Do you find yourself humming the tune "On The Road Again"? If so, it's time to hit the road in your RV, and don't forget to pack your amateur gear. Here's a portable antenna that takes up little room and gives you all-band flexibility.

The "Traveling" Wave Antenna For 160 Meters (And Then Some)

BY HAROLD P. MORGAN*, WDØP

Amateur radio and RVing go together like peanut butter and jelly. There are many hundreds of amateurs who regularly take to the roads with their rigs, operating mobile or stationary from their parking spots wherever they stop. In traveling the "snowbird" areas of Texas, Arizona, and southern California, I've marveled at the number of amateur antennas bristling from various campgrounds and RV parks just like so many porcupine quills. And, like at home, the antenna effectiveness is the key to successful operation.

Many of these RV amateur antennas take the form of some sort of ¼-wave vertical using the skin of the vehicle as a very effective ground plane. Some are longer, 25 feet or more, trap designs. Others include the short loaded mobile whips which can also be used on the move. The most common configuration appears to be the multi-band trap variety which can be raised and lowered by any number of ingenious methods. Several manufacturers offer units rugged enough for this kind of use. Only one, however, the Butternut, makes provision for the 160 meter band, and users with whom I have chatted complain that while fairly effective, the bandwidth is extremely narrow.

I have been using a very effective, easily transported 160 meter antenna (fig. 1) which can be set up in approximately one-half hour, but reduces down to a compact bundle of mast pipe and a small box containing the rolled-up coax, guy rope, anchors, and antenna.

The heart of this system is the inductively loaded ¼-wave radiator (fig. 2). This 4-bander incorporates 80 meter and 160 meter resonators and a separate parallel element for 20 meters. It can be tuned for natural resonance on the 20, 40, 80, and 160 meter bands with 1.5 to 1 SWR plus bandwidth on 160 and 80 meters of 45 to 55 kHz. Use a high-quality transmatch with sufficient range for 160 meters, and you can operate the full bandwidth on both 80 and 160 plus all of the 10, 12, 15, and 30 meter bands. I have used both RG8X and full-size RG8 and have had no problems with losses on these bands with either coax.

Fig. 1 - WDØP's portable 20, 40, 80, and 160 meter setup draws lots of attention from sightseers.

Only 60 feet long, this antenna was originally designed by Bill Fanckboner, W9INN, for use as a quarter-wave tower or ground-fed sloper (fig. 3). Truly effective tower feeding requires the presence of beam antennas or other structures for top loading. In normal ground-fed operation a radial system would be called for to deliver really good performance. But with the availability of the very large area of metallic skin found on the average RV, the bottom-fed sloping radiator can be used quite effectively in exactly the same fashion many RVers use their ¼-wave verticals.

Any convenient support structure, such as a tree limb approximately 25 to 30 feet above ground, can be used to secure the far end of the sloper. Simply toss the weighted end of a nylon cord over the limb and you're in business. But for those of us who often park our RVs where there are no nearby trees, a simple support (fig. 4) can be constructed from four sections of 5 foot (1.5 meter) long, *heavy-duty* TV mast from the local electronic supply outfit, topped off with a 5 foot (1.5 meter) sec-

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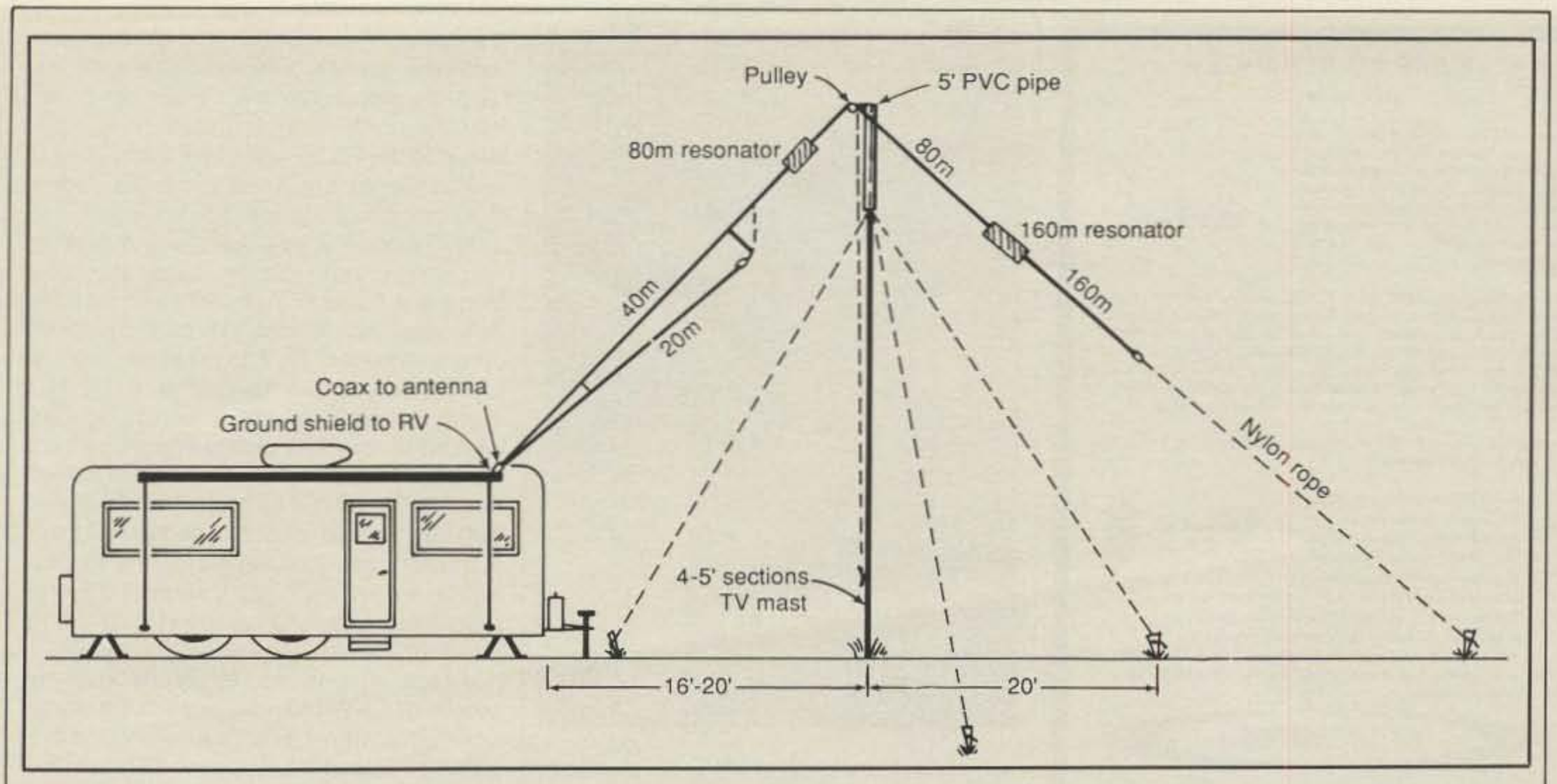

Fig. 2- A general overview of the antenna and its support system.

tion of PVC rigid pipe from your hardware store. If you obtain PVC pipe with the correct inside diameter, it will just slip over the crimped end of the TV mast and no additional fastener will be necessary. A small pulley attached to the top end of the PVC section will allow use of nylon cord to raise your antenna to the operating position.

This mast should be erected approximately 15 to 20 feet (4.6 to 6.1 meters) away from your RV. I ask a friend or my XYL to hold down the bottom end while I walk the mast up to a vertical position. I carry with me a 2 foot (61 cm) long section of conduit which I pound part way into the ground to serve as a base anchor. Diameter of the short conduit is small enough to slip inside the bottom section of mast. For most situations one set of three nylon cord guy-lines fastened just

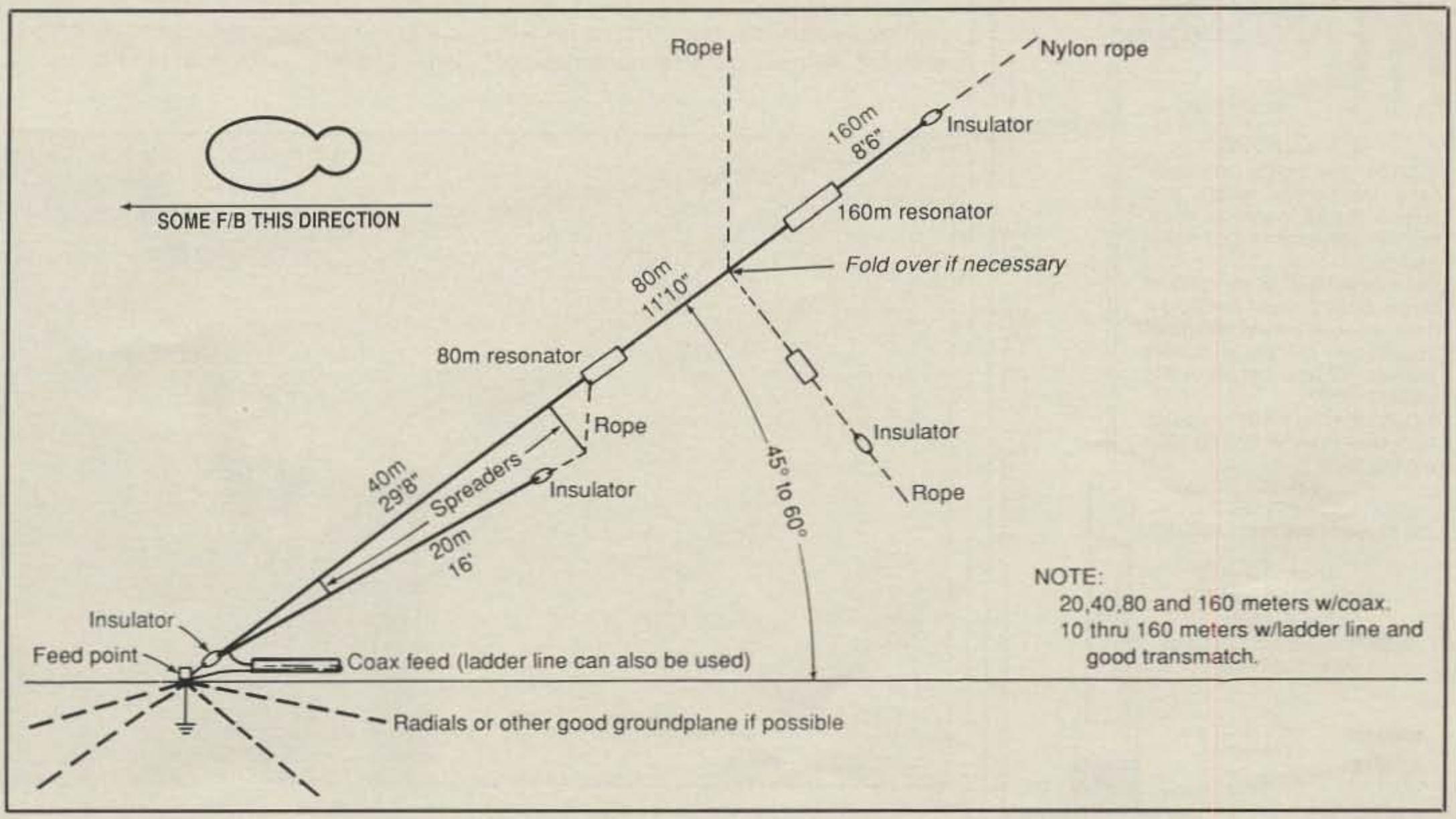

Fig. 3- This four-band sloper can be used on all amateur bands with a good wide-range transmatch. Short lengths of coax used in RV situations do not create enough loss to be a significant problem.

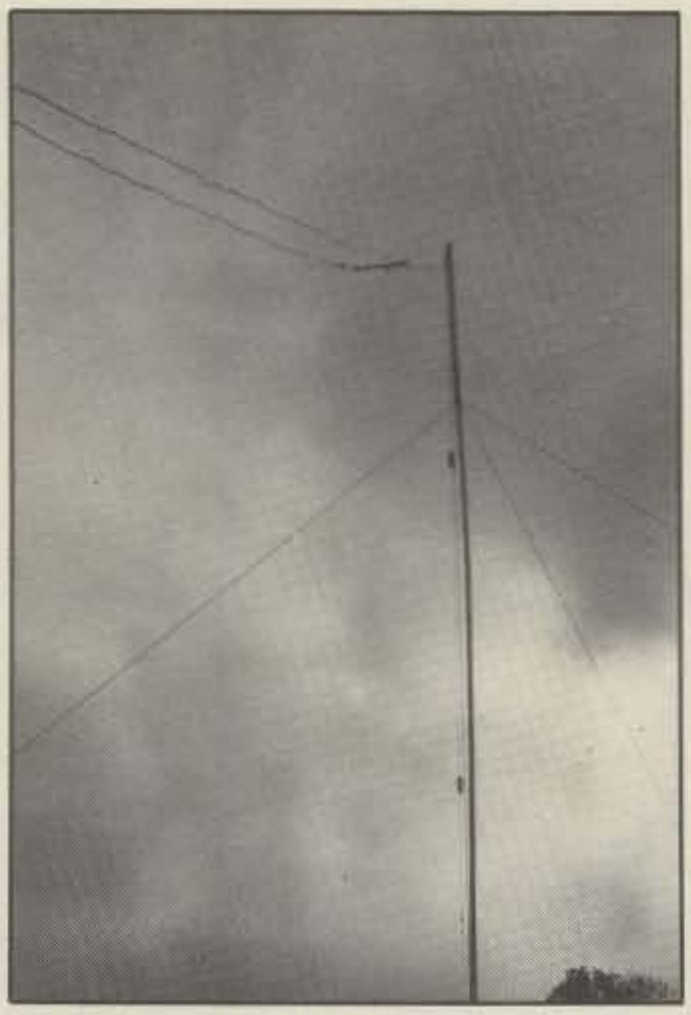

Fig. 4 - A 5 foot section of PVC at the top of the mast keeps metal, which might detune the antenna, away from the antenna.

below the top PVC section is sufficient. My guy anchors are a set of three screw-in doggie anchors placed about 20 feet (6.1 meters) away from the base of the mast and arranged at 120 degree intervals around it. This setup has successfully endured 40 mph winds.

There could be a number of ways to attach the antenna to your RV. I use an "S" hook (fig. 5) to hang the feedpoint end of the sloper on any convenient bracket, usually the awning bracket. The antenna feed is soldered to the center pin of an SO-239 connector. I ground the coax shield to the RV by way of a 6 inch (15 cm) length of coax braid and two extra-strong stiff-springed alligator clips.

For those of you who would like to homebrew your sloper, resonator coil forms are made of 1½ inch (3.75 cm) rigid PVC pipe with 6 inch (15 cm) outer circumference (fig. 6). The 80 meter form is 6½ inches (16.25 cm) long, and the 160 meter form is 9 inches (22.5 cm) long. Coil wire is number 18 insulated hookup stock close-wound 60 turns on the 80 meter unit (fig. 3) and 108 turns on the 160 meter version. The spreaders used to hold the 20 meter element away from the main antenna are made from ½ inch (1.25 cm) rigid PVC. One is 6 inches (15 cm) long and the other is 12 inches (30 cm) long.

These resonators easily handle the output of 1 KW from my solid-state transceiver and amplifier without suffering any damage. However, if you would feel more comfortable with heavier-duty units, I suggest you contact W9INN (W9INN Antennas, P.O. Box 393, Mt. Prospect, IL 60056) and order a set of his low-loss resonators. Also, if you prefer not to brew your own, you can order the complete tuned antenna from Bill.

To tune this sloper, adjust the length of the 40 meter element for resonance first, then the 80 meter and 160 meter sections, in that order. The 80 and 160 meter sections will interact, so check the SWR on both after each adjustment. The 20 meter element, if used, can be resonated independently from the others, as its

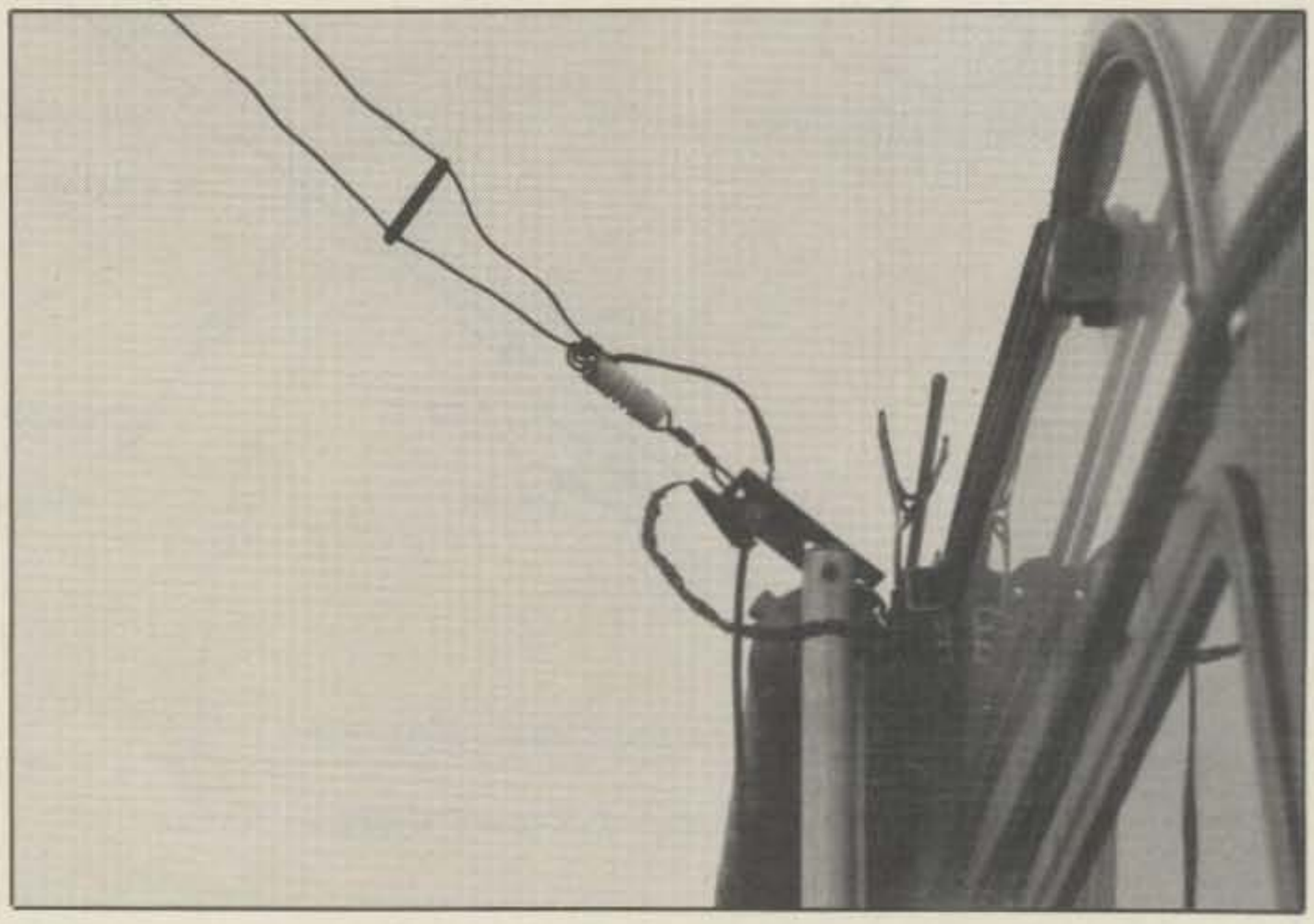

Fig. 5 - An SO-239 on a small aluminum plate provides a connection at the feedpoint. A ground strap made of a length of coax shield with spring-clips on each end is attached from shield to RV metal skin to assure good RF conduction.

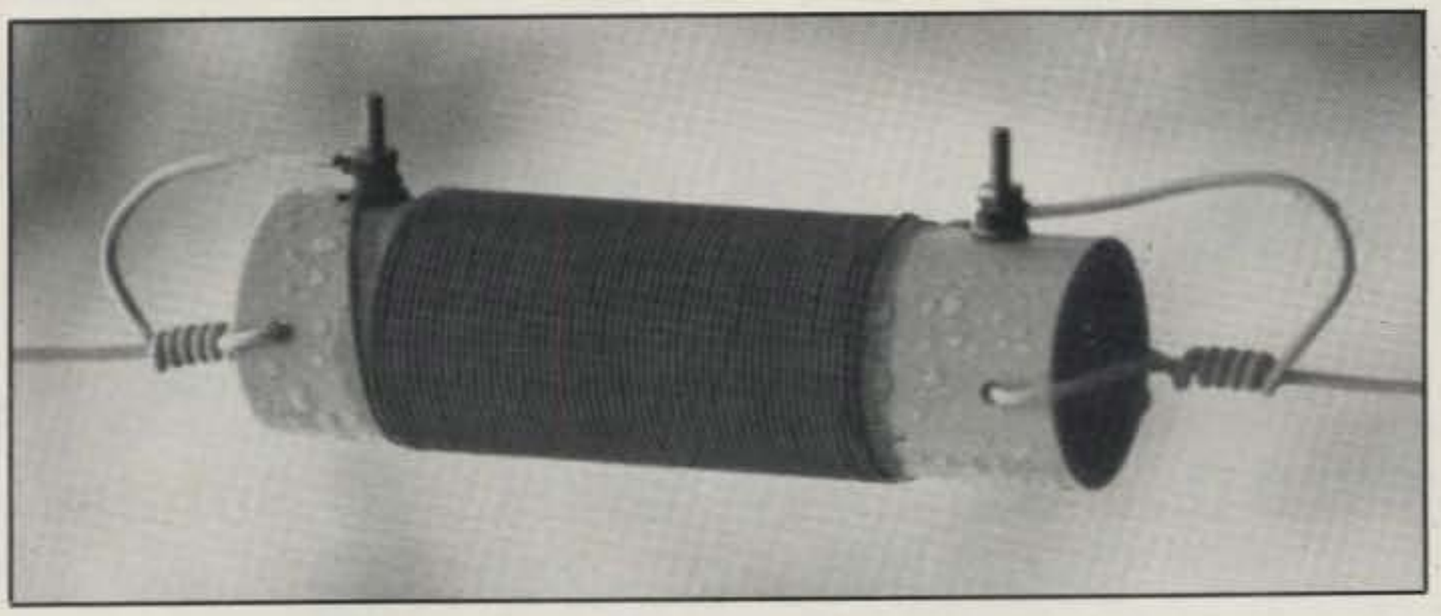

Fig. 6- Resonator coils are wound on PVC forms (see specs in text).

length will have little or no effect on the other bands.

Obviously, it is less than 60 feet from the top of the RV to the top of the mast. But the leftover end of the antenna can be tied off "inverted-V" fashion to any convenient structure around your campsite. I use another doggie anchor. Be sure to keep the end and the resonators at least 4 feet (1.2 meters) away from foliage or metal objects.

The 1.5 to 1 SWR bandwidth of this antenna will cover all of the 20 meter band, at least all of the 40 meter phone band (maybe more), about 50 kHz on 80 meters, and slightly less than that on 160 meters. I use my Heath SA-2060 transmatch to effectively tune all of the HF bands from 10 through 160 meters with gratifying results.

In the short time I had this antenna in operation barefoot on 160 meters at my Yuma, Arizona winter quarters, I was able to work numerous stations in northern and southern California, Arizona, Colorado, New Mexico, and Wisconsin. From my home in Missouri I've worked 13 states and 2 Canadian provinces with reports of 55 to 59+10. Usually the other stations were using amplifiers and their signals were no more than one S-unit higher than mine. This antenna was also a stalwart performer on all the other bands.

When I'm ready to move on, the mast and antenna pack into a 5 foot (1.5 meter) long, easy-to-handle bundle and a small box which fits easily into any extra nook or cranny I can find around the RV (fig. 7).

Other types of ground systems would work very well with this antenna. You might want to use another kind of RV, such as a van, or you might want to use a more traditional ground radial system. However, our 33 foot long motor home offers about 800 square feet of metal surface, providing a very effective collector of return currents, and I'm trying not to waste that capability.

If you're an RVer and would like to work 160 meters, you'll be amazed how well this baby will work for *you*. CQ

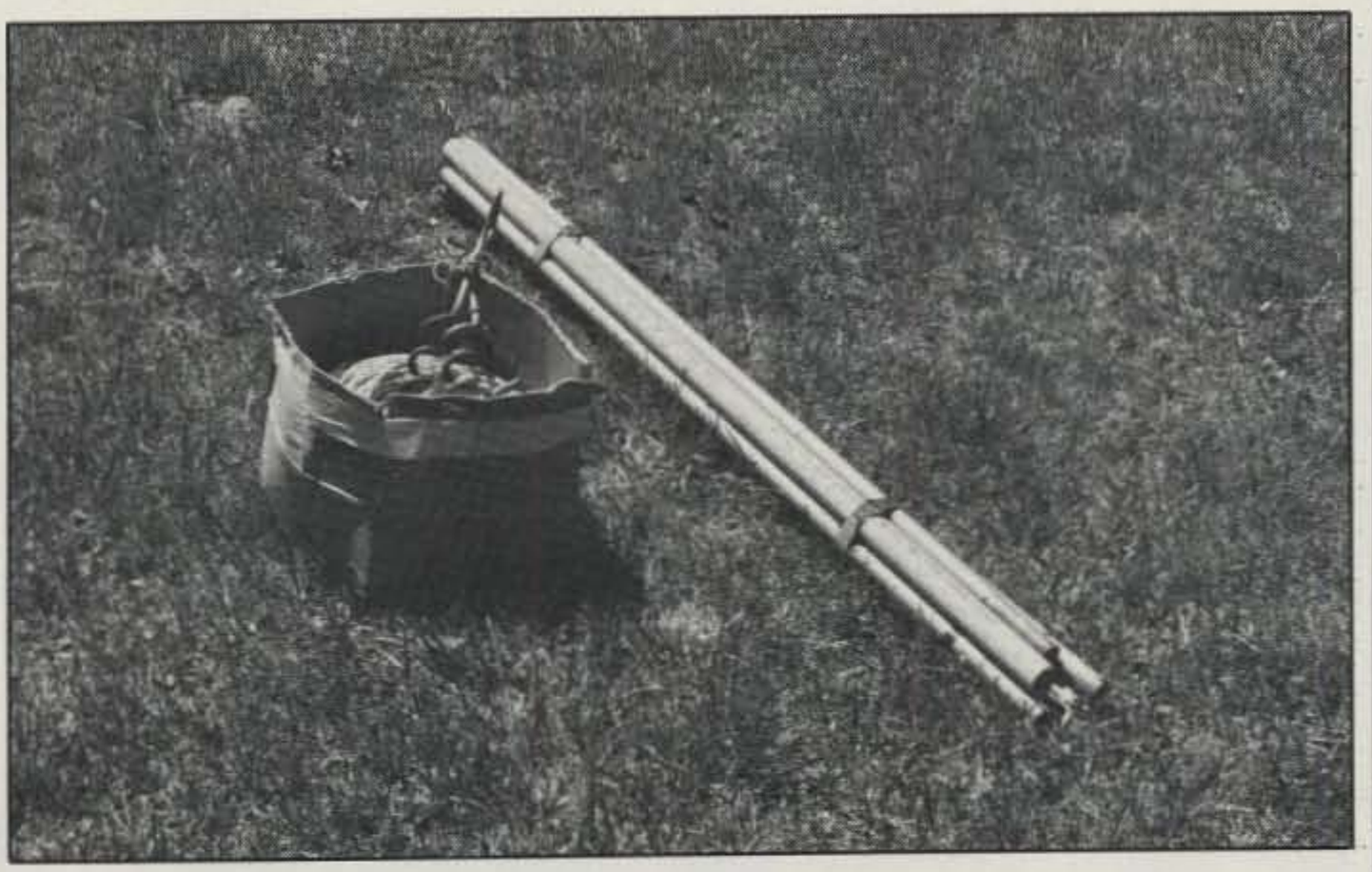

Fig. 7- The portable antenna and mast break down into a 5 foot long bundle and a small box for travel.