

By Bob Fischer  
The Antenna Sculptor

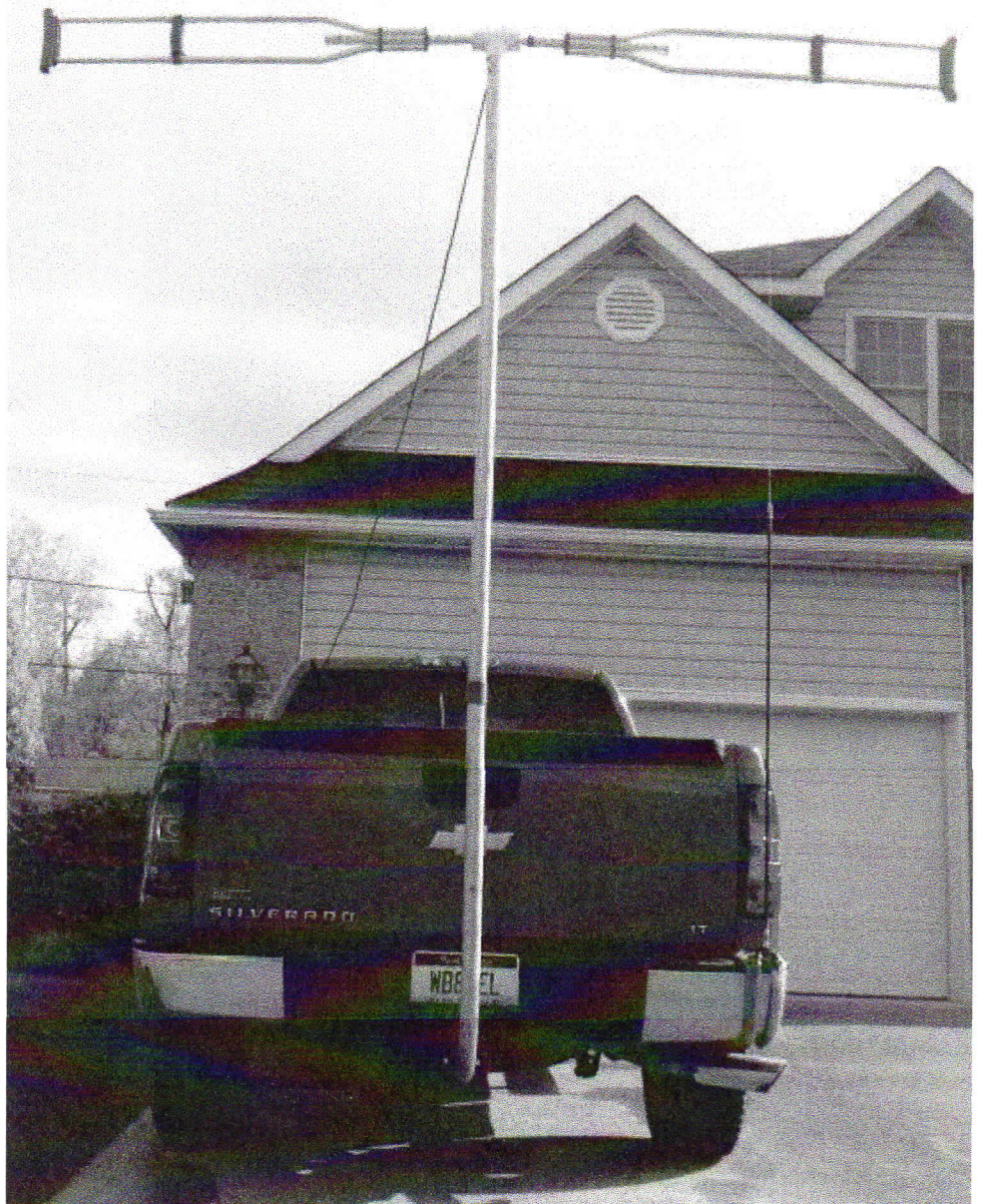
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# BUILD A 50 MHZ DIPOLE OUT OF CRUTCHES

**(Yep, crutches!)**

My father gave me a crystal radio set when I was around eight or nine years old. It was truly amazing! Just a few electronic components, an earphone, and two short wires with alligator clips.

Without a battery or any other source of power, this magical little device would pick up radio stations and play them through the earphone. All I had to do was attach one of the alligator clips to an "antenna."



soon discovered that most metallic objects a few feet in length made good enough antennas to bring in the closest AM station. Attaching the second alligator clip to metal that was “grounded” or in contact with the earth improved signal strength and brought in weaker signals.

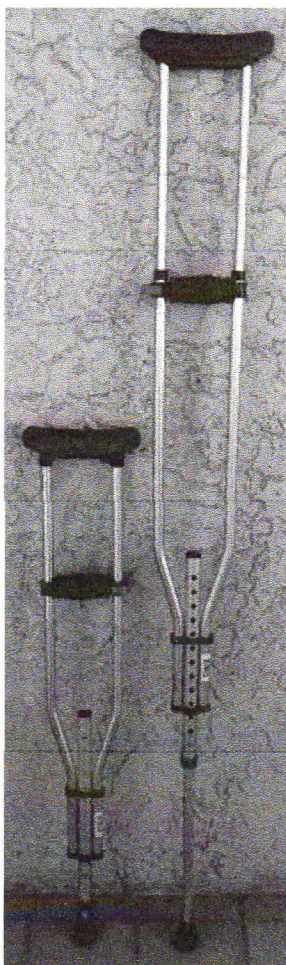
Those childhood “experiments” soon taught me that some metal objects were much better antennas than others, and that bigger metal was not always better. I have never forgotten the anticipation and excitement of attaching alligator clips to new materials and then hearing the results through the earphone.

I was hooked. The fascination of signaling through space without wires would become my primary hobby for the next half century. While writing this article, I realized I have actually been experimenting with antennas since I was in elementary school.

Later in life, I studied electronics and then electrical engineering. I learned about resonance and how radio frequencies have electrical wavelengths. Around 1969, I got my first ham radio license.

Over the last 45 years, I have built dipoles, ground planes, J-poles, quads, yagis, quagis, delta loops, and long wires. In addition to the traditional copper wire, I have cobbled them together using EMT and rigid aluminum conduit; copper, aluminum, and stainless steel tubing; brass welding rods; and even barbed wire. I have also used antenna tuners to load up bedsprings, fences, house wiring, abandoned telephone line, umbrellas, farm wagons, aluminum gutters, and tin roofs.

Just as other sculptors are blessed with the vision to see their works of art hidden in wood and marble, I have developed the ability to see antennas hidden in metal.



■ FIGURE 1.

After working with antennas for a while, I believe most everyone can probably develop an eye for dimensions that are quarter-wave multiples of their favorite frequencies.

A couple of months ago, my wife had an accident that injured her right foot. X-rays confirmed bones were broken, and an orthopedic surgeon sent her home with a cast and a set of shiny, new, adjustable aluminum crutches.

When all the medical excitement was over, I had time to take a closer look at her hobbling around on those crutches. That’s when I spotted the six-meter antenna hidden in them. A few minutes with the tape measure not only confirmed the 6M antenna, but also discovered a 4M dipole. All I needed to do was get the wife healed up and the crutches would be mine.

Eventually, the broken bones did mend and the crutches became surplus to her. That made them prime material for a novel antenna that would also become an eye-catching conversation piece.

My particular set of crutches happen to be rated for 300 pounds. Each crutch has two separate adjustments. The upper section has three settings 5-1/2 inches and 6 inches apart. The lower section has 13 positions in one inch increments. Refer to **Figure 1**.

When everything on one crutch is extended to its maximum length, it measures approximately 60 inches. Certainly long enough to make a 112 inch 6M dipole!

Compressing all the adjustments reduces the same crutch to 36-1/2 inches. Plugging these dimensions into the old standby dipole formula ( $468/\text{MHz} = \text{inches}$ ) indicates half-wave resonances from about 47 MHz to 78 MHz. Great! Now, all I needed to do was find a way to put the two crutches together and feed them with coax.

<b>QTY</b>	<b>ITEM</b>
2	Adult size aluminum crutches
6"	3/4" ASTM D 2241 PVC pipe (The ID of schedule 40 PVC was too small to work on my crutches.)
1	1-1/2" Schedule 40 PVC tee
2	1-1/2" x 3/4" PVC reducing bushings
2	#8-32 x 3" Machine screws
6	#8-32 Hex nuts
4	#8-32 Flat washers
2	#8-32 Star lock washers
2	#8 Crimp type ring connectors suitable for use with the size coax cable used to feed the antenna

**PARTS LIST**