An Allband Attic Antenna

Here is a bright ray of hope for the amateur who can't erect an outdoor antenna and wants to work all bands.

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"Yes, Joe, I'm using an antenna in the attic . . . thanks for the compliment on the signal, Joe . . . this affair works on 10, 20, 40 and 75 . . . yes, I said 75 too . . . guess I could have built in 15 if I had wanted to . . . how's it made? . . . well, it's like this . . .:"

It's an inverted V on 20 meters, trapped and extended to look like a duck's wishbone on 40. It's further trapped and extended to load on the high end of 75 and it's fed with 75 ohm twin lead through a Johnson Matchbox.

Although this attic antenna was designed on paper by W3FZ and W3WXA to work on 20, 40 and 75 meters, I discovered later that it loads and functions fine on 10 meters. But I don't know why.

As all attics vary in size and shape the physical length of the wire is peculiar to my situation and won't be discussed here. However, the method of construction, tuning, and the traps should not differ from one installation to another. The traps act as insulators for their respective frequencies. They also shorten the physical and electrical length of the antenna while the overall length is further modified by the angles which you will have to put in the wire to get it in the attic.

I started by stringing a 20 meter dipole, using 7-22 bare antenna wire, parallel to the rafters at one end of the attic (fig. 1). The feed point was placed directly under the ridgepole. The result was an inverted V. I used pieces of lucite as temporary insulators while in the center I attached the wires to a coax fitting set in the center of a piece of poly (fig. 2). In the preliminary feed line of RG 59/U, which ran to the Johnson Matchbox, I inserted an SWR bridge. In the coax between the Matchbox and the rig I placed another SWR bridge.

(From many experiments in working with attic antennas I have learned that the use of a

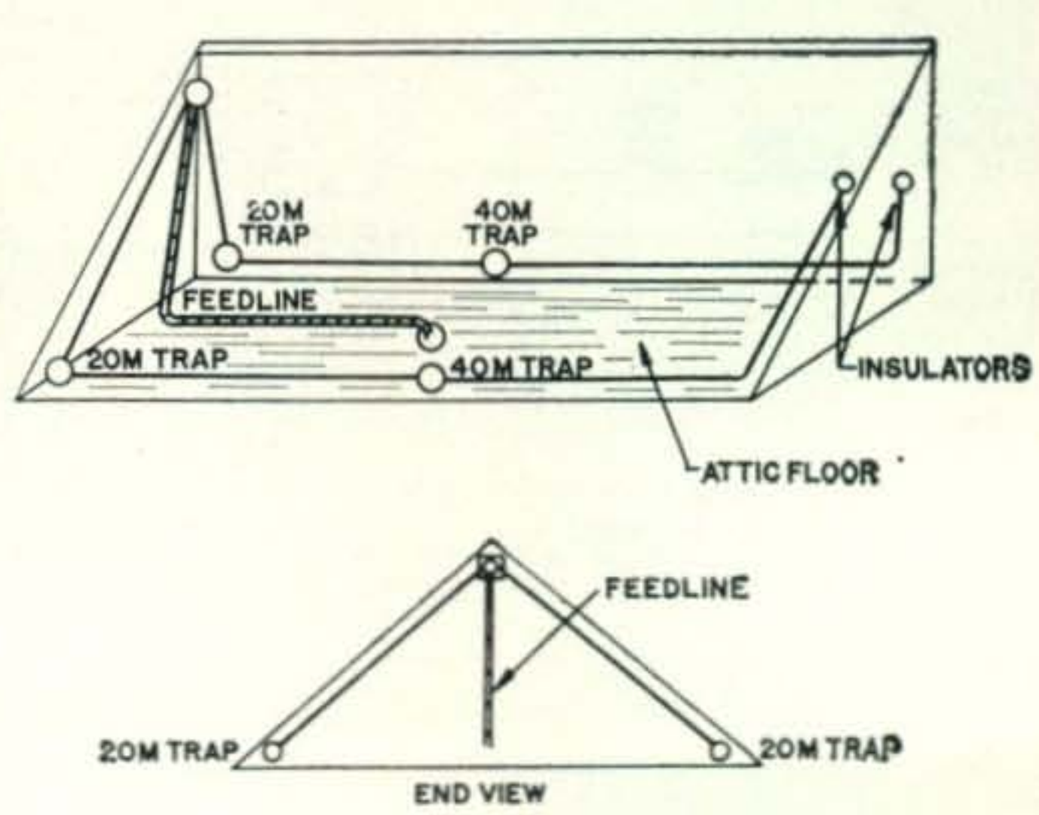

Fig. 1

grid-dip meter with or without an antennascope is not very satisfactory. It is usually difficult to reach the center of the antenna, the proximity of surrounding matter may cause unbalance, and the grid-dipper must continually be checked against some frequency meter or a well calibrated receiver.)

By patiently trimming the antenna I achieved a flat line as indicated on both bridges. Incidentally, I did not cut the wire. I folded it back so that it could be extended later if necessary. I found that when the antenna was a certain length both lines would be flat at the desired frequency. As soon as this length was reached I replaced the temporary insulators with traps.

The traps are inductances parallel tuned for 14.150 mc. I started making them by hacksawing a section of ten turns from an Airdux 2006T coil (fig. 3). One turn at either end I used as leads. I used a piece of poly about 4½ inches long and a little less than 2 inches wide for the supporting insulator. A piece of poly rod 1 inch in diameter and 4½ inches long will do. I bored two holes at either end of the poly: one about ½ inch from the end and the second about ¾ inch from the first. The outer holes are larger than the inner holes because the antenna wire is fed through them to make connection with the trap. Then I inserted the leads from the coil into the inner set of holes and bent them under and through the outer holes. I laid a 37 mmfd capacitor, 3 KV (or higher rating for power over 200 watts), on the supporting insulator, inside the coil, and soldered it across the coil. With the hacksaw I carefully loosened ¼ turn of the coil on each end so that it could be bent outward for fine adjustment (as shown in fig. 3).

It proved necessary to place the trap in a clear spot away from any metal when grid-dipping it for the center of the 20 meter band. For close adjustment I bent outward the free end ¼ turns. For the second trap I made a Chinese copy of the first. When finished, they had 7½ turns.

With the 20 meter traps attached, I checked the array for 20 meters. There should have been no change in the previous loading adjustments at the Matchbox or transmitter. And there were none! So I added about 10 feet of 7-22 wire to each of the traps and stretched it out, being careful not to make sharp bends. (All the bends were made with a radius greater than 4 inches.) I adjusted this system for the center of the 40 meter band by shortening the wire I had added. The 40 meter section coming at right angles to the 20 meter inverted V and parallel to the attic floor gave the duck's wishbone design.

When the 40 meter section was adjusted I added the 40 meter traps at either end. They are fashioned in the same manner as the 20 meter traps. I cut a section of Airdux 2408T coil about 13 turns. The insulator was made the same size as before. This time I used a 47 mmfd capacitor. The finished coil emerged as 11 turns. I grid-dipped it and set it for the center of the 40 meter band. A Chinese copy was easy to construct.

With the traps in place I tested the antenna on 40 meters. Again, there should be no change in adjustments if the traps were tuned correctly, and, again, I found none. I guess I was lucky.

Next, I added to each 40 meter trap one half of the remaining wire from my original 100 foot roll of 7-22 and stretched it around the attic fastening an insulator at the ends. Don't worry, you probably will have too much wire anyway because I found that I had to fold up almost 4 feet from either end to bring the resonance from 3.56 mc to 3.95 mc.

(Will some genius devise a means for me to add more wire when I want to QSY down to the lower depths of 80 meters? I'm tired of continually climbing up into the attic to unfold the ends of this antenna.)

When I had the entire thing adjusted to my satisfaction, I crossed my fingers and replaced the coax with 75 ohm transmitting twin-lead. (It was simple to solder a male coax fitting to the end of the twin-lead.) I was anxious to effect a balanced feed line to the Matchbox. Apparently I achieved my goal as I found no difference in loading and I cannot light neon bulbs on the feeders.

This antenna is quite broad on all bands except 75 meters. It has resulted in many contacts which I'd not have been able to make with other clumsy indoor devices. I was really intrigued when it loaded across the 10 meter band and worked out well although quite directional broadside. I surmise that if someone wanted to include 15 meters he cauld do so by starting with a 15 meter dipole and inserting 15 meter traps before the 20 meter traps. ■

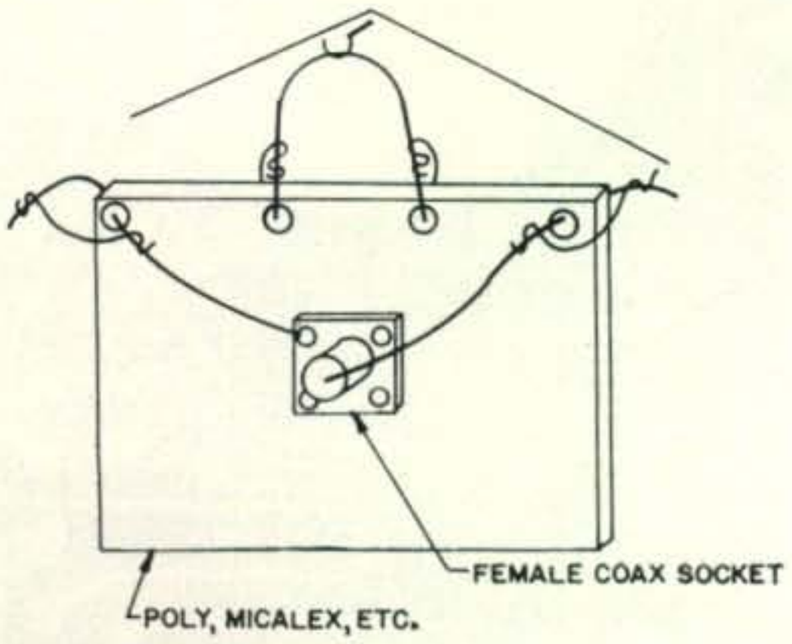

Fig. 2

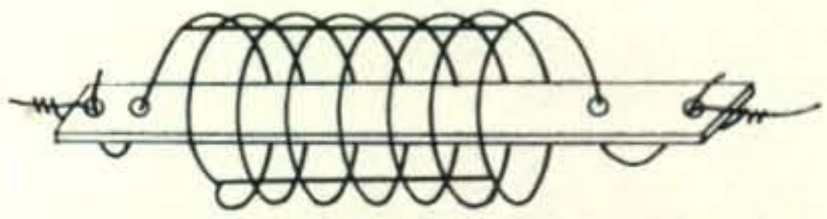

Fig. 3