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SOUND DEADENING MATERIAL

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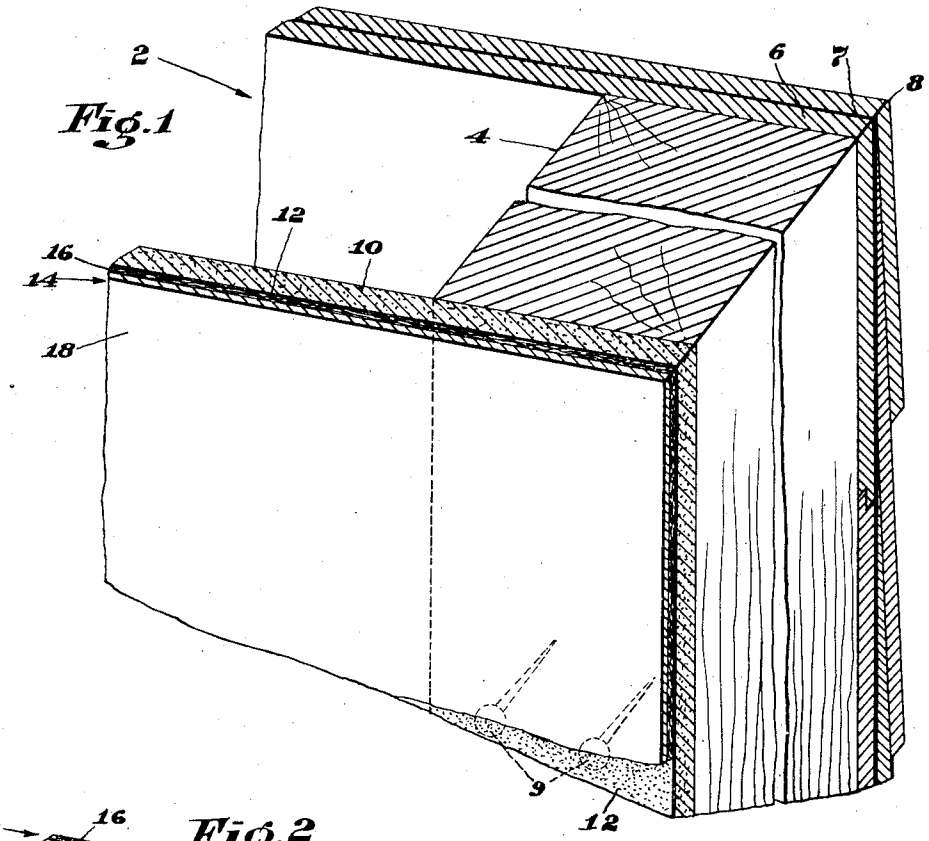


Fig. 1

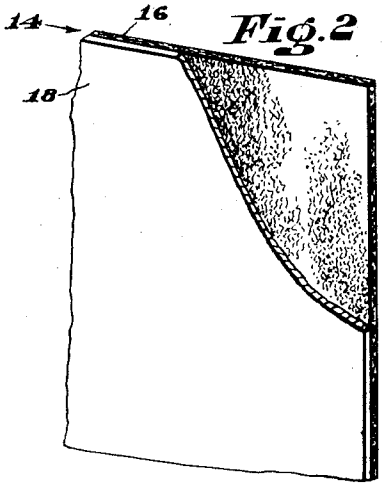


Fig. 2

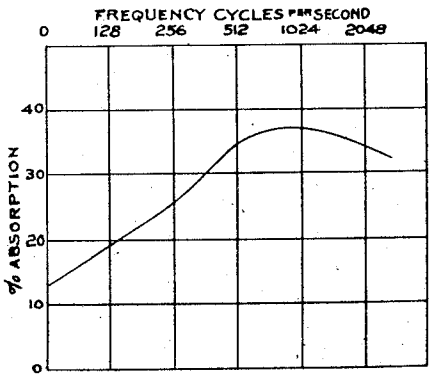


Fig. 3

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SOUND-DEADENING MATERIAL

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7 Claims. (Cl. 20—4)

This invention relates to an improved and novel material for sound-deadening and finishing the interior wall surfaces of buildings, and has particularly to do with the provision of such a material to be emplayed in lieu of the usual and well known plaster wall interior finish commonly employed in building construction. The invention also has considerable utility in that it is a complete manufactured product and provides an ornamental wall which may be used immediately following the application of the material, and one with improved heat insulating characteristics. The most important characteristic of the wall including the material of this invention lies in the improved ability of the wall to absorb sound waves and the improvement in this respect is believed to be due to the flexible and resilient—though apparently rigid—plaster-appearing, multi-layer material which, though unitary with respect to application to the wall, includes separate adherent layers of material of wholly different characteristics, namely, sound-absorbing dry felt layer plus a surface or exposed light-colored decorative layer of resilient plastic material adherent thereto, which closely simulates the appearance of decorated hard plaster. If desired, however, wall paper may be applied directly thereto and without the preliminary application of a sizing coat.

Prior to this invention, it has been suggested that a sound-deadening wall might include a fabric material in layer form, for example, cloth or felt, and such material, after being attached to a plaster or other equivalent permanent wall backing, then treated, as by paint, when in place to provide an ornamental surface. Such suggestions, however, have not been adopted generally and practically to any appreciable extent, and moreover, involve hand labor and expense and considerable time after being attached, before the wall, by repeated painting, can be provided with a smooth and uniform light-colored surface as is required for home construction, particularly in that the felt dry fabric layer absorbs so much paint and thereby sacrifices sound absorbency. Also, the paint layer itself does not absorb the sound well. By employing the present invention, however, there may be provided a complete and attractively finished wall and one which advantageously may be used at once, and at the same time provides the all important sound-deadening characteristics to which the invention is particularly directed.

In the accompanying drawing which forms part of this specification:

Fig. 1 is a perspective view, partly in section, of a wall including the sound-deadening material of the present invention in place on the interior of the same;

Fig. 2 is a perspective, much enlarged, showing a small portion of said material, and

Fig. 3 is a curve illustrating typical sound-absorption characteristics of said material mounted on an ordinary wall board (or plywood backing).

Referring to the drawing in which like numerals represent like parts, the usual permanent outside wall of a building is generally indicated at 2 and, as here shown, includes studding 4, sheathing 6, heat-insulating paper 7, and shingles or the like 8, on the outside of said insulating paper or the like.

To the inside of such permanent wall 2 there is attached by nails 9 or other suitable fastening to the studding 4, or equivalent structure, a wall board backing 10, and adhesively secured thereto by an adhesive layer of cement 12, preferably a flour paste, is the unitary multi-layer, flexible sound-deadening material of this invention, generally designated at 14. Said unitary multi-layer material 14 in its preferred form comprises an open porous and sound absorbent layer of rag and paper (water-laid) felt 16 to the surface of which felt 16 is adhesively attached the flexible ornamental plastic surface layer 18, as hereinafter more fully described. This ornamental plaster-appearing plastic surface layer 18 (which is frictioned into face-to-face relation with the felt as distinguished from being absorbed thereby as would be the case with paint) is made from fibrous material, finely divided or finely ground, and in the commercial practice of the invention has included organic material such as finely ground wood powder and/or finely divided cotton linters, depending somewhat upon the character and finish of the interior surface it is desired to produce.

Though the plastic material simulates the appearance of decorated hard plaster so closely that it appears upon superficial observation to be such, it is in fact flexible and soft. This accounts for some of its sound-absorbing capacity but, however, the primary reason for such high capacity is that the felt, though providing a perfectly smooth foundation for the plastic layer 18, is very open and porous and compressible despite the plastic layer which affords a smooth washable exposed surface and one to which dust does not adhere.

The coloring of the plastic layer 18 may be

accomplished by either dyes or pigmenting the plastic prior to frictioning the same by means of calender rolls upon the felt backing and, in addition, the plastic, after having been applied, may be color printed by means of roll or flat bed press, as desired, in order to impart thereto various decorative conventional or other ornamental designs. Also, the plastic, when initially colored, need not be all of the same color, but may be given a mottled effect by mixing on the calender two or more different colors of material which, by the calender, are caused to merge more or less into one another. Moreover, the mottled surface may be printed with what we may term an ornamental skip-space design, leaving the mottled effect for the background and printing thereon by means of a suitable liquid medium the desired design just as though it were printed on a plain, uniformly colored background.

In ordinary commercial practice, the plastic material is made up of wood powder, pigment, flexible binder, and, if necessary, a plasticizer. Suitable binders are plasticized nitro-cellulose with some solvent, plasticized resin, or linseed oil with a small amount of resin, natural or artificial, may be employed, with or without plasticizer. Any suitable finely divided type of light-colored mineral pigment will answer, such, for example, as are used for coloring paper or in paints. A typical table of materials as employed in practice is as follows, all parts being by weight:—

	Parts
Wood flour	100 to 250
Lithopone	25 to 75
Bentonite clay	30 to 50
Water	10 to 50
Resin and drying oil varnish	150 to 225

It is necessary that the binder then have sufficient time to become hardened or "set up" so as to give the finished product a certain amount of firmness together with the desired flexibility and resilience. The material may desirably be made with a backing felt in the thickness of, say, .050", plus or minus .025", and a porous plastic surface layer of .017"–.020", minus .010" plus .020"–.030", though these are not limiting dimensions. The product as thus made provides sufficient flexibility for a unitary multi-layer sound-deadening material so that it may be rolled and unrolled without fracture or appreciable cracking of the material when so rolled and unrolled and during the application thereof to wallboard or other backing to which the material is adhesively or otherwise secured. Despite the flexible and soft character of the laminated unitary product, it is sufficiently stiff so as to bridge any small irregularities or joints in the wallboard backing, and the dry felt, though possessing no great inherent strength, is sufficiently stiff so as to bridge such irregularities and joints. The aggregate thickness of the finished product as currently made and sold is of the order of .065"–.075" which gives adequate thickness and characteristics of the sound-deadening as heretofore described, and sufficient softness and body to provide a desirable and attractive wall covering having the novel and useful characteristics herein described.

The sound absorption capacity of a wall made in accordance with this invention as above described including a wall board backing is found to be much greater than that of an ordinary plaster wall made up of lime or gypsum plaster including scratch, brown and finished coats on wood-lath. The figures of actual tests made of such sound absorption coefficients are as follows:—

Sound cycles	128	256	512	1024	2048
Our structure (backing felt .030 plus plastic .015"–.017")	.13	.19	.26	.35	.37
Ordinary gypsum plaster	.020	.022	.032	.039	.039
Ordinary lime plaster	.024	.027	.030	.037	.039

In addition to such striking sound absorption characteristics, the wall, in practice, is found to have very good heat insulating characteristics. Moreover, it forms a ready and practical substitute for plaster construction at a substantial saving in the cost of lath, plaster, labor and necessary drying time, before wooden interior trim may be installed. Besides, the wall is permanent without any likelihood of cracking or other failure due to excessive swelling and shrinking such as inevitably result from the application of wet plaster, and does not shatter due to vibration and shock as does an ordinary plaster wall.

Having described our invention, what we wish to claim and secure by Letters Patent is:

1. In a building wall construction which includes a permanent wall portion, a substantially continuous backing, a flexible and resilient building wall sound-deadening material secured to said backing comprising a flexible multi-layer unit made up of a series of layers including a porous open paper felt layer, and permanently united to said layer upon the exposed surface thereof a layer of relatively light-colored flexible porous plastic surface coating, including finely-divided fibrous material and a hardened binder material.

2. In a building wall construction which includes a permanent wall portion, a substantially continuous backing, a flexible and resilient building wall sound-deadening material secured to said backing comprising a flexible multi-layer unit made up of a series of layers including a porous open paper felt layer, and permanently united to said layer upon the exposed surface thereof a thinner layer of relatively light-colored pigmented flexible plastic surface coating including finely divided wood powder and a hardened binder material.

3. In association with a building wall construction which includes a permanent wall portion and a layer of wall board affixed to said permanent wall portion and providing a continuous wall board backing, an adherent flexible and resilient multi-layer unit adhesively secured to said wall board backing including a porous open paper felt layer adjacent said backing, said layer having permanently united thereto upon the exposed surface thereof a relatively light-colored layer of pigmented plastic surface coating, including finely-divided fibrous material and a hardened binder material.

4. In association with a building wall construction which includes a permanent wall portion and a layer of wall board affixed to said permanent wall portion and providing a continuous wall board backing, an adherent flexible and resilient multi-layer unit adhesively secured to said wall board backing including a porous open paper felt layer adjacent said backing, said layer having permanently united thereto upon the exposed surface thereof a relatively light-colored layer of pigmented plastic surface coating including a

finely divided wood powder and a hardened binder material.

5. In association with a building wall construction which includes a permanent wall portion and a layer of wall board affixed to said permanent wall portion and providing a continuous wall board backing, an adherent flexible and resilient multi-layer unit adhesively secured to said wall board backing including a porous open paper felt layer adjacent said backing, said layer having permanently united thereto upon the exposed surface thereof a relatively light-colored layer of pigmented plastic surface coating including a finely divided wood powder, a hardened binder material, and bentonite clay.

6. In association with a building wall construction which includes a permanent wall portion and a layer of wall board affixed to said permanent wall portion and providing a continuous wall board backing, an adherent flexible and resilient multi-layer unit adhesively secured to said wall board backing including a porous open paper felt layer adjacent said backing, and permanently united to said layer upon the exposed surface thereof a layer of relatively light-colored flexible porous plastic surface coating including finely divided wood powder and a hardened plasticized resin.

7. In association with a building wall construction which includes a permanent wall portion and a layer of wall board affixed to said permanent wall portion and providing a continuous wall board backing, an adherent flexible and resilient multi-layer unit adhesively secured to said wall board backing including a porous open paper felt layer adjacent said backing, and permanently united to said layer upon the exposed surface thereof a layer of relatively light-colored flexible porous plastic surface coating including finely divided wood powder and hardened linseed oil.

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