

ASSEMBLY INSTRUCTIONS A144-11, A144-7, A220-11, A430-11

DESCRIPTION	PARTS LIST			
	A144-11	A144-7	A220-11	A430-11
BOOMS:				
7/8" x 50" boom sections -----	2			
1" x 48" boom sections -----	1		1	
7/8" x 44" boom sections -----		1		
3/4" x 47" boom sections -----		1		
7/8" x 56" boom sections -----			1	
1" x 54" boom sections -----				1

#	ELEMENTS: 3/16" Solid Rod	QUANTITY			
		A144-11	A144-7	A220-11	A430-11
#1	Reflector -----	*40 1/4"	*40 1/4"	*26 1/4"	*13 3/4"
#2	Dipole w/Reddi Match -----	38 7/16"	38 7/16"	24 15/16"	12 7/8"
#3	Director -----	36 3/4"	36 3/4"	23 3/4"	12 1/4"
#4	Director -----	36 1/4"	36 1/4"	23 1/2"	12 1/8"
#5	Director -----	35 3/4"	35 3/4"	23 1/4"	12"
#6	Director -----	35 1/4"	35 1/4"	23"	11 7/8"
#7	Director -----	34 3/4"	34 3/4"	22 3/4"	11 3/4"
#8	Director -----	34 1/4"		22 1/2"	11 5/8"
#9	Director -----	33 3/4"		22 1/4"	11 1/2"
#10	Director -----	33 1/4"		22"	11 3/8"
#11	Director -----	32 3/4"		21 3/4"	11 1/8"
	4" x 6" Formed aluminum mast bracket --	1			

PART #	DESCRIPTION	PARTS PACKAGE			
		A144-11	A144-7	A220-11	A430-11
3	1 1/2" U-bolts -----	4	1	1	1
4	1 1/2" U-bolt brackets -----		1	1	1
12	3/4" Plastic caps -----	2	3	2	
14	1 1/2" U-bolt backing plates -----		1	1	1
15	1/4" Flat steel washers -----	4			
16	1/4" Lock washers -----	8	2	2	2
17	1/4 - 20 Hex nuts -----	8	2	2	2
21	10 - 24 x 2" Bolts -----	10	6	10	10
22	10 - 24 Hex nuts -----	10	6	10	10
25	7/8" Formed aluminum brackets ---	10	6	10	10
28	Aluminum half washers -----	10	6	10	10
29	#10 Internal tooth lock washers ----	10	6	10	10
38	1" Plastic caps -----			1	2
39	3/8" Aluminum spacers -----	4			
53	1/2" Plastic caps -----				2
61	7/8" Plastic caps -----	2	1	1	
G-10 1/4	1" Telescope clamps -----	2		1	

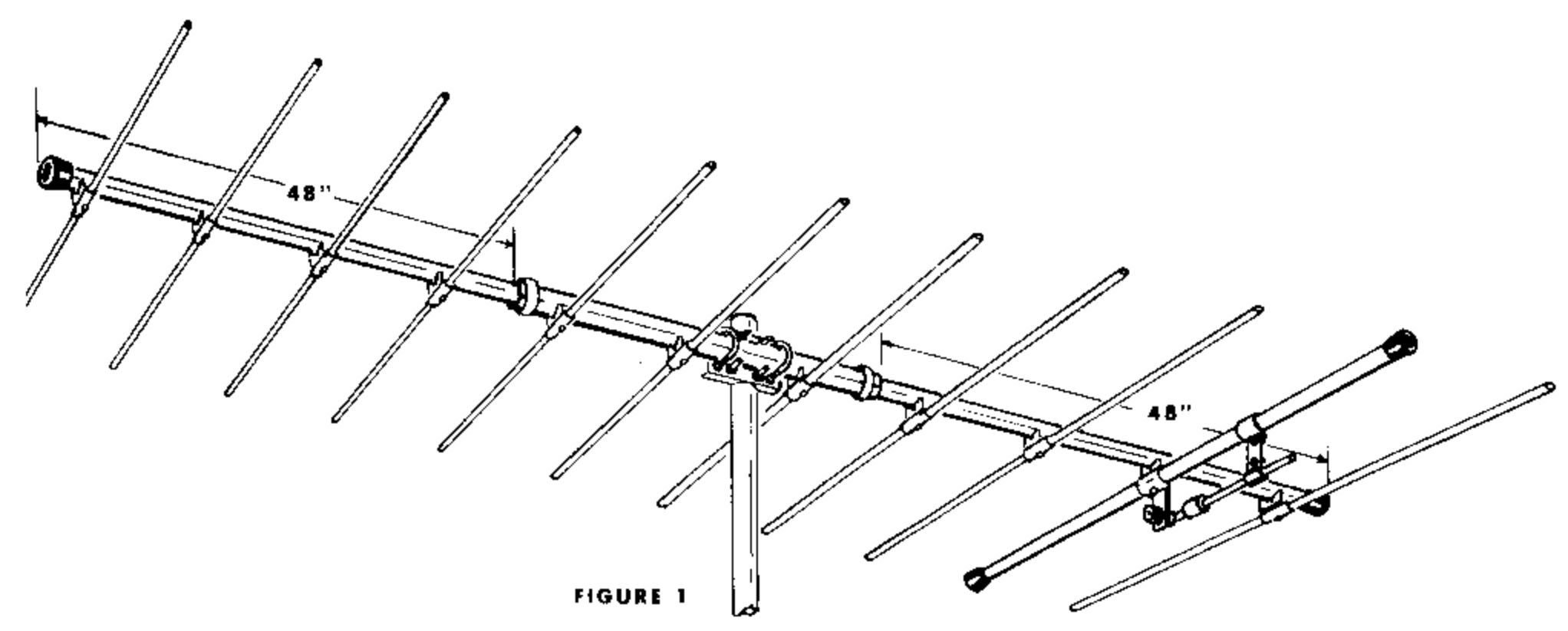


FIGURE 1

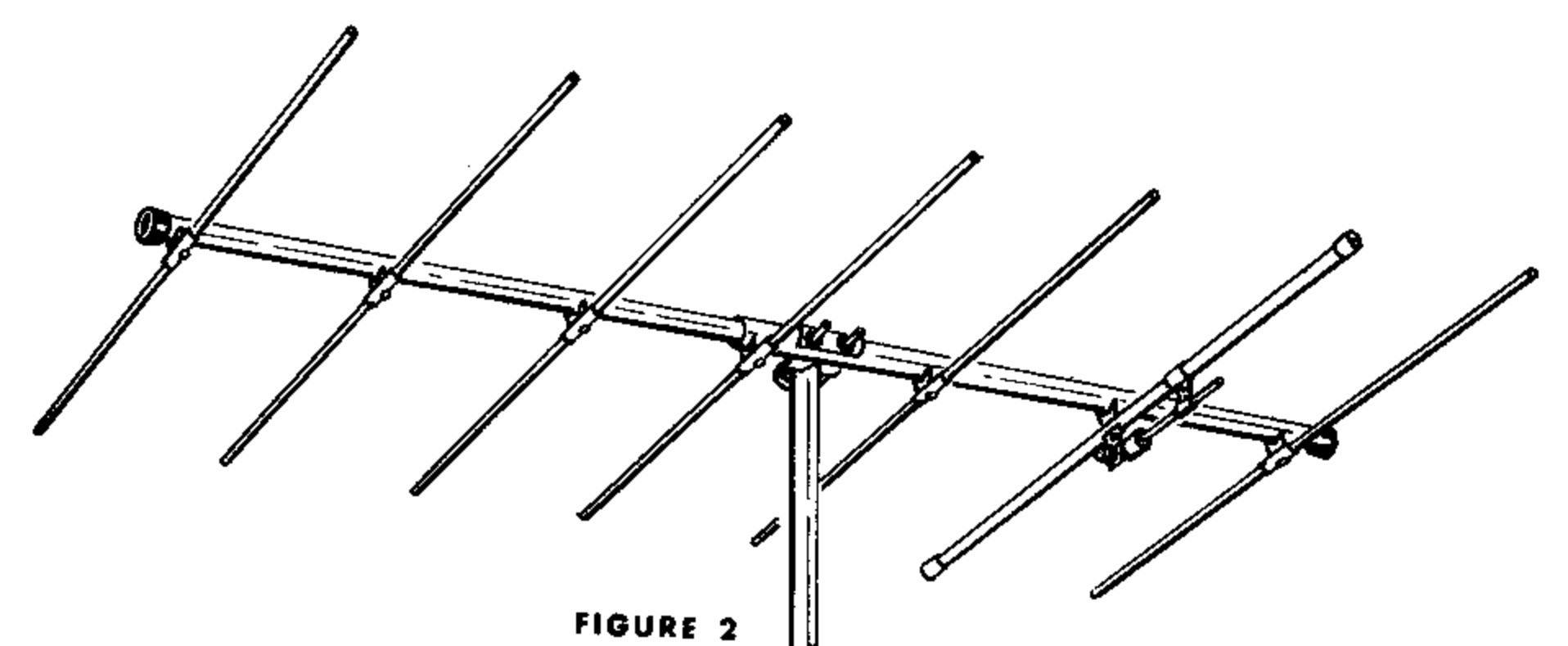


FIGURE 2

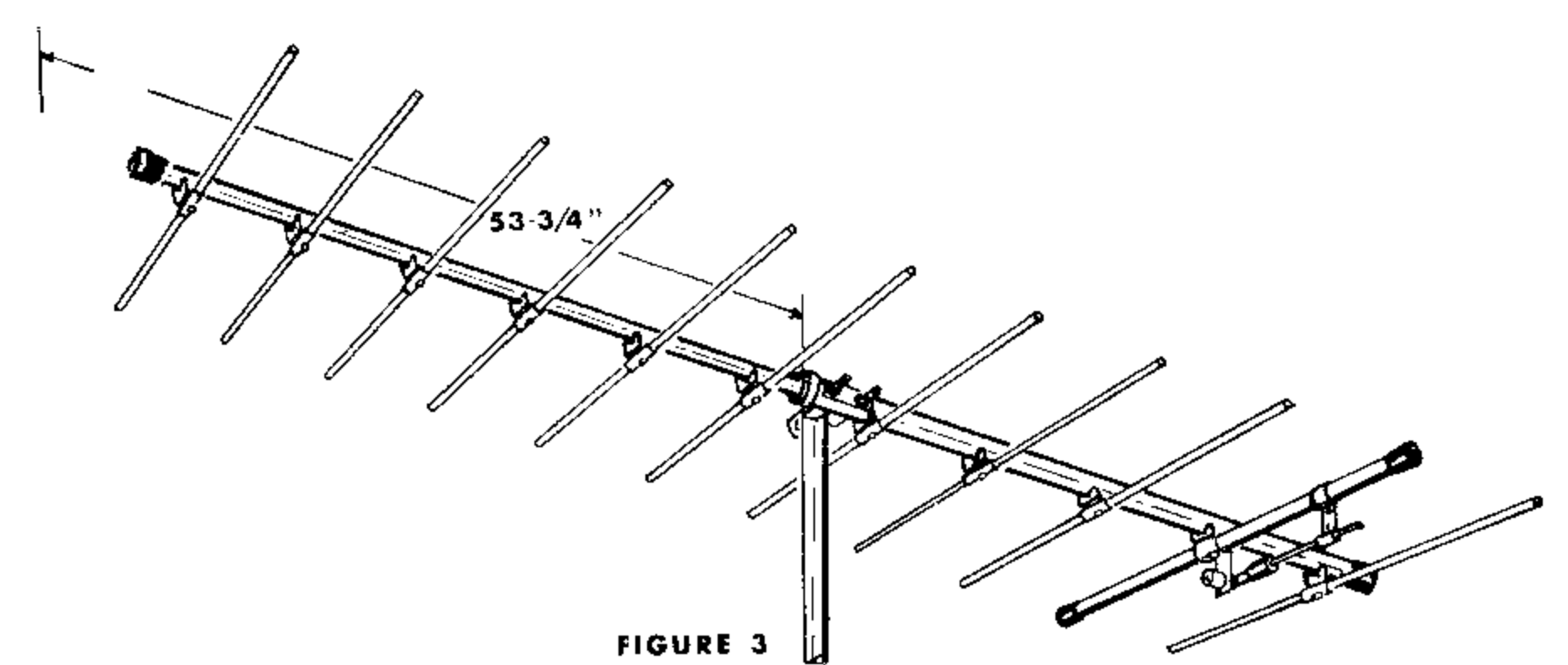


FIGURE 3

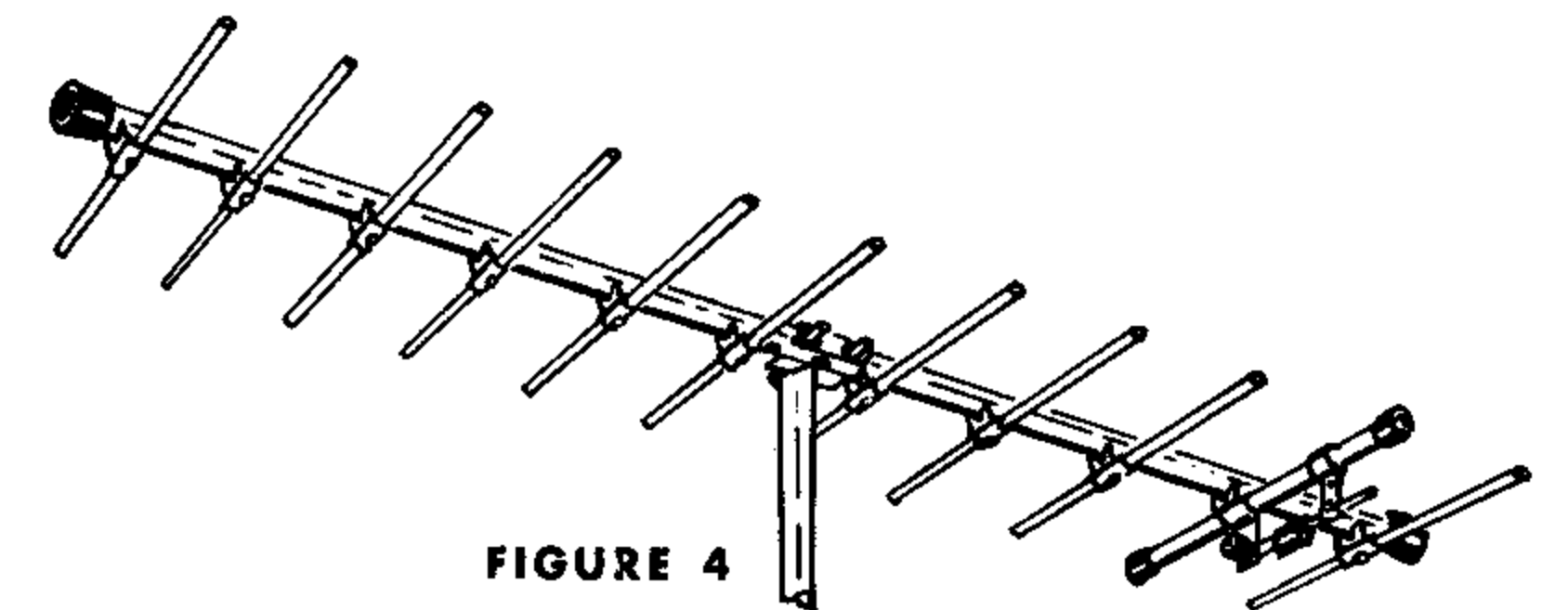


FIGURE 4

Your Cush Craft VHF/UHF Yagi is designed and manufactured to give top performance and trouble free service. The antenna will perform as specified if the instructions and suggestions are followed and if care is used in assembly and installation.

MASTING: The mast mount brackets will take up to a 1 1/2" O.D. mast. A 1 1/4" O.D. television type tubing is satisfactory for any of the single yagis.

MOUNTING: When mounting the yagis on the same mast with other dissimilar antennas they may be mounted within 4' of the other antenna. Generally it is best to mount these yagis above lower frequency antennas.

ROTATOR: A good quality television antenna rotator will easily handle any of these antennas.

LOCATION: of the antenna is very important. Surrounding objects such as trees, power lines, other antennas, etc. will seriously reduce efficiency. To minimize the effects of surrounding objects mount the antenna as high and in the clear as possible. If metal guy wires are used they should be broken with strain insulators installed approximately 4' from the top.

BOOM ASSEMBLY: For the A144-11 slide the 7/8" sections (as far as the black line) into the 1" center section and tighten securely with the 1" telescope clamps, figure 1. To align the boom sections insert a 2" bolt through one hole in each section and sight along the boom.

Assemble the two section A220-11 boom in the same manner as the A144-11 boom. The two A144-7 boom sections are secured by the #4 element and bracket. Select this element from the bundle and assemble it at the splice as shown in figures 2 and 5.

ELEMENT ASSEMBLY: The elements (not including the dipole) are taped in one bundle. They are progressively shorter to improve bandwidth. Mount the reflector (longest element) at the 7/8" end of the A144-7, the 1" end of the A220-11 and either end of the A144-11. Mount the dipole next, then each progressively shorter director up to the front director #7 or #11, which is the shortest element, figure 5. Align the elements and tighten securely. The A430-11 elements are preassembled on the boom.

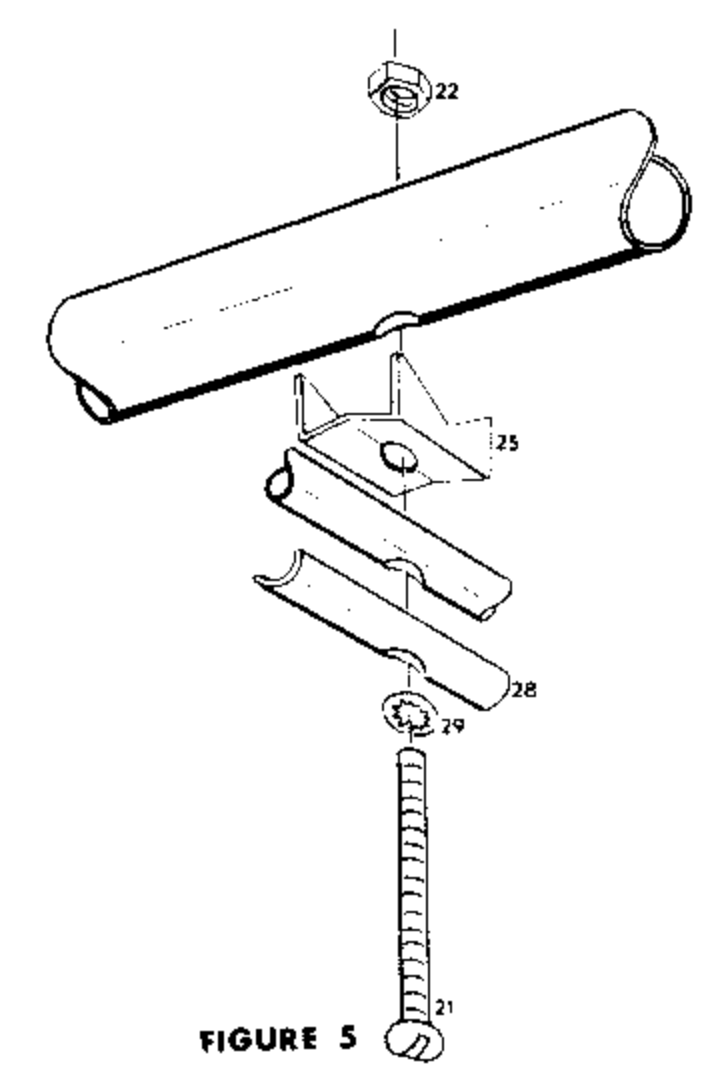


FIGURE 5

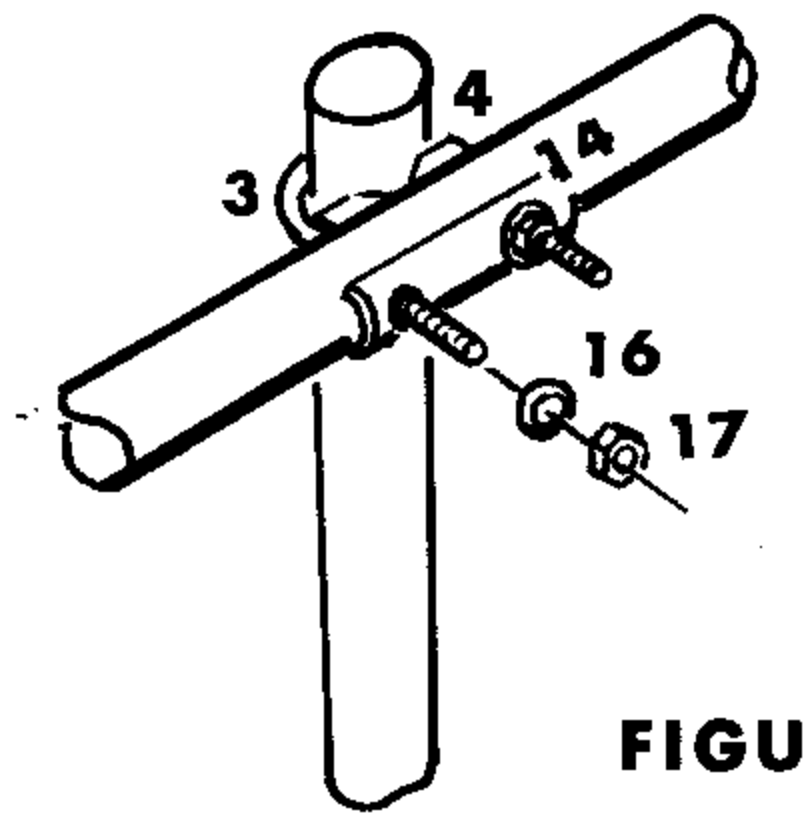


FIGURE 6

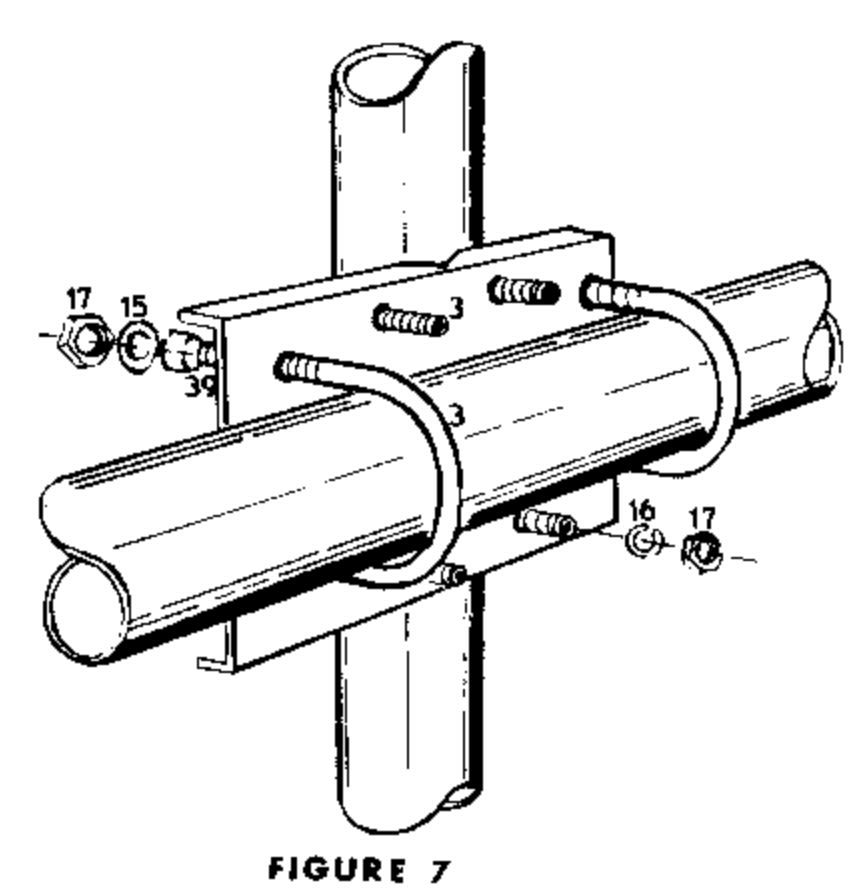


FIGURE 7

MAST MOUNT: The A144-7, A220-11 and A430-11 use a single U-bolt and bracket assembled as shown in figure 6. There are two sets of U-bolt holes in the booms, to give either horizontal or vertical polarization. The A144-11 used a 4" x 6" plate mounted between the No. 5 and 6 elements, figures 1 and 7. The boom may be rotated in the bracket to give either horizontal or vertical polarization.

FEED LINE: Attach a standard PL-259 coax fitting to your 52 ohm feed cable and connect it to the coax fitting on the Reddi Match, figure 8.

TUNING: The Reddi Match is set at the factory for 52 ohm coax and center band operation. For best results it should be individually tuned at your site, by using a good quality standing wave ratio bridge. It is not necessary to cut your feed line or prune it to a particular length. Any feed length cable may be used with the beam. Always make the cable as short as possible to reduce feed line loss.

- (1.) Insert the standing wave ratio bridge in the line between the transmitter and the antenna. Set the transmitter to your center operating frequency.
- (2.) Adjust the bridge for maximum forward power. Check the standing wave ratio with the bridge in the reverse position. If the VSWR is high loosen the tuning strap and adjust it slightly in either direction. Move away from the antenna and check the reading. If the VSWR has increased move the strap back to its original position and adjust in the opposite direction. If the SWR dropped repeat the adjustment procedure until there is little or no reflected power indicated on the bridge.
- (3.) When the antenna is completely assembled and tuned tighten the feed line connections, tape them and coat with a clear acrylic spray or equal. Run the coaxial feed line along the boom and down the mast with electrical tape to hold it in position.
- (4.) If necessary, re-align the elements and tighten all fasteners securely. Mount the plastic caps on the dipole and boom ends.

OPERATION: The A144-11 and A144-7 are cut at 144.5 mhz. They will cover the entire 2 meter band with a VSWR of less than 1.8-1, and the lower end with a VSWR of less than 1.5-1. The antennas may be cut for FM repeater or other use at high end of the band. For operation at the high end cut 1/4" from each end of each element for 1 mhz of change.

The A220-11 is cut at 221.0 mhz and will cover the entire band with a VSWR of 1.5-1 or less.

The A430-11 is cut at 432 mhz and will cover the most popular portion of the band with a VSWR of less than 1.5-1. For operation at the high end cut 1/32" from each end of each element for 1 mhz of change.

STACKING PROCEDURE

Any of the Cush Craft VHF/UHF beams may be stacked to give an additional 3 db gain, lower angle of radiation, and greater capture area. The following instructions apply to the Cush Craft coaxial stacking kits. This same procedure may also be used in fabricating your own stacking harness. Cable lengths Chart 1 Dimension B are the same for both RG-59/U and RG-11/U cables.

The stacking kits include two RG-59/U cable - Q sections, with PL-259's and T fitting.

- (1.) Before connecting the harness tune the antennas separately by following the procedure for the single antennas.
- (2.) Mount the two antennas on your mast with both Reddi Match units facing in the same direction, figure 9. Spacing between the antennas dimension A is given in Chart 1.
- (3.) Attach an end of the stacking harness to each Reddi Match. Run the cable along the boom and mast. Connect your 52 ohm feed cable to the center T fitting, figure 9. Any excess cable in the harness can be coiled equally on each side of the center insulator and taped to the mast.
- (4.) If it is necessary to tune the complete array, tune the lower antenna only. When the array is tuned tighten all connections. Cable connectors may be taped and covered with a clear acrylic spray or equal.

VPK: To assemble the vertical polarization kit slide the two 1 1/2" boom sections into the 1 5/8" center splice. The bolts of the 4" x 6" mast mounting bracket serve as the splice clamps. Mount the antennas on the ends of the boom with both Reddi Match rods pointing in the same direction. Connect the cable and tune the array as outlined in the previous section.

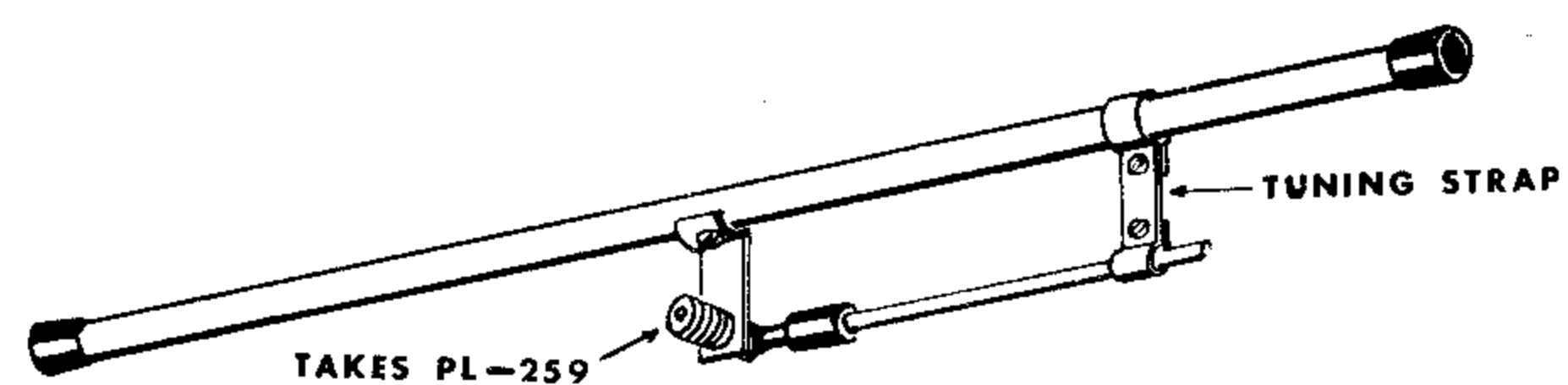


FIGURE 8

CHART #1

MODEL NO.	DIMENSION	
	A	B
A144-11	79"	95 1/4"
A144-7	79"	67 3/4"
A220-11	50"	61 3/4"
A430-11	26"	32 1/4"

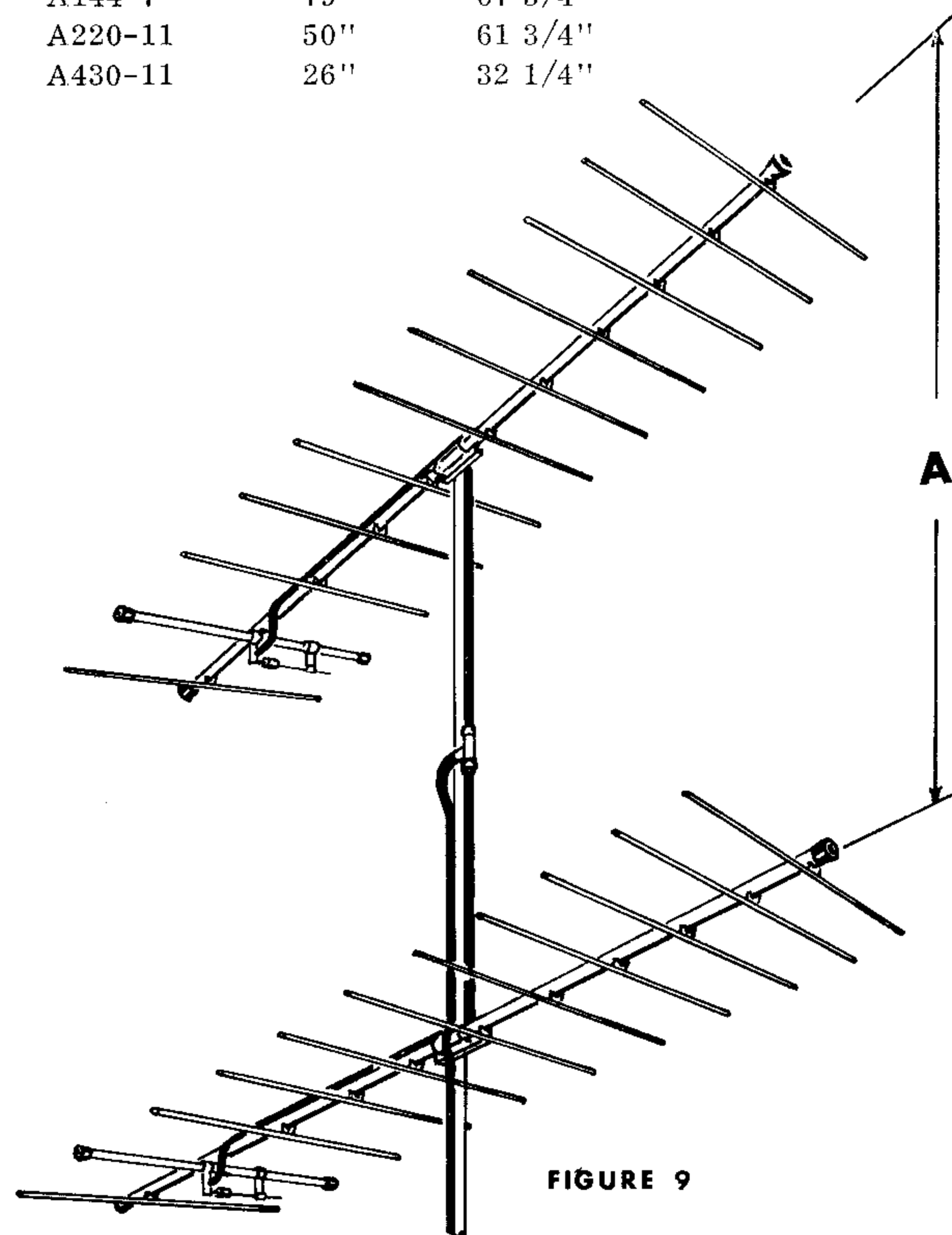


FIGURE 9

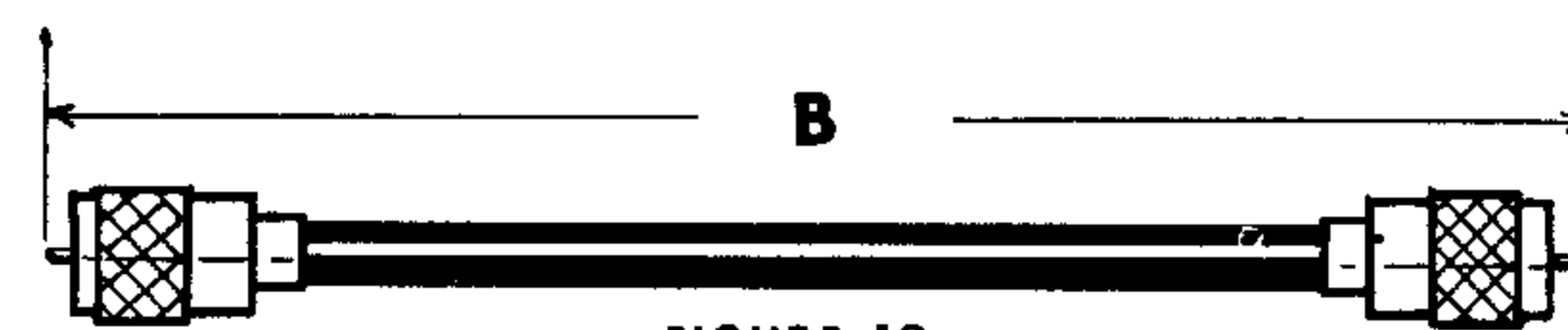


FIGURE 10

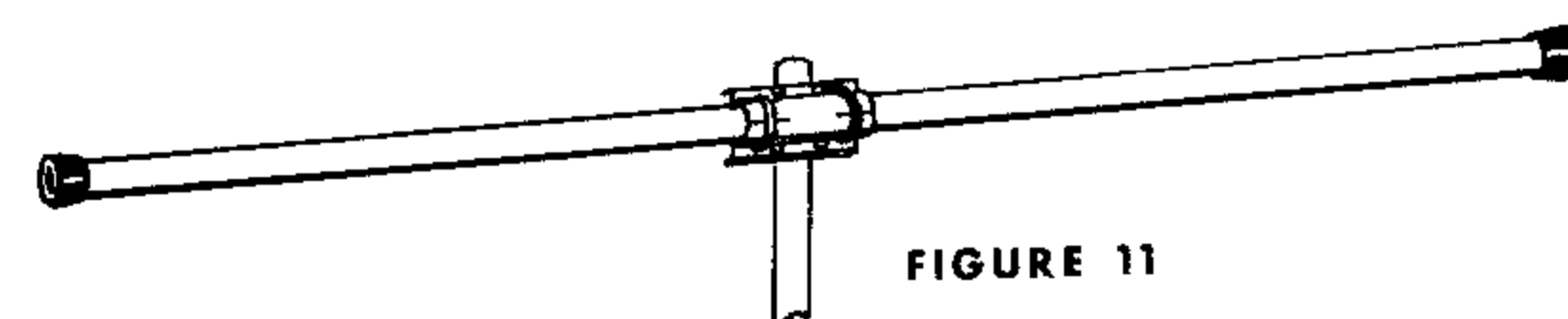


FIGURE 11



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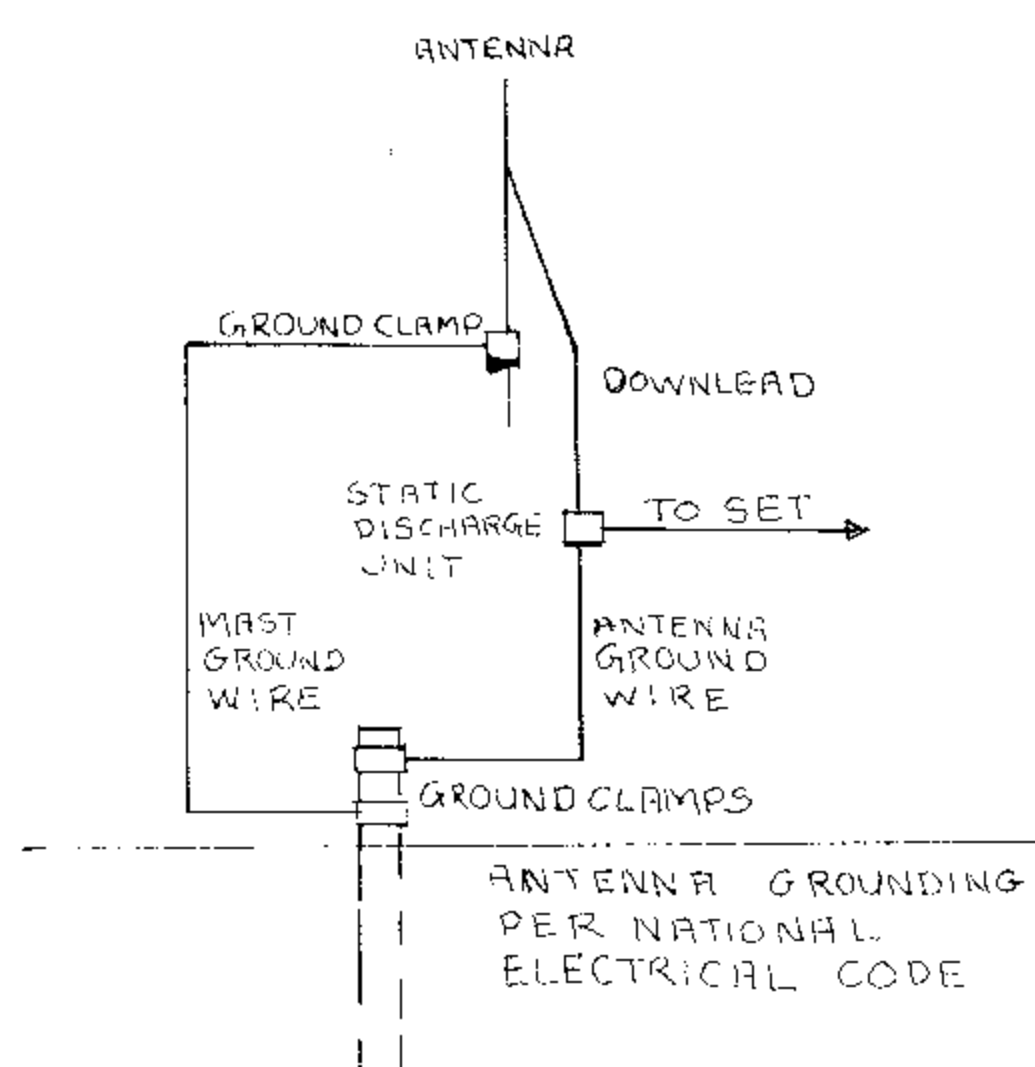
GENERAL INSTALLATION INSTRUCTIONS FOR MAST MOUNTED ANTENNAS

1. Assemble your new antenna on the ground at the installation site. Keep separate assembly instructions that come with it. Large CB and Amateur beams may have to be finally assembled on the tower or mast.
2. On the ground, clamp antenna to mast, pull enough coaxial cable and connect to antenna.
3. To insure that a mast does not fall the "wrong way" if it should get away during the installation or takedown, durable non-conductive rope should be secured at each two foot level as the mast is raised. The boss stands in a position where he can yank or pull the ropes if the need arises to *deflect* the falling mast away from hazards (such as power lines) into a "safe fall" (such as a yard or driveway). The ropes are tied taut at the base of the mast after installation and in place at the various levels.
4. Install selected mounting bracket.
5. If you are going to use guy wire installation instead of a mounting bracket:
 - install guy anchor bolts
 - estimate length of guy wire and cut
 - attach a mast using guy ring.
6. Carefully take antenna and mast assembly to mounting bracket and insert. Tighten clamp bolts. In case of guyed installation, it will be necessary to have at least a second person hold the mast upright while the guy wires are attached and tightened to the anchor bolts.
7. Install self-adhering "DANGER" label packaged in antenna hardware kit at eye level on your mast.
Install ground rod to drain off static electricity build up and connect ground wire to mast and ground rod. Use special ground rods, not a spare piece of pipe.

EXAMPLE OF ANTENNA GROUNDING AS PER NATIONAL ELECTRICAL CODE INSTRUCTIONS

- a. Use No. 10AWG copper or No. 8 AWG aluminum or No. 10 AWG copper-clad steel or bronze wire, or larger as ground wires for both mast and lead-in. Securely clamp the wire to the bottom of the mast.
 - b. Secure lead-in wire from antenna to antenna discharge unit and mast ground wire to house with stand-off insulators spaced from 4 feet (1.22 meters) to 6 feet (1.83 meters) apart.
 - c. Mount antenna discharge unit as close as possible to where the lead-in wire enters the house.
9. Drill a hole in wall (CAREFUL! there are wires in that wall!) near set just large enough to permit entry of cable.
 10. Punch cable through hole and form a rain drip loop close to where it enters house.
 11. Puts a small amount of caulking around cable where it enters house to keep out drafts.
 12. Install static electricity discharge unit.
 13. Connect antenna cable to set.

You should not attempt to raise a mast in excess of 30 feet in height/length not including the antenna proper) in a fully-extended condition. Thirty to forty foot tubular masts must be elevated a section at a time with the base or outer section secured in place with guy wires.
GET PROFESSIONAL HELP.



WARNING
INSTALLATION OF THIS PRODUCT NEAR POWER LINES IS DANGEROUS. FOR YOUR SAFETY, FOLLOW THE ENCLOSED INSTALLATION DIRECTIONS.

HOW TO INSTALL YOUR OUTDOOR ANTENNA SAFELY IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE U.S. CONSUMER PRODUCT SAFETY COMMISSION

THESE SAFETY RECOMMENDATIONS APPLY TO ALL CUSHCRAFT CB, TV, AMATEUR AND GENERAL PURPOSE COMMUNICATION ANTENNAS.

YOU, YOUR ANTENNA, AND SAFETY

Each year hundreds of people are killed, mutilated or receive severe permanent injuries when attempting to install an antenna. In many of these cases, the victim was aware of the danger of electrocution, but did not take adequate steps to avoid the hazard.

For your safety, and to help you achieve a good installation, please **READ** and **FOLLOW** the safety precautions below: **THEY MAY SAVE YOUR LIFE!**

1. If you are installing an antenna for the first time, please, for your own safety as well as others, seek **PROFESSIONAL ASSISTANCE**. Consult your dealer. He can explain which mounting method to use for the size and type antenna you are about to install.
2. Select your installation site with safety, as well as performance, in mind. (Detailed information on Site Selection appears in a separate section of this booklet.) **REMEMBER: ELECTRIC POWER LINES AND PHONE LINES LOOK ALIKE. FOR YOUR SAFETY, ASSUME THAT ANY OVER-HEAD LINES CAN KILL YOU.**
3. Call your electric power company. Tell them your plans and ask them to come look at your proposed installation. This is a little inconvenience, considering **YOUR LIFE IS AT STAKE**.
4. Plan your installation procedure carefully and completely *before* you begin. Successful raising of a mast or tower is largely a matter of co-ordination. Each person should be assigned to a specific task, and should know what to do and when to do it. One person should be designated as the "boss" of the operation to call out instructions and watch for signs of trouble.
5. When installing your antenna, **REMEMBER:**
DO NOT use a metal ladder.
DO NOT work on a wet or windy day.
DO dress properly—shoes with rubber soles and heels, rubber gloves, long sleeve shirt or jacket.
6. If the assembly starts to drop, get away from it and let it fall. **REMEMBER:** The antenna, mast, cable, and metal guy wires are all excellent conductors of electrical current. Even the *slightest touch* of any of these parts to a power line completes an electrical path through the antennas and the installer—**THAT'S YOU!**
7. If any part of the antenna system should come in contact with a power line—**DON'T TOUCH IT OR TRY TO REMOVE IT YOURSELF. CALL YOUR LOCAL POWER COMPANY.** They will remove it safely.
8. If an accident should occur with the power lines—
DON'T grab hold of the person in contact with the antenna and power line or you, too will be electrocuted. Use a DRY board, stick or rope to push or pull the victim away from the antenna. If the victim has stopped breathing, after moving, administer artificial respiration—and stay with it. Have someone call for medical help.



THE ANTENNA COMPANY

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SITE SELECTION:

Before attempting to install your antenna, think where you can best place your antenna for *safety* and performance.

To determine a *safe* distance from wires, power lines and trees:

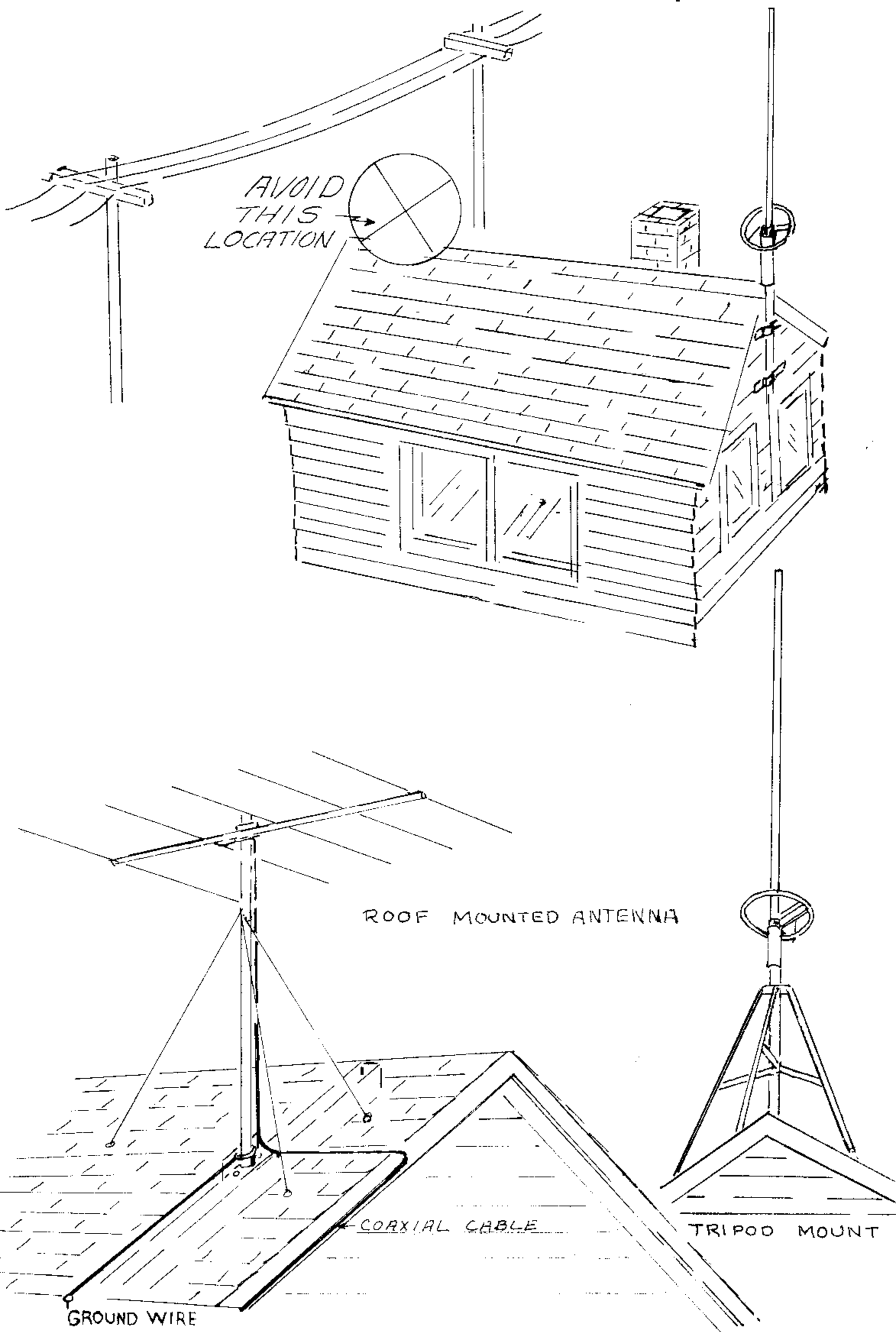
1. Measure the height of your antenna
2. Add this length to the length of your tower or mast, and then
3. Double this total for the minimum recommended *safe* distance.

If you are unable to maintain this safe distance, **STOP! GET PROFESSIONAL HELP.** Many antennas are supported by pipe masts attached to the chimney, roof, or side of the house. Generally, the higher the antenna is above ground, the better it performs. Good practice is to install your antenna about 5 to 10 feet above the roof line and away from power lines and obstructions. Remember that the FCC limits your antenna height to 60 feet. If possible, find a mounting place directly above your set, where the antenna wire can take a short, vertical drop on the outside of the house for entry through a wall or window near the set. Your dealer carries a complete line of installation hardware.

The safe distance from power lines should be at least twice the height of antenna and the mast combined.

CHOOSE A PROPER SUPPORT AND MOUNTING METHOD:

These are three types of supporting structures commonly used in antenna installations. Illustrations of these devices and various mounting methods follow.



ROOF MOUNTING

The swivel feature of "universal" type mounting brackets makes a convenient antenna mount for flat or peaked roofs. One clamp type bracket is used with 3 or 4 guy wires equally spaced around the mast and anchored to the roof or eaves by eyebolts. Apply roofing compound around the base of the bracket, screws and eyebolts for moisture sealing.

THESE MOUNTING STRUCTURES CAN BE FREE STANDING OR ALONG SIDE OF BUILDING

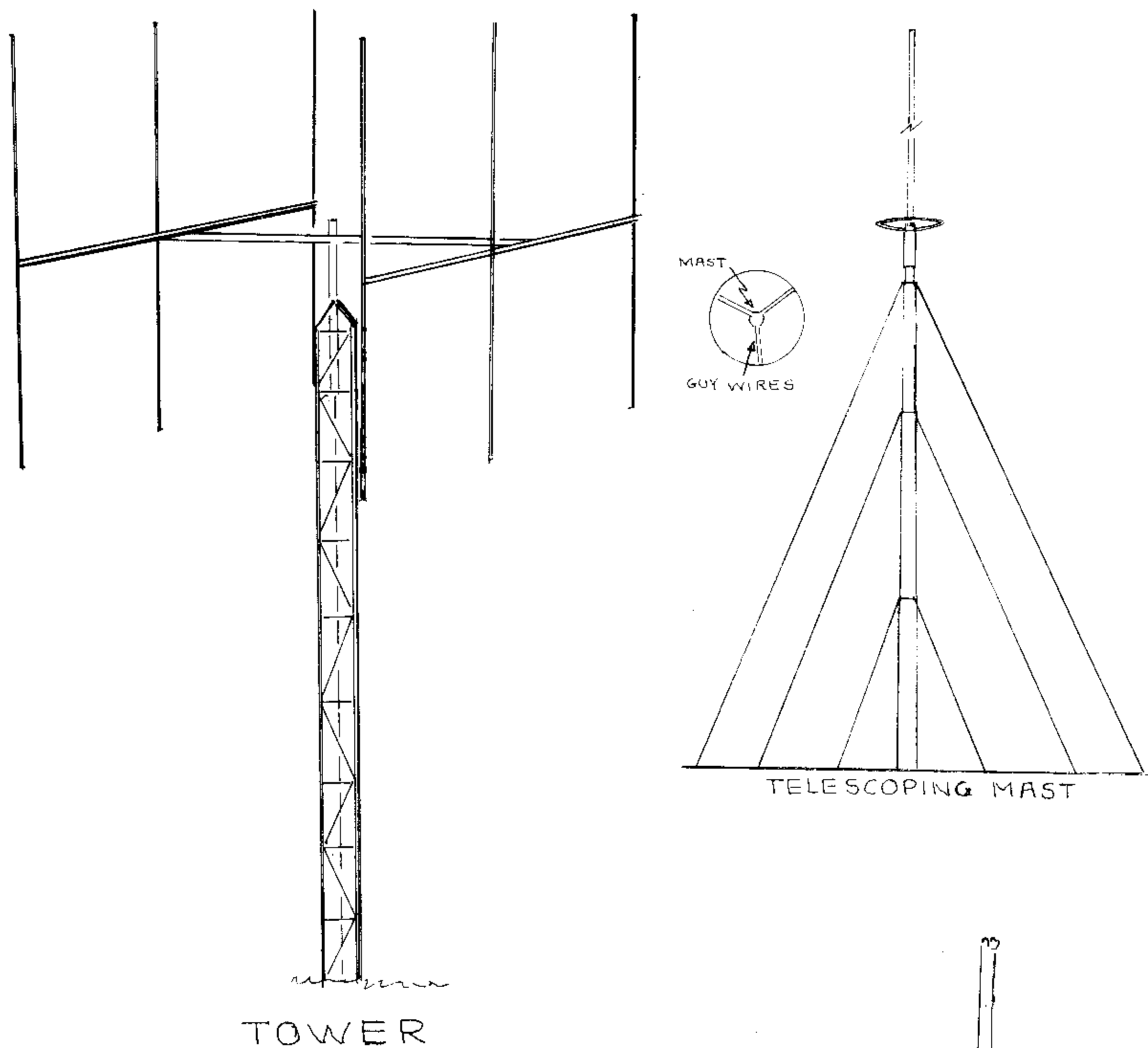
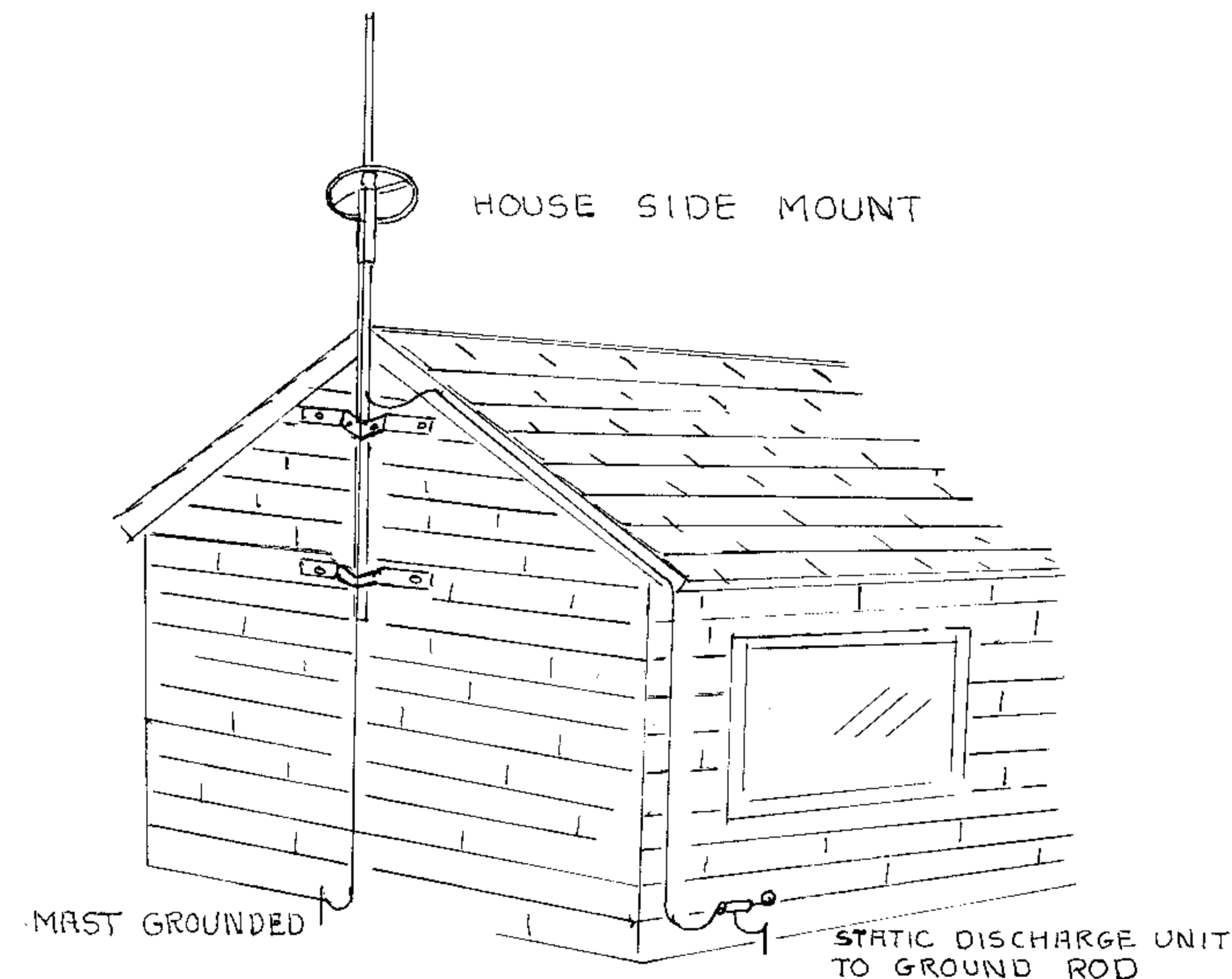
Guy wires should be equally spaced in at least three directions. Use at least three guy wires for each 10 foot section of mast.

SIDE OF HOUSE MOUNT

The safe distance from power lines is at least twice the height of antenna and the mast combined.

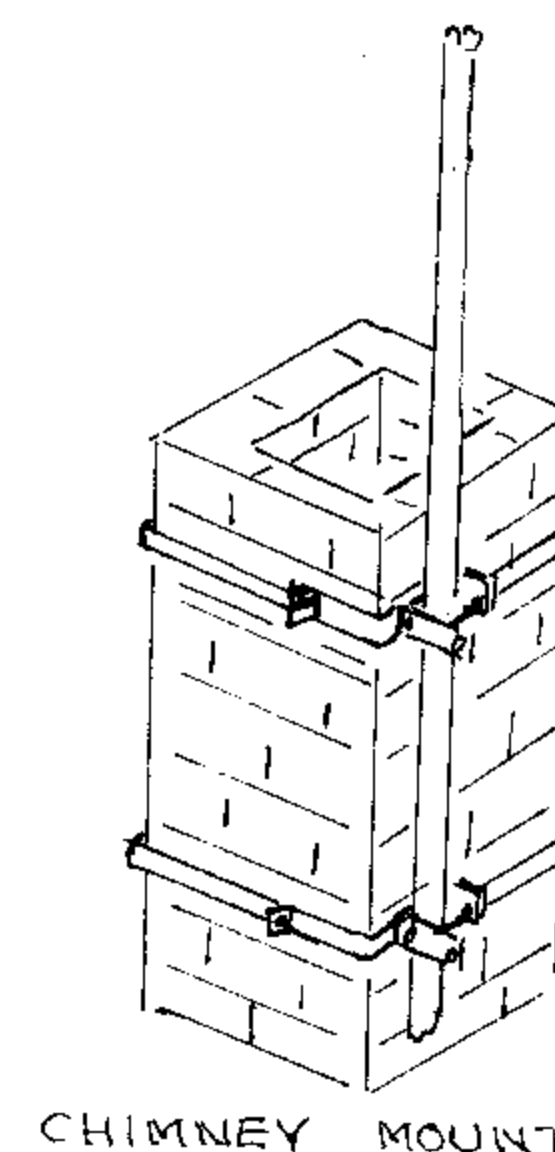
SIDE OF HOUSE MOUNTING

Where roof overhang is not excessive, the side of the house provides a convenient mounting. Position the brackets over a stud if possible, one above the other, and space two or three feet apart. For metal siding, first mark mounting holes, then drill pilot holes through the siding to accept mounting screws.



CHIMNEY MOUNTING

The chimney is often an easy and convenient mounting place. But the chimney must be strong enough to support the antenna in high winds. Do not use a chimney that has loose bricks or mortar. A good chimney mount makes use of a 5 or 10 foot 1 1/4" diameter steel mast, and a heavy duty two strap clamp-type bracket. Install the upper bracket just below the top course of bricks, and the lower bracket two or three feet below the upper bracket. For maximum strength, space the brackets as far apart as possible.



MORE THAN YOU EXPECTED

Cushcraft has included weatherproof connector boots for each PL259 connector used on your new antenna. To get the most out of them, please follow these simple directions:

1. Insert the antenna end of your coax through the small end of the connector boot. RG8 and RG11 are very tight fits which result in an excellent weather seal. Attach the PL259. If your antenna includes a phasing harness this step was completed at the factory.
2. Cut off the top of the silicon seal package and apply a liberal amount to the threads of the connector mounted on the antenna. Screw the PL259 on the feedline on this connector. Tighten it finger tight.
3. Now apply the remaining silicon to the outside of the connector. Cover it liberally. Be sure to cover the back as this will insure a good weather seal. Slip boot over the connector. Push it as far forward as possible.

