ADJUSTABLE RIGID SUPPORT FOR MASTS AND TOWERS

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The present invention relates to an adjustable rigid support for masts and towers, upon which antennas for television receivers are mounted, and is particularly concerned with means for securing such masts or towers on the roof of a building.

Television reception in many instances is dependent upon the use of an outdoor antenna, and it is customary for such antennas to be set up on the roof of the building in which the television receiver is housed. Particularly if the receiver is in the fringe area, or any area a considerable distance from the transmitter, it is necessary to position the antenna quite a distance above the roof, thereby necessitating the use of a mast or tower. The mast may comprise a single length of tubing or a plurality of telescoping sections of tubing with the upper section or sections secured to the lower adjacent section by set screws to provide the required height. A tower comprises a plurality of vertical members held together by side members.

The mast or tower may be self-supporting, or may be supported by guy wires. Generally the self-supporting mast or tower is not suitable for private dwellings because they are too expensive and too heavy. The difficulty of mounting an adequate base support on the roof of a private dwelling is ordinarily an insurmountable disadvantage to the use of a self-supporting mast or tower.

The guyed type of mast or tower is not satisfactory because home owners object to the appearance of a multiplicity of guy wires. The flexibility of such guy wires necessitates the use of at least three wires for which suitable anchoring points must be provided. Another serious disadvantage of this type of support is the occasional failure of the guy wire or the anchorage point. Such failure may cause the mast or tower to topple down, with considerable damage to the mast or tower, antenna, and possibly to the roof.

Although the support constructed in accordance with my invention is illustrated in connection with the use of a mast, it is obvious that the advantages inherent in the invention may be utilized in connection with the support of towers as well. The support may also be used for supporting other types of masts, such as flag poles for instance, if desired.

It is an object of my invention to provide a simple, efficient, inexpensive rigid support for masts or towers that can be quickly and easily set up on any type of roof without skilled labor and in which the supporting rods are individually adjustable longitudinally to fit properly between the mast or tower and the anchoring points for the base of the supporting rods. A further object of the invention is to provide a pair of longitudinally adjustable supporting rods that can be secured at their upper ends to a rotatable support ring mounted at any desired height on the mast or tower and at their lower ends to any suitable anchoring point on the roof.

A further object of the invention is to provide a rotatable adjustable fitting that may be secured on various types of roof, chimney or wall mounts, by means of which the lower ends of the supporting rods may be secured, thereby providing angular adjustment of the supporting rods in the installation of the mast or tower supported by such supporting rods.

It is a further object of the invention to provide support means for a mast or tower of such flexibility that the mast or tower can be mounted at any point on any type of roof, regardless of its contour, and the supporting rods can likewise be anchored at their base to any nearby suitable point on the roof.

A further object of the invention is to provide a rotatable support ring that can be secured to the mast or tower at any desired height whereby the radial angle between the rigid supporting rods and the vertical angle between each supporting rod and the mast can be varied to fit the requirements of the particular installation.

A further object of the invention is to provide a rigid support that may be used to facilitate ejection of the mast or tower which it supports, or to facilitate lowering of the mast or tower if servicing of the antenna is required at any time.

Other objects and advantages of the invention will become apparent upon reading the following specification, taken in conjunction with the accompanying drawings, in which:

Figure 1 is a perspective view of a mast mounted on a peak roof with the end of one of the supporting rods secured to an anchoring support mounted on the peak of the roof, and one end of the other supporting rod secured to an outside chimney mount;

Figure 2 is a fragmentary detail perspective view of the bottom of the mast mounted in a support adapted to fit the peak of a roof;

Figure 3 is a fragmentary perspective view of a rotatable support ring with sections of the supporting rods secured thereto;

Figure 4 is a detail perspective view of the rotatable supporting ring shown in Figure 3;

Figure 5 is a cross sectional view through the rotatable support ring showing the shoulder bolts for securing the rotatable bracket and the upper end of the supporting rod to the rotatable support ring;

Figure 6 is a fragmentary elevational view showing the rotatable support ring secured to a one-piece mast;

Figure 7 is a detail perspective view of another embodiment of the rotatable support ring;

Figure 8 is a fragmentary view, partly in section and partly in elevation, showing the rotatable support ring of Figure 7 secured to a telescoping mast;

Figure 9 is a fragmentary detail perspective view showing an anchor support for a peak roof with a portion of a supporting rod secured thereto;

Figure 10 is a fragmentary perspective view of an outside chimney mount with a portion of an angle iron supporting rod secured thereto;

Figure 11 is a perspective view of an antenna mounted on a flat roof tip with one end of one of the supporting rods secured to an anchoring member mounted on the top of a parapet and one end of the other supporting rod secured to an inside chimney mount;

Figure 12 is a detail perspective view of the anchoring member which is mounted on the parapet;

Figure 13 is a cross sectional view, taken along the line 13—13 of Figure 12;

Figure 14 is a fragmentary view, partly in elevation and partly in section, showing a mast supported by a supporting rod having one end anchored to an inside chimney mount;

Figure 15 is a fragmentary elevational view showing the means for adjusting the length of an angle iron type of supporting rod;
Figure 16 is a detail perspective view of an anchoring member adapted to be secured to a flat wall surface; and Figure 17 is a diagrammatic view showing the manner of erecting a mast on a peak roof.

Referring to Figures 1 to 9 of the drawings, the reference numeral 2 indicates a television mast of one piece construction and 3 indicates a similar mast formed of a plurality of telescoping sections and 5 secured together in extended position by a set screw 6. The masts 2 and 3 are alternative equivalents, and either may be used to support an antenna 7 at its top end. The bottom end of the mast 2 or 3 is pivotally mounted in an anchoring member 8 mounted on the peak 9 of a roof 10. The mast 2 or 3 is supported by a pair of rods 11 and 12 which are preferably in the form of angle irons, although they may be tubular. Although the supporting rods may each be of the desired length, it is desirable to make each of them of a pair of overlapping sections 13 and 14 (Figure 15). The sections 13 and 14 each have a plurality of longitudinally spaced bolt holes 15 and are secured together in overlapping relationship by bolts 16 to provide longitudinal adjustment so that the overall length of each supporting rod may fit the particular installation.

The upper end of each supporting rod is secured to a rotatable ring support 17 or 18 which encircles the mast 2 or 3 and facilitates its length. If the one-piece mast 3 is used, the rotatable ring support rests on a split collar 19 secured to the mast by a screw 20, as shown in Figure 6. If the sectional mast 3 is used, the rotatable ring support rests on the top edge 21 of the section 4, as shown in Figure 8. The rotatable ring supports are alternatives, and either may be used in any installation.

Referring to Figures 3 to 6, the rotatable ring support 17 comprises a flat plate 22 having a central aperture 23 to fit around the mast 2 or 3 to which it is applied. The fit of the aperture 23 around the mast is loose enough to permit rotation of the mast. An integral flange 24 extends upwardly at right angles from one edge of the plate 22 and a bracket 25 having a similar flange 26 is rotatably secured to the plate adjacent another edge by means of a shoulder bolt 27. The upper ends of supporting rods 11 and 12 are rotatably secured to the flanges 24 and 26, respectively, by shoulder bolts 28. The shoulder bolts 28 permit the supporting rods 11 and 12 to be positioned at any vertical angle to the mast, and the shoulder bolt 27 permits the rod 12 to be positioned at any radial angle relative to the rod 11.

The rotatable support ring 18 comprises a pair of superimposed flat plates 29 and 30 apertured, as indicated at 31 and 32, respectively, to fit around the mast 2 or 3 to which the support ring is applied. As in the case of the support ring 17, the apertures 31 and 32 are large enough to permit rotation of the mast. The plates 29 and 30 are provided respectively with upstanding flanges 33 and 34 at their peripheral edges. The flanges may be integral with the plates, or may be welded thereto. The flat plates 29 and 30 are free to rotate relative to each other, and the plate 30 is of circular form to eliminate the corners that would otherwise interfere with rotation of the plates by contact with the flange 34 during such rotation. In order to simplify manufacture, the plates 29 and 30 are preferably duplicates of each other. The rotation of the plates 29 and 30 permits relative angular adjustability between the supporting rods 11 and 12 which have their upper ends secured to the flanges 33 and 34 by shoulder bolts similar to 28.

The angular adjustability of the upper ends of the support rods 11 and 12 simplifies the erection of the antenna because the supporting rods are secured to the rotatable support ring 17 or 18 before the mast is raised on the roof, and thereafter the support rods is used as a prop to raise the mast to upright position, as shown diagrammatically in Figure 17.

The antenna 7 is mounted on the top of mast 2 and the bottom of the mast is secured to the mounting 8. As shown in Figure 2 the mounting 8 includes a tubular cup 35 into which the bottom of the mast fits. Set screws 36 are tightened against the mast to hold it in the cup. The cup 35 is pivotally mounted in a U-shaped member 37 by means of a stud 38. A bolt 39 secures the bottom of the member 37 to a saddle 40 adapted to fit the peak 9 of the roof and secured thereto in any suitable manner. The mast 2 and 3 secured to the rotatable ring support, hanging down one side of the roof. A man installing the antenna can stand on the peak of the roof and push the mast towards its vertical position, using either supporting rod to obtain the desired leverage after the mast has been partially raised. When the mast has been raised to its upright position the supporting rod 11 is secured to an anchoring support 41, and the supporting rod 12 is then secured to its anchoring support.

The installation illustrated in Figure 1 shows the lower end of the supporting rod 11 secured to the anchoring support 41 mounted on the peak and the supporting rod 12 secured to an outside chimney mount 42, but either supporting member may be anchored at any point where an anchoring support may be mounted. It is desirable, for the sake of stability, to maintain a radial separation of approximately 90° between the supporting rods and an angle of 45° or greater between each rod and the mast.

The anchoring support 41 (Figure 9) comprises a saddle 43 having a flat base 44 joining two downwardly sloping flanges 45. The flanges 45 may be bent in either direction to make the saddle fit the peaks on which it is to be mounted. The flanges 45 may be bent to lie in a common plane if the roof surface to which the anchoring support 41 is to be secured is flat. A bracket 46, having an integral upstanding flange 47 is secured to the flat base 44 of the means of a bolt 48. After the mast 2 or 3 has been raised into upright position the lower end of the support rod 11 is rigidly secured to flange 46 by a bolt 49.

The outside chimney mount 42, as shown in detail in Figure 10, comprises a flat strip 50 of thin sheet metal extending partly around the outside of the mast and having its opposite ends rigidly secured to a metal stamping 52 by means of eye bolts 53 and 54. The metal stamping is provided with an integral flat base in the form of a flange 56 which extends in a horizontal plane. A bracket 57, having an upstanding flange 58, is secured to the flange 56 by a bolt 59. The lower end of supporting rod 12 is secured to the flange 58 by means of a bolt 60. The flange 56 could, of course, be arranged to extend vertically and have the lower end of supporting rod 12 secured directly to it. However, it is preferred to use the bracket 57 because the bracket may be rotated slightly before the bolt 59 is tightened, to position the flange 58 parallel to the adjacent surface of the lower end of supporting rod 12 which is secured thereto.

In Figure 11 I have shown a mast 3 mounted on a flat roof 61 and having supporting rods 62 and 63 anchored at their bottom ends to a parapet wall 64 and to an inside chimney mount 65, respectively. The supporting rods 62 and 63 are duplicates of the rods 11 and 12, and are secured at their upper ends to a rotatable ring support 17 or 18. As shown in Figure 12, the mount 64 comprises a U-shaped member 66 having a transverse bridge 67 extending across the coping 68 of the parapet wall 69 and a pair of depending legs 70 straddling the coping and extending therebelow. The lower end of each leg 70 is provided with a lug 71 which may be integral therewith or may be welded thereto. A bolt 72 is threaded through a transversely extending cross bar 73 and has a disk 74 rotatably secured to its inner end, as shown at 74 in Figure 13. The disks 73 are each provided with a plurality of sharp projections 75 which are prefer-
ably arranged in horizontal lines spaced apart a distance slightly greater than the thickness of a standard brick. When the bolts 72 are threaded inwardly the disks may rotate with the bolt until the projections 73 engage the edges of the bricks of wall 69. The projections then bite into the mortar between adjacent rows of bricks and securely hold the mount 68 against displacement. A horizontal base of flange 76 is rigidly secured to the bridge 67, as indicated at 77. The flange 76 is provided with an aperture 78 to receive a bolt (not shown) by means of which a bracket 79 (Figure 11) may be secured to the flange 76. The bracket 79 is a duplicate of bracket 57, and the lower end of supporting rod 62 is secured to the flange 79 in the same manner that the lower end of supporting rod 12 is secured to the bracket 57.

The inside chimney mount 65, as shown in Figure 14, comprises two angle irons 80 and 81 which are pressed against diagonally opposite corners of a chimney 82 by a pair of oppositely threaded bars 83 and 84 having their adjacent ends threaded into a turnbuckle 85. The angle iron 81 projects above the top of chimney 82 and is provided with a horizontal base or flange 86 to which a bracket 87 is secured by means of a bolt 88. The bracket 87 has an upstanding flange 89 and the lower end of supporting rod 63 is secured to the flange 89 in the same manner that the lower end of the supporting rod 12 is secured to the flange 58 of bracket 57. In Figure 14 the mast 3 is supported on the roof by an anchoring member 90 which is similar to the member 8, shown in Figure 2, except that a flat base 91 has been substituted for the saddle 40. The member 37 is rotatable relative to the base 91 and is then bolted into place. The mast may be pivoted at any angle by virtue of the cup 35 mounted in the U-shaped member 37.

In Figure 16 I have shown a bracket 92 having a pair of foot portions 93 apertured, as indicated at 94, to receive fastening means by means of which the bracket may be secured to a vertical wall. The bracket 92 is provided with an integral base or flange 95 which extends in a horizontal plane when the bracket is mounted in its intended manner. The flange 95 is apertured, as indicated at 96, so that a bracket, similar to the bracket 57, may be bolted thereto.

In each of the mounts for securing the lower ends of the supporting rods it will be noted that the essential feature comprises a rigid, horizontally extending base to which is bolted a bracket having a vertical flange. In each structure the bracket may be rotated slightly to align the surface of its vertical flange with the adjacent lower end of the supporting rod. After the alignment is accomplished the bolt holding the lower end of the support rod to the vertical flange is rigidly tightened, and the bolt holding the bracket to the horizontally extending flange is also tightened. When the antenna requires servicing, the supporting rods are released from the vertical flanges to which they are bolted, and the mast 2 or 3 is set down to make the antenna accessible to a man of the roof without the necessity of using a ladder. The rigidity of the supporting rods permits either or both of them to be used as a prop to guide the downward movement of the mast and makes it easy to let the mast down carefully so that the antenna need not be damaged by falling to the roof.

Although I have described several preferred embodiments of the invention in considerable detail, it will be understood that the description thereof is intended to be illustrative, rather than restrictive, as many details may be modified or changed without departing from the spirit or scope of the appended claims. Accordingly, I do not desire to be restricted to the exact details of construction described.

I claim:

1. A mast projecting upwardly from a roof top, a support ring rotatably mounted on said mast, a pair of flanges extending perpendicularly to said support ring, one of said flanges being rotatably movable relative to the other, and a pair of rigid support rods each having its upper end pivotally secured to one of said flanges.

2. An antenna assembly comprising a mast, a support for anchoring the bottom of said mast to a roof, a pair of rotatable support rings encircling said mast intermediate its height, a pair of rigid supporting rods each having its upper end secured to one of said rotatable support rings, the upper end of each of said rods being rotatable relative to the axis of said mast, and a pair of anchoring members for securing the lower end of each of said supporting rods, each of said anchoring members including a flat base, a bracket secured to each of said bases, each of said brackets having a flange extending angularly relative to said flat base, said brackets being rotatable to align said flanges with the supporting rods, and means for securing each of said supporting rods to the flange aligned therewith.

3. In combination, a mast, a support for rotatably anchoring the bottom of said mast, a support ring assembly encircling said mast intermediate its height, said support ring assembly comprising a pair of superimposed flat rings rotatable relative to each other, said mast being rotatable relative to said support ring assembly, a pair of rigid supporting rods each having its upper end pivotally secured to one of said flat rings and an anchoring member for securing the lower end of each of said supporting rods.

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