March 12, 1929. M. MATHIESEN 1,705,262

COLLAPSIBLE LOOP AERIAL

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Fig. 1.

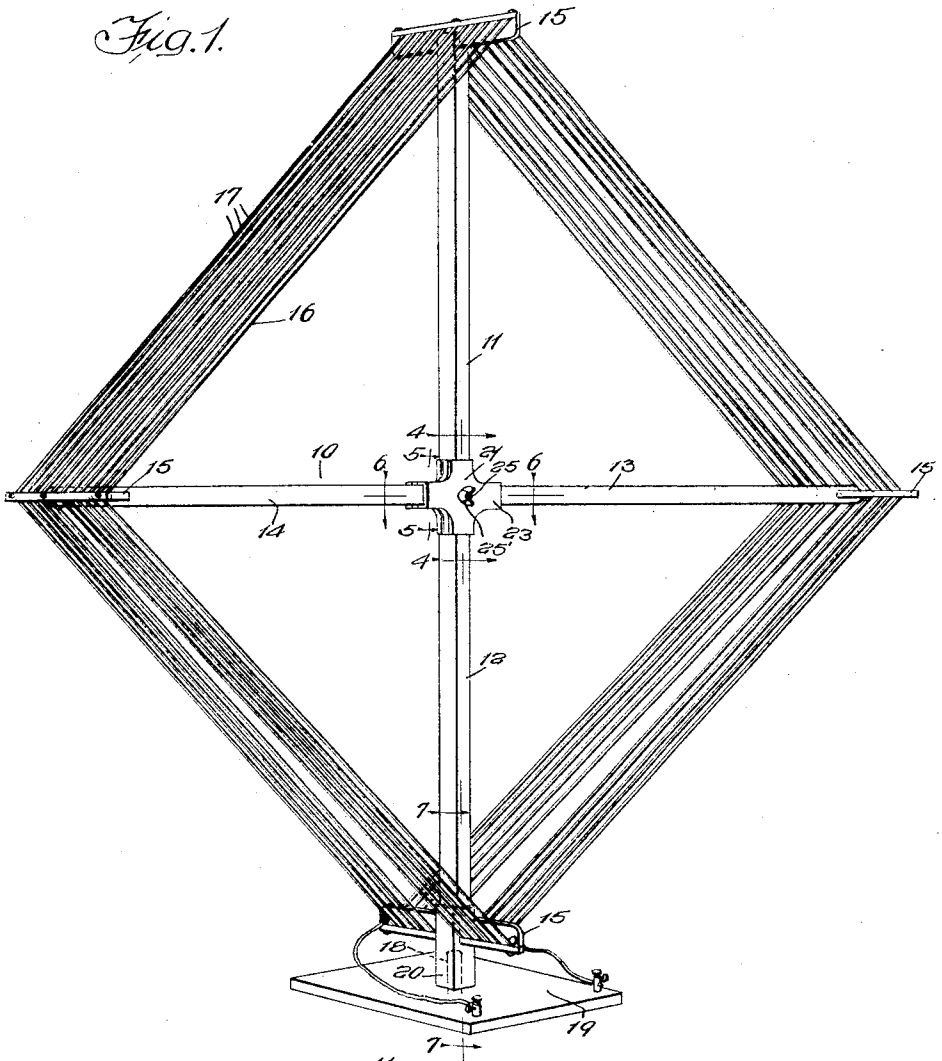
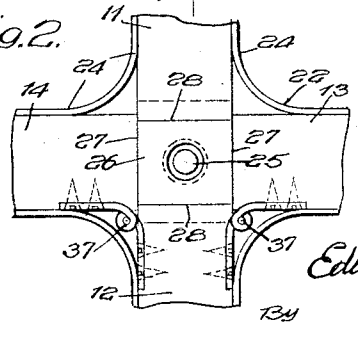


Fig. 2.



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Fig. 3.

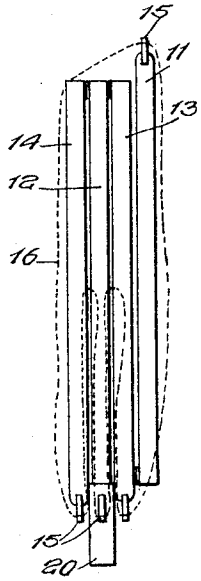


Fig. 4.

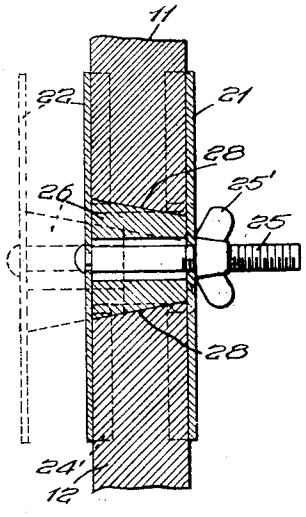


Fig. 5.

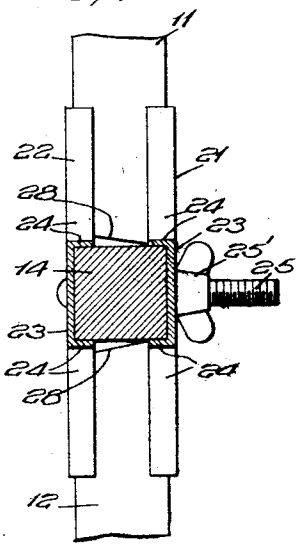


Fig. 6.

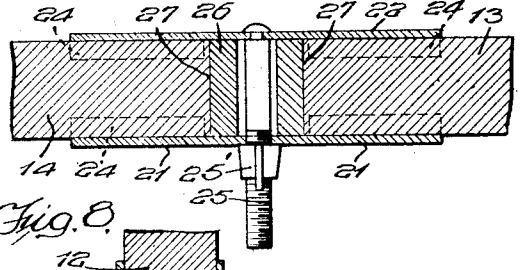


Fig. 7.

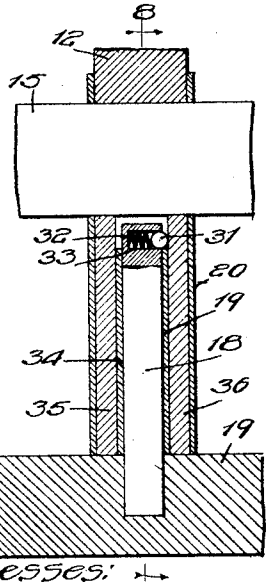


Fig. 8.

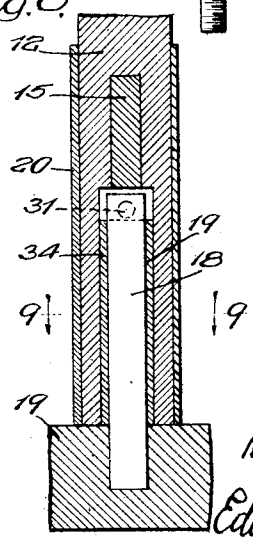
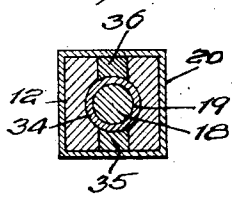


Fig. 9.



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Patented Mar. 12, 1929. 1,705,262

UNITED STATES PATENT OFFICE.

MARIUS MATHIESEN, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO WILLIAM J. SANDBERG.

COLLAPSIBLE LOOP AERIAL.

Application filed March 6, 1925. Serial No. 13,599.

My invention relates to loop aerials and has special reference to improvements in collapsible loop aerials.

The object of my invention is to provide a loop aerial which can be manufactured at relatively low cost, which can be readily collapsed into a compact form for shipment, which shall be likewise readily arranged in extended form for use, which shall have simple means for properly tensioning the plurality of turns of wire thereon.

A further feature of my invention relates to a base upon which the aerial is mounted to be swung around on a vertical axis and means for removably retaining the base on the aerial for the purpose of making the device readily portable, as a unit, when in extended condition.

Another feature relates to an improved manner of making the lower end of the mast whereby the projection of the lower cross bar through the mast is simplified.

My invention will be more readily understood by reference to the accompanying drawings forming part of this specification and in which;—

Figure 1, is a perspective view of a collapsible loop aerial made in accordance with my invention;

Figure 2, is a fragmentary elevation of the center of the frame as it would appear with one clamping plate removed;

Figure 3, is an elevational view of the frame shown collapsed to a compact bundle;

Figure 4, is a fragmentary, vertical, central section on the line 4—4 of Figure 1;

Figure 5, is a fragmentary, vertical section on the line 5—5 of Figure 1;

Figure 6, is a fragmentary, vertical, central section on the line 6—6 of Figure 1;

Figure 7, is a fragmentary, vertical section on the line 7—7 of Figure 1;

Figure 8, is a vertical, central section on the line 8—8 of Figure 7; and

Figure 9, is a horizontal section on the line 9—9 of Figure 8.

In said drawing, 10 represents generally a collapsible frame comprising an upper vertical arm 11 and a lower vertical arm 12 and two horizontal arms 13 and 14. At the ends of the arms are secured cross members 15 on which the aerial wire 16 is wound in the form of a plurality of turns 17. The four arms radiate from a common center where means, to be more fully described hereinafter, are provided for clamping them firmly together and for forcibly radially projecting some of the arms during the clamping operation to properly tension the turns 17 of the wire 16.

At the lower end of the lower vertical arm 12 I provide means for normally holding the frame in vertical position and permitting to be swung around on a vertical axis, so that the one using it can readily set it to obtain the best results. This swivelling mounting comprises a vertical fixed spindle 18 secured upright in a suitable base 19 or other support. The lower end of the arm 12 is provided with an axial opening 19 to receive the spindle 18. To make the lower end of the arm 12 more durable I provide a tubular casing 20 for this end and through which, as well as through the arm, the lowermost cross member 15 projects.

The means at the center of the frame for clamping and spreading the arms comprises two opposed clamping plates 21 and 22. Each of these plates is formed with a radial arm 23 for each of the arms of the frame 10 and the side edges of each of these arms are bent inwardly to form edge flanges 24 so that when the arms are opposed a socket is presented for the inner end of each of the arms of the frame. I provide a central clamping bolt 25 which I preferably rigidly secure at one end in the plate 22 and adapted to project through a central opening in the opposite plate 21. Preferably I provide a winged nut 25′ on the screw for clamping the two plates tightly upon the assembled inner ends of the arms. When the plates are tightly clamped upon the arms they are held rigidly projecting to form the frame 10.

In order to render it an easy operation to place the arms with their inner ends together and the plates upon them ready to be clamped, I provide means whereby the arms can be placed in such position without the necessity of completely tensioning the loop wire 16. For this purpose I provide a removable block 26 for placement between the inner adjacent ends of the arms of the frame. Two of the contacting sides 27 of the block 26 are square, as shown in Figure 6, and the other two opposing sides 28 are inclined to make the block in the form of a wedge. The ends 29 of the arms which con-

tact with the sides 28 are correspondingly inclined. This construction permits the assembly of the block 26 with the arms and the plates, as indicated in dotted lines in Figure 4, wherein the block 26 is shown as just started in between the adjacent ends of the arms of the frame. Then the plates 22 and 21 are placed in position, the bolt 25 being projected through a central opening 30 in the block 26. The bolt 25 is long enough so that the nut 25′ can be entered upon the bolt at this time, and upon screwing the nut home the plates 21 and 22 are clamped tightly together upon the arms of the frame, during which process the wedging block 26 is forced inwardly between the arms forcibly relatively projecting at least two of the arms radially outward and thus tensioning the loop wire.

As the loop aerial is easily portable, I provide means for yieldingly retaining the base 19 and the frame together so that if the device is picked up by the frame work the base will not drop off. For this purpose I provide a spring pressed ball 31 in the upper end of the spindle 18. This ball is mounted in a transverse pocket 32 in the upper end of the spindle and is constantly forced outwardly by a spring 33 in the pocket 32 beneath the ball 31. The mouth of the pocket 32 is slightly compressed after the ball is inserted to prevent the escape and loss of the ball. As best shown in Figure 7, the ball is projected beyond the cylindrical surface of the spindle 18 and over the top of a tubular bushing 34 which I insert into the lower end of the arm 12. When the base 19 is forcibly withdrawn from the frame the ball is pushed back into the pocket 32 and likewise when the base and frame are assembled. This construction permits the frame 10 to swing around on the spindle 18 but prevents the base being inadvertently dropped off.

All but the lower cross piece 15 can be readily secured on the outer ends of the several arms, but this lower one is projected through the lower end of the lower part 12 of the mast. I have devised a very simple way in which to effect the insertion of this lower cross piece in through the mast. First I cut a vertical central slot 35 in the lower end of the mast which extends from the lower end up to the upper edge of the lower cross piece 15 and of a width to receive the piece 15, as best shown in Figure 8. The tubular casing 20 reinforces this lower end and is provided with suitable openings to permit the projection of the cross piece 15 through same. I first assemble the cross piece with the tube and then place both on the mast together, sliding the cross piece up through the slot 35 to its upper end. To permanently retain the cross piece in position I drive a block 36 into the slot 35 to fill the same below the cross piece 15. Then I make the central vertical opening 19 in the lower end of the mast to receive the bearing tube 34. This construction is very cheaply made and is very durable.

Instead of the inner ends of the arms 11, 12, 13 and 14 being entirely free of each other, I sometimes prefer to hinge the two horizontal arms 13 and 14 to the upper end of the lower part 12 of the mast. This construction is best shown in Figure 2, the hinges 37 being preferably let into the sides of the arms to avoid the flanges 24 on the plates 21 and 22.

As many modifications of my invention will readily suggest themselves to one skilled in the art, I do not limit or confine my invention to the specific details of construction herein shown and described.

I claim:

1. In a collapsible loop aerial, a plurality of pairs of arms arranged to radiate from a center, clamping plates for binding the inner ends of the arms together, a wedge block for interpositioning between the inner ends of the arms, clamping plates between which the wedge block is arranged and a screw bolt passing through the plates and the wedge block for securing the parts in loop extended relation.

2. In a loop aerial of the kind described, a mast adapted to be swivelly mounted at its lower end, a cross bar for wires projected through the mast adjacent to its lower end, a reinforcing tube on the lower end of the mast, the mast slotted longitudinally for permitting the assembly of the parts, and means closing the slot below the assembled position of the cross arm.

3. In a loop aerial of the kind described, a mast adapted to be swivelly mounted at its lower end, a cross bar for wires projected through the mast adjacent to its lower end, a reinforcing tube on the lower end of the mast, the mast slotted longitudinally for permitting the assembly of the parts, means closing the slot below the assembled position of the cross arm, and a tube inserted in the lower end of the mast to form a bearing.

4. In a collapsible frame for a loop aerial, a plurality of arms adapted to be arranged in loop extended condition, radiating from a center, clamping plates for holding the inner ends of the arms together, the plates formed with radiating arms bent at their edges to engage around the inner ends of the frame arms, as and for the purpose specified and a wedge block between the plates and adapted to be forced into alignment with the arms by the plates.

5. In a collapsible loop aerial, a plurality of arms adapted to be arranged, in extended relation, radiating from a center, a pair of opposed clamping plates, the plates formed with radial arms bent in at their edges and

adapted to provide sockets for the inner ends of the frame arms and means for clamping the plates tightly upon the inner ends of the frame arms, as and for the purpose specified and a wedge adapted to be arranged between the inner ends of one pair of arms and to be held in position by the plates.

6. In an aerial loop frame of the kind described, a mast, a cross member above the lower end of the mast, the lower end of the mast provided with a central slot projecting up from its lower end, a tubular reinforcing member for the lower end of the mast, provided with oppositely disposed openings through which the cross member can be projected, the slot in the mast permitting the assembly of the cross member and the tubular member with the mast after the cross member has been projected through the tubular member, and means for permanently retaining the parts in assembled relation.

In testimony whereof, I have hereunto set my hand, this 27th day of February, 1925.

MARIUS MATHIESEN.