May 7, 1968 B. W. KIDNEY 3,381,437

SLIP SPLINE SUSPENDED CEILING STRUCTURE

Filed April 21, 1964

FIG. 1

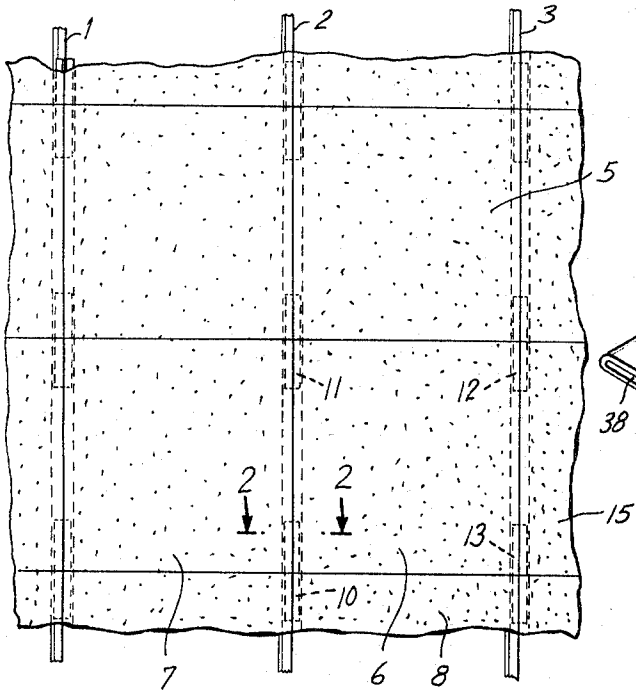


FIG. 4

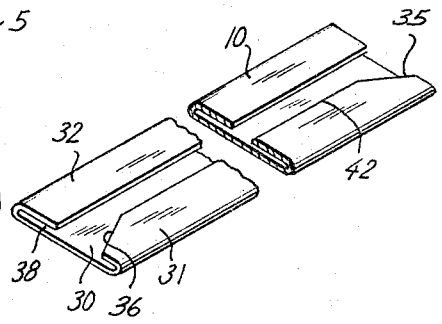


FIG. 3

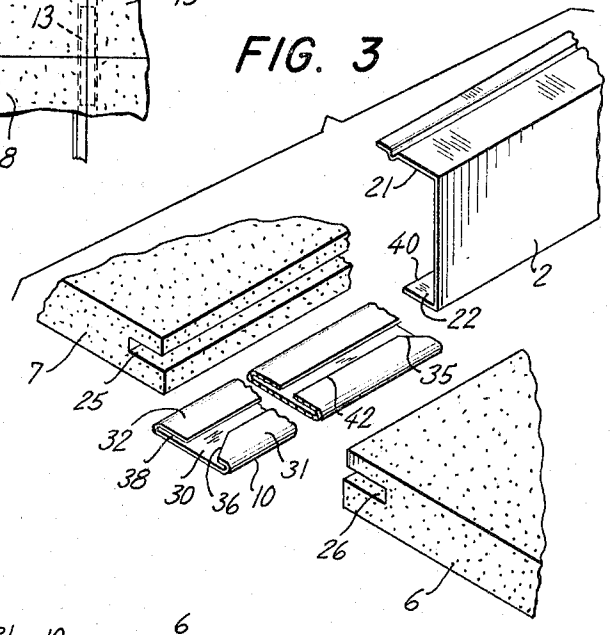
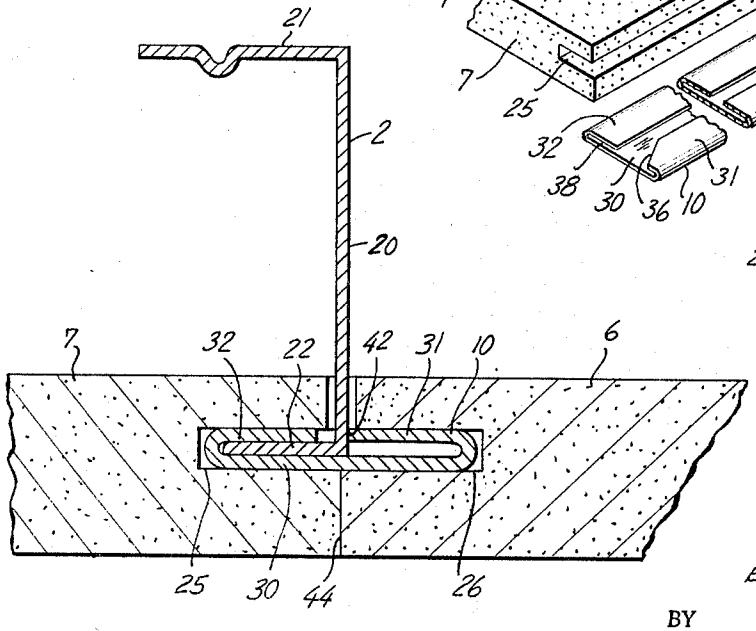


FIG. 2



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SLIP SPLINE SUSPENDED CEILING STRUCTURE

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This invention relates to ceilings formed of acoustic or other tile, and in particular to a new and improved tile assembly.

Acoustic tile used in forming a ceiling may, in many instances, need to be removed at one particular point to obtain access to junction boxes, valves, cutoffs, elements of the ventilating system, and the like. In the past, it has been necessary to either destroy elements of the tile to obtain such access or to have the tile supported in such a manner that the supporting units are visible to the observer below. Neither method is completely satisfactory. Other systems may be so put together that any tampering with the ceiling results in extensive damage to the appearance.

The present invention has the advantage that it provides for a tile ceiling which may be readily and inexpensively assembled without the utilization of special tools. The resulting ceiling is durable and strong, and the tile supporting elements are not visible.

The assembly has the further advantage that any one or more tiles in the entire assembly may be readily removed without use of special tools for access to the area above, and may, thereafter, just as readily be replaced.

The assembly of this invention may be made with but slight modifications of existing structures and at a decided cost advantage.

In the practice of my invention, tile is used having longitudinal slits or kerfs in two opposing edges of the tile. These kerfs are of the type that have in the past been used on edges of the tile to fit over the horizontal flange or web extending along the bottom edge portion of a C-bar or Z-bar or a standard concealed spline. An example of such a structure is found in Lydard Patent No. 2,866,233. The assembly of my invention also includes a series of parallel, horizontal C-bars, spaced apart a distance approximating the face dimension of the tile. Below and contiguous with the lower flange portions of the C-bars are fitted slip splines made of resilient metal and having a base portion from the longitudinal edges of which extend gripping jaws. One of the jaws overlies the flange and the other presses against the vertical web of the C-bar to hold the spline in place. The jaws are of about the same width and overlie substantially the entire base portion. The splines are of length less than the length of the tile, along the C-beam, and preferably of a length substantially less than half the length of the tiles.

The splines fit within kerfs of tiles on each side of the C-bar to hold the tiles in place. A spline may be removed, however, by sliding it horizontally along the C-bar until it is no longer positioned within the kerf of the tile to be removed.

The above and other advantages and details of the invention will be seen from the appended drawings, in which:

FIG. 1 is a view from below of a portion of a tile assembly supported in the manner of the present invention;

FIG. 2 is a section taken along the lines 2—2 of FIG. 1, showing a cross section of a C-bar with the slip spline thereon, and edge portions of two adjacent tiles supported by the spline;

FIG. 3 is an exploded partial perspective view showing a typical portion of a joint such as the joint of FIG. 2; and

FIG. 4 is a perspective of a slip spline of the type used in my invention.

There have been, in the past, numerous acoustical tile ceiling structures utilizing horizontal C-bars or Z-bars. Examples of these are found in Urbain Patent No. 2,340,911, Jacobson Patent No. 2,648,102, and Carlson Patent No. 3,100,319. In FIG. 1 of the appended drawings there is shown utilization of the same basic C-bar construction together with the improvement of my invention.

Thus, in FIG. 1 there are present C-bars **1**, **2** and **3**. These support a group of acoustical tiles indicated generally by the numeral **5** and include, for example, tiles **6** and **7**. The C-bars are spaced apart a distance substantially equal to the width of the tiles in question. It will be seen that C-bars **1** and **2** are spaced apart approximately the width of tile **7**, and C-bars **2** and **3** are spaced apart approximately the width of tile **6**.

Shown in dotted outline in FIG. 1 are the various slip splines used in my invention, as, for example, spline **10**.

In the preferred form of my invention there will be four splines in their respective kerfs to support each tile, but each spline will be used to support a corner of two different tiles. Thus, tile **6** is supported by splines **10**, **11**, **12**, and **13**; but splines **10** and **11** also support tile **7**, and splines **12** and **13** also support the tile **15** to the right of tile **6**, as viewed in FIG. 1. Comparable splines **11** and **12** also support corners of tile **5**; and splines **10** and **13** support corners of tile **8**.

It is preferable that the total length of all the splines along one edge of a tile be of less length than approximately two-thirds the width of that tile.

FIG. 2 shows a section along lines 2—2 of FIG. 1. There there will be seen the C-bar **2**. C-bar **2** is formed of vertical arm or web **20**, the upper supporting portion **21**, and the base flange **22**. Supporting portion **21** is secured to the upper ceiling of other cross members in the usual manner (not shown in the drawings), and supports C-bar **2** is a position with its axis running horizontally. Base flange **22** is normally at right angles to vertical support **20** and is a thin metallic section of the type often adapted to fit within the kerf of an acoustic tile.

As is shown in FIG. 2, each of the tiles, here represented by tiles **6** and **7**, has along its edges a slit or kerf. Thus, along the edge of tile **7** adjacent to C-bar **2** there is kerf **25**, and along the edge of tile **6** that is adjacent to C-bar **2** is kerf **26**. Since these kerfs are formed within the edges, they are not visible when the tile is installed.

Spline **10** includes a longitudinal base **30** folded about at opposing longitudinal edges to form gripping jaws. One jaw is the locking member **31**, and the other is the supporting open member **32**. Supporting member **32** overlies flange **22** when in use, and the locking member has a locking edge **42** and presses against the vertical web **20** to secure the spline in position. There is a gap **38** between the edges of supporting member **32** and longitudinal member **30**. This gap preferably is of a width at least approximating the thickness of the flange **22** of C-bar **2**. Thus, in cross-section, spline **10** has an appearance somewhat resembling an almost closed staple of the type normally used for stapling papers together.

As shown in FIG. 3, locking member **31** may, if desired, have beveled edge portions **35** and **36** for ease of installation.

In the completed assembly, spline **10** is positioned about flange **22** with the supporting member, or gripping jaw, **31** located above flange **22**. The base **30** below flange **22** and the remainder of base **30** extend in a horizontal direction toward the opposite side of vertical support **20**. The width of the spline on each side of supporting arm **20** is slightly less than the depth of the kerfs **25** and **26**, but, of course, is sufficient to surround base portion **22** of C-bar **2**. Thus, when the kerfs **25** and **26** of tiles **7** and **6**, respectively, are fitted over the spline **10**, the spline will serve to hold the tile in position, and keep the face of the tile level.

The spline 10 is preferably made of galvanized sheet steel, though other metals or plastics may be used. The material from which the spline is made should have sufficient structural strength to support the tiles in their installed position, and at least some flexibility for installation and locking as will be described below. The spline is preferably dimensioned with all of the supporting member lying to one side of its longitudinal mid-point axis and all of the locking member lying on the other side. Locking edge 42 is positioned to hold the unit with the axis below web 20. The pocket formed by base portion 30 and supporting member 32 should be of width equal to the width of flange 22.

Further details of the assembly of the ceiling unit and of the structure of the slip spline are shown in FIGS. 3 and 4, which have numbers corresponding to those in FIGS. 1 and 2.

In constructing a ceiling using the assembly of my invention, the C-bars are installed in the usual manner, spaced, as described previously, a distance equal to the width of the tiles. The slip splines are then slipped over the edge 40 of flange 22 of each of the C-bars. This is accomplished by pressing edge 32 of the slip spline onto flange 22 so that flange 22 enters gap 38 (between supporting member 32 and base 30). The pressure is continued until the inner edge 42 of locking member 31 has passed by the vertical support 20. Due to the flexibility of the metal from which the spline is made, this spline will snap in place, being retained by the edge locking member 31 pressing against the lower portion of vertical support 20.

As referred to previously, there will be C-bars along each opposing edge of given tile. Thus, in installing the tile, the slip splines will be snapped on C-bar and slipped into place as needed. For example, kerf 25, of tile 6 is inserted about flange 22 of the C-bar. Then tile 6 is lifted into position on C-bar 2, slip spline 10 is snapped on C-bar 2 and slipped longitudinally half the length of the slip spline into kerf 26, thus supporting tile 6, then slip spline 11, is snapped onto C-bar 2 and slipped totally into kerf 26, tile 6. Kerf 25 of tile 5 is then inserted on flange 22 of C-bar 1. Tile 5 is then lifted into position on C-bar 2. Slip spline 11 is slipped longitudinally along C- bar 2 to overlay tile 6 and 5, thus supporting the tiles.

It will be seen that in their supported position, the tiles block from view the flange 22 of the C-bar and the splines themselves.

As the installation of tile proceeds and the splines become covered, it may be necessary to move some of the splines that are already covered and cannot be reached with one's hands, or to move splines into positions where they cannot be reached. This is readily accomplished by the insertion of a knife blade between the tiles, and by pressing the knife blade against the end of the spline to slide it axially along the C-bar. Thus, as the ceiling is completed the splines may be slid into place and retain the tiles in position.

When at a later date it is necessary to obtain access to the area above the acoustic tile, this can readily be done by inserting a knife blade in the space between two tiles, and using the edge of the blade to slide the supporting splines to one side. The tile is then released and may be removed. It can, of course, later be replaced by fitting it into position and again sliding the splines into a supporting position. As can be seen, no damage has been done by obtaining temporary access to the area above the tiles, and access has been had readily without the use of any special tools. The structure in question is strong and secure and supports the tile without the supporting structures showing.

The present invention is not limited strictly to the embodiment disclosed, but encompasses modifications thereof falling within the appended claims.

I claim:

1. An acoustic ceiling assembly including a series of horizontally spaced, parallel, horizontal supporting bars, each of said bars having a continuous peripheral, horizontally-disposed tile supporting flange along its lower edge, a plurality of supporting splines shorter than said flanges slidably mounted on said peripheral flange, each of said splines having a base portion below and contiguous with said flanges and locking and supporting members along opposing longitudinal edges thereof, said supporting member fitting over said flange and said locking member pressing against said supporting bar to prevent the removal of said spline from said peripheral flange, and ceiling tiles having kerfs in opposing edges thereof, said kerfs being of a greater length than said splines and fitting over said splines whereby said tiles are retained in position, whereby said tiles may be individually removed and installed in said assembly by longitudinal movement of said splines along said flanges.

2. An acoustic ceiling assembly as in claim 1, in which said spline is formed of sheet material, said locking and supporting members being folded back along the edges of said base portion to a position above said base portion.

3. In an acosutic ceiling assembly having a series of horizontal, spaced supporting C-bars, each of which bars has a peripheral horizontally disposed tile supporting flange along its lower edge, a plurality of supporting splines slidably mounted on said peripheral flange, each of said splines having a rectangular base portion positioned below and contiguous with said flange and a locking member and a supporting member along opposing longitudinal edges of said base portion and overlying a portion of said base portion, said supporting member fitting over said flange and said locking member adapted to press against said supporting C-bar to prevent the removal of said spline from said peripheral flange, and ceiling tiles having kerfs in opposing edges thereof, said kerfs fitting over said splines whereby said tiles are retained in position.

4. A slip spline for use in an acoustic ceiling assembly and adapted to fit within kerfs along the edges of acoustic tiles and to be mounted for free longitudinal sliding movement along the continuous flange of a C-bar, said flange being longer than the length of the edge of one said tile, said spline including a rectangular piece of sheet material having a length less than the length of the edge of one said tile, said sheet material defining a base portion and two gripping jaw portions, said gripping jaw portions being disposed in opposed relationship adjacent opposite longitudinal edges of said base portion along folds in said sheet material, said gripping jaws including one jaw defining a gap between said one jaw and said base portion for receiving the flange of a C-bar therein, said one jaw being adapted to be snapped over the edge of and to fit about a C-bar flange and including a second jaw adapted to lock said spline in position on said C-bar flange by the edge thereof pressing against the peripheral portion of said C-bar on the opposite side thereof from said flange, and said jaws being of substantially the same width, whereby said spline may be moved longitudinally of said flange and within said kerfs while mounted in said acoustic tile assembly.

5. A slip spline for use in a ceiling tile assembly for fitting within the kerfs on the edges of removable tiles and adapted to be snapped onto the lower peripheral flange of a horizontally disposed C-bar at any desired position along the length of the flange for installing ceiling tile, said spline including a substantially rectangular sheet of sheet material having a length less than the length of the edge of one said tile, said sheet material being folded adjacent one edge to define a supporting member and being folded along an opposing edge to define a locking member, said supporting member and said locking member overlaying substantially all of the remainder of said sheet material and being substantially parallel thereto, said supporting member defining a gap between itself and the adjacent portion of the remainder of said sheet material for receiving the lower peripheral flange of a C-bar therein

when said slip spline is snapped onto the flange and said members being of substantially the same width with said locking member in opposing relation to said supporting member for pressing against the lower portion of the C-bar on the opposite side thereof from said flange for retaining said slip spline on said flange; and said supporting member and locking member being continuous along the length of said slip spline, whereby said slip spline can be snapped onto the lower peripheral flange of a horizontally disposed C-bar in any desired position therealong and is free to be slid longitudinally along the flange for releasing the tiles for removal.

6. The spline as set forth in claim **5**, in which the corners of said locking member are beveled.

7. A tile supporting slip spline adapted to be fitted to a horizontal supporting bar and to fit within the kerfs of removable ceiling tiles, said bar having a continuous lower horizontal flange secured along its edge to the bottom edge of a vertical web, said slip spline including a base portion having a mid-point axis therein, a supporting member overlying said base portion and lying to one side of said axis, said member being secured to said base portion along one edge thereof to form a pocket and adapted to be pressed over said flange at any position

along the length of said flange to receive said flange in said pocket, and a locking member overlying said base portion on the other side of said axis in opposed relationship to said supporting member, said locking member having a locking edge adapted to press against said web on the opposite side from said flange for locking the flange in said pocket, said spline having a length less than that of said flange and less than that of said kerfs whereby said spline may be held in locking engagement with said flange and said web, but may be moved longitudinally relative to said flange and said kerfs to permit the removal of said spline from said kerfs.

8. The spline set forth in claim **7**, in which said base portion, said supporting member, and said locking member are made from a single piece of sheet metal.

References Cited

UNITED STATES PATENTS

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Assistant Examiners.