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TELEVISION RECEIVING ANTENNA

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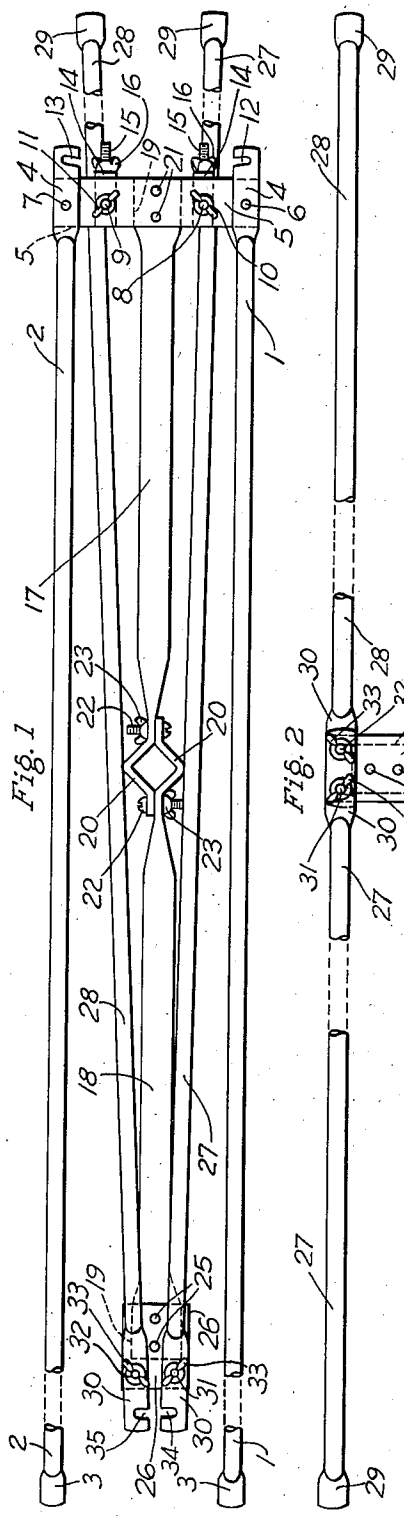


Fig. 1

Fig. 2

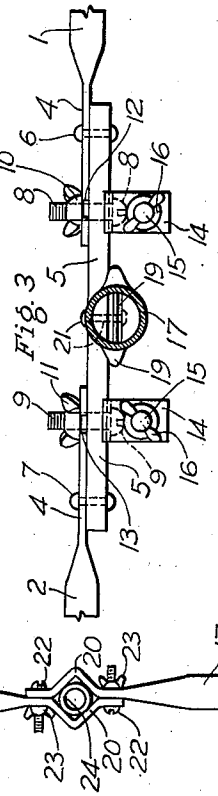
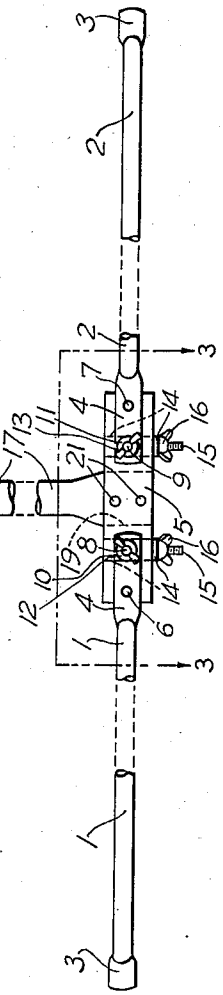


Fig. 3



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TELEVISION RECEIVING ANTENNA

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The invention relates to television receiving antennas, and, in particular, to such antennas of the rigid dipole variety.

The general object of the invention is to provide a new, simple, inexpensive, and practical collapsible television receiving antenna assembly which, when properly set up, is a rigid H-frame one leg of which is a dipole antenna and the other leg of which is a reflector, said assembly being provided on the crossbeam between said legs with means whereby the assembly may be secured to a mast at any of a variety of angular dispositions within planes normal to said mast. It will be obvious from the following description that the assembly may be utilized at a receiving station singly or in gang so as respectively to provide either a single dipole antenna with corresponding reflector or stacked dipoles with corresponding reflectors. Further, it will be understood, a plurality of such assemblies may be mounted upon a common mast with each assembly oriented specially to favor reception from a particular transmitting station. Also a single assembly or stacked assemblies with a common orientation are specially adapted, due to the rigidity of each assembly when properly set up, to be mounted on a rotatable mast whereby selective orientation of the signal receiving structure at will is facilitated.

A particular object of the invention is to provide such an antenna assembly of rugged yet lightweight construction, strong enough to withstand expected wind stresses, and of materials highly resistant to atmospheric conditions.

Another object is to provide such an antenna assembly which may be collapsed for storage, packaging, and shipment into a bundle of considerably less compass than that of the assembly when set up for television reception, and which is of such simple construction that it may be readily set up and mounted upon a mast with but little exercise of mechanical skill and with the aid of no tool other than a screwdriver.

In the drawing:

Fig. 1 is a top plan view of the antenna assembly in collapsed condition.

Fig. 2 is a top plan view of the same as properly set up and mounted upon a mast, the upper end of which is shown in the figure.

In Figs. 1 and 2 parts of the assembly are erased for the purpose of condensing the figures.

Fig. 3 is the section 3—3 of Fig. 2 enlarged to twice the scale of Figs. 1 and 2.

The dipole antenna itself comprises two elements 1 and 2, each of which is preferably a

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length of "duralumin" or other aluminum alloy tubing having flattened extremities. The outer extremities of elements 1 and 2 are designated 3, 3; the inner extremities 4, 4. The flattened inner ends of the elements 1 and 2 of the dipole are coupled together by means of a block 5 of suitable insulating material, the flattened ends 4, 4 being pivotally connected to said block on the upper side and near the extreme edges thereof by means of loosely fitted rivets 6 and 7.

As will presently be shown the block 5 serves as a means for dielectrically connecting the dipole to other parts of the assembly, and for this reason a plastic material which is substantially weatherproof is preferably selected for such block. Wood, which might possibly absorb and acidulate rain water, and thereby render it conductive, is undesirable.

In alignment with rivets 6 and 7, and between them, are two screws 8 and 9 passed upwardly through bores in block 5, such screws being provided with wing nuts 10 and 11 respectively. The distance between rivet 6 and screw 8 is equal to that between rivet 7 and screw 9. Near the inner end of element 1 the flattened portion 4 thereof is provided with an arcuate slot 12 the generative center of which is the axis of rivet 6; similarly, near the inner end of element 2 the flattened portion 4 thereof is provided with an arcuate slot 13 the generative center of which is the axis of rivet 7. Thus it will be obvious that the two elements of the dipole may be arranged so as to be coaxial, as shown in Fig. 2, the slot 12 engaging screw 8, and the slot 13 engaging screw 9, and both elements locked in position by means of the wing nuts 10 and 11.

Secured to the underside of block 5 by means of the screws 8 and 9 are two terminal elements 14, 14, which may be, as shown, sheet material bent to form angles. See Fig. 3. One leg of each angle engages the under side of block 5 and is electrically connected to an element of the dipole by means of one of the screws 8 and 9, and the other leg of each angle is bored for a screw 15 which is provided with a wing nut 16 to facilitate the attachment of a transmission line to the antenna.

The crossbeam of the H-frame comprises two elements 17 and 18, each of which, like the elements of the dipole, is preferably a length of Duralumin or other aluminum alloy tubing having flattened extremities. The outer extremities of elements 17 and 18 are designated 19, 19; the inner extremities 20, 20. The flattened outer end 19 of element 17 is rigidly connected to the mid-

dle of the under side of block 5 by means of rivets 21, 21; the axis of element 17 is thus maintained normal to the longitudinal axis of block 5 as indicated in all figures. As shown in the drawing the element 17 is not in contact with other conducting elements mounted on block 5.

The two elements 17 and 18 of the crossbeam are adapted to be joined together at their inner ends 20, 20 so as to form a unit for rigid attachment to a suitable mast. The ends 20, 20 are not only originally flattened, but are also bent as clearly indicated in Figs. 1 and 2, so that the beginning and ending portions of each such flattened end 20 are aligned with the axis of the element, while the mid portion of each such flattened end 20 is formed as a V-shaped offset. The aligned portions of each end 20 are bored so that when the ends 20 of the two elements are joined in opposition and overlapping, as shown in Figs. 1 and 2, the bores are aligned, and the elements may be joined together by means of screws 22, 22, each of which is provided with a wing nut 23. Thus the assembly may be mounted upon a mast by fitting the opposing offset mid portions of the ends 20 around said mast and then driving the nuts 23, 23 so as to lock such offset mid portions against the mast as a clamp. See Fig. 2 wherein the mast is designated 24. In the drawing the design adopted for the purposes of illustration is such that the two elements of the crossbeam may not be joined so that the elements are coaxial. This is immaterial for the purposes of the present invention; but it is clear that a slight modification of the bends of the ends 20, 20 would make possible a coaxial mounting if desired.

The flattened outer end 19 of the element 18 is rigidly attached by means of rivets 25, 25 to a plate 26, the purpose of which is to provide a support of greater area than the end 19 for the reflector, presently to be described.

The reflector comprises, like the dipole and the crossbeam, two elements; these are designated 27 and 28, and each is preferably a length of Duralumin or other aluminum alloy tubing having flattened extremities. The outer extremities of elements 27 and 28 are indexed 29, 29; the inner extremities 30, 30. The flattened inner ends 30, 30 of the reflector elements are coupled together by means of the plate 26, said ends being pivotally connected to the upper surface of the plate by means of screws 31 and 32, each of which is provided with a wing nut 33. Near the inner end of element 27 the flattened portion 30 thereof is provided with an arcuate slot 34 the generative center of which is the axis of screw 31; similarly, near the inner end of element 28 the flattened portion 30 thereof is provided with an arcuate slot 35 the generative center of which is the axis of screw 32. Thus it will be obvious that the two elements of the reflector may be arranged so as to be nearly coaxial, as shown in Fig. 2, the slot 34 engaging screw 32 and the slot 35 engaging screw 31, and end 30 of one element overlapping the end 30 of the other and the elements locked in position by means of the wing nuts 33. In Fig. 2 end 30 of element 27 is shown overlapping end 30 of element 28. Either end may of course be selected as the overlapping extremity.

Thus it is readily seen that the assembly may assume the shape of a loose bundle as shown in Fig. 1, with no parts actually detached, but collapsed so as to occupy relatively little space; or that of the rigid H-frame shown in Fig. 2 wherein

a rigid dipole antenna is provided with a rigid reflector positioned in opposition thereto and substantially in plane therewith. It will be readily understood that the flattening of the ends 30, 30 of the reflector elements might be accomplished so as to provide compensating offsets so that the overlapping of one such end by the other would not bring the elements slightly out of coaxiality as indicated in the drawing. Likewise a slight compensating offset in plate 26 would insure an absolute uniformity of height of the dipole and reflector with respect to the mast. Such refinements are of course hardly worthwhile.

The clamp provided on the crossbeam and comprising the flattened, bent ends 20, 20, and the screws 22, 22, and their wing nuts 23, 23, is specially adapted for mounting the assembly on a non-rotatable mast of round cross section, for any angular disposition desired is readily available.

The collapsible television receiving antenna assembly of the present invention provides a unit for a receiving station which makes possible, at relatively low cost, signal reception of great clarity. Each such assembly provides a dipole which may be expected under any but extremely unusual wind conditions to maintain a selected orientation with practical accuracy; and each assembly provides further a reflector held rigidly in parallelism with and in opposition to the dipole whereby seriously out-of-phase reflections from nearby buildings and other structures are largely avoided so that double images are accordingly largely avoided. From the foregoing and from the drawing it will be readily understood that more than one such assembly might well be used on a common mast to satisfy different conditions obtaining at the receiving station: each of a plurality of such assemblies might be mounted upon such mast at a different level and at a different orientation; each of a plurality might be mounted upon such a mast at a different level, each having a common orientation, in accordance with the stacked-dipole arrangement commonly used for amplifying received signals; also, as each assembly becomes a rigid unit when properly mounted, a mast carrying one or more such units may be arranged to be rotated to accomplish selective orientation.

I claim:

1. A dipole antenna in combination with a reflector, comprising a foldable frame having a crossbeam; a clamp on said crossbeam for securing the same to a mast, a dielectric bracket rigidly secured to one end of said crossbeam, a pair of rigid conductors pivotally mounted upon said bracket, said conductors constituting said dipole, another bracket rigidly secured to the other end of said crossbeam, another pair of rigid conductors pivotally mounted upon said other bracket, said last named conductors constituting said reflector when disposed parallel to said dipole, and means for locking said pairs of conductors in position in which the conductors constituting the dipole are parallel to the corresponding conductors constituting the reflector.

2. A dipole antenna in combination with a reflector, comprising a foldable H-frame having a crossbeam, a clamp on said crossbeam for securing the same to a mast, a dielectric bracket rigidly secured to one end of said crossbeam, a pair of rigid conductors oppositely disposed to each other and pivotally mounted upon said bracket, said conductors constituting said dipole when aligned, another bracket rigidly secured to the other end of said crossbeam, another pair of rigid conduc-

tors oppositely disposed to each other and pivotally mounted upon said other bracket, said last named conductors constituting said reflector when disposed in alignment with each other and parallel with said dipole, and means for locking said conductors comprising said dipole and reflector in position in which the conductors constituting the dipole are parallel to the corresponding conductors constituting the reflector.

3. A dipole antenna in combination with a reflector, comprising a foldable frame having a crossbeam, a clamp on said crossbeam for securing the same to a mast, a dielectric bracket rigidly secured to one end of said crossbeam, a pair of rigid conductors pivotally mounted upon said bracket, said conductors constituting said dipole, another pair of rigid conductors pivotally mounted upon said crossbeam, said last-named conductors constituting said reflector when disposed parallel to said dipole, and means for locking said pairs of conductors constituting said dipole and said reflector in position in which the conductors constituting the dipole are parallel to the corresponding conductors constituting the reflector.

4. A dipole antenna in combination with a reflector, comprising a foldable H-frame having a crossbeam, a clamp on said crossbeam for securing the same to a mast, a dielectric bracket rigidly secured to one end of said crossbeam, a pair of rigid conductors oppositely disposed to each other and pivotally mounted on said bracket, said conductors constituting said dipole when aligned,

another pair of rigid conductors oppositely disposed to each other and pivotally mounted upon said crossbeam, said last named conductors constituting said reflector when disposed in alignment with each other and parallel to said dipole, and means for locking said conductors comprising said dipole and reflector in position in which the conductors constituting the dipole are parallel to the corresponding conductors constituting the reflector.

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