BETTER SIGNALS

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ANTENNAS AND SIGNAL IMPROVING ACCESSORIES

Short W9INN WARC and 10-15-20-40-80M Mulit-Band Dipoles

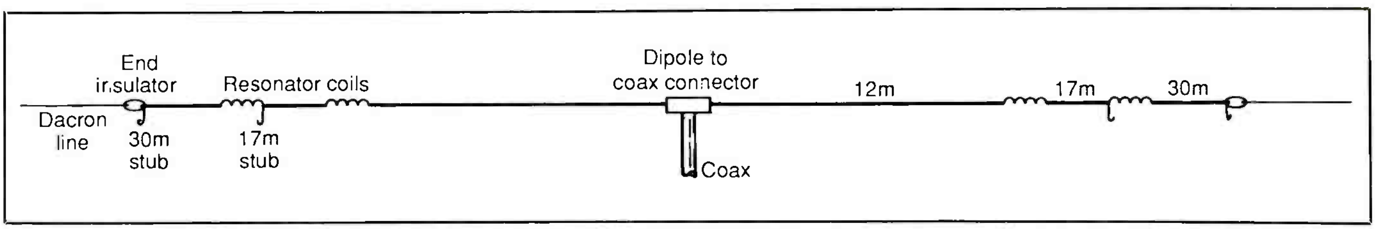

Fig. 1 - WARC Dipole by W9INN.

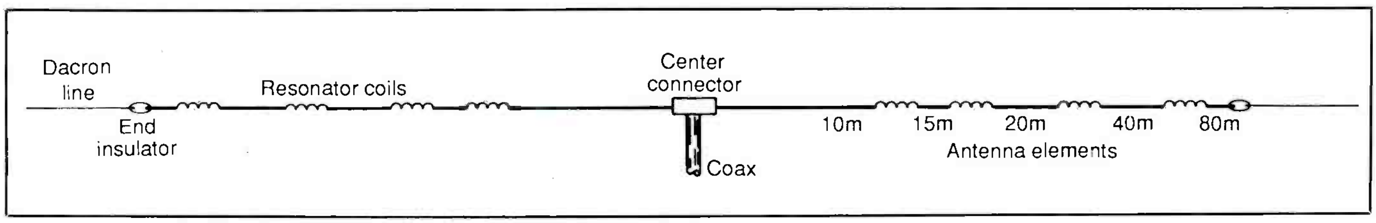

Fig. 2 - Multiband short dipole.

By now the 17M WARC is available for ham operation and, all three bands, 30, 17 and 12M are filling with signals. W9INN has developed an excellent WARC dipole designed just for these three exciting DX bands. It is only 30 feet long, Fig. 1, and is ideal for DX'ing from a location where you have little mounting space: thanks to the two efficient W9INN resonactor coils on each side. These coils permit shortening the antenna length and permit a single transmission line operation with or without a tuner. The W9INN Hideaway dipole, Fig. 2, is a similar design. It operates on 10, 15, 20, 40 and 80M and is only 50 feet in length, and is an ideal antenna for a small lot, attic mount or for portable application. A set of four resonactors are used in each dipole segment. Antennas can be hung as dipoles, inverted V's and slopers.

Small, single wire stubs can be cut to obtain some precise resonant frequency if you desire. Stub wire is included in the package. You can trim the wire stubs carefully if you wish to obtain the lowest SWR possible on each of the three bands, or on all the bands of the Hideaway, too. A good idea is to cut the antenna to the high-frequency side of a band and use a stub to bring the resonance down to a preferred frequency. Furthermore, if you wish, the stubs can be preset at the plant if you specify the center frequency you desire on each band. However, you may have to do some touch-up tuning to take care of any interaction that can occur at the mounting site.

W9INN sent the some tips and details on using the stubs. Stub tuning provides a method of adjusting an individual band center frequency without the need to actually change element lengths. By adding a stub at the outboard end of an element section, Fig. 3, the effective length of the element can be increased. If the element segments are initially made a little short, so that natural resonance (frequency at which the minimum SWR occurs) is located at the high-frequency end of the band, stubs can be used to lower the frequency to the desired parts of the bands without changing the physical length of the element. You need not disconnect wire from the resonactor coil, Fig. 4.

Stubs are made of the same 14 gauge solid wire used in the elements. Stubs can be cut in small increments to adjust the resonant frequency to the point desired. If you cut too much, it is easy to make another set of stubs! The frequency change caused by the stub approximates the frequency change that results from a similar change in element length. There is some coupling, where a change in the resonant frequency of one band with the stub also causes a change in the frequency of the following element (band). But, it is minimal and the change is less than that caused by changing

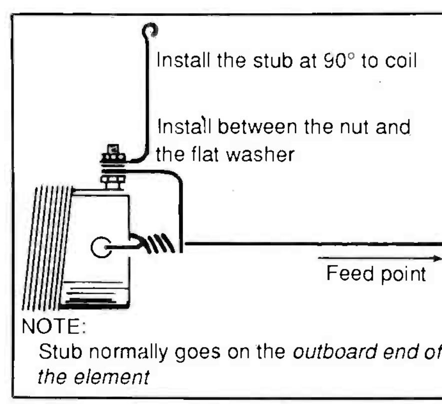

Fig. 3 - Single-wire stub held by nut and flat washer.

the actual element length.

The standard connection to the resonactor coil provides a simple method of connecting the stub, Fig. 3. Just loosen the nut, slide the hook on the stub between the nut and the flat washer, and re-tighten the nut. Bend the stub so it is at 90 degrees to the coil, sticking straight out. The "eye" formed at the end of the stub is made to reduce the possibility of corona. The voltages developed on short antennas are appreciable, particularly if you use a linear amplifier! The stubs themselves seem to reduce the possibility of corona by increasing the surface area of the element and dissipating the elec-

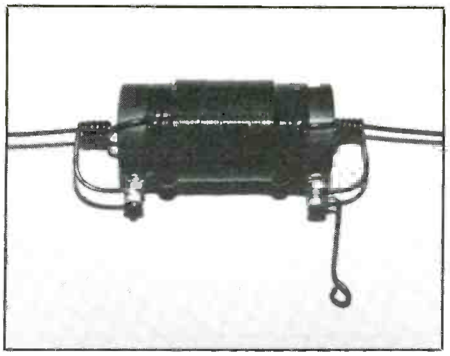

Fig. 4 - Stub attached to a resonactor coil.

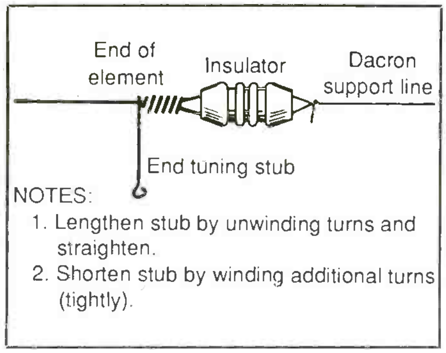

Fig. 6 - Stub attached to end insulator.

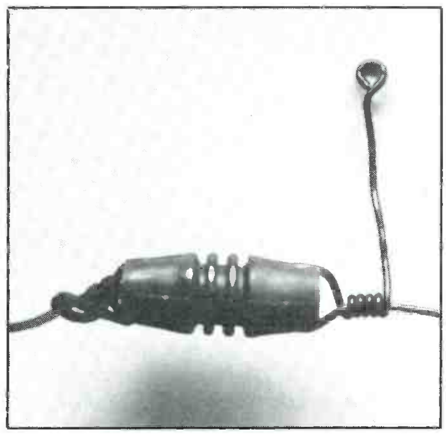

Fig. 7 - Stub attached to end insulator.

trostatic charge. High-power tests made so far have not revealed any problems!

There is a practical limit to the length of stub that can be used, Fig. 5; 6″ or 7″ seems to be thoroughly practical. If a longer stub seems to be needed, it is a good idea to lengthen the element in the usual way, by splicing in additional wire, or replacing it with a longer element segment. When making adjustments, it is a good idea to be scientific about it and keep a careful record of each change and the effect on each resonant frequency. Changes should be small; and, alternating between elements will keep one of the frequencies from getting away from you.

A stub can be attached ahead of the end insulator, too, Figs. 6 and 7, to adjust the resonant frequency of the lowest frequency band. End insulators should be located so they cannot cause a problem if they should melt or ignite, with any antennas. Any plastic insulators have the potential to burn or melt. Stubs appear to minimize this potential. The stub-tuning method can be used with dipoles or slopers.

Transmission Line Length.

When a multi-band antenna and its stubs are tuned, use as high a mounting position as practical. The antenna may often be mounted permanently at much greater height and with a different length of transmission line. Sometimes, when up in the clear, one or more of your minimum SWR frequencies may have shifted. In this case, a tuner can be used to establish the exact match to the transmitter with little loss if the SWR has not been changed drastically. All you are doing is setting up a small standing wave on the line to transform the impedance at the antenna feedpoint to the 50 ohms resistive located at the transmitter antenna terminal.

An alternative plan, as suggested by W9INN, is to cut and dress short sections of the same type of line which you will add to the transmitter end of the line and then connect to the 50 ohm antenna terminal In the old days I used this technique to match many 10, 15 and 20 meter multi-band V-beams and rhombics to my transmitter when cutting a very long wire length antenna so one of each band's odd harmonic lengths fell reasonably near to each other in physical length of wire. Thus, I could operate on each band without a tuner, making band switching much simpler without going through the tuner adjustments.

W9INN suggests one ideal way to so this to make several lengths of coax of the some type you use in your line with a PL-259 on each end. These can be combined with PL-258 connectors in a binary basis to make 1 foot increments from a foot through 15 feet using just four lengths, 1 foot, 2 foot, 4 foot and 8 foot. By adding to your transmission line length in one foot increments you can find a best length for operation on 10, 15, and 20 meters. You can do the same for the WARC antenna. When this best length to replace the test set-up. This section of line can be coiled up and located in an appropriate place at the operating position.

As you increase the length, one foot at a time, write down the resonant frequency (frequency at which there is minimum SWR). You will note the resonant frequency and SWR change at a different rate for each band. Try to find the length that gives you the happy compromise that produces the minimum SWR at the desired location on each of the bands. Multi-band operation of long wire antennas on several bands at high efficiency and with little tuning is an interesting subject. It can provide you, however, with a low-cost and surprisingly good antenna. Patience is required if you wish to avoid use of a tuner. PC

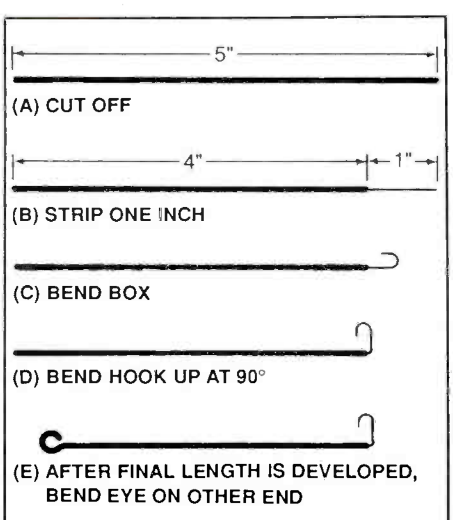

Fig. 5 - Construction of single-wire stub.