May 3, 1960 M. MACCAFERRI 2,935,152

ACOUSTICAL UNITS AND INSTALLED ASSEMBLIES THEREOF

Filed May 15, 1956 5 Sheets-Sheet 1

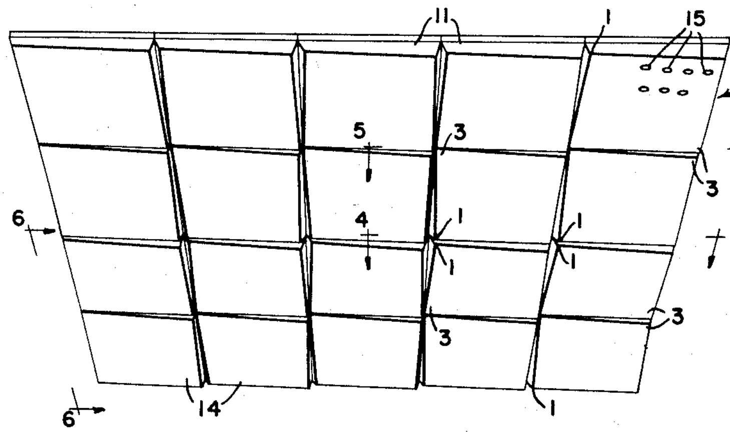


FIG. 1.

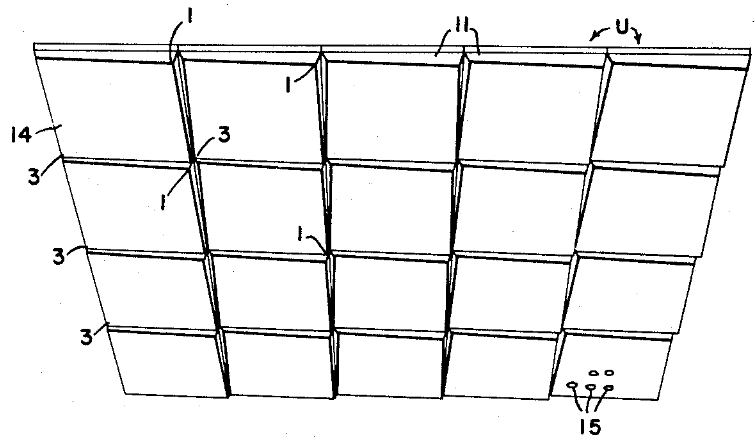


FIG. 2.

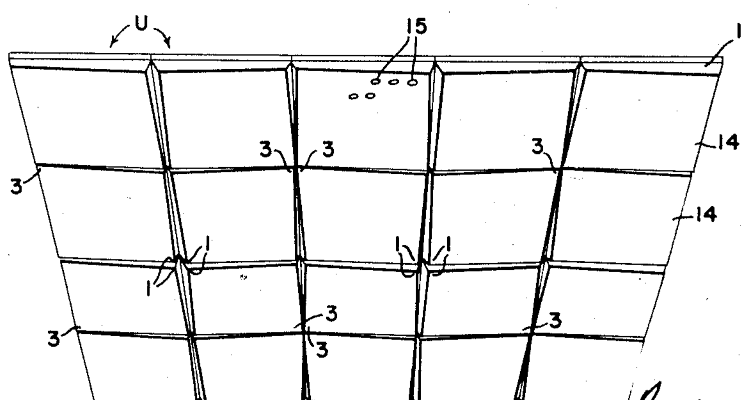


FIG. 3.

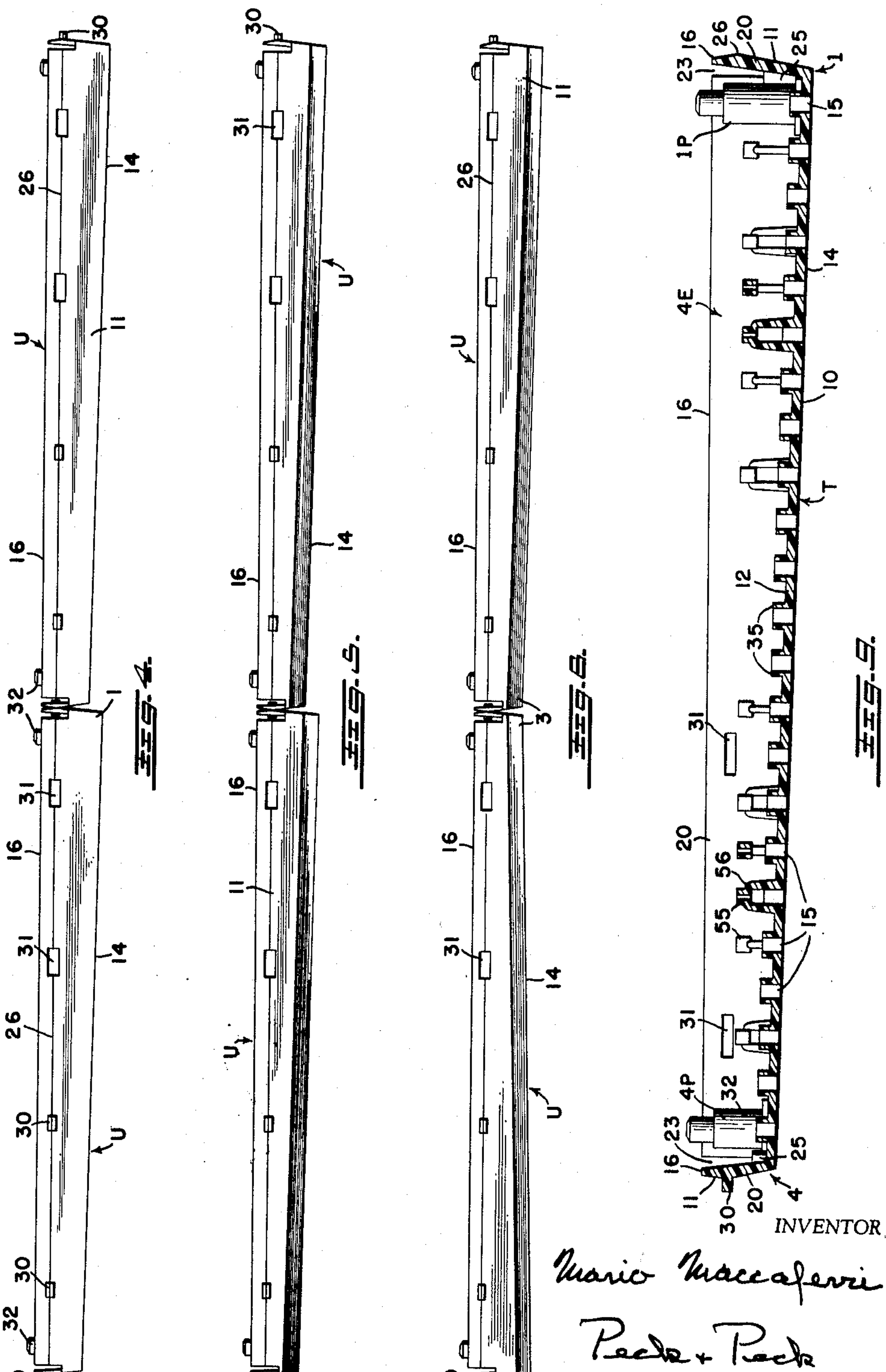
INVENTOR:
Mario Maccaferri

BY Peck + Peck.
ATTORNEYS

May 3, 1960 M. MACCAFERRI 2,935,152

ACOUSTICAL UNITS AND INSTALLED ASSEMBLIES THEREOF

Filed May 15, 1956 5 Sheets-Sheet 2



INVENTOR

Mario Maccaferri

Peck + Peck

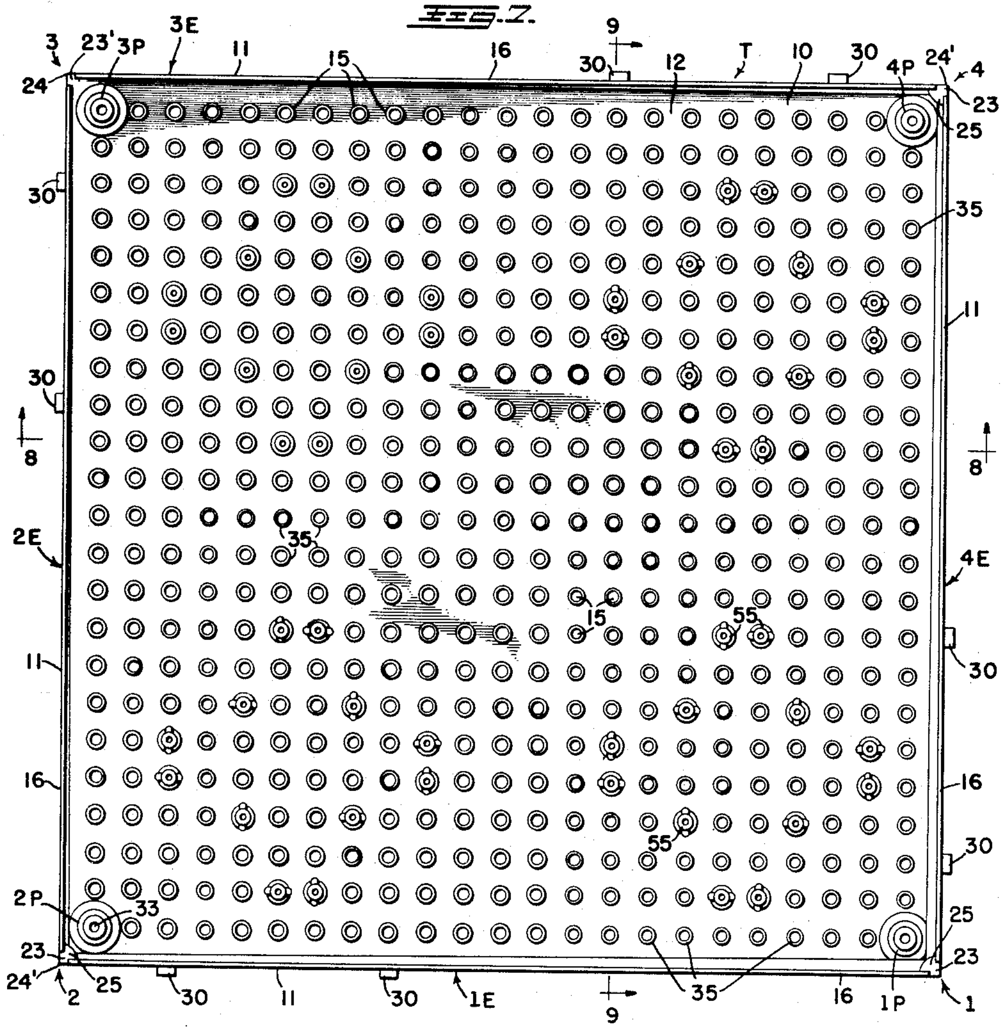
ATTORNEYS

May 3, 1960 M. MACCAFERRI 2,935,152

ACOUSTICAL UNITS AND INSTALLED ASSEMBLIES THEREOF

Filed May 15, 1956 5 Sheets-Sheet 3

FIG. 7.



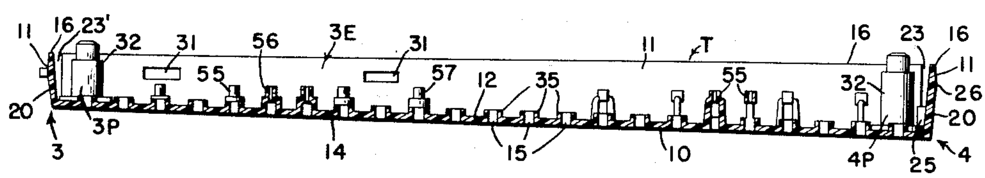


FIG. 8.

INVENTOR;

Mario Maccaferri

BY Peck & Peck

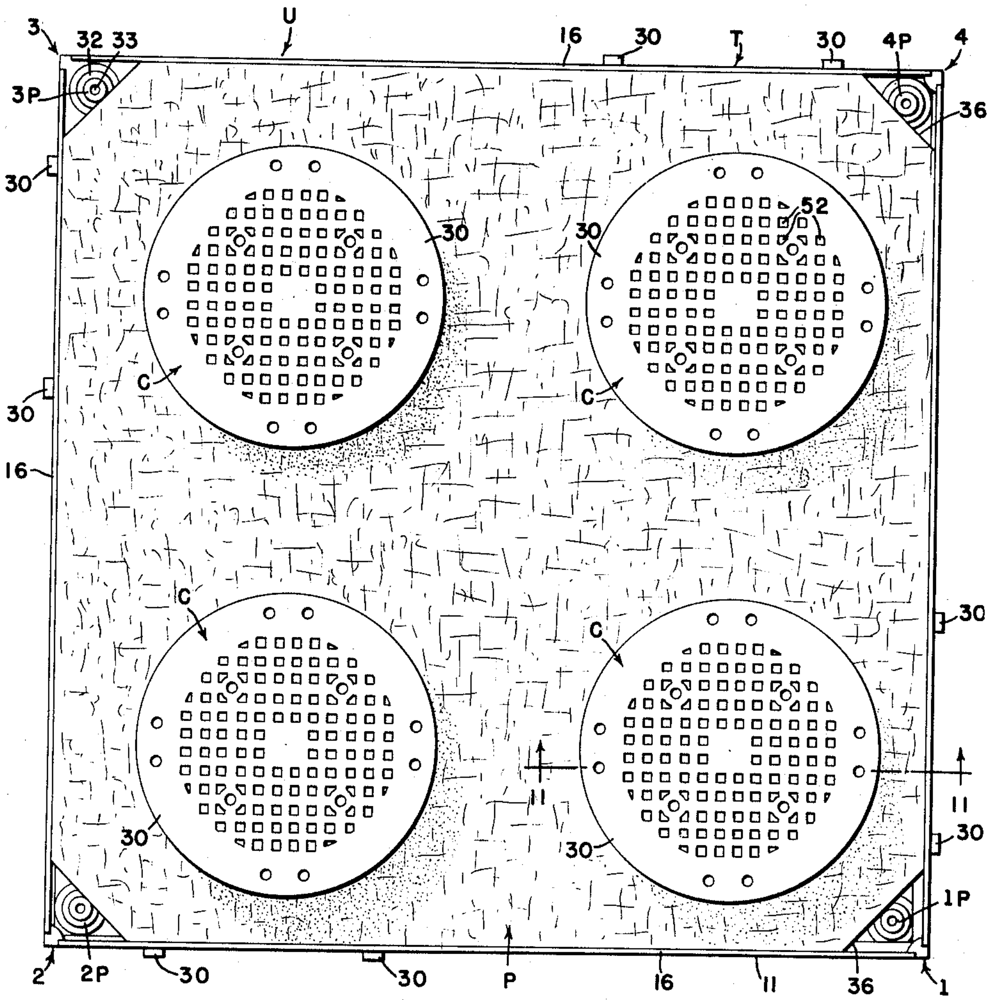
ATTORNEYS

May 3, 1960 M. MACCAFERRI 2,935,152

ACOUSTICAL UNITS AND INSTALLED ASSEMBLIES THEREOF

Filed May 15, 1956 5 Sheets-Sheet 4

FIG. 10.



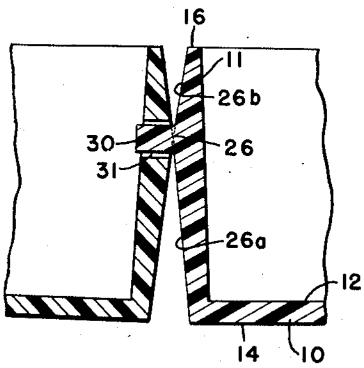


FIG. 13.

INVENTOR:

Mario Maccaferri

BY Peck + Peck

ATTORNEYS

May 3, 1960 M. MACCAFERRI 2,935,152

ACOUSTICAL UNITS AND INSTALLED ASSEMBLIES THEREOF

Filed May 15, 1956 5 Sheets-Sheet 5

Fig. 11.

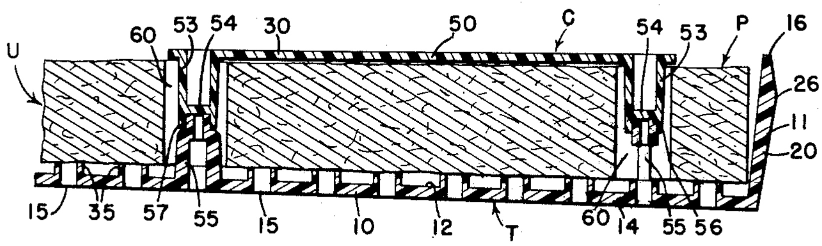
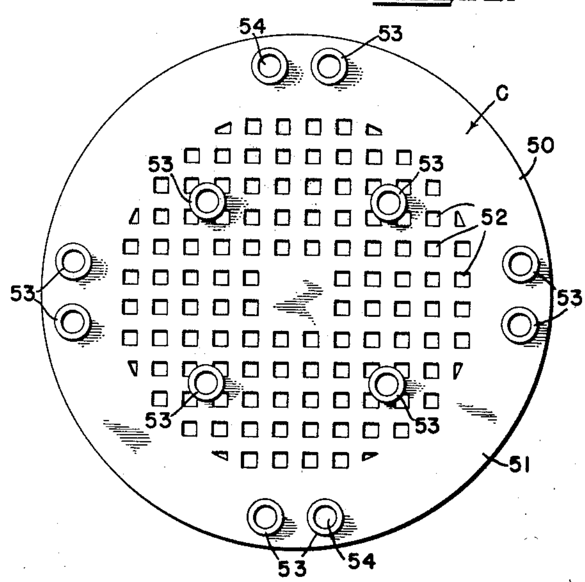


Fig. 12.



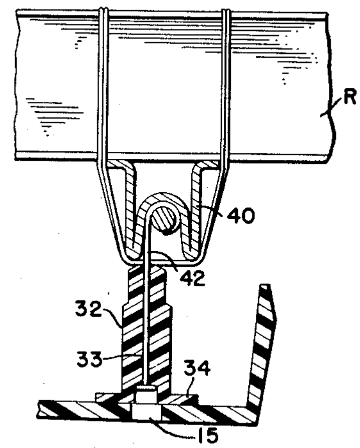


Fig. 15.

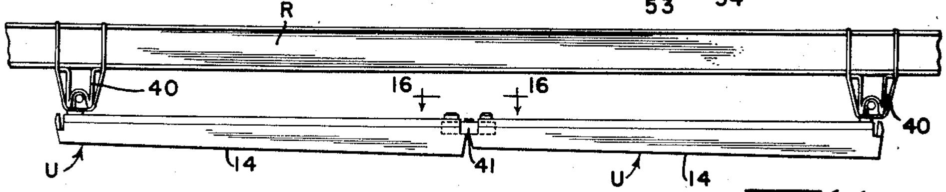


Fig. 14.

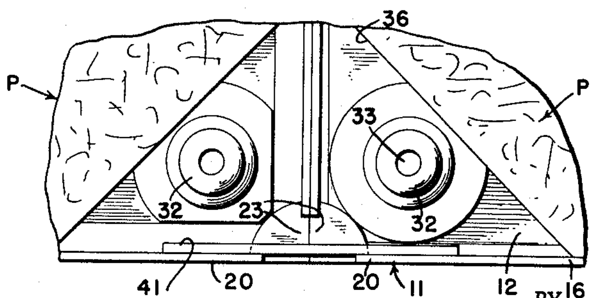


Fig. 16.

INVENTOR:

Mario Maccaferri

BY Peck + Peck

ATTORNEYS

United States Patent Office

2,935,152

Patented May 3, 1960

1

2,935,152

ACOUSTICAL UNITS AND INSTALLED ASSEMBLIES THEREOF

Mario Maccaferri, Rye, N.Y.

Application May 15, 1956, Serial No. 585,120

11 Claims. (Cl. 181—33)

My present invention relates and is directed to acoustical units and installed assemblies thereof providing acoustical, sound absorbing and deadening surfaces for the acoustical treatment of various structures, and the nature and objects of the invention will be readily recognized and understood by those skilled in the arts to which the invention relates in the light of the following explanations and detailed descriptions of the accompanying drawings illustrating what I now consider to be preferred forms of such acoustical units and preferred installed assemblies thereof embodying my invention, from among various other forms, designs, arrangements, constructions and mechanical and acoustical expressions of which the invention is capable within the broad spirit and scope thereof as defined in the claims hereto appended.

Acoustical structures installed for the purpose of absorbing and deadening sound waves are mainly used on or as an enclosing wall or walls of a space to be soundproofed thereby, such as a room or other enclosed space. As now generally installed and used, such an acoustical structure usually has the surface of the exposed, sound wave receiving face area thereof parallel with the surface of the structure which it covers or parallel with the plane of the engaged seating surfaces of the mounting for the acoustical structure. And generally the exposed, sound wave receiving face surface of the acoustical structure is also parallel with the surface opposite it in a space enclosing wall structure. For example, if the acoustical structure provides the ceiling of a room, it is generally installed with its exposed face surface parallel with the surface of the floor of the room, or, if it is installed on one of the opposite wall structures, its exposed face surface will be parallel with the face surface of the opposite wall structure. Where, as is generally the case, the acoustical structure is formed and installed as an assembly of acoustical units, such as acoustical tiles, then these units are conventionally assembled and installed with their exposed face areas parallel and in the same plane with such plane being usually parallel with the plane of the surface of the opposing wall of a space-enclosing wall structure. However, it has been determined that the acoustical efficiency and resulting sound-absorption and sound-deadening possible with such acoustical structures can be substantially increased if the exposed, sound wave receiving face surface of the structure is in a plane that is non-parallel with or at an angle to the opposite exposed face surface of an opposite wall of a space-enclosing wall structure.

One of the primary objects and an important feature of my invention is to increase the acoustical efficiency of a sound-absorbing and deadening structure by providing the exposed, sound-wave receiving surface thereof formed with sections or portions of said surface tilted or inclined at angles relative to the general plane of the surface covered by or the mounting system for such acoustical structure.

A further object is to provide such an acoustical structure formed of an installed assembly of acoustical units, such as acoustical tiles, in which the assembled tiles making up the acoustical structure have their exposed face surfaces inclined or tilted at angles relative to and non-parallel with the general plane of the surface covered by such assembly of acoustical tiles or to the general plane of a structure on which such assembly is mounted.

A further object is to provide an acountical unit in which the face surface of the unit is inclined or tilted from and relative to the general plane of the surface or structure onto or over which such acoustical unit is mounted in installed position thereof.

A further object is to provide an acoustical unit in the form of an acoustical tile, in which the exposed sound-wave receiving face surface of the tile is inclined or tilted relative to the general plane of the base or mounting of the tile in a direction diagonally across the tile from one location to a diagonally opposite location thereon.

More specifically, my present invention is directed to and concerns acoustical units or so-called acoustical tiles formed of plastic material, and particularly to such plastic acoustical tiles of the broad types disclosed and exemplified in my pending U.S. patent applications Serial No. 283,707, filed April 22, 1952, for Acoustic Tiles, now Patent No. 2,755,882, and Serial No. 379,918, filed September 14, 1953, for Acoustical Tile. However, while certain of the features of the invention may specifically find primary utility in these so-called plastic acoustic tiles, such features are not limited to use with plastic acoustic tiles but are adaped and intended for use generally in acoustical tiles formed of various other materials where the advantages of such features of the invention may be obtained from such use.

One of the features of the invention of particular utility in the plastic forms of acoustical tiles has as an object the provision of a design and construction by which such tiles are adapted to mounting and installation on standard tile mounting and suspension systems generally available on the market and in widespread use for mounting tile assemblies, thus avoiding the necessity of the expense and inconvenience of designing and providing special mounting and installation systems intended specifically for and generally usable only with such plastic acoustical tiles.

A further object is to provide a design and construction of acoustical tile by which the tile would be adapted for either mounting and installation on one of the standard acoustical tile mounting suspension systems now available on the market, or for mounting by cementing directly into installed position onto and against a surface which is to be covered and acoustically treated without using any mounting and installation system for direct attachment thereto of the tiles in suspended positions thereon.

Another object is to provide a design and construction of acoustical tile made of plastic material and of the types having rearwardly extending edge walls or flanges thereabound, in which provision is made for expansion and contraction of the assembled abutting tiles in an installation thereof so that the possibility of tile buckling or breakage by tile expansion and contraction is eliminated or materially reduced and the maintenance of the tiles in their desired installed and assembled positions against displacement or dislodgment is insured.

A further object is to provide a design and construction of each tile for interlocking with adjacent abutting tiles in an installed assembly of such tiles so that a system of interlocking is provided for the assembled tiles which materially aids in the precise mounting and assembly of the tiles into the desired installed positions relative to each other and which system further functions to maintain the tiles in their assembled positions as an interlocked composite structure.

Another object is to provide a self-contained acoustical unit adapted for storage, handling and installation as a unit, which is comprised of a plastic, "pan" type acoustical tile with a sound-absorbing mat or pad over and against and covering the rear side of the tile in position secured on the tile against displacement by discs or plates which also provide cement or mastic receiving surfaces on their rear sides by which the tile unit can be cemented directly onto a surface in the desired installed position without the necessity of applying cement either on such surface or to the sound absorbing pad or mat component of the tile unit.

A further object is to provide such a tile unit in which a sound-absorbing pad or mat may be used having substantial portions thereof of greater depth or thickness than the remaining portions of the mat so that the range of sound-wave frequencies which will be effectively absorbed and dampened by the mat and the tile unit will be substantially increased with resulting increased acoustical efficiency of the unit.

A further object is to provide an improved design and construction of pad retaining and cement receiving discs or plates for such a tile unit which will increase the rigidity of the discs or plates on a tile unit and also increase the cementing efficiency of the cement receiving surfaces thereof while preventing or substantially reducing the possibility of cement bleeding or seeping therefrom to the face of the tile unit.

Another object is to provide a plastic acoustical wall tile having rearwardly extending edge walls or flanges therearound with the adjacent ends of adjacent flanges separated to provide for independent displacement of adjacent flanges under conditions of expansion and contraction of a tile occasioned by varying temperatures to which a tile is subjected, so as to thereby eliminate or reduce the possibility of buckling or breakage of adjacent tiles in an assembly thereof.

A further object is to provide such an acoustical tile with a corner construction at such separated edge flange ends that will give the tile increased strength and rigidity and cause the tile to resist undue bending, twisting and warping thereof in handling and installation, as well as to resist the various forces to which such a tile is subjected in an installed assembly thereof.

Another object is to provide acoustical units, such as tiles, each having the exposed sound wave receiving face thereof tilted or inclined as a planar surface thereacross, adapted for assembly in various relative arrangements thereof to provide acoustical structures having different surface appearances and visual effects at the option of the installer.

And further objects are to provide a design and construction of plastic acoustical tile and tile unit formed thereof for carrying out the foregoing objects and features without substantially increasing the weight of the tile or the cost of production thereof while improving the acoustical efficiency and the appearance of the tiles in various installed assemblies thereof.

With the foregoing objects, features and results as well as certain others in view, which others will be readily apparent from the following detailed description and explanation, my invention consists in certain novel features in design and construction of parts and components and in combinations and sub-combinations thereof, all as will be more fully referred to and specified hereinafter.

Referring to the accompanying drawings in which similar reference characters refer to corresponding parts and elements throughout the several figures thereof:

Fig. 1 is a generally schematic view in face plan illustrating one possible assembly and relationship of tilt or inclined face acoustical tile units of my invention in a ceiling installation thereof.

Fig. 2 is a schematic view in face plan of another assembled relationship of acoustic tile units of the invention in a ceiling installaiton thereof.

Fig. 3 is a schematic view in face plan of still another relative arrangement of acoustical tile units of the invention in a ceiling installation thereof.

Fig. 4 is a view in edge elevation of adjacent abutting tiles of the installation of Fig. 1, taken as from the line 4—4 of Fig. 1.

Fig. 5 is a view similar to Fig. 4 but taken as from the line **5—5** of Fig. 1.

Fig. 6 is a view similar to Figs. 4 and 5 but taken as from the line **6—6** of Fig. 1.

Fig. 7 is a bottom plan view of a tile unit of the invention without the sound wave absorbing mat or pad and the pad retaining and cement receiving discs therefor.

Fig. 8 is a transverse sectional view taken as on the line 8—8 of Fig. 7, the tile edge flanges being indicated as sprung or flexed slightly outwardly to show the movement thereof independently of the adjacent flanges.

Fig. 9 is a transverse sectional view, similar to Fig. 8 but taken as on the line **9—9** of Fig. 7.

Fig. 10 is a bottom or rear side view in plan of the composite acoustical tile unit of the invention showing the sound wave absorbing pad retaining and mastic receiving discs in assembled positions making up the self-contained unit.

Fig. 11 is a transverse sectional view through the acoustical tile unit of Fig. 10 taken as on the line **11—11** of Fig. 10.

Fig. 12 is a rear or underside plan view of one of the pad retaining and mastic receiving disc units of the tile unit of Fig. 10.

Fig. 13 is a more or less diagrammatic view in transverse section through abutting edge flanges of adjacent tiles in an assembly thereof showing the interlocking of the tiles.

Fig. 14 is a view more or less schematic in edge elevation showing a pair of connected tile units of the invention in installed position on a suspension system.

Fig. 15 is a detail setcional view through one of the mounting posts and through a portion of the tile body showing the manner of attaching the tile in a suspension installation thereof on a suspension system.

Fig. 16 is a fragmentary plan view of adjacent corners of the pair of joined tiles of Fig. 14 showing one of the connecting plates by which the tiles are rigidly connected together.

The broad feature of my present invention by which I provide an acoustical unit, such as an acoustical tile, with its face tilted or inclined so that when installed the face surface of the tile unit will be out of parallelism with the plane of the surface on which the tile unit is mounted or with the plane of the mounting of the tile at the rear or underside thereof, is illustrated and disclosed herein as embodied in tiles and tile units of the plastic material types, such as exemplified in my above referred to pending U.S. patent applications Serial Nos. 283,707, now Patent No. 2,755,882, and 379,918. The embodiment of this tilted face feature of my invention in such types of plastic acoustical tiles and tile units is purely by way of example and is not intended as a limitation of this tilted face feature of the invention to either tiles of plastic material or of the types and the specific designs and constructions of the examples illustrated and disclosed herein. This tilted face surface feature of the invention is adapted to embodiment in acoustical tile units or acoustical structures generally formed of any material or materials other than plastic and to acoustical tiles and acoustical structures other than the specific designs and constructions herein disclosed, and such general adaptability and use is specifically recognized and included within the scope of the invention as will be apparent to those skilled in this art from the disclosures hereof based on the selected embodiment examples hereinafter described and explained.

The acoustical tile unit embodying the various features of my invention which I have selected for purposes of description and explanation, is illustrated in the accompanying drawings and is identified therein in its entirety by the reference character U. This acoustical tile unit U includes as a basic component thereof a tile or pan T, which will be hereinafter usually referred to as a tile or tile component, and which in this example is formed as an injection molded structure of polystyrene plastic. The tile component T is in and of itself an efficient acoustic tile when used alone, as will be referred to and described hereinafter. In this specific instance the plastic tile component T of the unit U is square in plan form and may be considered to be of 12" x 12" in plan dimensions. This tile component T is itself formed as an integral structure consisting essentially of a relatively thin, plate-like plastic body **10** having therearound the rearwardly extending edge walls or flanges **11** defining and enclosing a space or cavity at the rear side of the tile body **10**. The tile body **10** provides a rear side surface **12** and an exposed sound wave receiving front face forming, generally planar surface **14**. The tile body **10** is provided with a multiplicity of relatively closely spaced perforations or sound wave receiving holes **15** therethrough over substantially the entire area thereof, with these holes **15** extending completely through the body **10** and discharging at the rear side thereof within the cavity enclosed by the edge walls or flanges **11**.

The tile unit U includes a mat or pad P formed of any suitable sound absorbing or deadening material, such, for example, as glass fibre, secured in position on and covering the rear side of the tile body T within the cavity defined and enclosed by the edge flanges **11**. This pad P has thicknesses when uncompressed of substantially the depths of the portions of the rearwardly extending edge walls of flanges **11** extending therealong and adjacent thereto, so that in mounted position the rear surface of the pad lies substantially within and preferably does not extend outwardly substantially beyond the plane of the rear edges of the edge flanges **11**. This mat or pad P can, if desired, with certain acoustical units of the invention be secured and retained in position at the rear side of the tile body **10** by cementing the pad to the rear surface **12** of the tile body.

In accordance with one of the features of my invention the pad P is formed of different thicknesses throughout the plan dimension thereof to increase its acoustical efficiency, as will be described more in detail hereinafter.

However, in accordance with one of the features of my invention the sound absorbing material pad P is secured and retained in its mounted and assembled position in the tile unit U by retaining plates or disc structures C which are rigidly secured to the tile body **10** in positions thereon spaced rearwardly from the rear surface **12** of the body and extending over the pad P. These retaining disc or plate structures C present at the rear exposed sides thereof the flat, planar surfaces **30** which are positioned in this specific example to lie substantially within the plane of the rear edges of the edge walls **11** of the tile T. The planar rear surfaces **30** of the retaining disc structures C are provided in accordance with the teaching of my invention to form and function as cement or mastic receiving surfaces. Thus in those installations of acoustical tile units where it is necessary or desired to cement the units directly onto a surface to be acoustically treated, cement may be applied to the rear surfaces **30** of the structures C and the tile unit then pressed into installed position directly onto the surface to be treated to engage the cement on structures C into adherence with the surface and thereby secure the tile unit in its installed position thereof. In this manner the necessity for coating the surfaces on which the acoustical tile units are to be mounted with cement is eliminated and further the application of any cement onto the sound-absorbing material pad P of the unit is avoided.

As an exemplification of that feature of my invention by which the acoustical efficiency of an acoustical tile or tile unit is substantially increased through tilting or inclining the exposed, sound wave receiving face thereof, I have in the acoustical tile unit U of the example hereof inclined or tilted the planar face **14** thereof diagonally across the tile T from one corner to the diagonally opposite corner thereof. The tilted or inclined face **14** of the tile T is planar and extends completely across the tile as a flat planar surface in a single plane from its highest point at one corner of the tile to the intermediate height opposite corners and on across the tile to the diagonally opposite low corner thereof. In this instance the rear edges **16** of the edge walls **11** of the tile T lie in a single plane and it is the flat planar, relatively thin body **10** which is bodily tilted or inclined in its entirety across the edge walls **11** that gives and provides the tilt or inclination of the front, sound wave receiving face **14** across the tile unit. With this design and construction in a tile of generally rectangular plan shape, such as the square tile T of this example, the structure provides four corners so that with the body **10** tilted and inclined across the edge walls **11** there results a high corner **1** with a low corner **3** diagonally across the tile from the high corner and with the diagonally opposite intermediate height corners **2** and **4**. With the rear edges **16** of the edge walls **11** positioned in a single plane passing therethrough and with the tile body **10** tilted or inclined thereacross from the high corner **1** to the low corner **3**, it results that the section **1E** of the edge wall **11** between the high corner **1** and the intermediate height corner **2** progressively decreases in depth to the latter corner; the section **2E** of the edge wall **11** decreases progressively in depth from the intermediate corner **2** to the low corner **3**; the section **4E** of the edge wall **11** opposite or parallel with section **2E**, progressively decreases in depth from the high corner **1** to the intermediate height corner **4**; and the section **3E** of the edge wall **11** progressively decreases in depth from the intermediate height corner **4** to the low corner **3**. With the example tile T having the body **10** and its face surface **14** tilted or inclined in a single plane diagonally thereacross from the high corner **1** to the low corner **3**, the heights of the diagonally opposite intermediate corners **2** and **4** from the plane passing through the rear edges of the edge walls **11** will be the same and the sections **1E** and **4E** of the edge walls **11** extending between the high corner **1** and the intermediate corners **2** and **4**, respectively, will be dimensionally identical, while the sections **2E** and **3E** of the edge walls **11** which extend between the diagonally opposite intermediate height corners **2** and **4** and the low corner **3** will be dimensionally identical.

While in the acoustical tile T of the selected example hereof, the relatively thin tile body **10** is bodily pitched or tilted diagonally across the tile on the edge walls **11**, it is to be understood that if desired or found expedient in those acoustical tiles having relatively thicker bodies, the tilt or inclination of the exposed, sound wave receiving front face surface of the tile body may be formed as tilted or inclined relative to the rear side of the tile body and without bodily tilting or inclining the body of the tile in its entirety, or by so tilting the tile body but with a reduced angle of tilt. Such formations of an acoustical tile to provide the tilt or inclination to the face thereof in installed position are contemplated and considered by my present invention in its broad aspects as the structural and acoustical equivalents of the design and construction of the example tile unit hereof.

Each of the sections **1E**, **2E**, **3E** and **4E** of the side edge flange or wall **11** of the tile T is of the same design and construction and is comprised by an edge flange **20** which is integral with and extends rearwardly from the body **10** along a side edge thereof. Each flange **20** of the edge flange or wall **11** is disposed in a plane generally normal or substantially perpendicular to the plane which passes through the rear edges **16** of such edge flange or wall **11**. The rear edges **16** of the edge wall section 1E, 2E, 3E and 4E are located in a common plan spaced rearwardly from the tile body **10** so that the latter is thus tilted or angularly related to such common plane. In the example tile the sections 1E and 4E of the edge flange or wall **11** which extend between the high corner **1** and the diagonally opposite intemediate height corners **2** and **4** are dimensionally identical with their maximum widths at the high corner and their minimum widths at the intermediate corners. Similarly, the sections 2E and 3E which extend between the intermediate corners **2** and **4** and the low corners **3** of the tile are dimensionally identical and have their maximum widths at the intermediate corners, being the minimum widths of the sections 1E and 4E, and their minimum widths at the lower corner **3**.

One of the conditions which these plastic acoustical tiles must encounter, after installation into assembled position, is the expansion and contraction of the tiles under the varying degrees of temperature to which they will be subjected. In the installation of the tiles it is undesirable to leave any appreciable spacing between the adjacent side edge flanges of adjacent tiles so that in the preferred installations adjacent side edge flanges are either abutting or very minutely spaced. Particularly under extremes of temperature conditions the expansion and contraction of the adjacent abutting tiles frequently results in buckling of the installed tiles with possible breakage or fracture of portions of adjacent tiles. By my invention I have provided a construction and arrangement of the side edge flanges **20** making up the side edge flange or wall structure **11** which reduces the effects of expansion and contraction with the tiles in installed position and thus substantially eliminates the possibility of buckling of and damage to the tiles. In carrying out this feature of the invention in the example tile T hereof, I provide relatively wide clearance spaces, separations or gaps **23** and **23'** between the adjacent ends of the flanges **20** of the side edge flange or wall **11** at each corner of the tile. These spaces or gaps between the edge flanges **20** at the corners of the tile may extend for the full width or depth of the flanges at each corner, as illustrated by the space **23'** between the adjacent ends of the side edge flange section 2E and 3E at the low corner **3** of the example tile. Or, the spaces may extend from the rear edges **16** of adjacent flanges **20** a portion only of the full width of the flanges as shown by the spaces or gaps **23** between the flanges **20** at the high corner **1** and the intermediate height corners **2** and **4**. Thus the spaces **23** extend from and separate the rear edges **16** and the adjacent ends of the flanges at the corners **1**, **2** and **4** but terminate spaced rearwardly from the tile body **10** with the adjacent ends of adjacent flanges **20** being joined from the inner or forward ends of the spaces **23** to the tile body **10**.

In those instances, such as at the corners **1**, **2** and **4** of the example tile T, where the spacing or separation **23** between adjacent ends of the flanges **20** extends only a portion of the width of the flanges, I may provide strengthening and stiffening buttresses **25** which are molded integrally with the tile structure and which extend inwardly from the joined edge portions of the tiles at these corners. Due to the different widths of the edge flanges at the high and the intermediate height corners of the tile, it is preferable to form the buttresses **25** at the intermediate corners **2** and **4** of less length than the length of the buttresses at the high corner **1**, to thus provide the spaces or gaps **23** at the high corner **1** and the intermediate corners **2** and **4** of substantially the same lengths as the length of the full width space or gap **23'** between the adjacent ends of the flanges **20** at the low corner **3**.

It is to be noted that where the tile is provided with spacing or gaps between the adjacent ends of the side edge flanges **20** at the corners of tile which are of the full width of the flanges, such as the space or gap **23'** at the low corner of the tile T, then the body **10** projects outwardly beyond the adjacent ends of the flanges in the form of a sharp pointed corner **24**. Similarly, where the spacing or gaps **23** extend only for a portion of the width of the adjacent ends of flanges **20**, the corners of the tile will present instead of the sharp pointed corner **24**, the sharp edged corners **24'**. In either instance these sharply defined corners formed by what amounts to a "cut-back" of the adjacent ends of the flanges **20** at the corners of the tile, make possible close, precise and neat fitting of and joints between the corners of adjacent tiles in their assembled relation in a tile installation, as well as insuring regularity in the resulting positioning of the tiles relative to each other in the completed installation.

A further feature of the invention which contributes to the limited but free expansion and contraction of the side edge flanges **20** relative to adjust abutting edge flanges **20** of adjacent tiles in an installation, resides in the formation of the outer side of each flange **20** to provide angularly related surfaces meeting at and forming a ridge **26** disposed longitudinally along and throughout the length of the flange intermediate the rear edge **16** thereof and the opposite forward edge along the tile body **10**. In this particular example tile T the ridge **26** of each side edge flange **20** is formed by the line of jointure of the outwardly inclined angular faces **26**a and **26**b forming the outer side surface of a flange **20**, although attention is here directed to the fact that if desired or found expedient, the outer side surface of an edge flange **20** can be formed as a single planar surface with a ridge molded thereon to extend outwardly therefrom. In this instance the ridges **26** of the side edge flanges **20** are each spaced the same distance forwardly or inwardly from the rear edges **16** of the flanges and this distance is determined from the low corner **3** of the tile T by locating the ridges in a plane which intersects midway of the length of the gap or spacing **23'** at this low corner. The ridge **26** on the outer side of a flange **20** of a tile T will engage with the corresponding ridge **26** on the adjacent flange **20** of an adjacent tile when in assembled relation in an installation, so that initially and under the temperature conditions at the time the tiles are installed the ridges **26** will maintain a very slight spacing between the tiles which is sufficient to permit expansion of the tiles relative to each other without resulting in damage to or displacement of the tiles from their proper installed positions. With each side edge flange **20** of a tile being also free to flex or displace laterally by expansion and contraction due to the gaps between adjacent ends thereof at the corners of the tile, it will be evident that maximum protection against tile buckling or breakage is provided. The ridges **26** may be eliminated so that the adjacent side edge flanges **20** of adjacent tiles are in abutting relationship in an installation of the tile, without seriously impairing the protection against buckling or breakage from expansion and contraction, because of the freedom of independent movement of the edge flanges **20** provided for by the separation of the edge flanges at the corners of the tiles.

A system for interlocking and of assuring proper relative positioning of the assembled tiles is provided by the invention and, in the example tile T hereof, takes the form of alternate pairs of locking lugs **30** and keeper holes or recesses **31** on the side edge flanges **20**. In the particular arrangement of the locking lugs **30** and recesses **31** provided for the tile T, each side edge flange **20** has two identical lugs **30** spaced apart along one-half of the flange and two identical recesses **31** spaced apart along the other half of the edge flange. Each of the locking lugs **30** is of rectangular cross-section with the long dimension thereof disposed longitudinally of the edge flange **20** on which mounted, while each of the keeper holes or recesses **31** is also of rectangular plan form and each extends in this instance completely through the edge flange with the long dimension thereof disposed longitudinally of the flange. The locking lugs 30 and the recesses 31 of each side edge flange 20 are in this instance located along the ridge 26 of the flange with this ridge being interrupted by the lugs and recesses. Each rectangular recess 31 is of greater dimensions than each of the rectangular locking lugs 30, being in this particular example of a length substantially greater than and approaching twice the length of a locking lug and of a width but slightly greater than and approaching substantially the width of a lug.

The locking lugs 30 and recesses 31 are arranged on the side edge flanges 20 of the tile T so that the pairs or sets of lugs 30 alternate around the tile with the pairs or sets of keeper recesses 31. Thus in the assembly of adjacent tiles the locking lugs 30 of abutting flanges 20 of adjacent tiles will always line up with and be received in the recesses 31. In assembling the tiles in an installation the lugs 30 of an edge flange 20 of the tile being placed in position are inserted into the recesses 31 of the abutting edge flange of the adjacent tile with the lugs of such latter edge flange entering and being received in the recesses 31 of the abutting edge flange of the tile being inserted. Where, as is usual, the tile being inserted must be abutted with and against two previously inserted tiles, it will be obvious that the lengths of the recesses of the abutting tiles make it possible to position and properly engage a tile being inserted with two previously mounted tiles. When in properly installed position the length of each lug or positioning pin 30 relative to the length of the recesses 31 in which they are received is such that with the adjacent side flanges of abutting tiles in alignment, the lugs 30 will be positioned in their receiving recesses centrally of such recesses with clearance spaces between the ends of each recess and the opposite sides of the lug 30 received therein. With the locking lug or pin and recess arrangement providing the interlocking system of the invention, the assembly of the tiles into an installation thereof is rendered quite simple and their proper positioning relative to each other and the maintenance of such proper positioning in the installation after assembly is assured.

The tiles of the invention are designed and intended for both installation by directly adhering them to a mastic coating and by mounting on and suspension from a conventional type of tile suspension system. For mounting from a suspension system mechanically without the use of cement, I have provided in each corner of the tile a mounting post which extends rearwardly from the rear surface 12 of the body 10 of the tile. These mounting or suspension posts are identical in construction but vary in length in accordance with the corner in which they are located. Each post comprises a body 32 which may be of cylindrical or any other desired shape but which has an axial bore 33 therethrough for receiving an attachment member, such as a nail or a screw by which the tile is secured in position on and suspended from the rails of a suspension system, such as any one of the conventional systems known in the art, as will be more specifically referred to and described more in detail hereafter. The post 1P at the high corner 1 of the tile has a length such that it projects rearwardly a slight distance beyond the plane of the rear edges 16 of the flanges 20 of the tile. The posts 2P and 4P which are located at the intermediate height corners 2 and 4 of the tile are of the same length and have their rear ends extending rearwardly the same distance beyond the plane of the edges 16 of the edge flanges 20 as the rear end of the post 1P. The post 3P at the low corner 3 of the tile has a length less than the posts 1P, 2P and 4P but such that its rear end projects rearwardly a distance to be located in the plane of the rear edges of the posts 1P, 2P and 4P. Thus it is assured that when a tile T is mounted in position suspended from the rails of a tile suspension system, it will be held substantially level relative to the plane of the rails of the suspension system so that the tilted face 14 of the tile will be tilted or angularly disposed diagonally across the tile relative to the plane of the suspension rails for acoustically functioning in accordance with the principles of the invention.

The suspension posts 1P, 2P, 3P and 4P may be molded integral with the tile body 10 of a tile T or, as in the example hereof, they may be provided with the mounting bases 34 by which they may be solvent cemented or otherwise secured on and rigidly to the tile body. Each of the posts is mounted in position with the axial bore 33 therethrough aligned with the sound wave receiving opening 15 which is located in the corner in which the post is mounted so that this opening 15 provides the entrance into the bore 33 through which the suitable attaching member may pass position for attachment at its opposite end to the rail of the suspension system.

As in the usual tile suspension system the rails for practical reasons are spaced as widely apart as reasonably possible and usually considerably more than the 12″ width of the tiles T of the examples hereof, I propose to secure two tiles together in a desired relative positioning of the respective high corners 1 thereof so that these combined tiles will then bridge and may be mounted on and suspended from rails of a suspension system spaced approximately 24″ apart. The connection of the tiles into a rigid assembly may be made by placing connecting plate members joined to the adjacent ends of aligned side edge flanges of the joined tiles with these connecting plates being located in and extending through the spaces or gaps 23 at the adjacent corners of the joined tiles. This connecting arrangement is shown in Fig. 16 of the drawings.

An example of the suspension mounting of acoustic tiles of the invention to one of the standard types of suspension systems is illustrated in Figs. 14 and 15 of the accompanying drawings. The selected suspension system includes the rails R transversely across the undersides of which the nailing channels 40 are suitably attached in spaced, parallel relation. The channels 40 are spaced approximately 24″ apart and may be bridged by two (2) of the tiles of the example form of the invention. The tiles U are connected together in substantially fixed, rigid relationship by a connecting plate 41 fixed, as by solvent cementing, to the adjacent inner sides of the tile flanges 20 at the adjacent corners of abutting tiles, as will be clear by reference to Fig. 16 of the drawings in particular. It is to be noted that connecting plates 41 are provided at opposite sides of the joined tiles and that each connecting plate 41 extends through and is received in the adjacent and aligned separations or openings, such as the openings 23, between the edge flanges at the adjacent ends of the abutting tiles. The two tiles so joined are then placed in position across and bridging adjacent channels 40 with the suspension posts of the tiles along opposite sides thereof engaged against and aligned with the channels, after which attaching members such as the nails 42 are driven upwardly through the bores 33 in the posts into clinched engagement in the channels as shown in Fig. 15.

A tile T of the design and construction hereinbefore described may be effectively used as an acoustic unit without the sound wave absorbing pad or mat P but to increase the acoustical efficiency of the tile when so used or when used with a pad P, I have provided, in accordance with the disclosures and principles thereof of my above referred to U.S. patent applications Serial Nos. 283,707 and 379,918, a plurality of damping tubes 35 which project rearwardly from the rear surface 12 of the tile body 10 at and in axial alignment with the sound wave receiving holes or apertures 15, respectively, through the tile body 10. In this instance these tubes 35 are molded integral with the tile body 10 and have relatively short lengths to project but relatively short distances rearwardly from the rear surface 12 of the body 10.

If a tile T for suspension from a tile mounting and suspension system is to be used with a sound absorbing pad or mat P, such mat, as hereinbefore referred to, is of dimensions to substantially fill the space enclosed by the side edge flanges 20 and to completely cover the rear surface 12 of the tile body 10 and the tubes 35 projecting rearwardly therefrom. The corners of the pad may be suitably cut out or cut away, as indicated at 36 for clearance for the tile suspension posts 1P, 2P, 3P and 4P in the corners of the tile, as will be clear by reference to Fig. 10. One of the features of the invention which contributes to the acoustical efficiency of the tile when used with a mat or pad P, is the provision of such pad of varying thicknesses throughout its area so that the forward side of the pad is against and covering the rear surface 12 of the tile body 10 while the rear side of the pad is located throughout its area substantially in the plane in which the rear edges 16 of the side edge flanges 20 of the tile are located. With such a pad P of varying thicknesses I have found that the pad will more efficiently absorb and dampen sound waves over a wider range of frequencies than will a pad of substantially equal thickness throughout its area. This sound wave absorbing pad P of varying thicknesses with the damping tubes 35 discharging directly thereagainst and thereinto at the forward side thereof, together with the tilted sound wave receiving face of the tile, gives an acoustical tile of high efficiency, yet of simple and inexpensive design and construction.

Provision is made with certain forms of the tile T for mounting thereof directly onto a mastic or cement coating with the tile then adhering thereto in its installed position. This is carried out broadly in accordance with the cement mounted acoustical tile disclosures of my pending U.S. patent application Serial No. 379,918, in which discs are provided on the tile body in locations spaced from the rear side thereof parallel therewith and leaving the rear surfaces located in the plane of the rear edges of the side edge flanges of the tile. Thus the rear surfaces of such mounting discs may receive thereon the mastic for adhering the tile directly to the surface on and over which the tile is to be mounted and installed. In the present example tile unit U I have provided such pad retaining and cement discs C of improved construction and mounting. Referring now to Figs. 10, 11 and 12 in particular, each such disc C happens to be of circular form and is comprised of the plate body 50 of relatively thin plastic material providing the outer planar side surface 59 and the planar under surface 51 adapted to engage against the outer side of a sound absorbing pad or mat P when in assembled position in the acoustical tile unit. In order to increase the cement or mastic holding efficiency of a disc C the body 50 thereof is reticulated over the major area thereof by providing the multiplicity of closely spaced openings 52 therethrough which in this instance are shown of rectangular form.

Each disc unit C is provided with a plurality of supporting posts 53 by which the unit is mounted and attached in assembled position on a tile T. In this particular example each disc unit C is provided with twelve (12) of such mounting posts 53 extending rearwardly from the rear side 51 of the disc body 50 with the posts parallel and spaced apart in a symmetrical arrangement thereon. These posts 53 are in the present example formed of plastic and molded as integral components of the disc unit C. Each of the posts 53 may be of tubular form as here shown provided with a closing wall 54 inset axially from the outer end of the post, although if desired, such wall 54 may be eliminated, as will be explained hereinafter. Four (4) of the posts 53 are positioned on a disc body 50 spaced apart equal distances around the center of the disc body at locations intermediate such center and the outer or peripheral edge of the disc body, while the remaining eight (8) of the posts 53 are mounted in pairs spaced equal distances apart

around the peripheral portion of the disc body in locations adjacent but spaced slight distances inwardly from the peripheral or outer edge of the body, as will be clear by reference to Figs. 11 and 12. In order that the disc units C will be interchangeable between the locations at which mounted on the inclined or tilted body 10 of a tile T, the posts 53 are all formed of the same length. Thus the production cost and assembly difficulties encountered with providing a special disc for each location on a tile body are eliminated.

With a tile unit U of this particular example four (4) cement receiving disc units C are provided mounted spaced equidistant apart on and spaced from the rear side 12 of the tile body 10 with each unit C substantially centered on a quarter section of the area of the tile rear surface, as shown in Fig. 10. The disc units C are mounted with their rear or outer, cement receiving surfaces 59 located in a common plane located in and parallel with the common plane in which the rear edges 16 of the edge flanges 11 of the tile T are located. The body 10 of a tile T is provided on the rear side 12 thereof at each location of a disc unit C with the mounting pedestals 55 molded integrally therewith and spaced apart thereon in a spacing pattern and arrangement for axial alignment thereof with the mounting posts 53, respectively, for the disc unit C to be mounted thereon and attached thereto. The mounting pedestals 55 in each quarter section location for a disc unit C on the rear side of the tile present seating surfaces 56 thereon and therearound spaced outwardly distances from the rear surface 12 of the tile body T in accordance with the depth or width of the tile flanges 11 at the adjacent corner of the tile. In other words, the group of disc unit mounting pedestals 55 adjacent the high corner 1 of the tile will be located in a common plane spaced outwardly a greater distance from the rear surface of the tile body 12 than the seating surfaces on the groups of mounting posts 55 at the intermediate height corners 2 and 4 and the low corner 3 of the tile body. With the mouting posts 53 of the disc unit C being all of the same length, the seating surfaces 56 on the groups of pedestals 55 will be located spaced the necessary distances outwardly from the rear surface 12 of the tile body 10 to insure positioning the cement receiving surfaces 59 of the disc unit C in the common plane of the rear edges 16 of the tile flanges 11. In this specific example each pedestal 55 includes a reduced diameter mounting pin portion 57 which extends coaxially outwardly from its pedestal 55 and which has an external diameter to be received in the open end bores of the tubular posts 53 of a mounting disc below the closing walls 54 of such posts. The mounting of the posts 53 of a disc unit C on the pedestals 55 will be clear by reference to Fig. 11 of the drawings, in which it will be noted that the outer edges of the tubular posts 53 seat upon the seating surfaces 56 of the pedestals 55 respectively aligned therewith, so that proper spacing of such surfaces 56 from the rear surface 12 of a tile T will insure proper location of the rear surface 30 of a disc unit mounted thereon. Preferably the disc mounting posts 53 are attached in fixed positions on and to their pedestals 55 by solvent cementing.

An acoustical tile unit U embodying the assembly of a tile T, a sound wave absorbing mat or pad P of varying thicknesses thereacross and the pad retaining and mastic receiving disc unit C is shown in Fig. 10 in connection with Fig. 11. It will be noted that the bodies 50 of the disc unit C are positioned over and against the rear side surface of the pad P and thus retain this pad in assembled relation in the tile T as a permanent component of the resulting self-contained acoustical tile unit U. The rear surfaces 59 of the disc bodies 50 are located in a common plane which is preferably also the common plane of the rear edges 16 of the tile flanges 11, and may thus receive thereon portions of mastic which may be spread thereover and which will key into the openings 52 of the disc bodies 50. With the mastic on the discs C a tile may be directly applied and pressed onto the surface on which it is to be installed with the mastic then setting and fixing the tile in its installed position.

The primary purpose of the closing walls 54 in the mounting posts 53 is to prevent seepage or bleeding of mastic from the rear surface 59 of a disc body 50 to the face 14 of the tile. It will be noted that in the illustrated examples each post 53 is formed with its bore in axial alignment with an opening 15 through the face 14 of the tile so that means to prevent such condition is preferably provided, which means while shown as the closing walls 54 may take other forms for closing-off any communication between the cement receiving surface 59 of a disc unit C and the face 14 of a tile.

In a tile unit U the mat or pad P is provided with the necessary holes or openings 60 cut or otherwise formed therethrough for receiving the pedestals 55 and disc posts 53 attached thereto in the assembled positions thereof as shown in Fig. 11.

In Figs. 1, 2 and 3 of the drawings I have generally schematically illustrated three (3) possible installations of acoustical tires or tile units U having the inclined or tilted faces in accordance with my present invention. In Fig. 1, for example, the tile units U are arranged in the rows from left to right with their high corners 1 alternating but with the alternating high corners of one of the adjacent rows abutting the high corners of the first-mentioned row. In Fig. 2 a row of the tiles from left to right is arranged with the high corners alternating but with the low corners of adjacent rows located abutting or at the alternating high corners of the first-mentioned row. In Fig. 3 an assembly is exemplified in which the high corners of the tiles of adjacent rows are located abutting so that series of four (4) tiles make up the pattern of this installation in which all of the high corners are joined together and abutting. The foregoing examples are purely illustrations of possible relative arrangements of these tilt or inclined face tiles to give different and pleasing visual effects while retaining the substantially increased acoustical efficiency of the tile units as hereinbefore explained.

It will also be evident that various changes, modifications, variations, eliminations, substitutions and additions may be resorted to in th acoustic tiles or acoustic tile units per se and in the installations thereof, whether of the suspension or the direct mastic attached type, without departing from the broad spirit and scope of my present invention and the several features thereof; hence it is not intended or desired to limit the invention in all respects to the exact and specific illustrative examples thereof herein presented and described, except as may be required by specific intended limitations thereto in any of the claims hereto appended.

What I claim is:

1. An acoustic tile comprising, in combination, a tile body of generally rectangular plate form having a front side, a rear side, and outer edges therearound joining at and forming the corners of said tile body; said front side of said tile body providing a generally planar face surface thereover; edge flanges extending rearwardly from and around the outer edges of said tile body surrounding and enclosing said rear side thereof between said corners of said tile body; said edge flanges having rear edges located in a substantially common plane spaced rearwardly from said tile body; said tile body and said planar front face surface thereon being tilted bodily and positioned on and relative to said edge flanges inclined diagonally and rearwardly thereacross from one corner of said tile body to the diagonally opposite corner thereof; and said tilted and diagonally rearwardly inclined tile body together with said edge flanges therearound forming therebetween a rearwardly open space at and over the rear side of said tile body of decreasing depths thereacross in the direction from said first mentioned corner to said

second mentioned, diagonally opposite corner of said tile body.

2. An acoustic tile comprising, in combination, a tile body of relatively thin plate form of generally rectangular plan shape having a front side providing a generally planar face surface thereover, an opposite rear side, and outer edges therearound joining at and forming the corners of said tile body; edge flanges extending rearwardly from and around said outer edges of said tile body between said corners thereof terminating in rear edges located in a substantially common plane; said edge flanges being of maximum depth rearwardly at one corner of said tile body and of minimum depth rearwardly at the corner of said tile body diagonally opposite said corner thereof of maximum depth; said edge flanges progressively decreasing in depth around the opposite outer edges of said tile body from said corner of said tile body at which said edge flanges are of maximum depth to said diagonally opposite corner of said tile body at which said edge flanges are of minimum depth; said tile body being located on and relative to said side edge flanges in position tilted bodily rearwardly with said planar front face surface thereof located in a plane inclined diagonally rearwardly from said corner of said tile body at which said edge flanges are of maximum depth to said diagonally opposite corner of said tile body at which said edge flanges are of minimum depth.

3. An acoustic tile comprising, in combination, a tile body of plate form of generally rectangular plan shape having a front side providing a generally planar face surface thereover, an opposite rear side, and outer edges therearound joining at and defining the corners of said tile body; edge flanges extending rearwardly from and around said outer edges of said tile body between said corners thereof; said edge flanges terminating in rear edges located in a substantially common plane spaced rearwardly from said tile body; said edge flanges being of maximum depth rearwardly at one corner of said tile body and of minimum depth rearwardly at the corner of said tile body diagonally opposite said corner of maximum depth thereof; said edge flanges having the forward edges thereof at and around said outer edges of said tile body located in a common plane tilted and inclined at an angle to said common plane of said rear edges thereof in a direction rearwardly front said corner of said tile body at which said edge flanges are of maximum depth to said corner of said tile body at which said edge flanges are of minimum depth; and said tile body being located on and relative to said forward edges of said edge flanges in a plane parallel with the plane of the said forward edges with said planar face surface of the front side of said tile body thereby tilted and inclined rearwardly in a plane substantially parallel with the inclined common plane of said forward edges of said edge flanges.

4. An acoustic tile comprising, in combination, a tile body of plate form having a front side, a rear side, and outer edges therearound joining at and forming the corners of said tile body; said front side of said tile body providing a generally planar face surface thereover and thereacross; said tile body having edge flanges extending rearwardly therefrom around said outer edges thereof between said corners of said tile body; said rearwardly extending edge flanges surrounding and enclosing the rear side of said tile body and having rear edges located in a substantially common plane spaced rearwardly from said tile body; said tile body being positioned on and relative to said edge flanges inclined rearwardly at an angle diagonally thereacross from one corner of said tile body to the diagonally opposite corner thereof with said generally planar face surface of said front side of said tile body located thereby in a plane tilted and inclined rearwardly at an angle to said common plane of said rear edges of said edge flanges; and said inclined tile body together with said edge flanges forming therebe-

tween at the rear side of said tile body a rearwardly open space progressively decreasing in depth across the rear side of said tile body in the direction of inclination rearwardly of said tile body.

5. An acoustic tile comprising, in combination, a tile body of generally rectangular plate form having a front side, an opposite rear side, and outer edges therearound joining at and forming the corners of said tile body; said front side having thereover a generally planar face surface; edge flanges extending rearwardly from and around said outer edges of said tile body between said corners thereof; said edge flanges having rear edges located in a common plane; said edge flanges having their maximum depth rearwardly at one corner of said tile body and having their minimum depth rearwardly at the corner of said tile body diagonally opposite said corner thereof at which said flanges have their maximum depth; said edge flanges progressively decreasing in depth rearwardly around said tile body from said corner thereof at which said edge flanges are of maximum depth to said diagonally opposite corner of said tile body at which said edge flanges have their minimum depth; said tile body being tilted bodily rearwardly across said edge flanges from said corner of said tile body at which said edge flanges are of maximum depth to said diagonally opposite corner of said tile body at which said edge flanges are of minimum depth with said generally planar face surface of said front side of said tile body being thereby located in a plane inclined at an angle rearwardly to the common plane of said rear edges of said edge flanges; and said rearwardly inclined tile body together with said edge flanges therearound forming therebetween a rearwardly open space decreasing progressively in depth diagonally across the rear side of said tile body in the direction of rearward tilt of said body.

6. In the combination of claim 5 said tile body being provided with a multiplicity of relatively small diameter sound wave receiving apertures therethrough opening through said face surface on said front side of said tile body into said space at the rear side thereof; and said multiplicity of sound wave receiving apertures being located in closely spaced relation over substantially the entire area of said face surface.

7. In the combination of claim 5, a sound wave absorbing material mat of decreasing thicknesses diagonally thereacross mounted in and substantially completely occupying said enclosed space between said side edge flanges and between said rear side of said tile body and said common plane of said rear edges of said edge flanges.

8. In the combination of claim 5, said tile body being provided with a multiplicity of sound wave receiving apertures therethrough closely spaced apart over substantially the entire area of and opening through the face surface thereof at the front side of said tile body; sound wave damping tube members projecting rearwardly from said rear side of said tile body in communication with and an axial continuation of said apertures, respectively; a sound wave absorbing material mat mounted in and substantially completely occupying said enclosed space of varying depths between said edge flanges and between said rear side of said tile body and said common plane of said rear edges of said edge flanges with said sound-absorbing material mat having varying thicknesses corresponding, respectively, to said varying depths of said space; said tube members being engaged at their rear ends with and having sound wave discharge openings therefrom to said variable thickness sound wave absorbing material mat; and means securing said sound wave absorbing mat to and in position in said space over the rear side of said tile body.

9. An acoustic tile comprising, in combination, a tile body of generally rectangular plate form having a front side providing a generally planar face surface thereover, an opposite rear side, and outer edges therearound joining at and forming the corners of said tile body; outer

edge flanges extending rearwardly from said outer edges of said tile body around and between said corners thereof; said outer edge flanges surrounding and forming an enclosed space over said rear side of said tile body; said outer edge flanges having the rear edges thereof located in a common plane and meeting to form outer edge flange corners at said corners, respectively, of said tile body; said tile body being tilted bodily rearwardly and diagonally across and between said outer edge flanges from one corner thereof to the diagonally opposite corner of said outer edge flanges; and said outer edge flanges of said tile body progressively decreasing in depth rearwardly therearound from said first mentioned corner to said diagonally opposite corner with said planar face surface of said tile body thereby inclined rearwardly across said tile from said first mentioned corner to said diagonally opposite corner.

10. An all-plastic acoustic tile comprising, in combination, a relatively thin tile body of plastic material of generally rectangular plate form having outer side edges therearound joining at and forming the corners of said tile body; plastic material edge flanges integral with said tile body extending rearwardly from and along said outer side edges, respectively, of said tile body between said corners thereof; said outer side edge flanges terminating in rear edges located in a common plane spaced rearwardly from said tile body; said edge flanges having maximum depth at one corner of said tile body and minimium depth at the diagonally opposite corner thereof and progressively decreasing in depth around said tile body from said corner of maximum depth to said corner of minimum depth; said tile body being located on and relative to said side edge flanges in position inclined rearwardly diagonally thereacross and therebetween from said corner of maximum depth to said diagonally opposite corner of minimum depth of said edge flanges; the adjacent ends of said edge flanges at said corner of said tile body at which said edge flanges are of minimum depth being separated and spaced apart for the full depth thereof; and the adjacent ends of adjacent edge flanges at said other corners of said tile body being spaced apart inwardly from and through their rear edges distances substantially equal to the length of said separation of said adjacent edge flange ends at said corner of said tile body at which said edge flanges are of minimum depth.

11. An all-plastic acoustic tile comprising, in combination, a tile body of plastic material of generally rectangular plate form having a front side providing a face area thereover, a rear side, and outer edges therearound joining at and forming the corners of said tile body; said tile body having edge flanges extending rearwardy from and around said outer edges of said tile body integral therewith between said corners of the latter; said edge flanges terminating in rear edges located in a common plane; said tile body being inclined rearwardy across and relative to said edge flanges in a plane at an angle to said common plane of said rear edges of said edge flanges; spaced sets of spaced supporting posts mounted in fixed positions spaced apart on and extending rearwardly from said rear side of said tile body; mounting discs each providing with supporting legs therefor extending laterally from one side thereof mounted on and attached to a set of said spaced supporting posts, respectively, positioning said mounting disc on said tile body; said legs of said discs being all of equal lentghs; and said posts of each of said sets of spaced supporting posts being of different lengths from the lengths of said posts of said other sets and projecting distances rearwardly from said rear side of said tile body positioning said mounting discs in attached positions thereon with said rear surfaces thereof substantially in said common plane of said rear edges of said edge flanges.

(References on following page)

References Cited in the file of this patent

UNITED STATES PATENTS

1,070,375	Reyam et al.	Aug. 12, 1913
1,172,379	Mazer	Feb. 22, 1916
1,726,500	Norris	Aug. 27, 1929
1,926,679	Kellogg et al.	Sept. 12, 1933
1,929,751	MacDonell	Oct. 10, 1933
1,961,374	Mazer	June 5, 1934
1,966,167	Denk	July 10, 1934
1,967,611	Finck	July 24, 1934
1,978,632	Hoff et al.	Oct. 30, 1934
1,992,509	Slidell	Feb. 26, 1935
2,271,871	Newport et al.	Feb. 3, 1942
2,323,417	Pauli	July 6, 1943
2,324,706	Jacobson	July 20, 1943
2,370,379	Trippensee	Feb. 27, 1945
2,413,568	Hurley	Dec. 31, 1946
2,652,126	Mazer	Sept. 15, 1953
2,755,882	Maccaferri	July 24, 1956
2,770,965	Engel	Nov. 20, 1956

FOREIGN PATENTS

926,258	France	Apr. 14, 1947