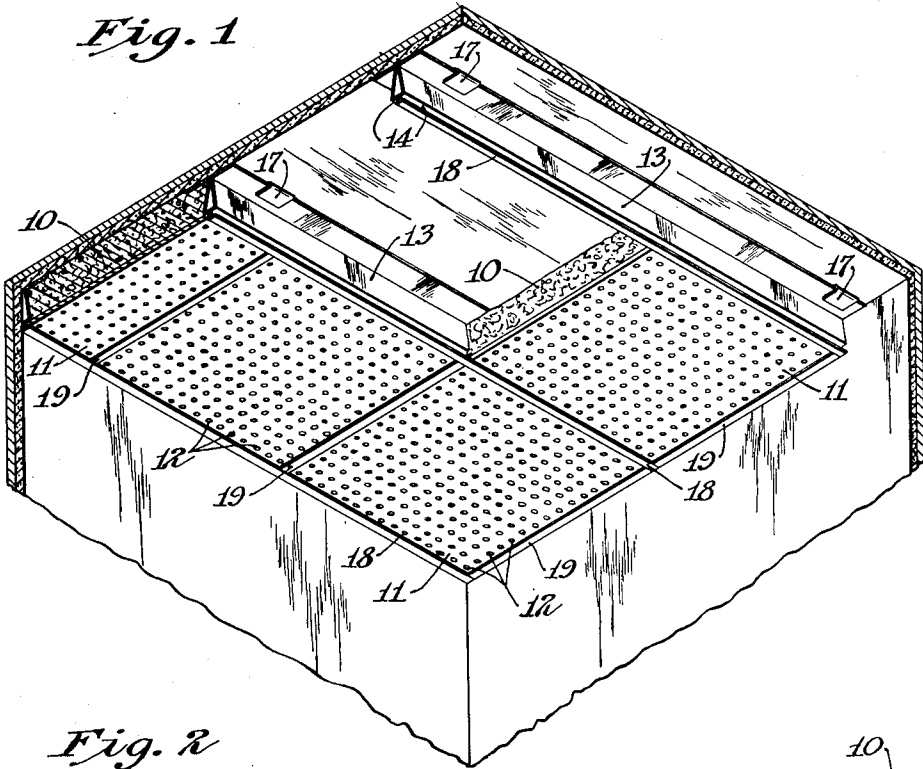


April 20, 1937.

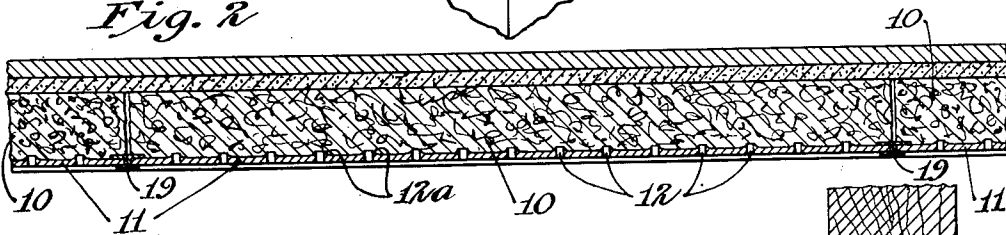
D. F. ROSS ET AL  
ACOUSTICAL MATERIAL  
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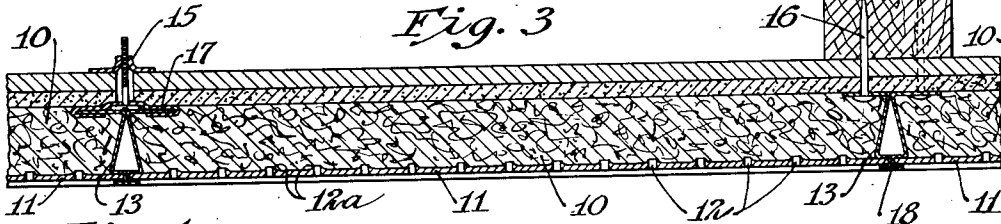
*Fig. 1*



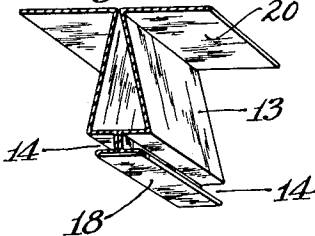
*Fig. 2*



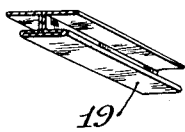
*Fig. 3*



*Fig. 4*



*Fig. 5*



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# UNITED STATES PATENT OFFICE

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## ACOUSTICAL MATERIAL

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Application February 24, 1936, Serial No. 65,181

4 Claims. (Cl. 20-4)

This invention relates to sound absorbing materials such as are used generally on the interior walls of offices, auditoriums and rooms generally for the purpose of deadening sound and improving the acoustical properties of such rooms.

It is an object of our invention to provide means for installing such materials in a manner which is simple to carry out and at the same time presents an attractive appearance.

There are several types of sound absorbing materials and devices in use at this time, but they possess disadvantages which it is one of the objects of our invention to overcome. One such disadvantage is the tendency for these materials to gather dust at the joints of the several sections of material due to the "breathing" action peculiar to this class of building material. Breathing takes place at the joints in most cases due to the space between each separate part of such construction, which space causes a slight circulation of air through the joint. The circulation thus induced, results in the deposit of dust at the joints in the material and consequent discoloration of the surface covered with the sound absorbing agent. Many of the materials used depend upon their porosity for effectiveness and thus cannot be painted to cover the accumulated dust. An object of our invention is to apply sound absorbing materials to a surface in a manner which will eliminate any danger of breathing.

A further object is to provide means for applying the material to a surface whereby the securing-elements have the additional advantage of enhancing the beauty of the surface to which it is applied.

These and other objects and advantages of the invention will more fully appear from the following description made in connection with the accompanying drawing, wherein like reference characters refer to the same or similar parts throughout the various views, and in which:—

Fig. 1 is a perspective view, looking upwardly at the corner of a room with a portion of the ceiling covered according to our invention;

Fig. 2 shows a cross section of one form of construction with one means for connection of the several sections of material;

Fig. 3 is a cross section of a form of construction in which two forms of attaching devices are shown with the incorporation of trim strips on said devices;

Fig. 4 is an enlarged view of a part of the attaching means shown in Fig. 3 with its lower por-

tion formed into the combined slab or sheet retainer and trim strip, and

Fig. 5 shows a form of slab or sheet connection and trim strip which may be used in our invention.

In one embodiment of our invention, the sound absorbing construction includes, generally, a plurality of sections of sound absorbing elements 10 of suitable material which may be made of rock wool, felt, cellulose fibers and other substances, and they may be cut in squares as shown, or in relatively long strips. The shape of these elements is not necessarily limited to rectangular form, but may be made in diagonal, parallel shape and other forms.

To retain the elements 10, we provide retaining means comprising relatively thin stiff sheets or diaphragms, 11. These may be made of suitable materials, such as phenolic condensation products, asbestos, metal and compressed fiber board and may or may not have sound absorbing qualities, as desired. It is preferred that these sheets 11 be made resilient so that they may be bowed slightly for a purpose to be explained later. The sheets are provided with suitable holes 12 to permit passage of sound therethrough to the absorbing elements 10. The apertures 12 are preferably formed in the sheets or diaphragms 11 by punching the material from the outer surface, the punching raising small conical portions 12a around the inner surfaces of the sheet. The said conical portions increase the thickness of the sheet at the apertured portions, producing a more efficient sound-dissipating action in the buffeting of the sound waves as they pass through the apertures. The edges of the conical portions 12a are irregular and jagged.

Securing members 13, in the form of rails, are preferably made of metal and are provided with means for engaging and retaining the edges of the sheets 11, as by grooves 14 formed in said rails, best shown in Fig. 4. Rails 13 may be secured to a ceiling or other surfaces by various fastening means such as the toggle bolt 15 and ordinary nails or screws as at 16 in Fig. 3. In Fig. 1, a simple strap fastener 17, suitably secured, may be bent over the flanges of the rail members to anchor them. The grooves 14 are defined at their outer or lower side by a trim strip 18 and may be flat as shown, or may be formed in various ornamental designs as desired.

The rails 13 are shown in this embodiment secured in parallel position. Where the sound absorbing elements and the sheets form joints transverse to the rail, the trim strip 18 is used.

It has grooves and an outer facing surface similar to that on the sheet retaining edge of the rails 13.

The application of our improved construction is accomplished in the following manner. The rails are secured to the supporting surface, such as a wall or ceiling and the sound absorbing elements or mats are placed in the space between the rails. Sheets 11 are inserted between the rails and in the grooves 14 of said rails, by flexing them slightly and slipping the edges of the sheets into the grooves. The stiffness of the sheets causes them to spring back to their original flatness. On the edge of the sheet transverse to the rails 13, one of the cross strips 19 is placed, as shown in Fig. 2. When an abutting surface is reached, the cross strip may be in the form of a longitudinally divided half portion of one of the strips 19. In the same manner, the rails 13 may be made for abutting surfaces, or the member as shown may have one of its base plates 20 bent over or cut off.

The method of interlocking the sheets 11 is of distinct advantage in that the trim strip and its corresponding construction on the rails 13 effectively seals the joint between the sheets, and no air can circulate through the joints to permit "breathing" and the resulting soiling of the surface with accumulated dust and dirt. Further, these trim strips add an attractive and finished touch to the surface in the style of paneling. The outer faces of the strips may be finished in colors contrasting to that of the sheets 11 if desired.

The small conical projecting portions 12a on the inner surface of the sheets 12 cooperate with the sound absorbing pads 10 to produce a more efficient absorption of sound than is possible with perforated containers or retaining sheets heretofore used. With our construction the conical projections 12a have jagged or saw-tooth extremities which engage and distend the absorbent pad at a multiplicity of points on the ceiling or wall, giving the sound an opportunity to spread laterally through the apertures caused by the saw-toothed edge and across the outer surface of the absorbent pad, thus increasing the area exposed to the sound waves transmitted through the perforations.

The said jagged edged projections 12a furthermore, by engagement with the pads 10, prevent the pads from slipping or becoming displaced with reference to the retaining sheets. By the

elimination of such slipping or displacement, contraction and expansion, resulting in "breathing" action is substantially eliminated.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the various parts without departing from the scope of our invention, which, generally stated, consists in the construction capable of carrying out the objects above set forth and in the novel parts and combinations of parts disclosed and defined in the appended claims.

What is claimed is:—

1. In sound absorbing construction, a soft sound absorbing material disposed against a supporting surface, a plurality of polygonal facing sheets covering said material and having edges thereof disposed in close opposing relation, a plurality of rails secured to a supporting surface and having elements for engaging the opposing edges of said sheets, said sheets having limited flexibility to enable the same to be bowed to permit engagement of opposite edges of a sheet with a pair of such rails.

2. A sound absorbing construction comprising a sound absorbing medium, a series of flat sheets for retaining said absorbing medium, said sheets being disposed with certain of their edges in close opposing relation, a plurality of rail members having means for attaching to a supporting surface, means on said rail members for engaging and sealing said sheets at their adjacent edges, and means positioned at an angle to said rail members for engaging and sealing adjacent edges of the same sheet.

3. In sound absorbing construction, a pad of relatively soft, sound absorbing material, a flat facing sheet having a multiplicity of perforations formed therein, the inner surface of said sheet having projections formed about said perforations, said projections engaging said pad and preventing displacement thereof relative to said sheet and means for securing said sheet in spaced relation to a supporting surface with said pad disposed therebehind.

4. The structure set forth in claim 3 wherein said projections have jagged annular edges permitting lateral distribution of sound across the outer surface of said absorbent pad.

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