United States Patent

[11] 3,604,166

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[45] Patented **Sept. 14, 1971**
[73] Assignee **Gichner Mobile Systems, Inc.**

[54] **DEPLOYMENT SYSTEM FOR SHELTER UNITS**
8 Claims, 21 Drawing Figs.

[52] **U.S. Cl.** **52/126,** 52/79, 52/127, 52/173, 52/745
[51] **Int. Cl.** **E04b 1/348,** G21f 7/00
[50] **Field of Search** 52/79, 122, 127, 173, 143, 745, 105, 126

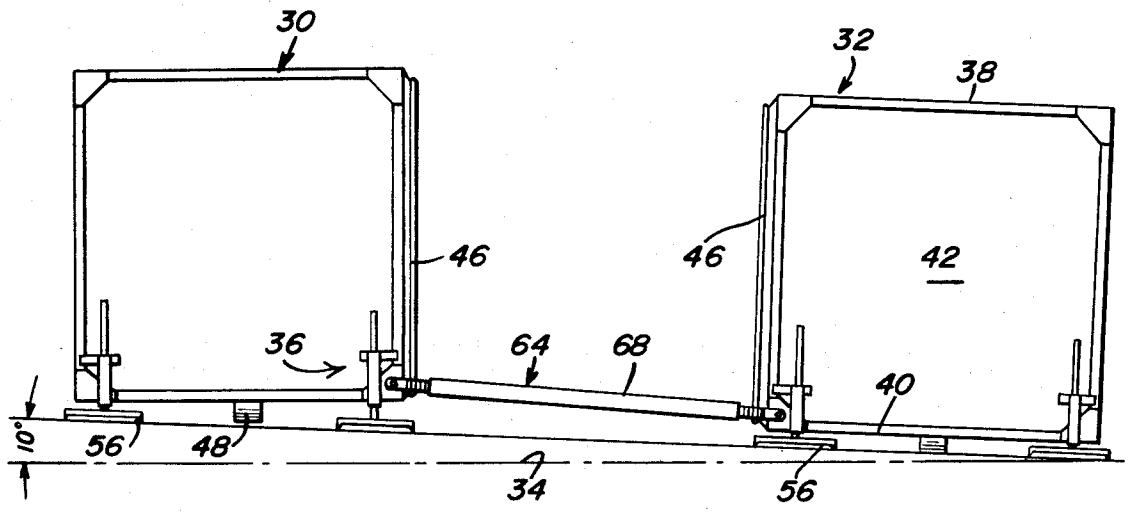
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Primary Examiner—Price C. Faw, Jr.
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ABSTRACT: A system and structural assembly for enabling two shelter units to be deployed in accurate relative relationship to enable the two shelter units to be expanded into an enclosure including levelling jacks with sliding pads at each corner of each shelter unit, an alignment bar for moving the shelter units in relation to each other and accurately aligning the shelter units so that the facing sidewalls of two spaced shelter units may be employed as the roof and floor of the space between the two shelter units and an auxiliary end wall carried by each of the shelter units may be employed for completely enclosing the space between the two spaced shelter units to insure the structural and RF integrity of the complex as well as the safety and reliability necessary for enabling operating personnel to deploy the two shelter units and expand them into an enclosure encompassing the space of three shelter units.



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SHEET 1 OF 5

Fig. 1

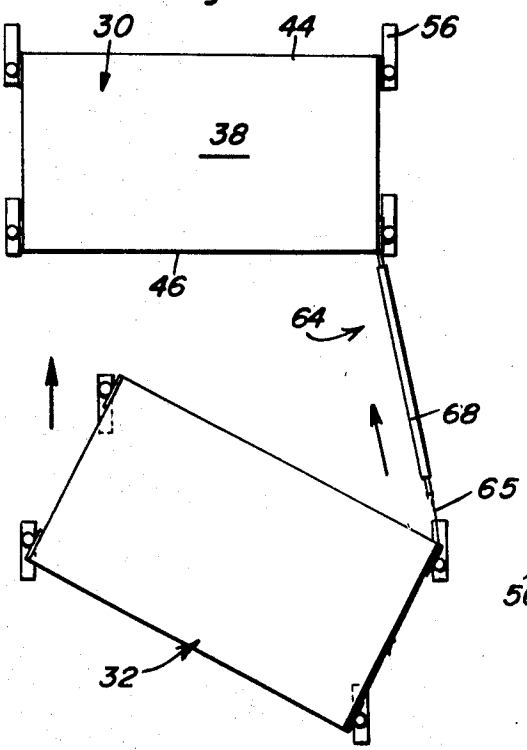


Fig. 2

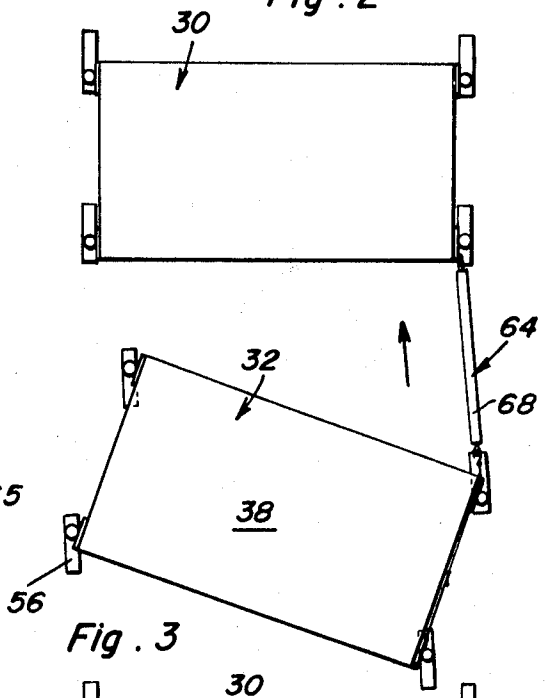


Fig. 3

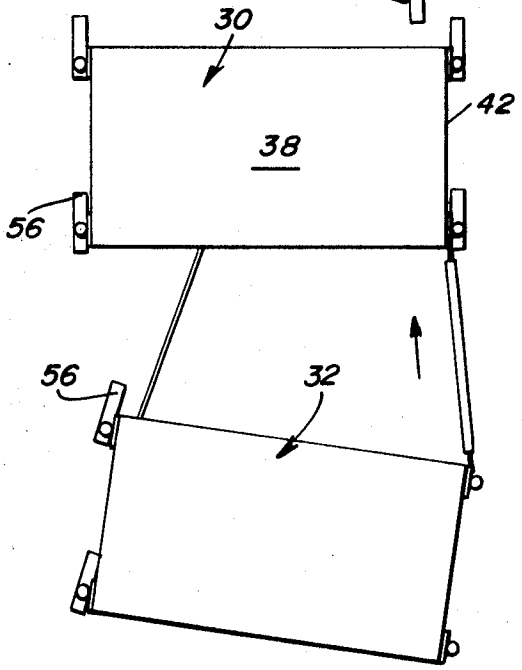
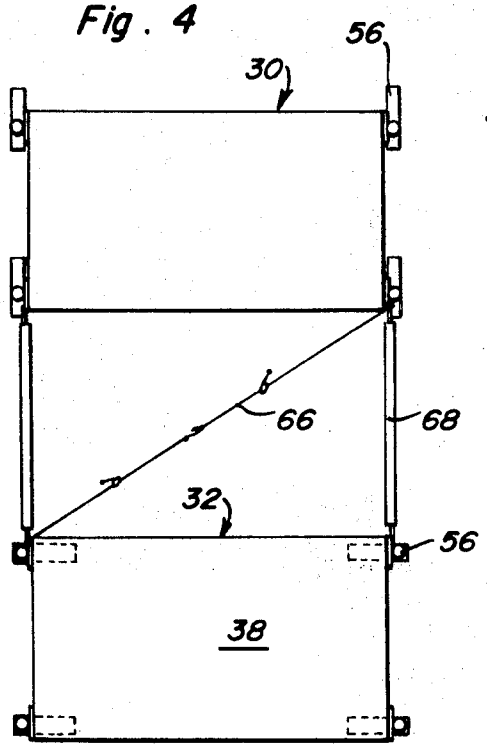


Fig. 4



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Fig. 5

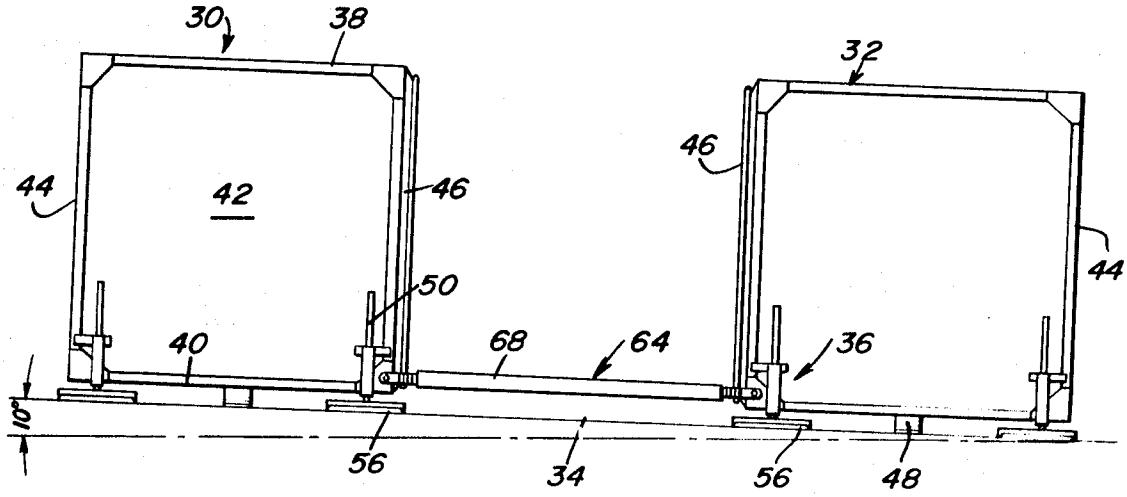


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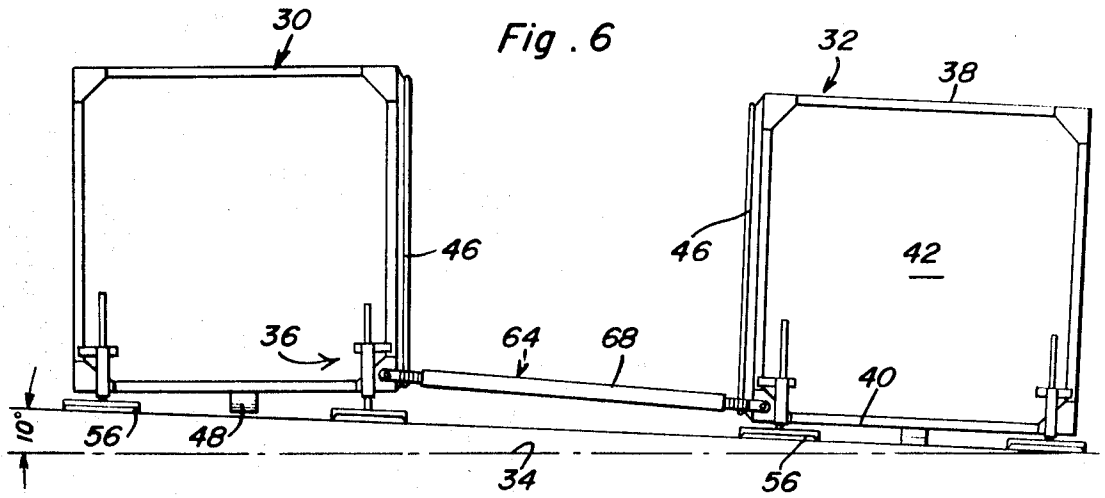
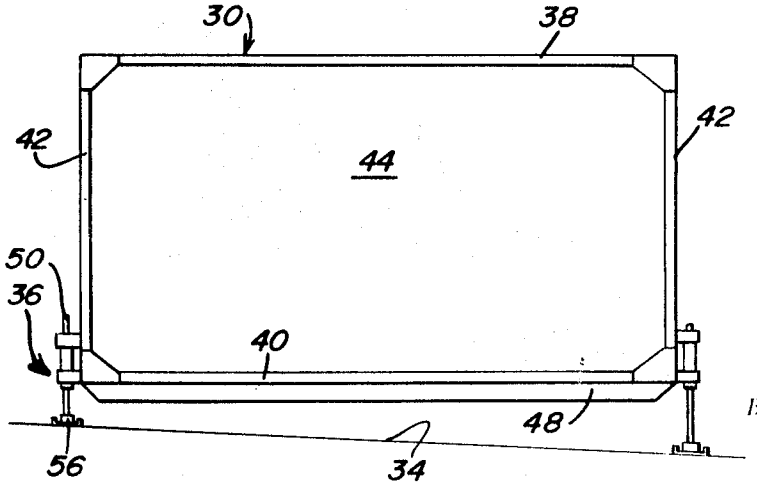


Fig. 9



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Fig. 7

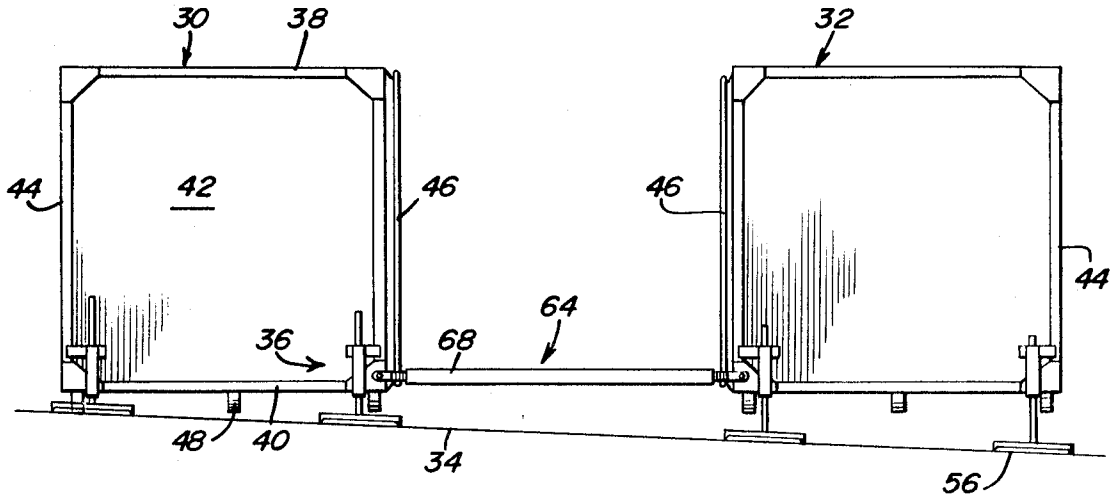


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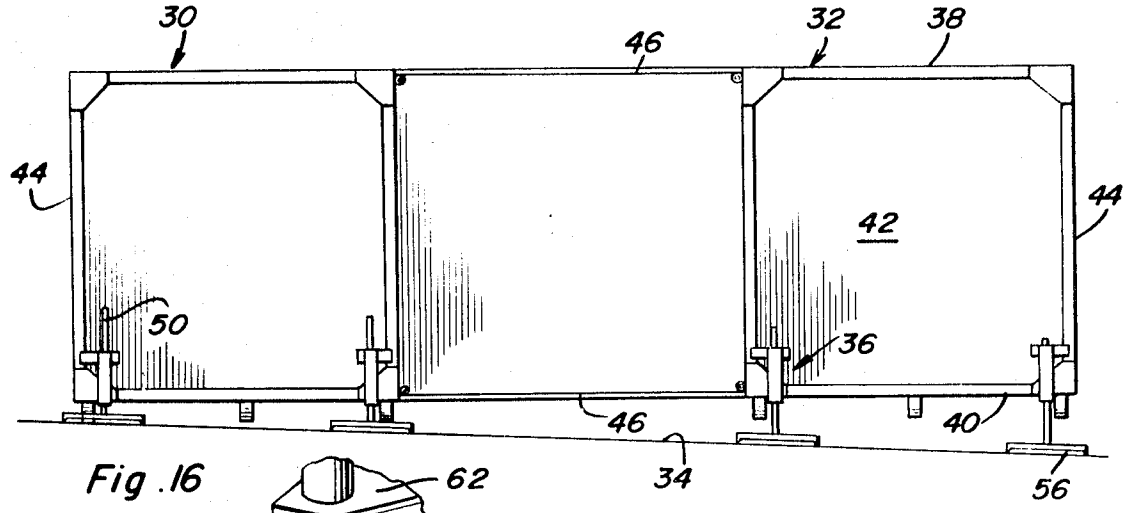
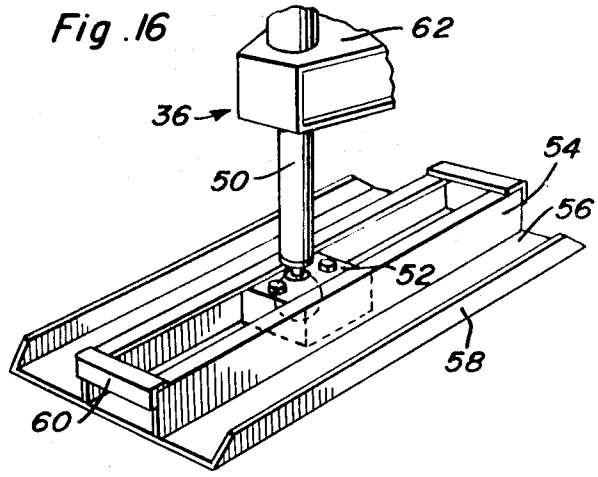


Fig. 16



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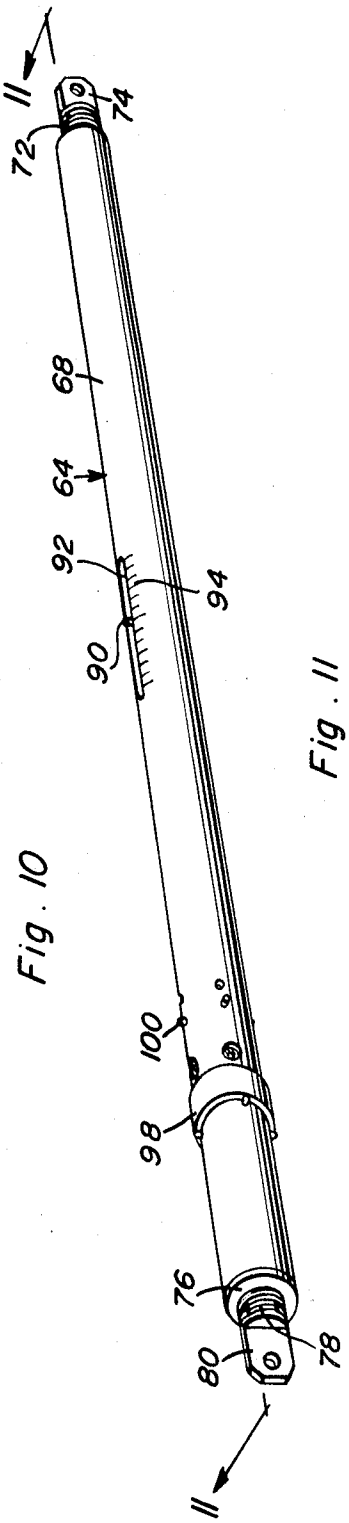


Fig. 10

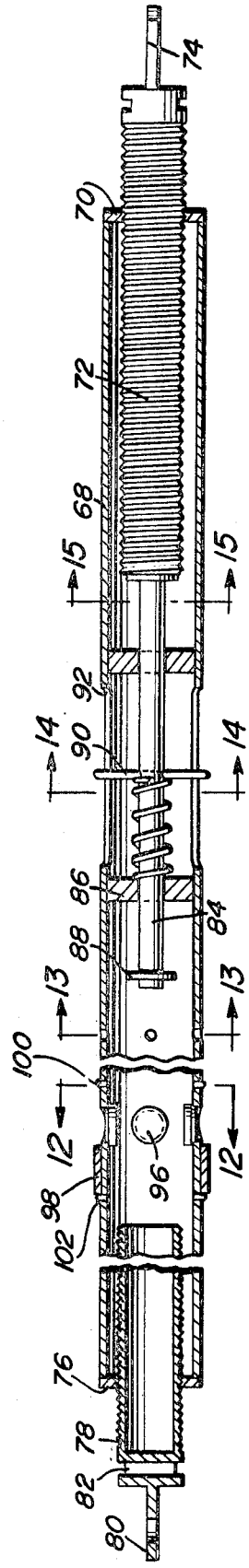


Fig. 11

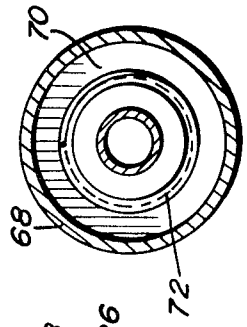


Fig. 15

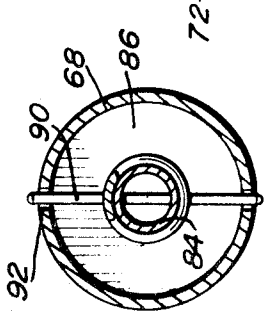


Fig. 14

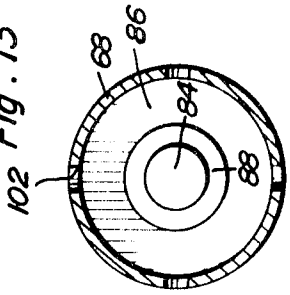


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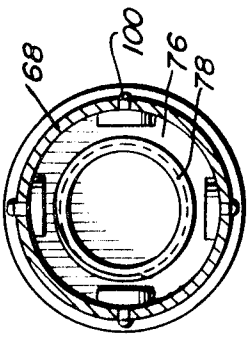


Fig. 12

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Fig. 17

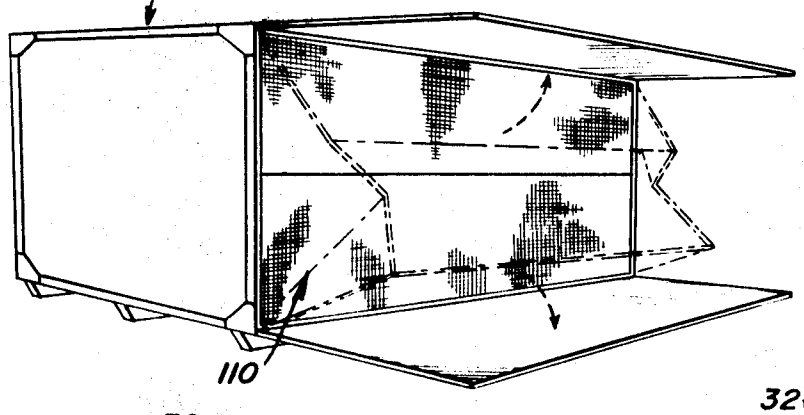


Fig. 21

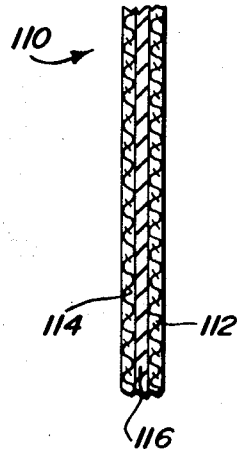


Fig. 18

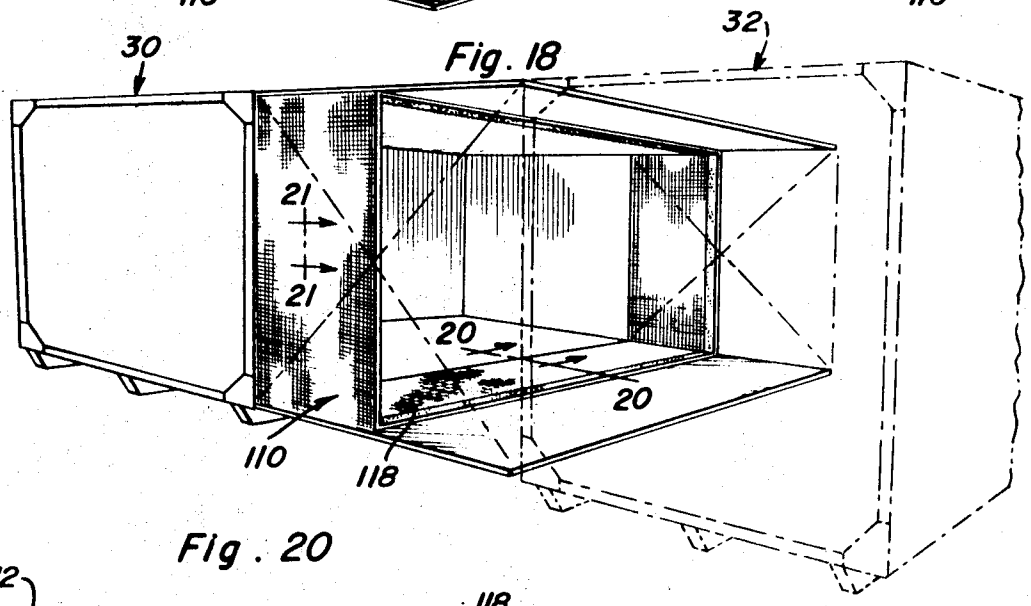


Fig. 20

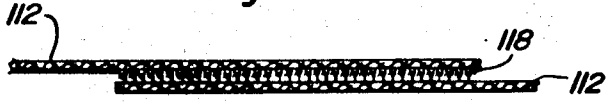
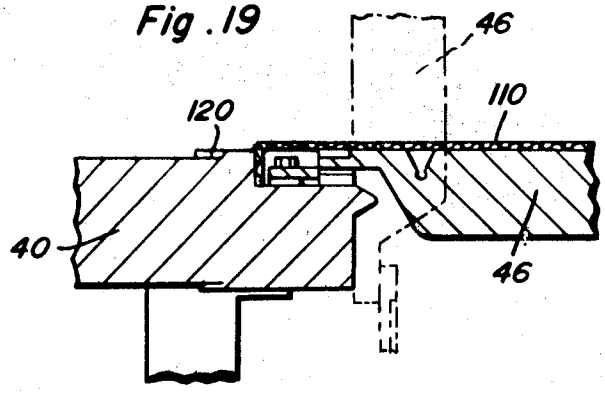


Fig. 19



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DEPLOYMENT SYSTEM FOR SHELTER UNITS

The present invention generally relates to the deployment of shelter units in a manner to enable two shelter units to be oriented and expanded to form an enclosure enclosing a space substantially equal in volume to three shelter units.

Shelter units in the form of rigid enclosures have been employed for various equipment such as communication equipment and the like. Such shelter units may be deployed by various means of transportation including aircraft, helicopters, trucks or detachable running gears and each shelter is provided with levelling jacks at the corners thereof for enabling the shelter to be levelled when deployed on uneven terrain. The deployment of single shelter units does not require special operational procedures even if the shelter unit is loaded to a maximum weight of 6,000 lbs.

However, when deploying two shelter units to form an expanded shelter configuration where the expanded shelter encloses a volume equal to three single shelter units, it becomes necessary to properly orient the two shelter units to insure the structural and RF integrity of the complex and at the same time maintains safety and reliability factors necessary for the operating personnel to effectively deploy the shelter units to the expanded configuration.

It is an object of the present invention to provide a deployment system for shelter units including the structure of the shelter units themselves, the levelling jacks, alignment bar, removable panel and a weather and RF tunnel to enable a trained crew to properly orient and set up the expanded shelter complex in a relatively short period of time.

Another object of the invention is to provide shelter units having one wall thereof removable to form a roof or floor of the enclosed space between two adjacent but spaced shelter units and each shelter unit also includes a supplemental end wall stored thereon for forming one end of the space between adjacent but spaced shelter units thus forming an enclosure for the space between adjacent but spaced shelter units.

A further object of the present invention is to provide shelter units having levelling jacks with sliding pads thereon to enable movement of the shelter units in increments of movement determined by the sliding pad structure.

Still another object of the invention is to provide shelter units and an alignment bar for moving the shelter units in relation to each other and aligning the shelter units in relation to each other.

A still further important object of the present invention is to provide shelter units having one wall provided with detachable components forming a portion of a closure between adjacent but spaced shelter units with the shelter units being provided with an RF shielded tunnel to maintain RF integrity of the enclosed space between adjacent but spaced shelter units.

Still another important object of the present invention is to provide a deployment system for shelter units in which the procedure employed and the apparatus provided is relatively simple and capable of being used by persons with very little training.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGS. 1–4 are diagrammatic plan views illustrating the sequential steps in orienting two adjacent shelter units in aligned relation.

FIGS. 5–8 are diagrammatic end elevational views illustrating sequential steps in aligning and levelling adjacent shelter units and enclosing the space therebetween.

FIG. 9 is a side elevational view illustrating the capability of orienting the shelter units in level conditions regardless of the slope of the terrain.

FIG. 10 is a perspective view of an alignment bar used in positioning the shelter units in relation to each other.

FIG. 11 is a longitudinal, sectional view taken substantially upon a plane passing along section line 11—11 of FIG. 10 illustrating the structural details of the alignment bar.

FIG. 12 is a transverse, sectional view taken substantially upon a plane passing along section line 12—12 of FIG. 11.

FIG. 13 is a transverse sectional view taken substantially upon a plane passing along section line 13—13 of FIG. 11.

FIG. 14 is a transverse sectional view taken substantially upon a plane passing along section line 14—14 of FIG. 11.

FIG. 15 is a transverse, sectional view taken substantially upon a plane passing along section line 15—15 of FIG. 11.

FIG. 16 is a fragmental perspective view illustrating the structure of a sliding pad employed with the levelling jacks.

FIG. 17 is a perspective view of a shelter unit illustrating an RF tunnel incorporated into the expandable unit.

FIG. 18 is a perspective view similar to FIG. 17 but illustrating the expandable tunnel in place.

FIG. 19 is a detailed sectional view illustrating the connection between the shelter unit and wall structure of the shelter unit.

FIG. 20 is a detailed sectional view along section line 20—20 of FIG. 18.

FIG. 21 is a detailed sectional view along section line 21—21 of FIG. 18.

As illustrated in the drawings, two shelter units **30** and **32** are deployed in spaced and angular relation to each other on a supporting ground surface **34** which may be level or inclined in one or more direction with each shelter being provided with supporting levelling jacks **36** at each corner thereof.

The shelter units are identical and each shelter unit includes a roof or top wall **38**, a floor or bottom wall **40**, end walls **42** and sidewalls **44** and **46** all of which are oriented in perpendicular relation to each other to form a closed interior space. Selective of the walls may be provided with window openings, door openings or the like to provide access to the interior thereof and the shelter unit structure may be of any suitable conventional construction such as a sandwich panel construction with metallic skins to provide RF shielding for the interior of the enclosure. Suitable reinforcing framing members may be provided along with suitable means adapted to support the shelter units from an aircraft, helicopter truck or demountable running gear. The floor or bottom wall **40** of the shelter unit is preferably provided with skids **48** extending from end to end of the shelter unit. Also, one sidewall **46** of the shelter unit is removable so that when the two shelter units **30** and **32** are disposed in facing relation to each other, one of the removable panels **46** is employed as a roof for the space between the shelter units while the other removable panel **46** is employed as a floor for the space between the shelter units.

Each levelling jack **36** is provided with a lift member **50** universally connected with a block **52** at its lower end by a ball and socket connection or the like and the block **52** is slidable in a longitudinal trackway or guide **54** provided on a bottom plate or pad **56**. The specific construction of the pad **56** as well as the jack is disclosed in copending application Ser. No. 853,908 filed Aug. 28, 1969. The edges of the pad or plate **56** are upturned as at **58** and transverse members **60** are provided on the guide for limiting the sliding movement of the block **52**. The lift element **50** may be any suitable exact structure but may be in the form of a screw-threaded member threaded through a nut attached to the shelter unit by bracket structures **62** with the lift element **50** being rotatable by a suitable tool such as a ratchet wrench or the like. Thus, the vertical position of the jack pads **56** may be adjusted in universal angular relation to the vertical axis of the lift member **50** so that the jack pads **56** when oriented in a particular angular relation to each other and to the shelter unit will enable the shelter unit to be moved in a particular path within the limits of the distance which the block **52** can move in the track or guide **54**. Thus, the shelter unit is capable of movement in increments determined by the length of the track or guide **54** on the pad **56** with the direction of movement being controlled by the initial direction of the jack pad **56**. With the rigid shelter unit, the shelter unit can be supported by three levelling jacks while the

other levelling jack is manipulated to relieve pressure on the jack pad and with the jack pad slightly off of the ground surface to enable the jack pad to be angulated and orientated in a desired position

The shelter units are manipulated either manually by hand by the crew pushing on the shelter unit or by an alignment bar generally designated by the numeral **64** which may be employed to push or pull the shelter units in relation to each other and to align the shelter units in relation to each other as illustrated in FIG. **1–4**. Once the alignment bar **64** has been used to align the shelter units, the final position of the shelter units may be retained by diagonal cables **66** which may be the cables normally employed in a sling for lowering the shelter units from an aircraft such as a helicopter on the like.

The alignment bar **64** includes an elongated tubular member in the form of a pipe or the like designated by numeral **68** which has an internally threaded flange or nut **70** at one end thereof rotatably and adjustably in threaded engagement with an externally threaded adjustment screw **72** having an apertured lug **74** on the outer end thereof by which the alignment bar **64** can be detachably connected to corresponding lugs on one of the shelter units. The other end of the tubular member **68** is provided with a nut or flange **76** thereon which is internally screw threaded and in adjustable screw threaded engagement with an externally threaded tubular member **78** The externally threaded member **78** is provided with a lug **80** apertured in the same manner as the lug **74** for engagement detachably with corresponding lugs on the shelter unit. Both threaded members **72** and **78** may be tubular members with a transverse opening **82** adjacent the outer ends thereof for receiving a tool of the like for rotation if desired. Thus by causing relative rotation between the tubular member **68** and the threaded members **72** and **78**, the effective length of the alignment bar may be adjusted for pushing or pulling the shelter units in increments within the limits of the adjustment of the threaded members in order to accurately position and space the shelter units.

The threaded member **72** is provided with an axial extension **84** which extends interiorly of the tubular member **68** and is slidably and rotatably guided by supporting members **86** within the tubular member **68**. A transverse retainer **88** is provided on the free end of the extension **84** to limit the outward movement of the threaded member **72** in relation to the tubular member **68** and some type of limit may also be provided on the threaded member **78** to limit the unthreading movement thereof. Centrally disposed between the support **86**, the extension **84** is provided with a transverse rod **90** which has the ends thereof extending outwardly through diametrically opposed slots **92** extending longitudinally in the tubular member **68**. The slots **92** have a graduated scale **94** associated therewith so that the ends of rod **90** serves as an indicator to indicate the movement of the threaded members in relation to the tubular member **68** for indicating not only the direction of movement, that is, either extending or retracting and also to indicate the distance of movement.

Disposed in the tubular member **68** is a plurality of level-indicating devices **96** which may conveniently be spirit level vials oriented to indicate the position of the alignment bar **64** in relation to a horizontal attitude. For protection of the levels, a slidable sleeve **98** is provided which is movable to a position overlying and concealing the levels to a position along side of and exposing the levels **96** are observation. Sets of limiting pins **100** are provided for limiting the movement of the sleeve **98** in its two positions. Thus, the sleeve **98** normally overlies and protects the levels but when desired to observe the levels, it is only necessary to grasp the sleeve and slide it longitudinally with the sleeve being frictionally held in place by engagement with the tubular member **68**, or, if desired, a latch mechanism may be provided for releasably retaining the sleeve in its two positions.

The tubular member **68** is also provided with diametrically opposed apertures **102** therein for insertion of a rodlike tool or the like to facilitate rotation of the tubular member **68** somewhat in the nature of a turnbuckle in the event it is necessary to apply force in addition to that that could be applied by merely gripping the exterior surface of the tubular member **68**.

FIG. **17–20** disclose the expandable shelter units with the RFI weather tunnel associated therewith which involves a liner of laminated material generally designated by the numeral **110** that includes a weatherproof outer sheet or panel **112** and a weatherproof inner sheet or panel **114** sandwiching a center sheet or panel **116** of metallic material to form an RFI shield. The trilayer material may be bonded together or laminated in any suitable manner of joining multiple layer materials and where the laminated material is joined together in edge-to-edge relation, the center sheets will be conductively connected to provide a continuous RFI shield for the interior of the shelter units. The shelter units **30** illustrated in FIG. **17** and sheltered unit **32** illustrated in broken line FIG. **18** are interconnected in the same manner with the liner **110** forming a trilayer tunnel with the liner in the shelter unit **30** covering one-half of the interior of the space between the two shelter units and normally being stored in a folded condition with the liner being unfolded as indicated by the arrows in FIG. **17** when expanding the shelter units. For joining the overlapping edges of the liner when folded and when in extended position, the edges thereof are provided with a conductive fastening material such as "Velcro" **118** which forms a conductive connector between the center conductive sheets **116** of the laminated liner or tunnel material **110**. The floor **46** of the expanded space is attached to the floor **40** of the shelter unit as illustrated in FIG. **19** with the floor being provided with an RFI shield liner or matt **110** which illustrates the conductive connection between the linear **110** to the metallic skin of the shelter unit designated by numeral **120** thus forming a continuous RFI shield for the interior of the closure. Thus, the liner need only extend from the periphery of the top, bottom and end walls of the shelter units outwardly in overlying relation to one-half of the space enclosed between the shelter units. FIG. **19** also illustrates the dotted line position of the panel **46** when in its position forming a closure for the shelter unit **30**.

Thus, by providing a conductive cloth liner that is conductively connected to the metal skin of the shelter unit and conductively connected to a similar liner or cloth on the adjacent shelter unit, a continuous RFI shield is provided for the shelter units in which three shelter unit spaces are enclosed by the use of two expanded shelter units.

By employing the conductive liner and conductively connecting it to the metallic interior skin of the shelter units and connecting the conductive liners to each other in a conductive manner, the RF integrity of the shelter units will be retained when the shelter units are expanded.

Under present requirements, it is required that a trained crew erect the expanded shelter complex within a particular time period, when the shelter units are "dropped" within certain limits of spaced relation. The jacks compensate for the lateral movement of the shelter unit during levelling operation on side slopes which otherwise generate side loads high enough to bend or damage the long jack's lower leg thus enabling the shelter unit to move through an arc that can cause up to two inches side shift, The long jacks are placed on the "downhill" shelter and short jacks are placed on the "uphill" shelter and the shelters are raised approximately three inches off the ground. All jack pads are positioned in the direction of travel by raising one jack until the pad can swivel in the desired direction and sliding the pad to its stop in the direction of travel and lowering the jack to take its load and repeating this operation at each corner with caution being employed to raise only one jack at a time on each unit so that the shelter units will be supported by the other three jacks. A shelter supported on the jacks can be moved by exerting lateral manual force against the shelter and under most conditions, the shelters can be moved by four men pushing against the shelter. If the terrain and weather conditions are such that

manual pushing is difficult, a mechanical moving device may be employed with it being preferable to move the shelter in a downhill direction at all times.

When using the mechanical moving device such as the alignment bar disclosed, the alignment bar is fully extended and attached to one shelter. The other end of the alignment bar is attached to the other shelter either directly or through a cable arrangement of indeterminate length. The cable arrangement which actually forms an extension of the alignment bar as illustrated in FIG. **1** and designated by numeral **65** may conveniently be the lift sling appropriately interposed between the alignment bar and the shelter thus enabling the alignment bar to be actuated thus pulling the shelter towards its final position by retracting the alignment bar and taking up on the sling ratchet when the sling has such a ratchet thus enabling a movement of approximately 36 inches. If additional movement is required, readjust the jack pads and repeat the operation.

By installing the alignment bars and and extending them as necessary, the shelters may be moved in increments to the desired spacing which are approximately parallel. The alignment bars are the connected to the shelter alignment bosses or lugs and the alignment bars are them either extended or retracted until the indicator **90** registers a particular spacing on the graduated scale necessary for proper expansion of the shelter units with the spacing being conveniently 7 feet. By levelling each shelter unit and levelling the alignment bars, by using levels incorporated into the corners of the shelter units and the levels incorporated into the alignment bars, the shelter units may be oriented in a completely level condition and in an accurately spaced aligned condition. The connection between the two aligned and spaced shelter units is accomplished by removing the auxiliary end panels from the shelter sidewalls by loosening suitable holddown clamps and these end panels are stored against the end panel of each shelter by the use of hand straps. The lift sling for the shelter unit is then attached at each corner of the removable slide panel selected as the roof panel which is then disconnected by removing the bolts securing the side panels in place. The side panel is disengaged from the lip and elevated until the panel leans against the upper roof corner. The side panel should be retained in centered relation while raising it so that it will slide on nylon runners located at each end. Four men can raise the roof panel until it is stored on the roof of the shelter unit with a maximum overhang of 2 feet. Under high wind conditions, the roof panel may be raised, and secured in place by the use of ratchet lift devices from the ground, to maintain positive control of the roof panel at all times. The other side panel is detached and lowered into the floor position by letting it pivot about its lower edge into position. The floor panel is installed and if it does not accurately mate with the shelter ledges provided therefor, the uphill shelter may be moved by relieving the jack load at one corner enough to permit each pad to rotate **90°** from its original position and reposition the uphill shelter unit using personnel or adjustable ratchet sling legs in fore and aft direction until the floor panel drops into position.

After the floor panel has been affixed by clamp bolts, the end panels are positioned from the outside. In the event of interference, the alignment bars are open until the end panels are completely inserted after which the alignment bars are readjusted to draw the shelter unit against the end panel gaskets. Complete setting of the gaskets can be achieved by adjusting the jacks and alignment bars as required and the end panels are thus clamped into final position using suitable clamp bolts.

The roof panel will now be slowly pulled into position by using sling lines or the like and the roof panel is clamped in final position from ground or by standing on alignment bars.

The RFI tunnel is installed by personnel unzipping all flaps from weather curtain configuration. The floor panel flap can be positioned in place while checking center seam alignment and then secured in position on Velcro tape which is part of the floor with the same procedure being followed on the roof. The end flaps of the tunnel are smoothed against the inner surface of the end panels and the outer surface of the tunnel may contain patches of Velcro which will assist in holding the tunnel in neat engagement against all panels with the tunnel being marked on the inner surface to denote the location of the areas. The peripheral seam at the center of the tunnel is completely engaged by the use of the Velcro closure and to assure a neat seam and to preclude gathers, the peripheral path of each tunnel is marked with a number arrow that corresponds with its like opposite location.

The major effort in RFI shielding the expanded shelter configuration involves eliminating hard conductive joints, which cannot be completely or reliably done in a rigid shelter expansion concept (due to slight misalignment, settling, local damage or dents, etc.), Furthermore, shielding of triplanar hard joints (corner joints) is difficulty, and depends on chance especially after several erections. The RF tunnel concept as shown in FIG. **17–20** realizes both a weather and RFI shield that is flexible and independent of joint-contact pressures, hard fasteners and triplanar joints.

The specific structural details of various hardware items are conventional and have not been illustrated in detail. For example, the various clamp bolts, sling cables, levels mounted on the shelter and the sandwich panel construction of the shelter itself may all be of conventional construction.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed as new is as follows:

1. A system for deploying a pair of shelter units, moving the units to an aligned spaced relation and expanding the two units to enclose a volume equivalent to three shelter units comprising a pair of shelter units each including a rigid hollow body with parallel opposed walls, a levelling jack mounted at each corner of each shelter unit, each levelling jack having a pad slidably attached thereto for engaging a supporting surface to enable relative translatory movement between the shelter unit and supporting surface to enable movement of the shelter units in increments within the limits of sliding movement of the jack pads, each shelter unit including a movable side panel whereby the two facing side panels of the two shelter units may be moved to form the top and bottom walls of the space between the pair of shelter units, each shelter unit also including a movable supplemental end panel to form a closure for the ends of the space between the pair of shelter units thereby providing an enclosed volume substantially equal to the volume of three shelter units, and alignment bars including a mechanical pushing and pulling apparatus operatively interconnected between the pair of shelter units when the shelter units have been dropped onto a supporting surface in random orientation to enable the shelter units to be moved in increments of movement determined by the length of sliding movement of the jack pads to an aligned relation whereby the jacks may elevate the pair of shelter units into a level relation, each of said alignment bars including a pair of axially extending externally threaded members having means on the outer ends thereof for detachable engagement with a shelter unit, an internally threaded member interconnecting the externally threaded members for causing axial movement of the externally threaded members for moving the shelter units in relation to each other, each jack pad including a longitudinally elongated plate having a longitudinal track on the upper surface thereof, said jack including a lifting member having a block universally pivotally attached to the lower end thereof with the block being slidably disposed in the track on the plate.

2. The system as defined in claim **1** wherein each of said shelter units includes a peripheral continuous metallic skin providing an RFI shield, and means continuing the metallic

skin between the pair of shelter units for providing RFI shield integrity for the space enclosed.

3. The system as defined in claim 2 wherein said means continuing the RFI shield includes a metallic liner in each shelter unit having a width substantially one-half of the distance between the pair of shelter units when expanded and extending peripherally of the peripheral wall enclosing the space between the pair of shelter units, conductive fastening means securing the liner to the skin of the shelter unit, and conductive fastening means securing the peripheral edges of the liner together, said liner being constructed of conductive material for providing a flexible continuous RFI shield for the enclosed space.

4. A shelter unit for use in deployment with a similar shelter unit for expansion into a three shelter unit complex comprising a rigid, hollow boxlike structure including parallel end walls, sidewalls, top and bottom walls, at least one of said sidewalls being connected to the edges of the corresponding end walls, top and bottom walls for movement to a position for use as a top or bottom wall for the space between a pair of shelter units when deployed in aligned pairs and a supplemental end wall attached to the shelter unit and corresponding in shape and size to the end walls to form a closure for the end of the space between adjacent shelter units when deployed in aligned pairs, and a levelling jack connected with each corner of the shelter unit, each levelling jack including a vertically movable lift member, a jack pad carried by and underlying the lower end of each lift member, and means interconnecting the jack pad and lift member to enable universal pivotal movement therebetween and to enable the jack pad to slide in relation to the lift member in a direction transverse to the longitudinal axis of the lift member.

5. The structure as defined in claim 4 together with an alignment bar provided with the shelter unit for connection therewith, said alignment bar including an extensible and retractible device by which a shelter unit may be moved along the ground surface as the jack pads slide in relation to the lifting member in order to orient the shelter unit in a predetermined spaced relationship to a second shelter unit to enable the two units to be expanded to provide a three shelter unit complex.

6. A shelter unit for use in deployment with a similar shelter unit for expansion into a three shelter unit complex comprising a rigid, hollow boxlike structure including parallel end walls, sidewalls, top and bottom walls, at least one of said sidewalls being connected to the edges of the corresponding end walls, top and bottom walls for movement to a position for use as a top or bottom wall for the space between a pair of shelter units when deployed in aligned pairs and a supplemental end wall attached to the shelter unit and corresponding in shape and size to the end walls to form a closure for the end of the space between adjacent shelter units when deployed in aligned pairs, and a levelling jack connected with each corner of the shelter unit, each levelling jack including a vertically movable lift member, a jack pad underlying the lower end of each lift member, and means interconnecting the jack pad and lift member to enable universal pivotal movement therebetween and to enable the jack pad to slide in relation to the lift member in a direction transverse to the longitudinal axis of the left member, said jack pad including a longitudinally elongated plate having a longitudinal track on the upper surface thereof, said vertically movable lift member having a block universally pivotally attached to the lower end thereof with the block being slidably disposed in the track of the plate, said track including retaining flanges retaining the block slidably in the track.

7. A system for deploying a pair of shelter units, moving the units to an aligned spaced relation and expanding the two units to enclose a volume equivalent to three shelter units comprising a pair of shelter units each including a rigid hollow body with parallel opposed walls, a levelling jack mounted at each corner of each shelter unit, each levelling jack having a pad slidably and pivotally attached thereto for engaging a supporting surface to enable relative translatory movement between the shelter unit and supporting surface to enable movement of the shelter units in increments within the limits of sliding movement of the jack pads, each shelter unit including a movable side panel whereby the two facing side panels of the two shelter units may be moved to form the top and bottom walls of the space between the pair of shelter units, each shelter unit also including a movable supplemental end panel to form a closure for the ends of the space between the pair of shelter units thereby providing an enclosed volume substantially equal to the volume of three shelter units, and each jack pad including a longitudinally elongated plate having a longitudinal track on the upper surface thereof, said jack including a lifting member vertically movably connected to the shelter unit and having a block universally pivotally attached to the lower end thereof with the block being slidably disposed in the track on the plate.

8. The system as defined in claim 7 together with alignment bars including a mechanical pushing and pulling apparatus operatively interconnected between the pair of shelter units when the shelter units have been dropped onto a supporting surface in random orientation to enable the shelter units to be moved in increments of movement determined by the length of sliding movement of the jack pads to an aligned relation whereby the jacks may elevate the pair of shelter units into a level relation.