Nov. 26, 1963 H. M. ANDERSON 3,112,015

MAST CONSTRUCTION

Filed Feb. 15, 1960

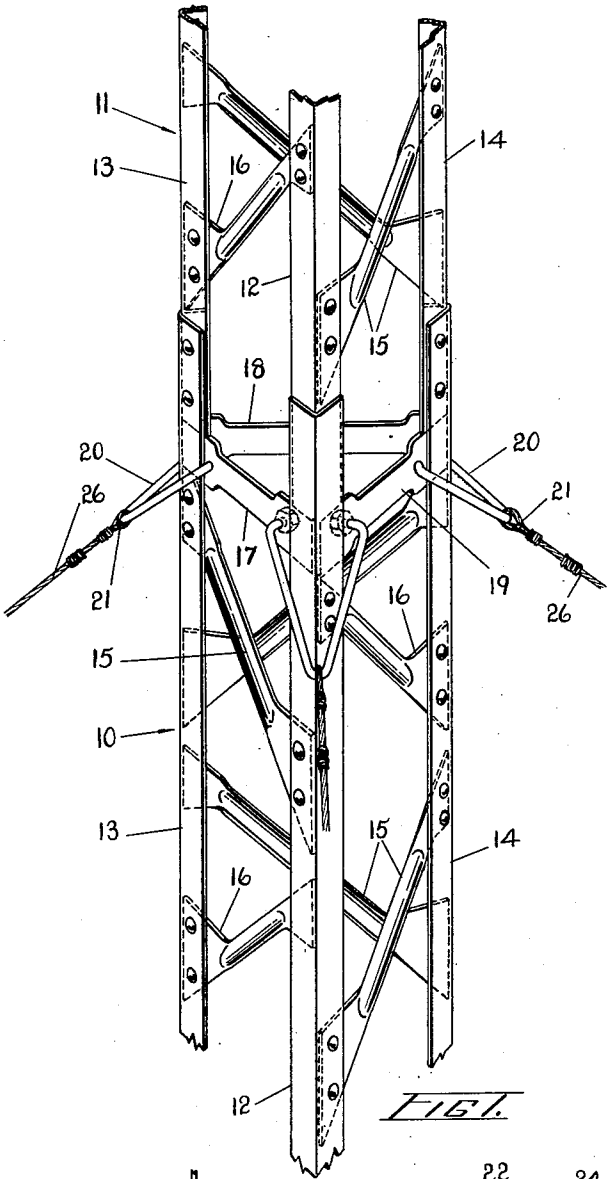


FIG 1.

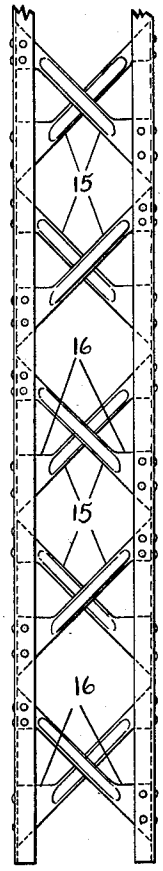


FIG 2.

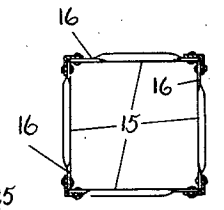


FIG 3.

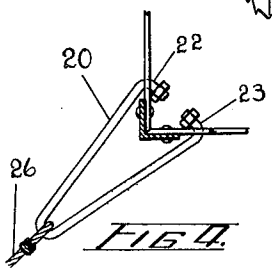


FIG 4.

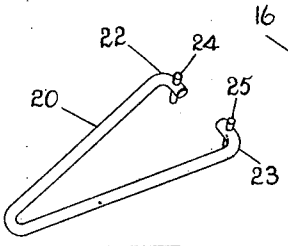


FIG 5.

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MAST CONSTRUCTION

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1 Claim. (Cl. 189—13)

This invention relates to a mast construction and in particular to a guyed mast or tower used for radio transmission or for supporting communication antennas.

One type of mast used for the foregoing purpose is disclosed in Canadian Patent No. 501,819, granted April 27, 1954. The present invention relates to improvements in the type of mast shown therein.

Since the wind load acting on the mast structure governs the height and antenna load rating of the mast structure, it one of the objects of the present invention to provide a mast structure which will keep the wind area of the mast to a minimum.

To attain this objective, the upright members or legs are joined together by formed diagonal braces so that the diagonal braces carry the wind load reactions. Such a construction eliminates the need for conventional horizontal struts heretofore employed. In carrying out the invention, the location of the diagonal braces on each face of the mast is identical so that the uprights are supported between the diagonal brace connection points on one face by the diagonal braces on the adjacent side, and similarly throughout the mast structure.

Another object of the invention is to provide a means for attaching the guyed cables to the corners of the mast or tower so that, when the mast structure tends to rotate axially due to eccentric loadings on the structure, the guyed cable tension will counteract any tendency of the structure to rotate axially.

Other features and advantages of the invention will be apparent from the following description and the accompanying drawings which illustrate an embodiment of the same.

FIGURE 1 is a fragmentary perspective view of the adjacent ends of two sections which are used to build a mast structure, each section having three upright members.

FIGURE 2 is a side elevation of a mast section structure having four upright members, the figure being on a smaller scale than FIGURE 1.

FIGURE 3 is a plan view of a four sided mast structure shown in FIGURE 2.

FIGURE 4 is a fragmentary plan view showing one of the guying bails attached adjacent the top of upright.

FIGURE 5 is a perspective view of guy cable bail.

Referring now to the drawings, the same show the upper end of a mast section **10** and the lower end of a mast section **11**. Each must section is similarly constructed and preferably of approximately ten feet in length which makes a very convenient size of section for handling.

In FIGURE 1, the section **10**, and likewise the section **11**, are formed of three uprights **12**, **13** and **14**, spaced apart to form a triangular shaped mast in cross section. The legs **12**, **13** and **14**, are joined together by diagonal braces **15**, the diagonal braces connecting each face of the mast follow a zig-zag pattern with all the braces joining the three faces registering with each other whereby the diagonal braces carry the wind load reactions thus eliminating the need for conventional horizontal struts. The diagonal braces, as will be seen from the drawings, connecting the legs of each face of the mast structure

are identical so that the uprights are supported between the diagonal brace connection point in one face by the diagonal braces on the adjacent side, and similarly throughout the mast structure. This staggered bracing, besides reducing the unsupported length of the uprights for maximum strength, makes for easier connection of the diagonal braces since interference from adjacent members has been eliminated. As will be seen from FIGURE 1, the diagonal bracing which connects the adjacent faces of the legs, for example, of the legs **12** and **14**, form a zig-zag pattern from the the bottom to the top of the legs. The diagonal braces can be secured to the legs by bolting, riveting or welding, being accessible to take fabricational tools.

A further feature of the invention relates to the specific shape of the diagonal braces. It will be seen that one end, in this case the lower end, of each brace is bent so that the portion adjacent the upright is perpendicular thereto, said portion being indicated by the numeral **16**. Steps are thus formed at each connection point which aid in climbing the mast structure and dispenses with the necessity of a ladder. The diagonal portion of the brace also forms a support for the foot of the person climbing the mast and thus reduces the hazard of the foot slipping off the step.

The upper end of each section has the uprights joined together by means of cross-bars **17**, **18** and **19**, the cross-bars being disposed substantially at right angles to the uprights and connected thereto inwardly of the upper ends. The cross-bars provide a member capable of receiving the guyed cables of the guyed cables bail as hereinafter described.

The guying of the mast consists of a guy bail **20** which is V-shaped, the vertex of the V being formed to suit the cable thimble **21** of the cable **26**. The leg ends **22**, **23** are turned-in at an angle that will allow the bail to swing vertically when installed to suit various guy cable slopes. The angle of the V is such that the bail has to spring into the matching holes formed in the members, **17**, **18**, **19**, respectively, the matching holes being formed adjacent each corner post so that the legs of the bail will straddle its respective post.

The bails are secured in their respective matching holes in the members **17**, **18**, **19** either by threading the leg ends **22**, **23**, and using nuts as shown in FIGURE 4, or by drilling holes in the ends and using cotter pins **24**, **25**, as shown in FIGURE 5.

The bail is self-aligning relative to the guy cable pull, the formed legs of the bail engaging the mast in a shearing fashion. When the mast structure tends to rotate axially, due to eccentric loading on the structure, the bail acting as an A frame together with the guy cable tension acting from the vertex of the V bail, counteracts rotation. All guys connect to the mast structure by means of the bails so that straightness is maintained throughout the full height of the mast or tower providing maximum compressive loading with torsional fatigue is eliminated.

In FIGURES 2 and 3, a mast having four faces is illustrated. Its construction is identical with that shown and described with reference to FIGURES 1, 4 and 5, the only difference being that it has four faces and therefor four upright legs instead of the three faces and three upright legs as in FIGURE 1.

What I claim as new and desire to protect by Letters Patent of the United States is:

In a sectional mast formed of a plurality of interconnected superposed units, each unit comprising at least three parallel upright corner posts in spaced apart relationship to form a geometric figure in cross section, cross

bars joining the posts into a unitary structure, said bars being arranged substantially at right angles to the posts and being substantially coplanar to each other, and means inhibiting torsional movement of the mast in its erected position, said means comprising a V-shaped bail, each side of the V terminating in an inturned extension forming a pivot whereby the legs of a bail are pivotally attached to cross members disposed on opposite sides of its respective post and an anchored cable, in tension, affixed to said V-shaped bail.

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