A VERSATILE ANTENNA TUNER

BY CHARLES M. FULLINWIDER,* W5PSA

THERE are many articles in radio magazines these days describing antenna tuners. All of the tuners follow the same general circuit with certain variations according to the use the amateur wishes to make of the tuner.

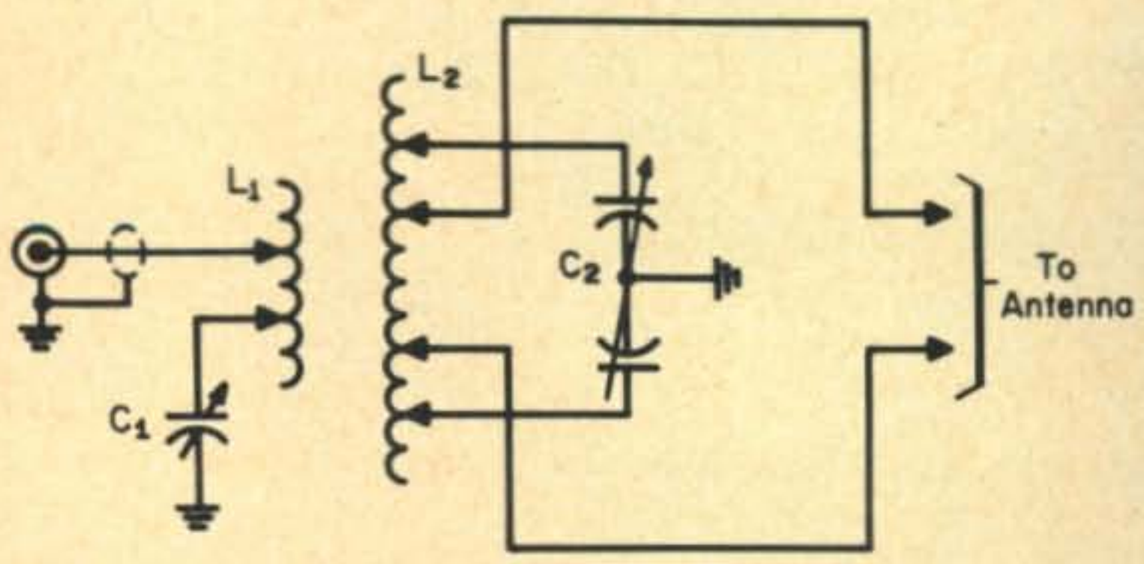
Employing parts on hand, I built a tuner which follows the usual pattern except that the coils are set up somewhat differently from other tuners I have seen described.

The one antenna at my QTH is a 40 meter inverted V, center fed with 50 feet of 300 ohm twin lead (450 ohm open wire feeder would also work well). With this length of feed line, the standing wave ratio can be brought down on all bands, 80 through 15, with the usual parallel arrangement as seen in fig. 1. Since only a dual capacitor of approximately 70 mmf per section was on hand, this is what was used, but if I had to purchase them, I would have bought two 100 mmf or 150 mmf capacitors, with spacings of 0.125" to handle maximum power. They should then be mounted in such a way that the stators and rotors would be insulated

* Box 377, Dexter, New Mexico 88230.

Fig. 1—Circuit of a basic parallel antenna tuner that operates from 80 to 15 meters feeding an inverted V antenna with a 50′ length of 300 ohm line.

C_1—365 mmf receiving type variable.
C_2—70 mmf per section 2 gang capacitor. See text.
L_1—22t., #16 e. wound on a 2" dia., 5" long porcelain form.
L_2—60t., #12, 3" dia. 6 t.p.i. Polycoil #1778 or Air-Dux #2406T.



Tap Settings

Band	L_1	L_2
80	12t	57t
40	8t	24t
20	4t	16t
15	1t	6t

from each other. This would permit the use of a series circuit arrangement, as well as parallel.

10 Meter Operation

The tuner would not work on ten meters with the 50' length of feed line. If the tuner is to be used on the 10 meter band, the feed line could be lengthened or shortened until the tuner could handle the impedence.

Some experimenting was done on ten meters with the 50 feet of feed line and a series arrangement, and it was found that the standing wave ratio could easily be brought down. Two variable capacitors of 20 mmf each were all that were on hand for use in the experiment, and variable capacitors of 100 mmf or 150 mmf would have been much better. See fig. 2 for the circuit used.

The Coils

Coil L_2 is 3" in diameter, 6 t.p.i. and 10" long. A surplus unit originally designed for use as a loading coil was used, however, commercially available coil stock can be used as indicated in fig. 1.

Coil L_1 is wound with #16 enameled wire on a 2" diameter 5" long porcelain ribbed coil form taken from an old BC-375E surplus tuning unit. The coil was wound with 22 turns in order to take advantage of the end feedthrough holes and for experimentation on 160 meters. (More on this later.) Only 12 of the 22 turns are used for operation from 80 meters to 10 meters. Taps were made so that 1, 2, 4, 8, or 12 turns could be used as desired; the tap wires were wrapped with plastic tape so that they would not short against the turns of L_2.

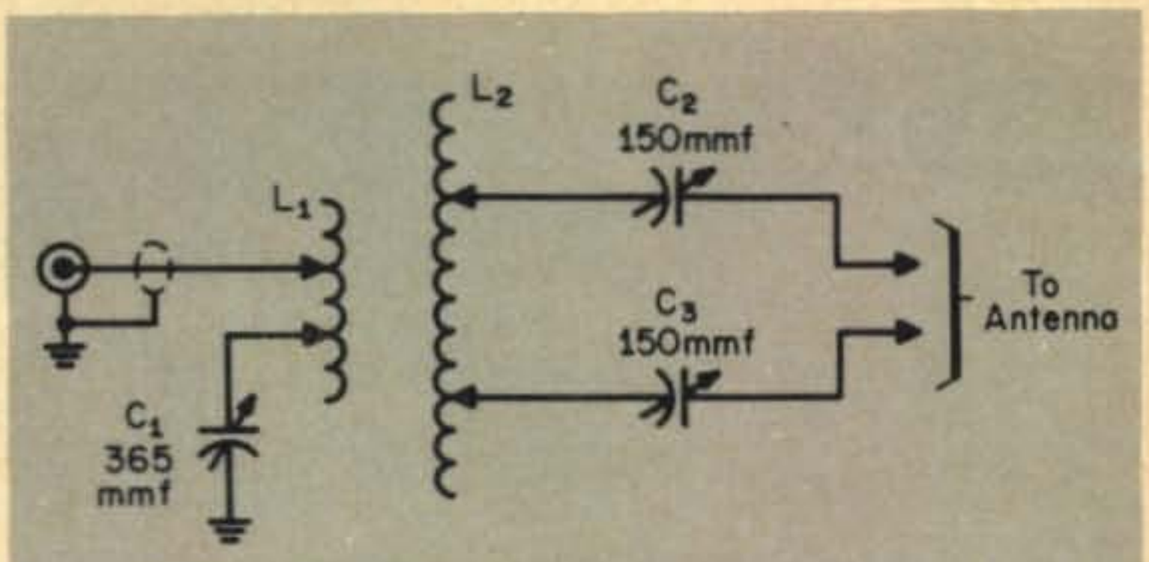


Fig. 2—Circuit of the tuner arranged for series feed on 10 meters. Capacitors C_2 and C_3 may be coupled mechanically if desired but must be separated electrically as shown above.

Construction

Coil L_1 was slid into place inside L_2, and the tap wires were brought down between the winding of L_2. The whole coil assembly was then mounted on a plastic bar.

Care should be taken that the turns used on L_1 are centered between the turns being used on L_2. The writer has put dots of paint and fingernail polish, a different color for each band, on the turns used so that the counting of turns is eliminated. Small alligator clips are used to attach wires to L_2 and to the taps of L_1.

160 Meters

Although it has not been tried with this coil arrangement, there should be no reason why such a parallel tuner could not be built for use on 160 meters, loading an 80 meter dipole antenna. Probably all 22 turns of L_1 would be used (Fig. 1), C_1 would be about 1200 mmf (a three-section variable capacitor with the sections wired in parallel), and C_2 could be a dual section capacitor of approximately 300 mmf per section. ■