July 25, 1967 A. J. TOTI 3,332,179

CANOPY CONSTRUCTION

Filed Sept. 8, 1964 3 Sheets-Sheet 1

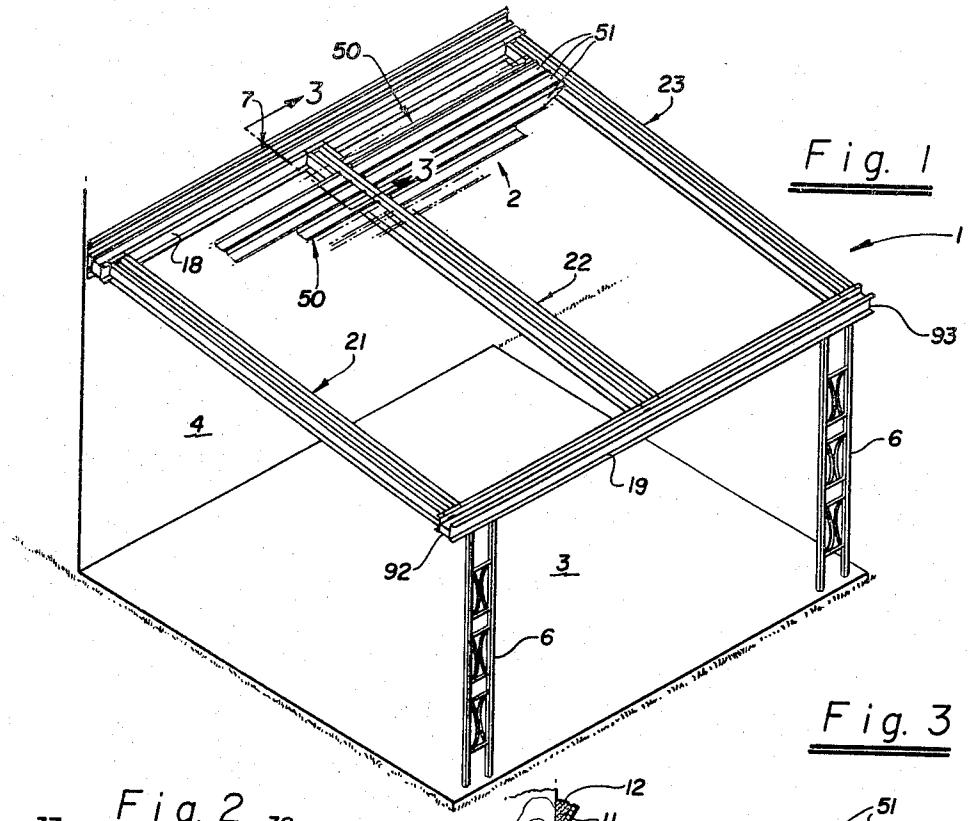


Fig. 1

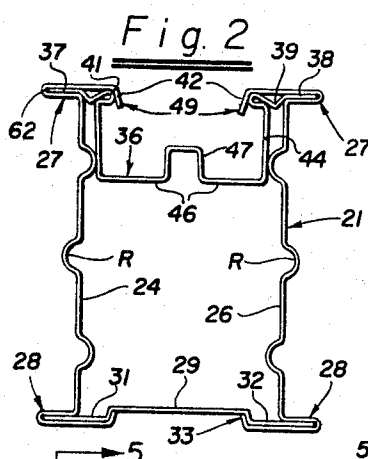


Fig. 2

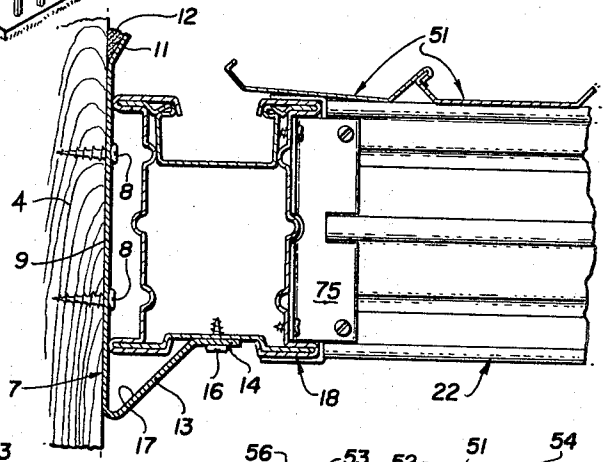


Fig. 3

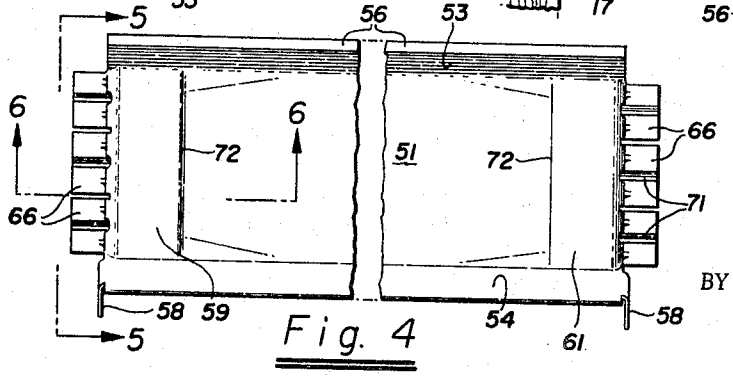


Fig. 4

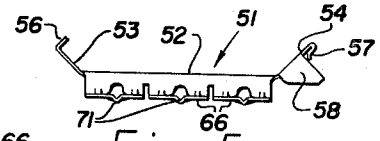


Fig. 5

INVENTOR.
Andrew J. Toti
BY
Schlemmer
Attorney

July 25, 1967 A. J. TOTI 3,332,179

CANOPY CONSTRUCTION

Filed Sept. 8, 1964 3 Sheets-Sheet 2

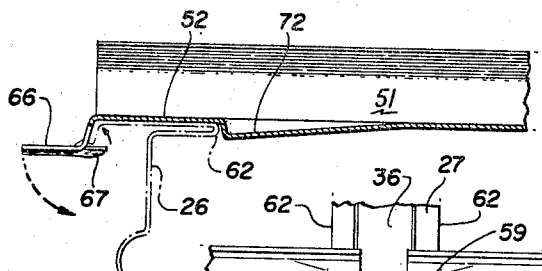


Fig. 6

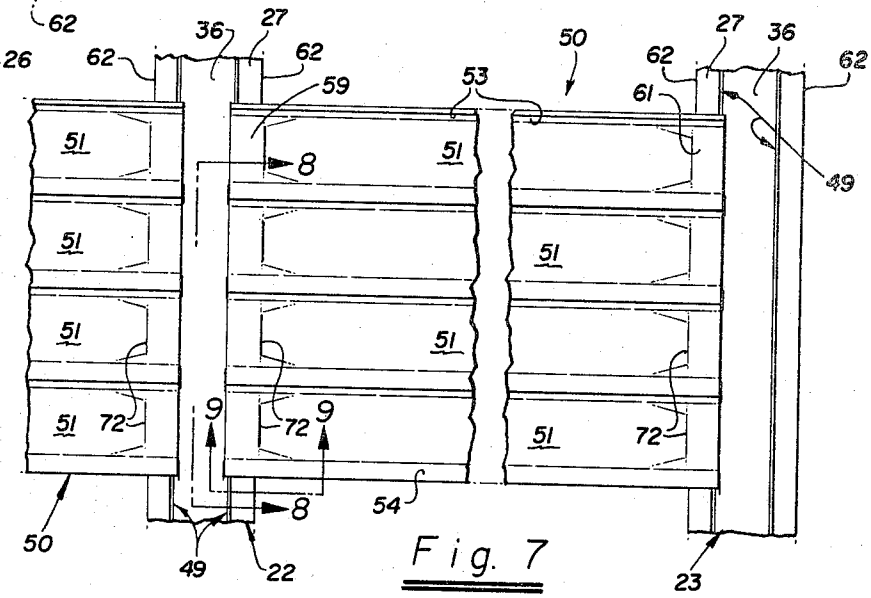


Fig. 7

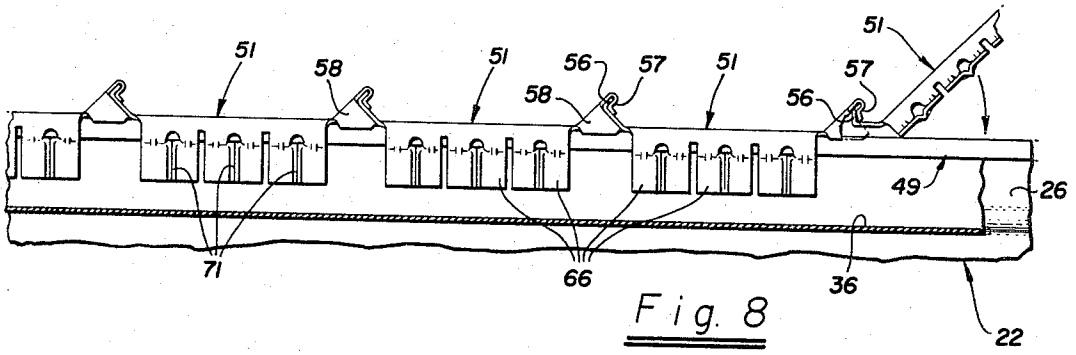


Fig. 8

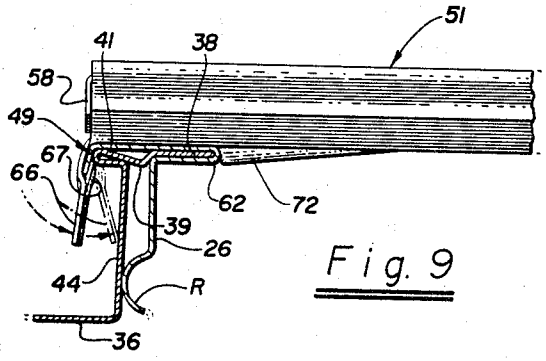


Fig. 9

INVENTOR.
Andrew J. Toti
BY
Attorney

July 25, 1967 A. J. TOTI 3,332,179

CANOPY CONSTRUCTION

Filed Sept. 8, 1964 3 Sheets-Sheet 3

Fig. 10

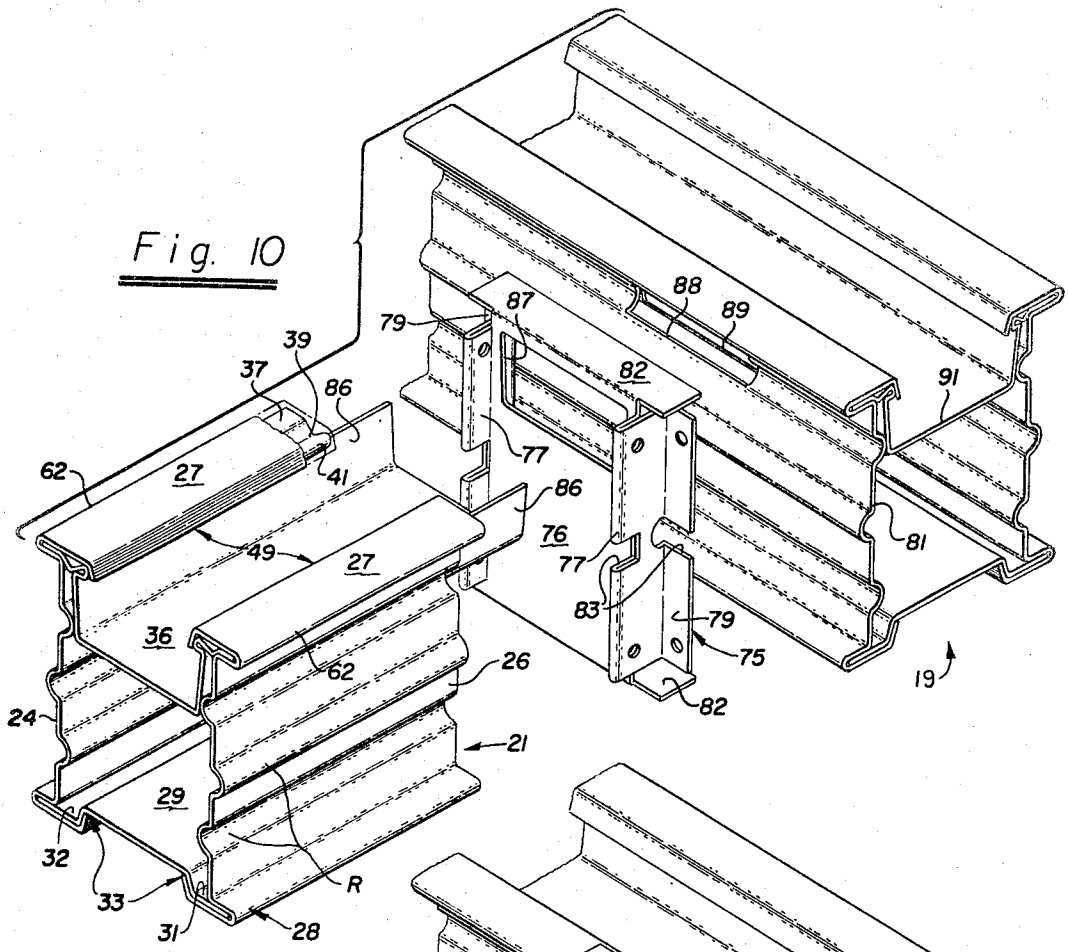
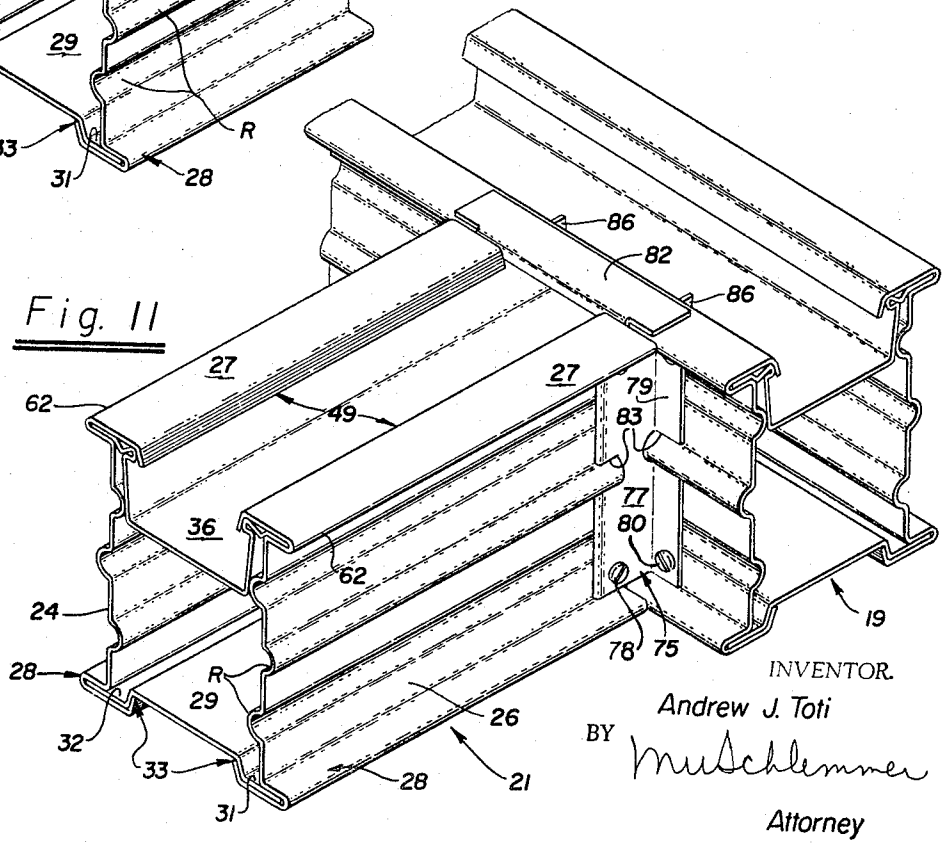


Fig. 11



INVENTOR.
Andrew J. Toti
BY
Attorney

United States Patent Office

3,332,179
Patented July 25, 1967

3,332, 179

CANOPY CONSTRUCTION

Andrew J. Toti, 311 W. River Road,
Modesto, Calif. 95351

Filed Sept. 8, 1964, Ser. No. 394,690
16 Claims. (Cl. 52—90)

This invention relates generally to a canopy construction, and to a method of assembling such a construction from discrete components, which is positionable over a reference surface to protect such surface from sun, rain, snow, and other elements of nature. More particularly, this invention relates to a cover assembly for a patio or like surface, and to a method of assembling such cover assembly.

Still more particularly, this invention relates to a cover assembly which includes a canopy structure and an underlying supporting framework in which the canopy structure includes means engageable with the supporting framework for maintaining the canopy structure securely in conjunction with the framework without requiring separate fasteners. In this regard, the canopy structure of this invention is defined by a series of discrete preformed cover panels specifically formed with integral locking means at ends thereof which are specifically designed to interlock with predetermined structural units of the supporting framework. The cover panels of the canopy structure preferably are engaged in overlapping fashion with each other to define a generally imperforate leak proof structure supported by the framework over a reference surface to provide protection, for example, for a patio, carport, or the like.

An important part of the cover assembly of this invention is the structural unit or supporting beam of the framework which preferably embodies generally the beam construction disclosed in Patent No. 3,134,468, dated May 26, 1964. However, the supporting beams employed in the subject cover assembly have a somewhat modified construction over the patented beams which particularly adapts them for use in supporting the novel canopy structure disclosed herein. While hereinafter reference will be directed to the construction of the supporting beams preferably employed in the subject cover assembly, such reference will be directed primarily to the modifications of the supporting beams employed herein over the patented beams. For general details of construction of such patented beams, reference is directed to the detailed disclosure of said patent.

It should also be understood, however, that although the subject cover assembly preferably includes in its supporting framework supporting beams generally of the type disclosed in said patent, other supporting beam constructions also may be employed if such other beams include configurations capable of cooperating with the special cover panels of the canopy structure to be supported thereby in the manner disclosed hereinafter in greater detail. However, beams of the general construction disclosed in said patent, as modified as disclosed herein, are preferred because of the substantial advantages possessed by such beams when used in patio and carport covers and the like, as discussed in greater detail in said patent.

Hereinafter specific reference is directed to the provision of a cover assembly positioned in operative location over

the patio slab of a private residence. However, it should be understood that utility of this invention extends to other similar protective uses, for example, in conjunction with mobile homes, business establishments, and other structures in which protection from the elements of nature is desired for a reference surface located beneath the cover assembly.

In said aforementioned patent, disclosure is made of a canopy structure to be secured to supporting beams generally without requiring separate fasteners to effect such securing. In the structure disclosed in said patent, however, the means for fastening the cover slats which define the canopy structure therein to the supporting beams are formed primarily directly on the supporting beams as an integral part thereof, and result in the supporting beams having a perforate top. The cover assembly of this invention differs from the structure of said patent in that the means for securing the cover panels of the canopy structure to the supporting framework are formed primarily on the panels themselves, rather than on the supporting beams as disclosed in the patent. Thus the supporting beams employed in this invention have imperforate water proof tops.

The canopy structure of this invention also includes improved interengageable means along overlapped longitudinal edges of adjacent cover panels by which adjacent panels may be securely interlocked with each other in leak proof fashion. Thus, by employing series of cover panels and interengaging panels with each other along their longitudinal edges, a generally imperforate water proof cover assembly may be built up rapidly and easily.

The cover panels of the canopy structure hereof desirably are formed of sheet material, such as a suitable aluminum or steel alloy. Also, high strength plastics may be employed if such plastics are capable of the permanent deformation required at the ends of the respective cover panels by the locking means provided thereon to secure the panels to the supporting framework of the cover assembly. However, due to its light weight and inherent strength, aluminum has been found particularly effective for this use. The components of the supporting beams may be formed from various strong materials also, as disclosed in said patent. However, aluminum also is preferred for those components due to its formability, light weight and strength.

The cover assembly of this invention may be readily and rapidly assembled without requiring special tools. The locking means provided on the cover panels for securing the same to the supporting framework, as well as the interengageable means provided for interlocking adjacent panels with each other, require no tools to effect such securing or interlocking. Thus, this assembly, due to its simplicity of construction, is well adapted for assembly and erection by unskilled "do-it-yourself" persons, as well as by more skilled trained commercial personnel.

From the foregoing it should be understood that objects of the present invention, among others, include the provision of a novel cover assembly; the provision of a novel method of assebling discrete preformed components into a generally waterproof cover assembly; the provision of a canopy structure of generally imperforate nature; the provision of a canopy structure which may be secured to a supporting framework without requiring separate fasten-

ers and special tools; the provision of a supporting beam having means thereon engageable by hold down locking means formed on a canopy structure to be supported thereby; the provision of a water trough supporting beam forming part of a cover assembly framework particularly adapted for use with specially designed cover panels having hold down locking means formed directly thereon; the provision of a cover panel structure having integral hold down locking means thereon employable to maintain such cover panel in secure engagement with a supporting framework; the provision of a canopy structure which may be built up from a plurality of substantially identical cover panels into a waterproof and insect proof canopy structure; and the provision of means for supporting a cover assembly on a reference wall in waterproof fashion relative to such wall.

These and other objects of this invention will become apparent from a study of the following specification, in which reference is directed to the accompanying drawings:

FIG. 1 is an isometric view of a cover assembly of this invention illustrating a preferred embodiment of the supporting framework thereof and illustrating further a portion of a canopy structure defined by a plurality of cover panels operatively secured to such framework.

FIG. 2 is an end view looking longitudinally through a beam of the supporting framework.

FIG. 3 is a sectional view through a portion of the supporting framework taken in the plane of line **3—3** of FIG. 1 illustrating a preferred embodiment of means for securing the cover assembly to a reference supporting wall.

FIG. 4 is a plan view of a cover panel employed in the canopy structure of this invention.

FIGS. 5 and 6 are end and sectional views respectively of the cover panel of FIG. 4 taken in the planes of lines **5—5** and **6—6** thereof, respectively.

FIG. 7 is a plan view of a portion of the subject cover assembly illustrating a portion of the canopy structure secured to a portion of the supporting framework thereof.

FIGS. 8 and 9 are sectional views through the cover assembly taken in the planes of lines **8—8** and **9—9** respectively of FIG. 7.

FIGS. 10 and 11 are isometric views which illustrate a preferred manner of interconnecting in angular relationship two supporting beams of the supporting framework preferably employed in the subject cover assembly.

As pointed out hereinbefore, preferably the cover assembly of this invention includes in its framework supporting beams of the general type disclosed in said aforementioned Patent No. 3,134,468, but such beams are somewhat modified to adapt the same for the particular requirements of this improved cover assembly. That is, the beams as disclosed in said patent are modified to include prevalent and readily accessible lip means which are engageable by locking means formed on the cover panels of the canopy structure of the assembly in the manner to be described hereinafter in greater detail. It should be understood however that, while beams as generally disclosed in said patent and as modified particularly herein are preferred for use with the subject cover assembly, other beams having suitable lip means thereon may be substituted in the supporting framework hereof if desired. Hereinafter, however, reference will be directed to use in the subject cover assembly of supporting beams of the general type disclosed in said patent specifically as modified as disclosed herein.

Referring first to FIG. 1, the cover assembly of this invention includes a supporting framework, generally designated **1**, and a canopy structure, generally designated **2**, supported by the framework. It should be understood, of course, that in FIG. 1, only a portion of the canopy structure has been illustrated so that details of the underlying framework may be seen. A completed cover assembly, however, includes a canopy structure which substantially completely overlies the supporting framework and forms a generally imperforate water proof canopy or roof therewith.

The cover assembly in the illustrated embodiment is shown supported in overlying relationship with respect to a reference surface comprising a patio slab **3** which extends outwardly in known fashion from the wall **4** of a private residence. In this regard, the supporting framework **1** and the canopy structure **2** secured thereto in the manner to be described are positioned in overlying relationship relative to the patio slab **3** by means of two supporting post constructions **6** located at outer corners of the cover assembly. The supporting posts have been illustrated as embodying the construction of the supporting posts disclosed in Toti application Ser. No. 126,622, filed July 25, 1961, now Patent No. 3,170,545 dated Feb. 23, 1965, and such posts may be secured to the cover assembly and to the patio slab in the manner disclosed in that application. Other supporting post constructions, of course, may be employed for this purpose so long as they are capable of supporting the outer margin of the cover assembly in stable fashion over the patio slab.

The inner margin of the cover assembly is secured to the supporting wall **4** by suitable means which preferably takes the form illustrated in FIG. 3. The preferred supporting means comprises an elongated one-piece bracket member **7**, preferably formed from sheet metal or as an extrusion, which is secured to the supporting wall **4** by suitable fasteners, such as by a series of screws **8** or expanion bolts positioned at regular intervals along the length thereof. Desirably the bracket member is of a length generally equal to or slightly greater than the lateral dimension of the cover assembly to be supported thereby.

Bracket member **7** is defined by an upright generally planar portion **9** through which the fasteners **8** extend and which terminates at its upper end in an outwardly directed short flange **11** which extends therealong and defines a space between such upper end and the building wall **4** to receive a bead of caulking compound **12** to prevent water seepage between the bracket member and the building wall. The bracket member also includes a lower generally reversely bent portion **13** which terminates at its outer end **14** in a generally flat horizontal flange **14** which extends therealong and underlies the supporting framework of the cover assembly. Suitable means may be employed for securing the framework to the bracket member, such as a series of sheet metal screw fasteners **16** positioned at regular intervals along the bracket member and extending through flange portion **14** into the framework.

As noted from FIG. 3, the bracket member is generally J-shaped in cross section with its upper and lower portions **9** and **13** thereof combining to define an elongated trough **17** at the base of the J which extends the full length along the bracket member. This elongated trough underlies and is spaced from the lower portion of the framework secured to the bracket member so that any water which may pass between the framework and the bracket member will be collected in the trough **17** and will be conducted laterally of the cover assembly. Thus the patio slab surface beneath the cover assembly will be maintained dry at its location of juncture with the wall **4**.

The illustrated supporting framework **1** comprises a plurality of interconnected supporting beams arranged in two angularly related series. A first series of beams is defined by two generally parallel beams **18** and **19** which extend in the same direction as building wall **4**. It is beam **18** that is secured in parallel contacting relationship with the bracket member **7** as shown in FIG. 3, whereby the inner margin of the framework is supported on the wall **4**.

The framework includes a second series of generally parallel beams **21**, **22** and **23** which extend angularly

relative to the beams **18** and **19** and are interposed therebetween at laterally spaced locations therealong. The angular relationship between the beams of the first and second series is generally a ninety degree relationship in the illustrated embodiment thereby imparting a rectangular configuration to the cover assembly. The beams of the first and second series are interconnected with each other at their respective locations of juncture by connecting means to be described in greater detail hereinafter.

In FIG. 1, a cover assembly is illustrated which employs three spaced beams in its second series but it should be understood that the number of such beams interposed between the beams **18** and **19** of the first series will be determined by the overall lateral extent of the cover assembly to be provided. The lateral spacing between the beams of the second series is determined by structural strength considerations, and the length of the cover panels of the canopy structure supported thereby is determined in accordance with such lateral spacing. For purposes of simplicity and minimization of the number of different components required in a given cover assembly, all of the beams of the framework preferably are of the same construction. In this regard, reference is directed to FIG. 2 which illustrates a preferred construction.

It is important to note that the beams of the supporting framework, at least those laterally spaced beams of the second series which extend generally normal to the building wall **4**, include lip means thereon for connecting the canopy structure thereto so that separate fasteners are not required. As seen in FIG. 2, the beams are of hollow construction and are defined by a plurality of preformed interfitted structural members which impart a generally rectangular cross sectional configuration to the hollow beam. The beams include a pair of substantially identical opposite side wall structural members **24** and **26** which preferably include longitudinally extending ribs R which strengthen and reinforce each beam in its longitudinal direction. The side wall structural members **24** and **26** are formed at their upper and lower marginal edge portions with preformed top and bottom slot structures **27** and **28** respectively. The exact construction of such slot structures is defined in greater detail in said patent and reference is directed thereto.

The bottom structural members **29** of the beams are formed in accordance with the disclosure of said patent and include flat marginal edge portions **31** and **32** which are received in the respective bottom slot structures **28** defined by the opposite side wall structural members of the beam. Separation of the bottom structural member from the side wall structural members is precluded by the provision on the respective members of interengaged flange and shoulder constructions, generally designated **33**, as described more fully in said patent.

The beam construction thus far described is generally in conformance with the construction of the beam disclosed in said patent. The beam disclosed in the patent, however, is modified for use in the present invention by changing appreciably the construction of the top structural member **36** which cooperates with the top slot structures **27** of the side wall structural members **24** and **26** in defining the top of the beam. The top structural member is imperforate for its full length and is defined by generally flat marginal edge portions **37** and **38** which are received within the top slot structures **27** of the beam in a manner analagous to that disclosed in said patent. Adjacent each of said marginal edge portions, the top structural member **36** is provided with a depressed bent section **39** which forms a detent engaged with an inner portion of each of the side wall structural members **24** and **26** of the beam. Spaced inwardly from each of the detents **39**, the top structural member is provided with reversely bent hairpin portions **41** which define bent shoulders which are engaged by the inner marginal extremities **42** of the top slot structures **27** which define inturned marginal flanges along the side wall structural members **24** and **26**. Engagement of the shoulders **41** of the top structural member with the marginal flanges **42** of the side wall structural members precludes inadvertent separation of the respective structural members under normal conditions. However, engagement and separation of the respective structural members which define the imperforate beam top may be effected as required in the manner described more fully in said patent.

Still referring to FIG. 2, the top structural member **36** includes a deeply depressed central web portion defined by generally vertical side walls **43** and **44** which are engaged in bracing contact with the inner surfaces of the side wall structural members of the beam to further reinforce and strengthen the beam structure. The side walls **43** and **44** of the top structural member are connected by a bottom wall **46** which forms the bottom of the recessed channel defined by the top structural member and which extends the full length of the beam.

The bottom wall **46** of the channel of top structural member **36** may take several configurations. For example, such bottom wall may be flat as seen in FIGS. 10 and 11. If preferred, however, for purposes of increased strength and reinforcement, the bottom wall **46** of the top structural member **36** may be formed with one or more upwardly directed reinforcing ridges or ribs **47** which extend longitudinally thereof, as seen in FIG. 2.

The depressed central channel in the imperforate top structural member of the beam performs the dual function of accommodating therein hold down locking means on the respective cover panels of the canopy structure and also serves as a water trough for receiving water deposited on the cover assembly and conducting the same longitudinally of the beams to a location more suited for removal thereof.

The aforementioned interengaged shoulders **41** and marginal flanges **42** of the respective side wall and top structural members define the aforementioned lip means of the beam with which the respective cover panels of the canopy structure are lockingly engaged. The lips, generally designated **49**, defined thereby overhang to a predetermined degree the central channel extending along the top of the beam and generally define the upper limits of such channel.

The canopy structure **2** of the illustrated cover assembly is defined by two series of interengaged cover panels, each designated **50** in the drawings, one of which extends laterally between and is secured to the beams **21** and **22** of the framework, and the other of which extends between and is secured to the beams **22** and **23**. The number of cover panel series employed in a given canopy structure will be determined by the size of the cover assembly and the number of laterally spaced beams employed in the supporting framework.

The length of the respective cover panels **51** employed in each series is determined by the lateral spacing between the beams to which the cover panels are to be secured. In this regard, standard spacing distances are preferred and the cover panels may be formed in incremental lengths of four feet or six feet, for example, in accordance with such spacing. The hold down locking means formed on the respective cover panels are properly located above the beams with respect to the lip means formed on the respective supporting beams. Widths of the cover panels may vary to suit particular needs but beam widths of four inches or six inches are satisfactory for most installations. In this same regard, while the dimensions of the beams also may vary to meet requirements, beams having widths of four and one half inches and heights of five or eight inches are usually satisfactory for most installations. Beam lengths, of course, will vary according to the size of a particular installation.

Referring now to FIGS. 4–9 the cover panels **51** of the canopy structure series preferably are identically formed so that only a minimum of parts need be stocked from which to draw in forming a given canopy structure of

predetermined size. Each cover panel is generally channel shaped in cross section defined by a generally flat base **52** bordered by opposite upwardly and outwardly extending longitudinal marginal portions **53** and **54**. Marginal portion **53** is provided with an angularly inwardly directed flange **56** along its longitudinal edge, while marginal portion **54** is provided with a reversely bent downwardly and outwardly directed longitudinal edge which defines a groove **57**.

The groove **57** of one panel is dimensioned and designed to receive snugly therein a flange **56** of an adjacent panel when a series of panels are overlapped and connected to build up a canopy structure as seen in FIG. 8. In this regard, as seen to the right of FIG. 8, interengagement between adjacent panels along their longitudinal edges is readily effected by inserting a flange **56** of one panel beneath the groove **57** of an adjacent panel and pivoting the first panel downwardly until the flange and groove along contacting edges of the panels are securely interlocked with each other in generally leak proof fashion. In this regard, it should be noted that each of the panels is generally imperforate so that when a series of panels are interlocked as described, a generally imperforate canopy structure is defined which cooperates with the imperforate supporting beams in defining an imperforate cover assembly as seen in FIG. 7.

A further important feature of the cover panel construction shown is illustrated by FIGS. 5 and 8. In this regard, referring to FIG. 8, it should be noted that when the upwardly directed marginal portions **53** and **54** of adjacent panels are interfitted as described, they normally would define a generally triangular open space between adjacent panels. However, the canopy structure of this invention includes means for blocking off each open space which normally would exist between adjacent panels, and to this end each panel is provided with a generally triangular blocking projection **58** at each of its ends which extends laterally therefrom and blocks off the space between adjacent interlocked panels as seen in FIG. 8.

Such blocking projections further enhance the waterproof nature of this cover assembly. Also, and importantly, if the cover assembly of this invention is employed to define the roof structure of a screened-in patio porch or the like, all possible areas of access for insects through the cover structure are blocked off by the interlocked edges of the cover panels and by the blocking projections **58** formed at opposite ends of each panel which close off the spaces between adjacent interfitted panels. Because the respective cover panels are received in direct engagement with the tops of the beams of the supporting framework, insect access between the beams and the respective panels also is precluded. Note FIG. 9, for example.

Referring now to FIG. 7, as noted previously each series **50** of interengaged cover panels **51** extends laterally between two spaced supporting beams. The opposite ends **59** and **61** of each cover panel extend to and overlie portions of the respective supporting beams, namely upper marginal portions of the beams defined by the interengaged top slot structures **27** provided at the imperforate tops of the beams. In this regard, it should be noted that the top slot structures **27** define laterally spaced shoulders **62** against which a predetermined portion of each cover panel is engaged as will be described. Such shoulders **62** define outer edges of the beam along the imperforate top thereof.

Each cover panel includes at its opposite ends hold down locking means for securely engaging each panel with an associated beam without requiring separate fasteners to effect such engagement. In the illustrated embodiment, such locking means comprises a series of integral bendable locking tabs **66** formed at each end of the cover panel which originally extend generally longitudinally thereof at a slight distance below the panel base **52**, as perhaps best seen in FIG. 6. The spacing of the tabs **66** from the base **52** of the panel before the tabs are bent is determined in accordance with the thickness of the lips **49** of the respective supporting beams with which such tabs are to be lockingly engaged.

As also seen in FIG. 6, each tab is provided with an inwardly directed locking tooth **67** which is engaged generally beneath the lip **49** of an associated beam, preferably in engagement with the flange **42** of such lip, when the tab is bent to its operative panel hold down position, as seen in FIG. 9. For purposes of increased strength, each tab preferably is provided with a longitudinal reinforcing rib **71**, note FIGS. 4 and 5, which extends into the tooth **67** of each tab to reinforce the tab and the tooth.

From the foregoing it should readily be understood that upon interfitting of adjacent cover panels along their longitudinal edges with each other, as described previously and as shown in FIG. 8, the locking tabs at the respective ends of each such panel are properly positioned in overlying relationship with the lips **49** of the beams between which the panels extend. Thus, upon depressing the locking tabs in the downward direction as shown by the arrow in FIG. 6 to the fully depressed position as shown in FIG. 9, the teeth **67** on the tabs will be lockingly engaged beneath an associated lip on an associated beam. In this regard, the depressed channel which defines part of the imperforate top of a beam is of sufficient depth to accommodate the tabs without interference. While three tabs **66** are shown at each panel end, more or less tabs may be employed depending upon particular requirements.

Each cover panel also preferably is provided with further means to insure against inadvertent separation of the panel series from a supporting beam. In this regard, each cover panel is provided adjacent each of its opposite ends with a stop shoulder **72**, as best seen in FIGS. 4, 6 and 9, formed in the panel base **52** and depending therefrom. Each such stop shoulder is provided to engage the aforementioned shoulders **62** which define the outer marginal edges of a given beam. Thus, lateral movement of the cover panels in a direction transverse to the longitudinal axis of a given supporting beam is precluded in one lateral direction by the aforementioned interengaged tabs and lips, while movement is precluded in the other lateral direction by the interengaged shoulders **62** and **72** of the beams and cover panels.

Thus, a simple yet highly effective and easy to assemble cover assembly is provided. As noted previously, because each of the cover panels and the tops of the respective supporting beams are imperforate, a generally waterproof cover assembly is insured. Water deposited on the respective cover panels is conveyed longitudinally therealong to an adjacent supporting beam from whence it passes into the central trough extending along the supporting beam. Such water is then carried along the top of the supporting beam for disposal adjacent the outer margin of the cover assembly as desired. In this regard, as seen in FIG. 7, it should be noted that adjacent series **50** of cover panels which overlie the same beam have the opposed ends of their respective panels spaced from each other so that the channel of the underlying beam remains unblocked and ready to receive water therein.

Referring now to FIGS. 3, 10 and 11, a preferred manner of interconnecting the respective supporting beams of the framework in angular relationship relative to each other will be described. Connecting means in the form of a preformed connecting plate **75** preferably is employed, which plate is designed to straddle the opposite side wall structural members **24** and **26** of a beam **21** being connected to one of the beams **18** and **19** which define inner and outer margins of the framework. Each plate **75** is provided with reversely bent laterally spaced flanges **77** which project from an apertured base **76**. The spacing between flanges **77** is determined by the spacing of the side wall members of the beam **21** to be engaged therewith and flanges **77** are received along outer surfaces of that beam. Suitable fasting means, such as sheet metal

screw fasteners **78**, are passed through openings provided in the flanges into the beam **21** as shown in FIG. 11.

Each connecting plate **75** also includes other flanges **79** which extend generally at right angles to the first mentioned flanges **77** and generally parallel to base **76**. Flanges **79** are adapted to be engaged with a side wall structural member **81** of the outer end margin beam **19**. Fasteners **80** similarly are passed through openings provided in flanges **79** into and through the side wall structural member **81** of beam **19** thereby securing the beams **19** and **21** securely together into a rigid framework. Each connecting plate **75** also preferably is provided with upper and lower marginal flanges **82** which overlie the top and bottom edge margins of the beam **19** as seen in FIG. 11. Flanges **82** further insure against shifting between the interconnected beams. As also noted from FIGS. 10 and 11, the connecting plate **75** preferably is provided with a suitable cut out **83** in the aforementioned flanges **77** and **79** to accommodate therein the longitudinal reinforcing ribs R of the respective side wall structural members of the beams being connected. Similar connecting plates are employed to interengage the other beams **22** and **23** to each of the beams **18** and **19** of the framework.

As noted previously, the depressed central channel defined by the top structural member **36** of the beams are adapted to carry water therealong for disposal at the outer margin of the cover assembly. To this end, it is desirable to provide means for communicating the channels of the beams **21**, **22** and **23** of the framework with the beam **19** which defines the outer margin of the framework.

In the embodiment illustrated, the top structural member **36** of each of beams **21**, **22** and **23** is provided with a longitudinal extension **86** (FIG. 10) which is received in and passes through aligned openings **87** in the apertured base of connecting plate **75** and similar openings **88** and **89** provided in the side wall structural member **81** and the top wall structural member **91** of the marginal end beam **19**. As seen in FIG. 11, extension **86** thus projects into the channel defined by the top structural member **91** of beam **19**. Thus water carried in the channel of beam **21**, for example, is deposited into the channel defined by the top structural member **91** of beam **19** and is carried therein laterally of the cover assembly for removal at the opposite lateral corners **92** and **93** (FIG. 1) of the cover assembly. In this regard, the water at such corners may fall freely from the cover assembly or down spouts (not shown) may be attached thereto to conduct the water to the ground.

While herein reference has been directed to the supporting of a canopy structure in overlying relationship relative to the supporting framework, it should be understood that a modified arrangement could be obtained easily in which cover panels also are secured to the supporting framework in underlying fashion. That is, series of cover panels could be secured by the locking means disclosed herein to the underside of the framework to provide a decorative ceiling above a patio slab, for example. To this end, the only change required in the framework shown would be to provide the supporting beams **21**, **22** and **23** with deeper central channels in their bottom structural members to accommodate the locking tabs on the cover panels.

Having thus made a full disclosure of this invention and the manner in which a cover assembly may be built up from the discrete components thereof, reference is directed to the appended claims which set out the scope of protection to be afforded thereto, and which are intended to encompass modifications to the embodiments disclosed herein which fall within the spirit of this invention.

I claim:

1. A cover assembly comprising in combination an elongated supporting beam, and a canopy structure supported by and secured to said supporting beam, said supporting beam having lip means and marginal shoulder means thereon, said canopy structure overlying said supporting beam and comprising a series of cover panels, said cover panels having panel hold down means thereon engaged with said lip means and shoulders thereon engaged with said shoulder means, said hold down means and shoulders cooperating in maintaining said panels in engagement with said beam.

2. A cover assembly comprising in combination an elongated supporting beam having lip means and spaced shoulder means extending therealong, and a canopy structure supported by and secured to said supporting beam, said canopy structure overlying said supporting beam and comprising a series of cover panels extending transversely of said beam, said cover panels having interlocking flange and groove means provided along longitudinal edges thereof, adjacent panels of said canopy being interlocked with each other along contacting longitudinal edges by said means in generally leak proof fashion, hold down means and spaced shoulders provided in conjunction with said panels, said hold down means and shoulders being engaged with said lip means and shoulder means respectively of said beam and cooperating therewith in maintaining said panels in engagement with said beam.

3. A cover assembly comprising in combination an elongated supporting beam, and a canopy structure supported by and secured to said supporting beam, said supporting beam having lip means extending therealong, said canopy structure overlying said supporting beam and comprising a series of cover panels, said cover panels having hold down tabs performed thereon and projecting generally longitudinally thereof, said tabs on said panels being manually bendable without requiring special tools to effect such bending and when bent being engaged beneath said lip means on said supporting beam and securing said panels to said beam without requiring separate fasteners to effect such securing.

4. A cover assembly comprising in combination a supporting framework which includes at least two elongated spaced supporting beams, and a canopy structure supported by and secured to said supporting beams, each of said supporting beams having lip means extending longitudinally therealong for substantially the full length thereof, said canopy structure overlying said supporting beams and comprising a series of cover panels which extend transversely of said beams, opposite ends of said panels terminating generally in overlying relationship with said beams, said panels overlapping each other along adjacent longitudinal edges thereof to provide a generally imperforate canopy between said beams, said cover panels having preformed hold down tabs thereon at said opposite ends thereof, said tabs on said panels initially extending generally longitudinally of the respective panels from the ends thereof, said tabs being spaced from the respective bases of said panels a distance corresponding generally with the thickness of said lip means, said tabs being manually bendable and being engaged with said lip means on the respective supporting beams and securing said panels to said beams without requiring separate fasteners to effect such securing.

5. The cover assembly of claim **4** in which each of said supporting beams is hollow and includes an imperforate leak proof top, each said top having a depressed channel extending therealong which defines a trough for conducting water along the length of each such beam which is conducted to said beams along said cover panels.

6. The cover assembly of claim **4** in which each of said panel locking tabs includes a locking tooth engaged beneath the lip means of an associated supporting beam, each said tooth extending in a direction generally opposite from the direction in which its associated locking tab extends.

7. The cover assembly of claim **4** in which said cover panels of said canopy structure are provided with gener-

ally leak proof interlocking flanges and grooves along corresponding longitudinal edges thereof, adjacent panels of said canopy structure having their contacting edges interlocked with each other for substantially their full lengths between said supporting beams.

8. In combination, a canopy structure and a hollow light weight elongated supporting beam; said beam being defined by a plurality of preformed interfitted structural members, one of said structural members including a deep channel extending longitudinally thereof, said one structural member being interfitted with longitudinal edge portions of two other structural members and combining therewith in defining an imperforate top for said beam, said beam including opposed spaced lips overhanging said channel and extending therealong; said canopy structure comprising two series of cover panels extending in opposite directions transversely from said beam, ends of the panels of each of said series being generally in line with one or the other of said opposed lips so that opposed ends of the panels of the respective series are spaced from each other above said beam, said ends of said panels having bendable locking tabs preformed thereon and normally extending longitudinally thereof, said panel tabs being spaced from the bases of the respective panels a distance corresponding generally with the thickness of said lip means so that said tabs are positioned for manual deflection into engagement with the undersurface of said lips in said channel to thereby positively preclude separation of said panels of said series from said beam.

9. A cover assembly comprising in combination a supporting frame work which includes at least two elongated spaced supporting beams, and a canopy structure supported by and secured to said supporting beams; each of said supporting beams having lip means extending longitudinally therealong for substantially the full length thereof and an elongated shoulder extending longitudinally therealong and defining an outer edge thereof; said canopy structure overlying said supporting beams and comprising a series of cover panels which extend transversely of said beams, opposite ends of said panels terminating generally in overlying relationship with said beams, said panels overlapping each other along adjacent longitudinal edges thereof to provide a generally imperforate canopy between said beams, said cover panels having hold down tabs thereon at said opposite ends thereof and shoulders thereon spaced longitudinally from said tabs at said ends; said tabs on said panels being engaged with said lip means on the respective supporting beams and securing said panels to said beams without requiring separate fasteners to effect such securing, and said shoulders on said panels being engaged with the shoulders on the respective supporting beams and precluding displacement of said panels relative to said beams.

10. In combination, a canopy structure and a hollow light weight elongated supporting beam; said beam being defined by a plurality of preformed interfitted structural members, one of said structural members including a deep channel extending longitudinally thereof, said one structural member being interfitted with longitudinal edge portions of two other structural members and combining therewith in defining an imperforate top for said beam, said beam including opposed spaced lips overhanging said channel and extending therealong; said canopy structure comprising two series of cover panels extending in opposite directions transversely from said beam, ends of the panels of each of said series being generally in line with one or the other of said opposed lips so that opposed ends of the panels of the respective series are spaced from each other above said beam, said ends of said panels having bendable locking tabs preformed thereon, said panel tabs being engaged beneath said lips in said channel and thereby positively precluding separation of said panels of said series from said beam; said beam also including spaced shoulders extending along and defining outer edges thereof, said panels of each of said series also including shoulders spaced longitudinally from said ends thereof and said locking tabs at such ends, the shoulders on said panels being engaged by the shoulders on said beam, said shoulders on said panels and said beam cooperating with said lips and locking tabs in securing said panels against displacement relative to said beam.

11. A cover assembly comprising a supporting framework, a canopy structure supported by said framework, and means engaged with and supporting said framework and said canopy structure therewith above a reference surface; said framework comprising a first series of elongated beams extending in spaced relationship in a first direction, and a second series of spaced supporting beams extending angularly relative to and interposed between the beams of said first series, and means securing the beams of said first and said second series together into a generally rigid frame, each beam of said second series including lip means extending longitudinally therealong and spaced shoulders extending therealong and defining outer edges thereof; said canopy structure comprising a series of interfitted cover panels extending transversely of the beams of said second series generally in the same direction as the beams of said first series, said cover panels overlying the beams of said second series and having bendable locking tabs thereon positioned in accordance with the spacing of such beams from each other, said panels further including shoulders spaced longitudinally from the locking tabs thereon, the tabs of the respective cover panels of said canopy being engaged with said lip means and said shoulders of said cover panels being engaged with said shoulders on said beams of said second series, said tabs maintaining said panels securely engaged with said framework and said beam and panel shoulders cooperating with said lip means and locking tabs in retaining said panels against displacement relative to said framework.

12. An elongated cover panel for use with other cover panels in a canopy structure, said panel having flange and groove means along opposite longitudinal edges thereof for securing said panel to other panels in said canopy structure, bendable locking tabs preformed on said panel adjacent at least one end thereof, said panel tabs being engageable with predetermined portions of a supporting framework for said canopy structure, and a stop shoulder preformed on said panel and spaced longitudinally from said end thereof and the locking tabs at such end, said shoulder being engageable with a predetermined shoulder portion of said supporting framework for said canopy structure to preclude shifting of said panel relative to said framework.

13. An elongated cover panel for use with other cover panels in a canopy structure, said panel having flange and groove means along opposite longitudinal edges thereof for securing said panel to other panels in said canopy structure, and bendable locking tabs preformed on said panel adjacent at least one end thereof, said panel tabs being engageable with predetermined portions of a supporting framework for said canopy structure, and an insect blocking projection at least at said one end of said panel adjacent said locking tabs, said projection extending laterally outwardly from a marginal end portion of said panel, said projection blocking off access between adjacent panels in an endwise direction when said panel is interengaged with another panel in said canopy.

14. A cover assembly comprising, in combination, an elongated supporting beam, and a canopy structure supported by and secured to said supporting beam; said supporting beam having lip means provided thereon, said canopy structure overlying said supporting beam and comprising a series of interfitted cover panels; each of said cover panels having hold down means preformed thereon and engaged with said lip means of said beam to maintain said panels in engagement with said beam; said hold down means comprising at least one bendable locking tab at the end of each cover panel which initially projects longitudinally from such end, and a locking tooth integral

with each said tab, each such tooth extending generally in a direction opposite from the direction in which said tab extends, each said tooth being engaged generally beneath said lip means of said beam to preclude separation of the respective cover panels from said beam.

15. The cover assembly of claim **14** which further includes a reinforcing rib extending generally longitudinally of each said locking tab into its associated locking tooth.

16. The cover assembly of claim **14** in which each of said locking tabs is normally initially offset from the base of its associated cover panel a distance corresponding generally to the thickness of said lip means of said supporting beam.

References Cited

UNITED STATES PATENTS

1,260,391	3/1918	Kane	52—90 X
2,969,754	1/1961	Wilson	52—522 X
3,113,434	12/1963	Phillips et al.	52—90 X
3,134,468	5/1964	Toti et al.	52—731
3,224,154	12/1965	Toti et al.	52—520

DAVID J. WILLIAMOWSKY, *Primary Examiner.*

HARRISON R. MOSELEY, *Examiner.*

P. C. KANNAN, *Assistant Examiner.*