

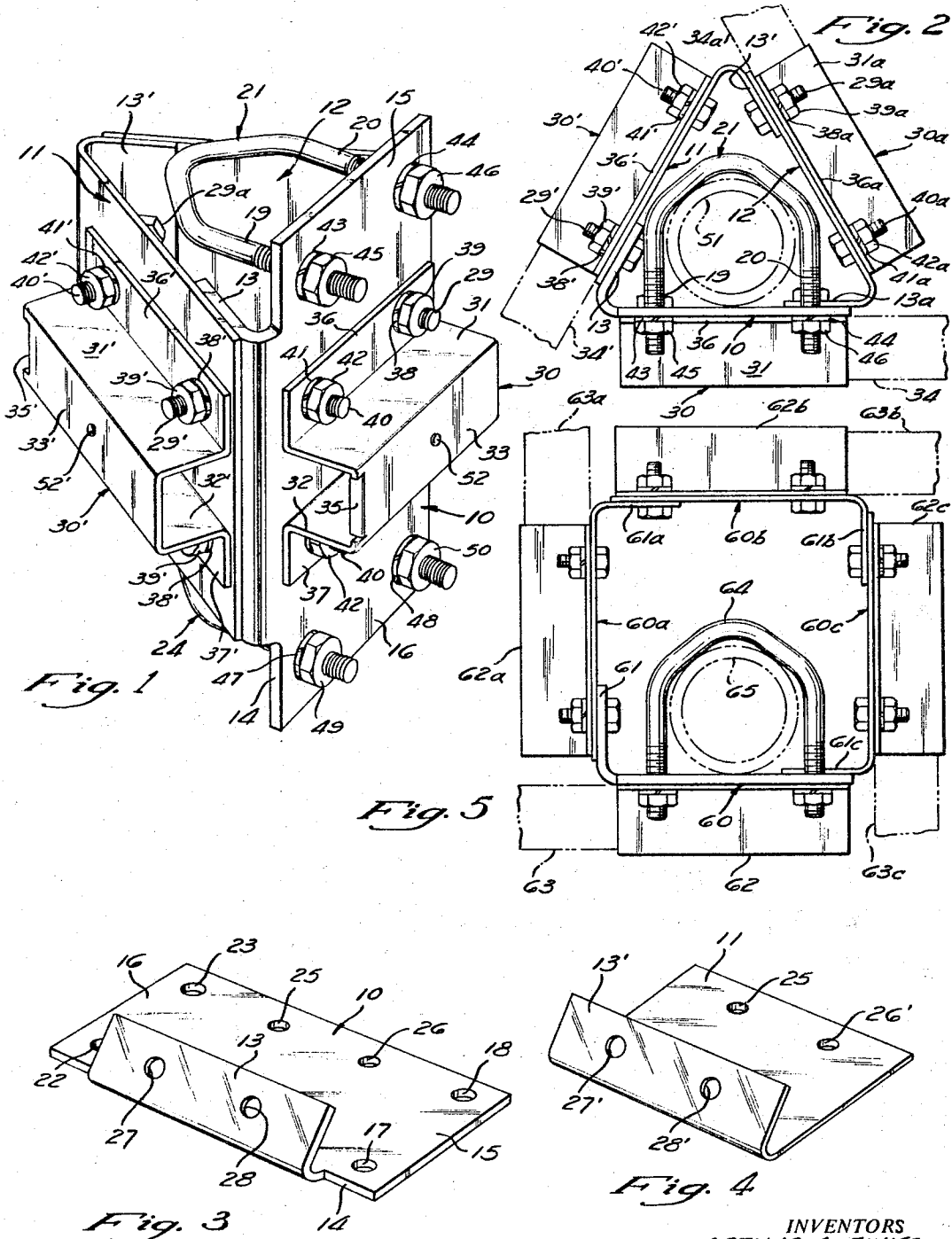
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ANTENNA SUPPORT BRACKET

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ANTENNA SUPPORT BRACKET

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This invention relates to an antenna support bracket for mounting on an upstanding mast a plurality of antenna units which are spaced apart laterally around the mast.

Various antenna assemblies have been proposed heretofore in which a plurality of generally horizontal, rigid arms or booms are attached at their inner ends to an upstanding mast and at their outer ends support the radiating elements of individual antenna units in the assembly. Usually such horizontal antenna-supporting booms have been attached to the mast by a plurality of individual support brackets, one for each antenna-supporting boom. In such antenna assemblies, for proper broadcast or reception it is important that the several individual antenna units be properly positioned with respect to each other and therefore the corresponding horizontal booms must have a predetermined angular relationship with respect to one another, extending laterally outward from the mast in substantially the same horizontal plane. This required careful mounting of their individual brackets on the mast. Another difficulty was that the individual support brackets were each designed for attachment to a mast of a specific size and could not be used on different sized masts, so that a different set of mounting brackets would have to be provided for each different size of mast encountered in actual use.

The present invention is directed to a novel support bracket which overcomes these difficulties.

It is a principal object of this invention to provide a novel and improved support bracket having provision for positively establishing the positional relationships of a plurality of individual antenna supporting booms, so that the antenna units attached to the outer ends of these booms will be properly positioned with respect to each other.

Another object of this invention is to provide such a support bracket which is adapted to be mounted on masts of different sizes.

Another object of this invention is to provide such a support bracket which is adapted to receive the mast within the bracket, rather than having the mast external to the bracket.

Another object of this invention is to provide such a support bracket which provides an extremely rigid support for the laterally extending booms in an antenna assembly.

Another object of this invention is to provide such a support bracket which may be quickly and easily installed and which is inexpensive.

Further objects and advantages of this invention will be apparent from the following detailed description of two presently-preferred embodiments thereof, which are shown in the accompanying drawing.

In the drawing:

FIGURE 1 is a perspective view of a first support bracket in accordance with the present invention for mounting three horizontal booms on an upstanding mast;

FIGURE 2 is a top plan view of the FIG. 1 bracket attached to the mast; which is shown in phantom;

FIGURE 3 is a perspective view of one of the plates in the FIG. 1 bracket;

FIGURE 4 is a similar view of another of the plates in the FIG. 1 bracket; and

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FIGURE 5 is a top plan view of a second support bracket in accordance with the present invention for mounting either two or four horizontal booms on the mast, shown in phantom.

Referring first to the embodiment of FIGS. 1-4, this bracket comprises three rigid metal plates 10, 11 and 12 which are bolted together to provide a hollow structure which is generally triangular in plan view, as shown in FIG. 2.

As shown in FIGS. 1 and 3, the first bracket plate 10 is generally flat and rectangular and has an integral flange 13 at its left edge 14 which extends at an angle of substantially 60° to the plane of this plate. This plate has integral coplanar extensions 15 and 16 at its upper and lower ends which project beyond the respective end edges of the flange 13.

The upper end extension 15 has a pair of laterally spaced holes 17 and 18 which respectively receive the opposite legs 19 and 20 of an upper U-bolt 21, as shown in FIG. 1. Similarly, the lower end extension 16 of the first plate 10 has a pair of laterally spaced openings 22 and 23 which respectively receive the opposite legs of a lower U-bolt 24 (FIG. 1). The respective bight portions of these U-bolts are disposed within the triangular outline of the three attached bracket plates 10-12 in plan view (FIG. 2).

The first plate 10 has a pair of vertically spaced openings 25 and 26 toward its right edge in FIGS. 1 and 3 which are aligned vertically with the respective openings 18 and 23 in its upper and lower extensions 15 and 16, as well as a similar pair of openings toward its left edge which are hidden in the drawing and are aligned vertically with the remaining openings 17 and 22 in its upper and lower extensions. The flange 13 has a pair of openings 27 and 28 (FIG. 3) which are horizontally aligned respectively with the openings 25 and 26.

The second plate 11 (FIG. 4) in the bracket assembly is identical to the first plate 10, except that it does not have the upper and lower extensions projecting above and below its flange. Corresponding elements of the second plate 11 are given the same reference numerals as for the first plate, but with a "prime" superscript added.

The third plate 12 is identical to the second plate 11, and its flange is designated by the reference numeral 13a in FIG. 2.

The three plates are bolted together, as shown in FIGS. 1 and 2 with the flange 13 on the first plate 10 extending contiguous to the flat inside face of the second plate 11 at the opposite side of the latter from its flange 13'. The flange 13' on the second plate 11 extends contiguous to the flat inside face of the third plate 12 at the opposite side of the latter from its flange 13a. The flange 13a on the third plate 12 extends contiguous to the flat inside face of the first plate 10 at the side where the openings 25 and 26 in the latter are located. The two openings in each flange register with the corresponding pair of openings in the next plate which it underlies, and respective pairs of upper and lower bolts 29, 29' and 29a pass through these registering openings.

As shown in FIG. 1, the first plate 10 of the bracket carries a boom-receiving channel-shaped clamp 30 having top, bottom and front walls 31, 32 and 33 respectively which, together with the flat outer face of the bracket plate 10, define a rectangular recess for receiving the inner end of a horizontal boom 34 (FIG. 2). At its left end in FIG. 1, the front wall 33 of this channel has an inwardly-bent tab 35 which acts as an abutment for engagement by the laterally inward end of boom 34. The front wall 33 of channel 30 has an integral, inwardly-depressed detent 52 which is adapted to cooperate with a complementary detent on the boom 34 to releasably lock the latter in place.

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Channel 30 has top and bottom vertical flanges 36 and 37, which are integrally connected respectively to the inner edges of the top and bottom walls of the channel and which lie contiguous to the outside face of plate 10.

Near the right end of this channel 30 the aforementioned bolts 29 extend outwardly through openings in these flanges and receive respective lock washers 38 and nuts 39. These two nut and bolt assemblies serve to attach the boom-receiving channel 30 to the first bracket plate 10, as well as to attach the first bracket plate 10 to the flange 13a on the third bracket plate 12.

Near its left end in FIG. 1, the channel 30 has another pair of vertically spaced openings which register with the corresponding openings in the first plate 10 of the bracket to receive respective upper and lower bolts 40. A lock washer 41 and a nut 42 are attached to each bolt 40 to clamp this end of bracket 30 to the outside of the first bracket plate 10.

An identical second channel 30' (FIGS. 1 and 2) is attached in the same manner to the outside of the second bracket plate 11, and its receives the inner end of a second horizontal, antenna-supporting boom 34' (FIG. 2). Corresponding elements of this second channel and its attachment members are given the same reference numerals as for the first channel, but with a "prime" superscript added.

An identical third channel 30a (FIG. 2) is attached to the outside of the third bracket plate 12 in the same manner, and this third channel receives the inner end of a third horizontal, antenna supporting boom 34a (FIG. 2). Corresponding elements of this third channel and its attachment members are given the same reference numerals as for the first channel, but with the suffix *a* added.

As shown in FIG. 2, this bracket assembly is generally triangular, viewed from the top, with the three bracket plates 10, 11 and 12 forming the three sides of the triangle and with the three boom-receiving channel-shaped clamps 30, 30' and 30a and the respective outside faces of these plates defining horizontal recesses for receiving the inner ends of the respective booms 34, 34' and 34a, so that these booms extend horizontally outward from the bracket assembly at 120° angles with respect to each other. Each of these booms at its laterally outward end (remote from the mounting bracket) supports a suitable antenna unit, not shown, which may, for example, be a center-fed dipole having upper and lower vertically disposed radiating elements. The booms are tightly clamped frictionally between these channels and the outside of the respective bracket plates.

As shown in FIG. 1, the upper U-bolt 21 at its respective opposite legs 19 and 20 carries lock washers 43, 44 and nuts 45, 46 at the outside of the upper end extension 15 of the first bracket plate 10. Similarly, the opposite legs of the lower U-bolt 24 carry lock washers 47, 48 and nuts 49, 50 at the outside of the lower end extension 16 of this plate.

The entire bracket may be slipped down over the upper end of a mast, shown in phantom at 51 in FIG. 2, with the mast received between each U-bolts 21 and 24 and the flat inside face of the first bracket plate 10, and then the nuts 45, 46, 49 and 50 will be tightened to cause the mast to be gripped securely between U-bolts 21 and 24 and the first bracket plate 10. This mounting of the bracket onto the mast can be performed quickly and easily. From FIG. 2, it will be apparent that the mast 51 may be larger or smaller in cross-section than shown, the maximum size limit being dependent upon the spacing between the opposite legs of each U-bolt, which in turn depends primarily upon the width of the first bracket plate 10 which supports it. In one specific embodiment, the present bracket may be used on any mast within the size range from about 1 inch to 2 inches outside diameter. Consequently, in accordance with the present invention, a bracket of one given size may be used on a relatively wide size range of masts.

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The entire assembly is exceptionally rigid, both as to the attachment of the bracket to the mast and as to the attachment of the antenna-supporting horizontal booms to the bracket, with the bracket itself positively locating the booms angularly with respect to each other without requiring any adjustments by the person who mounts the bracket on the mast.

FIGURE 5 shows a second embodiment of this invention which is intended for the support of four antennas at 90° intervals around the upstanding mast. This assembly comprises four bracket plates 60, 60a, 60b and 60c, having respective flanges 61, 61a, 61b and 61c at one side edge thereof which extend at 90° angles to the respective plates. Three of these plates, 60a, 60b and 60c, are identical to each other, and the other plate 60 is identical to them except that it has coplanar extensions at its upper and lower ends similar to the extensions 15 and 16 on the first plate 10 of the bracket of FIGS. 1-4. These four plates support respective channel-shaped clamps 62, 62a, 62b and 62c at their respective outer sides for receiving the inner ends of horizontal booms 63, 63a, 63b and 63c, which extend laterally outward from the bracket at right angles to each other. Nut and bolt assemblies similar to those in the first-described embodiment are provided for attaching the four bracket plates rigidly to each other and to the respective channels. The first bracket plate 60 also supports upper and lower U-bolts 64 for clamping the bracket to a mast 65.

If desired, of course, the bracket of FIG. 5 may be used to support just two horizontal booms extending in opposite directions laterally away from the mast.

The principles of the present invention may be embodied in a similar bracket designed to support five, six or any desired number of antenna-supporting booms simply by the appropriate choice of the angularity of each flange with respect to the bracket plate to which it is integrally connected. For example, in a six-plate bracket, each flange should extend at substantially 120° with respect to its plate, so that the assembled bracket in plan view will have six substantially equal sides.

Accordingly, while two specific presently-preferred embodiments of this invention have been shown and described, it to be understood that the bracket is susceptible of other structural embodiments without departing from the spirit and scope of the present invention. For example, the boom-receiving clamps on the bracket may be shaped to receive antenna-supporting booms of circular or other cross-section, as well as the rectangular cross-section shown.

We claim:

1. An antenna support bracket for attachment to a mast comprising a plurality of plates attached to and angularly disposed with respect to each other to provide a hollow tubular structure of polygonal cross-section to surround the mast, bracket clamping means carried by one of said plates and extending inwardly therefrom for engagement with the mast, and boom-clamping means on the outside of certain of said plates, at least, for clamping engagement with respective antenna-supporting booms extending laterally of the plates and disposed with respect to each other at an angularity determined by the angular disposition of the plates to which said booms are clamped, whereby actuation of said bracket clamping means to clamp the bracket to a mast will not distort the angularity of said booms with respect to each other.

2. An antenna support bracket for attachment to a mast comprising a plurality of plates attached to and angularly disposed with respect to each other to form a hollow tubular structure of polygonal cross-section for receiving the mast, clamps on the outside of each of said plates providing laterally extending recesses thereat for receiving respective antenna-supporting booms, each boom extending laterally of the plate to which it is clamped and at an angularity with respect to an adjacent boom predetermined by the angular disposition of the plates to which

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said booms are clamped, and U-bolts carried by one of said plates and having respective bight portions disposed inside the hollow outline of the plates for clamping the mast against the inside of said one plate, whereby tightening of said U-bolts to secure said bracket to a mast will not distort the predetermined angularity of said booms with respect to each other.

3. An antenna support bracket for mounting a plurality of laterally extending antenna-supporting booms on an upstanding mast, said bracket comprising a plurality of plates which together make up a hollow structure, said plates being attached to each other at angularly extending side flanges thereon, a plurality of clamps at the outside of the respective plates providing respective laterally extending recesses for receiving the inner ends of respective antenna-supporting booms, a pair of U-bolts carried by one of said plates and each having its bight portion disposed inside the outline of the attached plates for clamping the mast against the inside of said one plate, and nuts threadedly engaging said U-bolts at the outside of said one plate for tightening the U-bolts against the mast.

4. An antenna support bracket for mounting a plurality of laterally extending antenna-supporting booms on an upstanding mast, said bracket comprising a plurality of generally flat plates, a flange integral with each plate and extending angularly from one side edge thereof, said plates being positioned to form a generally polygonal structure with each angularly disposed flange on one plate extending contiguous to the inside face of the next plate in the polygonal structure, a plurality of clamps at the outside of the respective plates providing respective laterally extending recesses for receiving the inner ends of respective booms, a plurality of bolt and nut assemblies attaching said clamps to the respective plates, certain of said bolt and nut assemblies attaching both the respective clamp and the flange on the next plate to the respective plate, and mast clamping means carried by one of the plates and extending into the space between the plates for clamping the bracket to the mast.

5. An antenna support bracket for mounting a plurality of laterally extending antenna-supporting booms on an upstanding mast, said bracket comprising a plurality of generally flat plates, a flange integral with each plate and extending angularly from one side edge thereof, said plates being positioned to form a generally polygonal structure with each angularly disposed flange on one plate extending contiguous to the inside face of the next plate in the polygonal structure, a plurality of channels at the outside of the respective plates, each channel and the outside of the respective plate together defining a laterally extending recess for receiving the inner end of a respective boom, a plurality of bolt and nut assemblies attaching said channels to the respective plates, certain of said bolt and nut assemblies attaching both the respective channel and the flange on the next plate to the respective plate, U-bolts carried by one of the plates and each having its bight portion disposed between the plates for clamping the mast against the inside face of said one plate, and nuts threadedly engaging said U-bolts at the outside of said one plate for tightening the bracket against the mast.

6. An antenna support bracket for mounting a plurality of laterally extending antenna-supporting booms on an upstanding mast, said bracket comprising at least three generally flat plates attached along parallel edges to one another to provide a hollow tubular structure of polygonal cross-section, a plurality of clamps respectively attached to the outside of said plates for receiving respective antenna-supporting booms, one of said plates having upper and lower extensions projecting above and below the top and bottom of the other plates, upper and

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lower U-bolts carried respectively by said upper and lower extensions and having their respective bight portions disposed inside the outline of the attached plates for clamping the mast against the inside of said one plate, and nuts threadedly engaging said U-bolts at the outside of said one plate for tightening the bracket against the mast.

7. An antenna support bracket for mounting a plurality of laterally extending antenna-supporting booms on an upstanding mast, said bracket comprising a plurality of generally flat plates, each of said plates having an integral flange extending angularly from one side edge thereof, each plate having its flange lying contiguous to the inside face of another plate at the latter's opposite side edge and said plates being arranged adjoining one another to provide a polygonal hollow structure, a plurality of clamps respectively located at the outside faces of said plates and providing respective laterally extending recesses for receiving the inner ends of respective antenna-supporting booms, a plurality of threadedly engaged nuts and bolts attaching said clamps to the respective plates, certain of said nuts and bolts attaching both the respective clamp and the contiguous flange on the next plate to the respective plate, one of said plates having upper and lower extensions projecting above and below the top and bottom of the other plates, upper and lower U-bolts carried respectively by said upper and lower extensions and having their respective bight portions disposed inside the polygonal outline of the attached plates for clamping the mast against the inside face of said one plate, and nuts threadedly engaging said U-bolts at the outside of said one plate for tightening the bracket against the mast.

8. An antenna support bracket for mounting a plurality of laterally extending antenna-supporting booms on an upstanding mast, said bracket comprising a plurality of generally flat plates, each of said plates having an integral flange extending angularly from one side edge thereof, each plate having its flange lying contiguous to the inside face of another plate at the latter's opposite side edge and said plates being arranged adjoining one another to provide a polygonal hollow structure, a plurality of channels respectively located at the outside faces of said plates, each channel and the outside face of the respective plate together defining a laterally extending recess for receiving the inner end of a respective antenna-supporting boom, a plurality of threadedly engaged nuts and bolts attaching said channels to the respective plates, certain of said nuts and bolts attaching both the respective channel and the contiguous flange on the next plate to the respective plate, one of said plates having upper and lower extensions projecting above and below the top and bottom of the other plates, upper and lower U-bolts carried respectively by said upper and lower extensions and having their respective bight portions disposed inside the polygonal outline of the attached plates for clamping the mast against the inside face of said one plate, and nuts threadedly engaging said U-bolts at the outside of said one plate for tightening the bracket against the mast.

References Cited by the Examiner

UNITED STATES PATENTS

1,281,800	10/1918	Lustig	287—54
3,001,195	9/1961	Winegard	343—864

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