

1

3,207,057

PANEL SUPPORTING GRID

Donald A. Brown, Westlake, and Lucien R. Downing, Jr.,
Avon Lake, Ohio, assignors to Donn Products Incorporated,
Westlake, Ohio, a corporation of Ohio

Filed Sept. 7, 1962, Ser. No. 222,055

3 Claims. (Cl. 98-40)

This invention relates, as indicated, to a structure which is adapted to support a plurality of individual panel members, and more particularly to a grid structure, including the panels, which is ventilated. The grid structures of the present invention are useful in supporting decorative panel members, such as acoustic tile members, wood veneer, and the like as a wall, floor or ceiling.

Recent years have seen changes in the manner of internal room decoration and furnishing in which emphasis has been laid upon suspended ceilings or ceiling sections. Most usually, such structures are composed of a metallic grid of beam members and panel members supported thereby, such as the aforesaid acoustic tile members, and with or without flush lighting fixtures. The improvements of the present invention have particular utility in connection with suspended ceiling grid structures, and, therefore, will be discussed with particular reference thereto.

Concurrently with the developments mentioned above, changes have been made in the manner in which conditioned air has been introduced into a room. Most recently use has been made of the space or plenum formed between a suspended ceiling and the original room ceiling as a receptacle for conditioned air, and a region from which it can be introduced uniformly into the room. One such method is to utilize a ventilated tile in which holes have been drilled completely through the tile to provide channels for the escape of conditioned air from the plenum chamber into the room below. The void space in the surface area of such a perforated tile amounts to about 2% of the total area of the tile member.

Other methods of providing a passageway from the plenum chamber to the room below have involved extensive modification of the supporting grid beams or modification of the tile or panel members themselves along their marginal edges.

The present invention is distinguished from these methods for providing ventilation from a plenum chamber to an adjacent room in that it requires no modification of the panel members themselves, the supporting grid beams or the mode of installation, and utilizes instead materials of construction which are available on the market with the exception of relatively inexpensive means hereinafter more particularly described.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the appended claims, the following description and the annexed drawings setting forth in detail certain illustrative embodiments of the invention, such disclosed means constituting, however, but a few of the various forms in which the principle of this invention may be employed.

Briefly stated, the present invention is in the provision of a grid for supporting a plurality of individual panel members, generally in the same plane. The grid is generally formed of a plurality of structural beams which are disposed in intersecting relation to each other in a predetermined geometric configuration, for example configurations formed from squares, rectangles, triangles, diamonds, and other such geometric figures. The structural beams are conveniently formed from thin metal sheets, e.g., steel or aluminum, or extruded. In the preferred embodiment, the structural beams are characterized by a web portion which defines a pair of spaced parallel marginal edges. Along one of the marginal edges there is

2

provided a bead portion, usually perforated to admit the free ends of suspending wires, for example. Along the other marginal edge there is provided a flange portion extending laterally of the web. Means are provided for supporting panels in the grid in ventilating spaced relation to the beam flange, and means coaxing therewith are also provided to maintain the marginal edges of the panels in ventilating spaced relation to the web so that gas may pass from one side of the panel to the other between the web and marginal edges of the panels. In this manner, gas contained in the plenum chamber such as conditioned air, may pass freely from such chamber into the adjacent room or space. The flange portions of the beam serve to conceal the marginal edges of the panels supported by the grid in a decorative manner.

In the annexed drawings:

FIG. 1 is a fragmentary perspective view of a structural beam and showing a clip in coaxing relation therewith.

FIG. 2 is an end view of the beam and clip shown in FIG. 1.

FIG. 3 is a cross-sectional view of a beam and coaxing clip shown in suspended relation to a ceiling, and having panel members operatively disposed therein, and showing the passage of gas from the plenum chamber to the adjacent room below.

FIG. 4 is a fragmentary perspective view of a portion of a suspended ceiling showing beams in intersecting relation to form a panel supporting grid with panels in place as the structure would appear with the ventilating means of the present invention.

Referring more particularly to FIGS. 1 and 2, there is here shown a beam generally indicated at 10 and having a web portion 11 defining spaced parallel marginal edges 12 and 13. Along marginal edge 12 there is provided a beam bead portion 14 which is preferably integral with web 11. Bead 14 is preferably of rectangular or box-like configuration as shown in FIGS. 1 and 2 in order to confer longitudinal as well as transverse rigidity to the beam.

Bead 14 is conveniently provided with a plurality of spaced perforations 15 adapted to receive the free end of suspension wires, such as shown in FIG. 3, later to be discussed.

The lower marginal edge 13 of web 11 is conveniently provided with a laterally extending flange 16, preferably extending to either side of web 11 in a plane normal to the plane of web 11. Flange 16 is also desirably integral with web 11, a fold line at the juncture of flange 16 with one side of web 11 defining the lower marginal edge 13. In order to conceal the fold line from view, there is conveniently provided a cap 17 which is generally of very thin enamelled metal overfolded at each of its marginal edges to embrace the marginal edges of flange 16.

The beam, as thus far described, is a commercially available item, and it is used in the formation of grid structures for supporting panel members, the panels being supported by the flange 16. If the panels supported by structural beam members 10 on flange 16 are imperforate members or tiles, flow of gas from the plenum chamber to the adjacent room is impeded. Impediment to gas flow may be caused by abutment of the edge of a panel member against the web 11, or superimposition of a marginal portion of the surface of a panel member on the supporting flange 16, or a combination of both. Accordingly, means are provided for spacing the marginal edges of panel members from the web 11, and means are also provided for spacing the marginal surfaces of the panels from the flange 16.

A preferred form of accomplishing both of these functions is shown in FIGS. 1, 2 and 3 wherein there is provided a clip 20.

Clip 20 provides means for spacing the marginal edges of panels supported thereby from web 16 in the form of web-like members 21 and 22 which are capable of being disposed in substantially parallel spaced relation from each side of the web 11 by action of the panel member. Clips 20 are conveniently formed of thin spring steel in such manner that web-like portions or legs 21 and 22 are in diverging relationship to each other, and when a panel member is brought into abutting relation therewith as shown in FIG. 3, the legs or web-like members 21 and 22, for example, are brought into substantially parallel and spaced relation from each side of the web 11. The free ends of legs 21 and 22 are conveniently bent at right angles to the plane of legs 21 and 22, respectively, to form panel-supporting means, or support flanges 23 and 24, respectively. In the preferred embodiment shown in the annexed drawings, the panel-supporting means and the panel-spacing means are integral with each other. Such means may not, however, necessarily be integral with each other and may, for example, be formed from web 11 and flange 16 portions, respectively.

Legs 21 and 22 are conveniently joined together through a bead encircling portion 25 which, due to the spring-like nature of the metal from which the clip 20 is formed, is adapted to be snapped into encircling engagement with bead 14. Displacement of the legs 21 and 22, respectively, out of the plane of the vertical bead encircling portions, and towards each other, necessitates the application of deforming force to the bead encircling portion 25 to effect removal of the clip 20 therefrom.

When the extent of the divergence of legs 21 and 22 at the free extremities thereof, is greater than the width of bead 14, and placement of clips 20 at suitable intervals along the beam 10 is readily effected by the application of pressure in a direction toward the flange 16 to the clip 20 of sufficient magnitude to deform the bead encircling portion 25 to permit encircling and interlocking engagement with bead 14.

FIG. 3 is a cross-sectional view of a beam 10 shown in suspended relation to a ceiling portion 30. The mode of suspension is conventional and is illustrated by wire 32 anchored to ceiling portion 30 at 33 and secured to beam 10 through perforation 15. Panels 34 and 35 are conventional imperforate panels such as acoustic tile panels. Panels 34 and 35 are supported in spaced relation from flange 16 by means of support flanges 23 and 24, respectively, of clip 20. The marginal edges of panels 34 and 35 are shown maintained in spaced relation from the web 11 by means of legs 21 and 22, respectively. The spacing of the marginal edges of panels 34 and 35 from web 11, and the simultaneous spacing of the lower surfaces of panels 34 and 35 from the laterally extending flange 16 of beam 10 enables the free passage of gas, e.g. conditioned air, from plenum chamber 31 downwardly between the marginal edges of panels 34 and 35 and the web 11, and outwardly between the surfaces of panels 34 and 35 and flange 16 into the adjacent room below.

Thus, conditioned air may be supplied to plenum chamber 31 and permitted to escape in the manner aforesaid into the adjacent room to effect conditioning thereof to the comfort of the occupants.

FIG. 4 is a fragmentary perspective view showing a portion of a completed suspended ceiling. There is here shown a plurality of structural beams such as beam 10 disposed in intersecting relation to each other in a predetermined geometric configuration formed of squares. As indicated above, the elements forming the grid may have any desired geometric configuration, and the panels

34 and 35 provided with complementary configurations for emplacement therein and support thereon. Installation of suspended ceilings, for example embodying the improvements of the present invention, involves departure from standard installation techniques only to the extent of the emplacement of the clip members 20, for example, or the employment of other means to accomplish the same purposes.

There has thus been provided an improved grid for supporting a plurality of individual panel members in a plane which includes a plurality of structural beams disposed in intersecting relation to each other. Numerous means are currently available for effecting intersection of structural beam members of the type here described, for example as shown in Patent No. 2,903,104. In order to permit ventilation between a plenum chamber and an adjacent room, means are provided coacting with the beams for supporting the panels in ventilating spaced relation to the beam flange, and means coacting therewith to maintain the marginal edges of the panels in ventilating spaced relation to the web of the beam. In such manner gas such as conditioned air, may pass from one side of the panel to the other between the web and the marginal edges of the panels.

Clips 20 instead of being formed from sheet metal as indicated in the annexed drawings, may, as well, be formed of wire and installed in precisely the same manner. The lateral extension of flange 16 to either side of web 11 is sufficient to conceal support flange means 23 and 24 of a sheet metal as well as a wire clip.

Other modes of applying the principle of this invention may be employed instead of those specifically set forth above, changes being made as regards the details herein disclosed provided the elements set forth in any of the following claims, or the equivalent of such be employed.

It is, therefore, particularly pointed out and distinctly claimed as the invention:

1. A grid for supporting a plurality of individual panel members in a plane including a plurality of structural beams disposed in intersecting relation to each other in a predetermined geometric configuration, each of said beams having a web portion defining a pair of spaced parallel marginal edges, a beam bead portion along one of said marginal edges and a flange portion extending laterally of said web along the other marginal edge, a plurality of panel supporting clips disposed at spaced intervals along each of said beams, said clips being of generally U-shape and adapted to be suspended over said beam bead portions, the legs of said clip terminating in outwardly projecting flanges adapted to engage the marginal edges of panels to be supported thereby adjacent said web portion and in spaced relation to said beam flange portion.

2. A grid in accordance with claim 1 wherein the legs of said clip are in diverging relation to each other toward their respective flanged ends.

3. A grid in accordance with claim 2 wherein the outwardly projecting flanges of said clip do not extend beyond said beam flange portion.

References Cited by the Examiner

UNITED STATES PATENTS

3,031,944	5/62	Davidson	98—40
3,101,661	8/63	Bibb	98—40 X

ROBERT A. O'LEARY, *Primary Examiner*.

RICHARD W. COOKE, *Examiner*.