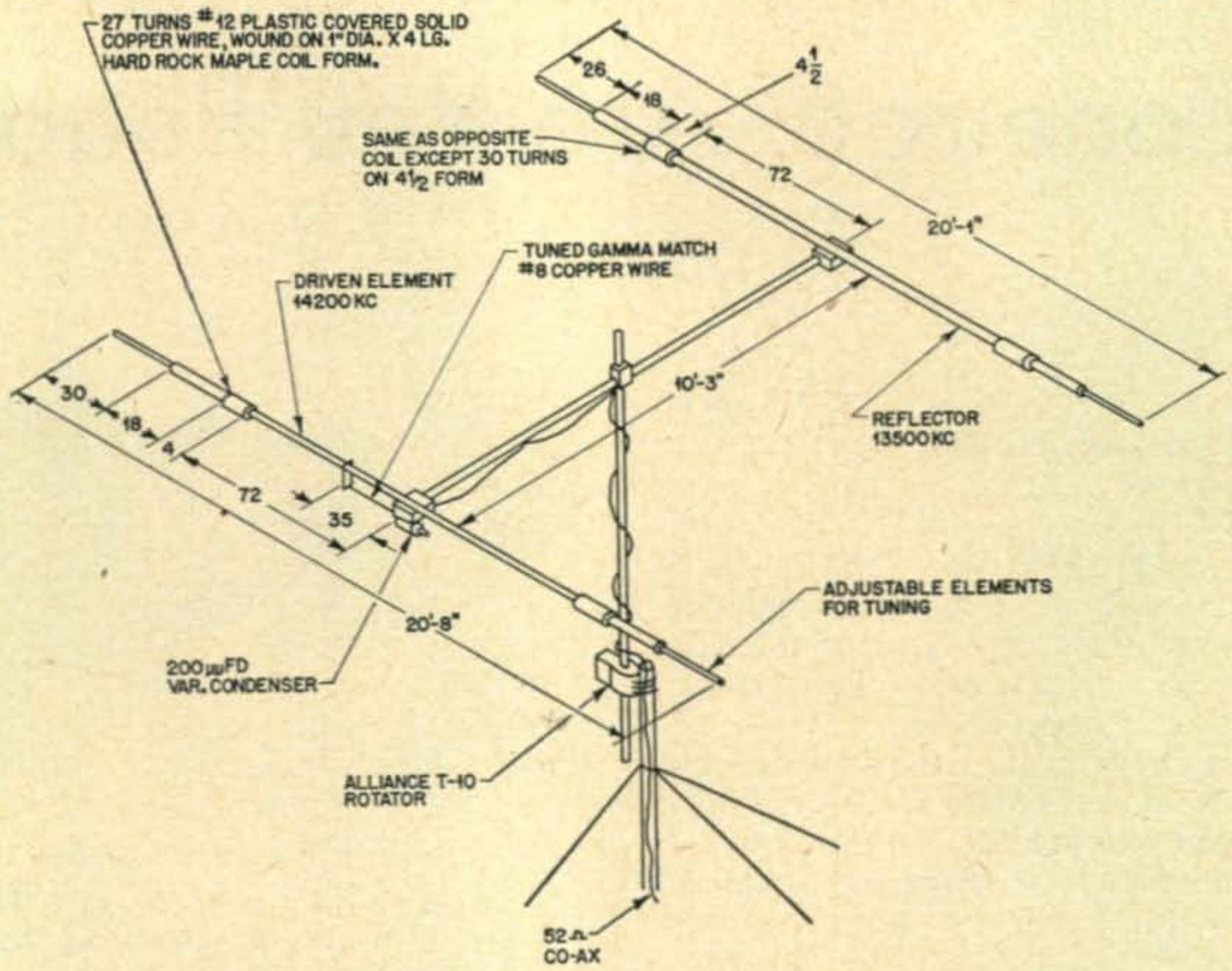

Short Twenty Meter Beam

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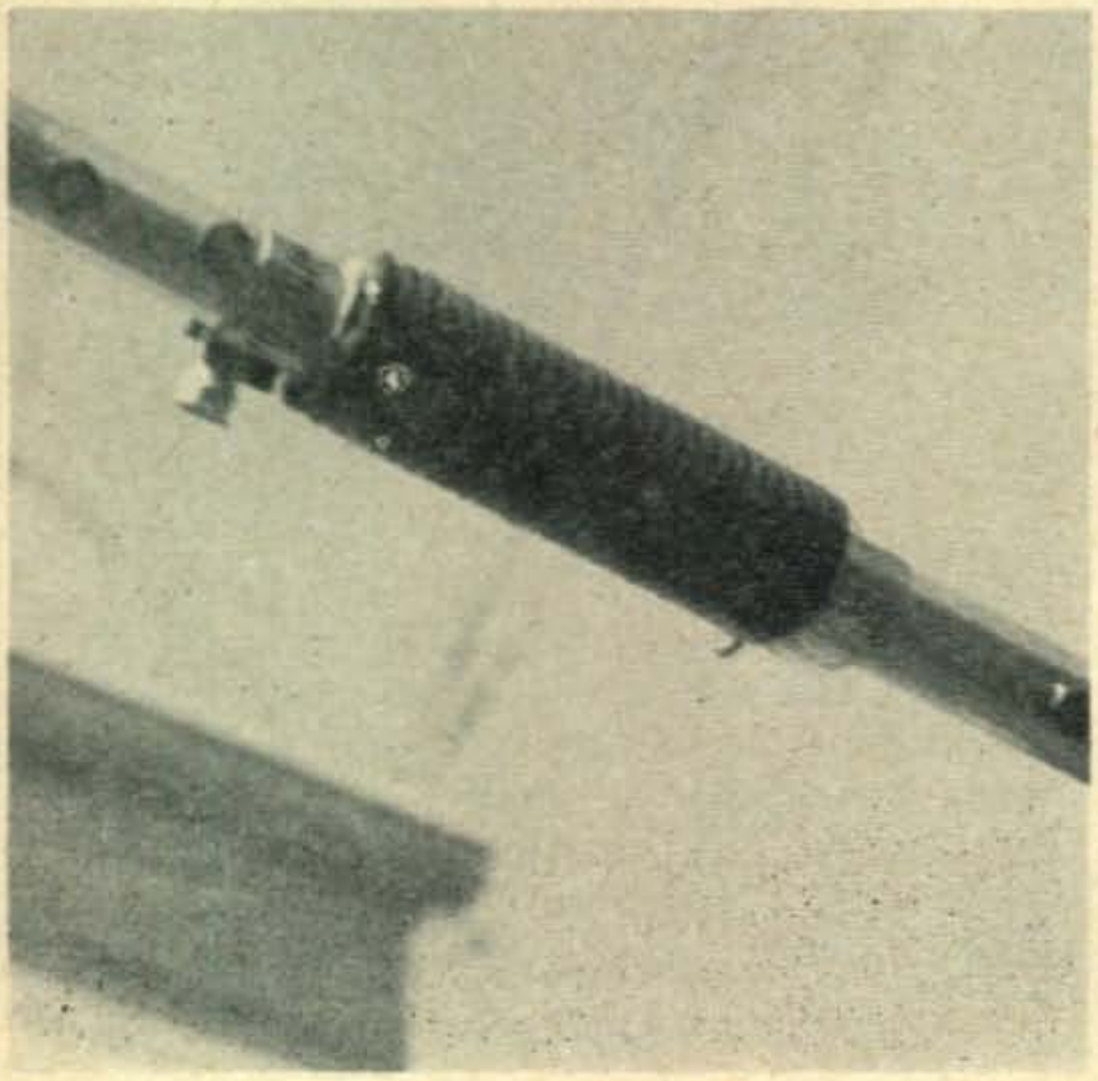
If you want to work out on twenty meters you have to have a beam. Some of us may try to fight city hall for a while, but eventually we come around. Once I finally got this fact through my head I still had to come to grips with the XYL and her ridiculous thumbs down policy toward full size beams. It will come as no surprise to you, if you noticed the title of this article, that I compromised on a short beam, something "a little larger than a TV antenna."

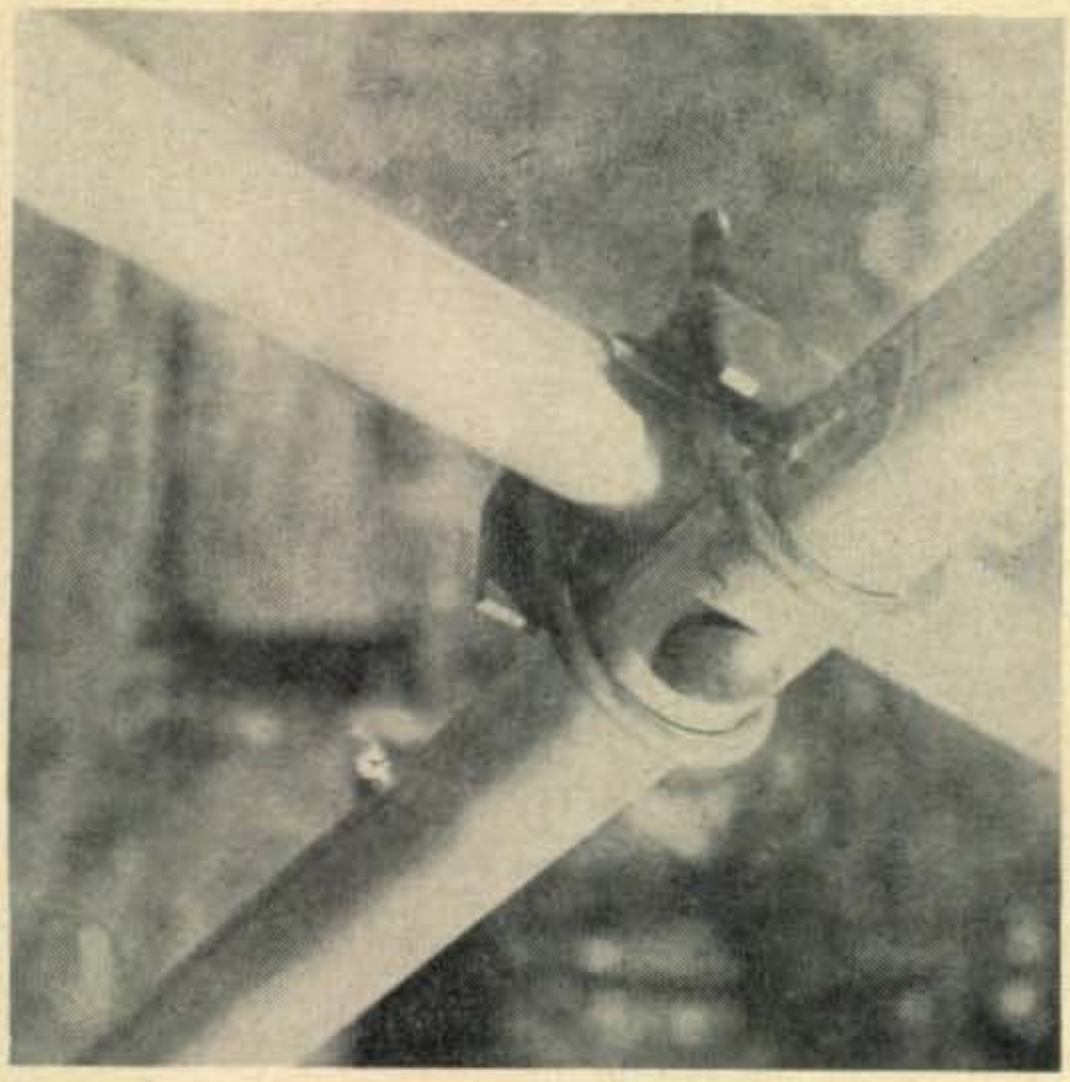
Since the bulk of the radiating of a beam element is done by the center of the element I decided it was only logical to shorten down the non-working parts . . . the ends. Plumbers-delight construction was used to keep it light and easy to assemble. It was fed with RG58/U (RG8/U would do) and tuned with a gamma match.

The completed driven element tuned and in the air measured 20′8″ from tip to tip and the parasitic reflector (which is electrically 700 kc lower) measured 20′1″; the spacing between the elements was 10′3″. The elements were attached to a 1″ diameter 10½′ boom.

I had to admit to the XYL that it did look a *bit* bigger than the TV conical, but believe it or not, neighbors asked us whether it was an antenna for color TV—so the beam was up to stay.

Detail of coil construction





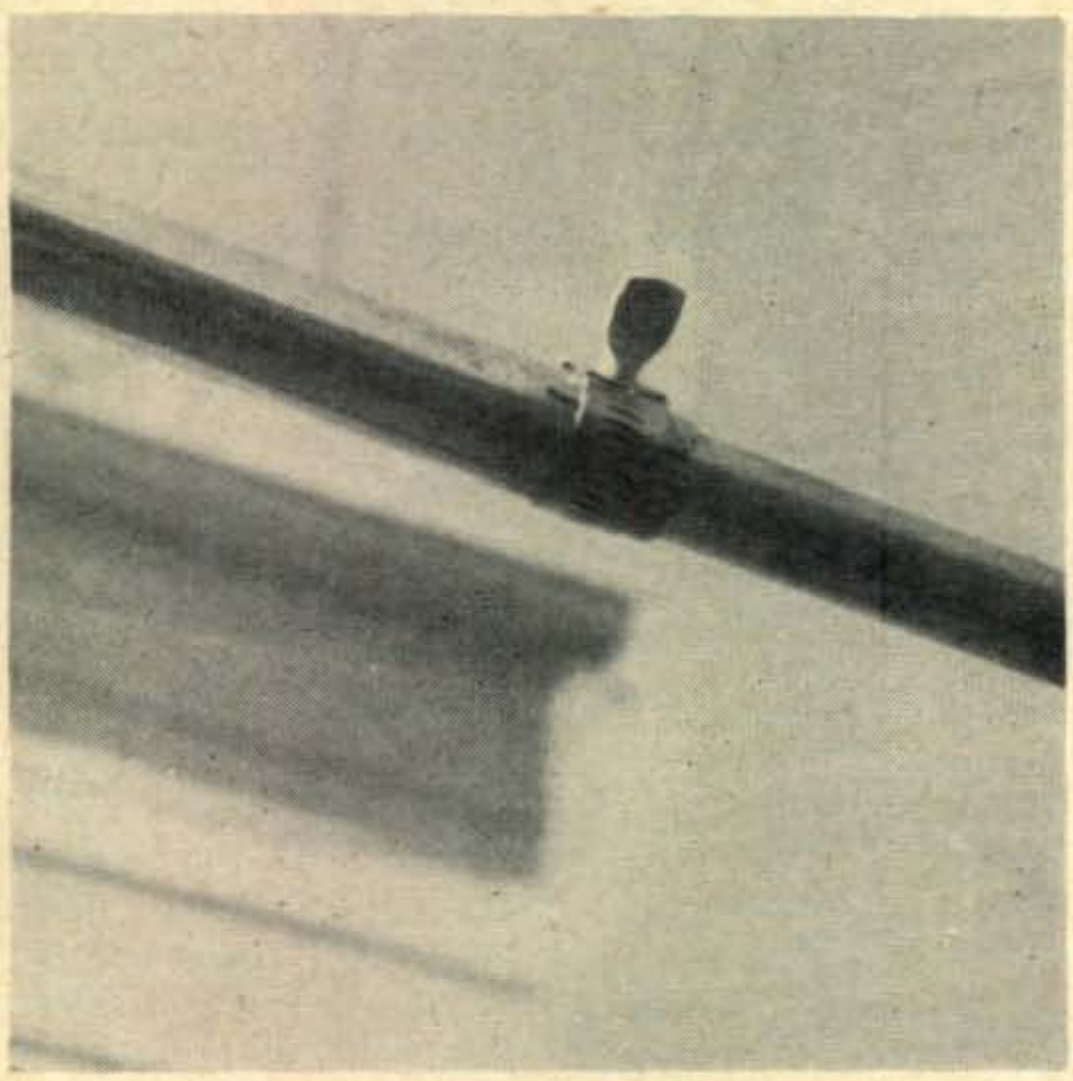
Method of fastening boom to rotator stub. In addition to bolt and TV "U" clamp, the stub has a crescent slot filed into it to make a mechanical solid fit to the boom.

The results obtained with the beam have been little short of fantastic. Running only 150 watts I can work about everything I can hear. The beam has consistenly outperformed center-loaded beams running the same and much higher power from the same local areas as well as occasionally getting better reports than those using full-size three-element beams. As a result of beam's success, several in this area have started to duplicate the beam at this writing.

Driven Element and Reflector

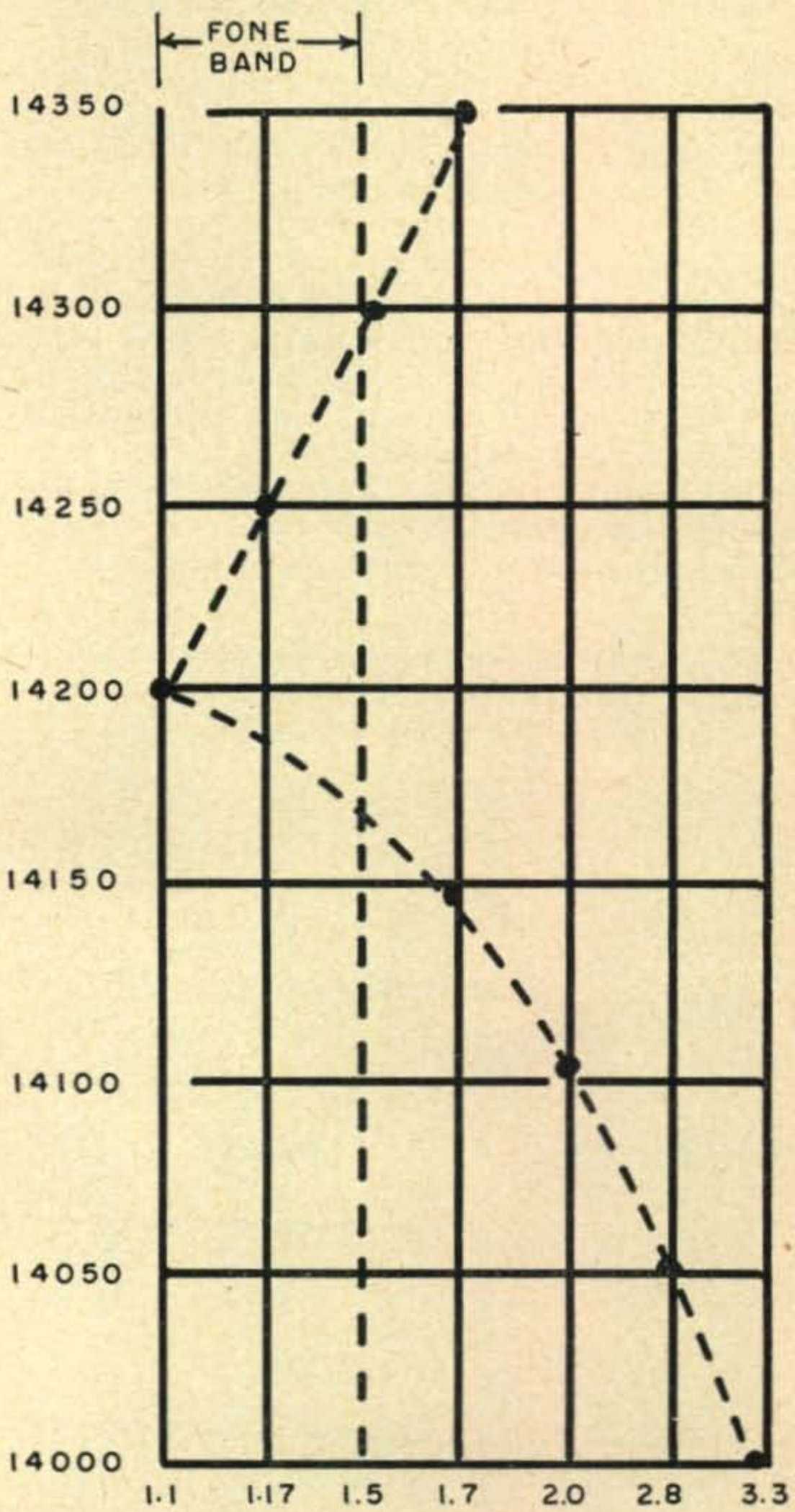
The center section of the driven element is a 12-foot length of 5/8" inside diameter, hard drawn aluminum tubing; on both ends have

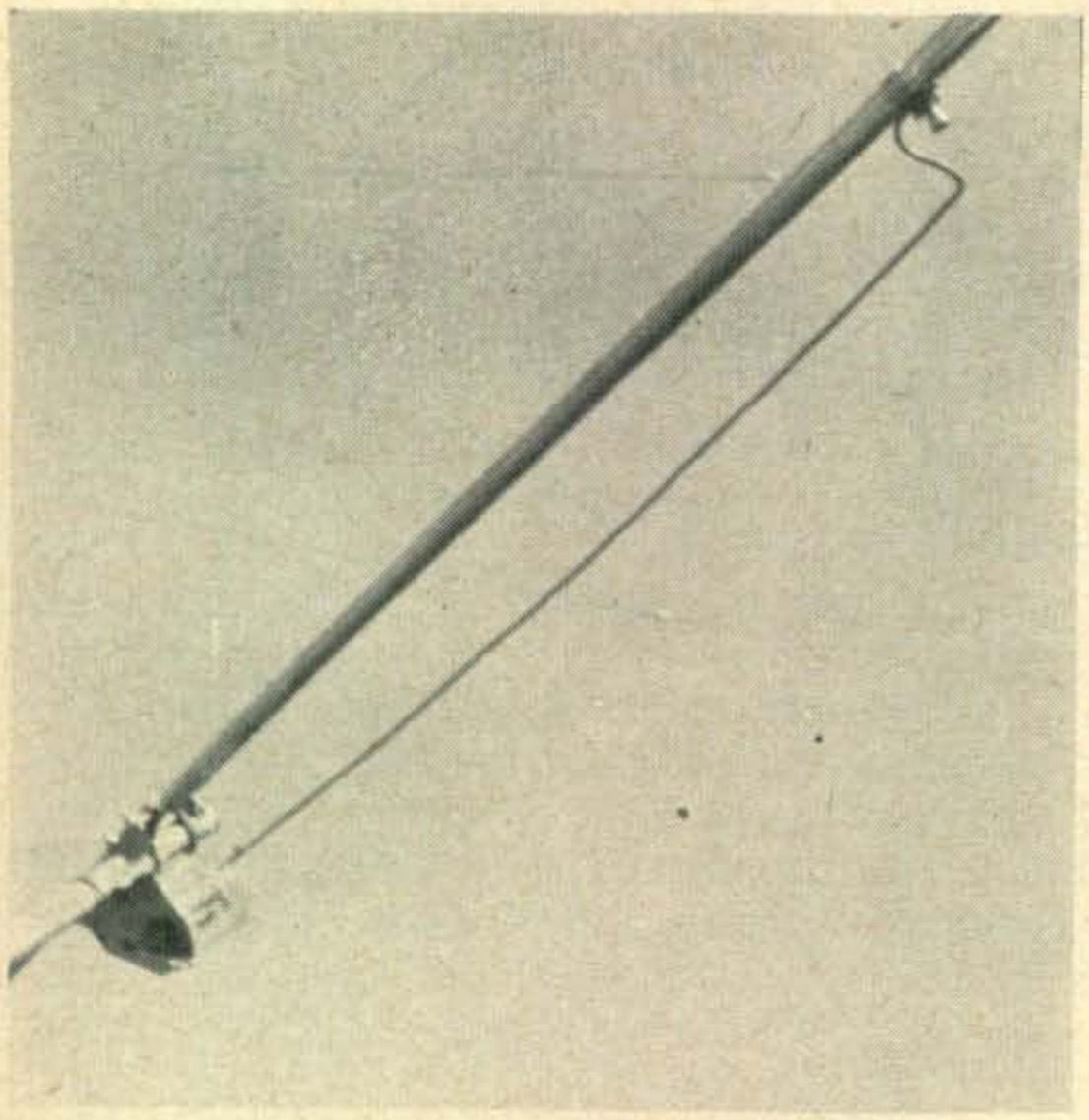
Aircraft tubing clamps come in both screw and bolt type. (Screw shown here)



been inserted hard-rock maple coil forms which were pre-dipped in melted parafin. After the coil form is inserted, slide on the 18", 3/4" outside diameter pieces. The coil form is now secured in place by drilling two holes in both sides of the form and bolting (use lock washers); attach a soldering lug to the bolt on either side. Wind the 27 turn coil tightly and secure at each end with an aircraft "aeroseal" hose clamp (secured at the local airport for about 30 cents each . . . 13 are used on the beam), solder the ends to the lugs and then completely cover the coil with Duco cement. When dry, apply at least three coats of plastic spray-type enamel. Insert the end tuning pieces all the way and lightly clamp. Duplicate this procedure for the parasitic reflector, except use 4½" coil forms and 30 turns. Construction of the boom is self-explanatory from the photo-

The chart shows the SWR over the entire band.



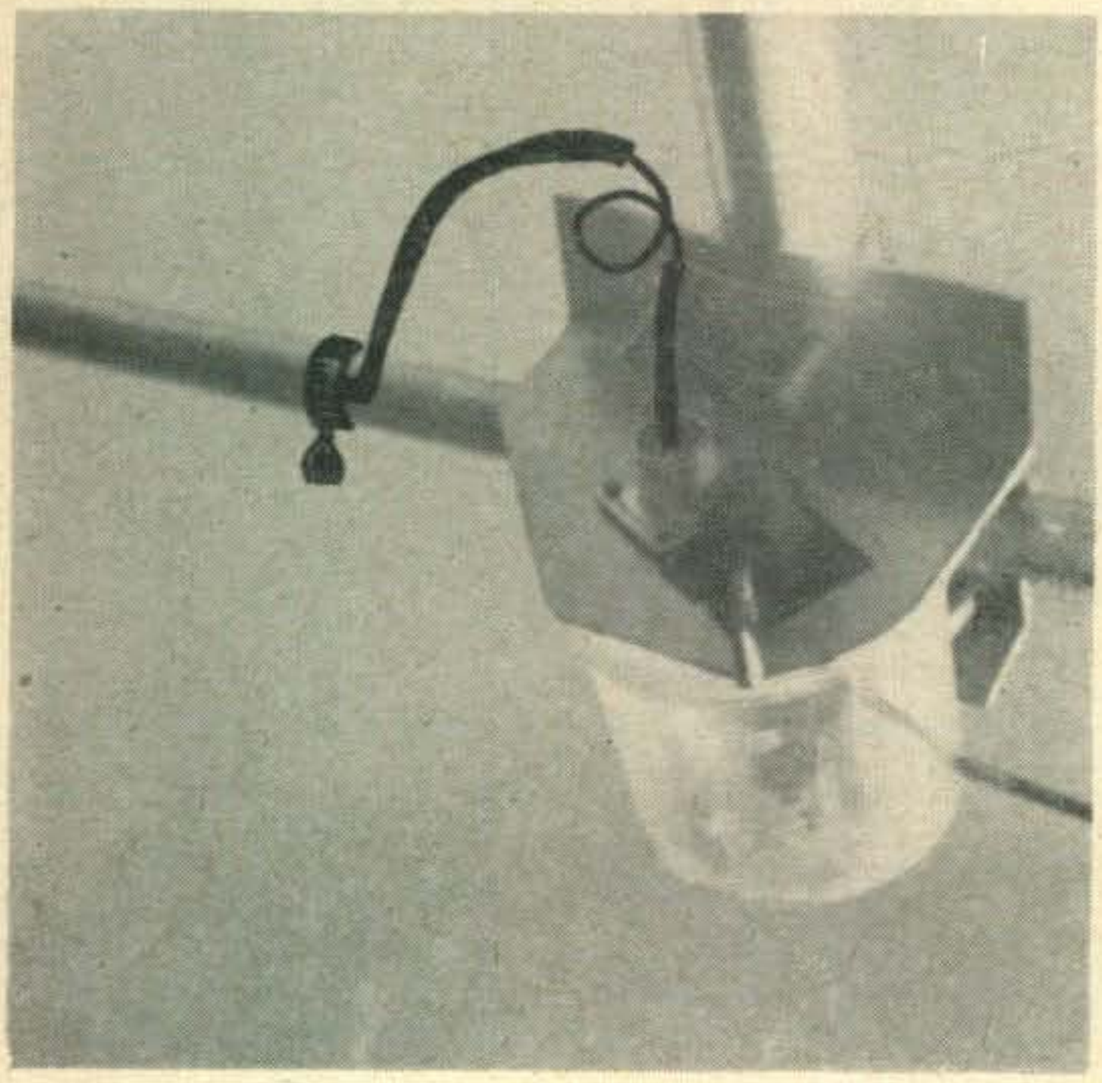


The gamma match consists of a 200 mmfd variable inserted between the hot side of the co-ax and the #8 solid wire extending 35" to one side of the driven element.

graphs and captions. All mechanical construction should be made with that terrific wind storm (you hope never materializes) in mind. This light-weight beam has so far ridden out a wind storm in excess of 60 miles per hour, snow and ice, and is still in perfect tune.

This brings up the matter of tuning. Contrary to anything you may have heard about the difficulty or impossibility of tuning end-loaded beams, this beam tuned perfectly to the desired frequency and there was *no* change when fully raised in the operating position.

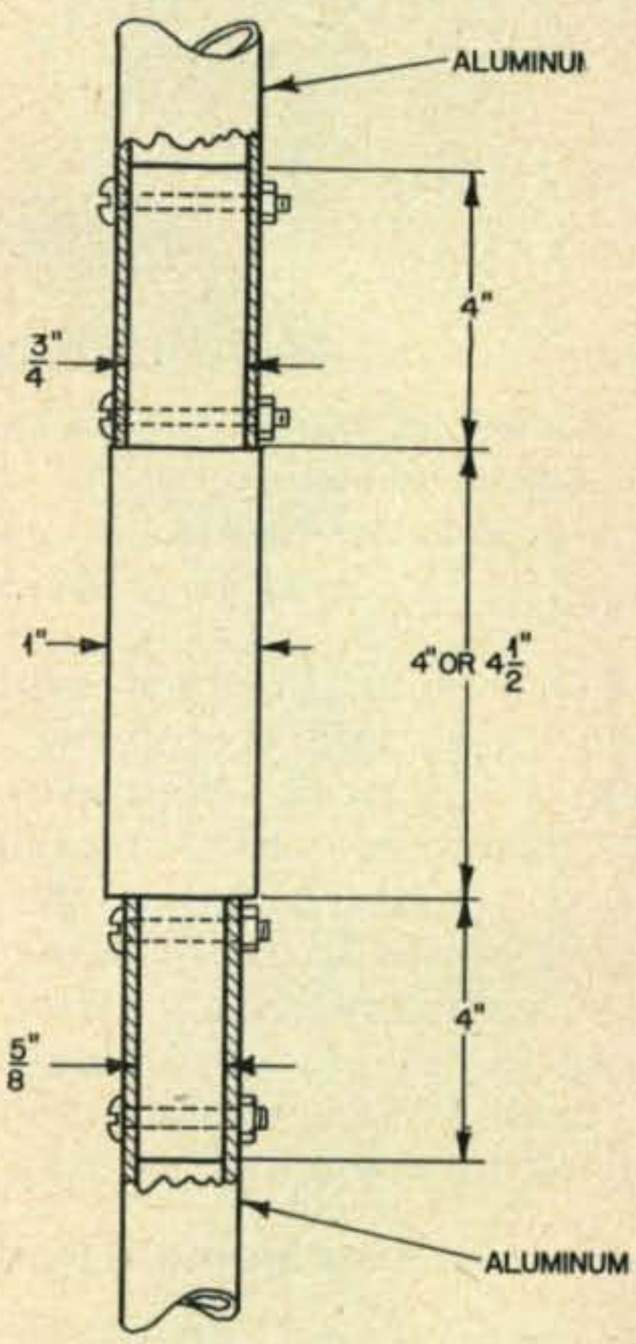
Detail of link coupling to tune element with grid dipper. Note holes drilled in the bottom of plastic refrigerator jar to prevent condensation.



Tuning Procedure

Calibrate a thoroughly warmed communication receiver to 14200 kc and dip your grid-dipper. Next, with the beam at least 5′ off the ground, and the gamma match condenser ¾ way open, insert a stiff piece of wire in the center of the co-ax on the gamma match, from this form a small loop, and ground the end to the driven element with a clamp. Insert the grid-dipper coil in the loop (the loop should be bare wire) and adjust tuning pieces in

Coil form construction



driven element equally, an inch at a time, until dipper beats with receiver; then secure tuning pieces tightly with the clamps. Recalibrate the receiver at 13500 kc and repeat operation for the reflector, the only difference being the loop pickup for the dipper will be clamped to both sides of the center of the reflector instead of the co-ax connector.

If you don't have a Micro-Match, I strongly urge that for the next step you immediately cultivate the friendship of one who does. Having the transmitter under load, the beam can be adjusted to zero reflected power in a matter of seconds by adjustment of the variable condenser.

No claim is made for this being the ultimate in beams or for anything revolutionary or new in design. The gamma match is essentially the same as the "Simple Squirt" beam (October 1954 *QST*) and the position of the end coils is scientifically determined by the fact that aluminum comes in 12′ lengths, but it will give a good account of itself with full-size beams and at least put a solid dent in "kilowatt alley." ■