Danny Centers W4DAN
2712 Bryant Dr.
Cleveland TN 37311
[Danny@W4DAN.us]

Just Hang 'er Up

Clear out your closets with this fun WARC triband dipole.

Many of us have a fairly functional antenna farm. In my case, it is more like an antenna garden in relation to the size. Well, not really a garden. My XYL would surely take exception to that description! She thinks that gardens should have some sort of eye appeal. Why, sure there is eye appeal. Just looking out across the back yard beyond the tower with tribander and dipoles, you can see trees, clouds and sky. There is something for the eye of each beholder.

Regardless of the number of radiators on your "farm," there is almost always another band or two that could be added. This article may help in adding more bands — with fewer antennas and feedlines — to your aerial maze and do it simply and inexpensively.

One object stretched across the scenic view of my "garden" is a three-band sloping dipole. It is basically three dipole antennas fed with one common coax cable and designed to operate on 12, 17, and 30 meters. These three bands are sometimes referred to as the WARC bands. I picked these three bands for a design because I already had a triband yagi for 10, 15, and 20 meters and dipoles for 40, 80, and 160 meters. I didn't want three more coax cables but I did want to operate on the three WARC bands.

A triband dipole fed with a single feedline is not a new concept. I have built multiband antennas in the past. They all worked very well, but with a couple of disadvantages. Drawback number one for this type of antenna is that they have several leg ends to anchor. Drawback number two is the possibility of the wires becoming entangled. For some time I pondered the idea of building a better WARC triband dipole that did not have these two drawbacks.

During a lull in the sunspot activity and on a weekend when there were no contests and/or local hamfests, I went shopping with the XYL. We went to a local discount department store. While she looked for some necessary household items, I looked for items to enhance the back yard and "garden." I found something that I believed could be used to build a better WARC antenna. This "fabulous find" was a dozen black plastic tubular clothes hangers for ninety-nine cents. I bought two dozen. I couldn't wait to get them home and start on my new project for the "garden." See **Fig. 1**.

I wanted to use the hangers as spacers

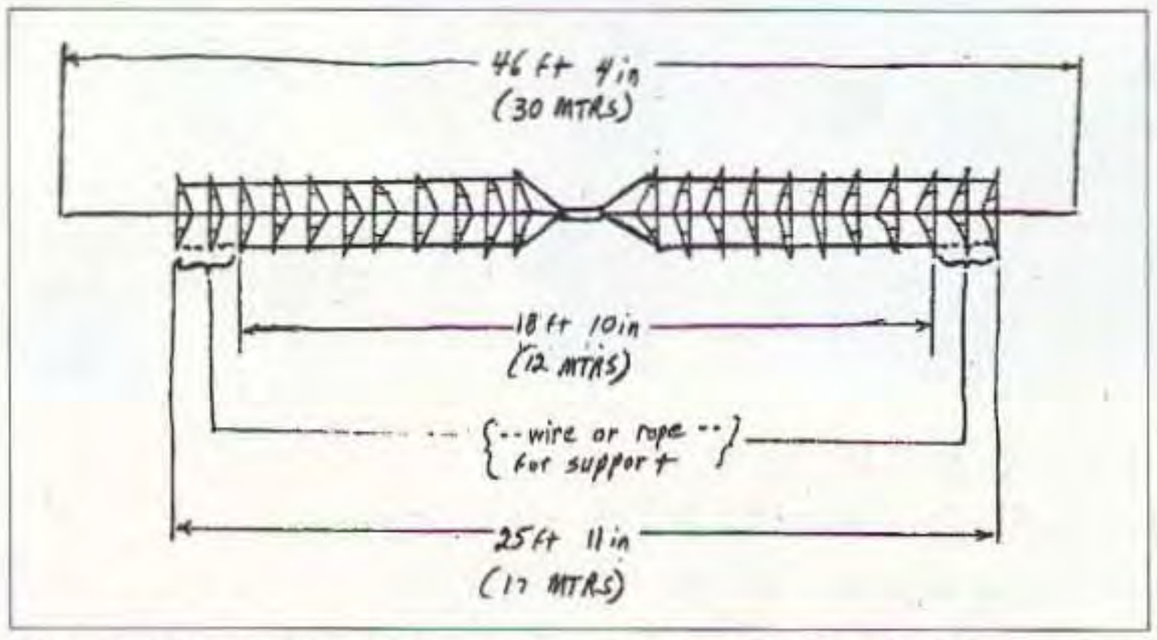

Fig. 1. This is the configuration for the tubular clothes hangers that I used as spacers.

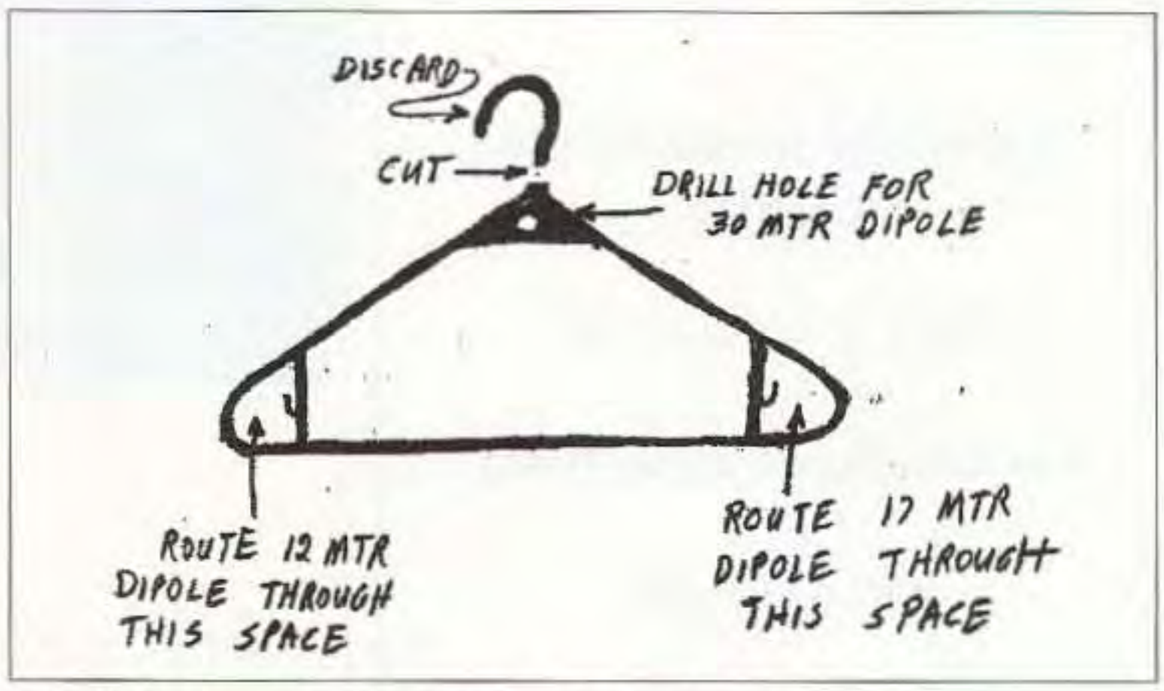

Fig. 2. Preparation details for clothes hangers.

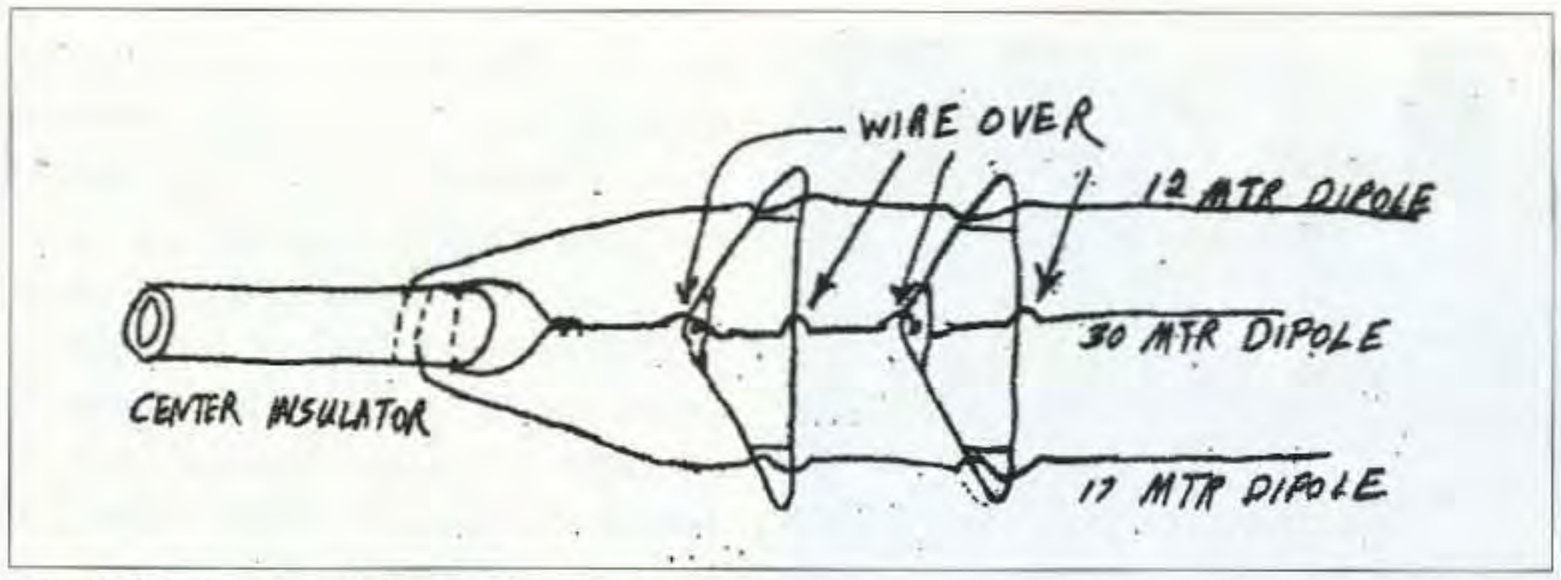

Fig. 3. Wiring detail for clothes hangers.

to separate the legs of the three-band dipole to be fed with a single coax. See **Fig. 2** for details. I drilled holes in the thin plastic tab at the apex of the hanger triangle using a drill bit that was only slightly larger than the wire to be used for the dipole legs. Next, heavy wire cutters were used to snip off the hanger hooks. They could have been left intact and possibly used in the construction. I decided to cut them off to help disguise the real identity of the hangers. So far, all observers have identified them for what they really are. Oh, well, no big deal! You may wish to leave them intact if you decide to construct this antenna. The beauty of a simple project like this is that it can be modified to suit your own needs. You may want to add more bands or build it for different frequencies.

Twenty-two of the hangers were prepared as shown in **Fig. 2**. Eleven were used on each side of the center insulator. Be sure to purchase the hangers with the reinforcement rods that run between the top and bottom at both ends. Try to find hangers of a dark color because they are not nearly as conspicuous as the white ones.

If a commercially made insulator is not available, you may want to consider making your own. A center insulator can be fabricated using a scrap of PVC pipe. Any diameter in the range of one to three inches, and cut to any length between four and seven inches, will work. Drill holes to accommodate the attachment of wires and you are in business. See **Fig. 4**.

The next task is to cut the 30-meter legs of the dipole to size. Being the longest, they will be used as the suspending elements. Almost any type of wire that is large enough to hold the weight of the completed antenna will do. Use your imagination and anything you have lying around the shop or garage. I used zip cord — the kind made to replace lamp and small appliance

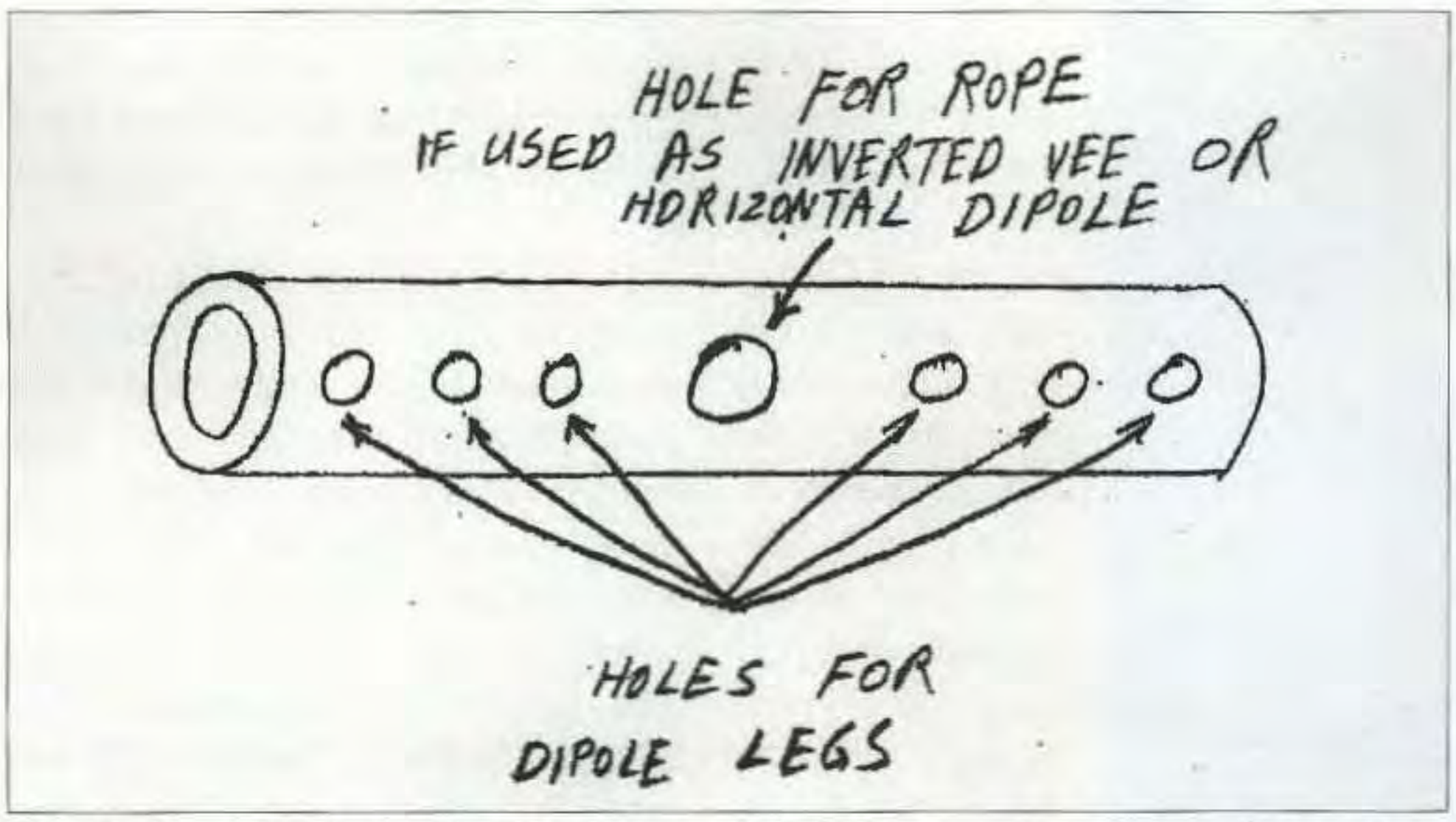

Fig. 4. Center insulator. The larger center hole is for rope, if used as an inverted vee or a horizontal dipole. The three smaller holes on each side of the center hole are for the dipole legs.

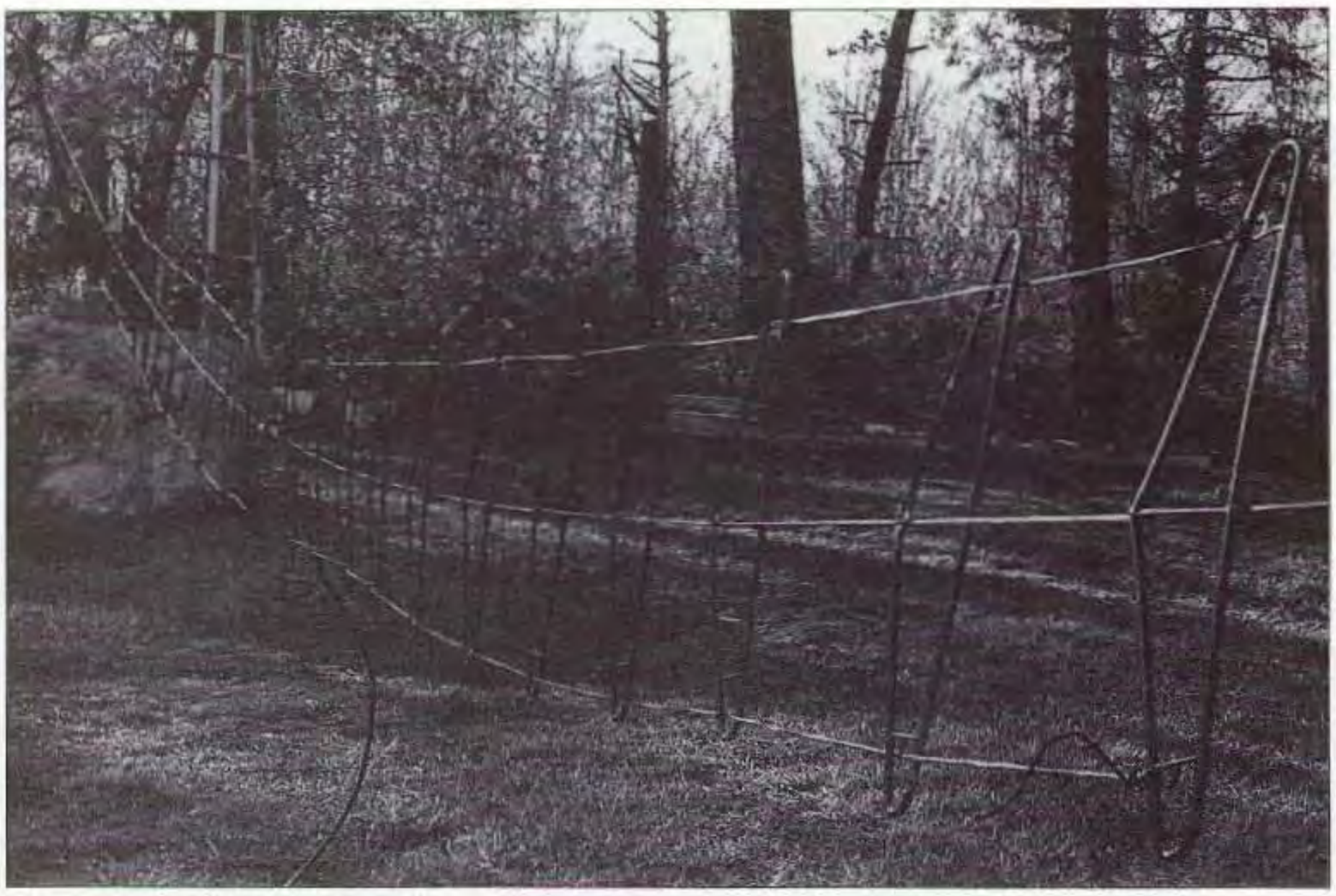

***Photo A.** WARC dipole under construction, suspended three feet above ground.*

cords. I separated it into single conductors. It is economical and durable.

I employed the formula for cutting a halfwave 30-meter dipole and calculated that 468 divided by 10.1 MHz equals 46.33 or 46 and one-third feet. You should probably round this length up to at least 47 feet. This will make up for tying off and trimming for resonance later on.

Now, cut the 47-foot length into two pieces to make two 23-1/2 foot legs. Tie the end of one of the pieces to the center insulator. Leave enough loose on this end to trim and solder. Push the other end of the same piece through the hole you earlier drilled in the tab of one of the plastic hangers. To do this, turn the hanger down horizontally. Place the apex (where the loop was, and the tab with the drilled hole is) to your left. From left to right, push the wire down through the hole, then pull it up and over the bottom of the hanger. See **Fig. 3**.

Continue this procedure through ten more hanger/spacers. For starters, you can space approximately seven inches between them. You should have a few feet of wire extending beyond the last spacer after you have finished threading the 30-meter wire. Spacers are not required for the full length because the 17- and 12-meter dipoles will be shorter. Follow the same method to construct the opposite leg.

***Photo B.** Upper half of WARC dipole with lower half blending into the landscape.*

After completion of the 30-meter dipole, tie each end of the dipole to trees or structures to suspend it approximately three to five feet above the ground. This is a good working height. At this point the spacers may be uneven along the wire and a little tangled. Straighten them as much as possible at this time. The addition of subsequent legs will help to align them better.

The next step is to cut the halfwave dipole sections for 17 and 12 meters. The calculation for 17 meters equals 25.9 feet, with 18.48 feet for 12 meters. Cut them a little longer for trimming and tuning later. Cut these half wavelengths into two pieces each to create the quarterwave legs. Tie the 17-meter pieces to the center insulator in preparation for feeding through the hanger/spaces. Feed the wire between the reinforcement rods and ends through all 11 spacers as shown in **Fig. 3**. After feeding the wire from the center insulator and through the hangers, the end of the wire should be close to the eleventh hanger from the center insulator. Adjust the spacing on all the hangers equally and space the eleventh to accommodate tying the 17-meter leg to it. Repeat this action on the opposite leg.

The 12-meter legs should be added using the same method by running the wires between the reinforcement rods and ends at the opposite corner of the hangers. They should terminate at the ninth spacers from the center. After attaching the end, cut a piece of wire, twine, or rope to fit between hangers nine, ten, and eleven to stabilize them as shown in **Fig. 1**. Check the SWR on each band and trim as needed to obtain resonance and lowest SWR. Tuning is

Continued on page 53

Just Hang 'er Up

continued from page 12

a little tricky. Adjust one band at a time, and then go back and check the SWR on the earlier tuned bands. More

trimming or lengthening may be needed. After you have it working correctly, you might consider using epoxy glue or electrical tape to secure the wires to the hangers. Solder all connections at the center insulator and use silicone sealer or electrical tape to protect them from moisture.

You can suspend this antenna horizontally, vertically, or sloping. I found it very easy to support by sloping it between my tower and a small tree. I have worked several DX stations with good reports on all three bands using this antenna. It is a very good DX antenna when used in a vertical configuration. By using it as a sloping dipole, it seems to be much less susceptible to noise than when mounted vertically. Sloping it is the easiest way to suspend and provides best all-around performance. If you are more interested in local and stateside communication, horizontal mounting could possibly work better for you.

This method can be incorporated in the construction of antennas for three or four bands of any desired frequency. It doesn't necessarily have to be made for the WARC bands. It is fun and economical to build and makes a great conversation piece for your antenna farm or garden.