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Improved Vertical Antenna for 2-Meter Mobile

Adapting the 5/8-Wave Vertical to Amateur V.h.f. Service

BY VERN EPP,* VE7ABK

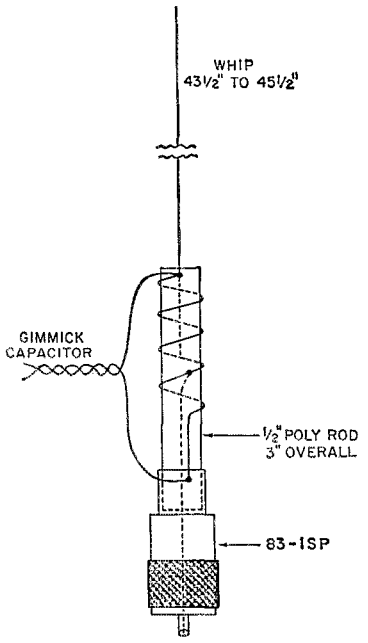

Fig. 1—The ⅝-wave 2-meter whip mounts in a poly rod, inserted in the top of a coaxial plug. Impedance matching coil is wound on the rod, and the line to the transmiter is tapped up one turn from the bottom end. The coil is tuned with a "gimmick" capacitor.

Observing the excellent results obtained in commercial v.h.f. communications with ⅝-wave vertical antennas, I decided to try an inexpensive adaptation of these antennas in our 2-meter f.m. work. There are several types of these antennas available commercially, but all are quite expensive. The construction shown here costs very little. The antenna is easy to make, and the original has been in use for several months, demonstrating that it is rugged enough for amateur service. Best of all, it has shown an average improvement of 3 db. over the quarter-wave vertical whips formerly used.

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Construction

As shown in Fig. 1, the whip is inserted in the top of a polystyrene rod, which is threaded into the sleeve of a standard coaxial plug (PL-259 or S3-1SP). The whip is ⅛-inch welding rod, 44 inches long. This is not critical, as the tuning capacitance can be varied for different antenna lengths. The impedance of the ⅝-wave whip is quite high, so a matching device must be used. A coil wound on the poly rod is in series with the whip and the sleeve of the plug. The coaxline and center pin tap up on the coil about 1 turn from the grounded end. The coil is resonated with a "gimmick" capacitor, or a small trimmer.

The rod is 3 inches long. It is drilled about 1½ inches deep, with a drill somewhat smaller than the whip stock. The end of the whip is then heated and forced into the hole slowly. A hole is drilled up from the other end of the rod, and a similar one into the side, at a point near where the tap will be. A wire may then be run into this to make the tap connection, or a thread may be tapped into the side hole and a screw threaded into it to make contact with the wire that runs down to the coaxial connector center pin. The end of the poly rod can be threaded into the plug if the latter is heated with a torch. An alternative is to turn or file the rod down just enough so that it can be forced into the threaded portion of the plug.

The coil is 4 turns of No. 14 wire, with the top end soldered to the whip. The bottom is soldered to the connector sleeve. The tap is one turn up from the bottom. The gimmick capacitor was made from a twisted pair of hookup wires, about 8 inches long. This can be cemented alongside the coil after adjustment has been completed.

Tuning and Use

The system can be resonated by adjusting the length or twist of the gimmick capacitor, checking resonance with a grid-dip meter coupled to the coil. To do the best job, put a 50-ohm resistor across the coaxial line at the point where the antenna is plugged into it, when the resonance check is made. Any variable capacitor could be substituted for the gimmick and replaced with a fixed capacitor of equivalent value when adjustment is completed.

Performance of this antenna was checked by calibrating the receiver's limiter grid current with a signal generator, and then comparing the ⅝ and ¼-wave whips. They were originally installed on a rear fender, where results were consistently better, transmitting and receiving, with the ⅝-wave whip. Still better results were obtained when the ⅝-wave whip was installed in the middle of the car roof. QST