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(54) Titre : STRUCTURE DE STOCKAGE SUSPENDUE
(54) Title: SUSPENDED STORAGE STRUCTURE

(57) Abrégé/Abstract:
An overhead storage assembly, vendible as a kit, includes a plurality of panels each of a rectangular platform having dimensions that are integer multiples of conventional structural spacing. The panels may be joined to each other to form a common support surface resting on a plurality of transverse support pieces connected at the ends to hanger assemblies that are attached to the overhead structure of a building. Each panel includes a first plurality of parallel elongate elements and a second plurality of elongate elements aligned perpendicular to the first plurality of parallel elements. Each panel, moreover, may include closely paired elongate elements near a longitudinal edge to increase the sectional stiffness of the panel and to facilitate releasable connection of the panels to the traverse support pieces and hanger assemblies. The hanger assemblies may comprise matching upper and lower straps that are secured to each other at selected suspension lengths.

ABSTRACT

An overhead storage assembly, vendible as a kit, includes a plurality of panels each of a rectangular platform having dimensions that are integer multiples of conventional structural spacing. The panels may be joined to each other to form a common support surface resting on a plurality of transverse support pieces connected at the ends to hanger assemblies that are attached to the overhead structure of a building. Each panel includes a first plurality of parallel elongate elements and a second plurality of elongate elements aligned perpendicular to the first plurality of parallel elements. Each panel, moreover, may include closely paired elongate elements near a longitudinal edge to increase the sectional stiffness of the panel and to facilitate releasable connection of the panels to the traverse support pieces and hanger assemblies. The hanger assemblies may comprise matching upper and lower straps that are secured to each other at selected suspension lengths.

SUSPENDED STORAGE STRUCTURE

FIELD OF THE INVENTION

[0001] The present invention relates to storage structures, and more particularly to overhead storage structures conformed for suspended attachment.

BACKGROUND

[0002] Overhead storage structures have been known in the past. Typically, the cost and maintenance of storage space are directly related to floor space. As a consequence storage of personal articles is associated with the costs of the housing structure, and the hobbyist, artist, or collector is often forced with the hard choice between cost of storage and artistic pursuit. Similarly, artisans, mechanics, and those engaged in business are always exchanging tool or merchandise inventory against the cost of its storage. Accessible storage is therefore uniformly sought.

[0003] In the past various storage structures have been devised which in one way or another are deployed overhead. Amongst these are structures associated with lifting mechanisms for raising and lowering the storage assembly, as exemplified in U.S. Pat. No. 5,203,619 to Welsch et al and U.S. Pat. No. 5,199,843 to Sferra. Each of the foregoing, while suitable for the purposes intended, describes a fairly complex structure that is devoted to lift, and store substantial overhead weights.

[0004] Alternatively, other passive or manually articulated overhead storage arrangements have been devised as exemplified in U.S. Pat. No. 5,011,239 to Guerin and U.S. Pat. Nos. 5,215,366 and 5,056,878 to Givens. Again, while suitable for the purposes intended, each of the foregoing entails substantial structural elements which often extend

from the ceiling to the floor or present a formidable visual mass that creates the appearance of crowding.

[0005] In the recent past, U.S. Pat. No. Des. 416,152 was issued to Sidney Thomas Payne describing an ornamental welded wire constructed storage structure suspended on spaced welded wire supports tied to a ceiling. While the welded wire structural implementation provides a somewhat less visually encumbered appearance, further improvements are possible both in the nature of the accommodation thereof to the available spaces and in the manner in achieving positive suspension engagement directly to structural elements and beams. It is these improvements that are disclosed herein.

SUMMARY OF THE INVENTION

[0006] The following presents a simplified summary in order to provide a basic understanding of some aspects of the claimed subject matter. This summary is not an extensive overview, and is not intended to identify key/critical elements or to delineate the scope of the claimed subject matter. Its purpose is to present some concepts in a simplified form as a prelude to the more detailed description that is presented later.

[0007] In one aspect of various exemplary embodiments, an apparatus for storing articles in an overhead manner is provided, the apparatus comprising: a planar panel structure composed of two or more individual panels, the individual panels secured adjacent one another to cooperate to form a continuous planar panel structure; a plurality of transverse support pieces subjacent to the planar panel structure, each support piece comprising hollow, square sections projecting beyond the planar panel structure at both ends thereof; a corresponding plurality of suspension assemblies each defined by an upper end and a lower end and each releasably secured with a horizontal fastening means at the lower end

thereof to a corresponding end of the plurality of transverse support pieces and operatively attached at the upper end to the overhead structure; and an adaptor interposed between the upper ends of each suspension assembly and the overhead structure transferring load therebetween.

[0008] In one aspect of various exemplary embodiments, an apparatus for storing articles in an overhead manner is provided, the apparatus comprising: a planar support surface composed of two or more individual panels, the outer edges of which are defined by elongate elements; an attachment clamp securing one of the elongate elements along an outer edge of one of the panels to an adjacent elongate element along an outer edge of an adjacent panel such that the individual panels secured adjacent one another cooperate to form a continuous support surface; a plurality of transverse support pieces subjacent to the planar support surface, each support piece projecting beyond the planar support surface at both ends thereof; a corresponding plurality of suspension assemblies each defined by an upper end and a lower end and each releasably secured with a horizontal fastening means at the lower end thereof to a corresponding end of the plurality of transverse support pieces and operatively attached at the upper end to the overhead structure; and an adaptor interposed between the upper ends of each suspension assembly and overhead structure transferring load therebetween.

[0009] In one aspect of various exemplary embodiments, an apparatus for storing articles in an overhead manner is provided, the apparatus comprising: a support surface including a plurality of generally planar panels, each panel secured to an adjacent panel to cooperate to form a continuous planar support surface; a plurality of transverse support pieces subjacent to the planar support surface, each support piece projecting beyond the support surface at both ends thereof; a corresponding plurality of suspension assemblies

each defined by an upper and a lower end and each secured with a horizontal fastening means at the lower end thereof to a corresponding end of the plurality of transverse support pieces and operatively attached at the upper end to the overhead structure wherein each suspension assembly includes an upper strap and a lower strap respectively defining the upper ends and the lower ends, each strap including a plurality of spaced openings receiving a fastener to releasably connect the upper strap to the lower strap; and an adaptor interposed between the upper ends of each suspension assembly and overhead structure transferring load therebetween.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIG. 1 is a perspective view of an exemplary embodiment storage assembly.

[0011] FIG. 2 is a perspective detail view of a suspension substructure of the exemplary embodiment storage assembly.

[0012] FIG. 3 is an end view of the exemplary embodiment storage assembly attached to a building structural member.

[0013] FIG. 4 is a perspective view detail illustrating a fastener arrangement useful with an exemplary embodiment storage assembly.

[0014] FIG. 5 is a perspective view of another suspension substructure of the exemplary embodiment storage assembly.

[0015] FIG. 6 is a perspective view of still another exemplary embodiment storage assembly.

DETAILED DESCRIPTION

[0016] In the following detailed descriptions of various exemplary embodiments, reference is made to the accompanying drawings that form a part hereof, and in which is shown, by way of illustration, specific embodiments that may be practiced. It is to be understood that other embodiments may be utilized and structural changes may be made without departing from the scope of the present disclosure.

[0017] As shown in FIGS. **1-3**, an exemplary embodiment storage assembly, generally designated by the numeral **1**, includes a horizontal storage platform formed by forming a plurality of welded wire panels **11**. Each of the panels **11** is defined by a set of parallel rods **12** and a set of perpendicular rods **14** laid above parallel rods **12** and welded to one another to form a welded wire surface element of a platform dimension in integer multiples of conventional structural beam spacing. Along an outer longitudinal edge **6** of the wire panels **11** a first set of two closely paired parallel rods **21** and a second set of two closely paired parallel rods **22** sandwich, above and below, first ends **8** of the perpendicular rods **14**. The closely paired parallel rods **21, 22** provide support and allow insertion of a bolt therebetween for reasons more fully described below. Along an inner longitudinal edge **9** of the wire panels **11** a pair of parallel rods 23 sandwich, above and below, second ends **10** of the perpendicular rods **14**.

[0018] Panels **11** may be joined at their inner longitudinal edges **9** to other adjacent panels to form a common storage surface, the joining being effected by one or more conventional nut, bolt and washer combinations. The joined panels **11** that form the common surface are then supported by several transverse pieces **31**, each in the form of a square tube sectioned structural member provided with a set of drillings **35, 36** at each

end that are useful for fastening to the joined panels **11** and a suspension structure further described below.

[0019] Those in the art will appreciate that the longitudinal dimension of pieces **31** will be in integer multiples of the width of panels **11**. Thus, the length of pieces 31 is preferably either one or two widths of panel **11** resulting in the exemplary overhead storage structure that allows for storage widths that are either one or two times the width of the panel. Furthermore, current construction practices, regulations and conventions have resulted in preferred spacing intervals of structural members that form a commercial or residential structure. Since these then define the hard points from which the stored articles can be suspended, the preference is to dimension the width and length of each panel **11** in integer multiples of this spacing interval. In this manner the resulting assembly is conveniently accommodated for direct attachment to structural elements.

[0020] The example illustrated herein provides transverse pieces **31** of a length that is equal to two (double) widths of panel **11**. Thus, the inner longitudinal edges **9** of each panel align proximate the middle of each piece **31**, and in order to fix this adjoining relationship the inner longitudinal edges **9** of each panel **11** are joined to each other, near a middle of the pieces **31**, by one or more nut, bolt and washer combinations. A nut is inserted horizontally between and through the adjacent closely paired parallel rods **23** of each panel **11** being joined. Upon insertion between and through each adjacent closely paired parallel rods **23**, a washer and nut are secured to the bolt. In the manner provided, joined panels **11** and transverse pieces **31** combine to form a relatively rigid storage surface which can then be suspended at the end drillings **35, 36**.

[0021] Those in the art will appreciate further that while the structural spacing intervals are predetermined, the interior walls that separate the structure into forms or divisions do

not always align with this structural spacing. As a result, most of the prior art overhead storage systems either do not engage structural members or are deployed away from the walls. Accordingly, either the suspension strength suffers or the overhead storage is suspended in a manner that creates optical and physical incursion.

[0022] To avoid the foregoing disadvantages a set of adapters **51** can be provided, each again formed as an L-sectioned structural member defined by a horizontal surface **53** and a vertical surface **54**. A set of drillings or holes **55** and **56** is provided respectively in the horizontal and vertical surfaces **53** and **54**, and a fastener **57** is passed through the opening **55** that aligns subjacent a beam or structural member SM, to form a direct attachment thereto. Once so fastened the drillings **56** in the vertical surface are then useful in suspending the storage surface.

[0023] More precisely an upper strap **61a** provided with a row of holes **65a** is fastened by a bolt and nut assembly **63a** to a selected one of the drillings **56**. A second, lower strap **61b** is provided with a row of openings **65b**. The lower strap **61b** may be connected to the transverse piece **31** via a horizontal fastening means **63b** using a single hole from of the row of openings **65b**. In this manner, a single, horizontal fastening means **63b** creates a pivot point about which the lower strap **61b** can rotate to fold flat and store parallel to the transverse piece **31** to reduce installation time and simplify packaging. Once in position each strap **61a** and **61b** are then aligned relative each other and one or more of the openings **65a** that align with the openings **65b** are secured to each other, by conventional nut and bolt combinations, connecting straps **61a** and **61b** together. Accordingly, adjustments can be made in the length of each suspension assembly accommodating any height variation in the structural beams.

[0024] In another embodiment, the suspension structure **80** may be substantially pre-assembled to greatly reduce installation time for the end-user and simplify packaging for the manufacturer. FIG. **5** illustrates an exemplary embodiment of this suspension structure **80**. The suspension structure **80** may replace, but is not limited to replacing, the upper strap **61a**, the lower strap **61b**, the adapter **51**, the fastening means **63b**, and the transverse piece **31**. Other methods of connecting the upper and lower ends **61a** and **61b** of the suspension structure **80** are contemplated including, but not limited to, pins, and rivets or other like hardware.

[0025] Furthermore, it is contemplated in still other embodiments, the upper end **61a** and lower end **61b** may be mated to each other in such other ways without departing from the spirit and scope of the present disclosure. Such mating methods include telescoping tubes, threaded couplings, or the like.

[0026] In a similar fashion, joined panels **11** are connected to the traverse pieces **31** by a conventional nut and bolt combination. A bolt **59** is inserted vertically between a first set of two closely paired parallel rods **21** and a second set of two closely paired parallel rods **22** into and through a corresponding aligned drilling **36** in the traverse piece **31** where a nut (shown in FIG. **6**) is applied.

[0027] While reference is made to welded structures, such are exemplary only. The foregoing assembly may be implemented in various material structures, and components thereof may be variously fabricated in all known material combinations. Moreover, while the foregoing description illustrates even hole spacing in the suspension elements unequal spacing may be utilized to provide further height adjustment convenience.

[0028] Obviously many modifications and variations can be effected without departing from the spirit of the invention set out herein. It is therefore intended that the scope of the invention be determined solely by the claims appended hereto.

[0029] What has been described above includes examples of one or more embodiments. It is, of course, not possible to describe every conceivable combination of components or methodologies for purposes of describing the aforementioned embodiments, but one of ordinary skill in the art may recognize that many further combinations and permutations of various embodiments are possible. Accordingly, the described embodiments are intended to embrace all such alterations, modifications and variations that fall within the spirit and scope of the appended claims. Furthermore, to the extent that the term "includes" is used in either the detailed description or the claims, such term is intended to be inclusive in a manner similar to the term "comprising" as "comprising" is interpreted when employed as a transitional word in a claim.

CLAIMS

What is claimed is:

1. A storage apparatus conformed for attachment to an overhead structure of a building, comprising:

a planar panel structure composed of two or more individual panels, the individual panels secured adjacent one another to cooperate to form a continuous planar panel structure;

a plurality of transverse support pieces subjacent to the planar panel structure, each support piece comprising hollow, square sections projecting beyond the planar panel structure at both ends thereof;

a corresponding plurality of suspension assemblies each defined by an upper end and a lower end and each releasably secured with a horizontal fastening means at the lower end thereof to a corresponding end of the plurality of transverse support pieces and operatively attached at the upper end to the overhead structure; and

an adaptor interposed between the upper ends of each suspension assembly and the overhead structure transferring load therebetween.

2. Apparatus according to claim 1, wherein the horizontal fastening means is conducive to folding the corresponding suspension assembly parallel to the planar panel structure.

3. Apparatus according to claim 1, wherein each suspension assembly includes an upper strap and a lower strap respectively defining the upper ends and the lower ends, each strap including a plurality of spaced openings conducive to means for releasably connecting the upper strap to the lower strap.

4. Apparatus according to claim 1, wherein the planar panel structure includes one or more individual panels comprising a first plurality of elongate members, a second plurality of elongate members, and the plurality of transverse support pieces, each planar panel structure being of a length that is an integer multiple of a transverse dimension of the panel.

5. Apparatus according to claim 4, wherein the first plurality of elongate members and the second plurality of elongate members are substantially perpendicular in order to form a grid.

6. Apparatus according to claim 4, wherein the first plurality of elongate members define a longitudinal direction of the panel.

7. Apparatus according to claim 6, wherein the first plurality of elongate members includes, adjacent outer longitudinal edges of the panel, at least one closely paired parallel elongate members confining, above and beneath, ends of the second plurality of elongate members.

8. Apparatus according to claim 7, wherein the plurality of transverse support pieces further include drillings to facilitate releasable connections to the longitudinal edges of the panels and the lower strap of the plurality of suspension assemblies.

9. A storage apparatus conformed for attachment to an overhead structure of a building, comprising:

a planar support surface composed of two or more individual panels, the outer edges of which are defined by elongate elements;

an attachment clamp securing one of the elongate elements along an outer edge of one of the panels to an adjacent elongate element along an outer edge of an

adjacent panel such that the individual panels secured adjacent one another cooperate to form a continuous support surface;

a plurality of transverse support pieces subjacent to the planar support surface, each support piece projecting beyond the planar support surface at both ends thereof;

a corresponding plurality of suspension assemblies each defined by an upper end and a lower end and each releasably secured with a horizontal fastening means at the lower end thereof to a corresponding end of the plurality of transverse support pieces and operatively attached at the upper end to the overhead structure; and

an adaptor interposed between the upper ends of each suspension assembly and overhead structure transferring load therebetween.

10. Apparatus according to claim 9, wherein the horizontal fastening means is conducive to folding the corresponding suspension assembly parallel to the planar structure.

11. Apparatus according to claim 9, wherein each suspension assembly includes an upper strap and a lower strap respectively defining the upper end and the lower ends, each strap including a plurality of spaced openings conducive to means for releasably connecting the upper strap to the lower strap.

12. A storage apparatus conformed for attachment to an overhead structure of a building, comprising:

a support surface including a plurality of generally planar panels, each panel secured to an adjacent panel to cooperate to form a continuous planar support surface;

a plurality of transverse support pieces subjacent to the planar support surface, each support piece projecting beyond the support surface at both ends thereof;

a corresponding plurality of suspension assemblies each defined by an upper and a lower end and each secured with a horizontal fastening means at the lower end thereof to a corresponding end of the plurality of transverse support pieces and operatively attached at the upper end to the overhead structure wherein each suspension assembly includes an upper strap and a lower strap respectively defining the upper ends and the lower ends, each strap including a plurality of spaced openings receiving a fastener to releasably connect the upper strap to the lower strap; and

an adaptor interposed between the upper ends of each suspension assembly and overhead structure transferring load therebetween.

13. Apparatus according to claim 12, wherein the horizontal fastening means is conducive to folding the corresponding suspension assembly parallel to the planar support surface.

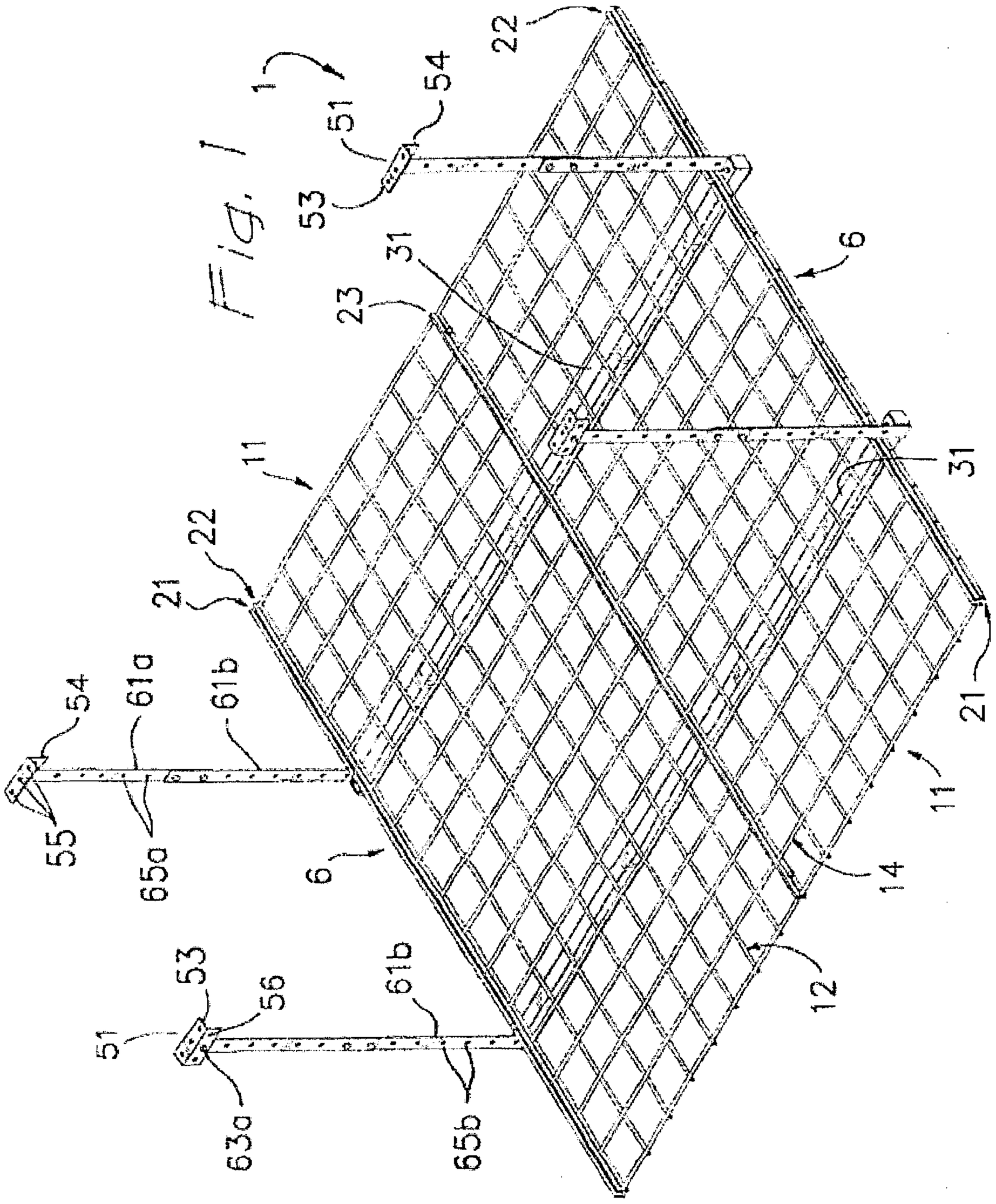


Fig. 1

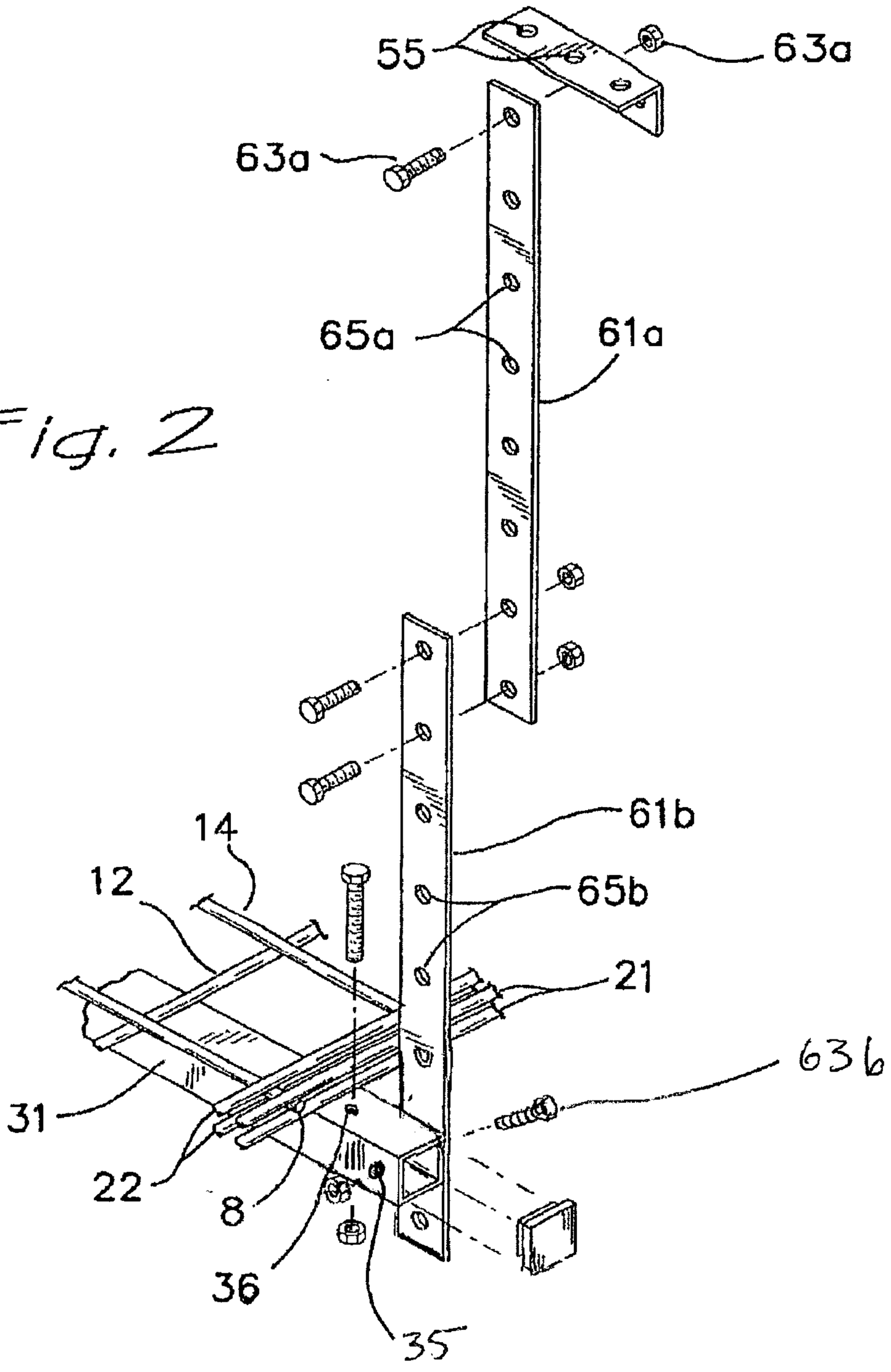


Fig. 2

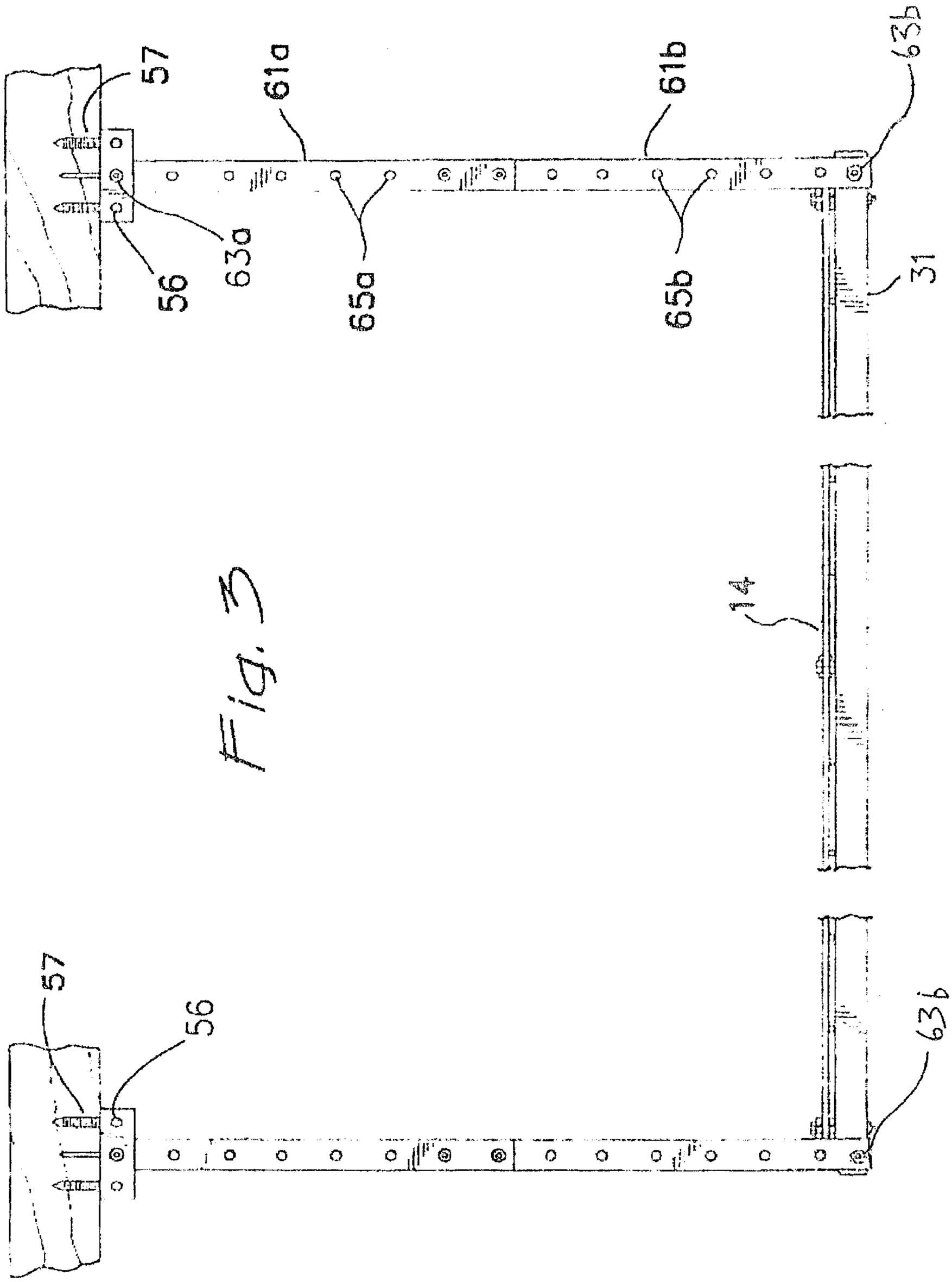


Fig. 3

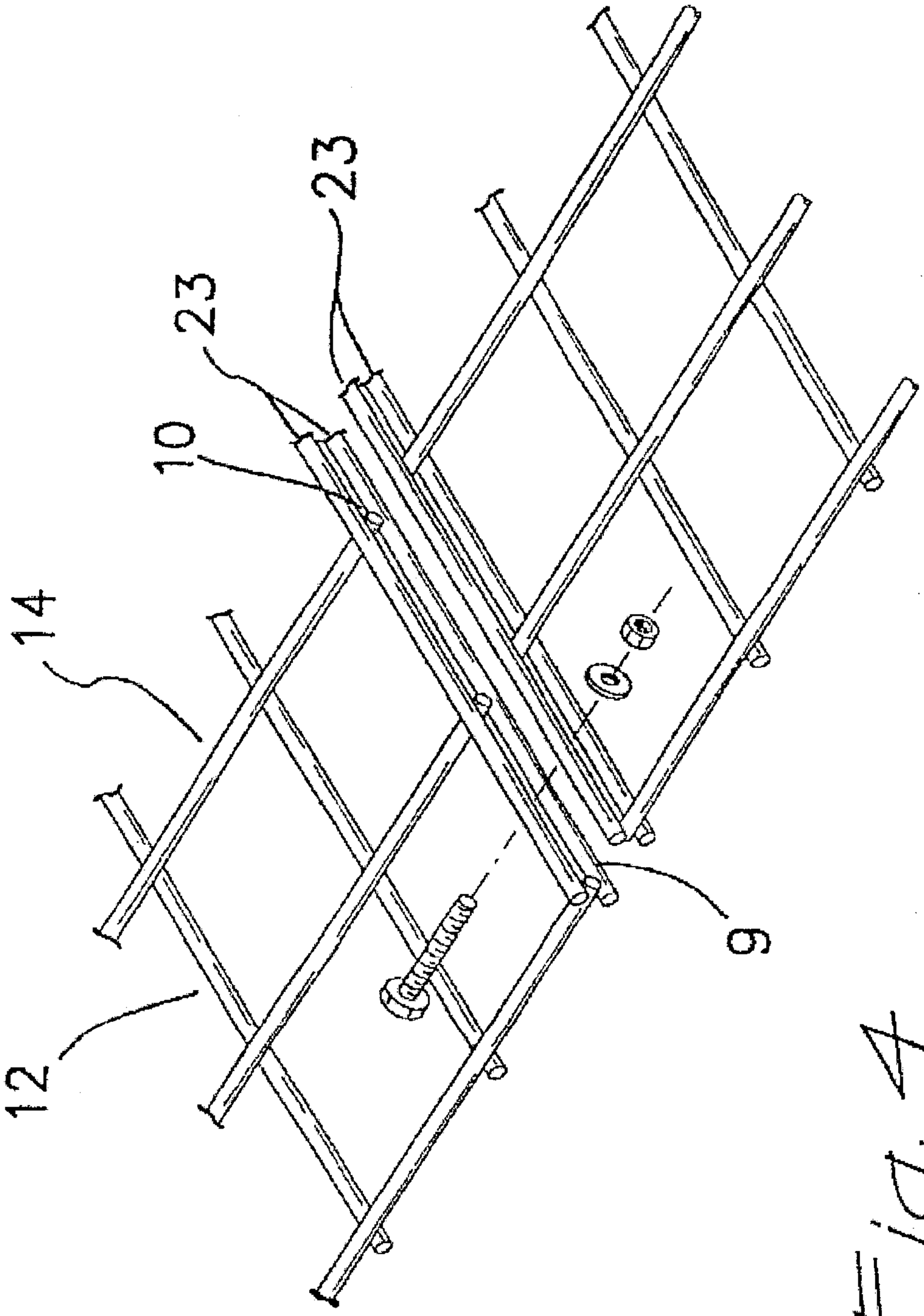


Fig. 4

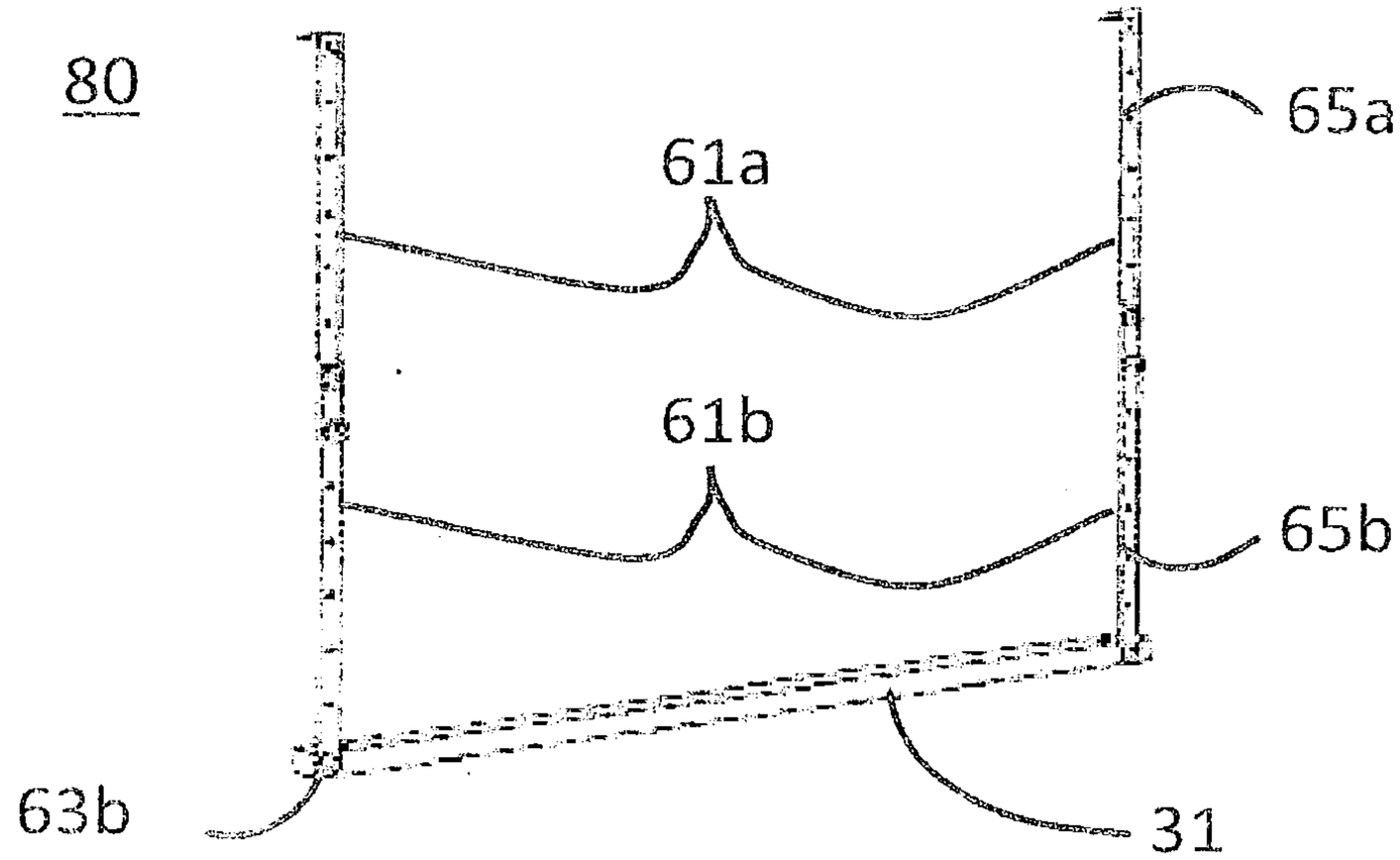


FIG. 5

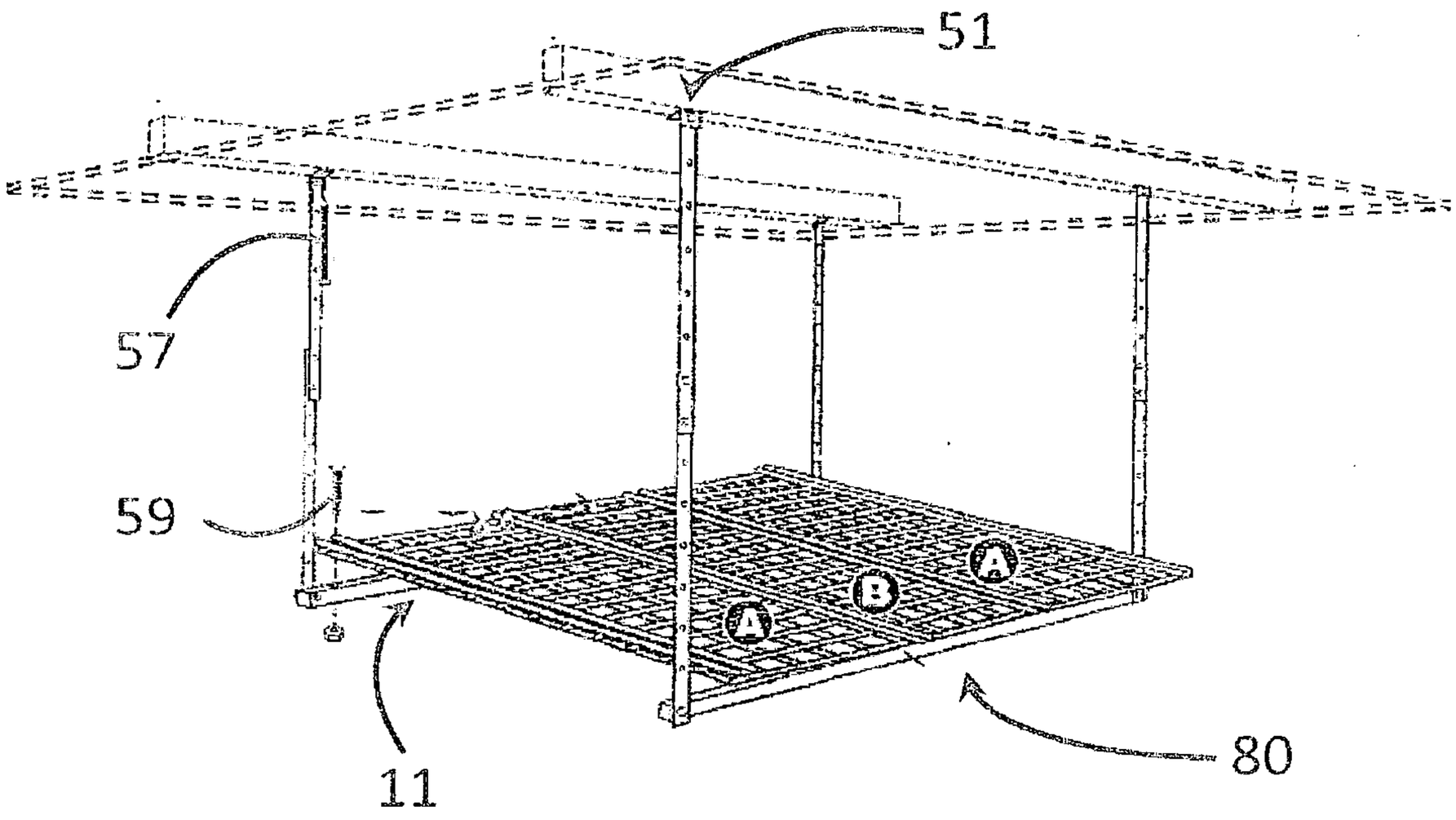


FIG. 6