

[54] SECTIONAL TOWER STRUCTURE

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[58] Field of Search..... 52/148, 632, 637, 638, 645, 52/646, 648, 40, 655, 726

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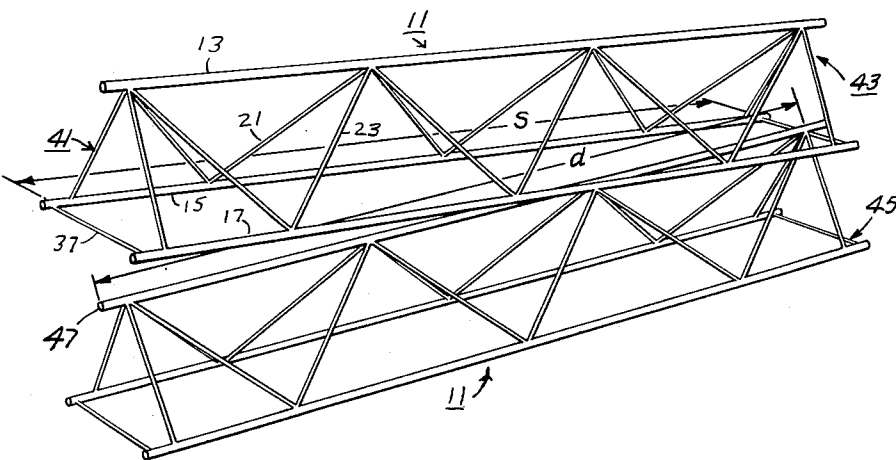
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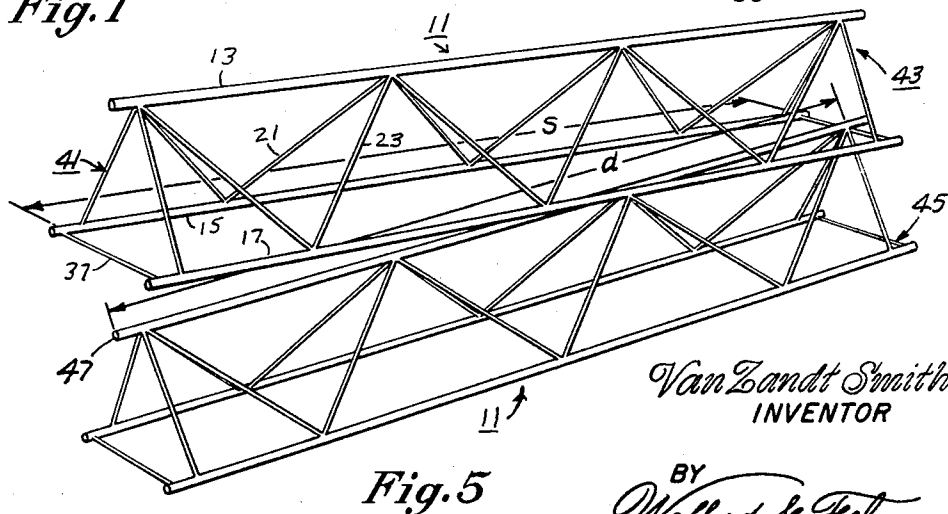
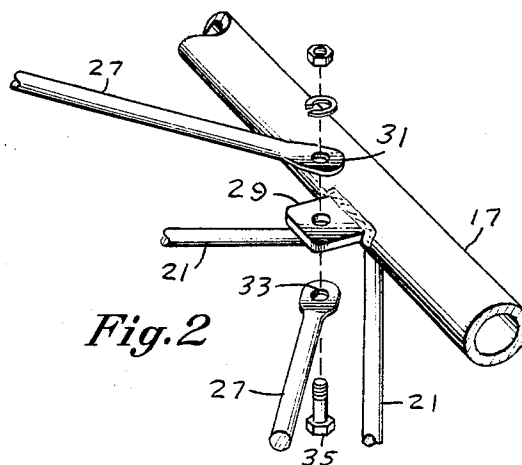
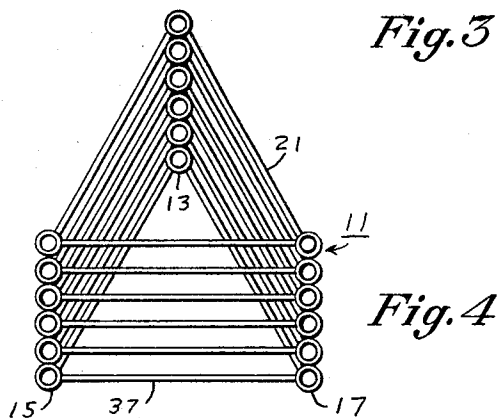
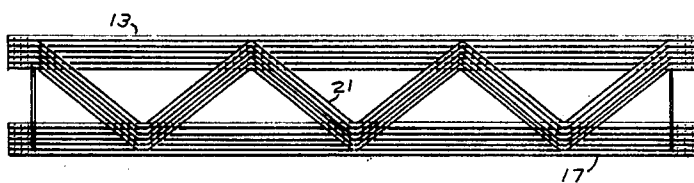
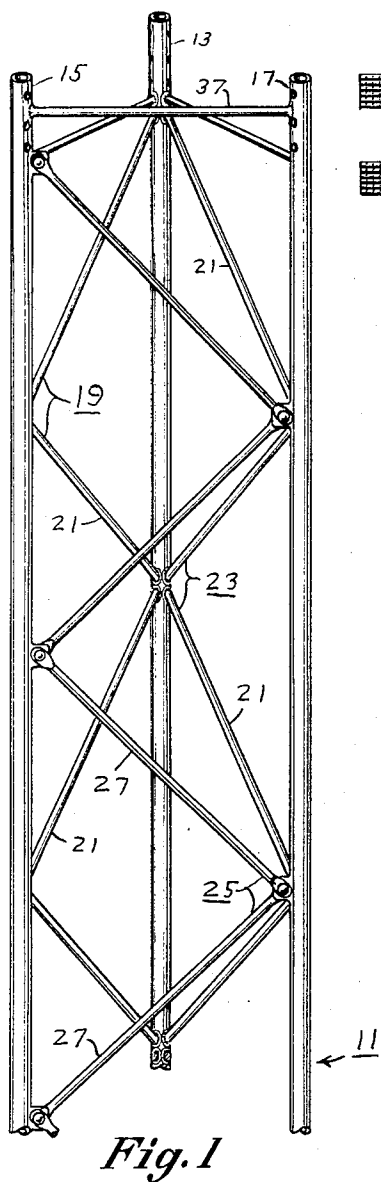
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ABSTRACT

Readily transportable sectional tower structure of triangular transverse section, having three column members disposed in juxtaposed spaced relation, with brace systems permanently fixed between each of two of the column members and the other one, forming two sides of the section and constituting a V-trough-like configuration. Detachable brace members are provided to make up a brace system for a third side, when assembled. With detachable brace members removed, tower sections can be stacked in nested relation. End brace members extending transversely of the two columns on the third side of the section may be used and are disposed so as not to interfere with stacking of the sections in nested relation.

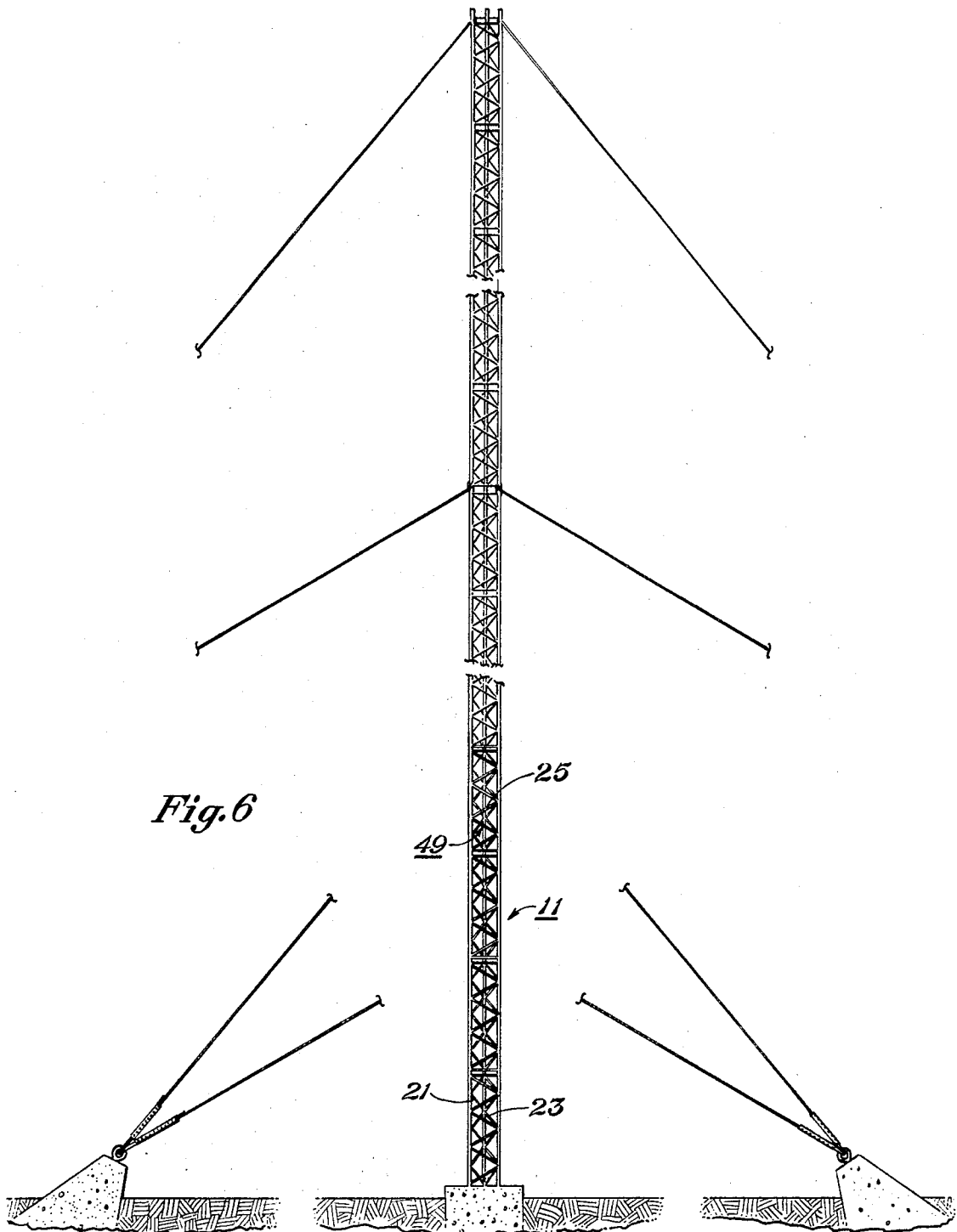
1 Claim, 6 Drawing Figures





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SECTIONAL TOWER STRUCTURE

This is a continuation of Ser. No. 746,454, filed July 22, 1968, and now abandoned.

BACKGROUND OF THE INVENTION

The tower structure of the present invention is particularly useful as a support for devices utilized for communications, such as antennas. In most applications it is highly desirable that the tower structure be readily transportable. At the same time, the tower sections should not require extensive assembly operations at the erection site. Also, in some instances it is necessary to ship tower sections over great distances. Tower sections of the prior art of which I am aware are either completely disassembled for transportation and shipment, in which case extensive assembly operations are required at the destination site, or they are completely assembled, in which case they are quite bulky since generally each one occupies a volume represented by its transverse section area times its length. The present invention seeks to provide tower section configurations which fulfill criteria for desirable design from the standpoints of structural integrity, weight, durability, maintenance, economy and the like, while greatly reducing the volume needed for transportation and shipment and at the same time requiring a minimum of assembly operations at the erection site.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 is a perspective view showing a portion, including an end, of one tower section constructed in accordance with a preferred embodiment of the present invention, with the detachable brace members assembled;

FIG. 2 is an enlarged fragmentary perspective view showing details of the tower section structure at a detachable brace joint region;

FIG. 3 is a side elevational view showing a stack of nested tower sections;

FIG. 4 is an end elevational view of the stack of FIG. 3;

FIG. 5 is a perspective view showing two tower sections, with one about to be stacked or nested on the other; and

FIG. 6 is a partial isometric view of a tower having a plurality of sections joined end to end.

DESCRIPTION OF PREFERRED EMBODIMENT

In FIG. 1 of the drawings there is shown one end portion of a typical tower section 11 constructed in accordance with a preferred embodiment of the present invention. The other end of the section is essentially the same structure and so is not shown in detail. The tower section 11 includes first, second and third column members 13, 15, 17 which are disposed in juxtaposed spaced relation. A first system, or lattice of brace members 19 is provided, with the brace members 21 extending between and permanently fixed, as by welding, to the first and second column members 13, 15 to hold same in predetermined spaced relation. A second system of brace members 23 is provided, with the brace members 21 extending between and permanently fixed to the first and third column member 13, 17 to hold same in predetermined spaced relation. The first brace system 19 together with the first and second column members 13, 15 form a first side of the tower section 11, while the second brace system 23, together with the first and third column members 13, 17 form a second side of the tower section. The first and second sides of the tower section 11 make up a V-shaped trough-like structure.

A system of detachable brace members 25 is provided, with the detachable brace members, when assembled, extending between the second and third column members 15, 17. In the embodiment shown, the second and third column members 15, 17 have inwardly extending bolt plates 29 fixed, as by welding, thereto at predetermined spaced intervals compatible with the detachable brace system 25. The side faces of the bolt plates 29 are substantially parallel to a plane containing the second and third column members 15, 17. The detachable brace members 27 (see FIG. 2) have flattened end portions 31

with bolt holes 33 therein. In assembly, one brace member 27 is secured on each side of each bolt plate 29 by means of suitable bolts 35.

In the embodiment shown, an end brace member 37 extends transversely between the second and third column members 15, 17 at their outer end portions and are fixed thereto, as by welding. These end braces 37 are disposed nearer to the ends of the column members than any of the braces 21 of the brace systems and farther apart than the distance between the ends of the brace systems at one end of the section 11 and the end of the first column member 13 at the other end of the section, so as to not interfere with the stacking of tower sections in nested relation.

In FIG. 3 of the drawings there is shown a side elevational view of a plurality of tower sections 11, such as the one shown by FIG. 1, stacked in nested relation. In FIG. 4 of the drawings there is shown an end elevational view of the stack of nested tower sections of FIG. 3.

In FIG. 5 there is shown two tower sections 11 with the detachable brace members removed and about to be stacked in nested relation. As can be seen, each section has end braces 37 extending transversely between the second and third column members 15 and 17 and fixed thereto. The end braces 37 are disposed nearer to the ends of the columns 15 and 17 than any of the braces 21 and 23 of the first and second brace systems, or lattices, 41 and 43. The end braces 37 are spaced apart a distance s greater than the distance d between the ends of the brace lattices at one end 45 of the section and the end 47 of the first column member 13 at the other end of the section. With this construction, the end braces 37 will not interfere with the stacking of the sections in nested relation.

FIG. 6 illustrates a completed tower structure in which a plurality of sections 11 are joined end to end. The front lattice 49 comprises the detachable brace members 25, whereas the other two side lattices comprise permanently fixed braces 21 and 23.

It will be apparent from the foregoing, with particular reference to FIGS. 3 and 4, that tower sections constructed in accordance with the principles of the present invention may be stacked in nested relation for transportation and shipment, occupying only a small fraction of the space that would otherwise be required for the case of a completely assembled tower. At the same time, tower sections constructed in accordance with the principles of the present invention require only a fraction of the assembly time and effort at the erection site that would otherwise be required for the case of completely disassembled tower sections.

While I have shown my invention in only one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof. The column members may, if desired, be disposed in tapered relation instead of parallel. The column members may, if desired, be in the form of angles or rods, instead of tubular. Also, the brace member may be in the form of rods, angles, or tubes. The configuration or pattern of the brace systems may take various forms, many of which are conventional and well known. The detachable brace members can be attached and detached in various ways, many of which are conventional and well known. The end brace members shown in the preferred embodiment may be omitted on smaller size towers where the additional structural rigidity they provide is not essential.

What is claimed is:

1. A tower structure comprising a plurality of sections joined end to end, each said section comprising:

- a first, second, and third column members disposed in juxtaposed spaced relation;
- a first lattice of brace members which are permanently fixed to and extending between said first and second column members to hold same in predetermined spaced relation;
- a second lattice of brace members which are permanently fixed to and extending between said first and third

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column members to hold same in predetermined spaced relation;

- d. said first and second column members and their brace lattice forming a first side of said tower section, said first and third column members and their brace lattice forming a second side of said tower section, said first and second sides forming a V-shaped trough-like structure;
- e. a lattice of detachable brace members, and means for detachably fixing same to said second and third column members; and
- f. a pair of end brace members extending transversely between said second and third column members and fixed thereto for maintaining them in said predetermined spaced relation with said end braces disposed nearer to

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the ends of said columns than any of the braces of said first and second brace lattices, and spaced apart a distance s greater than the distance d between the ends of the brace lattices at one end of the section and the end of the first column member at the other end of the section;

g. whereby, when said lattice of detachable brace members are detached, said sections may be stacked in nested relation without interference by said end brace members; and when said lattice of detachable brace members is assembled, said second and third column members are held in predetermined spaced relation with structural strength adequate for said tower structure.

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