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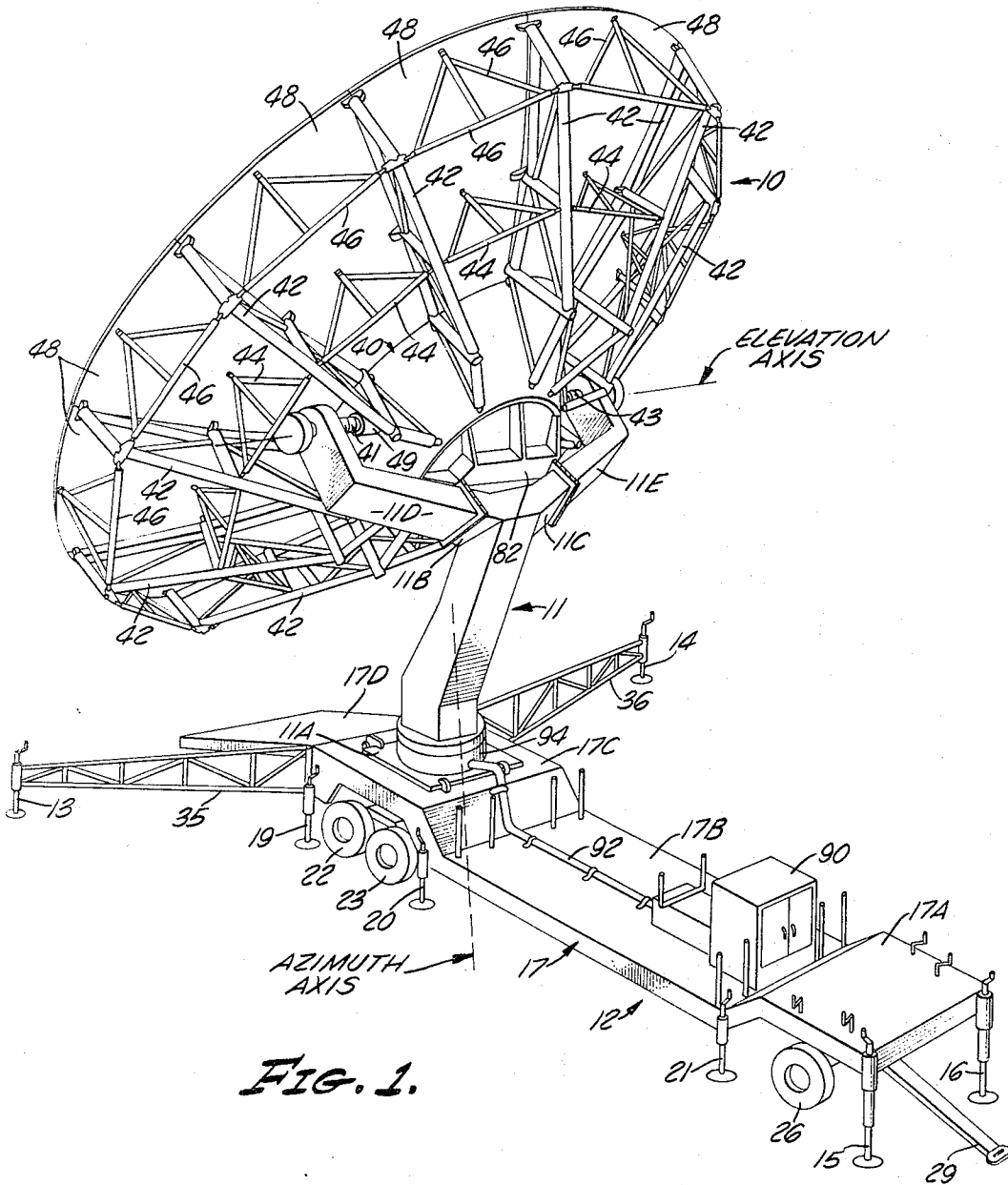
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3,377,595

DEMOUNTABLE AND PORTABLE ANTENNA CONSTRUCTIONS

Filed Oct. 16, 1964

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

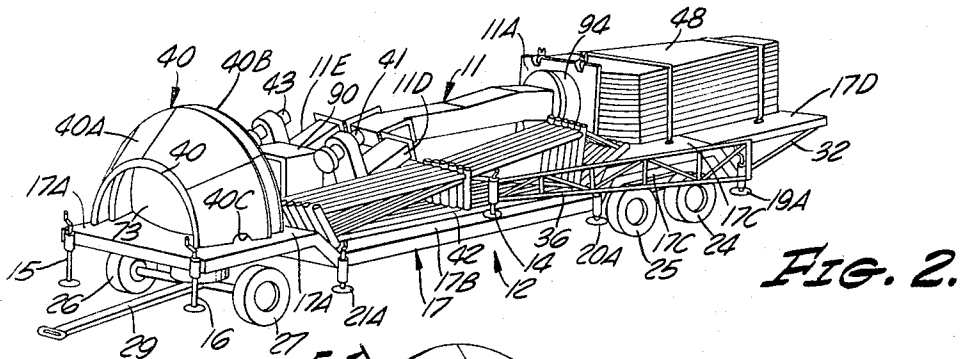


FIG. 2.

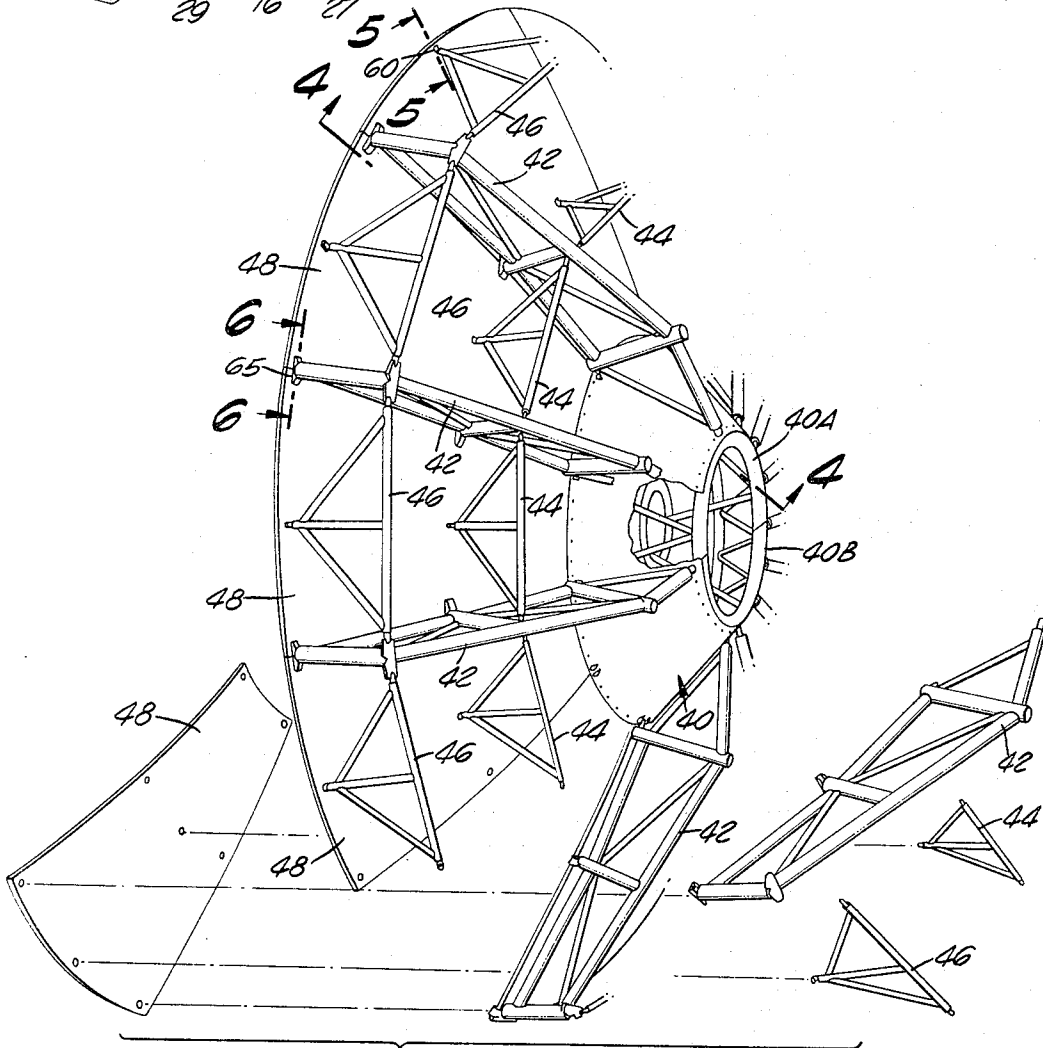


FIG. 3.

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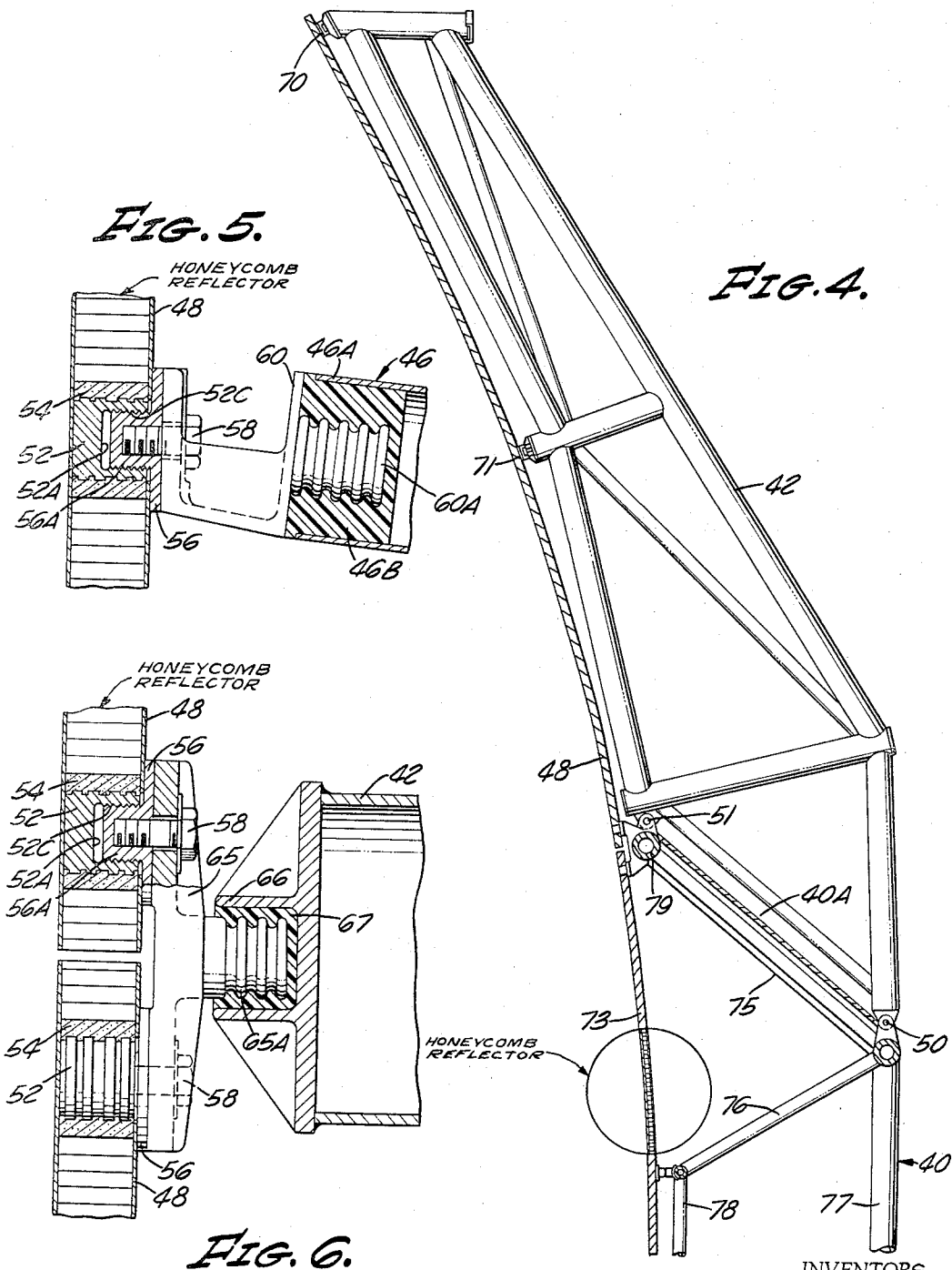


FIG. 5.

FIG. 4.

FIG. 6.

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**DEMOUNTABLE AND PORTABLE
ANTENNA CONSTRUCTIONS**

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5 Claims. (Cl. 343-713)

ABSTRACT OF THE DISCLOSURE

A trailer is used to transport an antenna in its disassembled condition and to support the antenna after it is assembled in the form of a large parabolic reflector on the upper end of a tower, the tower being rotatably mounted at its lower end on a plate which, in turn, is pivoted on the trailer bed. The tower at its upper end pivotally mounts a pair of yoke members upon which connected halves of a two-piece center reflector section are pivoted about a horizontal axis to provide adjustment in elevation of the parabolic reflector. Azimuth adjustment is provided by rotating the tower about a vertical axis on such pivoted plate.

The present invention relates to means and techniques particularly useful in the constructions of reflectors and antennas, which are particularly useful in those antenna and reflector structures where it is desired to be able to assemble and disassemble the elements thereof for portability purposes.

Briefly, as described herein, there is provided a trailer which is used in supporting a steerable parabolic reflector antenna in its erected condition and which is used in the transport of the antenna in its disassembled condition. The parabolic reflector involves novel constructional features involving its assembly whereby the same may be conveniently assembled and disassembled, with the reflecting panels being accurately aligned. In use, the trailer bed acts as one arm of the base of the elevation and azimuth pedestal system.

It is therefore a general object of the present invention to provide means and techniques whereby the above indicated results may be achieved.

A specific object of the present invention is to provide a reflector which may be conveniently assembled and disassembled.

Another specific object of the present invention is to provide a reflector and pedestal which in their disassembled conditions are conveniently transportable on a trailer, with the trailer being used in the erected condition of the reflector as a support for the antenna.

Another specific object of the present invention is to provide an arrangement of this character wherein the trailer bed acts as one arm of the pedestal's tripod base system.

Another specific object of the present invention is to provide a novel construction of reflector panels which permit their interchangeability and yet assure accurate alignment of all of the panels in the composite reflector.

Another specific object of the present invention is to provide novel means and techniques whereby a reflector may be erected and disassembled with respect to a trailer used not only in the transport of the reflector but also as a support for the antenna in its erected condition.

The features of the present invention which are believed to be novel are set forth with particularity in the appended claims. This invention itself, both as to its organization and manner of operation, together with further objects and advantages thereof, may be best understood by reference to the following description taken in connection with the accompanying drawings, in which:

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FIG. 1 is a perspective view illustrating an antenna in its erected condition on a trailer in accordance with the features of the present invention.

FIG. 2 is a perspective view illustrating the manner in which components of the antenna in its disassembled condition are mounted or stowed on the trailer for transport.

FIG. 3 is a perspective view like FIG. 1, with some of the elements being detached for purposes of illustrating the assembly and disassembly of the reflector.

FIG. 4 is a sectional view taken substantially in the direction indicated by the arrows 4-4 in FIG. 3.

FIGS. 5 and 6 are sectional views taken as indicated by the corresponding lines 5-5 and 6-6 in FIG. 3.

Referring to FIG. 1, the reflector 10 on its steerable pedestal 11 is supported on a six-wheeled trailer 12 which is releasably anchored by anchor means 13, 14, 15 and 16, with the trailer bed 17 being lifted somewhat by three jacks 19, 20 and 21 and 19A, 20A, 21A (FIG. 2) on each side of the trailer to relieve somewhat the forces otherwise present on the four rear wheels 22, 23, 24 and 25 and the two forward wheels 26, 27 steerable, when, as shown in FIG. 2, the trailer is adapted for transport by applying forces to its draft bar 29.

The trailer bed 17 has, in general, four sections 17A, 17B, 17C and 17D, the section 17B being a depressed section between the two elevated sections 17A and 17C over the front and rear wheels, respectively, and the other section 17D being hinged on section 17C to provide either a ramp as in FIG. 1 or, as in FIG. 2, a planar extension of section 17C in transport conditions wherein a truss member 32 pivoted on section 17C is positioned below section 17D to support the same in a substantially horizontal position above the ground.

The previously mentioned anchor means 15 and 16 are mounted on the forward end of section 17A and are each provided with manually operable screw-threaded means, as in a screw-threaded jack, for raising or lowering such means; and likewise, the anchor means 13, 14 of like construction are mounted on the ends of outrigger truss members 35, 36, respectively, each pivoted on trailer section 17C.

The tower 11 terminating in a plate 11A at its azimuth bearing is pivotally or hinged mounted on trailer section 17C and includes two transversely extending sections 11B and 11C at its upper end to which generally L-shaped yoke members 11D and 11E, respectively, are pivotally mounted.

The reflector 10 supported by tower 11 includes generally: a two-piece central hub or center section 40 serving as a reflector and housing for radio-frequency components; twelve removable radial trusses 42; twelve removable intermediate removable intercostal trusses 44; twelve removable circumferential intercostal trusses 46; and twelve removable reflector panels 48.

In assembly of the reflector 10, the center section 40 which includes the two halves 40A, 40B (FIG. 2) is releasably secured to a pair of aligned elevation drive shafts 41 and 43 on the yoke members 11D, 11E, respectively, such shafts 41, 43 extending through aligned apertured portions defined by adjacent semicircular cut out portions 40C (FIG. 2) in adjacent halves 40A, 40B. The particular means used to so releasably secure the center section 40 may take various forms. For example, the shafts 41 and 43 may each be threaded with a pair of threaded clamping sleeves on each shaft serving to clamp the center section therebetween. One of such threaded clamping sleeves is indicated at 49 in FIG. 1. Also, at least one of the shafts may be motor driven, with the other being journaled for rotation, by a motor mounted on one of the yoke members for operating the reflector at a continuously adjustable elevation position.

The inner ends of the twelve radial trusses 42 are releasably secured to the framework of the center section 40 using, for example, clevis pins 50, 51 (FIG. 4). Likewise, the ends of the series of intercostal trusses 44 and 46 are releasably secured to adjacent radial trusses 42 using either bolts or clevis pins.

The panels 48 are releasably secured to the trusses 42, 44 and 46 by bolts using the means and techniques now described in connection with FIGS. 5 and 6.

In FIG. 5, the intercostal strut 46 is provided with a panel mounting bracket 60 which has a grooved shank 60A secured permanently within the tubular frame member 46A by a potting compound 46B which may be a Narmco 3150 putty available through Narmco Division of Whittaker Corporation, San Diego, Calif. The panel 48 is of conventional honeycomb construction for lightness and strength and has a threaded insert element 52 secured therein by an epoxy cement 54, the element 52 being externally grooved for the latter purpose.

The insert element 52 is formed with a blind bore 52A and a threaded portion 52C for screw-threadedly receiving a washer element 56 having a threaded shank portion 56A for receiving a fastening bolt 58. It will be seen that the washer element 56 may be unthreaded to provide for its removal in which case the panel has no protuberances and can be stocked with other like panels.

An important feature of the present invention is to provide the particular fastening for the panel described above, and this involves an alignment of the panels on the trusses in a semi-permanent manner prior to and during the time when the epoxy potting agent is allowed to harden in its final solid mass. In other words, in initial manufacture of the panels the nut element 52 is free to move therein for alignment purposes, and after the panel is maintained in aligned relations with respect to other elements including adjacent panels, the potting is applied and allowed to harden in its final condition wherein it then rigidly secures the nut element 62 in its aligned condition for further use.

As seen in FIG. 6, adjacent panels 48 are secured to the truss member 42 using like threaded sockets in the panels. Since these threaded sockets in FIGS. 5 and 6 are identical, elements of the same as well as the washers and bolts have identical reference numerals. In FIG. 6, the bolts 58 are secured to a strap element 65 having an externally grooved shank portion 65A permanently secured within a tubular portion 66 of the truss member 42 by a potting compound 67, as in FIG. 5.

It will be seen that each of the intercostal trusses 44 and 46 are secured, as shown in FIG. 5, to only one intermediate portion of a panel and that each of the radial trusses 42 are secured to adjacent abutting panels at a total of four different points, two of the latter points being indicated at 70 and 71 in FIG. 4. A construction like that shown in FIG. 6 is used to interconnect the panel 73 (FIG. 4) of the center section 40 with the radial panels 48. The panel 73 may be permanently secured to such center section 40, i.e. it need not be disassembled from the center section 40 for transport purposes.

The center section 40 is of two-piece construction, as previously indicated, with each piece including frame members as indicated at 75, 76, 77, 78 and 79 in FIG. 4, with the panels 40A being secured to the truss members 77, 79 and 75. For added rigidity, the conical center section 40 may be braced using a spider element 82, as shown in FIG. 1, having the end of each of its twelve arms releasably secured to a corresponding one of the radial truss members 42.

For transport purposes, elements are disassembled and stowed on the trailer for transport as shown in FIG. 2, the panels 48 being stacked on the trailer section 17D which is now braced by the pivoted brace 32; the elements of the two-piece center section 40 being stacked and carried on trailer section 17A; the tower 11 being pivoted

downwardly to straddle the control box 90 and rest on the trailer depressed section 17B with the yoke members 11D and 11E folded inwardly; the trusses 42, 44 and 46 being carried on the trailer section 17B; the six jacks 19, 20, 21, 19A, 20A, 21A being raised; and the four anchors 13, 14, 15 and 16 being raised and the outriggers 35, 36 being pivoted inwardly.

The tower 11 when erected is rotatable in azimuth by a motor (not shown) connected by cable 92 to the control box 90. In such case, the tower 11 is rotatably supported on the bearing member 94 on base plate 11A, with the motor mounted on the base plate 11A so that the entire driving assembly is pivotal upon pivoting base plate 11A from its position shown in FIG. 1 to its position shown in FIG. 2, the cable 92 being sufficiently flexible for that purpose.

While the particular embodiments of the present invention have been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from this invention in its broader aspects and, therefore, the aim in the appended claims is to cover all such changes and modifications as fall within the true spirit and scope of this invention.

We claim:

1. In a reflector assembly of the character described, a trailer having a first bed portion overlying wheels thereof; a tower pivoted on said bed portion for movement between a substantially vertical position to a substantially horizontal position resting on a second trailer bed portion; said tower including two yoke members pivoted thereon for movement between a retracted and extended position; a reflector having a two-piece center reflector section, each being generally semicircular and being releasably secured to ends of said yoke members; a plurality of radial truss members each releasably secured at one of their ends to said center section and diverging radially outwardly; intercostal truss members releasably secured to and between said radial truss members; and reflecting panels releasably secured to said radial and intercostal truss members and defining generally a parabolic reflecting surface.
2. An assembly as set forth in claim 1, in which a pair of outrigger elements are pivoted on the trailer, and ground anchor members on the ends of said outrigger elements.
3. An assembly as set forth in claim 1, in which said first bed portion is raised with respect to said second bed portion.
4. An assembly as set forth in claim 1, in which each of said panels is of honeycomb construction and an insert member embedded within said panels to which said trusses are secured, said insert member being entirely within said panel whereby when disassembled said panels may be stacked one on top of each other on adjacent extended surfaces of the panels.
5. An assembly as set forth in claim 4, in which said insert member is secured in said honeycomb panel by a potting compound.

References Cited

UNITED STATES PATENTS

2,471,828	5/1949	Mautner	343-916
2,572,430	10/1951	Balton	343-765 X
2,997,712	8/1961	Kennedy	343-916
3,010,106	11/1961	Lippitt et al.	343-716 X
3,263,232	7/1966	Burwell et al.	343-716

OTHER REFERENCES

Electrical Communication, vol. 39, No. 1, May 26, 1964, pp. 63-65.

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