Dec. 5, 1967 S. R. RICH 3,356,381

MOBILE BUILDING WITH TOWING BRACKET AND BRACING SYSTEM

Filed Jan. 3, 1966 3 Sheets-Sheet 1

Fig. 1.

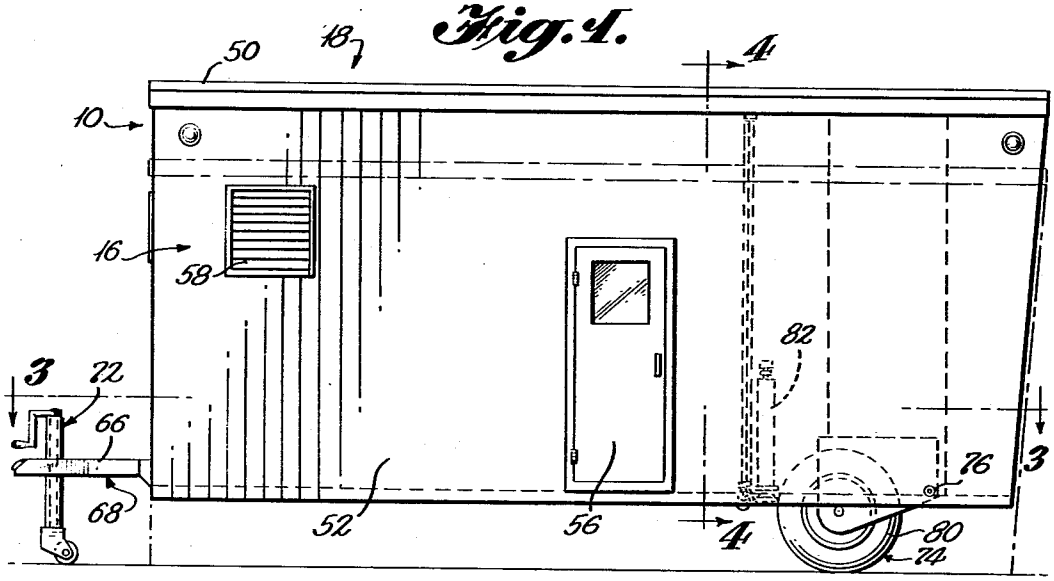
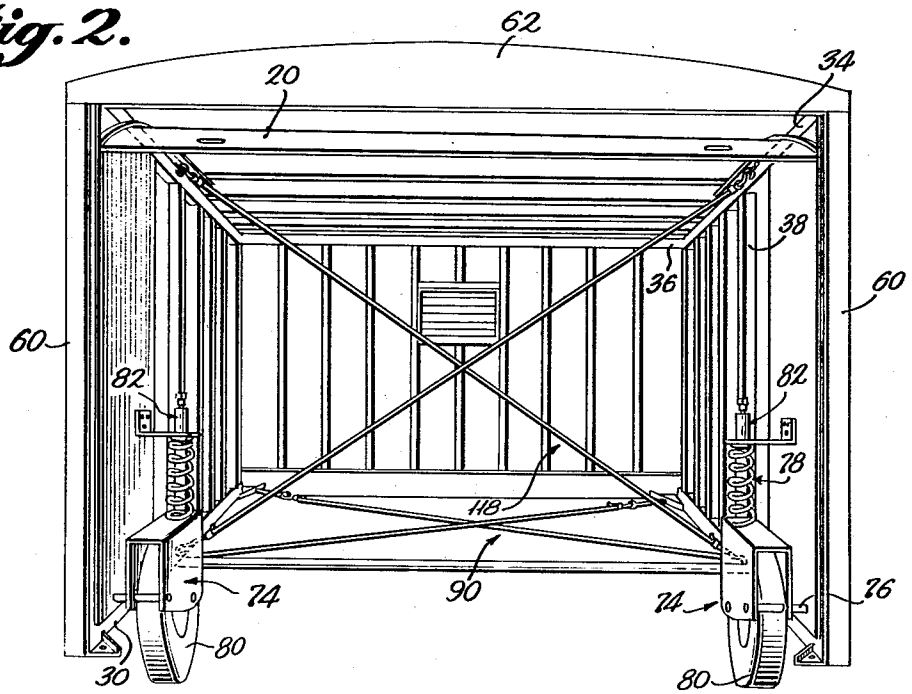


Fig. 2.



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Filed Jan. 3, 1966 3 Sheets-Sheet 2

Fig. 3.

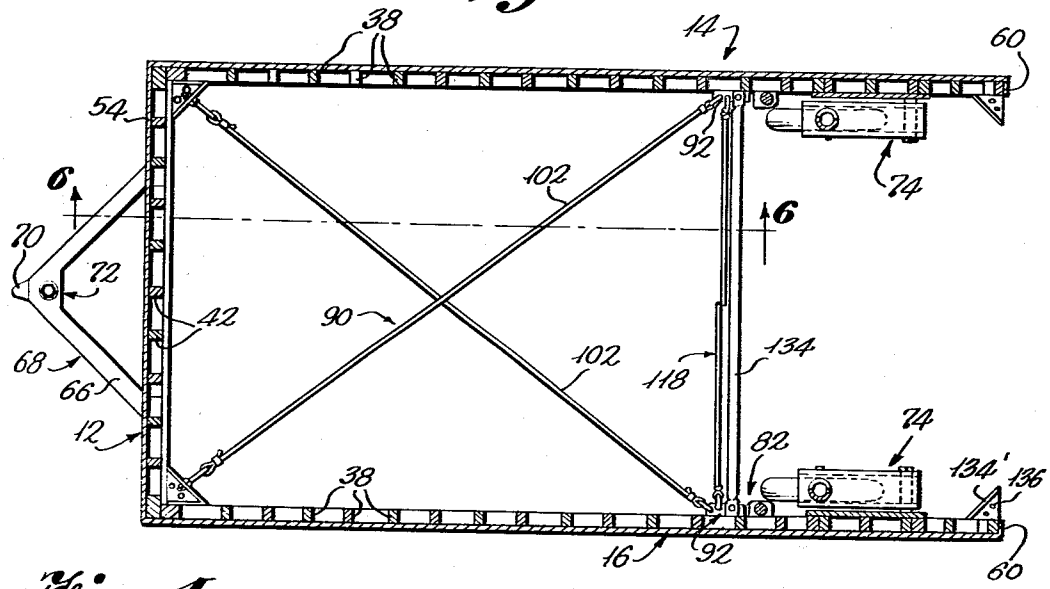


Fig. 4.

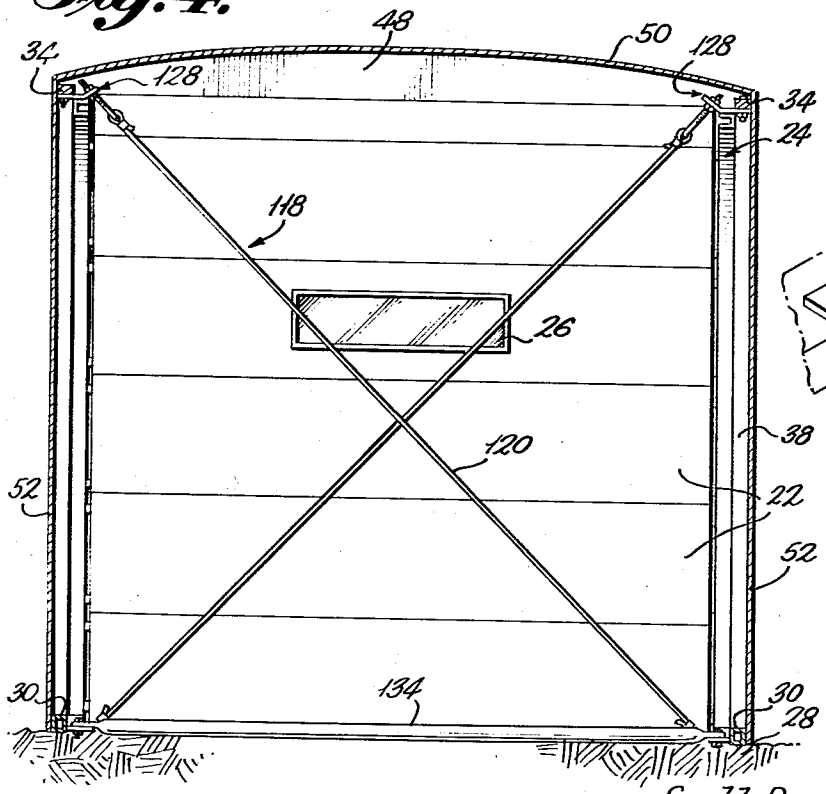
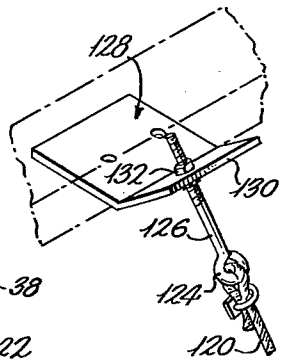


Fig. 5.



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Filed Jan. 3, 1966 3 Sheets-Sheet 3

Fig. 6.

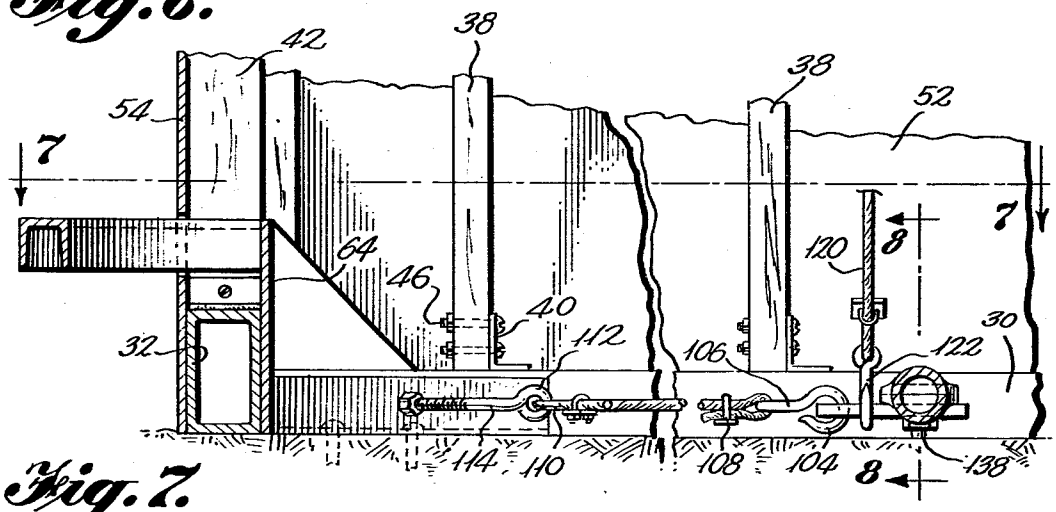


Fig. 7.

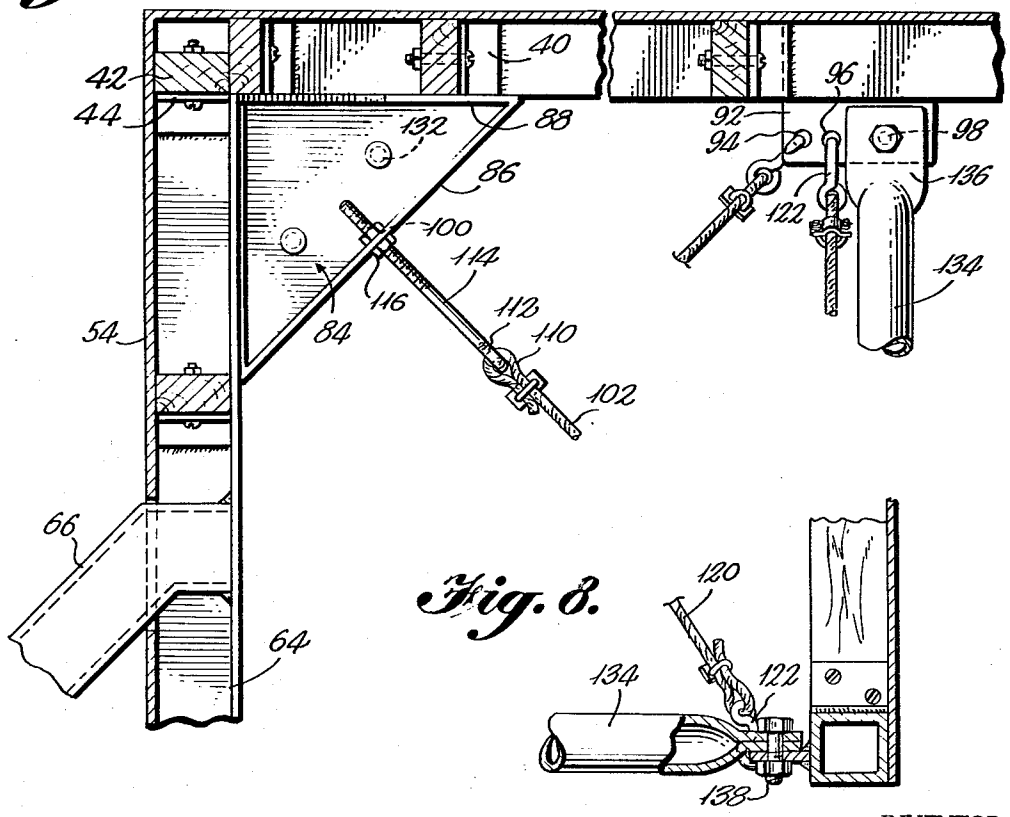


Fig. 8.

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MOBILE BUILDING WITH TOWING BRACKET AND BRACING SYSTEM

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Filed Jan. 3, 1966, Ser. No. 518,270
7 Claims. (Cl. 280—30)

ABSTRACT OF THE DISCLOSURE

The invention relates to the manner of removably bracing the walls of a mobile building structure for towing. It includes a horizontal cross bracing system comprising two removable guy cables located at the bottom of the structure and a vertical cross bracing system comprising two removable guy cables located transversely of the structure and intermediate its ends.

This invention relates broadly to the class of wheeled structures or vehicles and is directed particularly to an improved mobile building structure.

While the present invention is applicable to a movable or mobile building structure of any type, it is especially directed to an improved mobile garage structure.

When travelling by automobile an occasion may arise when it is desirable to have a building structure or a garage structure in which the motor vehicle may be temporarily left for protection from the elements or against vandalism. Accordingly, it is the particular object of the present invention to provide a wheeled housing or building structure which can be easily towed by a motor vehicle and which may be employed for housing or enclosing the motor vehicle when it may be desirable to leave the vehicle in one place for any length of time.

Another object of the invention is to provide a mobile building structure of the type referred to, having, in addition to suitable running gear, a towing bracket by means of which the structure when elevated for support upon the running gear, may be readily coupled with a motor vehicle for movement over the road by the vehicle.

Still another object of the invention is to provide in association with a mobile building structure having a towing bracket incorporated therein, a truss system which will secure the structure against twisting and damaging strains and also ensure safe transportation of the building while being towed at reasonable speeds and provide for better handling and braking of the moving structure.

Still another object of the invention is to provide an improved mobile building structure and towing bracket, more particularly a mobile garage with a towing bracket incorporated therein, which building structure or garage is floorless and is provided with means whereby it may be readily lowered to and caused to rest upon the ground following removal of running gear.

It is also an object of the invention to provide in a structure of the character described designed to rest directly upon the earth, a means by which the structure may be secured in position upon the earth.

Many other objects and advantages of the present invention will become apparent as the description of the same proceeds and the invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings, wherein:

FIG. 1 is a view in side elevation of a mobile building structure designed in accordance with a preferred embodiment of the invention and showing the structure in elevated position and in dotted outline in lowered position when resting upon the ground;

FIG. 2 is a rear elevational view of the structure looking into the interior thereof and showing elements of the bracing system in use during movement or transportation of the structure;

FIG. 3 is a transverse section taken in a horizontal plane approximately on the line 3—3 of FIG. 1;

FIG. 4 is a transverse section taken in a vertical plane approximately on the line 4—4 of FIG. 1;

FIG. 5 is a perspective detail of a coupling between a bracing cable and a rafter plate supporting bracket;

FIG. 6 is a longitudinal section in a vertical plane taken approximately on the line 6—6 of FIG. 3 with portions of the structure broken away;

FIG. 7 is a longitudinal section taken in a horizontal plane approximately on the line 7—7 of FIG. 6, the section being restricted to the front right corner portion of the structure; and

FIG. 8 is a sectional detail, the section being taken approximately on the line 8—8 of FIG. 6.

Referring now more particularly to the drawings the numeral **10** generally designates the mobile building or garage structure which is illustrated as embodying a front end wall **12**, side walls **14** and **16** and a top or roof **18**.

The rear end of the building is closed by a sliding door structure which is generally designated **20** and which may be of any suitable construction. The door structure here shown comprises a number of individual transverse panels **22** and is supported for sliding movement in the oppositely positioned trackways **24** such as are conventionally employed for this type of sliding door structure.

One of the panels **22** of the sliding door may be provided with the window **26** as shown in FIG. 4.

The building structure **10** is designed to be used without a floor, and for housing a car or for other purposes, it is adapted to rest directly upon the surface of the earth as illustrated in FIGS. 4 and 6, the numeral **28** designating the earth upon which the bottom or base sills of the structure are designed to rest.

The bottom part or base of the building structure comprises the longitudinal side beam sills **30** and a transverse front beam sill **32**. These side and front sill beams are here illustrated as being of tubular cross section but obviously they may be of any other suitable cross sectional configuration and they are of rigid steel construction as obviously would be essential in a structure of the kind under consideration.

Overlying the side beam sills are the longitudinal rafter plates **34** which are connected together at their forward ends by a transverse plate **36**.

The side rafter plates **34** are supported upon the side sill beams by the vertical studding **38**. The studs or studding are secured to the supporting sill beams in a suitable manner, as, for example, by means of brackets **40**, shown particularly in FIGS. 6 and 7 and at the front end of the structure the individual studs **42** are mounted upon the front sill beam **32** as shown in FIGS. 6 and 7, to which they are secured in a suitable manner as, for example, by means of the brackets **44** which, like the brackets **40**, may be welded to the supporting beams with the vertical flanges of the brackets secured to the adjacent studs by bolts **46** or in any other suitable manner.

The rafter plates **34** support the ends of suitable transversely extending rafters, one only of which is illustrated in FIG. 4, this being a back rafter or a rafter at the rear of the structure and is designated **48**. This rafter and others in parallel relation therewith support the roof sheathing **50**.

Numerals **52** and **54** respectively designate side and front wall sheathing.

One side wall, here designated the left side wall **16**, may be provided with a suitable doorway **56** and window or ventilation opening **58**.

At the rear of the building structure, the numeral **60** designates the vertical door opening posts.

The numeral **62**, in FIG. 2, designates the facing board covering the back rafter and connecting the top ends of the door posts which are positioned upon opposite sides of the opening which the sliding door **20** is adapted to close.

The sliding door trackway **24** has the usual horizontal top track portions which extend along the inner sides of the rafter plates to support the door horizontally in open position and which curve downwardly and extend along the inner sides of the door posts **60** to maintain the door in vertical closed position as it is shown in FIG. 4, FIG 2 showing the open position of the door as will be readily apparent.

The numeral **64** designates a relatively wide towing bracket plate which extends transversely of the interior of the structure against the inner side of the front sill beam **32** as best illustrated in FIG. 6. As shown, this plate **64** extends above the beam **32** and it has secured thereto by welding or any other suitable manner the rear ends of the forwardly converging legs **66** of the tow bracket which is generally designated **68**. The forward ends of the legs **66** of the tow bracket are joined in a suitable manner to provide a coupling means **70** for connecting the bracket to a conventional coupling unit such as is commonly provided for connecting trailers to the rear of an automobile and the joined together ends of the legs **66** are also designed to be secured to a vertical jack unit **72** by means of which the front end of the building structure may be raised and lowered as desired to level the structure above the earth in cooperation with the running gear at each side of the building structure. Such running gear upon each side of the building structure is generally designated **74**.

Each rnning gear unit or wheel unit **74** may be of the same construction as the units illustrated in my Patent No. 3,108,820 which issued Oct. 29, 1963. These units as set forth in the patent are mounted upon suitable supporting shafts **76**, carried by the adjacent wall of the structure for movement in a vertical plane. Each unit includes in its construction suitable spring means generally designated **78** which functions in a nature of a shock absorber and which is coupled in an operative manner with the adjacent wall of the housing for assisting in supporting the garage building structure upon the ground engaging wheels **80**.

Associated with each of the running gear units **74** and mounted forwardly thereof upon the inner side of the housing wall, is a jack unit **82** which is employed in cooperation with the jack unit **72** for raising and lowering the building structure as necessary to facilitate removal and replacement of the running gear units.

No detailed illustration or description is here given of the wheel unit **74** or the jack units **72** and **82** since these several units are fully illustrated and described in my issued patent above referred to and such illustration and description of these units is not believed to be necessary to a proper understanding of the towing and bracing features of the present invention.

The bracing and rigidifying system of the present invention for strengthening the building structure and facilitating the towing thereof will now be described.

At each front corner of the base frame structure embodying the front and side sill beams, there is welded or otherwise secured a triangular gusset plate **84**, one of the two right angle sides of which is secured by welding or the like to the inner side of the adjacent side sill beam **30** while the other right angle side of the plate is secured by welding or the like to the inner side of the towing bracket plate **64**.

Extending across the plate and connecting the ends of the right angularly related sides thereof is the upstanding flange **86** and the ends of this flange may, if desired, be joined to the upstanding right angular flanges **88** which border the right angularly related sides of the triangular plate.

The corner gusset plates **84** comprise a part of a horizontal cross bracing system. This horizontal cross bracing system which includes the gusset plates and other plates about to be described, is generally designated **90**.

Included in the cross bracing system **90** are the transversely located or positioned sill beam bracket plates **92**. These bracket plates **92** are secured in substantially horizontal position, to the inner sides of the sill beams **30**, directly opposite one another as shown in FIG. 2. The bracket plates **92** are each provided with the three apertures **94**, **96** and **98** for the purpose about to be described.

The vertical flange **86** of each of the corner gusset plates **84** is also provided with an aperture **100**.

The horizontal cross bracing system includes the two guy cables **102**. Each of these cables is secured at one end to a hook **104**, which has a shank formed with an eye **106** in which a loop of the cable end is engaged and secured by the cable clamp **108**.

The opposite end of each cable **102** is connected by a loop **110** which may be formed and secured by a clamp **108** as described or by any other means and such loop **110** is engaged in the eye **112** of a long screw bolt **114** which is adapted to have the threaded end portion thereof passed through the aperture **100** in a flange **86** of a corner gusset, and secured and adjusted in the aperture by means of the nuts **116** threaded thereon.

The guy cables **102** are disposed horizontally in crossed relation as shown in FIG. 3 with the hook at one end of each cable engaged through the aperture **94** of a plate **92** and the bolt **114** at the opposite end of each of the attached cables is extended through the aperture of the gusset plate flange which is diagonally spaced across the width of the building structure and this bolt **114** is used as a draw bolt by threading the nuts **116** in the proper manner thereon so as to pull the cable taut. Thus the two guy cables extend diagonally across the building structure in crossed relation as shown in FIG. 3 and when they are drawn taut they cross brace the building in a horizontal plane substantially at the level of the base forming sill beams **30** and **32**.

In addition to the horizontal cross bracing a vertical cross bracing system is provided, which is generally designated **118**.

This vertical cross bracing system which lies in a vertical plane transversely of the building structure includes the two cables **120** which are arranged in crossed relation as shown in FIG. 4 and each is connected between a side sill beam on one side of the building structure and the rafter plate at the top of the structure upon the opposite side thereof.

As illustrated in FIG. 3 the sill beam bracket plates are disposed forwardly of the running gear units **74** and the adjacent jack units **82**.

Each of the cross bracing guy cables **120** has one end secured to a hook **122** which is adapted to be engaged through the aperture **96** of one plate **92** while the opposite end of each guy cable **120** is secured to the eye **124** of a draw bolt **126** which is secured to the rafter plate **34** at the opposite side of the structure as shown in FIG. 4, by the means about to be described.

Disposed upon opposite sides of the building structure are the transversely spaced rafter plate brackets **128**. Each of these brackets is disposed approximately directly above a plate **92** and each bracket has an end portion which extends at an angle as indicated at **130** and this angled portion **130** of the bracket **128** has a suitable aperture to have the draw bolt **126** pass therethrough to be secured therein by means of the securing nuts **132**. As will be readily seen these draw bolts **126** and the means of securing the same as well as their formation with the eyed ends for the attachment of a cable, are of the same form or construction as the draw bolts **114**.

In addition to the cross bracing provided by the guy cables **102** and **120** there is provided the transverse brac-

ing bar **134**. This bar **134** is of a length to extend transversely of the structure to couple at its ends with the plates **92** and each end of the bar is flattened as shown at **136** in FIG. 7, to lie upon a surface of the bracket plate **92** and the flattened portion of the bar is apertured to align with the third aperture of the plate, which is designated **98**, to receive a securing bolt **138**. Thus each of the sill beam plates **92** has secured thereto an end of the cross bar **134**, a hook of one of the guy cables **120** and a hook of one of the guy cables **102**.

Each of the gusset plates **84** is provided with an aperture **132**, or two or more of these apertures may be provided if desired as shown.

At the opposite end or back end of each side sill beam **30** there is secured the horizontal plate **134'** and each of these plates has one or more apertures **136** therein as shown in FIG. 3.

In the employment of the present invention, when the building structure is to be transported along a roadway the hitch **70** is connected in the usual or a suitable manner with the draft vehicle and the rear end of the garage or building structure is elevated upon the running gear units **74**. The horizontal cross bracing system **90** is set up as shown in FIG. 3 so that a front corner of the structure will be rigidly attached to the opposite side of the building rearwardly of the front corner bracket, to a plate **92**. In addition to the horizontal bracing system the vertical bracing system is also set up as shown in FIG. 4 so that each of the guy cables **120** will be drawn taut between a plate **92** at one side of the structure and the rafter plate **128** at the opposite side of the structure. Thus, when the cables are drawn tightly there will be rigid bracing transversely of the structure which will hold the structure against twisting, in cooperation with the horizontal bracing system **90**, when the structure is being moved along a roadway.

In addition to the foregoing the cross bracing beam **134** will be secured in the manner illustrated.

When the mobile building has been moved to a location where it is intended to be used to house the draft vehicle or for other purposes, the jacks are employed to elevate the vehicle for the removal of the running gear units **74**, after which the rear end of the building can be lowered to bring the side sill beams **32** onto the surface of the ground and the jack **72** is also employed to lower the front end of the building after the hitch has been disconnected from the draft vehicle. Thus, the sill beams may rest directly upon the surface of the ground as illustrated in FIGS. 4 and 6.

The building may be secured in position after it has been lowered to the ground by means of fastening bolts or stakes passed through the apertures **132** and **136** of the plates **84** and **134'** respectively. These securing stakes may be of a temporary nature or if the structure is to be permanently secured, bolts or the like may be extended through the apertures, into or through lagging or any other body by means of which proper or desired security of the building in position may be attained.

Upon removal of the vertical cross bracing guy cables **120** it will be seen that a motor vehicle or the like may be run into the garage building and also the sliding door structure **20** may then be readily closed as the cables **120** will be out of the way. Also the transverse bar **134** may be allowed to rest upon the ground if desired together with the horizontal bracing or all of these bracing elements can be removed after the structure has been suitably staked down or fixed in position for use.

As this invention may be embodied in several forms without departing from the spirit or essential characteristics thereof, the present embodiment is therefore illustrative and not restrictive, and since the scope of the invention is defined by the appended claims, all changes that fall within the metes and bounds of the claims or that form their functional as well as conjointly cooperative equivalents are therefore intended to be embraced by those claims.

I claim:

1. A mobile building structure embodying side walls, a front end wall, a rear end and a roof, means supporting the structure for towing comprising running gear removably connected to the structure adjacent to the rear end thereof, hitch means connected to the front end of the structure for attachment to a draft vehicle, guy means within the structure extending from side-to-side thereof and cross bracing the structure for resisting twisting and straining of the structure during towing thereof, and said guy means being readily removable for facilitating occupancy of structure, said guy means comprising a first system of cables in crossed relation and disposed in a substantially horizontal plane closely adjacent to the bottom of the structure and each cable extending from a point adjacent to the said front wall rearwardly obliquely across the width of the structure to a point intermediate the ends thereof and forwardly of said running gear and a second system of cables in crossed relation and disposed in a substantially vertical plane.

2. The invention according to claim **1** wherein said structure includes a transversely extending rigid bar substantially in the plane of the cables of said first system and the ends of said rigid bar being adjacent the rear ends of said cables of said first system.

3. A mobile building structure embodying side walls, a front end wall, a rear end and a roof, means supporting the structure for towing comprising running gear removably connected to the structure adjacent to the rear end thereof, hitch means connected to the front end of the structure for attachment to a draft vehicle, guy means within the structure extending from side-to-side thereof and cross bracing the structure for resisting twisting and straining of the structure during towing thereof, and said guy means being readily removable for facilitating occupancy of structure, said structure including horizontal, longitudinal side sill beams, and a horizontal, transverse front end sill beam between and connected at its ends to and forming front corner angles with the side beams, a gusset plate in each corner angle secured to said beams, bracket plates spaced apart transversely of the structure and each secured to one of said side beams, and said guy means embodying a pair of cables each carrying a means at one end attached to a gusset plate and means at its other end attached to a bracket plate at the opposite side of the structure.

4. The invention according to claim **3**, wherein the said means attached to a bracket plate is a hook removably engaged in an aperture in the bracket plate and the said means attached to the gusset plate is a draw-bolt for drawing the cable taut.

5. The invention according to claim **3**, wherein said guy means further includes a rigid bar disposed transversely of the structure between said bracket plates and means securing each end of said bar to a bracket plate.

6. A mobile building structure embodying side walls, a front end wall, a rear end and a roof, means supporting the structure for towing comprising running gear removably connected to the structure adjacent to the rear end thereof, hitch means connected to the front end of the structure for attachment to a draft vehicle, guy means within the structure extending from side-to-side thereof and cross bracing the structure for resisting twisting and straining of the structure during towing thereof, and said guy means being readily removable for facilitating occupancy of structure, said structure including horizontal, longitudinal side sill beams and a horizontal, transverse front end sill beam, wall studding supported upon said longitudinal side sill beams, rafter plates supported on said studding and extending longitudinally of the structure above the side sill beams, said front end sill beam joining at its ends with said side sill beams and forming front corner angles therewith, a gusset plate secured to

the side and front beams in each of said angles, bracket plates spaced apart transversely of the structure and each secured to one of said side beams, an upper bracket plate secured to each of said rafter plates above a side beam bracket plate, and said guy means embodying a pair of cables each carrying a means at one end attached to a gusset plate and means at its other end attached to a side beam bracket plate at the opposite side of the structure, a second pair of cables each attached at one end to a side beam bracket plate and attached at its other end to an upper bracket plate at the opposite side of the structure.

7. The invention according to claim **6**, with a rigid bar extending across the interior of the structure and having each end in engagement with a side beam bracket plate, and means removably securing each end of said bar to the adjacent bracket plate.

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