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The Small But Mighty Arboreal Aerial

— tree-hanging triband vertical

Living in apartments these past five years, I've learned a lot about short antennas, bent antennas, and antennas with traps. I've had to. I simply haven't had the room to put up the kinds of antennas that I would really like to have. Fortunately, I've usually had a small patch of dirt and a sturdy tree outside the window. By stringing up, over the years, an assortment of temporary wire antennas running to the nearest tree limb, I have been able to make many good contacts on all bands from 160 meters to 2 meters. And I've done my DXing with low power to minimize TVI and CQs coming out of the speakers of neighbors' stereos.

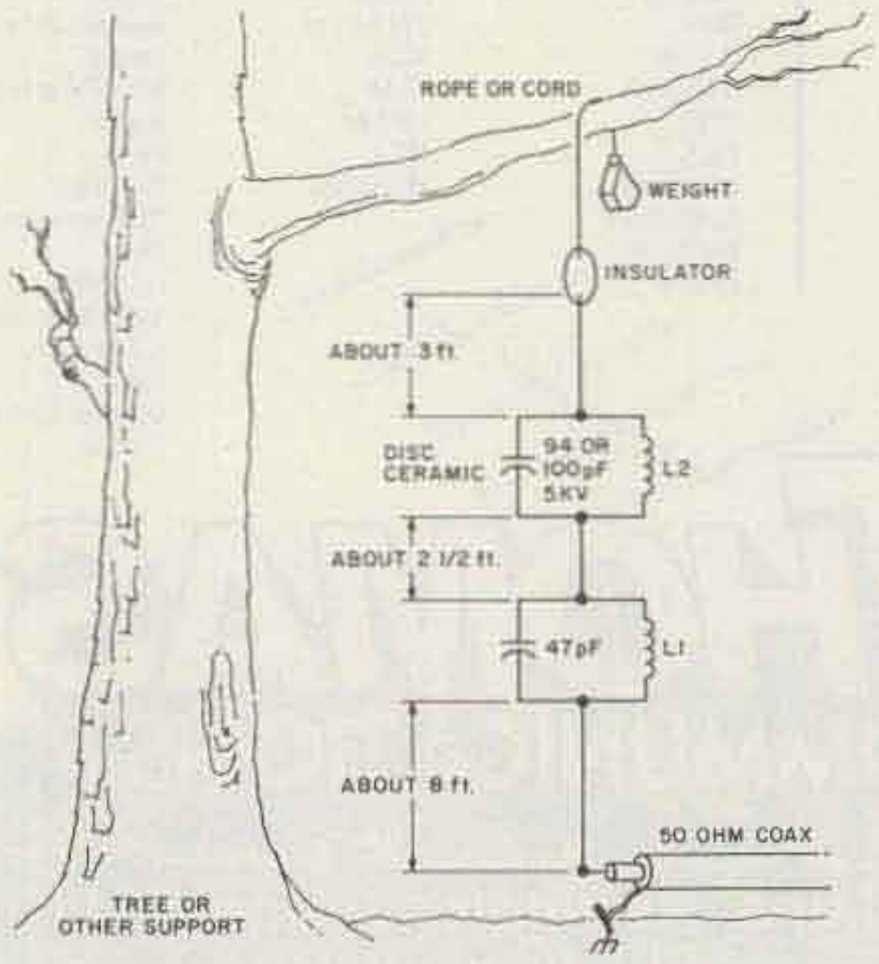

Fig. 1. The tree-limb antenna. L1 = 8½ turns of no. 18 wire, ¼" diameter and 1½" long, with 1/8" turn spacing. L2 = 9 turns of no. 18 wire, 5/8" diameter and 1½" long, with 1/8" turn spacing.

An efficient three-band vertical for power levels under 200 Watts can be made cheaply with wire, insulators, and homemade traps. The wire vertical that I've used for more than two years can be suspended from a tree limb or other support. It can be bent, sloped at angles up to 45 degrees or more, used indoors, rolled up and taken on camping trips, or tossed out an upstairs window to work as an "inverted vertical." Some sort of ground system is necessary, and a network of radial wires beneath the vertical could make it perform as well as a store-bought trap vertical.

You also can make two of these wire antennas for 20, 15, and 10, hook them to coaxial cable in the usual dipole fashion, and have a dandy three-band antenna for horizontal or vertical mounting.

A grid-dip oscillator is necessary to adjust the traps to the right frequency range. To protect the traps from rain and ice, I enclosed them inside plastic film canisters that come with Kodak 35mm film. Punch holes in the lid and the bottom just big enough to pass the ends of the wire. The holes and film canisters will be sealed later with glue or varnish, after the traps are installed.

Begin by cutting a piece of antenna wire to a length of 8 feet 6 inches. Connect one end of this wire to your coax and ground system. Suspend the other end vertically from an insulator and a support. Using your swr bridge as a guide and a few Watts of 28-MHz rf, trim the antenna from the top—a half inch at a time—for the lowest swr in your favorite section of the 10-meter band.

Take down the wire temporarily and build the first trap. I used a 47-pF, 5-kV disc ceramic capacitor hooked across 8½ turns of no. 18 wire, ¾ of an inch in diameter and 1½ inches long, with the turns spaced by 1/8 of an inch. Do not solder the leads together until you have trimmed the coil to resonance at 28

MHz using the grid-dip meter. Then install the trap in its case and solder one lead to the top of the wire previously trimmed for lowest swr on 10 meters. Solder a 3-foot piece of antenna wire to the top lead of the trap, suspend this combination from a support, and trim the top section for lowest swr on either 21 MHz or your favorite section of the 15-meter band. On my antenna, this top section turned out to be 2½ feet long.

If you want only a 15- and 10-meter trap vertical, you can stop right here and put the antenna up in the air. But if you add just one more trap resonant to 21 MHz and another 3 feet of antenna wire, you can operate 20 meters as well. My second trap consists of two 47-pF, 5-kV disc ceramics in parallel (94 pF total capacity—or use 100 pF) hooked across 9 turns of no. 18 wire, 5/8 of an inch in diameter, 1½ inches long, with the turns spaced by 1/8 of an inch.

Using the grid-dip meter, trim the coil and capacitor combination to resonate at 21 MHz. Then solder the trap to the top of the wire previously trimmed for lowest swr at 21 MHz. Solder 3 feet of antenna wire to the top of the trap and trim the wire for lowest swr on 14 MHz.

Hang the wire securely from a tree limb or other support and put it on the air. The whole antenna is about 14 feet long.

I don't make any great DX claims for this antenna, but it has helped me reach all continents with 180 Watts or less. And I haven't had to give up ham radio just because I live in an apartment. ■

What Do You Do When Your Rotator Dies?

—you fix it . . . like this

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The Problem: After several decades of faithful service, the control unit of my Ham-M rotator ceased functioning. A postmortem examination revealed a dead 130-microfarad, 50-volt alternating-current motor-starting capacitor.

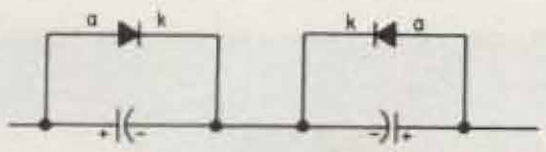

Fig. 1.

The Non-Solution: A quick survey of electronic supply stores showed that no such capacitors were available. A visit to electrical supply houses revealed numerous motor-starting capacitors, but none was physically small enough to fit into the space within the control unit housing.

The Solution: Two 150-microfarad, 50-volt electrolytic capacitors and two 100-volt, 3-Ampere silicon rectifiers were used in the circuit shown. The control unit was resuscitated.

Another interesting situation came to light during the repair job. The meter had been intermittent, sometimes operating normally, sometimes quite dead. The cause was the 1/16-Ampere fuse used in series with it. This is indeed unusual. A fuse normally is fully conductive or unmistakably open. This one probably had a mechanical discontinuity instead of having been blown. The original one was soldered in place, an action fraught with peril to the delicate interior conductor. A clip-type fuse holder was installed to minimize the probability of future trouble.

For those interested in the theory of the functioning of the circuit, the explanation is simple. During any half-cycle, one capacitor is shorted by its associated diode. It might be presumed that having two capacitors in series, the resultant capacitance would be halved. This, however, is not the case because the diode acts as a bypass for the capacitor during every half-cycle. ■