

Oct. 11, 1966

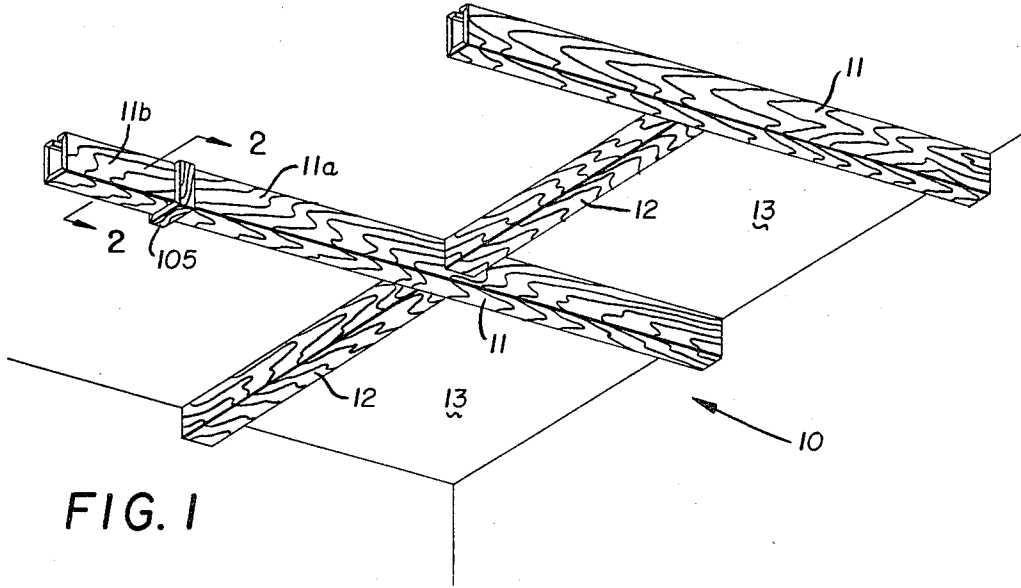
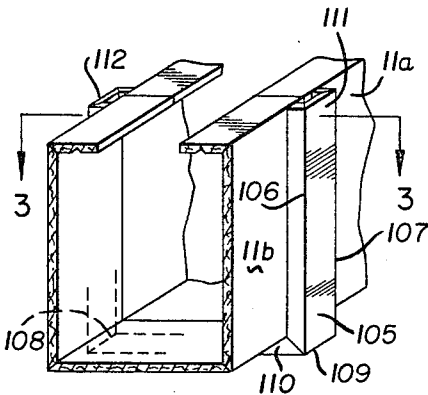
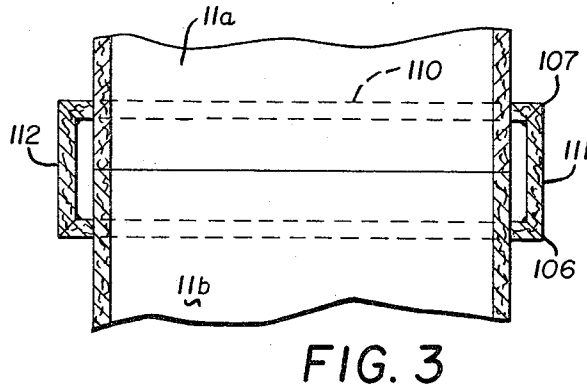
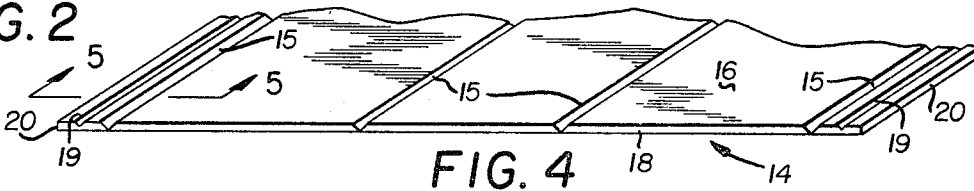
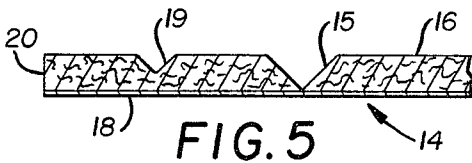
R. R. CORNELL

3,277,624

BEAMED CEILING CONSTRUCTIONS

Filed July 29, 1963

3 Sheets-Sheet 1

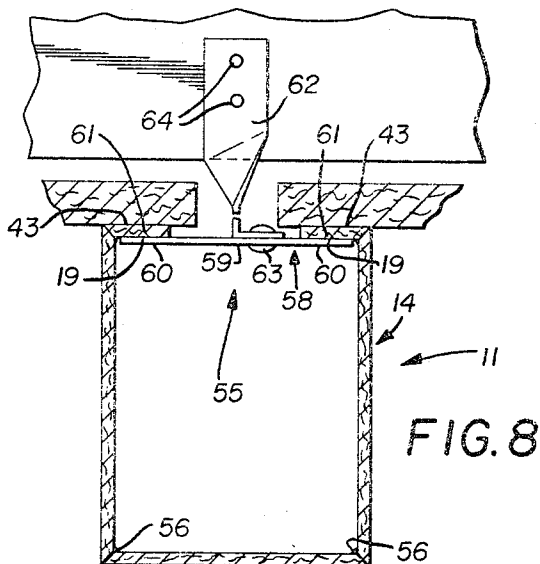
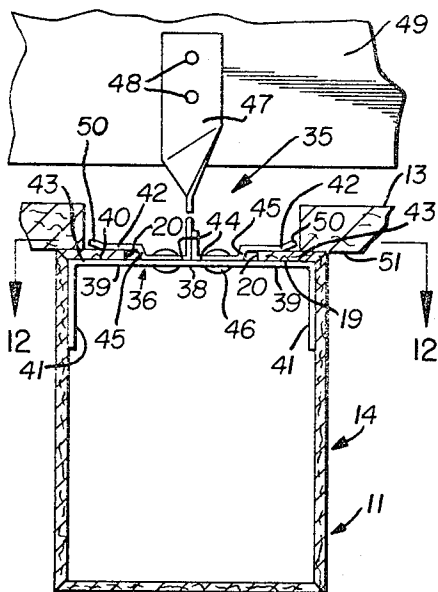
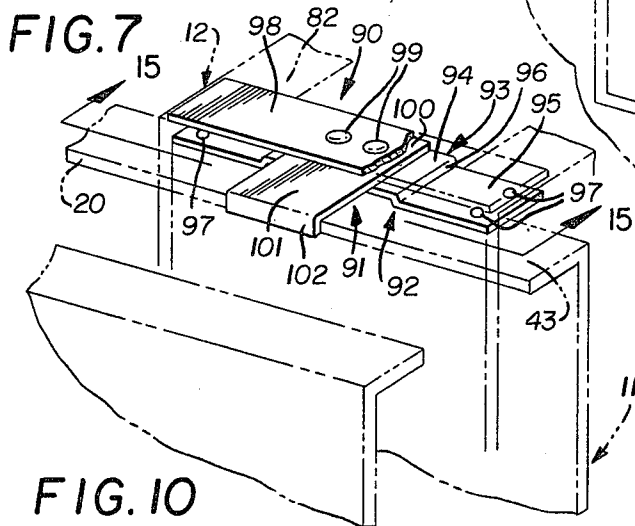
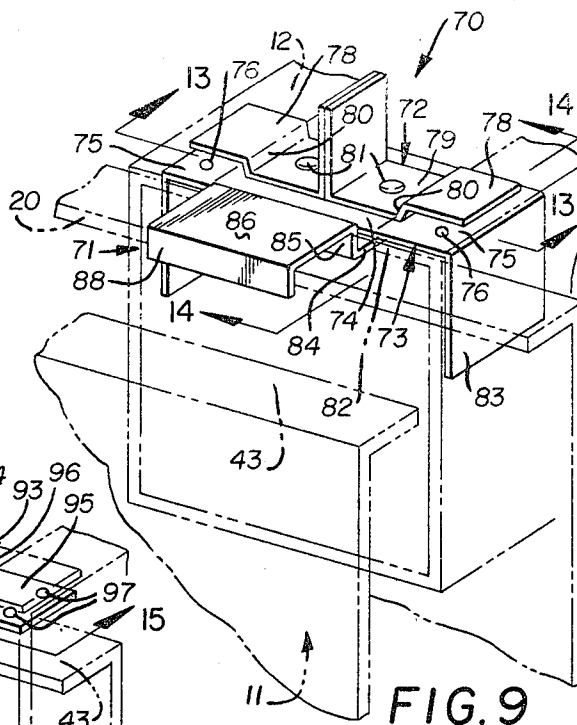


INVENTOR.
RICHARD R. CORNELL
BY *Hamilton & Cook*
ATTORNEYS

3,277,624

Filed July 29, 1963

3 Sheets-Sheet 2



INVENTOR.
RICHARD R. CORNELL
BY *Hamilton & Cook*

ATTORNEYS

R. R. CORNELL

BEAMED CEILING CONSTRUCTIONS

3 Sheets-Sheet 3

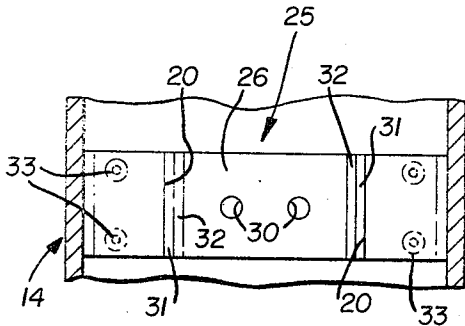


FIG. 11

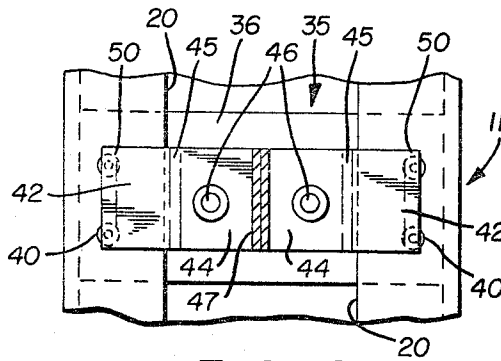


FIG. 12

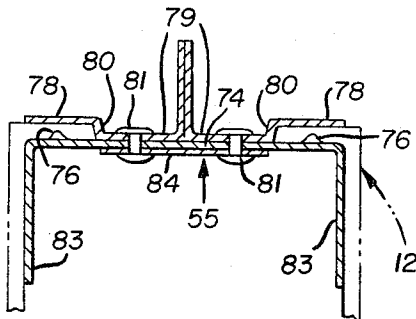


FIG. 13

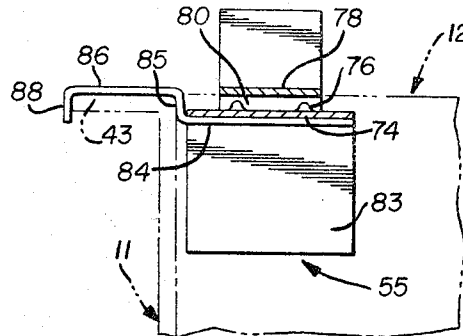


FIG. 14

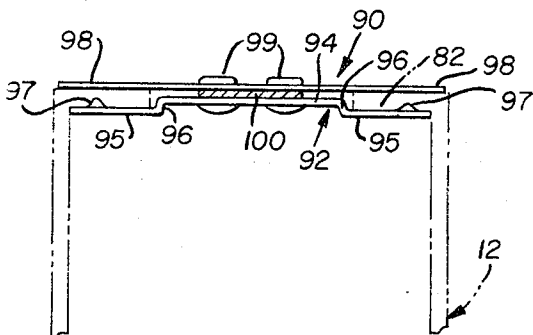


FIG. 15

INVENTOR.
RICHARD R. CORNELL
BY *Hamilton & Cook*
ATTORNEYS

1

3,277,624

BEAMED CEILING CONSTRUCTIONS

Richard R. Cornell, Newcomerstown, Ohio, assignor to Groovfold Fabricators, Inc., Newcomerstown, Ohio, a corporation of Ohio

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10 Claims. (Cl. 52-484)

The present invention relates to ceiling construction. More particularly, the present invention relates to a beamed ceiling construction capable of supporting decorative or functional ceiling panels. Specifically, the present invention relates to folding of sheet material to simulate solid beams and the support beams whereby said simulated beams are mounted to the structural ceiling and to each other.

Architects and interior decorators alike are more and more utilizing the beamed ceiling to impart an aura of elegance to rooms, irrespective of whether the decor is modern, traditional or period.

The beamed ceiling had its inception at the time when lumber was one of the least expensive of the building materials, and the structural ceiling beams were of magnificent aesthetic dimension. This true, or structural, beamed ceiling was simply left unexposed for the desired effect.

Today, however, the cost of lumber has become a major consideration in construction costs. Moreover, the cost of solid structural members of the dimensions used historically has become astronomical. In fact, it is less expensive now to laminate a plurality of pieces of dimensional lumber to the desired size than it is to have the desired size cut to order. Even this is too expensive where only the aesthetic effect is desired, and this has given rise to the "boxed" beam construction. That is, where a beamed ceiling appearance is desired, the builders are now constructing a three-sided linear box to the desired size and doing so by joining three lengths of much cheaper one inch or less dimensional lumber. However, even with the most tedious craftsmanship, itself a prohibitive cost factor, the joiners of the three sides of the linear box are readily discernible as a constant reminder that the beam is merely a facsimile.

Aside from the aesthetic factor of beamed ceiling constructions, they can also perform the useful function of supporting the decorative ceiling and at the same time not contribute an iota to the structural requirement of the building in which they are used. For example, in re-vamping old office buildings with their high ceilings to more modern decor, an artificial or "dropped" ceiling is often employed. Such drop ceilings often comprise acoustic panels which are periphery supported by inverted metallic "T" bars.

It has heretofore been impossible inexpensively to produce a beamed ceiling without telltale signs of artificiality.

It is therefore an object of the present invention to provide a beamed ceiling which has the appearance of a solid wood member and yet is inexpensive to produce.

It is another object of the present invention to provide a beamed ceiling, as above, by folding a decoratively clad sheet of laminar material into the shape of a beam so as to have an unbroken continuity of the facing material.

It is another object of the present invention to provide hangers for use in conjunction with the folded sheet material to suspend it in the style of a beamed ceiling.

It is a further object of the present invention to provide joinder clips for connecting perpendicularly intersecting primary beams and secondary beams of different sizes with the minimum apparent joinder line.

It is a still further object of the present invention to provide a beamed ceiling system, as above, adapted to support modular decorative ceiling panels.

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These and other objects which will become apparent from the following specification are accomplished by means hereinafter described and claimed.

One preferred embodiment is shown by way of example in the accompanying drawings and hereinafter described in detail without attempting to show all of the various forms and modifications in which the invention might be embodied; the invention being measured by the appended claims and not by the details of the specification.

In the drawings:

FIG. 1 is a perspective of a beamed ceiling installation embodying the concepts of the present invention;

FIG. 2 is an enlarged perspective taken through a section of the installation shown in FIG. 1, as indicated by line 2-2;

FIG. 3 is an enlarged top plan taken substantially on line 3-3 of FIG. 2;

FIG. 4 is a perspective of a flexible sheet grooved to be folded into a beam;

FIG. 5 is an enlarged section taken substantially on line 5-5 of FIG. 4;

FIG. 6 is an end elevation of a beam according to the present invention mounted contiguously to the ceiling by a unique support member;

FIG. 7 is a view similar to FIG. 6 showing the beam mounted in spaced relation below the supporting structure by a unique hanger and in turn supporting a ceiling panel;

FIG. 8 is a view similar to FIG. 7 depicting an alternative hanger embodiment;

FIG. 9 is a trimetric perspective of a primary beam and a secondary beam intersecting at right angles and depicting a unique joinder clip used;

FIG. 10 is a view similar to FIG. 9 depicting an alternative joinder clip embodiment;

FIG. 11 is an enlarged cross section taken substantially on line 11-11 of FIG. 6;

FIG. 12 is an enlarged cross section taken substantially on line 12-12 of FIG. 7;

FIG. 13 is a section taken substantially on line 13-13 of FIG. 9;

FIG. 14 is a section taken substantially on line 14-14 of FIG. 9; and

FIG. 15 is a section taken substantially on line 15-15 of FIG. 10.

In general, a beamed ceiling constructed in accordance with the concept of the present invention utilizes a flat, flexible sheet material grooved by the method and apparatus disclosed in my copending application Serial No. 296,221, filed July 19, 1963, to permit folding to the shape of a simulated beam.

Each beam may be affixed to and supported from the ceiling or superstructure by a series of unique hangers.

When a geometric arrangement of primary and secondary beams is desired, the primary beams are supported from above by the hangers, and the secondary beams connected to the primary beams by the unique joinder clips.

Referring particularly to the drawings, a geometrically arranged beamed ceiling, indicated generally by the numeral 10, is shown in FIG. 1. The primary beams 11 may be positioned at a desired interval and intersected by secondary beams 12 running transversely thereto. Such an arrangement 10 may be positioned contiguously with the ceiling or lowered, with respect thereto, to form a false, or dropped, ceiling. In a dropped ceiling the primary and secondary beams may be laid out in modular units to support standard panels 13 by engagement with their peripheral edge.

To form the beam shape a sheet 14 of material is provided with a plurality of, four for a square or rectangular beam, mitered rabbets 15 which cut through the material to within a few thousandths of an inch of the surface to

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be exposed. If the beams are to simulate wood, a base material 16 may be provided with a decorative wood grained film facing 18 laminated onto the base, and the resulting composite sheet rabbeted through the base 16 exactly to the facing 18, as disclosed in my copending application Serial No. 296,221.

In addition to the four mitered rabbets 15, a lock notch 19 is spaced between, and parallel to, the outermost rabbet 15 and each longitudinal edge 20 of the sheet 14. The purpose of the lock notch 19 will be more fully understood after the following description of the various hanger and clip means.

When it is desired to mount the beam contiguously with the ceiling a support member, as shown in FIGS. 6 and 11 and indicated generally by the numeral 25, is preferred.

Support member 25 which may be metallic, has a mounting base 26 engaging the ceiling 28 and can be affixed thereto by nails 29 driven through appropriate bores 30 in base 26 into the ceiling 28. Extending outwardly from each side of the base 26 is a resilient gripping portion, or wing, 31 connected to the base 26 by an offset extension 32. The base 26 and the two wings 31 lie in generally parallel planes spaced apart an amount equal to the thickness of the sheet 14 from which the beam is formed. However, to assure the necessary spring resistance the plane of the individual wings 31 may converge slightly toward the plane of the base 26, outwardly of the base itself. Each gripping wing is provided with one or more lock lugs 33 for insertable engagement within the lock notch 19.

To install such a beam system a plurality of spring clips 25 are mounted along the lines of both the primary and secondary beams to be installed. Then the edges 20 of the groove sheet 14 are inserted between the respective resilient gripping wings 31 and the ceiling 28 until the lock lugs 33 on each wing 31 snap into lock notches 19. To facilitate insertion, the end of each gripping wing 31 may be provided with a downwardly turned feed lip 34.

In order to assemble a drop ceiling with a beam system according to the present invention, as for example the drop ceiling construction disclosed in FIG. 1, the primary beams 11 are grooved, as shown in FIGS. 4 and 5, to the proper dimension for the size of the beam desired, and then hung from the original ceiling, superstructure or the like by primary hangers.

FIGS. 7 and 8 depict alternate forms of primary hangers to facilitate installation of the primary beams 11, dependent upon their particular characteristics.

For example, it may be desirable that the grooved board 14 be shipped to the installation situs in flat form to reduce packing volume. In such a case it may be impractical to glue the mitered grooves 15 when the sheet is folded to beam form so a primary hanger of the nature depicted in FIGS. 7 and 12 and indicated by the numeral 35 may be utilized. Primary hanger 35 has a support member 36 which includes the mounting base 38 which terminates in coplanar gripping portions, or wings, 39 on each end thereof. Each gripping wing 39 is similarly provided with one or more lock lugs 40 and may, if desired, terminate in a forming skirt 41 extending perpendicularly downwardly from the end of the wing 39. A back-up tab 42 is spaced apart from each gripping wing 39 by an amount equal to approximately the thickness of the sheet material 14 from which the beam is formed. Either the back-up tabs 42 and/or the gripping wings 39 are preferably resilient to provide a biasing engagement for the mounting flange 43 of the folded beam.

As shown in FIG. 7, an attaching flange 44 is joined to each back-up tab 42 by an offset extension 45 and is connected to the mounting base 38, as by rivets 46 or spot

welding. A hanger strap 47 extends upwardly from base 38 and is provided with a plurality of holes 48 whereby the primary hanger 35 may be mounted to the ceiling, or superstructure, at the desired height by nails, wire or other

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suitable means. The strap 47, as well as the remainder of the hanger 35, may be of 16 to 24 gauge metal so that the strap 46 may be readily bent for mounting against a flat ceiling and yet be sufficiently strong to support the weight of the beamed ceiling when secured to the side of a joist 49.

This particular hanger is especially adaptable for mounting unglued grooved sheet material. The edges 20 of the grooved sheet are inserted between the resilient back-up tabs 42 and their opposed gripping wings 39 until the lock lugs 40 snap into engagement with the lock notches 19. In this hanger also it may be desirable to provide the end of each back-up tab 42 with a guide lip 50 to facilitate insertion of the edges 20.

The forming skirt 41 has been found especially suitable for use with unglued beams as it imparts a modicum of lateral stability to the beam itself which is especially desirable when the primary beam is required to support a secondary beam 12 by the joinder clip, or secondary hanger, arrangement more fully hereinafter described.

As shown in FIG. 7, the modular ceiling panels 13 are supported on the ledge 51 formed by the upper surface of the mounting flange 43 of the beam 11.

An alternative primary hanger clip, indicated generally by the numeral 55 in FIGS. 8, 13 and 14, has been found especially suited for use with beams in which the folds along the mitered rabbets are bound with glue, as at 56. By gluing the folds at the corners of the beam, sufficient rigidity and stability of shape is built into the beam itself so that a less complex primary hanger 55 will suffice to support the beam in a drop ceiling arrangement.

In hanger 55 the support member 58 is a substantially flat strip with a medial mounting base portion 59 terminating in coplanar wings 60 which engage the underside of the mounting flange 43 to support beam 11. One or more locking lugs 61 may be provided for engagement within the lock notches 19 in mounting flange 43 for fixed lateral placement of the beam 11 on primary hanger 55. Hanger 55 is mountable to the ceiling, or super structure, by a strap 62 secured, as by rivet 63, to the base portion 59 of support member 58. Strap 62 is also preferably provided with a plurality of holes 64 by which the hanger 55 may be secured at selective vertical positions.

After the primary beams 11 are mounted with the proper modular spacing, the secondary, or intersecting, beams 12 are fitted transversely between the primary beams mounted thereto by unique joinder clips.

One form of joinder clip is shown in FIG. 9 and indicated generally by the numeral 70. Clip 70 is generally comprised of two portions, a hooked portion 71 and a gripping portion 72.

The gripping portion 72 has a support member 73 which includes a medial base portion 74 terminating in coplanar wings 75 on each end thereof. The upper side of each wing 75 is provided with one or more lock lugs 76. Each of the wings 75 has an opposed back-up tab 78. Each back-up tab has an attaching flange 79 which is joined with the tab 78 by an offset extension 80 and is fastened to the base portion 74 of support member 73, as by rivets 81.

There is a degree of flexibility between wing 75 and the respective back-up tab 78 to permit insertion of the mounting flange 82 of the secondary beam 12 until the lock lugs 76 are insertably received in lock notches 19 on the under side of the mounting flanges 82.

When the secondary beam 12 is not glued at the folds it may also be desirable to provide the end of each wing 75 with a forming skirt 83 in order to add stability to the beam itself.

The hook portion 71 has a base portion 84 which may also be joined to the base 74 of support member 73 by rivets 81. From the base 84 extends an offset connection 85 which joins the base 84 to the spanning section 86. The spanning section 86 extends across the top of the mounting flange 43 of beam 11 and terminates in catch

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flange 88 which engages the edge 20 of the mounting flange 43.

The length and disposition of the offset connection 85 controls the vertical relationship between the primary and secondary beams. As shown in FIG. 9, the intersecting beams may be disposed so that the upper surfaces of the mounting flanges 43 and 82 are in the same horizontal plane to provide a level support for the panel 13.

An alternative form of joinder clip is shown in FIGS. 10 and 15 and indicated generally by the numeral 90. The clip 90 also has a hooked portion 91 and a gripping portion 92. The gripping portion also has a support member 93 with a medial base portion 94. However, the wings 95 are not coplanar with the base 94 but are instead joined thereto by an offset 96. Each wing has one or more lock lugs 97 and is opposed by a back-up tab 98 for grippingly engaging the mounting flange 82 of secondary beam 12, as described above in conjunction with clip 70.

The back-up tabs 98 are formed from a single flat strip the central portion of which is attached to the base 94 of support member 93 by rivets 99. The central portion of back-up tabs 98 and support member base 94 sandwich the base 100 of the hooked portion 91 therebetween.

Because of the inversion of the offset from the back-up tab to the support member, the spanning section 101 may extend coplanar with the base 100 and terminate in a catch flange 102 for engaging the edge 20 of the mounting flange 43 on primary beam 11, similarly to that described above in conjunction with the FIG. 9 embodiment and still maintain the upper surfaces of flanges 43 and 82 on the same plane for supporting a panel 13.

Depending upon the length of the beam spans required and the shipping facilities, the required length of the primary beams 11 may be of an overall length greater than readily available in unbroken lengths of beam. The concept of the present system also includes a coupler 105 for aesthetically joining axially abutting ends of the beam. As shown in FIG. 1, the end of primary beam 11A abuts a continuing length of primary beam 11B and what would ordinarily be an unpleasant break, or seam, is covered by coupler 105.

The coupler 105 is formed from the same material and preferably according to the same process by which the beams were made.

Two mitred rabbets are cut to permit forming a channel by two fold lines 106 and 107. These are glued firmly together and then two mitred rabbets are made transversely to the folds 106 and 107 to permit folding along lines 108 and 109 to achieve the generally U-shaped coupler 105. If the base 110 of coupler 105 is exactly the same dimension as the beam in the legs 111 and 112 of coupler 105 are parallel, the coupler may be glued or otherwise fastened to the beam. However, the most satisfactory results have been obtained when the mitred rabbet for folding along lines 108 and 109 was slightly in excess of 90°. This causes the legs 111 and 112 to converge outwardly of base 110 and, if the base 110 is of substantially the same dimension as the surface it engages on the beam, provides a gripping engagement for the coupler 105 to the beam.

It is apparent from the foregoing description that the beamed ceiling system disclosed herein accomplishes the objects of the invention.

What is claimed is:

1. A beamed ceiling system supported from a superstructure comprising one or more sheets of flexible sheet material, a plurality of parallel mitred rabbets in said sheets, said sheets folded along said rabbets, each folded sheet forming the exposed surfaces of a simulated beam and two mounting flanges, a lock notch on the under side of each mounting flange, primary hangers, each said primary hanger having a mounting base and support wings, at least one lock lug on each wing, attaching means operably joined to said mounting base and extending upwardly therefrom attaching the hanger and the flexible

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sheet metal material to the superstructure, said wings supportingly engaging said mounting flanges to position said folded beams, each said lock lug engaging a lock notch when said beam is so positioned.

2. A beamed ceiling system dependently mounted from a superstructure comprising one or more sheets of flexible sheet material, a plurality of parallel mitred rabbets in said sheets, said sheets folded along said rabbets, each folded sheet forming the exposed surfaces of a simulated beam and two mounting flanges, a lock notch on the under side of each mounting flange, primary hangers, each said primary hanger having a mounting base, support wings on either side of said mounting base, back-up tabs spaced in opposition to said support wings, at least one lock lug on each wing, said lock lug extending toward the opposing back-up tab, and attaching means extending upwardly from said mounting base attaching the hangers and the flexible sheet material to the superstructure, said mounting flanges insertably received between said wings and said back up tabs with said lock lugs in said lock notches.

3. A beamed ceiling system dependently mounted from a superstructure comprising one or more sheets of flexible sheet material, a plurality of parallel mitred rabbets on each sheet, said sheets folded along said rabbets, each said folded sheet simulating the exposed surfaces of a beam and providing two mounting flanges, a lock notch in each said mounting flange, primary hangers, each said primary hanger having a base, at least one hole in said base, attaching means extending through said hole and into the superstructure fastening said base and the flexible sheet material against said superstructure, a support wing on each side of and connected to said mounting base by an offset extension, said support wing lying in a plane substantially parallel to and offset from said mounting base, at least one lock lug on each said wing extending toward said superstructure, said mounting flanges retained between their respective support wings and the superstructure with the lock lugs positioned within said lock notches.

4. A beamed ceiling system dependently mounted from a superstructure comprising, one or more sheets of flexible sheet material, a plurality of parallel mitred rabbets on each sheet, said sheets folded along said rabbet, each said folded sheet simulating the exposed bottom and two side surfaces of a beam and providing two mounting flanges, said beam glued along the folded rabbets, a lock notch in each said mounting flange, primary hangers, each said primary hanger having a base, an attaching strap connected to said base and extending upwardly attaching the hangers and the flexible sheet material to the superstructure, a support wing on each side of said base, at least one lock lug on each wing, said wings supportingly engaging said mounting flanges with the lock lugs seated in said lock notches.

5. A beamed ceiling system dependently mounted from a superstructure comprising, one or more sheets of flexible sheet material, a plurality of parallel mitred rabbets on each sheet, said sheets folded along said rabbet, each said folded sheet simulating the exposed surfaces of a beam and providing two mounting flanges, a lock notch in each said mounting flange, primary hangers, each said primary hanger having a base, an attaching strap connected to said base and extending upwardly attaching the hangers and the flexible sheet material to the superstructure, a support wing on each side of and connected to said mounting base, back-up tabs, a back-up tab connected to said mounting base in substantially parallel disposition to each said support wing, said back-up tabs opposed to and spaced apart from their respective support wing at a distance equal to the thickness of said sheet, at least one lock lug on each support wing extending toward the opposed, spaced apart back-up tabs, the mounting flanges insertably received between the support wings and their respective back-up tabs with the lock lugs positioned within said lock notches.

6. A beamed ceiling system, as defined in claim 5, in which each beam exposes a bottom and two side surfaces and in which each primary hanger has a forming skirt extending perpendicularly from the end of each support wing to engage that portion of the folded sheet constituting the two side surfaces.

7. A beamed ceiling system dependently mounted from a superstructure comprising, intersecting primary and secondary beams, each said beam formed from one or more sheets of flexible material, each said sheet having a plurality of mitered rabbets, said sheets folded along said rabbets, said folded sheets simulating the exposed bottom and two side surfaces of a beam and providing two mounting flanges on the upper side of said beam, a primary hanger means connecting the mounting flanges of primary beams to said superstructure, joiner clips connecting the mounting flanges of said secondary beams to said primary beams.

8. A beamed ceiling system, as defined in claim 7, in which said primary and secondary beams in turn support decorative ceiling panels along their peripheral edges.

9. A beamed ceiling system, as defined in claim 7, wherein the joiner clips comprise, a hooked portion and a gripping portion, the gripping portion having a medial base with a wing on each side thereof, back-up tabs attached to said base, one back-up tab lying in parallel, spaced apart, opposed relationship to each wing, at least one lock lug extending towards the back-up tab from each wing, said hooked portion having a base attached to the base of said gripping portion, a spanning section and a

catch flange disposed perpendicularly from said spanning section, the gripping portion of said clip engagingly supporting the mounting flange of a secondary beam and the hooked portion engaging the mounting flange on said primary beam.

10. A beamed ceiling system, as defined in claim 8, wherein the joiner clip has a skirt extending perpendicularly from each end wing at the end of each wing outwardly of the base of said gripping member to engage the flexible folded, sheet material.

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HARRISON R. MOSELEY, *Primary Examiner*.

FRANK L. ABBOTT, *Examiner*.

L. R. RADANOVIC, A. I. BREIER, *Assistant Examiners*.