A GIANT C-BEAM

THE "BIG" FOUR

BY FRANK DERRY*

In the construction of any antenna, the end result depends upon the quality material used and the care used in construction.

The material used for the elements is ½" I.D. rigid aluminum conduit of the type used by electricians. This is available in 10' lengths threaded on both ends. Also included with each section is one coupling. Eight pieces will be needed for a four element beam.

The material for the boom is two pieces of 1½" I.D. rigid aluminum conduit joined with a standard 1½" plumber's tee.

The average prices for the material will be approximately $2.00 each for the ½" and $3.75 each for the 1½". It is available from electrical supply houses, electricians, hardware stores, and mail order houses.

Following is a complete material list:

8 pieces—½" rigid aluminum conduit
2 pieces—1½" rigid aluminum conduit
1 piece —1½" plumber's tee (galvanized)
1 piece —telescoping mast (car radio antenna or rabbit-ears antenna)
1 piece —LBM, Bud, or Premier #AMC-1007 Minibox Lafayette #MC-365 (4x5x3)
1 piece —Johnson #45 Feedthru. Lafayette #CN-480
1 piece —Hammarlund #APC-140 variable capacitor Lafayette #HP-15
1 piece —Amphenol #83-1R Coax connector
1 piece —⅛" guy wire cable clamp

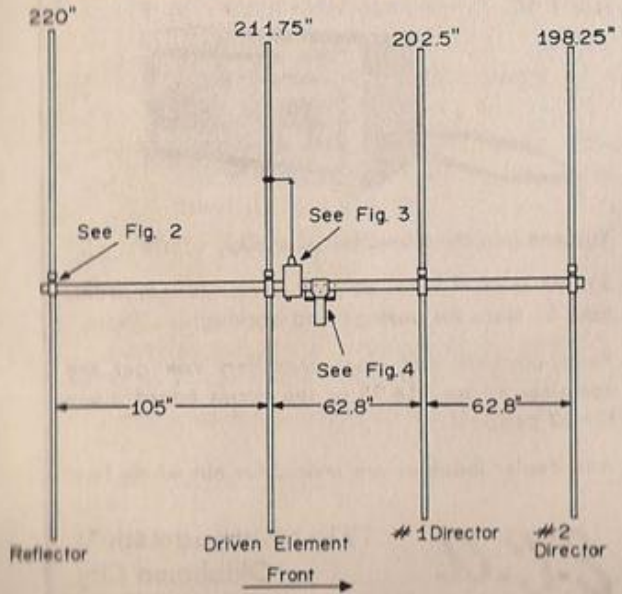

Fig. 1

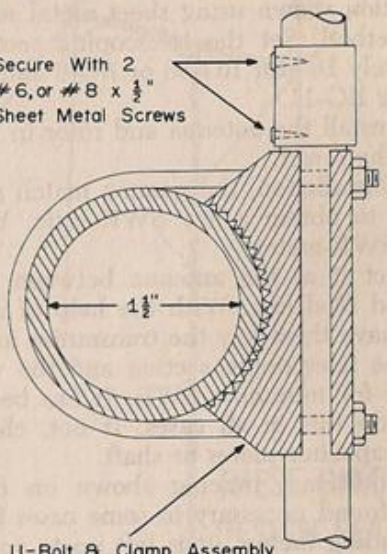

Fig. 2

1 piece —Electrical ground clamp as illustrated in diagram #3
8 pieces—#6 or #8 by ½" sheet metal screws
3 pieces—¼" by 3½" plated bolts and nuts
4 pieces—TV U-bolts and clamps as illustrated
2 pieces—#4 by ¾ screws

After you have obtained all the material you are ready to start construction. First you assemble the elements by threading two pieces of the ½" conduit together with the couplings supplied. When you have done this you will have four pieces of conduit 20' long.

Pin each of the four pieces with two sheet metal screws.

After this drill two ¼" holes carefully through the tubing for the u-bolts. Drill just below the coupling. Now measuring from the center of the u-bolts cut each element to the length on the diagram. CAUTION: Mark each element as to function, driven element, etc.

Next join the two lengths of 1½" conduit with the tee. Tighten securely and pin with two ¼" by 3½" bolts.

Now mark the location of all four elements with crayon or other method. The reflector and driven element will both be on one side of the tee. On one end there will be a piece about 6"-8" long left over. Cut this off and thread into the tee and pin with the remaining ¼" bolt, as this will be used to mount the antenna to a rotor.

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in the drawings being careful not to bend the capacitor plates. If using car radio antenna for telescoping mast, use only bottom two sections.

Assemble the elements to the boom using the spacings shown on the drawing, being careful to allow approximately 10 or 15 degress of tilt away from the short stub used for the rotor.

Next mount the gamma match to the boom in the position shown using sheet metal screws or other method. Set the telescoping section approximately 18" for RG-58 or RG-8 and 24" for RG-59 or RG-11.

Next install the antenna and rotor in its location on the tower.

After installation, the gamma match must be adjusted to obtain a low SWR ratio. You will need a SWR-meter.

Connect it at the antenna between the antenna and feed line. With the help of a friend or wife have them key the transmitter and then adjust the telescoping section and the variable capacitor for minimum SWR. It has been possible to do this in all cases. If not, check for shorted capacitor plates or shaft.

The additional bracing shown on drawing #4 was found necessary in some cases because of ice loading factors. It is left up to your own judgment as to its need in your own area.

Also, we found later in the trial construction to cut cost that using smaller tubing for the elements was unsatisfactory both in strength and performance.

Note for diagram #3: The shaft of the variable capacitor must not touch the metal box so drill the hole for mounting as large as possible.

If available, a packet of Silica Gel moisture absorbent will do much to prevent condensation of moisture if placed in the Gamma Box before sealing.

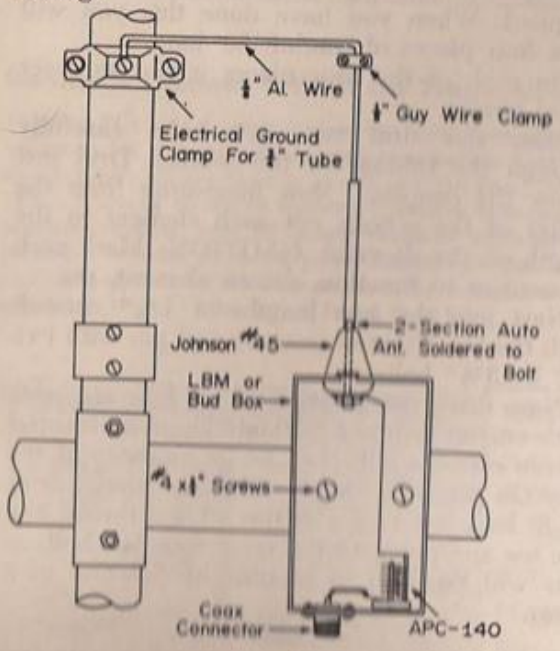

Fig. 3

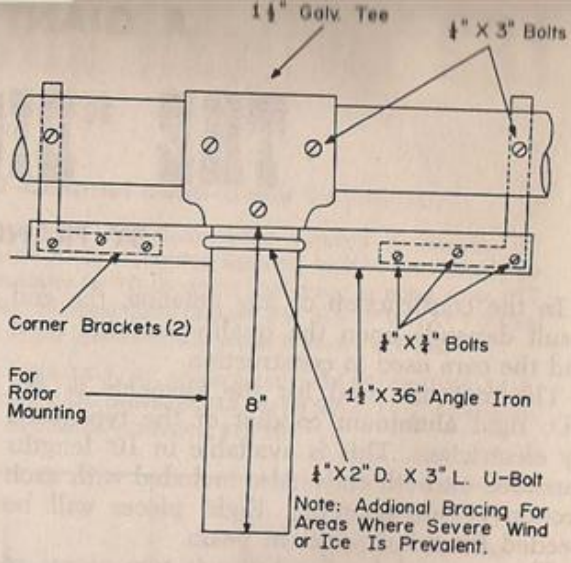

Fig. 4

In the absence of a SWR-meter it was found that a fair Gamma match was possible by adjusting it for maximum signal on a weak station by using your "S" meter as an indicator. CAUTION: This is a substitute method to be used only if necessary. It will not give maximum performance possible with this antenna.

If desired the 1 st director can be eliminated for use as a 3 element with approximately 1 to 2 db. loss.