Nov. 9, 1965 N. NELSSON 3,216,537

CLIP MEMBER FOR SUSPENDED CEILING CONSTRUCTION

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Fig. 1

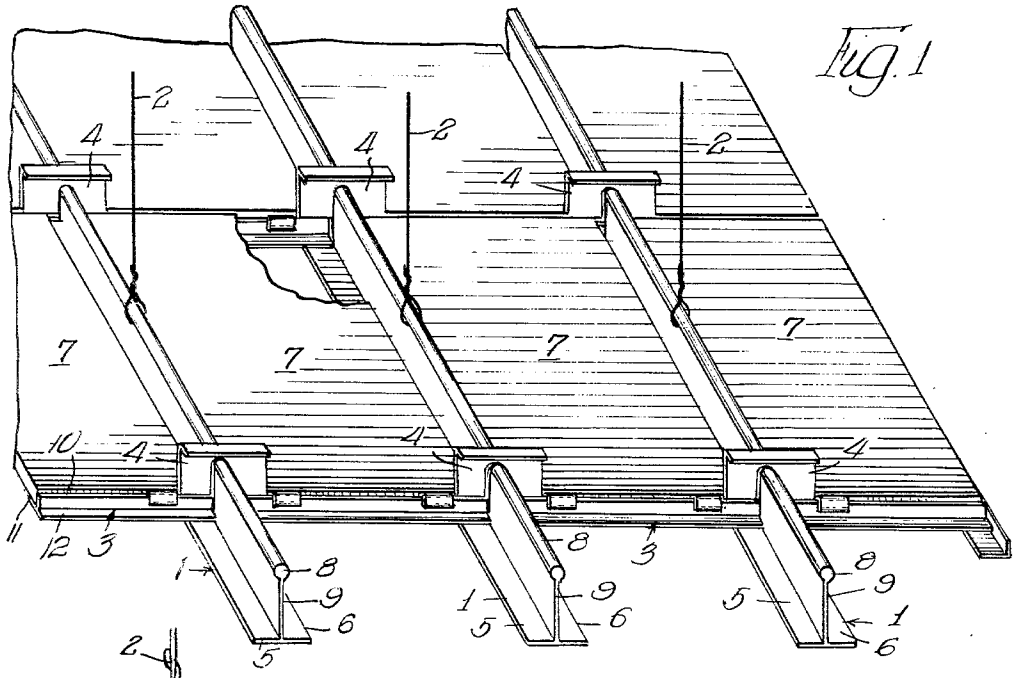


Fig. 2

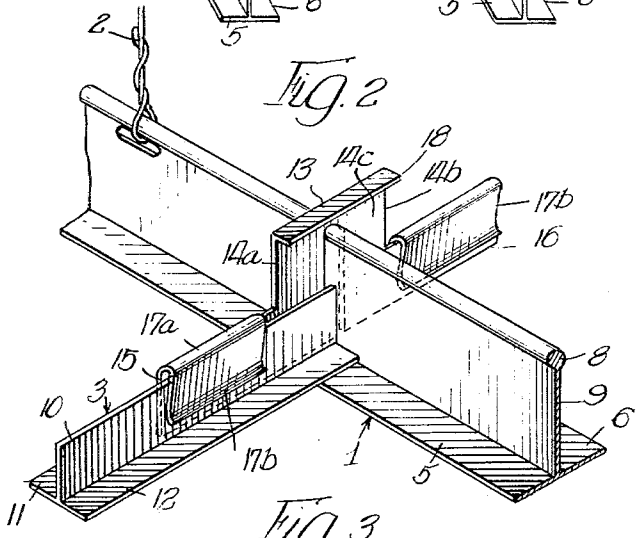


Fig. 3

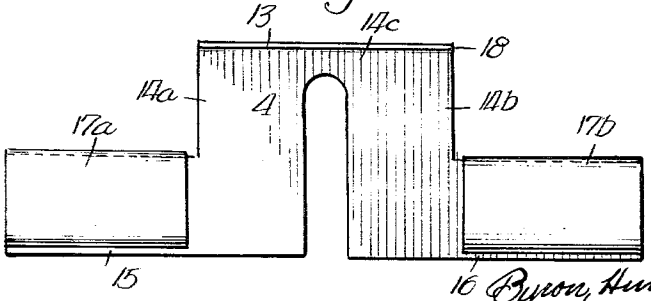
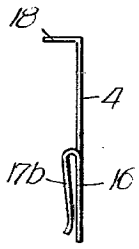


Fig. 4



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CLIP MEMBER FOR SUSPENDED CEILING CONSTRUCTION

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Fig. 5

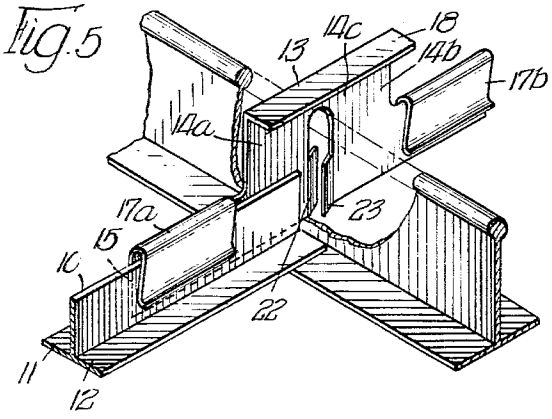


Fig. 6

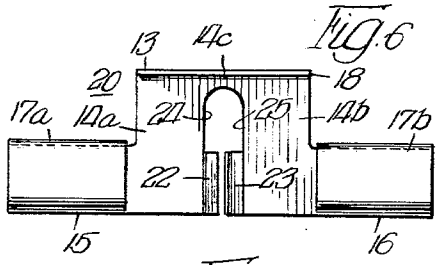


Fig. 7

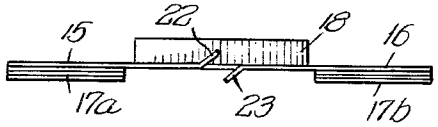


Fig. 8

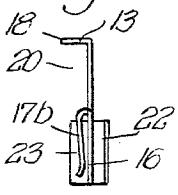


Fig. 9

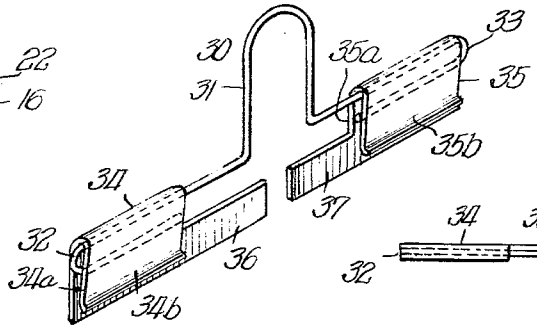


Fig. 10

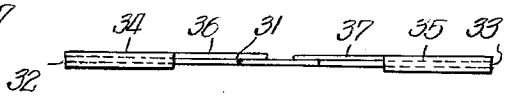


Fig. 14

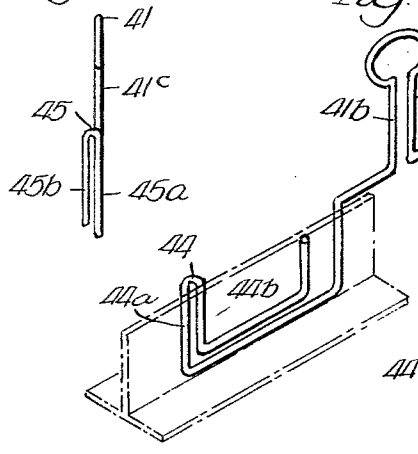


Fig. 12

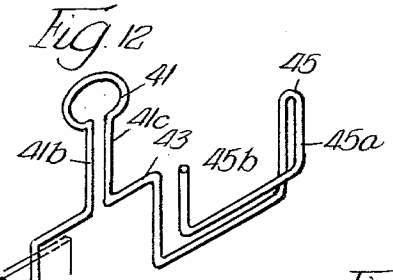


Fig. 11

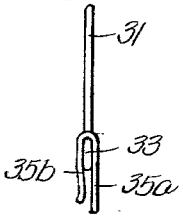
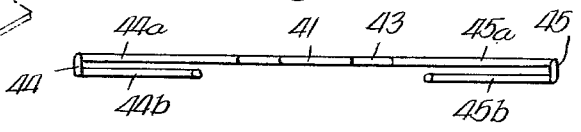


Fig. 13



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CLIP MEMBER FOR SUSPENDED CEILING CONSTRUCTION

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3 Claims. (Cl. 189—35)

This invention relates to an improved suspended ceiling construction and more particularly to a cross member attachment means for use in such construction.

In conventional suspended ceiling constructions, parallel spaced primary support members are suspended by hanger wires from the overhead frame or surface. These primary members are joined by cross support members which, with the primary members, make up a lattice-like framework for supporting the ceiling panels or tiles. In many types of suspended ceiling constructions, the cross support members are rigidly or permanently secured to the primary support members in order to provide a stabilized framework for firmly supporting the ceiling panels or tiles. Such constructions are not only difficult and time consuming to install, but they are not adapted to easy removal or disassembly such as is often required for the repair and maintenance of utilities commonly carried in the space above the suspended ceiling construction. Suspended ceiling systems have met with commercial acceptance to a lesser or greater degree, depending upon the type of construction employed. Most frequently the deficiencies in any such system are to be found in the means and methods that are employed for purposes of attaching the cross support members to the primary support members.

Therefore, it is a general object of the present invention to provide an improved and inexpensive ceiling construction which is easy and simple both to install and to disassemble but which when installed is rigid and stable.

Another object of the invention is to provide an improved suspended ceiling construction adapted to permit easy removal of the ceiling panels without damaging or rendering unfit for reinstallation either the panels themselves or the support members of the system.

Another object of the present invention is to provide an improved direct suspended ceiling construction which has but few parts and wherein the parts are mutually constructed and joined in the construction so as to obviate close tolerance requirements in the system.

Another object of the invention is to provide a new and improved clip for a suspended ceiling construction wherein the clip is adapted to secure cross support members to the primary support members and is adapted for easy and rapid disassembly from both the cross members and the support members.

Other objects and features of the invention pertain to the particular construction and means whereby the above identified objects are attained.

The invention contemplates a suspended ceiling construction in which the primary support members and cross support members are inverted T-flanged beams and in which the parallel spaced primary support members are suspended by hangar wires from an overhead frame or surface and in which the cross support members are held in position between the primary members by novel construction clips. Each of the construction clips is generally of an inverted T construction for which the stem of the T is slotted to provide a straddling portion for positioning over the primary support member and for which the arms of the T comprise a pair of oppositely extending portions for engaging the cross members positioned on each side of the primary support member. In its operation each construction clip grips two longitudinally adjacent cross support members in longitudinal alignment and grips said cross support members to the intervening primary support member. The primary support member and the cross support members thus joined provide a lattice-like framework into which ceiling panels or tiles may be easily and rapidly positioned. In addition, the novel construction clips are of such a design as to be easily and rapidly both assembled and disassembled from the ceiling construction.

The invention, both as to its construction and method of use, will be better understood by reference to the following specification and claims forming a part thereof wherein:

FIGURE 1 is a perspective view of a suspended ceiling construction utilizing the principles of the present invention;

FIGURE 2 is a perspective view of one form of the novel construction clip of the present invention;

FIGURE 3 is a front view of the clip illustrated in FIGURE 2;

FIGURE 4 is a side view of the clip illustrated in FIGURE 2;

FIGURE 5 is a perspective view of another form of the construction clip of the present invention;

FIGURES 6, 7 and 8 show, respectively, a front, a bottom and a side view of the clip of FIGURE 5;

FIGURE 9 is a perspective view of another form of the construction clip of the present invention:

FIGURES 10 and 11 show, respectively, a top and a side view of the clip of FIGURE 9;

FIGURE 12 is a perspective view of still another form of the construction clip of the present invention; and

FIGURES 13 and 14 show, respectively, a top view and a side view of the clip of FIGURE 12.

Referring specifically to FIGURE 1, there is shown therein a suspended ceiling construction including a plurality of primary support members **1** spaced apart in substantially parallel relationship and suspended by hangar wires **2** from an overhead frame or surface, not shown. The overhead frame might very well be the roof of the building or the floor above the room in which the suspended ceiling construction is to be provided, and the overhead surface might well be the ceiling of the room in which the suspended ceiling construction is to be placed. A plurality of cross support members **3** are located transversely between the primary support members **1** and are secured in position relative thereto by novel construction clips **4**. The cross members are also spaced apart in substantially parallel relationship with one another. In the conjoint arrangement as shown, the primary support members **1**, the cross support members **3** and the clips **4** combine to form a lattice-like framework in which the ceiling panels **7** are supported. It is understood, of course, that the type of ceiling panel or tile used is not considered a part of the invention and may be any type of panel or tile available on the market.

The primary support members **1** are essentially an inverted T-beam having a vertical web portion or element **9** and a pair of oppositely extending flange portions or elements **5** and **6**. For extra strength and rigidity, the web element **9** may carry at its free end a circularly shaped head or bulb element **8**. This support member may be of any suitable material including metals and synthetics and may be fabricated or extruded. The transversely located cross support members **3** may be of a shape similar to that of the primary support members **1** although smaller and are preferably of an inverted T shape including a vertically arranged web portion or element **10** having flange portions **11** and **12** projecting laterally in opposite directions from one marginal edge thereof.

The construction clips **4**, shown in greater detail in FIGURES 2, 3 and 4, are made from a substantially flat

piece of sheet metal formed in an inverted T shape made up of a bridge element 13 and arm elements 15 and 16. The bridge element is made up of a bight portion 14c and a transversely projecting flange portion 18. Each of the arm elements 15 and 16 includes a vertically extending leg portion 14a and 14b, respectively, and an outwardly extending and overlapping flange segment 17a and 17b, respectively, which are downwardly bent from the arm and define mating clips. The bridge element 13 derives its name from the fact that it physically bridges the primary member 1 and preferably the bridge element is symmetrically disposed with regards to the arms 15 and 16, although it is understood that the clip 4 need not be symmetrically constructed in order to serve the inventive purpose.

Because the clip 4 straddles the primary support member 1, the width of the bight portion 14c is such as to permit it to pass over the head element 8 of a primary support member 1.

FIGURE 2 shows a more detailed illustration of the clip construction 4 and the manner in which it secures the cross members 3 to a primary support member 1 in a suspended ceiling construction. The illustration of FIGURE 2 will be better understood by considering the method of installation of the clip to the primary support member and the cross members. As previously explained, the primary support members are suspended by wires 2 in spaced parallel relationship. Cross support members 3 of a length nearly equal to the distance between the primary support members are placed in a transverse position between a pair of primary support members. These cross members are arranged at prescribed distances from one another in substantially straight parallel rows between successive primary support members. The distances between the primary support members and also the distances between the cross support members are determined by the dimensions and weight of the ceiling panels to be used. Just by way of example, the primary members 1 and the cross support members 3 may be arranged to accommodate standard panels of a dimension two feet by four feet or two feet by two feet, or they may be arranged to accommodate any special sized panels. Each cross member 3 is supported at the flanges 5 or 6 of the primary support member by its substantially flat bottom flange portions 11 and 12. In order to secure lateral stability for the grid system so defined and with the clip 13 illustrated in FIGURES 2, 3 and 4, it is preferable that the ends of the cross members 3 abut directly against the web portion 9 of the primary support member 1. Thus arranged, the cross support members are ready to be positioned by clips installed thereon.

The clips are installed by placing a clip 4 transversely to the primary support member 1 and in coplanar relationship with a row of cross support members 3 and moving the clip relative to the primary support member 1 so that the head element 8 and the web element 9 are disposed within the aperture formed by the leg and bight portions 14a, 14b and 14c, respectively. As the clip is installed on the primary support member, the web elements 10 of the two engaged cross members 3 are inserted between the overlapping flange segment 17a and the arm element 15, and the overlapping flange segment 17b and the arm element 16 by springing each flange segment out from the arm element. The cross support members are thus held in secure engagement with the clip by frictional engagement between the flange segments and the arm elements and also by the spring tension exerted on the web element of the cross members by the flange segments and the arm elements of the clip. Inasmuch as the clip is secured to the cross support members 3 but not to the primary support member 1, the cross support members and clips may be adjusted along the primary support member 1 to any preferred dimension for ceiling panels. This is a decided advantage over many of the present methods of installation and construction which utilize the primary support member with slots adapted to receive portions of the cross members and which results in only one dimension of ceiling panel being acceptable by the grid system so developed.

The above described method of construction of the grid system can actually be completed independent of the installation of the tiles or progressively as the tiles are installed. That is, in one instance, the entire ceiling framework and grid system made up of primary members 1 and cross members 3 may be installed with the clips 4 and then, and not until then, are the panels placed in position on the framework by lifting the panels through the diagonal dimension of the grid opening to a position above the grid system and then lowering the panel into the grid opening for support on the flanges 5 and 6 of the primary support member 1 and on the flanges 11 and 12 of the cross support members 3. In the other method of installation the cross support members 3 are installed to the primary members 1 by means of the clips 4 as described, but the panels are installed as each grid is completed. Specifically, after the primary members 1 have been positioned and secured, the cross support members 3 are installed in successive rows by use of the construction clips 4 of the invention, and after each row has been installed, then the panels are placed in position.

Without regard to which of the methods of installation is involved, it is easily understood that the panels or tiles can easily and rapidly be demounted from the suspended ceiling construction by lifting the panels off of the grid construction and by the same token designated one or ones of the cross support members can be removed by removing the clips 4 joining such members to the primary support member.

FIGURE 5 shows a clip 20 which is a variation of the clip 4 illustrated in FIGURE 2. As shown in FIGURES 5, 6, 7 and 8, the clip 20 is changed only in regard to the arm elements 15 and 16 thereof. The arm elements 15 and 16 are comprised of the two legs 14a and 14b, respectively, and include in addition tab segments 22 and 23 angularly disposed with and projecting from the marginal edges 24 and 25, respectively, of the leg portions. The tab segments 22 and 23 are preferably of a width such that they engage the width of the web 9 of the primary support member 1 and are spaced apart in substantially parallel relationship by a distance substantially equal to the thickness of the head element 8 of the primary support member 1. It is intended that the tab segments 22 and 23 will engage and grip the web portion 9 of the primary support member 1.

In installing the modified clip-construction 20 in the suspended ceiling construction, the tab segments 22 and 23 can be bent at a prescribed angle before installation. If spacing between the tab segments is adequate, the clip may be installed over the head segment 8 of the primary support member 1 by turning it to an angle which will allow the head segment to pass between the tabs 22 and 23. After the head segment has cleared the tab segments and is within the open aperture defined by the legs 14a, 14b and the bight portion 14c, the clip may then be rotated to its normal position, that is, coplanar to the cross support members 3 and normal to the web portion 9 of the primary support member 1. When the clip is rotated to its normal position, the tab segments 22 and 23 engage the web portion 9 of the support member thereby adding to the stability of the system.

Alternately, the tabs 22 and 23 may be bent normal to the plane of the bridge element 13 prior to installation over the primary support member 1 and after mounting thereon may be bent into engagement with the web 9 of the support member. The clip is installed to the cross support members 3 on the primary support member 1 in the same manner as are the clips shown in FIGURES 2, 3 and 4.

The advantage of the clip 20 with its tab elements 22 and 23, is that in order to provide stabilization to the

grid system, with the use of such clips it is no longer necessary that the cross support members **3** be of a length to abut and engage the web member **9** of the primary support member **1**. The improved clip construction **20** performs this stabilizing function. Obviously, the time required to erect the grid system by the use of the modified clip is greatly reduced inasmuch as the cross support members do not have to be of exact interspatial lengths. All that is required is that the cross support members be of a length sufficient to span the distance between the flanges of adjacent primary support members **1**.

The FIGURES 9, 10 and 11 illustrate a clip **30** which is an alternative form of the clip **20** shown in FIGURES 5, 6, 7 and 8. Specifically, the clip **30** is comprised of a bridge element **31** and of outwardly extending arm elements **32** and **33** all formed of a suitable gauge of relatively stiff wire. The arm elements **32** and **33** are partially bent back on themselves and each carries thereon clip elements **34** and **35**, respectively, formed of sheet metal or a plastic. The clip **34**, for example, includes a back face segment **34***a* and an overlapping flange segment **34***b* which together define a mating clip. The back face segment has inwardly extending therefrom a tab segment **36** adapted to engage the web of a primary support member **1**. The clip **35** is similarly formed including a back face segment **35***a* and an overlapping flange segment **35***b* and an inwardly extending tab segment **37**. The clip **30** so formed functions identically as does that clip **20** shown in FIGURE 5.

A further variation of the clips **20** and **30** is the clip **40** illustrated in FIGURES 12, 13 and 14. This clip **40** is formed entirely of a single piece of bent wire selected from material having sufficient resiliency to resist deformation in the normal handling and use of the clip. The clip so formed includes a bridge element **41** and arm elements **42** and **43** outwardly extending therefrom. The bridge element **41** is formed of an inwardly bent bight portion **41***a* which acts as a spring between two leg portions **41***b* and **41***c* of the arm elements **42** and **43**, respectively. The arm elements **42** and **43** have clips **44** and **45**, respectively, formed thereon of the bent wire. Specifically, the spring **44** is formed of a wire that is bent in a form to define a plane designated as the back segment **44***a*. The wire in extension from the back segment **44***a* is bent to define a substantially parallel planar overlapping segment **44***b*. The clip **45** is similarly formed of wire to define a back segment **45***a* and an overlapping segment **45***b*. The clips **44** and **45** engage the web portions of a cross support member in a manner as above described. The leg portions **41***b* and **41***c* in conjunction with the spring formed bight portion **41***a* perform the tab function of engaging the opposite sides of the web of the primary support member **1**. The leg portions **41***b* and **41***c* are spaced apart by the thickness of the web of the primary support member **1** and the bight portion **41***a* is of a flexibility so as to permit the outwardly extending arms **42** and **43** and the leg portions **41***b* and **41***c* to be opened about the bight portion **41***a* and inserted over the head or bulb element **8** of the primary support member **1**. The bight portion **41***a* then springs the leg portions **41***b* and **41***c* into engagement with the sides of the web of the primary support member.

It is appreciated that the suspended ceiling construction described herein and the clip means therefor are exemplary of the principles of the present invention. Obviously, those skilled in the art could make variations and modifications therein without materially changing the nature of the invention, and it is intended to cover in the appended claims all such variations and modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. In a suspended ceiling construction for supporting ceiling panels including parallelly arranged primary support members and cross support members disposed between adjacent ones of said primary support members, wherein each of the primary support members and cross support members is of an inverted T-beam configuration having a continuous vertical web portion and a pair of oppositely arranged outwardly extending flange portions, and wherein each of the cross support members is vertically supported at its flange portions on the flange portions of adjacent primary support members and is horizontally movable relative thereto: a unitary clip member for horizontally aligning and securing two cross support members at a primary support member comprising a bridge element, and a longitudinal spaced pair of planarly aligned arm elements joined to said bridge element, said arm elements being oppositely disposed and outwardly extending from said bridge element, each of said arm elements being made up of a pair of oppositely facing spring portions downwardly opening to form smooth surfaced gripping members, said spring portions being spaced apart a distance less than the thickness of the web of said cross member, whereby said clip member is adapted to frictionally and slidably grip the webs of a pair of cross support members arranged transverse to said primary support member in a fashion permitting adjustment of either or both of said cross support members toward or away from the web of said primary support member and adjustment of said clips and said associated cross members in either direction along the web of said primary support member.

2. The clip member set forth in claim **1** wherein said bridge element is made up of a bight portion and a reinforcing transverse flange portion and wherein said pair of arm elements are joined one at each end of said bight portion of said bridge element.

3. The clip member set forth in claim **1** wherein each of the arm elements thereof further includes a vertically running tab portion extending toward the aperture defined by said bridge element, whereby said clip member further is adapted to engage the primary support member by frictional contact of said inwardly extending tab portions at the web portion thereof.

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