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J. A. FLIPPEN

2,523,531

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2 Sheets-Sheet 1

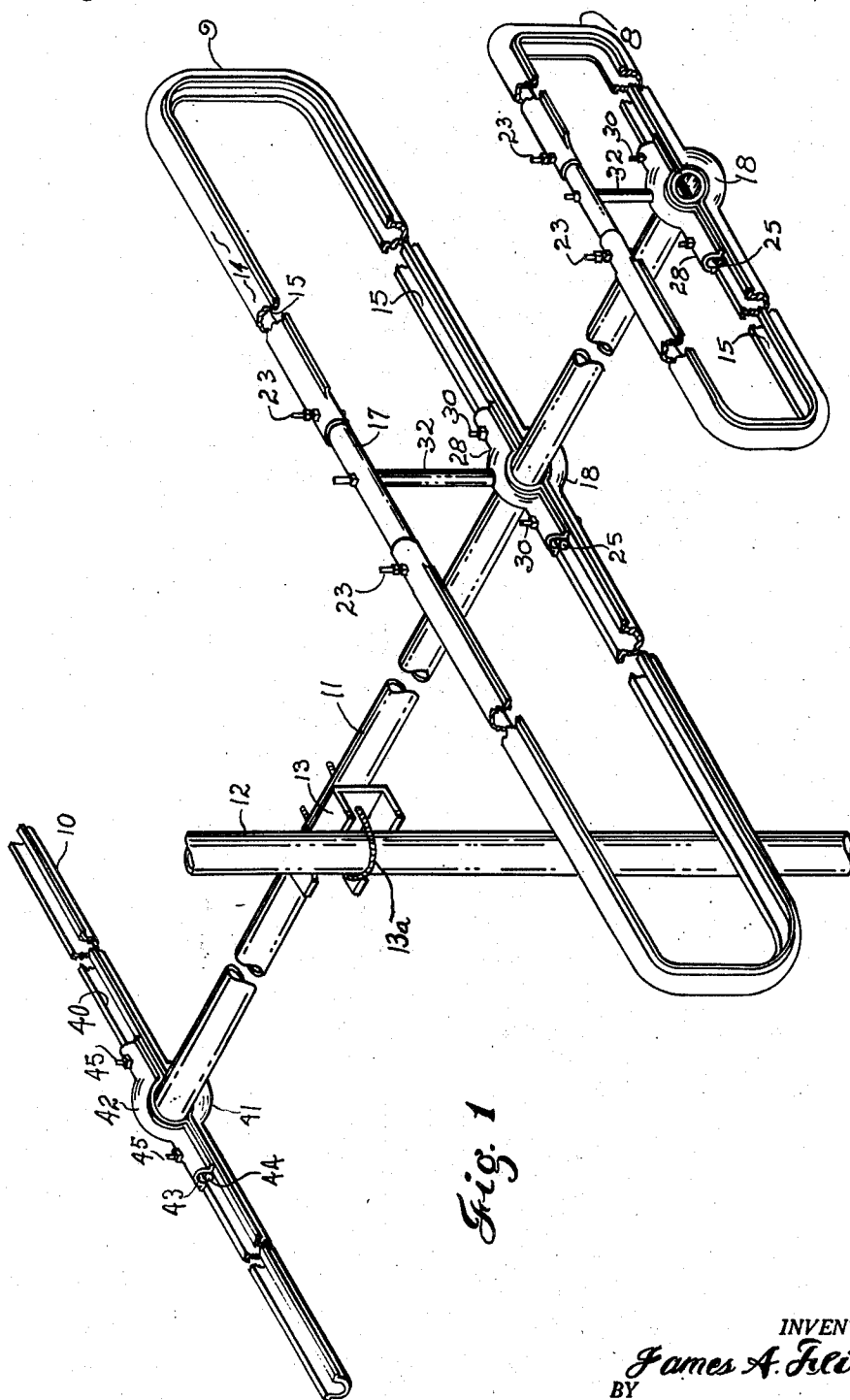


Fig. 1

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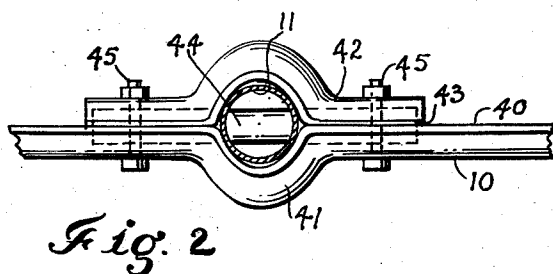
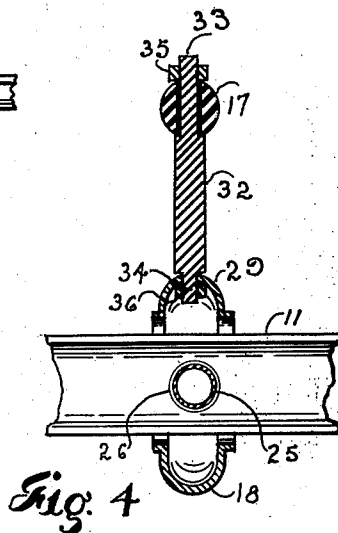
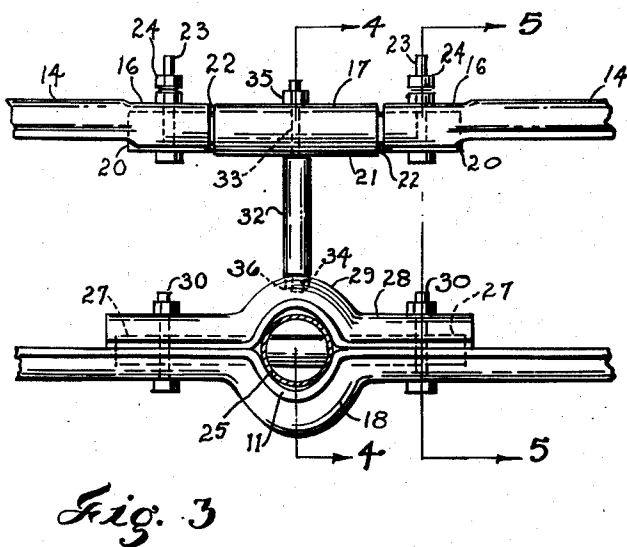
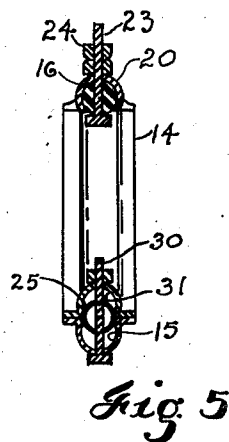
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2 Sheets-Sheet 2



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3 Claims. (Cl. 250—33)

1

This invention relates to antennas and more particularly relates to an antenna for receiving television broadcasts, and has as an object the provision of an antenna for the purpose stated which is strongly, yet economically, constructed, which is adapted for sale and shipment as a knocked-down kit, and which may be assembled at the point of use with little expenditure of time or effort.

A further object of the invention is to provide a television receiving antenna having a surface area large in proportion to the amount of material used in its construction, so as to afford good wave reception at a minimum of cost.

Another object of the invention is to provide a folded dipole television antenna having simple, rugged, and effective clamping means for securing it to the cross-arm of an antenna mast.

The invention possesses other objects and advantages which will become apparent as the following description of a preferred embodiment of the invention proceeds, or from the accompanying drawings, in which:

Fig. 1 is a perspective view of a television reception antenna array embodying the principles of my invention, showing dipole antenna parts assembled and secured upon the customary cross-arm and mast;

Fig. 2 is an elevational view illustrative of the clamping mechanism for securing antenna parts to the cross-arm;

Fig. 3 is an elevational view illustrative of the middle portion of a folded dipole antenna, and showing means for insulating and bracing the poles;

Fig. 4 is a vertical sectional view taken on the plane of section indicated by the line 4—4 of Fig. 3; and

Fig. 5 is a vertical sectional view taken on the plane of section indicated by the line 5—5 of Fig. 3.

Having reference now to the details of the drawings and more particularly to the general assembly of my invention shown in Fig. 1, my improved television receiving antenna preferably comprises a high-frequency folded dipole antenna 8, a low-frequency folded dipole antenna 9, and a dipole reflector antenna 10, secured to a cross-arm 11, which in turn is secured to a mast 12. The cross-arm 11 is formed of round stock, preferably tubular, and may be secured to the mast 12 by a notched bracket 13 and a U-bolt 13a. The dipole antenna parts 8, 9 and 10 are formed of channel-shaped electro-conductive material, such as half-round and flanged aluminum channel

2

stock, and are secured to the cross-arm 11 in a manner presently to be described.

As the folded dipole antennas 8 and 9 are substantially alike except for size, a description of the details of one will suffice as a description of the other. In each, a suitable length of channel stock 14, preferably flanged to give it additional strength, is folded and bent to the general shape of an elongated parallelogram, having the channel 15 on the inner side. The ends 16 of the member 14 approach each other in the mid-portion of one of the longer sides of the parallelogram, but do not meet, forming a gap which is bridged by an insulator rod 17 of suitable dielectric material. The mid-portion of the other longer side of the parallelogram is bent, opposite to the insulator rod 17 to form an arch 18. The arch 18 need not be a true arch, but is designed to extend around one half the periphery of the cross-arm 11 and to bear against the cross-arm on two or more elemental lines thereof so as to resist tilting with respect to the cross-arm, the radii of the arch being held radial to the cross-arm when the arch is held snugly to the cross-arm.

The insulator rod 17 has end portions 20 adapted to fit within the channel 15 of the member 14, and has a center portion 21 of greater diameter, forming shoulders 22 against which the ends 16 of the member 14 abut. Binding-posts 23 extend through the channel ends 16 and through the dielectric rod ends 20, serving not only to connect wiring (not shown) to the electro-conductive antennas by binding nuts 24, but also to secure the dipole ends to the insulator rod.

Each dipole antenna is clamped to the cross-arm 11 at its arch 18. A tube 25, or like round member such as a rod, extends through holes 26 in the side-walls of the cross-arm 11 and has its ends 27 disposed in the channel 15 at each side of the arch 18. A clamp bar 28, made like the antenna of channel-shaped material and having an arch 29 of such dimension as to be complementary to the arch 18 in encompassing the cross-arm 11, is bolted to the antenna member 14 by bolts 30 with its channel 31 juxtaposed to the channel 15. The ends 27 of the tube 25 are held between the clamp bar 28 and the member 14 in the juxtaposed channels 31 and 15 thereof, and the cross-arm 11 extends through the opening formed by the arches 18 and 29. The bolts 30 pass through holes in the tube 25 as well as through the clamp bar 28 and the antenna member 14.

To afford rigidity to the antenna, the con-

3

vergerly folded ends 16 of the member 14 are braced by a spacer bolt 32 to the opposite long side of the antenna. The spacer bolt 32 has threaded ends 33 and 34 of reduced diameter extending through the insulator rod 17 and through the arc 29 of the clamp bar 28 and held thereto by nuts 35 and 36. The thicker central portion of the bolt 32 thus spaces the long sides of the folded dipole antenna at a fixed distance apart.

The dipole reflector antenna 10 is secured to the cross-arm 11 in the same manner as are the folded dipole antennas 8 and 9. The reflector is formed of a single length of electro-conductive material, not folded, and having a channel 40, and an arch 41 at its center. An arched clamp bar 42, similar to the clamp bar 28 except that it need not have a hole for reception of a spacer bolt, cooperates with the arch 41 to encompass the cross-arm 11. The channel 43 of the clamp bar 41 is juxtaposed to the channel 40 to grip a tube 44 disposed in the channels when tightened thereon by bolts 45. The tube 44 passes through the cross-arm 11.

The dimensions of the folded dipole antennas 8 and 9, and of the reflector antenna 10, will of course depend upon the wave-frequency of the transmitting stations whose broadcasts are to be picked up. In general practice, and in view of the wave-bands presently authorized for television, it is convenient to have the low frequency antenna 9 proportioned to receive with maximum strength a wave of approximately 66 megacycles, that being the main frequency of the 44-88 megacycle band, and to have the high frequency antenna 8 proportional for maximum reception of a wave of approximately 192 megacycles, that being the mean frequency of the 174-210 megacycle band. The length of the reflector 10 may preferably be about five percent longer than one-half the optimum wave length of the low frequency antenna 9.

In general, as is well known, television receiving antennas are cut in multiples of half wave-lengths, with reference to the mean wave length of the broadcast band. The folded dipole construction of the antennas 8 and 9 permits them, without being inconveniently large, to have a length factor of 2. That is, they may each, conveniently, have an effective length, measured on the perimeter of the electro-conductive member 14, of one full wave length, at the mean of their respective bands. The efficiency of a folded dipole antenna is several times greater than the efficiency of a straight antenna, and this greater efficiency is further increased in the present invention by the channel-shape of the members 8, 9 and 10. These members, due to their channel shape, present for reception of electro-magnetic waves areas much larger in proportion to the amount of material used in them than can be obtained from rods or tubes of equal rigidity. Conversely, it may be said that they are much lighter, and yet strong, than rods or tubes of equal receptive area.

The advantages obtained from the channel shape of the members 8, 9, and 10 are not, however, confined to greater receptivity and rigidity. By utilizing the channels as beds for the tubes 25 and for the insulating rods 17, a rigid, convenient, and easily understood method of assembling an antenna kit is obtained, as well as an attractive and compact appearance. These advantages are further enhanced by the arched clamp bars 28 and 42 which afford both the

4

structural and the aesthetic effects of symmetrical combination with the arches 18 and 41. For example, the folded dipole antenna 9 is held in a plane at a right angle to the cross-arm 11 by the fit of the arches 18 and 29 upon the cross-arm 11. When the arches are clamped upon the cross-arm by the bolts 30, the spacing of their channel walls affords a zone of contact along elemental lines of the cross-arm sufficient to prevent the antenna from tilting from its intended vertical plane. Also, by positioning the spacer bolt 32 between the center of the securely held insulating rod 17 and the center of the arched clamp bar 28, the folded antenna is maintained in its original rectangular shape, and warping and distortion due to wind and temperature are minimized.

To assemble the antenna of my invention, only a wrench is required. The spacer post 32 may first be secured between the insulating rod 17 and the clamping arch 28. The ends 20 of the insulating rod are then secured in the channel ends 16 by the binding posts 23, closing and completing the rectangular form of the dipole antenna. The clamp arch 28 may then be aligned roughly with the arch 18, but is not yet clamped thereto. The dipole antenna is then placed upon the cross-arm 11, the latter extending through the opening made by the arches 18 and 29, and is moved thereon to bring the channels 15 into alignment with the holes 26. The tube 25 is placed in the channel 15 and moved through the holes 26 to a position wherein it may receive the bolts 30. When the bolts 30 have been inserted and tightened, the dipole antenna is secured in its intended position. Securing the reflector 10 to the cross-arm is similarly accomplished, as will be understood. The cross-arm 11 is secured in the desired orientation upon the mast 12 by the U-bolt 13a.

Obviously, my invention is subject to modifications in form and arrangement which will occur to those skilled in the art, without departing from the spirit of the invention; therefore, I do not wish to be limited to the exact embodiment herein described, but rather only to the scope and spirit of the appended claims.

I claim:

1. An antenna for television reception, comprising in combination with a cross-arm: a channel-shaped electro-conductive member folded to form an elongated discontinuous quadrilateral, the ends of said member being separated to define a gap in one of the longer sides of said quadrilateral; insulating means bridging said gap and secured in the channels of said ends of said member; reinforcing means connecting said insulating means to the opposite side of said quadrilateral, and inclusive of an arched channel-shaped member having its channel juxtaposed to the channel of said opposite side; said opposite side being arched opposite to said arched member to form an opening through which said cross-arm may extend; and means secured in said juxtaposed channels and extending transversely of said opening for securing said antenna to said cross-arm.

2. In apparatus for television reception, in combination with support means; a dipole antenna, channel-shaped in cross-section, having an arched portion adapted to partly encompass said support means, the concave side of said channeled antenna being on the concave side of said arched portion; a clamping member of similar channel-shaped cross-section and similarly-

5

arched to cooperate with the arched portion of said antenna to encompass said support means, the concave sides of said antenna and said member being then juxtaposed and forming substantially enclosed channels at the ends of said arches; an elongated member engaging the encompassed portion of said support means so as to be held thereby at a definite angle thereto, the ends of said elongated member being held in said channels whereby said antenna is held at a definite angle to said support means in two dimensions; and means for clamping the arched portions of said antenna and said clamping member upon said support means whereby said antenna is held at a definite angle to said support means in a third dimension.

3. In apparatus for television reception, in combination with support means: a dipole antenna, channel-shaped in cross section, having an arched portion adapted to partly encompass said support means, the channel side of said antenna being on the concave side of said arched portion; a clamping member similarly arched to complement said arched portion of said antenna in substantially encompassing said sup-

6

port means; an elongated member engaging the encompassed portion of said support means so as to be held thereby at a definite angle thereto, the ends of said elongated member being engaged by said antenna and said clamping member to prevent rotation of said antenna around said support means; and means for clamping the arched portions of said antenna and said clamping member to said support means.

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