cloth and resin to complete this antenna, and a few more besides! After glassing the stress points shown in Figure 4, I used automotive primer and white automotive enamel (obtained where I bought the fiberglass kit) to spray the entire assembly for weather protection and unobtrusive appearance.

After the boom has cured, drill holes for the element mounting clamps, which are common plumbing clamps. Secure the 1/2"-diameter by 5'-long aluminum tubing to the element holders, also shown in Figure 4, spacing the ends of the tubing about 1" apart. Notice that I isolated the elements further from the boom mounts by slipping clear plastic tubing over the ends (also obtained from my local hardware store). You might wonder why I would bother to isolate elements when "plumber's delight" construction predominates in yagi construction, and I already had wooden insulating supports. Take nothing for granted, and KISS (keep it simple, stupid) are my mottos. I had analyzed the antenna as a set of free space conductors and that is what I wanted to build!

Connect the inside ends of the reflector with #12 wire and a pair of solder lugs screwed into the 1/2" tubing, shown in Figure 6. Be sure to weatherize these connections as well.

You can strap the Radio Works 1:1 balun to the boom near the driven element using one or two large stainless steel hose clamps. Connect the unbalanced output of the balun to the driven element ends, again using #12 copper wire, solder lugs, and self-tapping screws affixed to the 1/2" tubing. Be sure to weatherize these connections.

At this point, you have assembled the antenna as far as it can be and still fit in a normal garage. Subsequent assembly must be done outdoors, presumably on the day you will erect it.

Wind the loading coils on 1" wooden dowels, a total of 23 turns of #16 enameled wire spaced over 2.5 inches, for 4.2 µH of inductance, shown in Figure 5. Start by cutting a 1" wooden dowel into four 6.5" lengths, and then drilling a 3/8" hole into the ends of each dowel to a depth of two inches. Be careful to center the hole and keep the drill bit straight as it enters the dowel. A drill press and vise make the job easy.

After drilling the dowels, cut eight 5"-long pieces from a section of 3/8" solid aluminum rod. Mix up some "two-hour" epoxy, and after roughing one end of the rods with sandpaper, coat the rough end of each rod and insert it into the dowel until fully seated. Continue until all four dowels have 3/8" aluminum mountings at either end. This technique yields low profile, strong coil forms that you can easily attach to 1/2" tubing with hose clamps.

I used stainless screws and solder lugs, shown in Figure 5, to secure an electrical connection to the aluminum rods. I drilled small pilot holes through the wooden dowels at each end, continuing until the hole progressed into the rod. Wind the coils between the solder lugs and secure by soldering each end to its respective lug. To help in producing a uniformly wound coil, I used masking tape to secure the windings while I manually adjusted turns spacing with a thumbnail. This is very easy to do, and will only take a few minutes for all four coils. After the spacing looked uniform, I spread four thin beads of fast-curing epoxy down the length of each coil. I spaced the beads 90 degrees apart (the coils resembled B&W units at this point) and removed the masking tape when the epoxy cured.

The coil assembly must be weatherized, so I used 1-1/8" Teflon™ heatshrink over the entire length of the wooden dowels, and then sealed the ends with urethane. Alternatively, you can spray or brush the weather-resistant coating of your choice over the coil assemblies, making sure to seal the lugs and screws. The result will be loading coils that should last for a very long time.

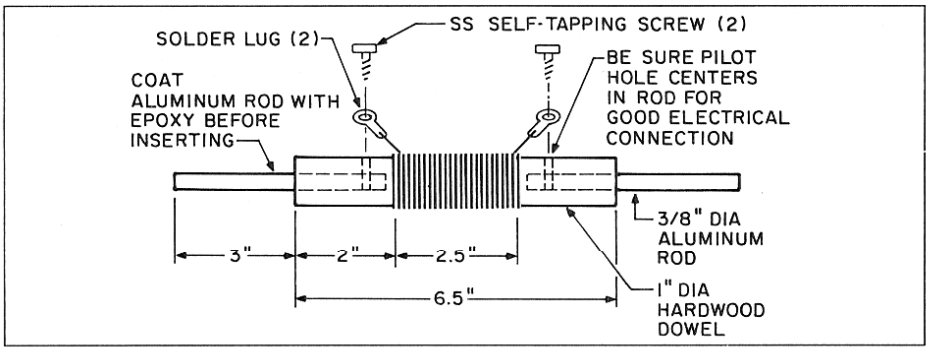

Figure 5. Loading coil assembly.

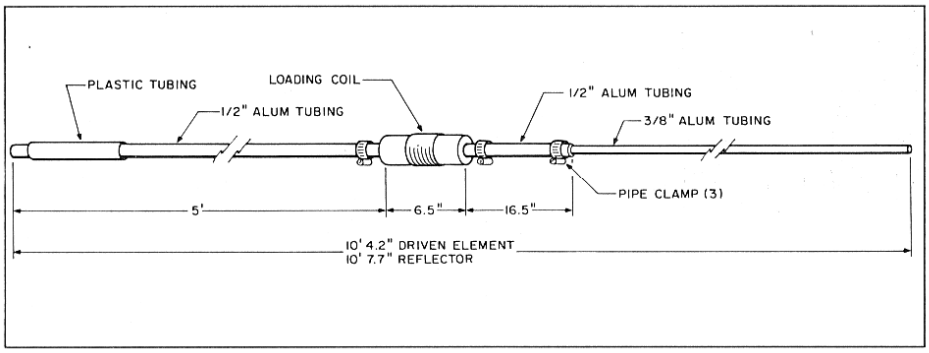

Figure 6. Element assembly (times four).

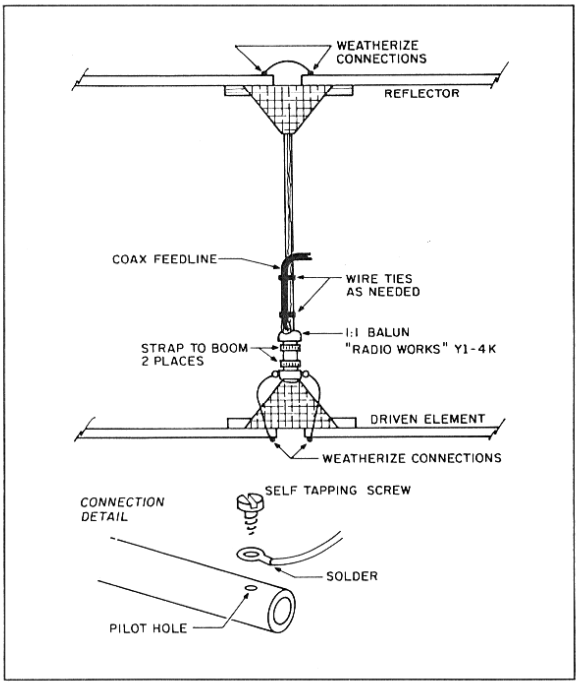

Figure 7. Final wiring.

Assemble the antenna elements by following the diagram in Figure 6. I used stainless steel hose clamps, but you can screw the element segments together, being sure to leave the four 3/8" end segments adjustable for tuning purposes.

Tuning

With the antenna lifted to the top of an 8' to 10' ladder, and using your rig at very low power (please don't cause QRM), simply tune the driven element to resonance at the center of your primary operating frequency. Adjust the reflector for a length that is 3.5" greater than the driven element on each side, or 7" longer overall. If you use the MFJ SWR Analyzer as I did, you can play around a bit with no fear of causing QRM. Repeat the process one more time and then recheck after raising the antenna to its final height. You can see from my SWR chart that I missed by a hint because of impatience. The antenna is usable over the entire band as tuned, and the high frequency side of the SWR chart does offer the highest forward gain . . . (excuses, excuses).

Antenna Mounting

To install the antenna, I used a 40' four-section push-up pole, a wall-mounting bracket, and a TV antenna rotor, all obtained from

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