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[73] Assignee **Owens-Corning Fiberglass**

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[54] SUSPENDED CEILING CONSTRUCTION 7 Claims, 6 Drawing Figs.

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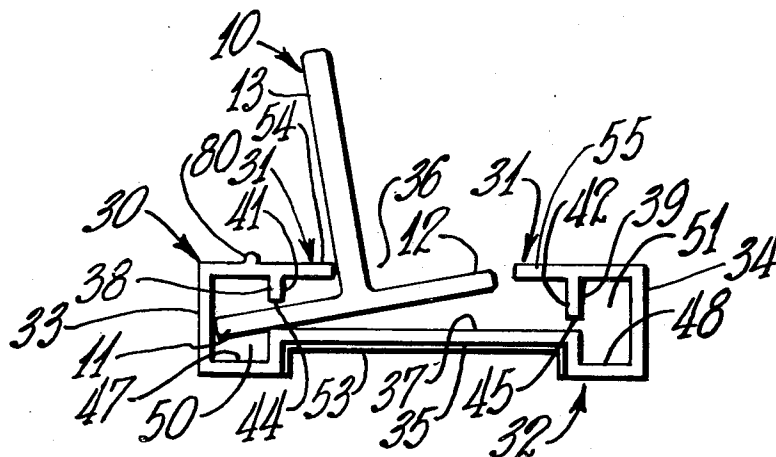
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ABSTRACT: A cap member and suspended ceiling construction employing the cap member with structural beams having laterally extending portions where such cap member is a longitudinal hollow member including a lengthwise opening communicating with the interior thereof through which laterally extending portions of a structural beam can be inserted for support of the hollow member by the laterally extending portions of the structural beam. The hollow member further including an internal aligning means for holding the hollow member in lateral alignment in its supported relation on the beam.



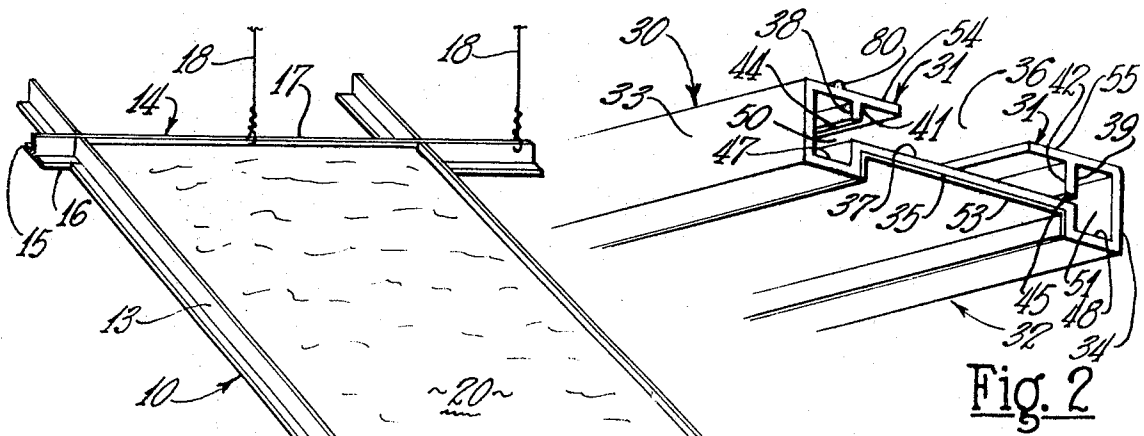


Fig. 1

Fig. 2

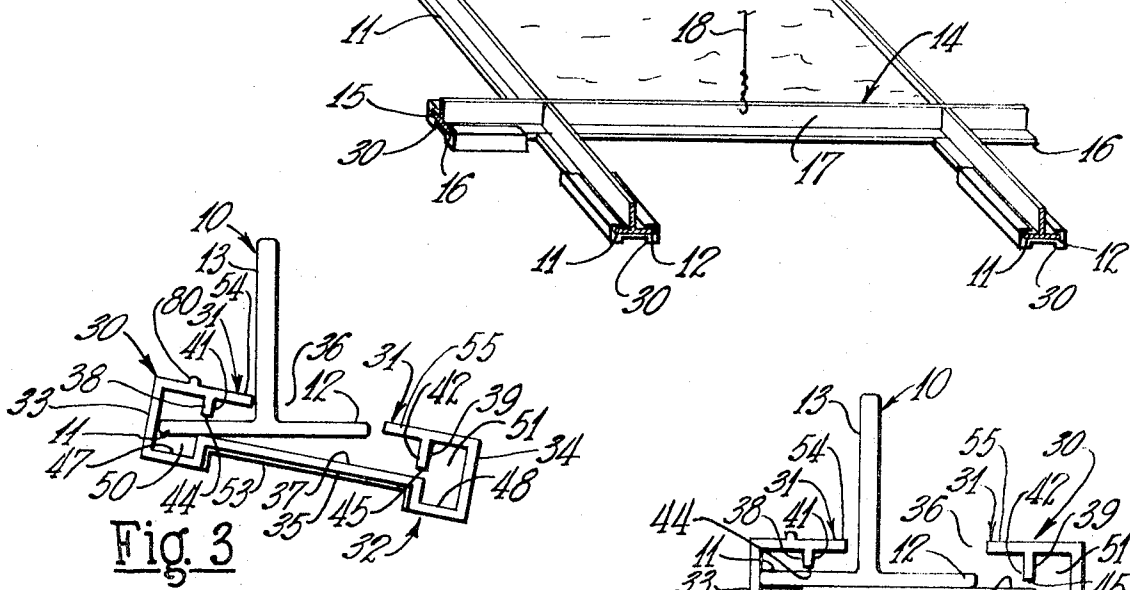


Fig. 3

Fig. 4

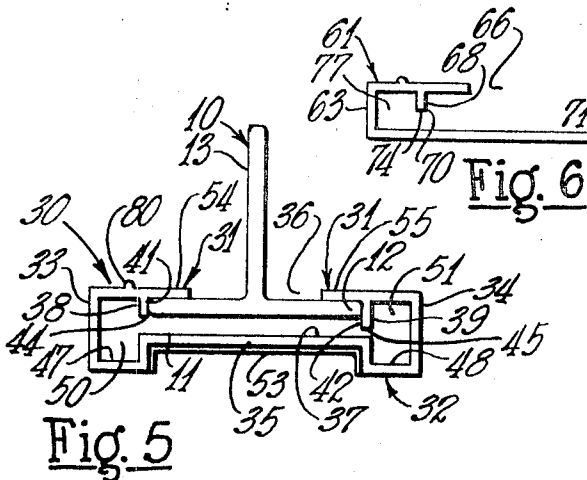


Fig. 5

Fig. 6

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SUSPENDED CEILING CONSTRUCTION

BACKGROUND OF THE INVENTION

Suspended ceiling constructions are extensively used in private and commercial buildings. Such constructions normally employ a rigid interlocking grid of cooperating structural T-beam members. For example, suspended ceilings of the type comprising structural T-beam members employ main T-beams supported on wire hangers in predetermined fashion and transverse or crossing T-beams cooperatively interconnected in a determined manner to form rigid grid system that serves as a convenient support system for modules or panels such as acoustical units, light fixtures and the like.

Because of the variety of commercially available modules, the fixed flanges of standard T-beam members are not adequate for use in all types of suspended ceiling constructions. The modules are of different constructions and sizes. Larger modules tend to require more flange support. Such is particularly true in the case of larger modules having a glass fiber construction of a medium density pack, e.g. one to six pounds per cubic foot. Such modules have a tendency to manifest their weight within a suspended ceiling construction through unsightly depressions, i.e. "pillowing," along the exposed module portions adjacent to the flanges.

Moreover, it is advantageous to have available a variety of ceiling support systems that have interchangeable module support portions exposed to view having differing esthetic qualities without requiring a supplier or builder to keep separate T-beam inventories of differing design constructions and flange widths.

SUMMARY OF THE INVENTION

It is an object of the invention to provide an improved suspended ceiling construction.

It is a further object to provide an interchangeable cap unit for structural beam members having laterally extending portions that increases width of such laterally extending portions.

It is another object to provide an interchangeable cap unit supported in the flanges of structural T-beam members of a suspended ceiling construction that increases flange width and aligns with the flanges of such T-beam members.

It is yet another object of the invention to provide a flange cap unit for use on structural T-beam members of a suspended ceiling construction where the unit can be positioned with the modules in place in the grid.

These and other objects are attained by use of a longitudinal hollow cap unit or member having an opening running lengthwise of the hollow member communicating with the interior thereof through which laterally extending portions of a structural beam member can enter for subsequent positioning of the laterally extending portions of the beam member internally of the hollow member between alignment means adapted to accept the laterally extending portions for aligning the longitudinal hollow member in supported relation on the structural beam members.

Other objects, advantages and features of the invention will become apparent as the invention is described hereinafter in more detail with references made to the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view looking somewhat downwardly that shows a portion of a suspended ceiling construction employing structural T-beam members using a cap unit according to the principles of the invention;

FIG. 2 is an enlarged perspective view of a portion of the embodiment of a cap unit according to the principles of the invention as generally depicted in FIG. 1;

FIG. 3 is an end elevation view exemplifying an initial step for positioning the cap unit illustrated in FIGS. 1 and 2 on the flanges of a structural T-beam member;

FIG. 4 is an end elevation view exemplifying an intermediate step for placing the cap unit on the structural T-beam member;

FIG. 5 is an end elevation view illustrating the cap unit in supported and aligned position on the structural T-beam member; and

FIG. 6 is an end elevation view of a modified cap unit according to the principles of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 1 shows a suspended ceiling construction using a cap unit or member employing the principles of the invention. The suspended ceiling construction includes a grid having rows of spaced apart parallel extending main structural beams having laterally extending portions such as structural T-beam members generally denoted as 10 having flanges 11 and 12 extending laterally from a web 13 and further including spaced apart parallel extending crossing rows of usually shorter transverse structural beams having laterally extending portions such as structural T-beam members generally denoted as 14 that include flanges 15 and 16 laterally extending from a web 17. The transverse structural T-beam members 14 extend between the main structural T-beam members 10 to intersect at right angles thereto and at spaced intervals along the length of the main T-beam members 10. Appropriate support means such as wires 18 support the grid from overlying ceiling joists and the like. The illustrated suspended ceiling construction further includes modules such as acoustical units 20 of a glass fiber construction. A longitudinal hollow member or cap unit 30 fits on the laterally extending flange portions of the structural T-beam members 10 and 14 and are fashioned to run substantially along the entire length of the T-beam members, viz their flange length, as indicated in FIG. 1.

While the suspended ceiling construction employing the longitudinal hollow members 30 has particular utility in ceiling arrangements using larger and heavier modules such as modules up to 20 feet long or more, the hollow members 30 may be used in any type of suspended ceiling construction employing structural beam members having laterally extending flange portions, especially T-beams.

FIG. 2 illustrates an enlarged view of the embodiment of the member or cap 30 generally shown in FIG. 1. The member 30 is a longitudinal hollow structure having in transverse section a substantially rectangular wall arrangement, which gives rise to two opposing major walls 31 and 32 and two opposing minor walls 33 and 34. The major wall 31 has an opening or slot 36 communicating with the interior of the member 30 and extending the entire length thereof, the flanges of a structural T-beam member being inserted into the chamber or space within the hollow member 30 through the slot 36. The outer surface of the major wall 32 is a decorative side; as illustrated, the wall 32 includes a longitudinal recess 35 extending the entire length of the hollow member 30. Because of the recess 35 the major wall 32 is multipanar. The recess 35 brings into being interiorly of the member 30 a raised portion having a surface 37, which as shown in FIG. 2 is parallel to the major wall 31 and is closer thereto than other interior surface portions of the major wall 32. The interior surface of the major wall 32 further includes interior surfaces 47 and 48, which extend laterally outwardly of the surface 37 to terminate at the intersection of the minor walls 33 and 34 respectively. The surfaces 47 and 48, as shown in FIG. 2, are parallel to the major wall 31 and are located the same distance from the major wall 31, such distance being greater than the distance of the surface 37 from the major wall 31. The major walls 31 and 32 have a width dimension greater than the total flange width of the structural T-beam members.

Because a viewer sees the outer surface of the wall 32, one may desire to make the recess 35 a color different from the remaining portions of the hollow member 30. Moreover, decorative designs other than the recess 35 can effectively be used with the wall 32 to present different design esthetics to a viewer.

Within the longitudinal hollow member 30 is an alignment arrangement. As shown in FIGS. 2 through 5, the arrangement includes two raillike barrier walls or projections 38 and 39 jutting at right angles from the interior surface of the major wall 31 towards the surface 37 of the major wall 32 and running the entire length of the member 30. In FIGS. 2 through 5, the projections 38 and 39 are disposed in spaced apart parallel relationship interiorly of the member 30 on opposite sides of the slot 36 with a distance between their opposing surfaces 41 and 42 at least equal to the total flange width of its associated structural T-beam member, i.e. the perpendicular distance between the outer longitudinal edges of such flange portions. The projections 38 and 39 are located the same distances laterally outwardly of the longitudinal edges of such flange portions. The projections 38 and 39 are located the same distances laterally outwardly of the longitudinal edges of the opening 36, such distances being equal to the lateral distance of the outer or longitudinal edges of the surface 37 from the edges of the opening 36.

One of the projections has a greater height dimension above the interior surface of the major wall 31 than the other. As shown in FIGS. 2 through 5, the projection 39 has the greater height, the projections 38 and 39 terminating away from the interior surface of the major wall 31 with longitudinal edge surfaces 44 and 45 respectively. The surfaces 44 and 45 oppose the interior surface 37 along its longitudinal edges in spaced apart relation where the surface 44 is more remote from the surface 37.

Located laterally outwardly of the projections 38 and 39 are interior portions or channels 50 and 51, which are portions of the hollow space within the member 30 defined by the walls of the member 30 and its projections 38 and 39. The space between the surface 44 and the interior surface 37 of the wall 32 is an entrance opening to the channel 50. Similarly the space between the surface 45 and the surface 37 opens into the channel 51.

The relatively short height of the projection 38 provides an entrance or space large enough to permit flange movement within the member 30 laterally outwardly or beyond the projection 38 into the channel 50 required to place the hollow member 30 on a structural beam, e.g. structural T-beam member 10 or 14. The entrance must be large enough to permit a flange of particular thickness to pass. Of course the size of the entrance, i.e. distance between the surfaces 44 and 37, may vary with a change in flange thickness. The distance between the surfaces 44 and 37 is greater than the thickness of the flange of the structural T-beam member with which the member 30 is used.

Although it may be less, the shorter projection 38 should have height at least equal to the thickness of the flanges with which the member 30 is employed. For improved flange engagement it is preferred that the height be somewhat greater than the thickness of the flanges.

The perpendicular distance between the surfaces 45 and 37 is normally less than the thickness of the flange on the associated structural T-beam member. Because the opening formed between such surfaces is so small, flange entry into the interior portion or channel 51 is normally precluded, the projection 39 acting as a stop to lateral movement beyond itself.

While the width of the slot 36 must be great enough to permit entry of both flanges into the member 30, its width is less than the total flange width of the associated structural T-beam member to provide wall portions 54 and 55 of the major wall 31 located between the projections 38 and 39. The wall portions 54 and 55 engage the flanges of the associated structural T-beam member, e.g. flanges 11 and 12 of the member 10, for support of the hollow member 30 thereon.

In practice the member 30 is made by an extrusion process. While it has been useful to use polyvinyl chloride to make a rigid cap unit, other suitable materials may be employed, e.g. metals. Further, it has been advantageous to concomitantly extrude a strip 53 that secures in the recess 35 as shown in FIG. 2. Other methods may be used to secure the strip 53 to the hollow member 30, e.g. laminating processes. The addi-

tional strip 53 may, as indicated, be of a color different than the remaining portions of the hollow member 30. In practice, when the strip 53 is used, it normally is made from a polyvinyl chloride composition that through use of appropriate plasticizers is softer than the member 30.

While a suspended ceiling construction using the hollow member or cap unit 30 on both the main and transverse structural T-beam members gives excellent results, the member 30 may be employed at times with certain ceiling arrangements only on the main structural T-beam members 10.

FIGS. 3 through 5 example steps for placing the longitudinal hollow member 30 in position on a structural T-beam member such as a main T-beam member 10. Initially the member 30 is moved to have the flanged portion of the member 10 move through the opening 36 into the member 30 along a path extending laterally outwardly of the member 30 towards the minor wall 33 and converging on the major wall 32 to have a portion of the flange 11 pass through the space between surfaces 44 and 37 into the channel 50 until the web 13 abuts against the edge of the opening 36 on the wall portion 54. When the flange 11 is in such position, the hollow member 30 is moved to bring all of the flange 12 into the member 30 through the slot 36. With such movement the member 30 is placed in a temporary position with both flanges 11 and 12 wholly contained within it and the beam 10 laterally offset therein. The FIG. 4 represents such temporary position.

Because the surface 47 is more remote from the wall 31 than the surface 37, the structural beam 10 may more easily be initially positioned within the hollow member 30. Because the outer most portion of the flange 11 may be moved to have its outer edge protrude to a position greater in distance from the wall 31 than the surface 37, the beam 10 may be more greatly tipped with respect to the member 30, i.e. the flanged portion of the beam 10 follows a path more highly convergent with the major wall 32.

Lastly, the member 30 is moved to an aligned position with the flanges 11 and 12 between the projections 38 and 39. The outer longitudinal edge surfaces of the flanges 11 and 12 fit in snug abutting relationship against the opposing surfaces 41 and 42 of the projections 38 and 39. Because the opening between surfaces 45 and 37 is small, the flange 12 is precluded from entering the channel 51, the final aligned position of the flange between the projections being, therefore, more easily accomplished. Because lateral movement of the cap 30 with respect to the member 10 is precluded by the projections 38 and 39 positive alignment is maintained.

The hollow member 30 may be placed on the structural T-beam members after the grid is complete and the modules are in position.

The structural T-beam member 10 supports the hollow member 30 on its flanges 11 and 12, which engage the interior surface of the wall portions 54 and 55 respectively of the major wall 31, such portions being located between the projections 38 and 39. Because the member 30 has a width dimension greater than the total flange width of the structural T-beams, the hollow members 30 assist in the support of the modules 20.

As indicator may be employed to point out the location of the shorter projection 38. A mark such as a raised line 80 located on the exterior surface of the major wall 31 has been found useful to show which direction to move the flanged portion of a structural T-beam member through the opening 36.

FIG. 6 illustrates a modified longitudinal member or cap. Shown in FIG. 6 is a longitudinal hollow member 60 having a rectangular transverse cross section with major walls 61 and 62 and minor walls 63 and 64. The major wall 61 has an opening or slot 66 communicating with the interior of the member 60 extending the entire length thereof. The major wall 32 is a decorative side and is planar.

Within the hollow member 60 is an alignment arrangement, which includes two raillike barriers or walls 68 and 69 running the length of the member 60 with opposing surfaces 70 and 71 respectively. The barrier 68 is a projection having a longitudi-

dinal edge surface 74 spaced from and opposing the interior surface of the major wall 62. The barrier 68 is located inwardly of the minor wall 63 leaving a channel 77. The raillike wall 69 connects the interior surfaces the walls 61 and 62 and extends at right angles thereto. The wall 69 is spaced inwardly from the minor wall 64 leaving a channel 78, which is shut off from the remainder of the interior of the hollow member 60. The slot 66 is similar to slot 36 of the hollow member or cap unit 30.

The member 60 positions on a structural member, e.g. the main structural T-beam member 10, like the member 30 as exemplified in FIGS. 2 through 5 except the channels 77 and 78 are in a planar wall 62 permitting a lesser amount of tipping relationship during their positioning.

It is apparent that within the scope of the invention modifications and different arrangements may be made other than as herein disclosed. The present disclosure is merely illustrative, the invention comprehending all variations thereof.

We claim:

1. A cap member for beams of suspended ceiling constructions wherein the beams have opposed longitudinal flange portions comprising:

a longitudinal hollow member having a lengthwise opening communicating with the interior thereof through which the laterally extending flange portions of a beam can be inserted internally of the hollow member for support by the flange portions of the beam; and

aligning means located within the hollow member for holding the member in lateral alignment in its supported relation on a beam, the aligning means including two spaced apart alignment surfaces located on opposite sides of the opening, one of the alignment surfaces being shorter in height than the other alignment surface, the hollow member having an interior portion located laterally on at least one side of the opening beyond the alignment surface located on such side and into which a flange portion of the beam can extend during insertion of the flange portions within the hollow member.

2. A cap member as recited in claim 1 wherein the alignment surface having the greater height acts as a stop precluding beam movement laterally beyond it.

3. In a suspended ceiling construction a cap member for beams wherein the beams have opposed longitudinal flange portions comprising:

a longitudinal hollow member having a lengthwise opening communicating with the interior thereof through which the laterally extending flange portions of a beam can be inserted internally of the hollow member for support by the flange portions of the beam; and

two spaced-apart projections located within the hollow member on opposite sides of the opening for holding the hollow member in lateral alignment in its supported relation on the beam, the projections extending lengthwise in the hollow member at a distance between them permitting the laterally extending flange portions of a beam to snugly fit therebetween, one of the projections being shorter in height than the other projection the hollow member having an interior portion located laterally at least on the side of the opening having the shorter projection that is located beyond the shorter projection, the projection having the greater height acting as a stop precluding beam movement laterally beyond it.

4. A cap member for T-beams of suspended ceiling constructions comprising:

a longitudinal hollow member having at least one major wall, the major wall having a lengthwise opening communicating with the interior thereof through which the flange portions of a T-beam can be inserted internally of the hollow member for support by the flange portions of

the T-beam; and

a pair of spaced-apart projections within the hollow member jutting from the inside surface of the major wall for holding the hollow member in lateral alignment on the beam, the projections running parallel to each other on opposite sides of the opening, one of the projections having a shorter height dimension than the other, the hollow member having space located laterally at least outwardly of the shorter projection, the shorter projection having a height dimension permitting movement of a portion of one of the flange portions laterally outwardly of it into the space located there, the width of the opening being less than the combined flange width of the flange portions of the T-beam.

5. A cap member for T-beams of suspended ceiling construction comprising:

a longitudinal hollow member having two opposed major walls and two opposed minor walls connecting the major walls, one of the major walls having a lengthwise opening communicating with the interior thereof through which the flange portion of a T-beam can be inserted internally of the hollow member, the major wall with the opening having a width greater than the flange portions of the T-beams; and

a pair of spaced-apart projections within the hollow member jutting from the inside surface of the major wall having the opening towards the other major wall, the projections running parallel to each other on opposite sides of the opening, one of the projections having a shorter height dimension than the other, the hollow member having dimensions locating one of the minor walls spaced from and laterally outwardly of the shorter projection, the height of the shorter projection with respect to the other major wall and the location of the minor wall laterally outwardly of the shorter projection permitting flange movement of the T-beam laterally outwardly of the shorter projection through the space between the shorter projection and the other major wall, the width of the opening being less than the combined flange width of the flange portions of the T-beam.

6. A cap member recited in claim 5 where the other major wall is multiplanar.

7. A cap member for T-beam members of suspended ceiling construction comprising:

a longitudinal hollow member having two opposed major walls and two opposed minor walls connecting the major walls, one of the major walls having a lengthwise opening communicating with the interior thereof through which the flange portions of a T-beam can be inserted internally of the hollow member, the major wall with the opening having a width greater than the flange portions of the T-beam; and

a pair of spaced-apart projections within the hollow member jutting from the inside surface of the major wall having the opening toward the other major wall, the projections running parallel to each other to opposite sides of the opening, the minor walls located laterally outwardly in spaced relation from the projections, one of the projections having a shorter height dimension than the other, the height of the shorter projection with respect to the other major wall permitting flange movement of the T-beam laterally into the space between the projection and its associated minor wall, the other projection having a height with respect to the other major wall that precludes entry of T-beam into the space between the other projection and its associated minor wall, the width of the opening being less than the combined flange width of the flange portions of the T-beam.