April 21, 1959 J. E. STANLEY 2,882,559

ACOUSTICAL CEILING

Filed April 6, 1955

fig. 1.

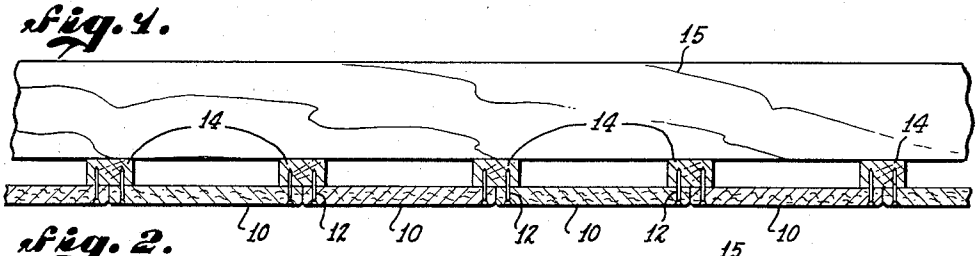


fig. 2.

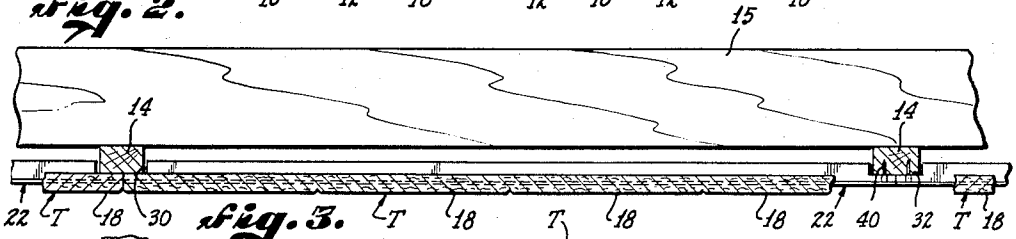


fig. 3.

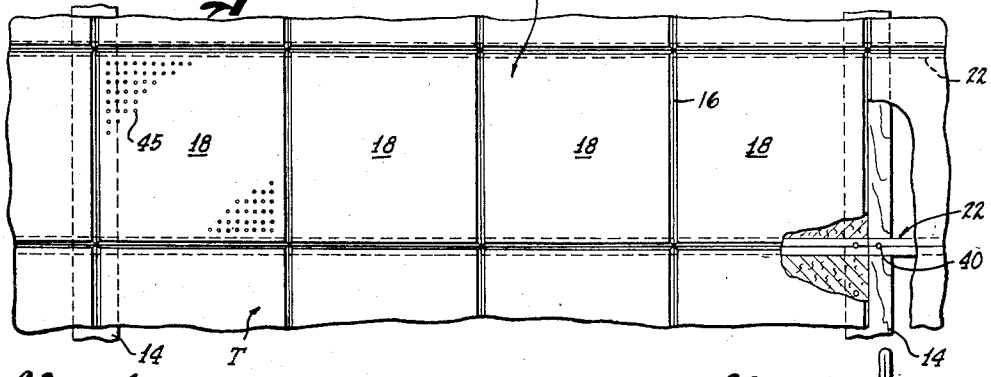


fig. 4.

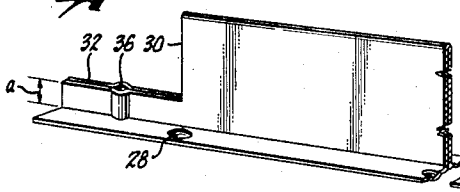


fig. 6.

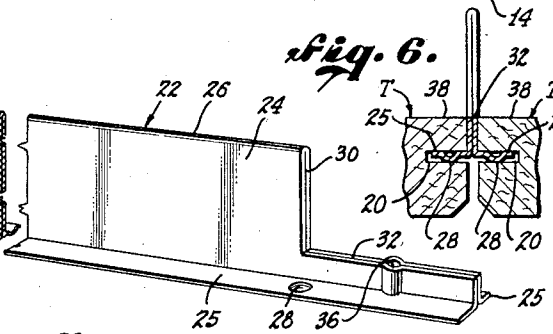
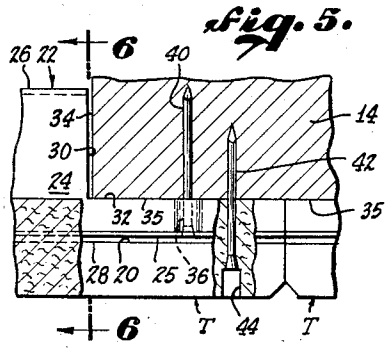


fig. 5.



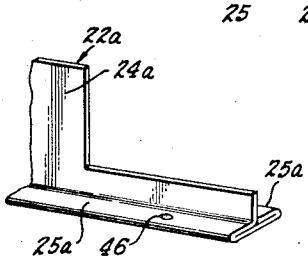


fig. 7.

JOHN E. STANLEY,
INVENTOR.

BY George J. Smyth

ATTORNEY.

United States Patent Office 2,882,559 Patented Apr. 21, 1959

2,882,559

ACOUSTICAL CEILING

John E. Stanley, North Hollywood, Calif., assignor to Duo-Flex Corporation, Hollywood, Calif., a corporation

Application April 6, 1955, Serial No. 499,676

4 Claims. (Cl. 20—4)

This invention relates to ceiling constructions, with special reference to acoustical ceilings, and is directed to an acoustical ceiling construction that not only affords labor savings in installation cost but also affords savings in materials and additionally results in an advantageous ceiling construction.

Acoustical tiles are mounted and supported in various ways to form acoustical ceilings. In those installations where no overhead space is required to accommodate air-conditioning ducts, pipe, electrical conduits, and the like, it is a common practice simply to nail the acoustical tiles directly to parallel 2 x 3 wood members commonly referred to as furring strips, the furring strips being attached directly to the overhead ceiling beams of the building structure.

Since an acoustical tile does not have substantial structural strength, it must be supported at relatively close points to prevent sagging and a maximum of twelve inches between support points is commonly regarded as good practice. Conventional acoustical tiles, therefore, are commonly twelve inches square in dimension and are nailed to parallel furring strips spaced twelve inches apart center to center. The nailing may comprise, for example, a row of three nails at the opposite ends of each square tile.

The present invention affords striking savings in labor and material by reducing the number of furring strips required and may afford additional savings in handling by increasing the size of the individual acoustical tile. These savings are accomplished without increasing the spacing between the points at which the tiles are supported.

The savings without sacrifice in structural efficiency are made possible by the concept of using special support members to span the spaces between the parallel furring strips. The special support members engage kerfs cut in the parallel edges of the tile and thereby both reinforce the tiles and seal the joints between the tiles. The special support members are preferably a multiple of twelve inches in length. Each tile is preferably also a multiple of twelve inches in length, being twelve inches wide and being divided into twelve inch squares or panels to give the appearance of separate twelve inch tiles.

A feature of the invention is that while these special support members are attached directly to the furring strips, they are so constructed as to permit the elongated tiles also to be directly attached to the furring strips. Thus each of the multiple length tiles is supported along its opposite sides by two adjacent special support members and is nailed at each end directly to a furring strip. As will be explained, such a construction is made possible by, in effect, notching the support members to mate with the furring strips in a manner to support the acoustical tiles adjacent the plane of the bottom surface of the furring strips.

The various features and advantages of the invention may be understood by reference to the following detailed description of a selected specific practice of the invention,

this description being considered with the accompanying drawing.

In the drawing, which is to be regarded as merely illustrative:

Figure 1 is a sectional view of a prevalent prior art acoustical ceiling construction of the general type to which the invention pertains;

Figure 2 is a similar sectional view of a ceiling constructed in accord with the presently preferred practice of the invention;

Figure 3 is a fragmentary bottom plan view of the new ceiling construction with portions broken away to reveal concealed structure;

Figure 4 is a perspective view of a preferred embodiment of the special support member that is utilized in the new ceiling construction;

Figure 5 is a fragmentary sectional view similar to Figure 2 on an enlarged scale;

Figure 6 is a fragmentary transverse section taken as indicated by the line 6—6 of Figure 5; and

Figure 7 is a fragmentary perspective view of a second form of the special supporting member that may be utilized in the practice of the invention.

Figure 1 shows a typical prior art acoustical ceiling construction of the type to which the present invention pertains, i.e. a type in which the acoustical tiles are directly attached to the building ceiling structure in a plane closely adjacent thereto. Thus, Figure 1 shows how individual acoustical tiles **10** that are twelve inches square are attached by nails **12** to parallel 2 x 3 furring strips **14**. The furring strips **14** are spaced twelve inches apart center to center and are nailed directly to the overhead ceiling beams **15** of the building structure.

In the selected embodiment of the new acoustical ceiling construction shown in Figures 2, 3, and 5, the furring strips **14** are positioned in the usual parallel relationship and are nailed directly to the overhead ceiling beams **15** in the usual manner, but in this instance the furring strips are spaced apart forty-eight inches center to center instead of twelve inches. Each of the acoustical tile utilized in the ceiling construction is generally designated by the letter T and is divided by three transverse grooves **16** into four integral squares or panels **18** each of which is 12″ x 12″, the total length of each tile being 48″. Thus each of the tiles T has the appearance, when installed, of four separate twelve inch tiles. As best shown in Figure 6, each of the tiles T has a longitudinal slot or kerf **20** extending the full length of each of its longitudinal edges, this kerf being at a level intermediate the top and bottom edges of the tile.

The longitudinal kerfs **20** of the tiles T are engaged by special support members, each of which is generally designated by numeral **22** and each of which is adapted for attachment directly to the widely spaced furring strips **14**. In the preferred practice of the invention, each of the support members **22** has the general cross-sectional configuration of an inverted letter T, the support member having a central longitudinal vertical web **24** and two longitudinal side flanges **25** extending in opposite lateral directions from the bottom edge of the web. As indicated in the drawing such a support member **22** may be made of suitable sheet material, for example, light sheet metal, the sheet material being folded to form a double-ply web **24** with a rounded top edge **26** and to form two single-ply side flanges **25**.

Preferably the bottom side flanges **25** of the support members **22** are formed with suitable off-sets, such as spaced downwardly extending dimples **28**, which serve, in effect, to increase the thickness of each of the side flanges so that each flange occupies the full vertical dimension of a tile kerf **20** as shown in Figure 6. Thus

the off-sets 28 insure perfect horizontal alignment of the tiles with no sagging of the tiles between the spaced furring strips 14.

While the special support members 22 may be long enough to intersect more than two of the forty-eight inch space furring strips 14, preferably each of the special support members is approximately forty-eight inches long to span the space between two furring strips. Each of the special support members 22 is suitably notched in accord with the cross-sectional configuration of the furring strips 14. Thus in the present preferred practice of the invention, the web 24 is cut-away at each end of each support member 22 to provide a vertical notch edge 30 and a horizontal notch edge 32. As best shown in Figure 5 a vertical notch edge 30 of a support member 22 is installed closely adjacent a side face 34 of a furring strip 14 and the horizontal notch edge 32 is positioned closely adjacent the bottom face 35 of the furring strip.

Suitable apertures are provided to receive nails or the like for directly attaching each end of the special support members 22 directly to the furring strips 14. In this instance the material of the web 24 and of the adjacent portions of the side flanges 25 of the support member are deformed or off-set to provide vertical passages 36 in the regions of the web notches to receive nails for anchoring the support members to the furring strips, there being at least one such nail passage at each end of a support member.

In the preferred practice of the invention, the vertical dimension "*a*" as shown in Figure 4, which is the vertical dimension of the notched portion of the web 24 measured upward from the side flanges 25, is substantially equal to the vertical distance of a tile kerf 20 from the top surface 38 of the tile. Therefore, as may be seen in Figure 6, the engagement of the side flanges 25 of a support member with the kerfs 20 of two adjacent tiles T places the upper surfaces 38 of the tiles flush with the horizontal notch edge 32. As a result the installed tile T are positioned with the plane of their top surfaces 38 close to the plane of the bottom faces 35 of the furring strips 14. With the tiles T thus elevated into positions contiguous to the bottom faces of the furring strips, the two ends of each forty-eight inch tile T may be nailed directly to the corresponding furring strips.

The manner in which the invention serves its purpose may be understood from the foregoing description. The notched ends of each of the special support members 22 are attached directly to the corresponding furring strips 14 by suitable nails 40 extending through the vertical nail passages 36 of the support members. Each of the tiles T is supported and reinforced throughout its length by the corresponding pair of the special support members 22. In addition, the two ends of each tile T are nailed directly to the corresponding furring strips 14 by suitable nails. Three nails 42 (Figure 5) may be used at each end of a tile. For this purpose, each of the tiles T may be provided with three short blind bores 44 at each end, as shown in Figure 5, to permit each of the nails 42 to be driven out of sight. The blind bores 44 are of the same appearance as the usual acoustical bores 45 (Figure 3) that are characteristic of the under surface of the tiles so that the added blind bores 44 are not conspicuous.

It is to be noted that, in contrast with the prior art construction shown in Figure 1, the new acoustical ceiling is completely sealed. The ends of the tiles are sealed by direct attachment to the furring strips and the longitudinal sides are sealed by the special support members 22.

In a typical procedure for installing the tiles T in accord with the invention, each successive tile is moved side-wise and edgewise into engagement with longitudinal side flange 25 of a support member 22 that has been previously nailed at its two ends to furring strips 14. A second special support member 22 is then engaged with the kerf of the second longitudinal edge of the tile and the tile and the second supporting strip being moved into position to permit the second special support member to be nailed directly to the furring strips thereby to secure the newly added tile. Three nails are then driven in each end of the newly positioned tile for final anchorage of the tile.

The savings afforded by the invention may be readily appreciated by comparing Figures 2 and 3 with Figure 1. Only two furring strips 14 instead of five are required for the same ceiling area and in addition six rows of three nails each are eliminated. The omission of the furring strips and the six rows of nails results in considerable saving in labor in addition to the saving in material. Still further labor savings arise from the fact that there are fewer tiles to be handled for a given installation. It has been found that one forty-eight inch tile can be installed in the manner described nearly as quickly as a single twelve-inch tile by the older procedures. These savings in material and labor greatly overbalance the cost of the special support members 22 that makes the savings possible.

It is apparent that a special support member may be fabricated from sheet material in other ways than described above, if desired. Figure 7 for example, shows how a modified special support member, generally designated 22*a*, may be fabricated to the same cross-sectional configuration by bending and folding sheet material to make a single-ply vertical web 24*a* and two double-ply longitudinal side flanges 25*a*. To permit the special support members 22*a* to be nailed to the furring strips 14, one or both of the longitudinal side flanges 25*a* may be apertured in the region of the end notch of the member, such an aperture being shown at 46 in Figure 7. A nail driven through such an aperture may impinge on the edge of the adjacent tile but the material of the tile is soft enough to yield sufficiently to clear the nail.

An important structural advantage of the new ceiling construction is that the engagement of the side flanges of the special support members with the longitudinal edge kerfs of the tiles stiffens and strengthens the tile. Thus the special support members 22 are also reinforcement members. In addition of course the support members 22 span and seal the spaces between the tiles T, whereas in the prior art construction shown in Figure 1 the junctures between successive tiles are not sealed.

Although the now preferred embodiment of the present invention has been shown and described herein, it is to be understood that the invention is not to be limited thereto, for it is susceptible to changes in form and detail within the scope of the appended claims.

I claim:

1. In a ceiling construction supported from overhead building structure, the combination of: a plurality of parallel furring strips anchored to said building structure, said furring strips being made of material penetrable by nails or the like and being spaced apart center to center approximately by multiples of one foot; a plurality of parallel support members perpendicular to said strips, each of said support members being of the cross-sectional configuration of an inverted T with a central longitudinal vertical web and two longitudinal side flanges extending laterally in opposite directions from the bottom edge of the web, said web being notched inward from its upper edge to conform to the cross-sectional configuration of each of the furring strips intercepted by the support member, with the web extending into the planes of the furring strips in the spaces between the furring strips, said support members being nailed to the furring strips in the longitudinal regions of the web notches; and a plurality of ceiling tiles, each having a longitudinal kerf in its opposite longitudinal edges spaced below its upper face, said flanges of said support members extending into said kerfs to support and reinforce each of said tiles from opposite

sides thereof, the tiles abutting said furring strips being secured to the latter to provide additional cross support for each row of tiles.

2. A ceiling construction as set forth in claim 1 in which the distance that the notched portions of said web extend above said side flanges is substantially the same as the distance from the kerfs of said tiles to the top faces of the tiles.

3. A ceiling construction as set forth in claim 2 in which the end portions of said tiles are nailed directly to the furring strips whereby the spaces between adjacent ends of the tiles are sealed by the furring strips and the spaces between the adjacent sides of the tiles are sealed by said support members.

4. A ceiling construction as set forth in claim 1 in which said parallel support members that are perpendicular to said furring strips are spaced apart center to center approximately one foot and in which said tiles are each approximately one foot wide and multiples of one foot in length.

References Cited in the file of this patent

UNITED STATES PATENTS

1,625,637	Abel	Apr. 19, 1927
1,931,713	Walper	Oct. 24, 1933
2,139,641	Neumeister	Dec. 6, 1938
2,242,558	Venzie	May 20, 1941
2,293,431	Frease	Aug. 18, 1942
2,303,271	Haertel	Nov. 24, 1942
2,318,092	Olsen	May 4, 1943
2,338,468	Tench	Jan. 4, 1944

FOREIGN PATENTS

493,571	Great Britain	Oct. 11, 1938
278,208	Switzerland	Jan. 3, 1952

OTHER REFERENCES

Architectural Record, page 109, March 1944. (Copy in Scientific Library.)