April 21, 1942. C. L. COFFEY 2,280,631

FACING SHEET FOR SOUND ABSORBING MATERIAL

Filed May 15, 1939

Fig. 1.

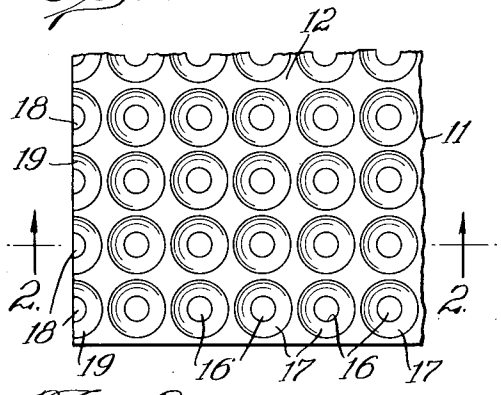


Fig. 3.

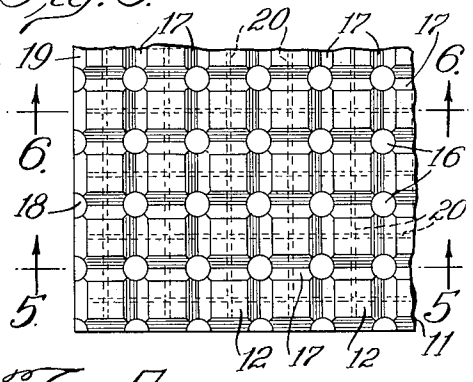


Fig. 2.

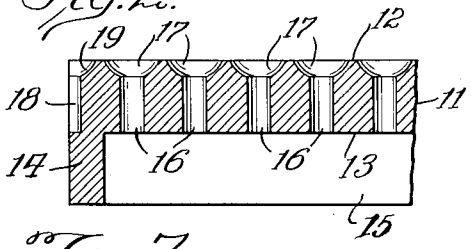


Fig. 4.

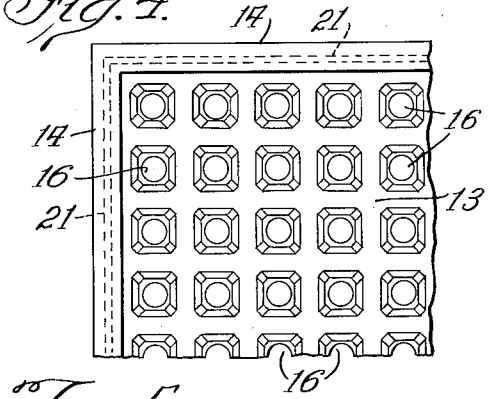


Fig. 7.

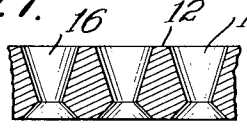


Fig. 5.

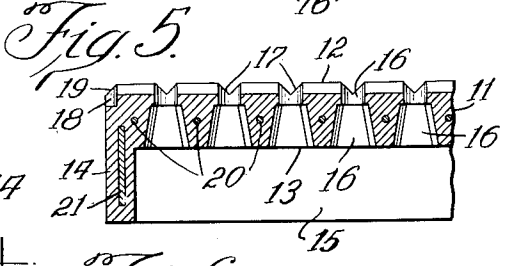


Fig. 8.

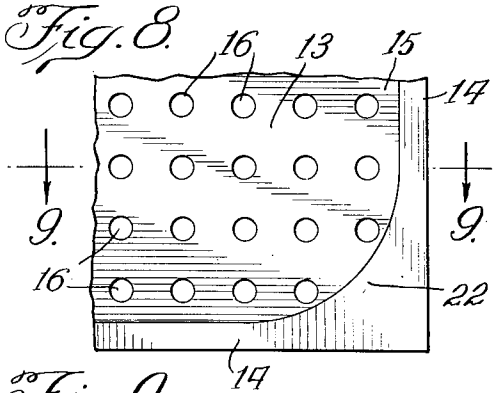


Fig. 6.

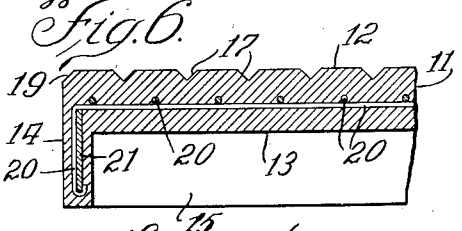
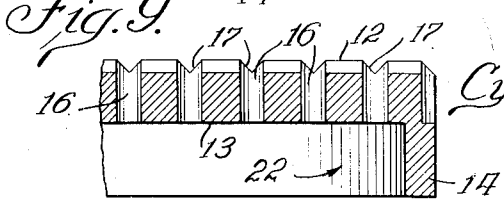


Fig. 9.



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UNITED STATES PATENT OFFICE

2,280,631

FACING SHEET FOR SOUND ABSORBING MATERIAL

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Application May 15, 1939, Serial No. 273,649
In Australia June 16, 1938

6 Claims. (Cl. 72—18)

This invention relates to sound absorbing constructions in the acoustical treatment of the ceilings, walls or the like of rooms and more particularly to the facings or coverings employed for the sound absorbing material.

Normally the facing sheets for use in conjunction with the sound absorbing material consist of rigid perforated metal sheets or perforated fibre-cement sheets backed with sound absorbing material. Neither perforated metal sheets nor perforated fibre-cement sheets are however satisfactory foundation for interior decoration.

Moulded fibre-plaster or plaster sheets would be highly satisfactory for interior decoration but in order to obtain the requisite strength the sheets must be made about ¼" or ⅜" in thickness whereas perforated fibre-cement sheets need only be ⅛" in thickness and metal sheets, such as iron, zinc, aluminum, etc., need only be of 26 gauge. Owing to the thickness which would be necessary if the sheets were made of fibre-plaster or plaster the pins used in forming the perforations would be liable to tear away portions of plaster when they are being withdrawn. Also the sharp edges of the holes might be broken away subsequently. Again the greatly increased depth of the holes would tend to reduce the sound absorption, particularly at high frequencies.

An object of the invention is to provide a facing tile or panel of plaster, preferably a gypsum plaster, or fibre-plaster in which the liability of defacement of the tile around the edges of the hole is minimized. Another object is to improve the efficiency and appearance of the tile or panel and to provide tiles or panels which when set together on a wall or ceiling present the appearance of a continuous decorative surface. A still further object is to provide a facing tile or panel in which, due to the form of the holes, the sound deadening qualities of the panel or tile are enhanced.

According to one feature of the present invention, the perforated facing tiles or panels are formed of plaster or fibre-plaster, and are provided with rearwardly extending flanges to form a pocket or seating to receive the sound absorbing material, and are recessed in the neighbourhood of each perforation on one or both faces. Recesses and portions of perforations are provided along an edge or edges of the tiles according to the position of the perforations on the tile or panel in such manner that when the tiles are assembled in abutting relation the recessed portions and portions of perforations form mating halves so that an assembly of tiles will present the appearance of a continuous perforated surface. According to a further feature of the invention, the perforations are formed with a double conical taper.

It will be seen that where a recess immediately surrounds the perforation its effect is to form at the end of the hole a flared portion. This recessing or flaring of the perforations reduces the thickness of material through which the pins, which form the holes in moulding the panels, must be withdrawn and thus facilitates the withdrawal of the pins and minmizes the likelihood of tearing or breaking away of portions of plaster either then or subsequently. Furthermore, even if any small pieces of plaster should occasionally be removed during the withdrawal of the pins, the disfiguration when the outer face is so recessed, will be much less noticeable than it would be with a flat-faced sheet. Very little effort is required to withdraw the pins used in moulding holes in the tile or panel. Also the holes, being short, can be tapered more sharply thus rendering the withdrawal of the pins still easier. The recessing or flaring out of the end portion or portions of each hole facilitates the passage of sound waves to the sound absorbing material.

In forming such a tile it is preferably moulded between male and female dies which reduce the thickness of the plaster surrounding each hole by forming recesses in each face of the plaster. These recesses may be conical or dome-shaped or may be grooves. A very suitable construction is to provide conical or dome-shaped recesses on the inner face, which will be adjacent to the sound-absorbing material, and to provide a series of intersecting grooves on the outer face arranged with the perforations at the intersections of the grooves. The grooves may be more or less V-shaped or U-shaped or of other similar shape. This arrangement of intersecting grooves, not only greatly improves the appearance of a tile as compared with a perforated flat-faced tile, but enables the tiles to be arranged together so as to produce the appearance of a continuous surface. Along the front edge of each side of the tile may be formed a half-V or half-U or like groove so that when two tiles are placed together there is a V-shaped or U-shaped or like groove at their junction.

Several constructions of perforated tiles or panels in accordance with the invention are illustrated in the accompanying drawing in which Fig. 1 is a plan view of a portion of one form of the improved tile and Fig. 2 a transverse section on the line 2—2 of Fig. 1. Figs. 3 to 6 illustrate

another form of tile, Fig. 3, being a plan view of a portion of the tile, Fig. 4 an inverted plan view, Fig. 5 a section on the line 5—5 of Fig. 3 and Fig. 6 a section on the line 6—6 of Fig. 3. Fig. 7 is a detail showing an alternative form of perforation, while Figs. 8 and 9 illustrate a modified form of the tile shown in Figs. 3 to 6, Fig. 8 being an inverted plan view and Fig. 9 a section on the line 9—9 of Fig. 8.

In the different embodiments illustrated, the same reference characters indicate like parts.

Referring to the drawing, 11 denotes the body of the tile, 12 its front or normally exposed face, 13 its rear face, 14 denotes the rearwardly extending flange of the tile forming in the rear of the tile, a seating or pocket 15 to receive sound absorbing material (not shown). 16 indicates the perforations and 17 the recesses.

In the form of tile illustrated in Fig. 1 each perforation 16 is surrounded on the front face by a hemispherical recess 17 which serves to reduce the effective length of the cylindrical part of the hole and facilitates the withdrawal of the pins used in moulding the tile. Along one or more edges of the tile dependent on the arrangement of the perforations in relation to the tile, are provided half holes 18 extending substantially a depth equal to the normal thickness of a tile and co-operating half recessed portions 19 which mate with similar portions of holes and recesses on an adjacent tile so that when the tiles are assembled they present a continuous series of perforations.

In the embodiment illustrated in Figs. 3 to 6, the recesses in the face of the tile are constituted by grooves 17 of V-shape intersecting at right angles. The perforations 16 are formed at the intersections of the grooves and are therefore of less depth than the thickness of the panel so that the pins which form the perforations may be easily withdrawn. As shown particularly in Figs. 4 and 5, the rear end portions of the holes may be suitably flared for the same purpose.

In Figs. 3 and 5 the side edges of the front face of the panels are bevelled and formed with half perforations so that when the panels are assembled in abutting relation they present the appearance of a continuous panel with regularly spaced perforations and grooves.

In the embodiment illustrated in Fig. 7, the perforations 16 are flared from both sides of the body of the panel so that a throat is formed in each hole.

The arrangement shown in Figs. 8 and 9 differs from that shown in Figs. 3 and 6 only in the feature that the perforations 16 are in this instance of uniform diameter throughout their depth. In Fig. 8 a corner construction 22 is illustrated which is of value if the tile is to be nailed or screwed to the supporting structure. The corner is filleted as shown with plaster suitably reenforced as hereinafter described and the nails may be driven through this portion through the face 12.

By a fibre-plaster panel or tile in the foregoing description, is meant a panel or tile of plaster of Paris or like material containing fibre such as sisal, hemp, open Hessian or other open woven fabric or like material as a reenforcement within the tile. For convenience, an open woven fabric is used as illustrated in Figs. 3, 5 and 6 by strands 20. This reenforcing is completely encased by the plaster. It is inserted during the pouring operation, the reenforcing being inserted after part of the plaster is poured.

It usually is desirable to reenforce the flanges of the tile by means of strips or ribbons of wood 21 as shown in Figs. 4, 5 and 6. When this reenforcing is used, the fabric ends are advantageously wrapped around the reenforcing strip as shown in Fig. 6. A tile so reenforced is capable of being handled in a normal manner during shipment and installation without breakage.

I claim:

1. A plaster facing tile or panel for the walls or ceiling of an enclosure having a plurality of apertures extending therethrough from the exposed surface thereof, said tile having a plurality of shallow recesses in said exposed surface coinciding with said apertures, the walls of said recesses divering outwardly at a substantial angle to the walls of said apertures to form flaring enlargements of said apertures at said exposed surface.

2. The construction of claim 1 in which the recessed portions are formed by grooves in the surface of said tile, the grooves coinciding with the apertures.

3. The construction of claim 1 in which the recesses are formed by intersecting grooves, the intersections of the grooves being at the perforations.

4. A cast pan-like plaster tile or panel for the reception of sound-absorbing materials, comprising a facing-wall of substantial thickness and rearwardly extending flanges at the edges thereof, said facing-wall having a plurality of apertures extending therethrough and having a plurality of shallow recesses in the exposed surface thereof, said recesses coinciding with said apertures, the walls of said recesses diverging outwardly at a substantial angle to the walls of said apertures to form flaring enlargements of said apertures at said exposed surface.

5. The construction of claim 4 in which the recesses are in the form of intersecting grooves and the perforations are provided at the intersections of the grooves.

6. The construction of claim 4 in which a reenforcing ribbon of wood is inserted in the flanges, the flat portion of said ribbon being parallel to the outside edge of said flanges.

CYRIL L. COFFEY.