

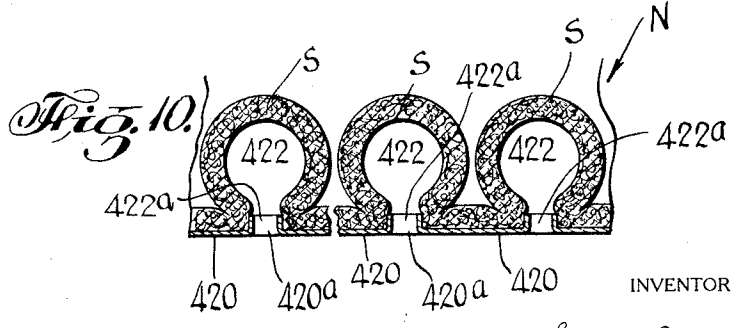
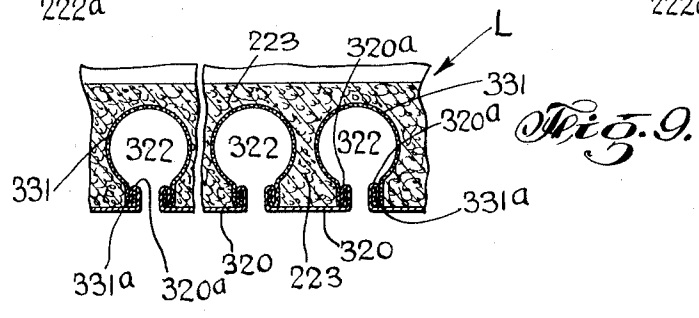
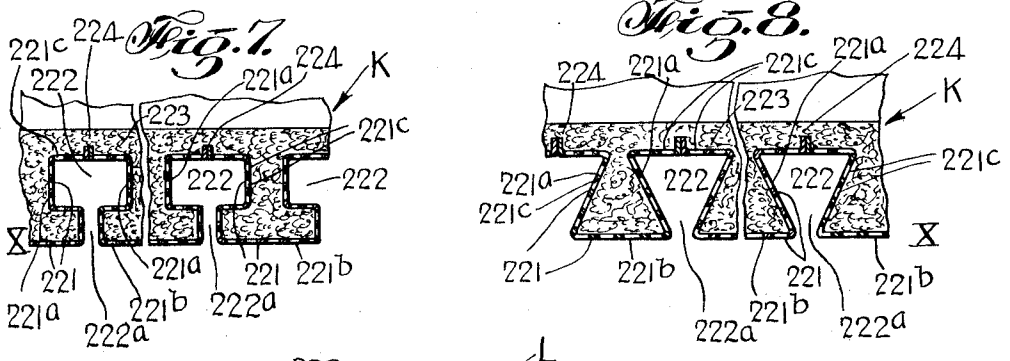
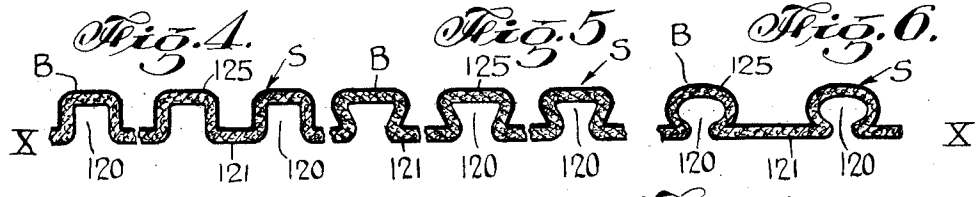
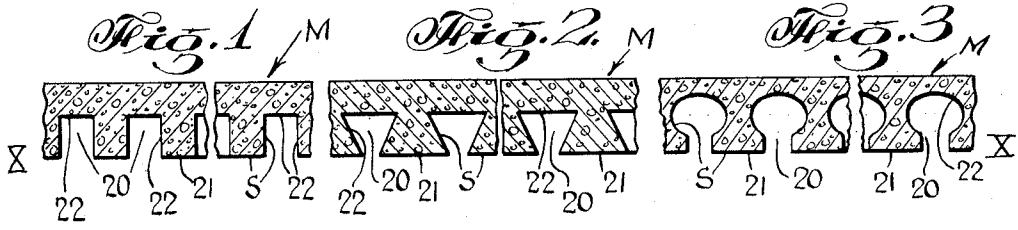
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SOUND ABSORBING CONSTRUCTION

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# UNITED STATES PATENT OFFICE

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## SOUND ABSORBING CONSTRUCTION

Application filed July 3, 1929. Serial No. 375,711.

This invention relates to sound absorbing panel, screen, wall, floor and ceiling structures for use in acoustical corrections to or quieting the interior of buildings and for other like purposes.

One object of the invention is to provide in structures of the character described a novel construction of building material having an improved large effective sound absorbing surface.

Another object of the invention is the provision of a structure of the character described comprising a novel acoustical correcting or quieting building material construction formed of few and simple parts adapted to be used in new and altered buildings, which shall be cheap to manufacture and apply, and practical and efficient to a high degree in use.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be exemplified in the constructions hereinafter described and of which the scope of application will be indicated in the following claims.

In the accompanying drawings, in which is shown various possible illustrative embodiments of this invention,

Figs. 1, 2 and 3 are cross-sectional views of sound absorbing building material formed of relatively stiff sheets or blocks embodying the invention.

Figs. 4, 5 and 6 are cross-sectional views of sound absorbing building material of relatively flexible sheet building material formed to embody the invention, and

Figs. 7, 8, 9, and 10 are cross-sectional views of other sound absorbing structures embodying the invention.

One dominating feature of the invention is the provision of an improved construction of building materials of the character described having a sound absorbing surface or surfaces formed so as to increase the effective area presented and the coefficient of sound absorption in the manner hereinafter described. In the following descriptions of

the different embodiments of the invention, three types of sound absorbing materials are used to form the improved structures, namely; (1) relatively unbendable, stiff sheets or blocks of plaster composition, pulp or composite board, concrete compounds or other materials comprising cellular bodies; (2) relatively flexible sheet material of hair felt, flaxlinium, balsam wool, asbestos in a pliable and bendable form, and (3) material of plastic or loose pieces requiring a sheathing or like device for retaining said material in place.

Referring now in detail to Figs. 1, 2 and 3 of the drawing M denotes a suitable sound absorbing material formed of relatively unbendable stiff sheets or block structures embodying the invention. Said material M has the surface S thereof, which is adapted to receive the sound vibrations formed with spaced grooves or recesses 20. The latter form pockets extending in from the exposed flat portions 21 of the surface S which lie in the plane X—X.

The walls 22 of the pockets and the surface portions 21 together provide an increased effective area for absorbing the sound as compared with ordinary stiff sheeting or blocks which present a continuous, unbroken or substantial flat surface. Beside said pocket walls provide for more efficient absorption of the reflected sound vibrations entering there-in than do as a continuous flat surface because of interception of said vibration by the side walls 22 of the pockets 20. Said pockets may be of any cross-sectional shape, being shown rectangular in Fig. 1, triangular in Fig. 2 and curve-shaped in Fig. 3. Where it is desired that the openings or passages leading to the pockets 20 shall be relatively small so that said pockets may be inconspicuous or that the extra large exposed sound absorbing surface areas are required the forms shown in Figs. 2 and 3 are preferable.

Sound absorbing structures formed of flexible sheeting materials S are shown in Figs. 4, 5 and 6. Said pliable sheeting materials of suitable texture are bent and shaped to provide spaced grooves or recesses 120 which form pockets extending in from the plane X—X of exposed flat surface portions 121.

Like the material M described above, the wall surface of the pockets 120 and the surface portions 121 provide an increased effective and high efficient sound absorbing means.

5 The sheeting material S preferably is made so as to have self-supporting and shape-retaining properties when bent in desired shapes with said pockets.

10 If the composition or texture of the material S does not provide sufficient body to form a self-supporting and shape retaining structure, the rear surface 125 of the material S may have a stiffening film coating or layer B of sodium-silicate, glue, plaster Paris or other  
15 similar substance applied thereto or said material S may be constructed with reinforcing wires (not shown) threaded therethrough for that purpose.

18 In Figs. 7 and 8 embodiments of the invention are shown in which the improved structures K include a sheathing formed of a plurality of sections or plate members 221 made preferably of any suitable fire resistance or fireproof sheets such as asbestos or other composition board, fibre, or metal. Plate members 221 when constructed of sheet iron or steel may be made in identically shaped strips having the opposite longitudinal edge portions 221a bent back from the front side of a flat mid-portion 221b. Said edge portions 221a are so formed and shaped that when a plurality of strip sections 221 are positioned with their mid-portion 221b lie in the same plane X—X and the edge portion 221a of adjacent sections in abutment, pockets or chambers 222 are formed between adjacent sections. Said chambers have passages 222a communicating with the exterior sides of the sections and may be of any desired cross-sectional shape, preferably being made to present a relatively large interior chamber wall surface. About the exterior side of the wall pockets 222 there may be packed any suitable plastic, sound absorbing material 223 in loose piece or flexible sheets preferably having fire resistant or fire-proofed properties.

20 In order that the sound may reach said absorbent material, the edge portions 221a of said section forming the walls of the passage 222a and chamber 222 are perforated with openings or slots 221c to expose as much of the absorbent material as possible yet leaving a sufficient skeleton of the sheathing for retaining the sections relatively rigid.

25 The edge portions 221 of the sections that abut are fastened together by a seam or joint 224 which may be welded, riveted, soldered or otherwise, securely interconnected, said joint construction and bent section edge portions 221a serve as a longitudinal stiffening brace for the structure formed by the connected sections and require only widely spaced supporting means for installing same. Said structure may be made in units of any desired length and width that are convenient

to handle thus providing for economy of manufacture, transportation and installation.

70 The modified sheathing construction L shown in Fig. 9 differs from those shown in Figs. 7 and 8 in providing the plate members 320 with hook shape connection 320a for interlocking with corresponding longitudinally extending hook-shaped connections 331a on inverted U or curve shaped coarse wire mesh sheet strips 331. The latter form the skeletonized walls of the chambers 322 which expose and present the surrounding sound absorbent material 223.

80 In Fig. 10 another modified form of the invention is shown which is particularly suitable in providing a structure using absorbent material like that described above and shown in Figs. 4, 5 and 6 with a sheathing. The unit structures N here shown are seen to comprise spaced channel section 420 which may be interconnected in any well understood manner at their ends 420a. The spacing of said section provide the passage openings 422a for the self supporting chambers 422 formed by absorbent material S which is looped about said passages as shown.

85 The channel shaped sections provide the longitudinal stiffening bracing to the structure and since the sound absorbent sheeting is self shape retaining, no skeletonized reinforcing construction for the chamber walls need be provided.

90 It should be noted that the structures described above incorporating a sheathing have flat exposed surfaces that may serve as relatively large light reflecting surfaces that may readily be cleansed, refinished or redecorated without interfering with the acoustical properties of the said constructions and which may readily be kept in sanitary condition.

95 It will thus be seen that there is provided devices in which the several objects of this invention are achieved and which are well adapted to meet the conditions of practical use.

100 As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiment above set forth, it is to be understood that all matters herein set forth or shown in the accompanying drawing are to be interpreted as illustrative and not in a limiting sense.

105 Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. An acoustical correcting structure of the character described comprising a sheathing formed with openings, and a sound absorbing material bent to form walls of pockets about said recesses, said sheathing having means extending into the pockets to reinforce the structure.

2. An acoustical correcting structure of the

character described comprising a sheathing having openings, and sound absorbing material forming chambers communicating with said openings, portions of said sheathing at the rims of said opening forming a stiffening reinforcement for the structure.

5  
3. An acoustic correcting structure of the character described comprising a sheet sheathing having spaced openings, and sound absorbent material positioned about said openings to form chambers.

10  
4. An acoustic correcting structure of the character described comprising a sheet sheathing having spaced slots, and pliable sound absorbent material looped about said slots to form chambers, the rim portions of said slots being bent to provide an angle stiffening reinforcement for the structure.

15  
5. An article of manufacture comprising an acoustical correcting structure formed of a sound absorbent layer having recesses extending inwardly from the surface thereof exposed to sound, said recesses being of relatively increasing cross-sectional areas inwardly from said exposed surface whereby sound waves reaching the walls of said recesses will be absorbed, said recesses being closed rearwardly of said exposed surface.

20  
6. A sound absorbent layer formed with recessed pockets extending inwardly from the sound exposed surface thereof, said pockets having walls of substantially uniform thickness and having relatively increasing cross-sectional areas inwardly from said exposed surface, whereby, sound waves reaching said pockets will be absorbed, said pockets being closed rearwardly of said exposed surface.

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In testimony whereof I affix my signature.  
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LOUIS BARNETT.

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