

The Omni-Gain Antenna on 2 Meter F. M.

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SINCE the description of the Harris omni-directional gain antenna for 220 mHz f.m. appeared in *CQ*,¹ the author has been getting numerous letters asking how it could be built for 2-meter f.m. As a matter of interest, such a 2-meter antenna was built at the same time the 220 mHz antenna was constructed.

The principles upon which this 2-meter gain antenna is based are as described in the article on the 220 mHz antenna. Figure 1 gives the dimensions, figured upon a center of design frequency of 147.5 mHz using the ARRL *Handbook* formula. The v.s.w.r. stays below 1.2 to 1 through 146 to 148 mHz, the portion of the band used mainly for f.m. Like the other antenna, which is also basically three half waves in phase stacked vertically, gain is in the order of 4 db. A nice feature of this antenna is that no ground radials are necessary. A short length of close-woven copper-braid, from a piece of scrap RG-8/U, was used as a decoupling sleeve, electrically $\frac{1}{4}$ wavelength long, taking in account the propagation factor of the vinyl covering of

the coaxial cable.

Construction

While the 220 mHz antenna was built with RG-58/U, we decided to build the 2-meter antenna with RG-8/U, making it capable of handling a quarter kilowatt of r.f. input. Using RG-8/U presented a bit of a problem when we got to the folded sections. On 220 we simply bent the RG-58/U. On 2-meters we actually cut the RG-8/U, making the middle fold $6\frac{1}{4}$ " long and then soldered the three sections together. Figure 2 shows how this was done. Figure 3 details the preparation of the ends of the coax. It is recommended that $\frac{3}{4}$ " of the braid be tinned and then cut back to expose $\frac{1}{4}$ " of polyethylene insulation; plus the $\frac{1}{4}$ " extra of the center conductor. The soldered connections can be wrapped with Scotch #88T electrical tape.

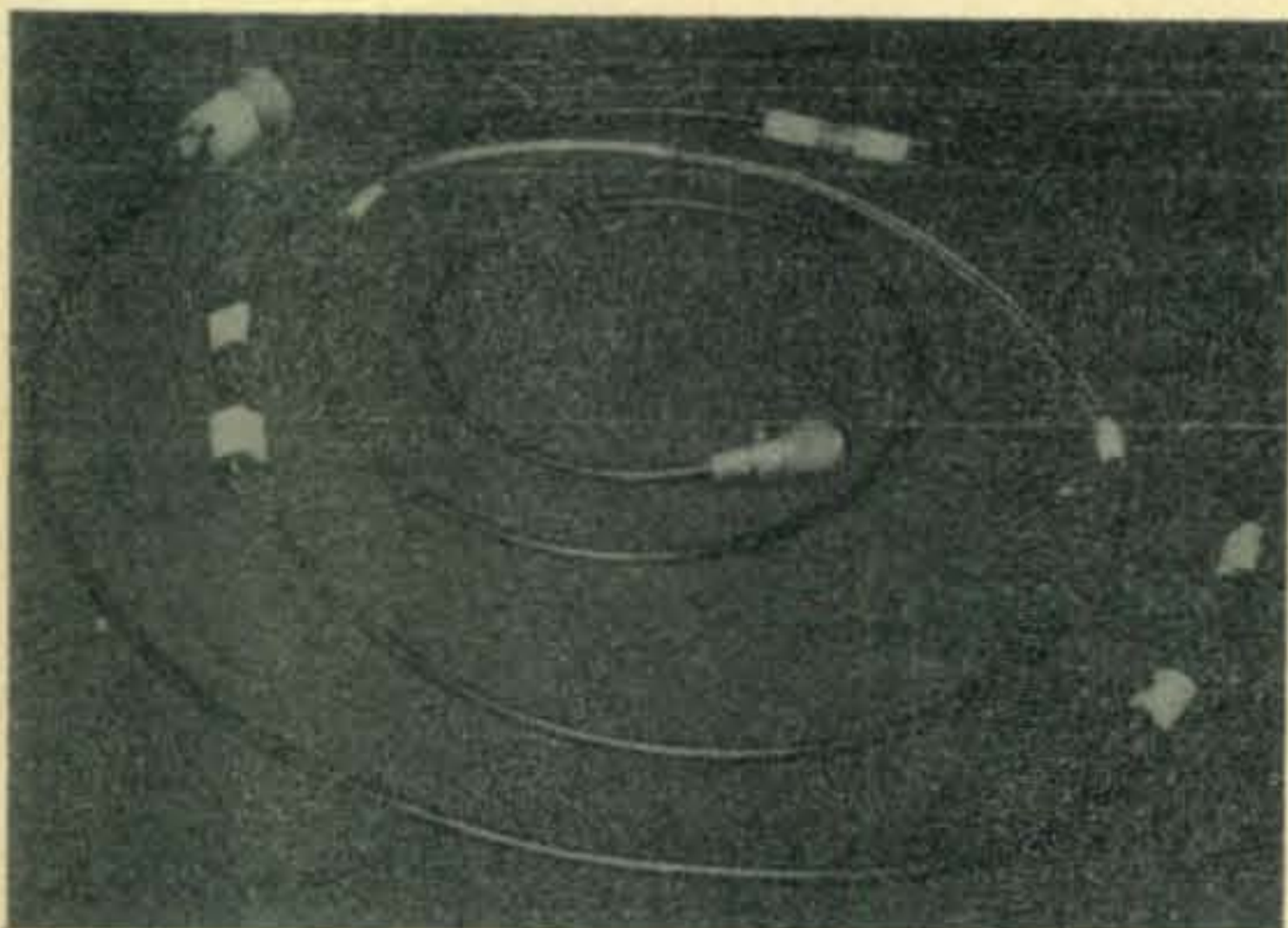
The top half of the 2-meter gain antenna was also constructed of RG-8/U although the center conductor is really not necessary, electrically. (It does provide some mechanical strength, though.) As the result, the top folded section need not be made exactly as shown in fig. 2 for the bottom section. In the top section we soldered both inner and outer conductors together.

Figure 4 details the connections at the electrical center feed point. To give the necessary mechanical strength to this joint, two pieces of glass-base printed circuit board, without the copper, were cut to roughly 6 inches long by $\frac{3}{8}$ inch wide. These strips were then taped, parallel to the joint, with Scotch electrical tape.

Figure 5 shows how the decoupling sleeve is attached. About $\frac{1}{4}$ " of the outer vinyl covering of the RG-8/U is removed at the measured location and the exposed braid is tinned. The copper braid sleeve is then slipped over the RG-8/U and soldered to the exposed braid of the RG-8/U. The connected braid sleeve is then pulled down to smoothly fit over the RG-8/U for a total length of $12\frac{3}{8}$ inches. Do not connect anything to the bottom end. The whole sleeve, top connec-

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¹ Kretzman, B. H., "The Motorola 80D on 220 mc F.M., Part III—Antennas," *CQ*, Dec. 1971, P.28.



Similar in design to the 2-meter Omni-Gain antenna, a 220 mHz version is shown here constructed of RG-58/U for low power operation. If only low-power operation is contemplated, this same construction may be employed on 2-meters using the dimensions of fig. 1.

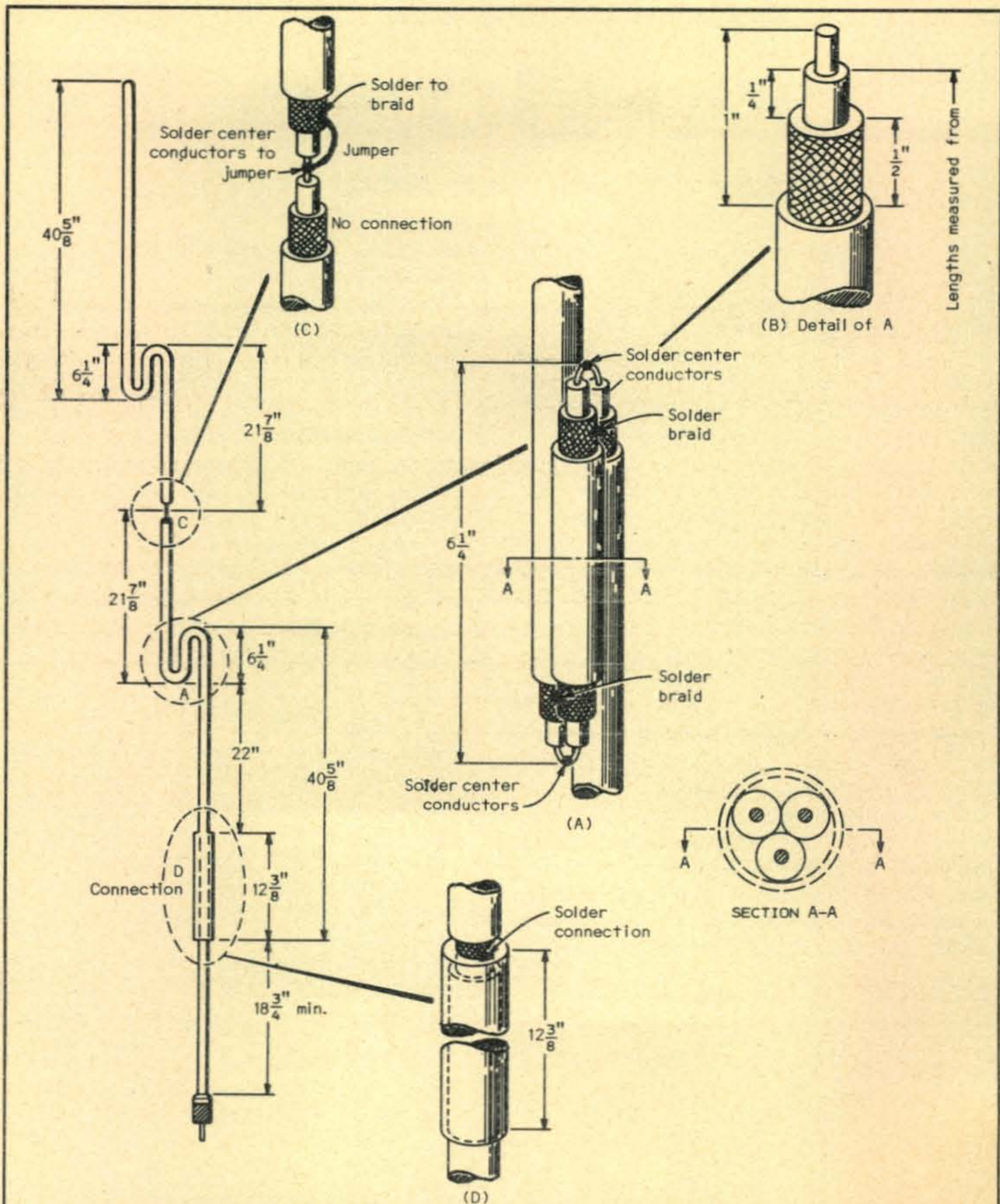


Fig. 1—Construction details of the 2-meter Omni-Gain antenna. (A) Detail of construction of folded section. (B) Preparation of ends of RG-8/U coax for folded sections. (C) Assembly of center feed point. (D) Assembly and connection of de-coupling sleeve.

tion included, is then taped with the electrical tape.

The complete antenna is then slipped into a 10 foot length of thick wall 1" inside diameter "PVC" pipe. The bottom end was cemented into a PVC threaded pipe adaptor into which an 18 inch length of aluminum pipe was screwed. U-bolts were then used to

mount the antenna by bolting to the pipe. Of course the top to the antenna was plugged. Like the 220 antenna, the 2-meter antenna can be made water proof by pouring into the pipe expandable polyurethane foam. Appearance, except for size, is similar to that of the 220 antenna as pictured on page 30 of December 1971 *CQ*. ■