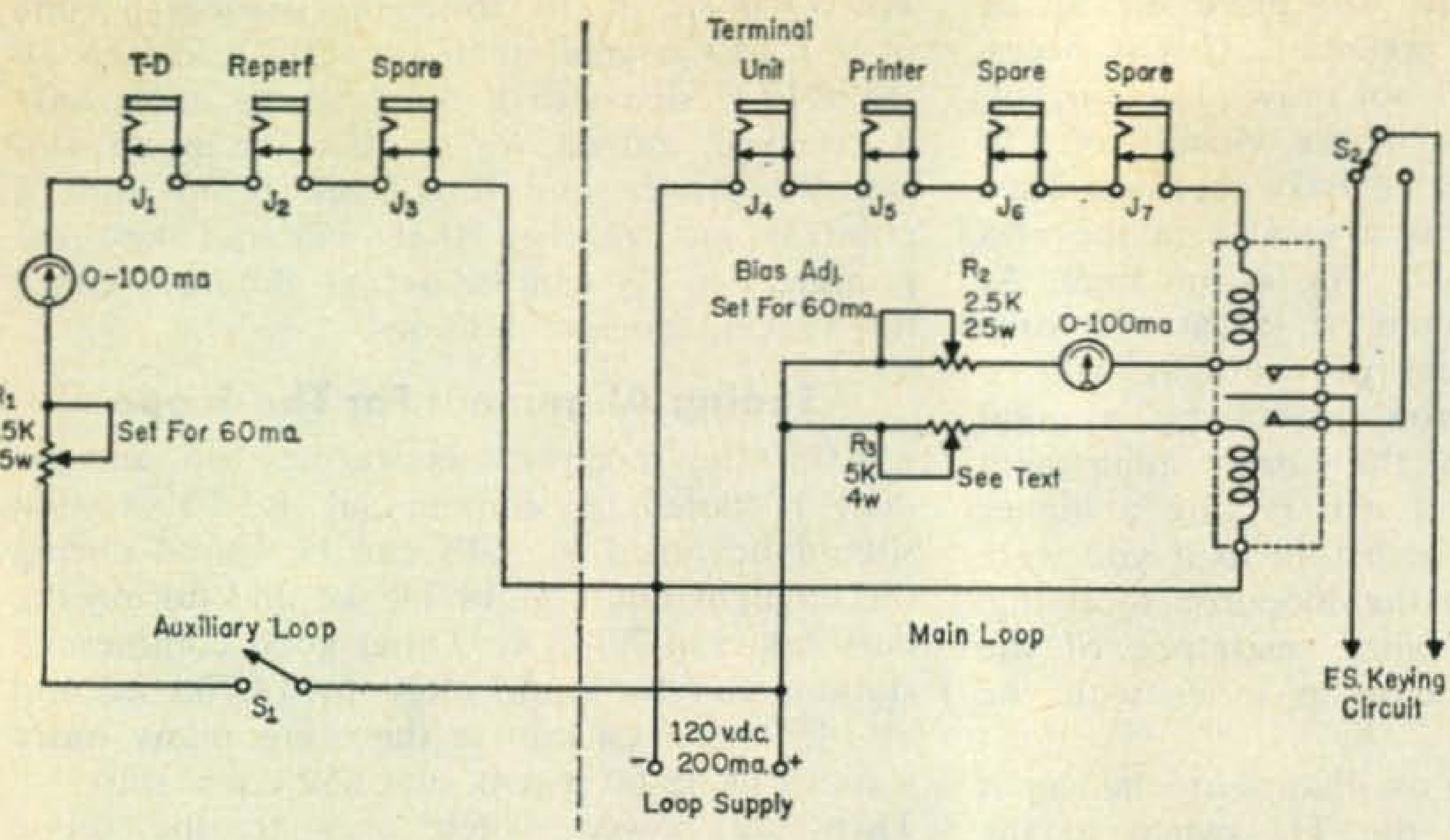

Fig. 2—The loop and transmitting keying circuit in use at W5BGP.

have one loop and transmitting keying circuit built separate. The flexibility of the circuit becomes greater.

The circuit (fig. 2) actually shows two loop circuits using the same power supply. The handbooks will show several methods of building the necessary power supply, but keep in mind the better the regulation the better the supply. A word of caution: It is much safer to use an isolation transformer in the supply than coming straight off the power main and just using a rectifier and filter. The auixliary loop can be put in use by the operators who are blessed with a typing reperforator. One can be cutting tape while the other loop is tied up in receiving or some other function. The relay connections are not shown due to the various types of polar relays available. I have found the bias current to be in order of 30 ma for the large type relays such as the 255 and in the order of 10 ma for the small type polar relays (such as the ones manufactured by Sigma).

The spare jacks in the main loop can be used to connect the transmitter-distributor for transmitting tape and the reperforator for making tape. Switch S_2 is used as the NORMAL-REVERSE switch for the frequency shift keying circuit and S_1 is used to break the circuit in the auxiliary loop when it is not in use. ■

A Rotatable Dipole For 40 Meters

JOSEPH NELSON*, K6SXT

General concern over the worsened conditions on 10, 15 and 20 has led to a great deal of effort on the lower frequency bands. Now K6SXT has devised a rotatable dipole for 40. Its simplicity and ease of construction will be of interest to the many 40 meter men.

With the inevitable sunspot cycle on the downgrade the 40 meter band is the logical choice for continued operating pleasure. With the 10 and 15 meter bands practically gone plus some quiet periods on 20, the lower frequency bands are all that's left for those of us that enjoy cross country and DX contacts.

Like many others, while operating, I've often said, "Wait till I get the beam on you." Perhaps the several years on 10 meters made it a habit. Even with a fixed dipole I sometimes find myself reaching for the rotator control box. Rather than kick the habit I decided to give in and try a rotatable dipole on 40 meters. The results have been well worth the effort.

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A trip out back to my antenna graveyard yielded a reflector from my former 20 meter beam. This served nicely as the dipole element. I then had to find a way of making this element electrically resonant at 7.2 megacycles. Borrowing from mobile experience I decided to try loading coils and lumped capacity. The final coils and capacity loop when added to the element gave me a total length of 50 feet. The number of turns on the coils was found by supporting the assembled dipole on a ladder and holding a grid dipper parallel to the coil at the end toward the element center. Trying to dip on the capacity side gave many erroneous readings. The coil stock needed only a little pruning to show resonance at 7.2 mc. The capacity loop was arbitrarily made two feet in diameter and stiff enough to prevent sagging. Keeping both ends of the element symmetrical made the tuning job easier than I had anticipated.

The next big item was the type of feed. I decided on a gamma match for one reason; the gamma capacitor allowed me to set the v.s.w.r. to a minimum at my favorite spot in the band.

Construction

The element consists of three lengths of aluminum tubing. The center section of 1½" diameter is 16 feet long and the two outside sections are of 1⅜" diameter and 12 feet long. Each end of the center element contains several saw slits to permit clamping and two hose clamps are required for locking the outer lengths of the element in position. In spite of the length there is very little sagging when 1½" diameter element stock is used. A smaller diameter stock would probably result in a "drooping dipole".

Now for the coil and capacity loop. For the coil I purchased a B&W #3905-1 standard inductor coil stock which contains six turns per inch and is sufficient for both coils. Make a pigtail by removing one turn. Count 14 turns and cut this point. Unwind the last turn for the other pigtail. Make both coils the same.

The dielectric spacer is a 12" length of polystyrene rod 1¼" in diameter. This rod fits into a four foot length of 1⅜" aluminum tubing as shown in fig. 1. Drill two holes through the tubing and dielectric. Also drill two holes on the other end where the dielectric rod is inserted in the element. The two bolts nearest the dielectric rod are used to support the coil.

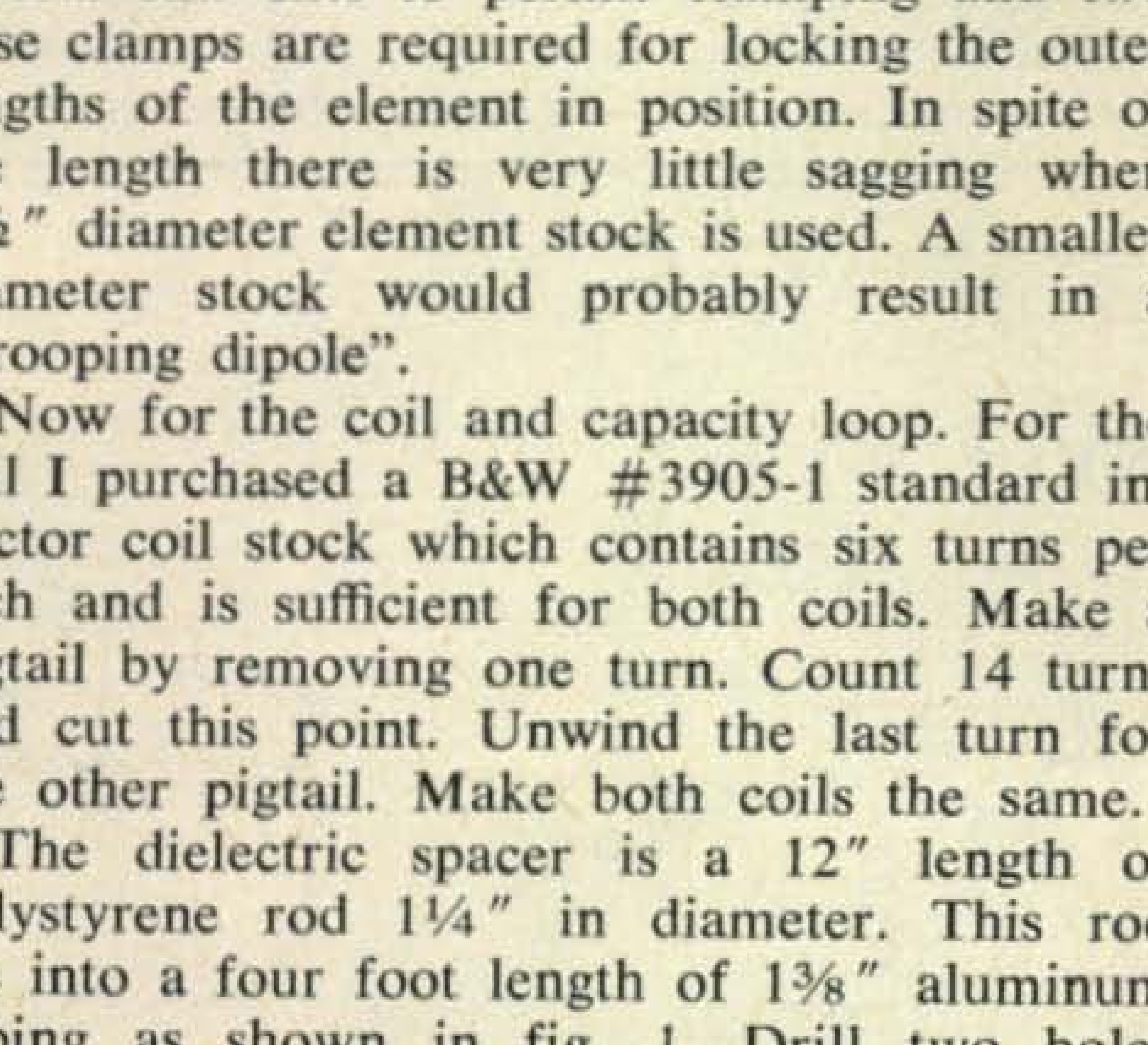

Fig. 1—Details of the capacity hat and loading coils. That hat is fashioned from #12 Copperweld and the coil from standard B&W stock. The dielectric rod is 1¼" polystyrene.

Capacity Loop

The capacity loop is made of #12 Copperweld but any good stiff wire will do. Form the loop as shown in fig. 1. One end of the four foot length of aluminum tubing is flattened to receive the ends of the capacity loop. Use plenty of solder where the loop ends come together since this end will be inserted in the flattened end of the four foot length of tubing. Insert the end of the capacity loop into the tubing and drill a single hole. When secured with a nut and bolt this serves to hold the loop in place and also insures good electrical contact.

Gamma Match

Only the gamma match remains. From past experience I selected a six foot length of ¾" aluminum tubing for the gamma rod. A six inch length of aluminum strap fastened with self-tapping screws secures the outer end of the rod to the element. The 200 mmf variable capacitor is mounted on a 10" length of plastic sheet (wood coated with wax would also work). This plastic sheet is fastened to the dipole with a single "U" bolt. It hangs down from the element and the capacitor is bolted to the lower end as shown in fig. 2. At the center of the plastic sheet drill a hole and mount a

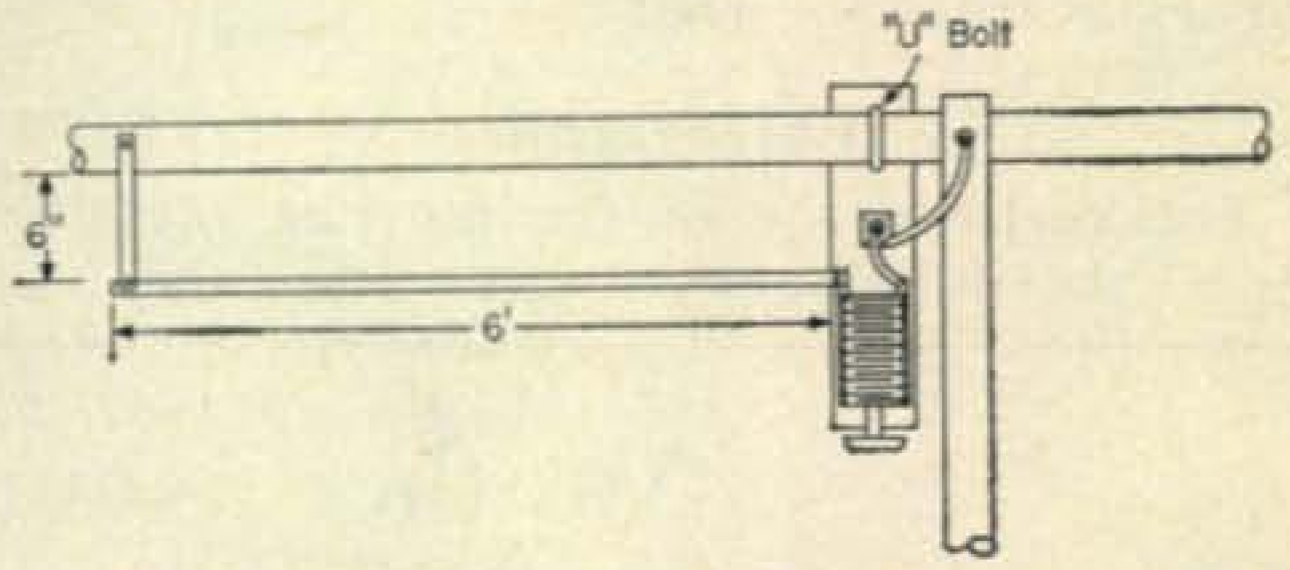

Fig. 2—Details of the Gamma match. The capacitor is a 200 mmf variable mounted on a plastic sheet. Coax feedline connector is mounted above the capacitor.

coax bulkhead fitting. This will be the point of attachment for your feedline. Finally bolt the inside end of the gamma rod to the capacitor frame. Use #14 buss wire and solder a short length from the stator of the capacitor to the coax fitting center conductor pin. Run another piece of buss wire from the coax fitting ground side to the center of the dipole. Use a solder lug and a self-tapping screw to make this connection. Be sure the tuning shaft of the capacitor points downward and is fitted with a knob. (Note: If a permanent installation is planned a weatherproof housing should be built to protect the capacitor).

Adjustment

The antenna is now ready for mounting. Because of the size and turning torque I suggest that the element be mounted as close to the rotator as possible. Any try for extra height might prove disasterous. Tuning is easy and only consists of adjusting the gamma capacitor for minimum s.w.r. at your favorite spot in the band. At a height of 25 feet I stood on a roof-top ladder and adjusted the capacitor for a minimum (1.2) v.s.w.r. at 7225 kc. If the v.s.w.r. drops as you increase capacity and doesn't rise above a minimum with full capacity it may be necessary to parallel the variable with a 100 mmf fixed capacitor. When you reach the best minimum you are ready to

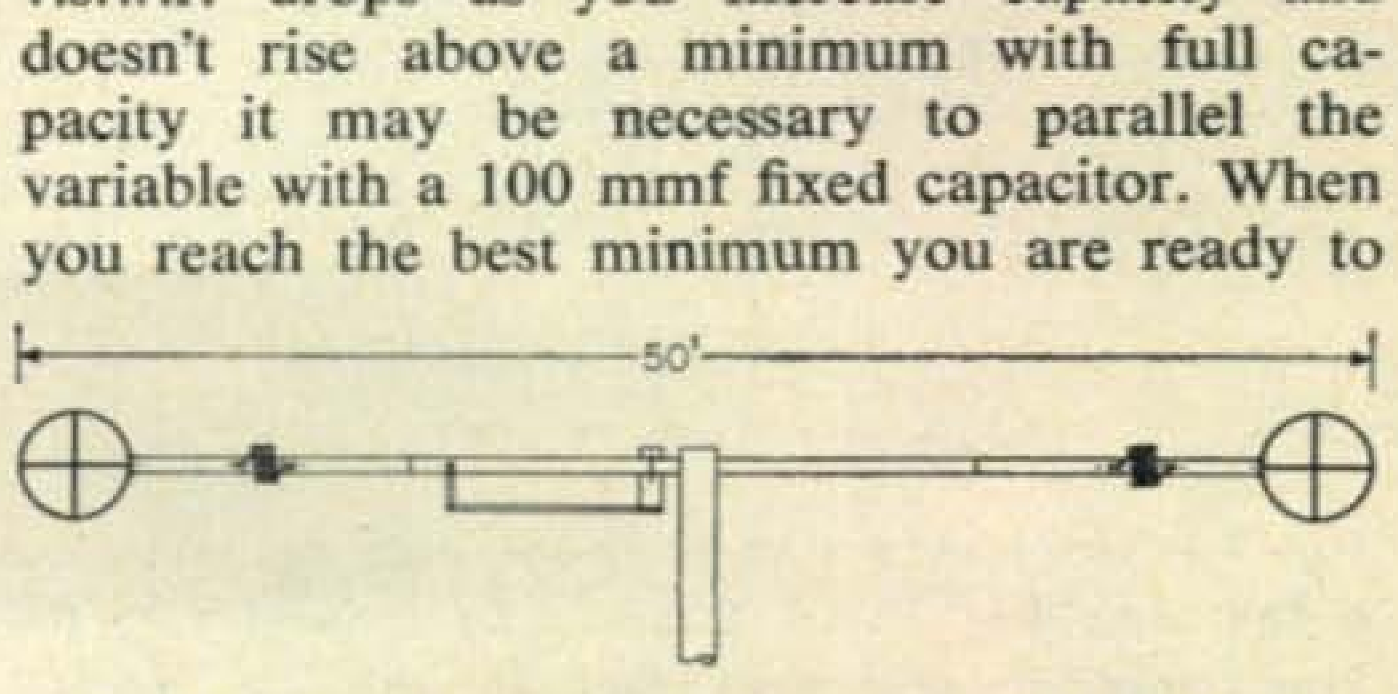

Fig. 3—Overall view and dimensions of the beam.

raise to full height. Try to get at least 40 feet if possible, however even at 25 feet you'll have a lot of fun. At full height check the v.s.w.r. again. You may find it changed. Before you haul it down, rotate to 4 points of the compass and check the v.s.w.r. at each point. You'll probably find, as I did, that it changes as you rotate. I attribute this to surrounding buildings and trees and since 40 feet was my limit on height there was nothing I could do about it. At full height the v.s.w.r. increased to 1.4 at 7225 kc. and I considered this satisfactory. For those who insist on an absolute minimum a long pole can be rigged to adjust the gamma capacitor from the roof-top.

Performance

The performance of the antenna measured up to my initial objective: to place the main lobe of a dipole in any direction desired. To compare the performance I erected a half-wave fixed dipole at the same height. Several contacts off the side of the reference dipole resulted in equal signal strength when the rotatable dipole was turned parallel to the fixed antenna. The maximum and minimum signal strength as the antenna is turned 90 degrees was 18 db. This front to side ratio was an extra bonus that helped cut down on QRM. It is difficult to set any gain figure for this antenna. However, there were several contacts in which a 5-9 report was received and a change to the fixed dipole resulted in dropping our signal into the QRM.

For those who build a rotatable dipole of this type and enjoy the ability to pinpoint their contacts, a 14 foot boom and a second similar dipole makes a nice two element beam. ■

Another Neutralizing Method

BY E. H. MARRINER*, W6BLZ

SOME of the manufactured transmitters can be more easily neutralized by feeding a signal into the antenna output terminal and detecting it in the grid circuit. This is just the reverse of normal neutralizing methods but works quite well, and is advantageous especially when the driver and final output tube are operated from the same plate supply switch. Under these circumstances it is easier to feed a v.f.o. exciter into the antenna output terminal rather than dig into the transmitter and unsolder wires to disconnect the final output circuit from the driver.

The little device needed to do the job is shown in the photograph and fig. 1 and consists of two r.f. chokes, a capacitor and a diode. It is placed across the grid coil of the final amplifier tube (fig. 2) and connected to a 0-200 μa meter. The v.f.o. exciter signal is fed into the antenna output terminal of the final. When this is done, the filaments of the transmitter should be energized but *no plate voltage should be applied.* Assuming the grid and final have already been tuned to the v.f.o. frequency, an indication should be apparent on the meter, M_1. If there is no indication, change the neutralizing capacitor slightly and rock the grid tuning capacitor back and forth to obtain a maximum reading. To neutralize, simply tune the neutralizing capacitor for a minimum of reading on M_1 and the amplifier is neutralized. It is always best to neutralize on the highest frequency you anticipate using. ■

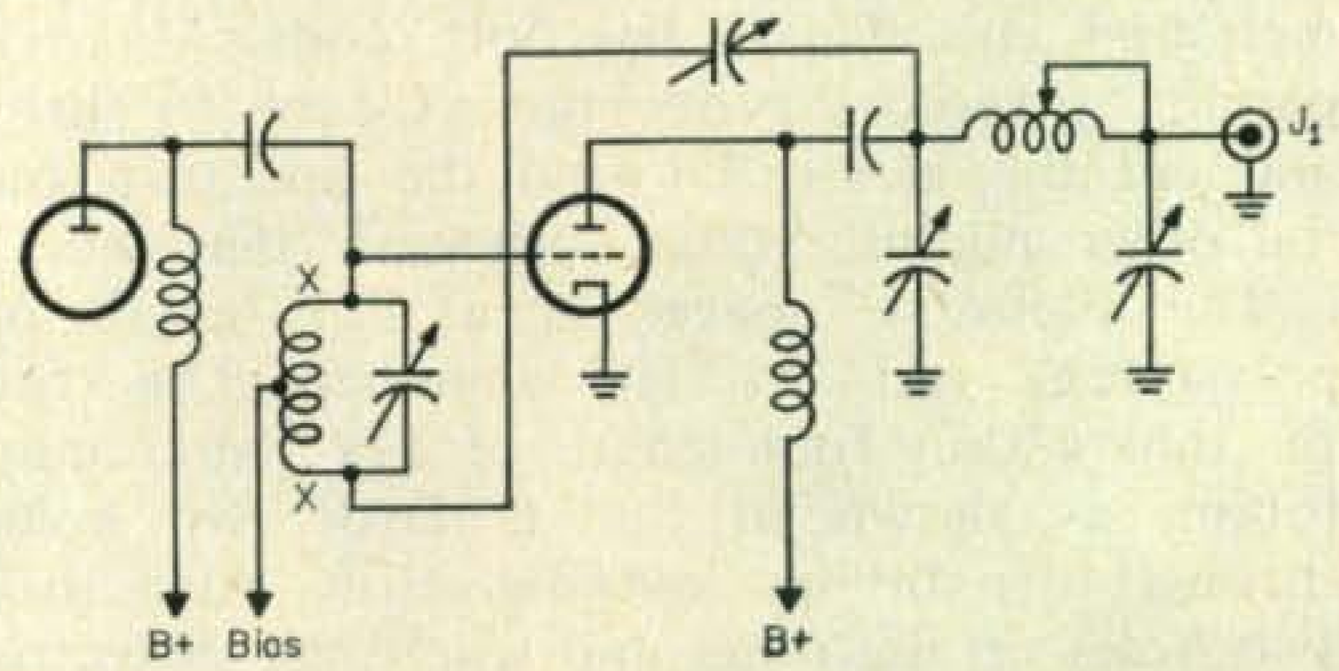

Fig. 2—Typical r.f. amplifier illustrating where the neutralizing device is connected. The v.f.o./exciter input is fed to J_1. *CAUTION:* Plate voltage should be OFF.

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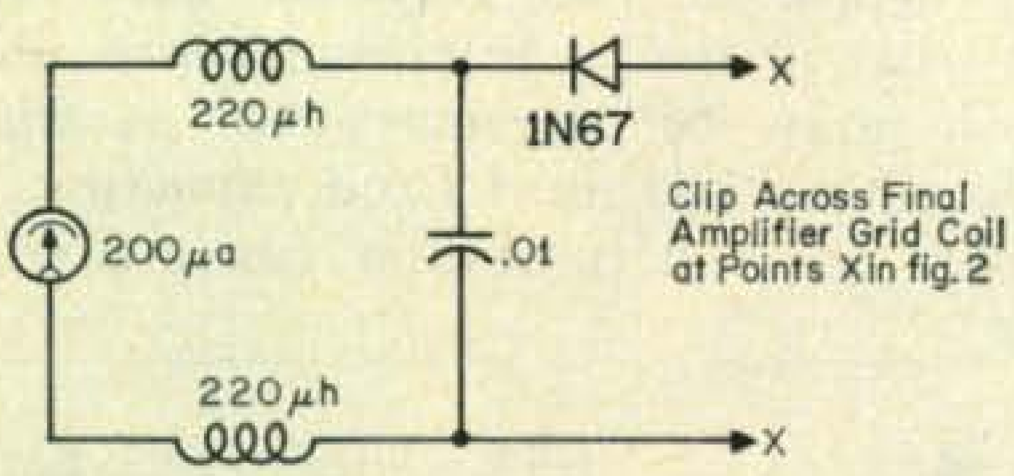
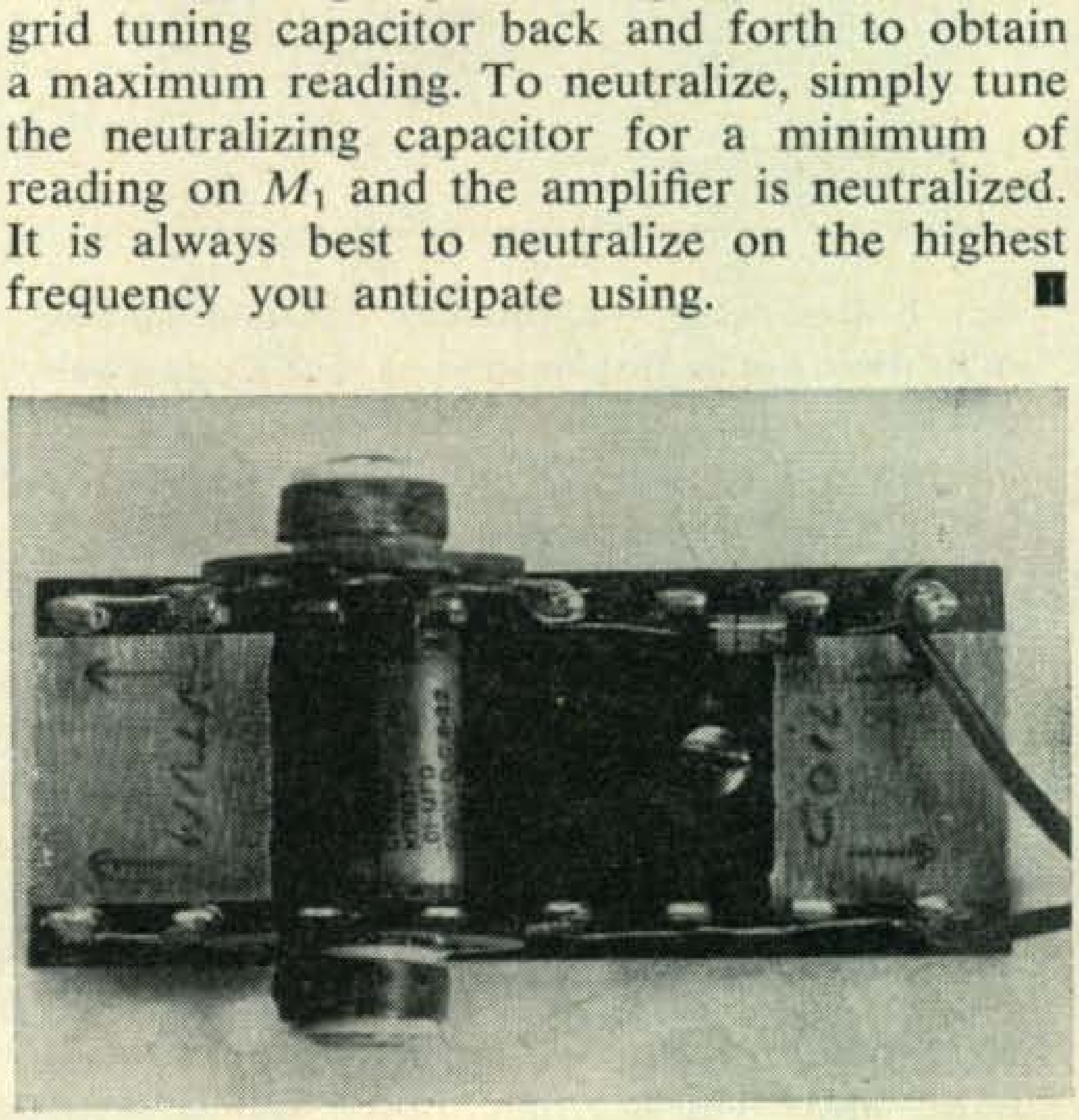


Fig. 1—Circuit of a simple device used to neutralize a final amplifier. Points X should be connected to the final amplifier grid tank (fig. 2) with the shortest possible leads.



Parts layout for the neutralizing device has been made on a phenolic terminal board. A paper capacitor is shown but a disc ceramic is preferable.