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Janosko

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[54] **PATIO CANOPY STRUCTURE**

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[52] **U.S. Cl.** **52/63,** 52/82, 52/86

[51] **Int. Cl.** **E04b 1/347,** E04b 1/32

[58] **Field of Search** 52/79, 86, 74, 82, 63

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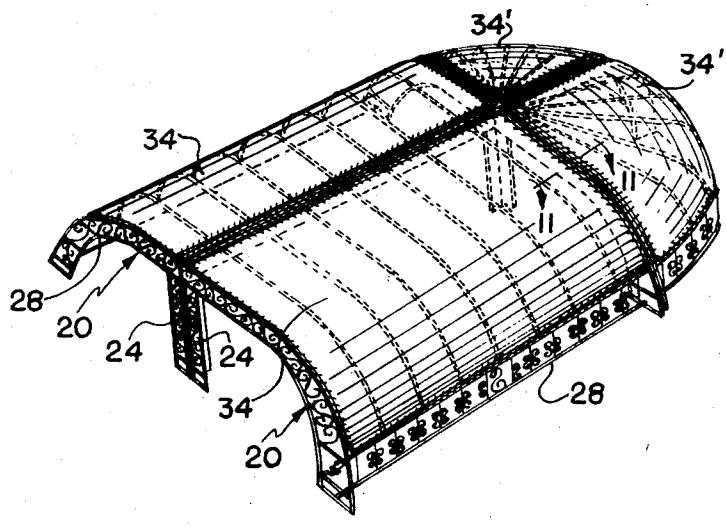
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Primary Examiner—Frank L. Abbott
Assistant Examiner—Leslie A. Braun
Attorney, Agent, or Firm—Baldwin, Egan, Walling & Fetzer

[57] **ABSTRACT**

A patio structure is disclosed involving a canopy and a supporting structure made in modular units. One unit is generally rectangular in shape, and two other units are generally segmental in shape. An essential feature of the invention is that the end frames involved in each of the modular units are identical in size and shape, each frame having the contour of approximately one-quarter of an ellipse positioned with the longer semi-axis on the ground and the shorter semi-axis vertical.

5 Claims, 14 Drawing Figures



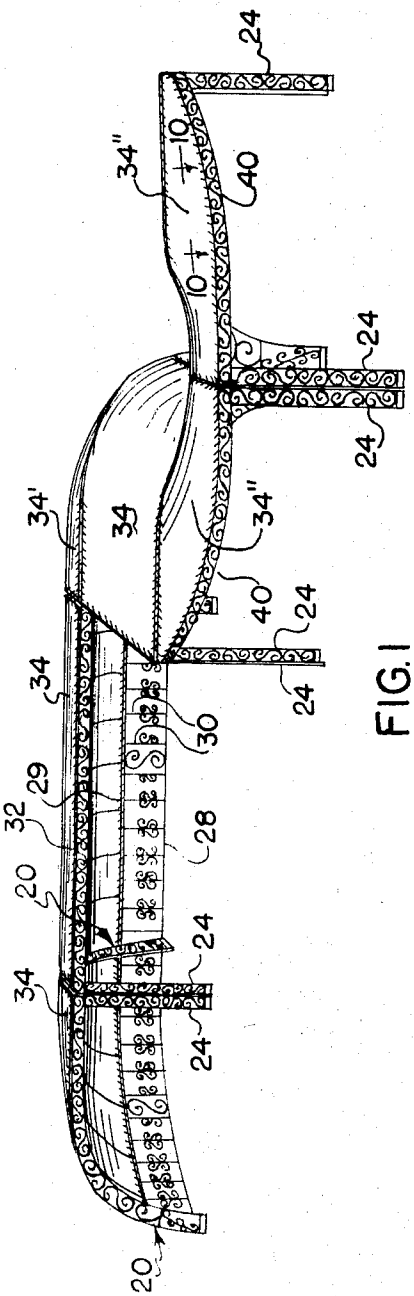


FIG. 1

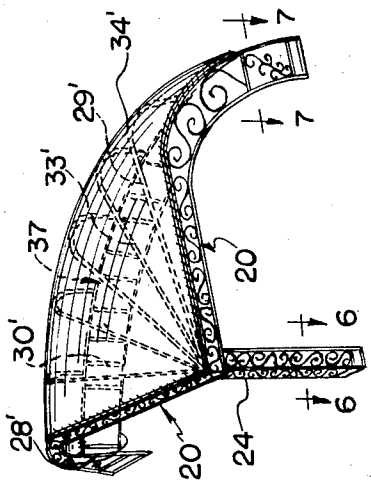


FIG. 3

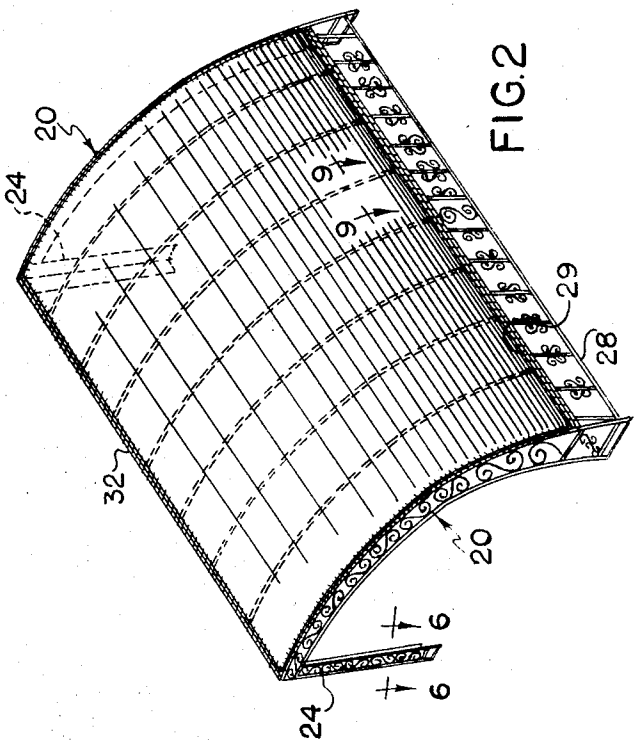


FIG. 2

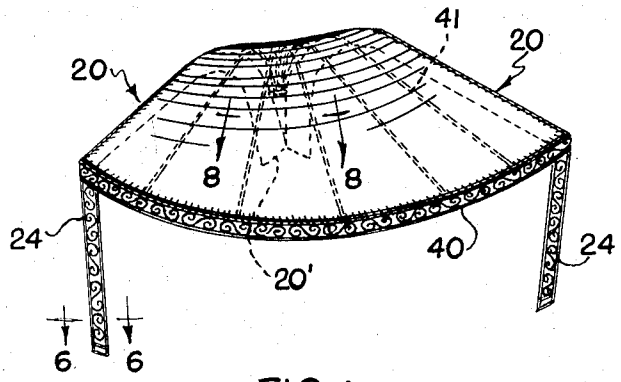


FIG.4

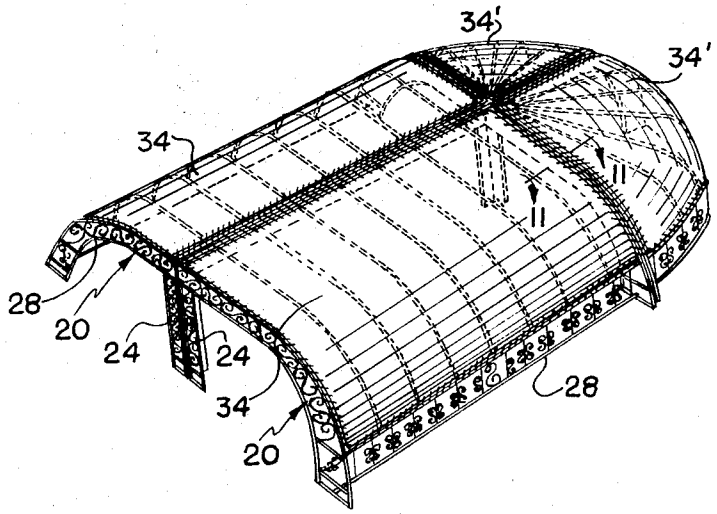


FIG.5

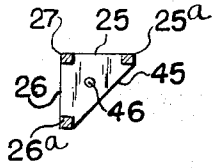


FIG. 6

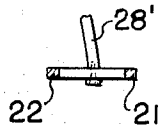


FIG. 7

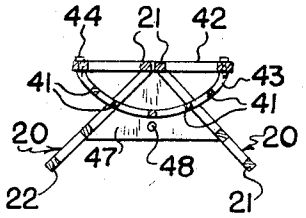


FIG. 8

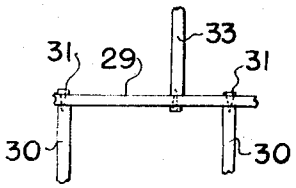


FIG. 9

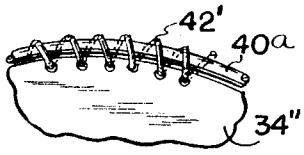


FIG. 10

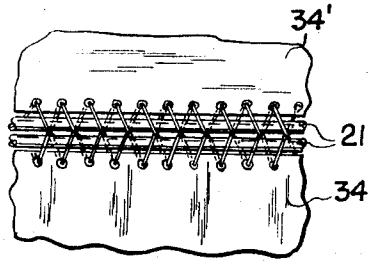


FIG. 11

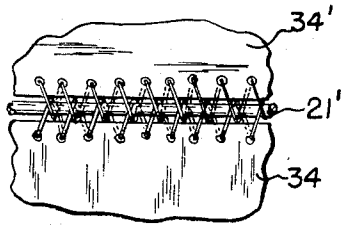


FIG. 12

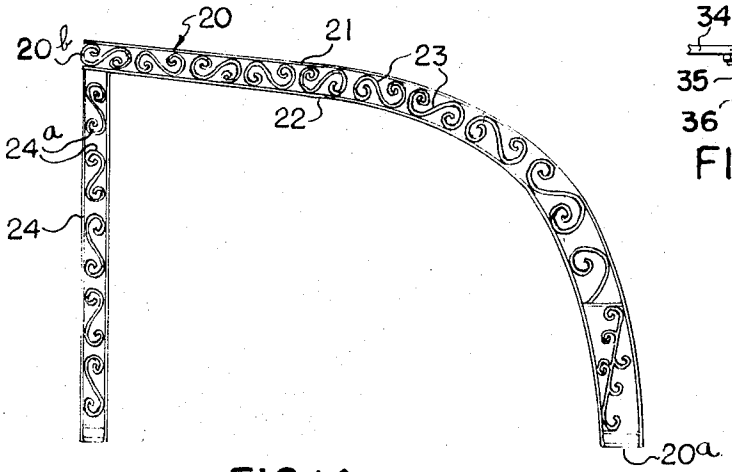


FIG. 14

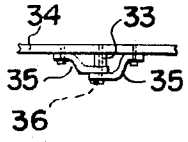


FIG. 13

PATIO CANOPY STRUCTURE

This invention relates to a patio canopy structure which might be used also for a pool shelter, for a carport, or for other uses. Three modular units are disclosed which may be put together in various combinations. One modular structure is generally rectangular with two quarter-elliptical parallel end frames positioned with the longer semi-axis on the ground and the shorter semi-axis being a vertical post which holds up the upper end of the elliptical beam whose other end lies on the ground at the apex of the longer semi-axis. The elliptical beams and the vertical post comprises parallel bars rigidly connected by truss forming members which are preferably ornamental. The tops of the opposite end frames are connected at an open side of the unit by a longitudinal stringer. The lower ends of the end frames are connected by a rigid structure which is shown and described as having somewhat the character of a fence rigidly connecting the two end frames. Spaced parallel roof ribs having the same contour as the end frames are rigidly connected along the fence and the stringer. Another modular unit has the two end frames secured together at approximately 90 degrees and held together at the apex by a vertical post at the open side. The closed side has an arcuate fence rigidly connecting the lower ends of the end frames and has spaced roof supporting ribs radiating from the supporting post to the arcuate fence. Another modular unit has two of the end frames secured together at their lower ends and diverging away therefrom at approximately 90 degrees and having their outer upper ends each supported by a vertical post. An arcuate roof beam connects the tops of the posts and roof supporting ribs extend from spaced points along the roof beam and converge toward the point where the two lower ends of the end frames are secured together.

The objects and advantages of the invention will be set forth in the accompanying specification and the structures are disclosed in the accompanying drawings.

IN THE DRAWINGS

FIG. **1** is a perspective view showing an assembly of two of the modular rectangular units together with two each of the different segmental units;

FIG. **2** is a perspective view of the rectangular modular unit;

FIG. **3** is a perspective view of one of the segmental modular units;

FIG. **4** is a perspective view of the other segmental modular unit;

FIG. **5** is a perspective view of an assembly of two of the rectangular units, together with two of one of the segmental modular units;

FIG. **6** is an enlarged sectional view taken along the line **6—6** of FIG. **3**;

FIG. **7** is an enlarged sectional view taken along the line **7—7** of FIG. **3**;

FIG. **8** is an enlarged sectional view taken along the line **8—8** of FIG. **4**;

FIG. **9** is an enlarged sectional view taken along the line **9—9** of FIG. **2**;

FIG. **10** is an enlarged fragmental view taken from the position indicated at **10—10** in FIG. **1**;

FIGS. **11** and **12** show the manner in which roof sheeting may be laced together where two frames are in registry with each other at a point where they join each other;

FIG. **13** is a sectional view through one of the roof ribs illustrating how the roof sheet may be secured to the rib; while

FIG. **14** is an elevational view, enlarged, showing details of one of the end frames.

Referring to FIG. **2**, the generally rectangular modular unit comprises two generally identical end frames **20**, each comprising an upper bar **21** and a lower bar **22** rigidly fastened together by filler structure **23** lying in the same vertical plane as the bars **21** and **22** and having inclined portions rigidly secured, as by welding, at their opposite ends and at an inclined position between the upper and lower bars so as to provide a truss effect. It is clearly seen in FIG. **14** that the end frame has essentially the shape of one-quarter of an ellipse whose longer semi-axis is horizontal and its vertical semi-axis is vertical. The lower end of the beam **20** rests upon the ground at point **20***a* at its lower end and is supported at its upper end **20***b* by a vertical post **24**. Each vertical post or column **24** is constructed as shown in FIG. **6** as being L-shape in section rigidly secured at its upper end to the upper end of its associated frame **20**. Each leg of the vertical column is a planar beam **25** or **26**, each comprising an outer bar **25***a* or **26** *a* at the end of each leg of the L-shape structure and preferably comprising a common inner bar at the apex of the L-shape, although there could be two parallel bars at this point. In other words, the vertical bar **27** forms part of beam **25** as well as beam **26**. Each of these vertical legs of each vertical post has a filler structure **24***a*, like that described in connection with filler structure **23**, forming a truss effect in each vertical beam of the vertical column.

A rigid structure connects the lower ends of the end frames **20** in a rigid manner, as by welding. The structure is here shown in the form of a fence having a lower bar **28** which is secured to each end frame sufficiently inwardly from the outer edge of bar **21** so that a parallel upper fence bar **29** vertically above bar **28** may be rigidly secured as by welding to bar **21** at that point. A series of parallel vertical bars **30** are spaced along the fence and secured in place either by welding or by bolts **31** as seen in FIG. **9**.

Referring to FIGS. **1** and **2**, a horizontal stringer **32** is rigidly secured to the tops of the posts **24** at each end of the unit. This stringer is here shown as comprising upper and lower parallel bars connected by a truss forming filler like that shown at **24***a* in the vertical post **24**.

A plurality of sheet supporting roof ribs **33** are spaced between the end frames and are rigidly supported by connection at their lower ends to the lower fence bar **29**, and supported at their upper ends by welding to the stringer **32**. All of these ribs **33** have the same quarter-elliptical shape as the upper bars **21** of the end frame beams so that they may be finally secured in place forming a roof from end to end and side to side of the module shown in FIG. **2** which lies smoothly along the entire roof. Referring to FIG. **13**, a cloth roof **34** is shown secured to a roof rib **33** by means of tabs **35** sewed to the cloth **34** on opposite sides of the rib **33** and having their ends overlapping as shown in FIG. **13** where the overlapping ends are provided with grommets **36** which are tied together when the parts are assembled so as to hold the roof sheet

firmly in place. The roof cloth **34** is provided with a line of grommets at its upper forward edge by which it is laced to the stringer **32** and it is provided with other rows of grommets at opposite ends of the roof whereby it is laced to the upper bars **21** of the end frames. The lower longitudinal edge of the roof cloth **34** is preferably provided with grommets by which it is laced to the upper bar **29** of the fence structure so as to hold the roof taut at that point.

The first segmental canopy structure is shown in FIG. **3.** Here the two end frames **20** are exactly like those described in connection with FIG. **2** and they have their upper ends rigidly connected to the vertical column **24** which is exactly like that described in connection with FIG. **6** and FIG. **14.** The two end frames diverge from the post **24** at an angle of approximately **90** degrees to each other. The lower outer ends of the frames are connected by a rigid supporting structure **37** which extends horizontally through a **90** degree arc. This structure is of fencelike design as previously described having an upper bar **29'** and a lower bar **28'**, these being connected rigidly by vertical bars **30'**. Bar **28'** is connected to the lower ends of the end frames in the same manner as described in FIG. **2** while the upper bar **29'** of the fence-like structure is secured vertically above the bar **28'** to bar **21** of the end frames. The generally segmental roof cloth **34'** is secured by grommets and lacing to the upper bars **21** of the end frames and the upper rail **29'** of the fence structure. Ribs **33'** are welded at their outer ends to the top fence rail **29'** and converge inwardly toward the apex at post **24** where they are all rigidly connected to the end beam structure there.

A second segmental canopy structure is shown in FIG. **4.** Here two end frames **20** exactly like those described in connection with FIG. **2** are secured together with their lower ends welded together at **20'** with the two frames diverging outwardly therefrom at **90** degrees to each other and having their outer ends rigidly secured as by welding to the vertical columns **24** exactly like column **24** originally described. The upper ends of the two columns **24** are rigidly connected by a roof beam **40** which extends horizontally in a **90** degree arc. The structure of this roof beam is like that of the stringer **32** except that it is curved. Roof supporting ribs **41** have their outer ends rigidly secured spaced along the roof beam **40** at spaced points and then all converge inwardly to the fastening point **20'** or a point just above that. The roof cloth **34'** is secured as by lacing **42'** to the upper bar **40a** of the roof beam **40** as shown in FIG. **10.** The side edges of the roof cloth are laced to the upper beams **21** of the end frames **20** as previously described in other connections. In FIG. **8,** the bars **21** and **22** of the end frames are connected by a plate **42** which in turn supports a curved bar **43** bolted at **44** to the plate **42** and the ribs **41** have their ends welded to the bar **43.**

Where two modular units are secured to each other with their end frames in registration as shown in FIGS. **5** and **11,** separate roof covers **34** and **34'** may be secured by cross lacing involving the two upper bars **21** of the registering end frames.

Another structure is shown in FIG. **12** where one end frame bar **21'** takes the place of the two bars **21** shown in FIG. **11** and the roof cloth both at **34** and at **34'** are secured together by a single lacing around the member **21'**.

Preferably the vertical support columns **24** are secured by bolts into the patio as by providing a plate **45** as shown in FIG. **6** having a bolt hole **46** to receive the bolt. In a similar manner, a horizontal plate may be rigidly secured to the lower ends of the end frames **20** in FIGS. **2** and **3** so as to bolt the same down at these locations. Referring to FIG. **8,** the two end frames **20** in FIG. **4** are secured by a plate **47** welded to the lower ends of the end frames **20** and provided with a bolt hole **48** to fasten the structure there.

It will now be obvious that with all of the end frames having the same quarter-elliptical contour, any of the modular units may be placed with its end frame registering with the end frame of one of the other modular units so as to form a continuous compatible shelter. The patio structure of this invention makes a very pleasing appearance and is very strong to resist storms and the like. To this end, the fence structure shown in FIGS. **2** and **3** is preferably left open so that wind will not form a pocket underneath the roof cover.

The posts **24** in each case are preferably 6 to 8 feet high so a person can stand up in the shelter.

What is claimed is:

1. Patio canopy structure including a main roof sheet support comprising two generally identical end frames each comprising a beam having essentially the shape of one-quarter of an ellipse whose lower end at the apex of the longer ellipse axis is adapted to rest on the ground and whose upper end is at the distal end of the short ellipse axis, each of said beams comprising two substantially parallel upper and lower bars lying in the same vertical plane and filler structure lying in said vertical plane and having inclined portions rigidly secured near their opposite ends to said upper and lower bars respectively and providing a truss effect between said bars, each end frame including a vertical column L-shape in section rigidly secured to said distal end of its associated beam, each vertical column including two vertical planar beams at right angles to each other, each of these last named beams comprising an outer bar at the end of each leg of the L-shape and comprising a common inner bar at the apex of the L-shape, each of said vertical planar beams having a filler structure lying in the same plane as the associated bars and rigidly secured to said associated bars and providing a truss effect there, structure rigidly connecting the lower ends of said two end frames, a stringer rigidly connecting the upper ends of said two end frames, a plurality of sheet supporting roof ribs spaced between said end frames and rigidly connected at their opposite ends to said connecting structure and to said stringer respectively, said ribs having the same quarter-elliptical shape as the upper bars of said end frame beams, and a flexible roof cloth covering said canopy structure and secured to said end frames and to said structure rigidly connecting the lower ends of said two end frames and to at least some of said ribs.

2. The combination of claim **1,** including a first segmental canopy structure capable of useful assembly with said main roof sheet support, comprising two of said generally identical end frames rigidly assembled with their upper ends combined closely adjacent at a junction point and with said last mentioned frames diverging therefrom at approximately ninety degrees, a connecting structure rigidly connecting the lower ends of said last mentioned frames in a horizontally extending 90 degree arc, and a plurality of sheet supporting

roof ribs rigidly connected to said connecting structure and spaced therealong, said ribs converging to said junction point and rigidly secured there to said last mentioned frames, said ribs having the same quarter-elliptical shape as the upper bars of said end frame beams, whereby one or more of said first segmental canopy structures may be positioned with one of its end frames registering with and end frame of said main roof structure to provide a substantially continuous compatible shelter, and a flexible roof cloth covering said canopy structure and secured to said end frames and to said structure rigidly connecting the lower ends of said two end frames and to at least some of said ribs.

3. The combination of claim **1,** including a second segmental canopy structure capable of useful assembly with said main roof sheet support, comprising two of said generally identical end frames rigidly assembled with their lower ends closely adjacent at a fastening point and with said last-mentioned frames diverging therefrom at approximately 90 degrees, a roof beam rigidly connecting the upper ends of said last mentioned frames in a horizontally extending ninety degrees arc, and a plurality of sheet supporting roof ribs rigidly connected to said roof beam and spaced therealong, said ribs converging to said fastening point and rigidly secured there to said last mentioned frames, and said ribs having the same quarter-elliptical shape as the upper bars of said end frame beams, whereby one or more of said second segmental canopy structures may be positioned with one of its end frames registering with an end frame of said main roof structure, or registering with an end frame of said first segmental canopy structure, to provide a substantially continuous compatible structure, and a flexible roof cloth covering said canopy structure and secured to said end frames and to said structure rigidly connecting the lower ends of said two end frames and to at least some of said ribs.

4. Patio canopy structure including a segmented canopy structure comprising a beam having essentially the shape of one-quarter of an ellipse whose lower end at the apex of the longer ellipse axis is adapted to rest on the ground and whose upper end is at the distal end of the short ellipse axis, each of said beams comprising two substantially parallel upper and lower bars lying in the same vertical plane and filler structure lying in said vertical plane and having inclined portions rigidly secured near their opposite ends to said upper and lower bars respectively and providing a truss effect between said bars, each end frame including a vertical column L-shape in section rigidly secured to said distal end of its associated beam, each vertical column including two vertical planar beams at right angles to each other, each of these last named beams comprising an outer bar at the end of each leg of the L-shape and comprising a common inner bar at the apex of the L-shape, each of said vertical planar beams having filler structure lying in the same plane as the associated bars and rigidly secured to said associated bars and providing a truss effect there, said frames rigidly assembled with their upper ends combined closely adjacent at a junction point and with said last mentioned frames diverging therefrom at approximately 90 degrees, a connecting structure rigidly connecting the lower ends of said last mentioned frames in a horizontally extending 90 degree arc, and a plurality of sheet supporting roof ribs rigidly connected to said connection structure and spaced therealong, said ribs converging to said junction point and rigidly secured there to said last mentioned frames, said ribs having the same quarter-elliptical shape as the upper bars of said end frame beams.

5. Patio canopy structure including a segmented canopy structure comprising a beam having essentially the shape of one-quarter of an ellipse whose lower end at the apex of the longer ellipse axis is adapted to rest on the ground and whose upper end is at the distal end of the short ellipse axis, each of said beams comprising two substantially parallel upper and lower bars lying in the same vertical plane and filler structure lying in said vertical plane and having inclined portions rigidly secured near their opposite ends to said upper and lower bars respectively and providing a truss effect between said bars, each end frame including a vertical column L-shape in section rigidly secured to said distal end of its associated beam, each vertical column including two vertical planar beams at right angles to each other, each of these last named beams comprising an outer bar at the end of each leg of the L-shape and comprising a common inner bar at the apex of the L-shape, each of said vertical planar beams having filler structure lying in the same plane as the associated bars and rigidly secured to said associated bars and providing a truss effect there, said end frames rigidly assembled with their lower ends closely adjacent at a fastening point and with said last-mentioned frames diverging therefrom at approximately 90 degrees, a roof beam rigidly connecting the upper ends of said last mentioned frames in a horizontally extending 90 degree arc, and a plurality of sheet supporting roof ribs rigidly connected to said roof beam and spaced therealong, said ribs converging to said fastening point and rigidly secured there to said last mentioned frames, and said ribs having the same quarter-elliptical shape as the upper bars of said end frame beams.

* * * * *