
 outer layer of the tile is attached to or car-
 ried by a fibrous wall board 20, whereas the
 60 tile shown in Figs. 1 and 3 include a base
 member of cementitious material 10.

65 Although the grooves 15 and 16 may be
 readily formed in the outer layer 19 of the
 unitary tile body by sawing (when the
 bosses 11, 12, etc., are rectangular or

square), I prefer to make the unitary sound
 absorbing tile described hereinabove in a
 different manner. A mould consisting of
 side walls, end walls and a bottom and hav-
 ing interior dimensions identical with the
 70 exterior dimensions of the desired tile, may
 be used. A grating may then be suspended
 in the mould box, the grating being capable
 of forming grooves of the desired width
 and thickness in the cementitious material,
 75 which is then poured into the mould box.
 The grating does not rest on the bottom of
 the mould box but is preferably spaced
 therefrom so as to form a backing layer or
 member of desired thickness. Before the
 80 cementitious material sets but after the
 mass has hardened, the grating may be
 withdrawn from the mould box leaving an
 article of the character shown in Figs.
 1 to 4. 85

It is to be understood that although a
 particular device has been described in de-
 tail, I am not limited thereto and any suit-
 able mould capable of being employed in
 carrying out the method described may be
 90 used.

After setting, the cast body may be re-
 moved from the mould and suitably dried
 or cured. The upper surfaces, namely, the
 outer surfaces 14, may be treated with a
 95 sizing material or with a hardening mate-
 rial. When gypsum compositions are em-
 ployed for the composition from which the
 bosses 11, 12 and 13 are made, it has been
 found desirable to apply a solution of borax
 and alum to these surfaces so as to render
 them hard, thus permitting subsequent
 washing of these surfaces. 10

When tile having irregular edges are to
 be produced, such as for example, a tile
 105 shown in Fig. 2, then a mould having side
 walls desirably deformed may be employed,
 or the straight side walls 21' and 22' may
 carry filler blocks 28 and 29 adapted to im-
 part the desired irregularity to the sides of
 110 the finished block.

Tile made in accordance with this inven-
 tion may be readily attached to walls, ceil-
 ings and the like by means of mortar or by
 first applying a rough cementitious coating
 115 to sheathing, wire lath or foundation, and
 then placing the pre-cast tile upon such cem-
 entitious coating while it is still plastic.
 For ceiling work it may be desirable to ex-
 tend suitable tie-wires through the blocks or
 120 to cast such blocks or tile with suitable
 hanger straps embedded therein.

Although the upper surface of the uni-
 tary acoustical tile described hereinabove is
 only broken by the relatively narrow and
 125 deep grooves or openings 15 and 16 which
 occupy but a small proportion of the total
 area, still it has been found that these tile
 prevent reverberation to a great extent and
 have a high absorption value, sound waves 130

entering the grooves 15 and 16 encountering the large facing surfaces 17 and 18 which effectively absorb sound.

It will thus be seen that a novel and useful acoustical material has been provided, composed in part of a porous cementitious material such as the composition 19, which could not be effectively applied to a wall because of its great plasticity and fluidity. The finished tile may be readily shipped or transported and when on the job may be readily sawed or cut into desired shapes or sizes to fit corners, angles and other relatively unusual situations.

It will be understood that although I have described a particular form of acoustical material and a preferred method of making the same, I am not to be limited to such illustrative descriptions, but this invention includes all such modifications and changes as come within the scope of the appended claims.

I claim:

1. A unitary tile body comprising a base member and a plurality of bosses of cementitious material provided with sound absorbing porosities, said bosses being carried by said member in spaced relation to each other, said bosses being provided with opposing faces in planes transverse to the body plane of said tile, and adapted to absorb sound.

2. A unitary tile body, comprising a cementitious base member and a plurality of bosses of porous cementitious material in spaced relation to each other carried by said member on one side thereof, the faces of said bosses, lying in planes substantially perpendicular to the plane of the base member, being spaced from each other sufficiently to absorb sound waves entering said spaces between bosses.

3. A unitary sound absorbing tile body, comprising a base member, and a plurality of bosses of porous cementitious material in spaced relation to each other carried by said member, said bosses being provided with opposing faces one-half to two inches in depth and one-eighth to three-eighths inch apart, whereby said faces are adapted to absorb sound, and smooth outer faces substantially parallel to the body plane of said tile.

4. A unitary sound absorbing tile body, comprising a base member, and a plurality of bosses of cementitious material having artificially formed porosities therein, said bosses being in spaced relation to each other and extending from one surface of said base member, said bosses being provided with opposing faces in planes parallel to the body plane of the tile and adapted to absorb sound, and smooth outer faces substantially parallel to the body plane of said tile.

5. A unitary sound absorbing tile body

comprising a cementitious base member and a porous cementitious layer adhering thereto, said layer being moulded into a plurality of bosses spaced from one-eighth inch to three-eighths inch from each other whereby sound waves entering said spaces may be absorbed by the porous walls of said bosses.

Signed at Los Angeles, Calif., this 17th day of February, 1931.

GEORGE P. LITTLE.