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An Honest 6 db on 450 MHz

. . . the stacked collinear

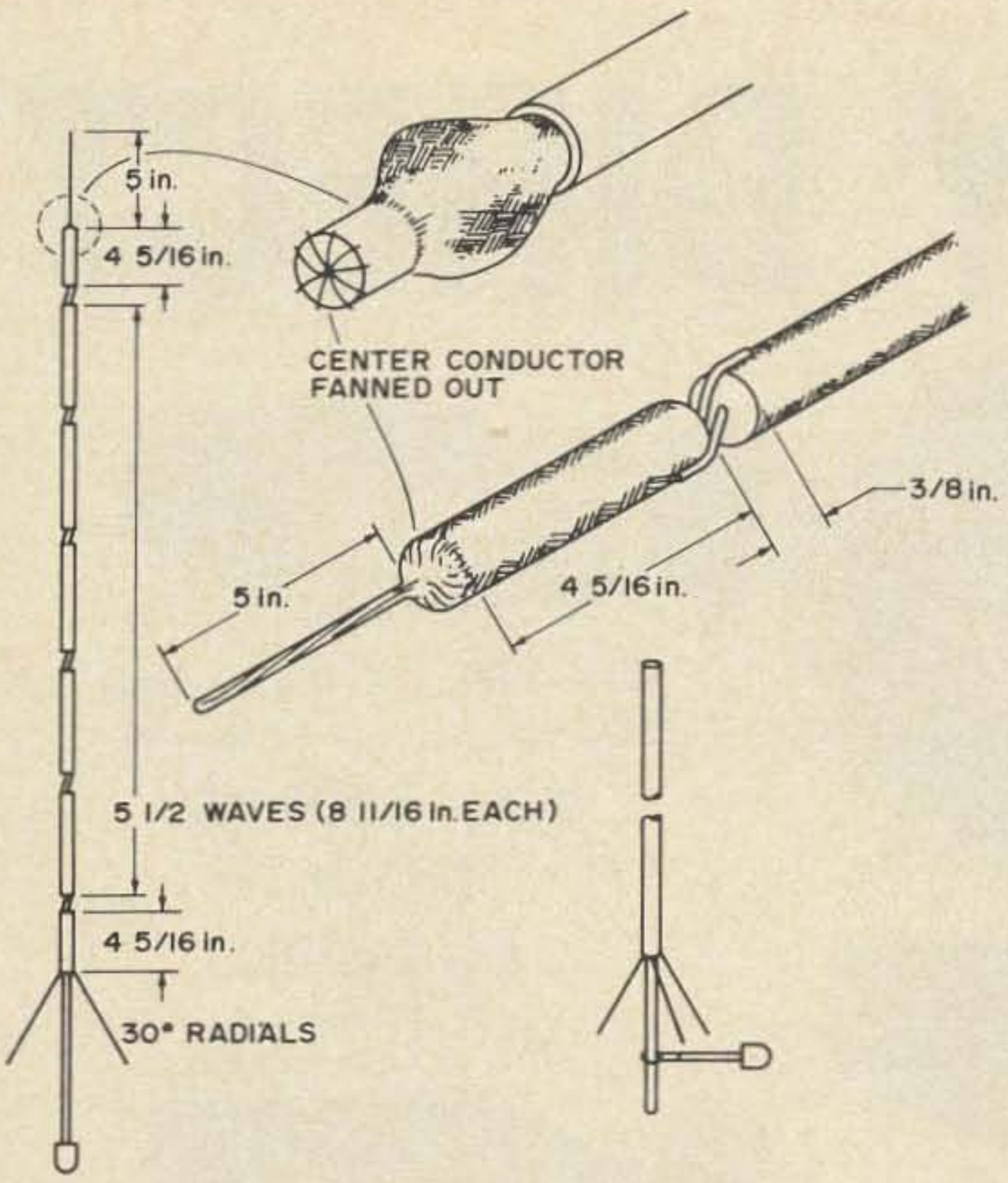
This antenna can be called a stacked collinear, but whatever it is called, it does a beautiful job in the 450 MHz band. Inspired by a similar design in another magazine for 2 meters, and in dire need of a good antenna for 450, I recalculated the dimensions and built it. There are 3 of us on 449.1 in the Dallas area; myself (W5GDQ), WA5QFO and W5GQE.

I had been trying my 6 Watt RCA Carfone base station on my 2 meter antennas, which work pretty well, but I am tired of wearing my rotator out on VHF and wanted a little more gain. I took this antenna, hung it from the light bulb in the garage and noted considerable gain over the 43 foot 4 element 2 meter beam with W5GQE some 20 miles away. (His antenna was about 50 ft. high.) With this antenna about 51 ft. above the ground, I am now hearing a Ft. Worth 3 Watt transmitter about 26 μA at this limiter.

Construction

Start by cutting 5 pieces of RG-8 10 inches long. These will be the 1/2 wave sections. Strip the braid back until the braid is 8-11/16 inches long. The braid should be centered in each section leaving about 3/8" gap between the sections as in the drawing. cut another section of RG-8 about one foot long; strip the rubber insulation back about 6''. This will be the bottom section. Strip some of the braid back and overlap center-conductor to braid as before placing this section below the already assembled 5 sections. Solder this piece on. On this bottom section, from the top edge of the braid, measure down 4-5/16 inches. Mark this spot. Tin it with solder and mark it again. This is where the 4 radials will leave the braid for their drooping 30 degree 5 inch run. Needless to say, start your radials with about 6½" lengths then bend them, measure 5" and cut them off. Then solder securely, binding them with copper wire first. I found it much easier to put one radial on, bind it, solder it, cut off the rest of the unused copper wire for binding, then go to the next radial. For the radial material, brazing rod is ideal. It bends with no difficulty but won't accidentally bend and solders very well. Put your coax connector on the bottom of this section.

For the top section, cut a 12 inch length of RG-8. Prepare one end as before. Remove the rubber insulation. From the upper end, pull the braid back to where you can see the point 4-5/16" from the bottom edge of the braid. Mark this point. About 1/4" further



towards the top, cut the insulator and center conductor off. At the point where you made the mark 4-5/16" from the bottom edge of the braid, carefully cut the polyethylene off leaving the exposed center conductor and the still pulled back braid. Cut the center conductor off leaving about 1/16" exposed. Fan each strand out to the edge as shown in the figure. Pull the loose braid up over the cut off center conductor and pull down tight as shown. Solder the braid to the fanned out edges of the center conductor, then solder the braid making it solid up for about another 5½." Measure up from the fanned out center conductor and cut the braid off at 5 inches. This 5 inches will not compute with your formulas but for some reason works best.

This completes the construction of the antenna itself. I recommend you buy a 10 foot length of PVC rigid plastic pipe 3/4" diameter. You will find it measures about 1 inch but that's OK. Lay your newborn antenna down on the floor. Place the PVC pipe beside it with the bottom edge of the pipe at the top of the radials. Cut the pipe off about 4 inches longer than the antenna from the radials up. At the top section of the antenna where you have the top two sections soldered together, drill a small hole through the pipe. Place the antenna inside the pipe and thread a piece of nylon fishing line through the pipe, through the gap in the antenna and out the other side of the pipe. Tie securely. This will keep the antenna straight and taut in the pipe. Seal the upper end of the pipe with either the cap, plastic wood, fiberglass, epoxy, etc. I cut another 4 inch piece of pipe and put it up under the radials and epoxied that in solid.

Take the remaining PVC pipe, cut off 12 inches, and take the rest and place below the antenna overlapping 12 inches. Take PVC cement and cement the two pipes together. After they are dry, take the remaining 12 inches of pipe, and rip it lengthwise into 4 pieces. Throw 2 of them away. Take the other two and place along the 12 inch overlap in a concave fashion. Cement them onto the assembled antenna. At your local TV shop, for about $2.50 you can buy a package of 2 (you need only 1) 6" wall mounts. They may have an extra chimney mount you can buy cheaper. The only difference is the chimney mount is at a 90 degree angle instead of 180 degrees. (You can straighten it out.) In the provided hole on the bracket, your antenna will fit. Take the other end, drill holes for a "U" bolt then cut off the excess. It is now ready to mount below an existing beam and go up through it with no ill effects.

Note: More 1/2 wavelength sections can be added to this antenna as long as the number of sections is an odd number. However, going from 5 sections to 11 sections will only give you about 3 dB more gain, but a lot of construction headaches. I am using about 100 ft. of RG-213 (RG-8). This is about 5 dB loss but think what I would have if I didn't have this 6 dB antenna!

. . . **W5GDQ**

INTERESTING MORSELS

What frequency did Heinrich Hertz use during his experiments of 1888-1889? HF? VHF? UHF? The answer is: Approximately 500 MHz! (60 cm)

Who took out the first patent on a tuned circuit for radio receivers or transmitters? It was Oliver Joseph Lodge, and the date was 1898. It was several years before the use of tuned circuits became common, though.

. . . **W5JJ**