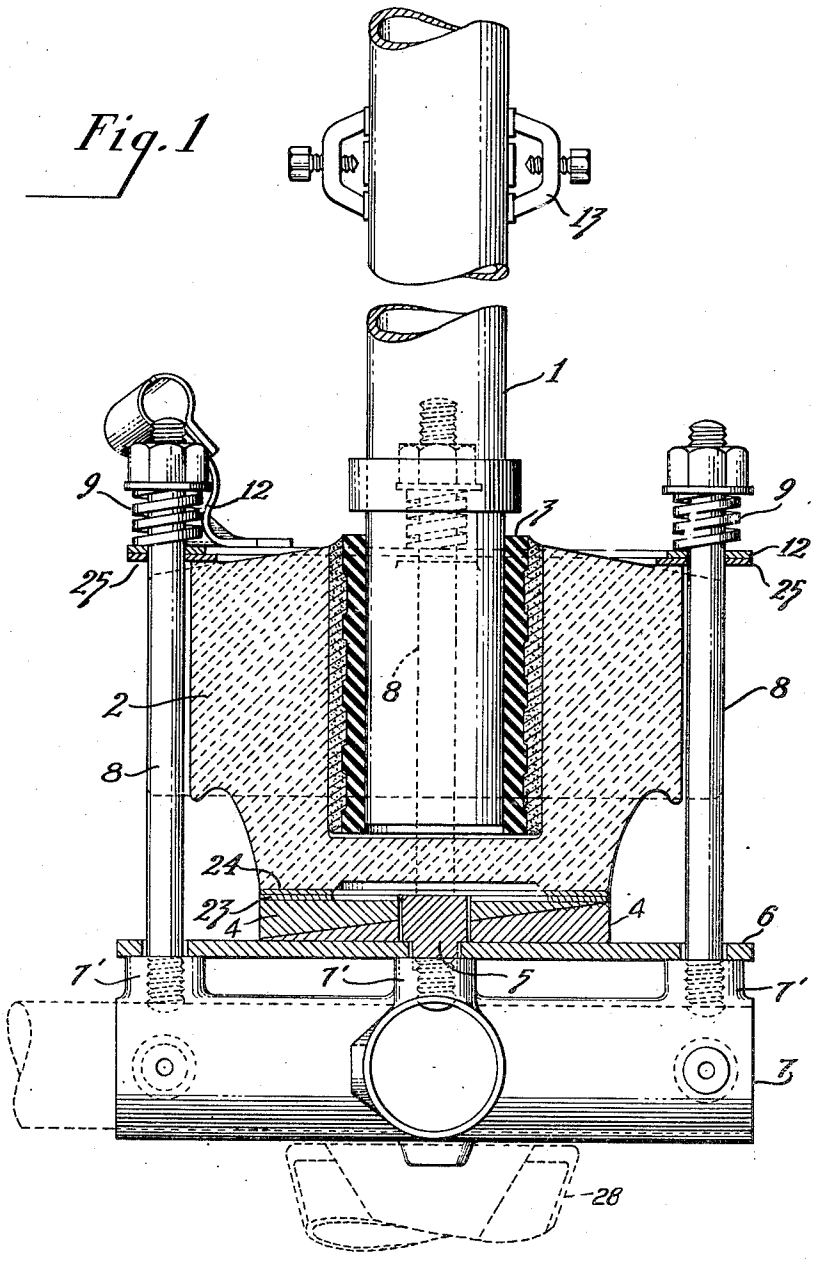
May 22, 1951 F. J. AINSLEY 2,554,288

MAST

Filed Oct. 12, 1945 6 Sheets-Sheet 1

Fig. 1



INVENTOR
Frederick J. Ainsley
BY
H. S. Grover
ATTORNEY

May 22, 1951 F. J. AINSLEY 2,554,288

MAST

Filed Oct. 12, 1945 6 Sheets-Sheet 2

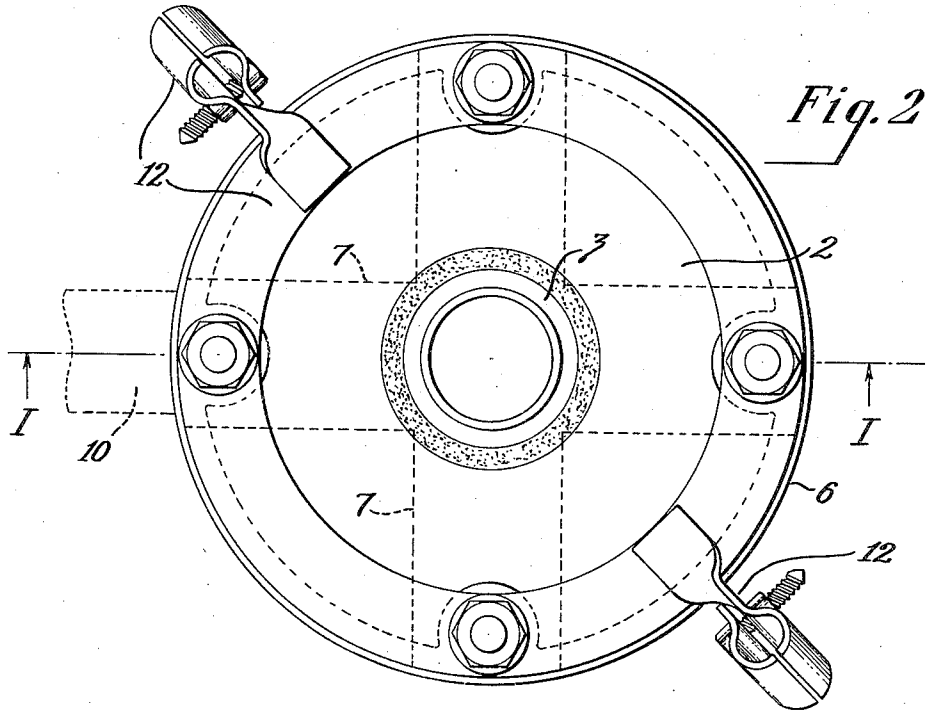


Fig. 2

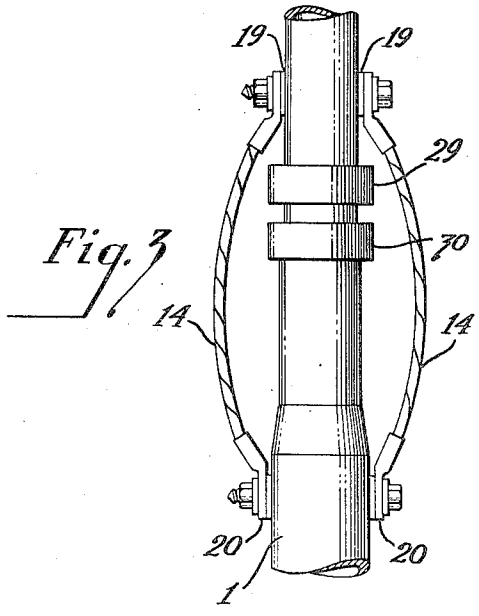


Fig. 3

INVENTOR
Frederick J. Ainsley
BY
H. S. Grover
ATTORNEY

May 22, 1951 F. J. AINSLEY 2,554,288

MAST

Filed Oct. 12, 1945 6 Sheets-Sheet 3

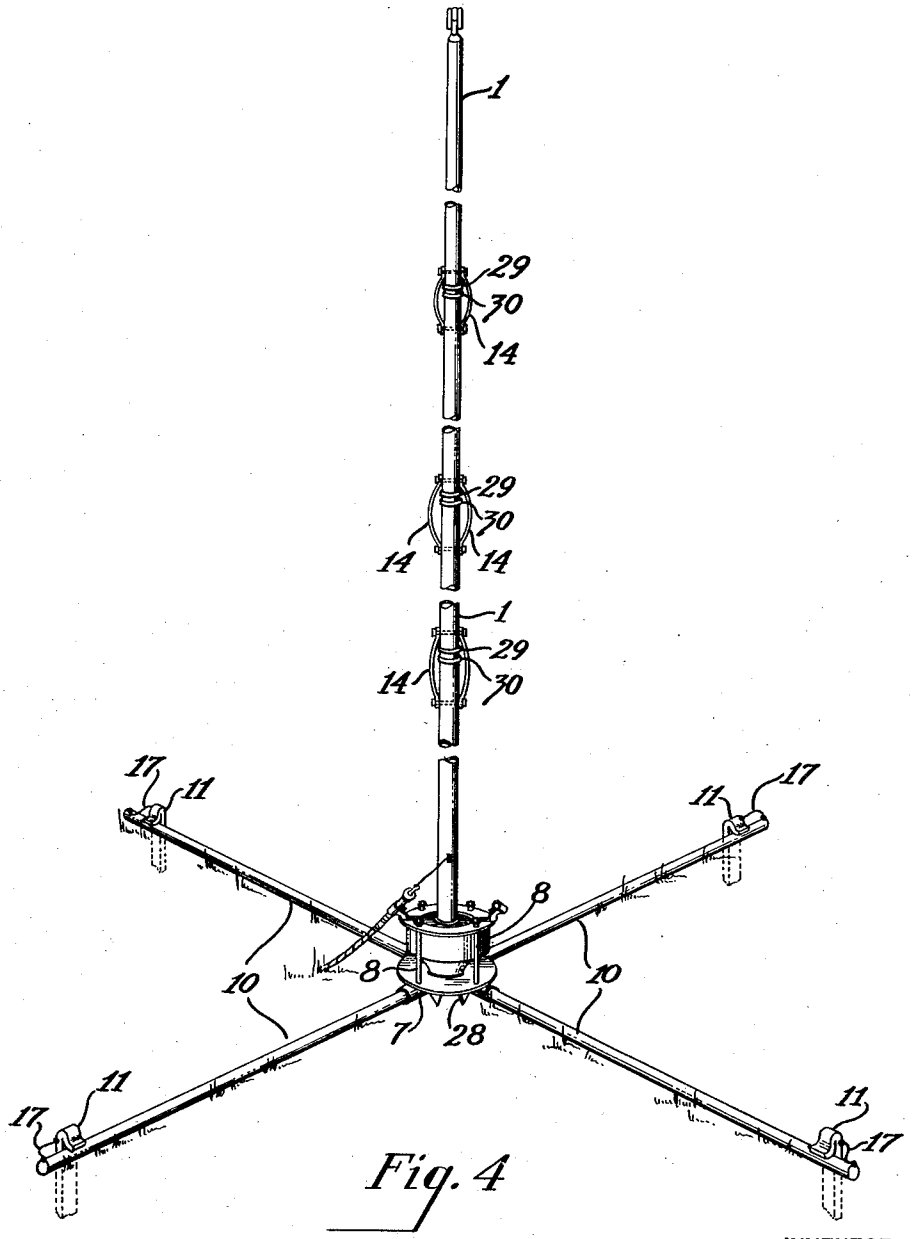


Fig. 4

INVENTOR
Frederick J. Ainsley
BY
H. S. Grover
ATTORNEY

May 22, 1951 F. J. AINSLEY 2,554,288

MAST

Filed Oct. 12, 1945 6 Sheets-Sheet 4

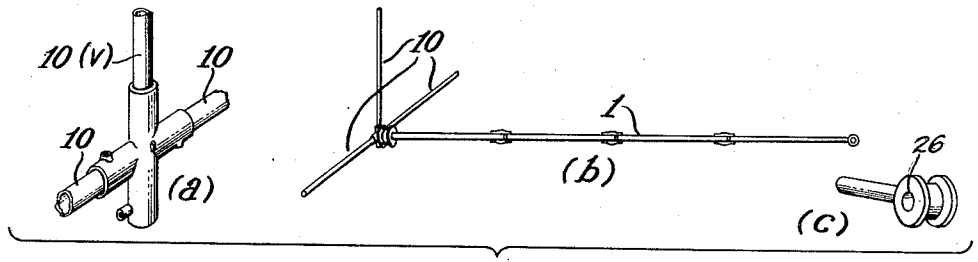


Fig. 5

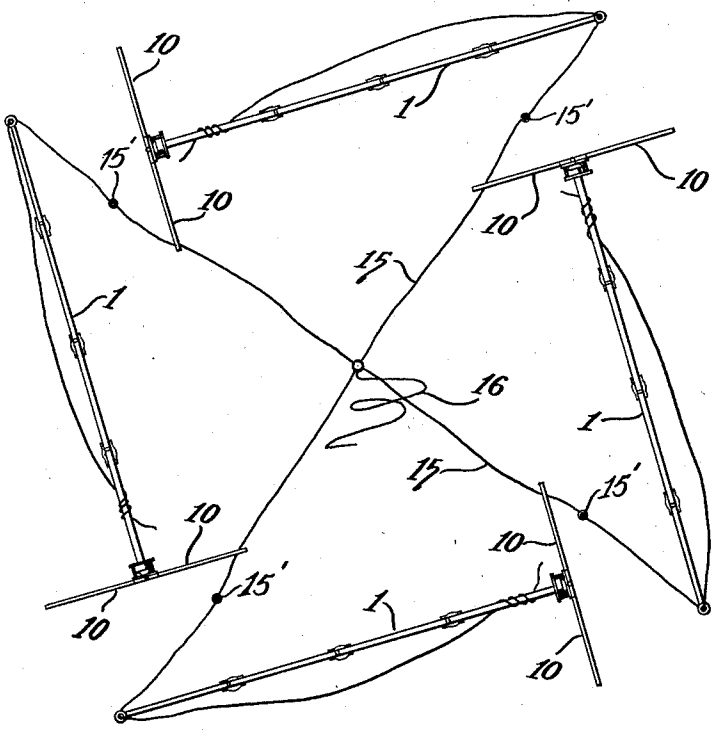


Fig. 6

INVENTOR
Frederick J. Ainsley
BY
H. S. Brower
ATTORNEY

May 22, 1951 F. J. AINSLEY 2,554,288

MAST

Filed Oct. 12, 1945 6 Sheets-Sheet 5

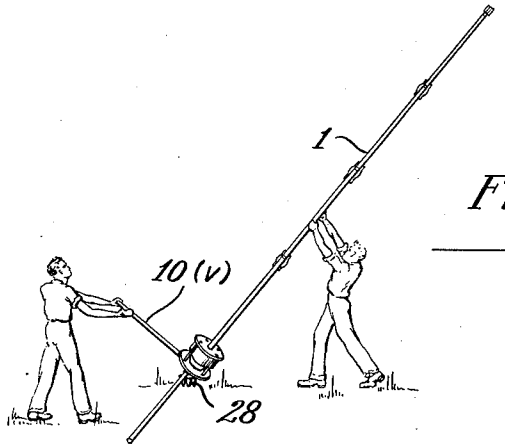
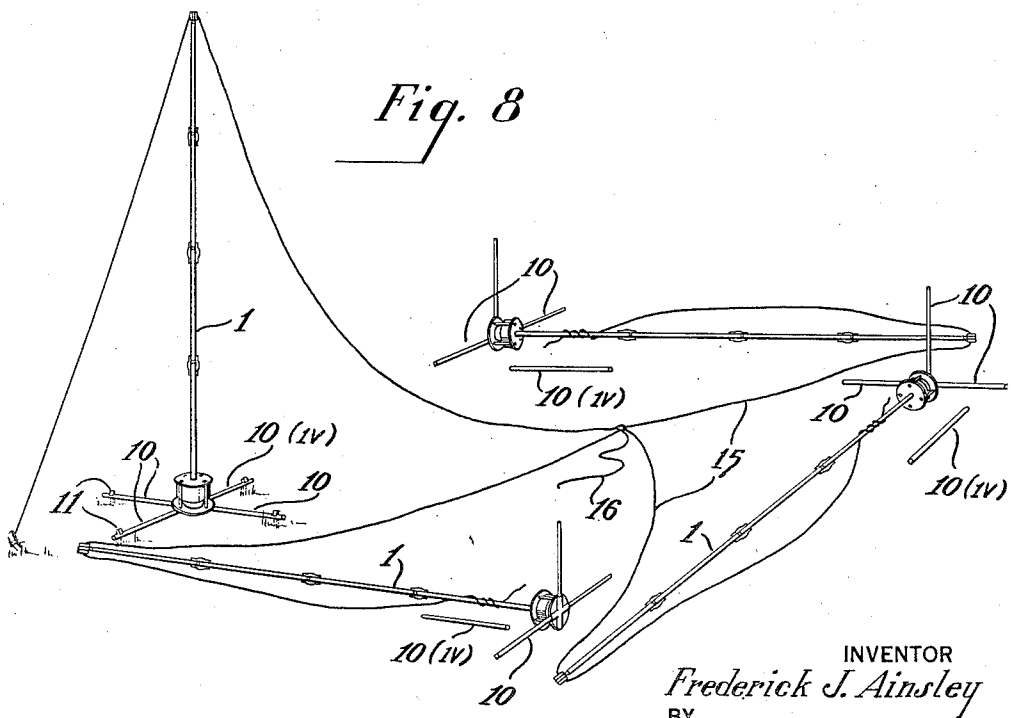


Fig. 7

Fig. 8



INVENTOR
Frederick J. Ainsley
BY
H. S. Brower
ATTORNEY

May 22, 1951 F. J. AINSLEY 2,554,288

MAST

Filed Oct. 12, 1945 6 Sheets-Sheet 6

Fig. 9

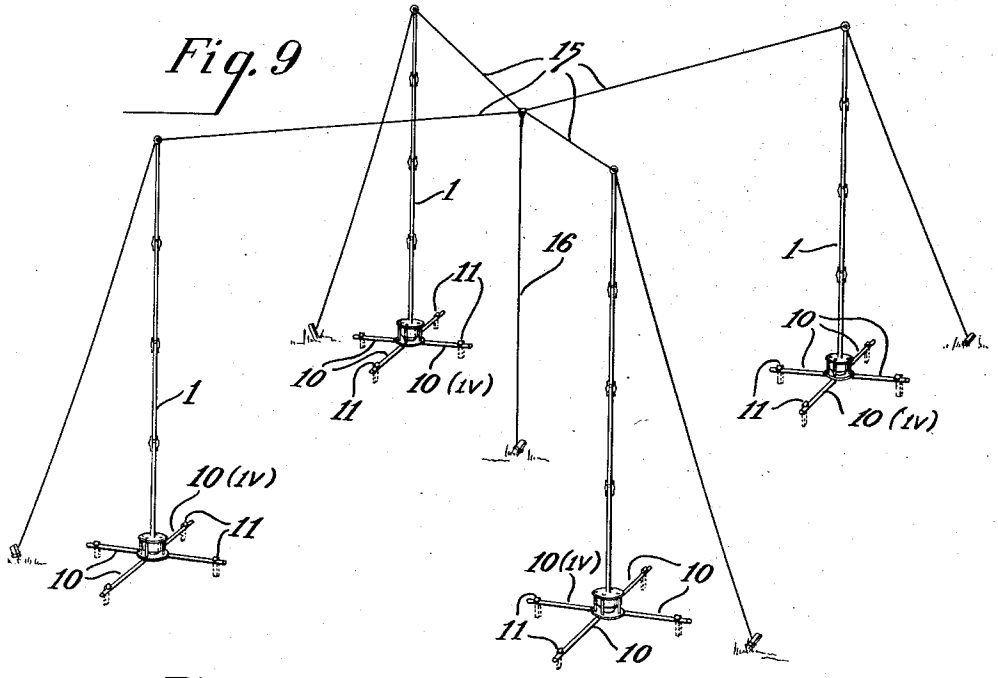


Fig. 10

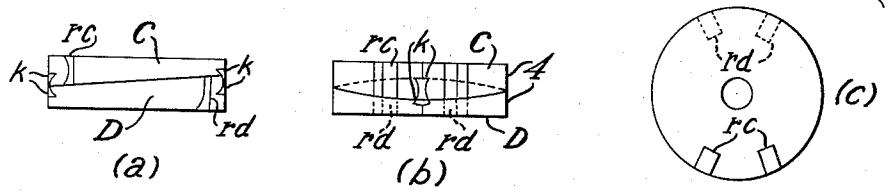
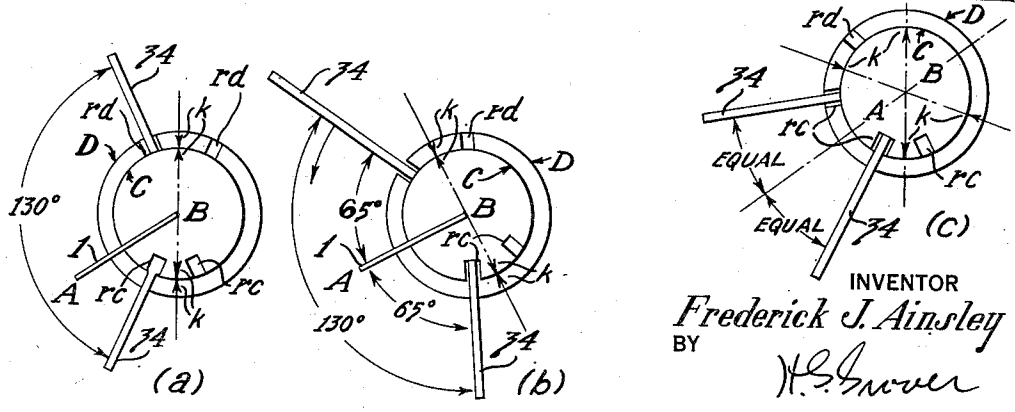


Fig. 11



INVENTOR

Frederick J. Ainsley

BY

ATTORNEY

Patented May 22, 1951

2,554,288

UNITED STATES PATENT OFFICE

2,554,288

MAST

Frederick James Ainsley, Chelmsford, England, assignor to Radio Corporation of America, a corporation of Delaware

Application October 12, 1945, Serial No. 622,042
In Great Britain March 2, 1945

5 Claims. (Cl. 189—28)

1

This invention relates to masts, such as wireless aerial masts, and particularly to portable masts. It provides a mast which incorporates means for ensuring a vertical setting even though the mast is erected on uneven ground. By use of the invention, a plurality of masts, usually four, for a directional aerial system may be made parallel even when standing upon uneven ground.

According to the invention a mast assembly includes the mast itself and a mast base, the latter being provided with a foot member, and a base plate, wherein the foot member or the base plate is provided with a spigot or pivot pin and the base plate or the foot member is centrally apertured, with at least one centrally apertured washer through the aperture in which said spigot passes interposed between the foot member and base plate, the said washer being of wedge shaped cross section and the whole arrangement being such that, by rotation of the said washer, the angle which the mast makes with respect to the base plate may be adjusted.

Preferably there are two centrally apertured washers interposed between the foot member and the base plate, both said washers being of wedge shaped cross section so that, by rotation of the angle which the mast makes with the base plate may be adjusted.

In the application of the invention to wireless aerials, the foot member is preferably of insulating material.

In the application of the invention to directional aerials, each aerial is constituted as set out above and the several aerials may be brought parallel to each other by rotation of the washer or washers, as the case may be.

If the directional aerial system is of the kind including four aerials situated respectively at the four corners of a square with a fifth sense determining aerial at the centre of the square, each of the four aerials is constituted as set out above, diagonal triatics being connected to the tops of the several aerials and connected together at their middles and to the central sense aerial before erection.

The invention will be described in connection with the accompanying drawings, which illustrate a particular directional wireless aerial, which may be considered to consist of four vertical rods erected at the corners of a square, and a central aerial.

In the drawings:

Figs. 1 and 2 are respectively an elevation and plan of the base unit of a mast;

2

Fig. 3 is an elevation showing the method of electrically connecting together adjacent sections of the rod aerial;

Fig. 4 is a perspective view showing a mast erected;

Fig. 5*a* is a detailed perspective view showing the base tubes;

Fig. 5*b* is a perspective view of the mast ready for erection;

Fig. 5*c* is a perspective view of the reel insulator;

Fig. 6 is a plan view of the antenna system in its position prior to erection;

Fig. 7 is a perspective view showing one of the masts in the process of being erected;

Fig. 8 is a perspective view showing one of the masts in an erected position;

Fig. 9 is a perspective view of the antenna system after the four masts have been erected;

Fig. 10*a* is an elevational view of the washers which are employed in leveling the masts;

Fig. 10*b* is another elevation of the leveling washers, the position being taken 90° from that of Fig. 10*a*;

Fig. 10*c* is a plan view of the washer shown in Figs. 10*a* and 10*b*;

Fig. 11*a* is a plan view of the leveling washers prior to rotation;

Fig. 11*b* is a plan view of the washers in a rotated position; and

Fig. 11*c* is a plan view of the washers rotated in opposite directions.

In the various figures, 1 indicates the sections of tube from which the mast, also indicated by reference 1, is built up, 10 indicates base tubes, 11 indicates earth securing stakes, 14 indicates bonding wires by which the various sections of the mast are electrically bonded together, 17 indicates bonding wires by which the base tubes are electrically bonded to the earth securing stakes, and 19 and 20 indicate bolts, nuts, and washers for securing the bonding wires to the lower end of an upper section and to the upper end of a lower section.

In Figs. 1 and 2, 1 is the lower end of the lowermost section of which the mast is constituted, 2 is the foot member, which, since the mast 10 is shown as an aerial, preferably is of insulating material and is centrally bored through part of its depth, 3 is an insulator bush, 4 are two washers having their upper and lower faces not parallel but sloping in opposite directions with respect to each other, 5 is a pin, 6 is the base member or base plate which is supported by a cross piece or supporting member

at bushes 7', 8 are stud bolts, 9 are spring washers, 12 is a bolt ring and cable grip, 13 is a feeder terminal, 23 is a plate washer and 24 is a lead washer interposed between foot member 2 and tapered washers 4, 25 are lead washers interposed between bolt ring 12 and the upper surface of foot member 2.

In Figs. 3 and 4, 29 and 30 are collars fixed to the upper and lower ends of sections 1.

The base unit (see particularly Figures 1 and 2) is constituted as follows:

Base plate 6 rests upon cross-piece 7, spigot 5 is placed in position, and wedge-shaped washers 4 are placed upon plate 6 with spigot or pin 5 serving as a pivot. It should be noted that washers 4 should, preferably, be so relatively angularly disposed, that taken together the outside surfaces are parallel. This is facilitated by keying marks *k* (see Fig. 10). Washers 23 and 24 are then placed upon the sloping washers, and foot member 2 is placed upon the assemblage of washers. Ring 12 is placed upon foot member 2 with lead washers 25 in place. The whole assemblage is then bolted together by stud-bolts 8 which pass through holes in ring 12 and are screwed into bosses 7' on cross-piece 7. Recesses are provided in the side of foot member 2, for the accommodation of the shanks of bolts 8.

In order to allow rain to run off it, the top face of member 2 is sloped outwards and is so shaped that the metal ring makes contact with it at four places only.

The mast aerial comprises a number of tubular sections 1 of convenient length (as shown in Fig. 4), to form a vertical aerial of approximately 20 feet high. The upper end of each tubular section is belled out and the lower end tapered so that they may easily fit together.

Collars 29 and 30 are fitted at the top and bottom of each tubular section 1 and so spaced that when sections are assembled there is a gap between adjacent collars. This spacing permits the use of a parting tool, which can be placed in the gap to force apart the tubes if they are too tight to be removed otherwise. By this means, the rod aerial can be made rigid and yet easily demountable without loose bolts, nuts, etc.

The sections of rod aerial having been thus assembled and provided at the top with a reel insulator 26 (as shown in detail by Fig. 5*c*) which is free to swivel, to which a stay wire is to be attached, the end of the lowermost section is provided with an insulator bush 3 and inserted into the central bore hole in foot member 2. It would perhaps be more correct to say that the base unit is slipped onto the end of the mast assembly, it being observed that the latter is lying lengthwise on the ground.

One end of each of three, of an eventual four, base tubes 10 is inserted into the end of each of three of the branches of cross piece 7, as indicated in Figure 5*a*. This mast is then ready, for erection, as indicated in Fig. 5*b*.

If, as may well be the case, the mast aerial thus assembled is one of four constituting four corner aerials of a quincuncial aerial system, the several mast units and base units are so assembled that the base units when the masts are erected, will be properly situated over base locating plates 28, see Figs. 1, 4 and 7, the triatics 15 are attached to the tops of the masts, and the central aerial 16 is attached to the point of meeting of the triatics which, of course, are connected together. The disposition of the system is then as illustrated in Fig. 6. The positions of the base locating plates have been accurately determined by any convenient means, for example, by means of a standard system of chains connected to form a right-angled isosceles triangle the base of which is laid on the ground along a line which is to form one diagonal, say the north-south diagonal, of the aerial system, the ends of the base thus defining two corners, and the triangle disposed first to one side and then to the other side of the base so that the apex defines successively the other two corners.

Using the vertical one (10(*v*) of Figs. 5*a* and 7) of the base tubes 10 as a lever, an erector, with the assistance of a second erector, erects the masts, one at a time, in the manner indicated in Fig. 7. As each mast is erected, the fourth base tube 10(*iv*) is inserted in the end of the fourth member of cross piece 7, see Figs. 8 and 9. Earth stakes 11 are then fixed. Fig. 9 shows the completely erected and levelled aerial system.

Levelling is effected as follows, see Figs. 10 and 11.

In Fig 11, washer D is indicated as having a larger diameter than washer C. This is merely for convenience of representation. Observing the direction in which a mast leans, the erectors or riggers rotate both washers 4 (separately identified in Figs. 10 and 11 as upper washer C and lower washer D) in the same direction until the line joining marks *k* forms right-angles with the line A—B of Figs 11*a* and 11*b*, which is the projection of the mast. Rotation is effected by tommy bars 34 inserted in recesses *rc* and *rd*, see Figs. 10 and 11. This operation, indicated in Figs. 11*a* and 11*b* as keeping marks A in line, has no effect upon the slope of the mast. Next, the two washers are rotated at any equal angular distance with respect to each other, but in opposite directions with respect to marks K, see Fig. 11*c*. Thus the mast is adjusted so as to stand perfectly erect.

It may usefully be observed, that triatics 15 and the stay wires are preferably continuous, and the wires of which they are formed are passed through rectangular insulators 26. A stop 15' is fitted to the triatics so that the stays and triatics hold the several masts in position, the stop also defining the amount of sag.

What is claimed is:

1. An aerial mast base comprising a foot member having a socket therein to receive an aerial mast, supporting means, a pivot pin carried centrally of said supporting means, a pair of wedge-shaped washers surrounding said pivot pin and interposed between said foot member and said supporting means whereby rotation of one washer with respect to the other adjusts the angle which said aerial mast makes with said supporting means, a plurality of studs having the lower ends thereof secured to said supporting means at points surrounding said pivot pin, and retaining means at the other end of said studs clamping said foot member to said supporting means in the adjusted position of the aerial mast.

2. An antenna mast base comprising a base plate, a tubular cross member, four bolts having their lower portions secured to an end portion of said tubular cross member, a foot member of insulation material located above said plate and having an aperture to receive an antenna mast and recesses receiving said bolts, spring tension means arranged with each bolt fastening said foot member and said base plate to said tubular

cross member, a pivot pin secured to said tubular cross member, and a pair of wedge-shaped washers surrounding said pin and interposed between said foot member and said base plate for adjusting the mast with respect to the base plate.

3. An antenna mast base comprising a base plate, a tubular cross-member, a plurality of bolts each having its lower portion secured to an end portion of said tubular cross-member, a foot member of insulation material located above said base plate and having an aperture to receive an antenna mast and recesses provided to receive said bolts, a ring member having apertures receiving said bolts, said ring member being positioned outside of said foot member and fastening said foot member and said base plate to said tubular cross-member, a pivot pin secured to said tubular cross-member, and a pair of wedge-shaped washers surrounding said pin and interposed between said foot member and said base plate for adjusting the mast with respect to said base plate.

4. An aerial mast base comprising a foot member of insulating material having a socket therein to receive an aerial mast, a supporting means, a pivot pin carried centrally of said supporting means, a pair of washers having complementary sloping surfaces interposed between said foot member and said supporting means and surrounding said pivot pin whereby rotation of one washer with respect to the other adjusts the angle which said aerial mast makes with respect to said supporting means, a plurality of studs having the lower ends thereof secured to said supporting means at points surrounding said pivot pin, and retaining means at the other end of said studs clamping said foot member to said

supporting means in the adjusted position of the aerial mast.

5. An aerial system of the kind which includes a plurality of spaced masts supporting the wires of said aerial system, means insuring a vertical setting even though the masts are erected on uneven ground, said means comprising mast bases supporting the masts, each of said mast bases having a foot member, a base plate, a supporting member, a pivot pin secured to said supporting member and passing through an aperture in said base plate, a pair of centrally apertured washers surrounding said pivot pin, each washer having a wedged-shaped cross-section, said washers being interposed between said foot member and said base plate, whereby upon rotation of one washer with respect to the other the angle of each mast relative to its base plate may be adjusted, a plurality of studs having the lower ends thereof secured to said supporting member at points surrounding said pivot pin, and retaining means at the other end of said studs clamping said foot member to said supporting member in the adjusted position of the aerial mast.

FREDERICK JAMES AINSLEY.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
846,001	Blessing	Mar. 5, 1907
1,182,881	Frye	May 9, 1916
1,679,254	Masson	July 31, 1928
1,791,425	Mundy et al.	Feb. 3, 1931
2,099,254	Ballman	Nov. 16, 1937