

GETTING

THE

MOST

INTO YOUR

ANTENNA

ANT. EXAMPLES -

1. MULTIBAND

A) ANT = 70 \sim

B) FEEDLINE = 450 \sim

C) SWR STILL 1:1 AT XMTR

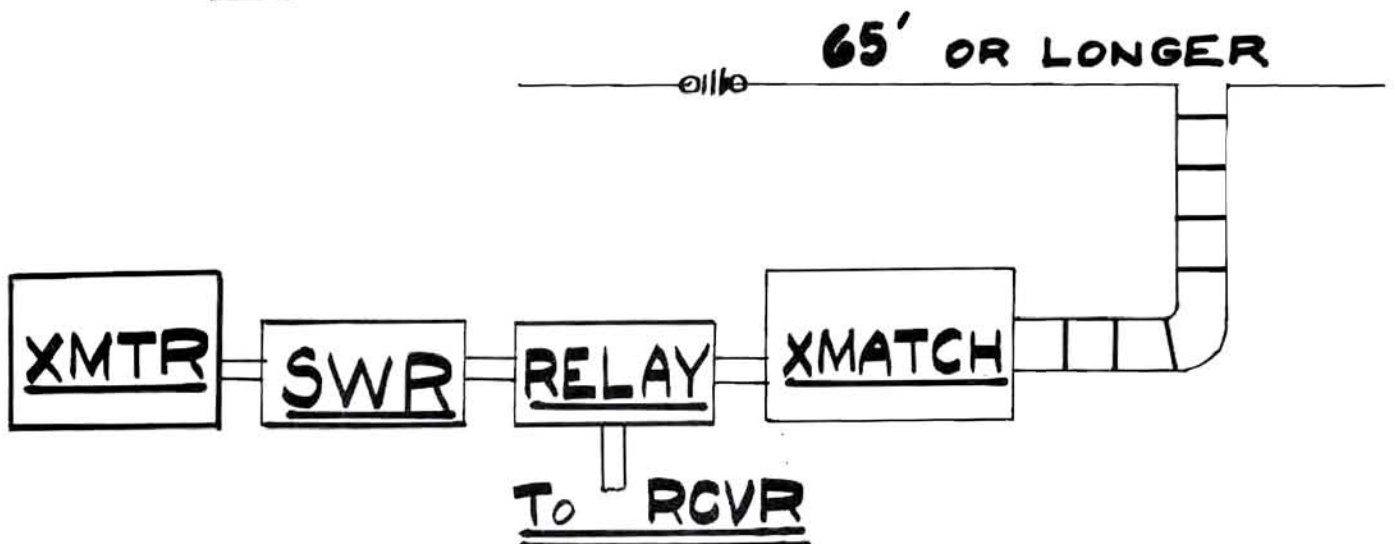
D) 6:1 AT ANT - WE DONT CARE!

E) LOW-LOSS LINE

F) XMTR MATCHED PERFECTLY

G) LENGTH NOT CRITICAL

H) USE COUPLER



THE PROBLEM

ALL SEEMS OK BUT NO QSO
AM I DOING RIGHT THING?
METER READINGS UNDERSTOOD!
CONDX BAD? QTH POOR?
POWER NOT GETTING TO ANT
FAILURE OR SUCCESS
NOT A MYSTERY.

W4ADE SEZ:

A FELLOW MAY HAVE A WATT OR A
KW, BUT WITHOUT AN EFFICIENT ANT
HE RESEMBLES AN ELEPHANT FALL-
EN INTO A PIT —

HE CAN'T GET OUT VERY

WELL!

FUNDAMENTALS -

1. USE RESONANT ANT. SYS.
2. SYSTEM? ALL WIRE.
3. RESONANCE - $L = \frac{468}{f} = \frac{1}{2} \text{ WAVE}$
4. WIRE LENGTH IMPORTANT.
5. CURRENT DISTRIBUTION
6. GOOD COUPLING
7. SWR 1:1 WHY NOT?

RANDOM - LENGTH ANT.

ANY LENGTH 65' OR MORE

BEND - SLANT - MAX. HT.

FROM WINDOW TO TREE

LANDLORD PROBLEM?

USE #30 WIRE

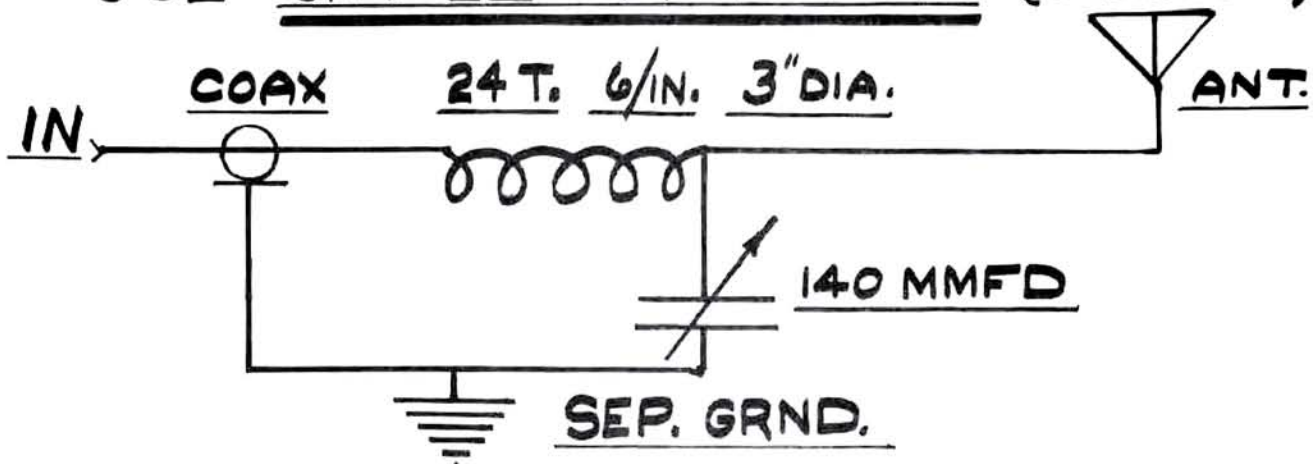
RUBBER BANDS

AFTER DARK

DONT LOSE WIRE

XMTR MAY NOT LOAD (52 Ω ONLY)

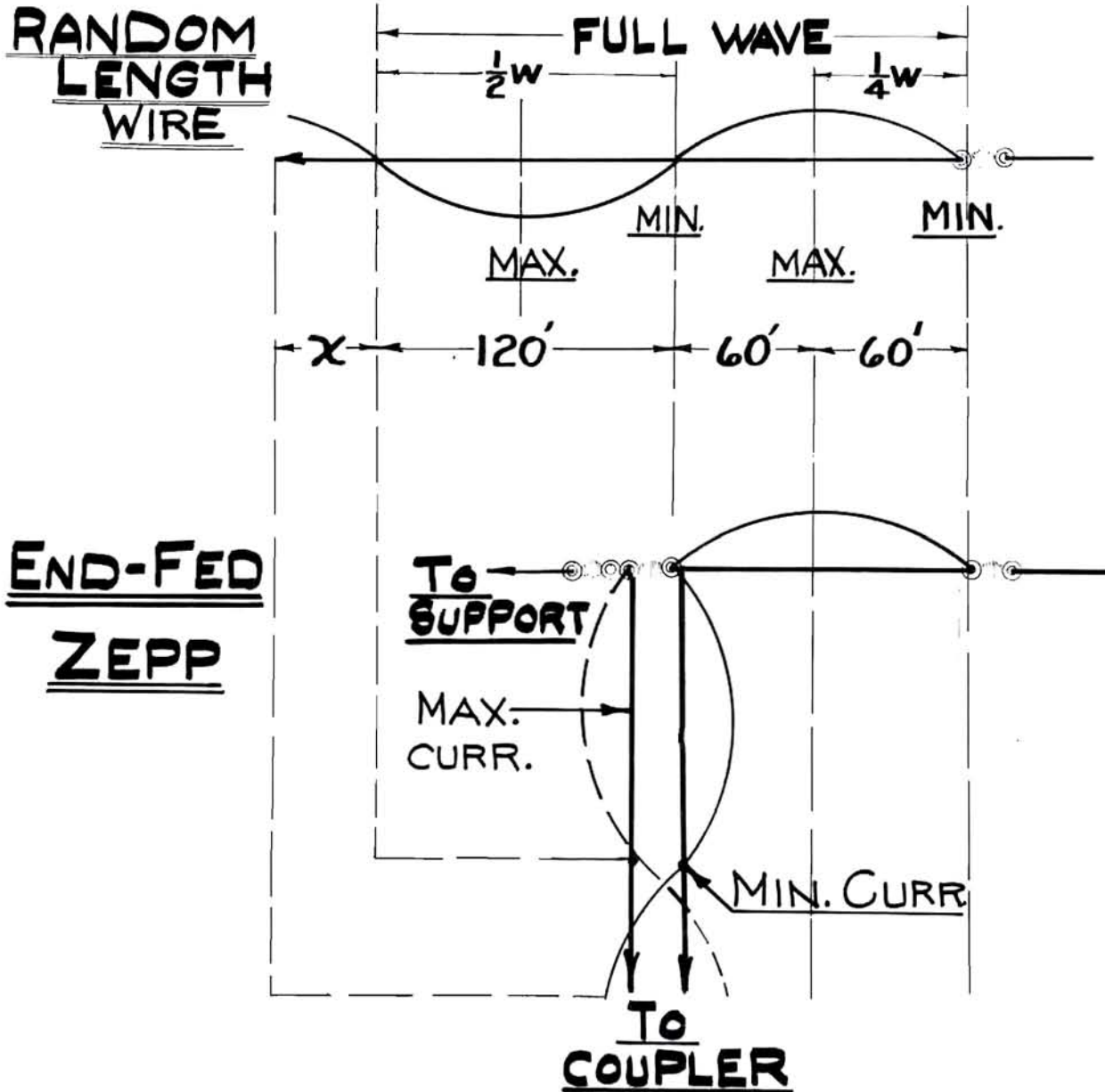
USE SIMPLE XMATCH (BREADBOARD)

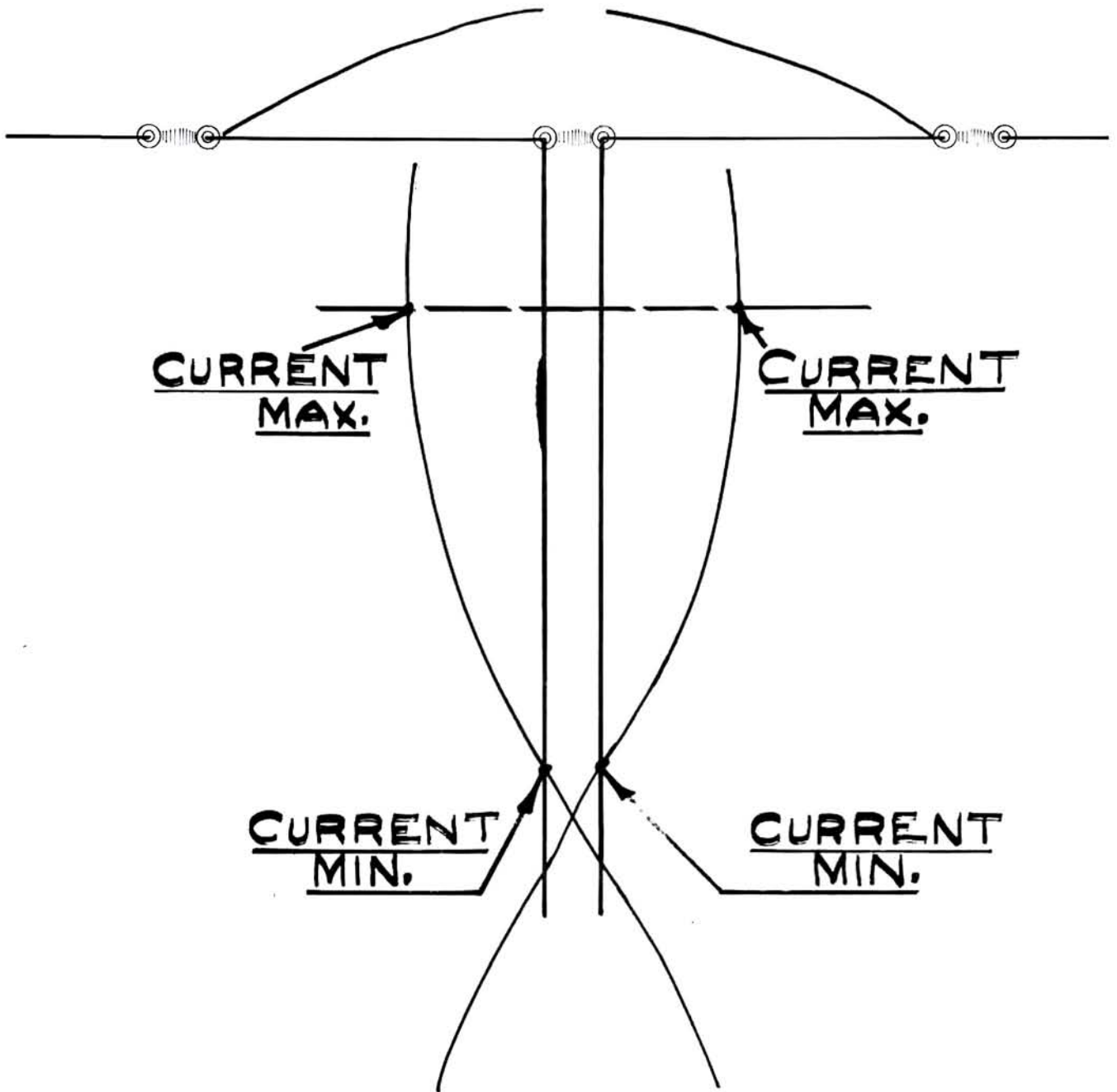


RANDOM LENGTH WIRE

1. RESONANCE NOT REQ'D
2. RADIATES - ENTIRE LENGTH
3. NEAR TREES & EARTH
4. OBJECTS ABSORB R.F.
5. R.F. INSIDE SHACK
6. NOT BALANCED LINE
7. SIMPLEST WIRE ANT
8. "LONGWIRE" WILL NOT
RADIATE FROM FLAT-
TOP ONLY, WHICH IS
DESIREABLE.

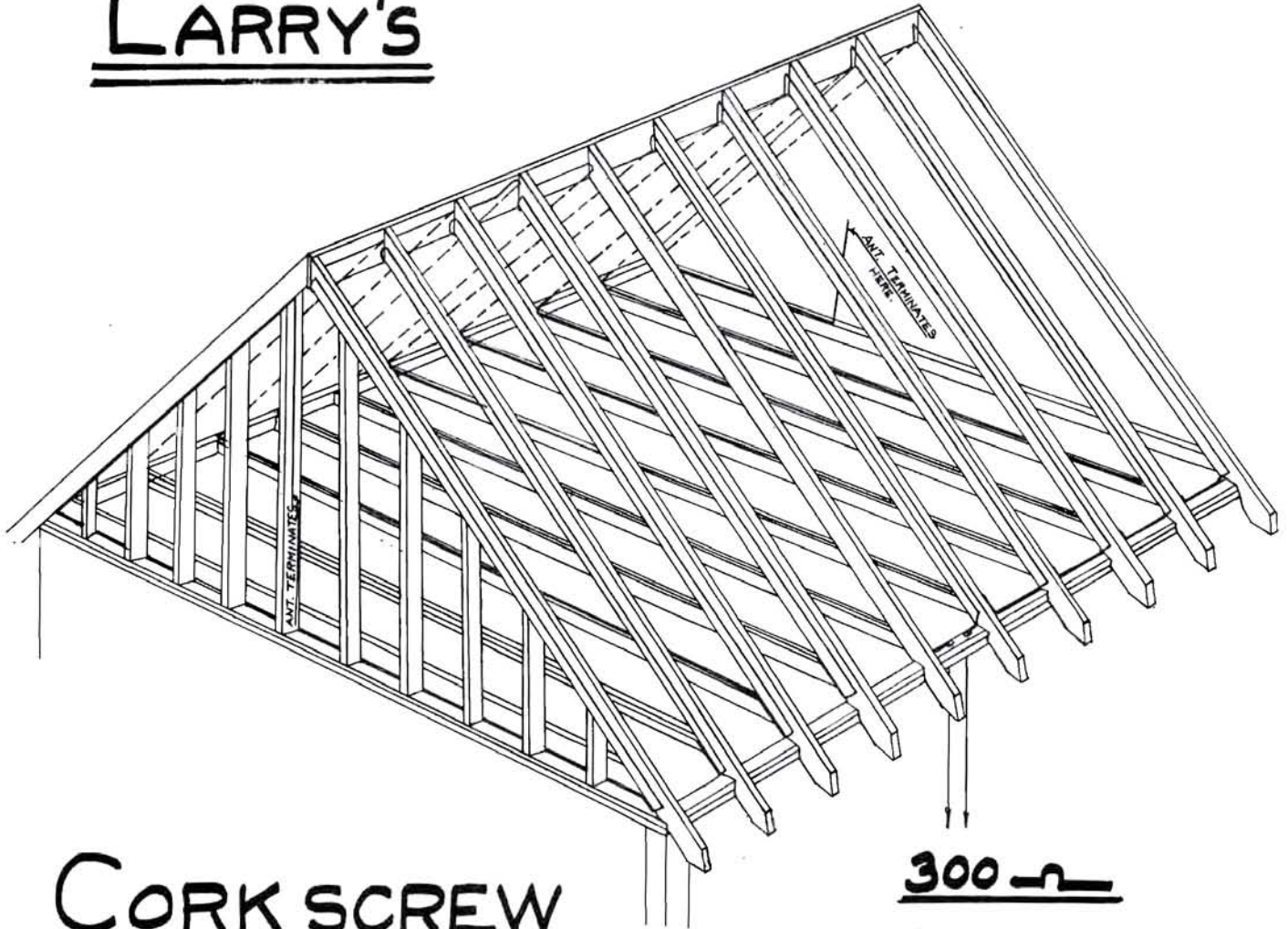
CURRENT DISTRIBUTION





CENTER-FED DOUBLET
FLAT TOP TOO SHORT

LARRY'S



CORK SCREW

ANTENNA

FOR 160 M.

THRU 10 M.

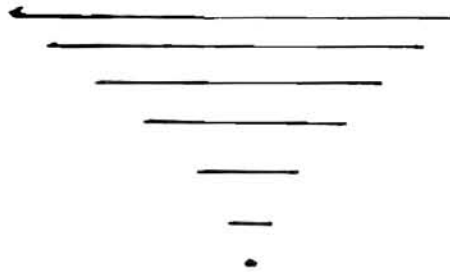
300 -Ω

FEEDLINE

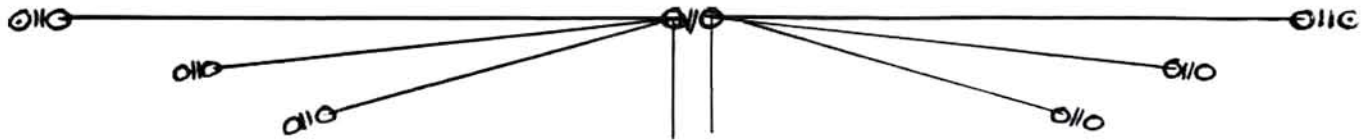
TO XMATCH

INDOOR ANTENNAS

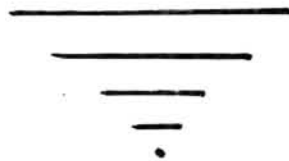
1. 30' WIRE TAPED TO CEILING
2. 66' " • 1/2 w DIPOLE
3. 3-ELEMENT BEAM - WIRE
4. USE 300-Ω FEEDERS
5. USE GRND - AC SOCKET
6. BEDSPRINGS
7. "CORKSCREW" ANTENNA



FAN TYPE DIPOLE



1. THREE BAND DESIGN
2. USES 3 DOUBLETS
3. COAX FEEDLINE
4. SIMPLE - COMMON FEEDLINE
5. 52 Ω
6. TWO ANT (40-20)
7. MAY BE PARALLEL
8. USE TO XMT & RECEIVE
9. PASSES HARMONICS



CENTER - FED ANT.

1. FED AT MAX. CURRENT
2. BOTH FEEDERS CONSIDERED
3. IF SHORT, CURRENT POINTS ARE DOWN FEEDLINE
4. BOTH FLATOPS SAME LENGTH
5. CURR. OPPOSITE EACH OTHER
6. RADIATION MINIMIZED ^(ON FEEDLINE)
7. CENTER-FED IS BETTER
8. ADVANTAGE GREATEST - QSY
9. ALWAYS BALANCED - ALL FREQ.
10. U DONT NEED SPACE FOR $\frac{1}{2}$ WAVE
11. BUT THERE MUST BE ENUFF WIRE IN COMPLETE SYSTEM
12. A COUPLER IS NECESSARY

FOLDED DIPOLE



- A) 300 Ω
- B) BROADER
- C) 2-BAND (40-15)
- D) SAME LENGTHS
- E) EASY TO BUILD
- F) LIGHT WEIGHT
- G) FORMULA - SAME
- H) NO CENTER
- I) NEED BALUNS
- J) HUMIDITY CHANGES
- K) LOWER LOSS TWINLEAD

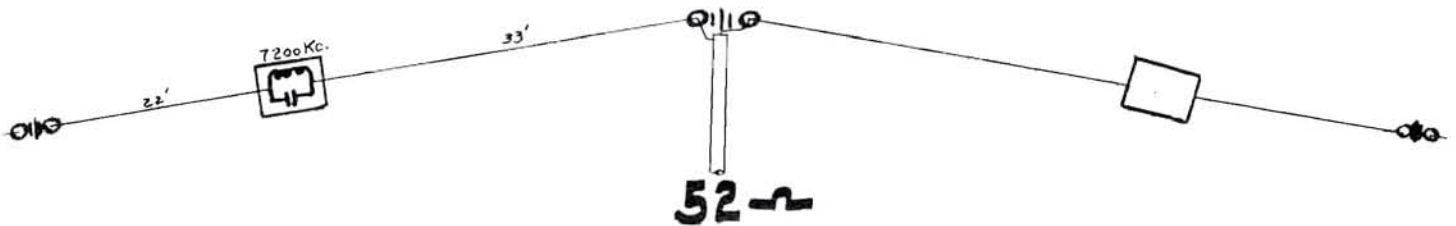
TRAP DIPOLE DISADVANTAGES

1. 80-40 METERS ONLY
2. NARROW BAND SWR 1:1
3. SWR 3:1 HIGHER FREQ.
4. SWR 6:1 ON 10 METERS
5. PLUS LINE LOSS
6. POWER LOSS 50%
7. NO HARMONIC REDUCTION
8. HEAVY ANTENNA
9. STRETCHES
10. SEPARATE ANTENNAS

PHONE & CW

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TRAP DIPOLE



1. SHORT - 108 FT.

2. COAX-FED - BURY IT

RUN NEAR GUTTER

GRND THE SHIELD

THRU METAL WORK

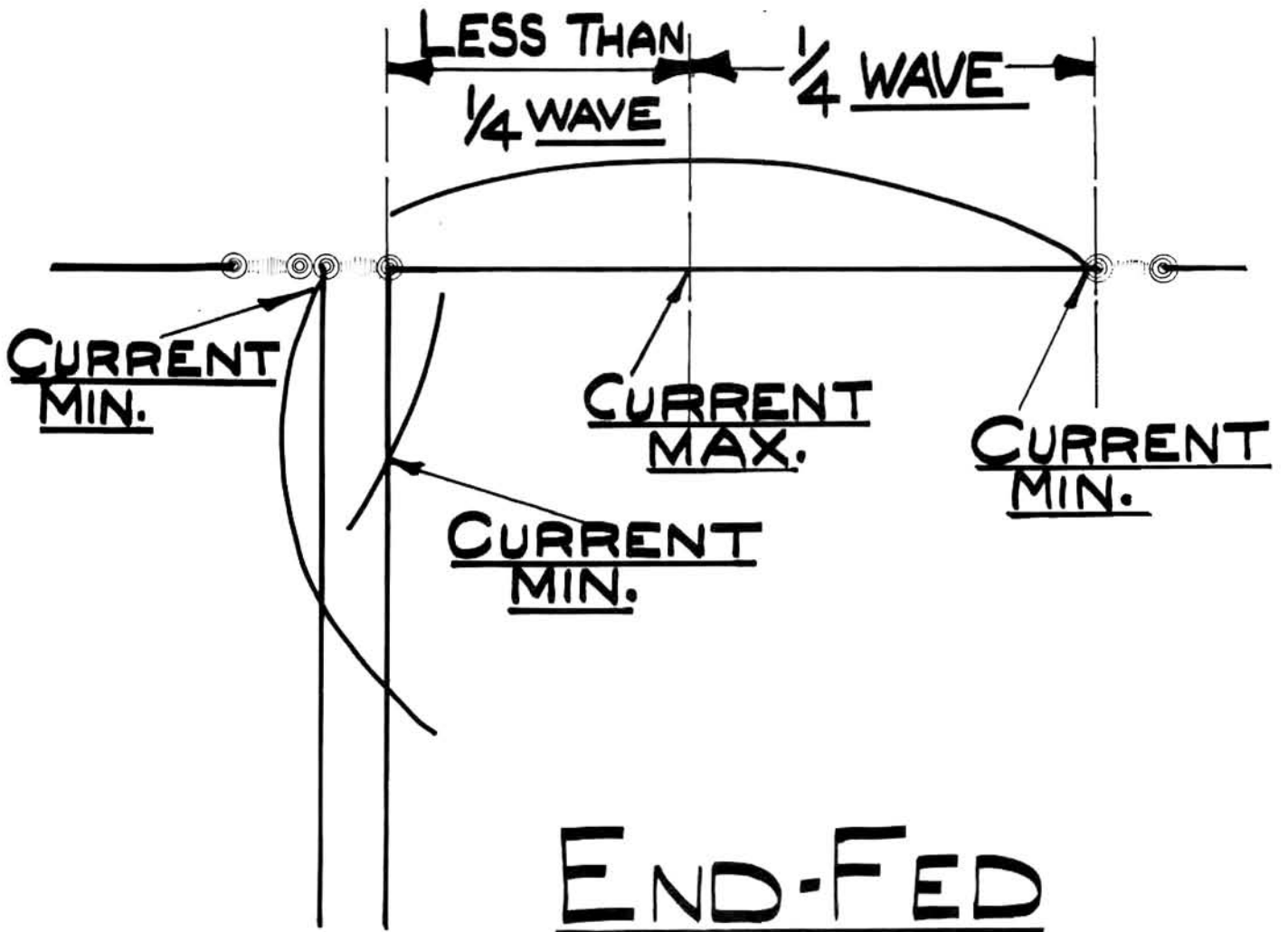
CONVENIENT

3. FAIRLY GOOD MATCH OVER

NARROW BAND

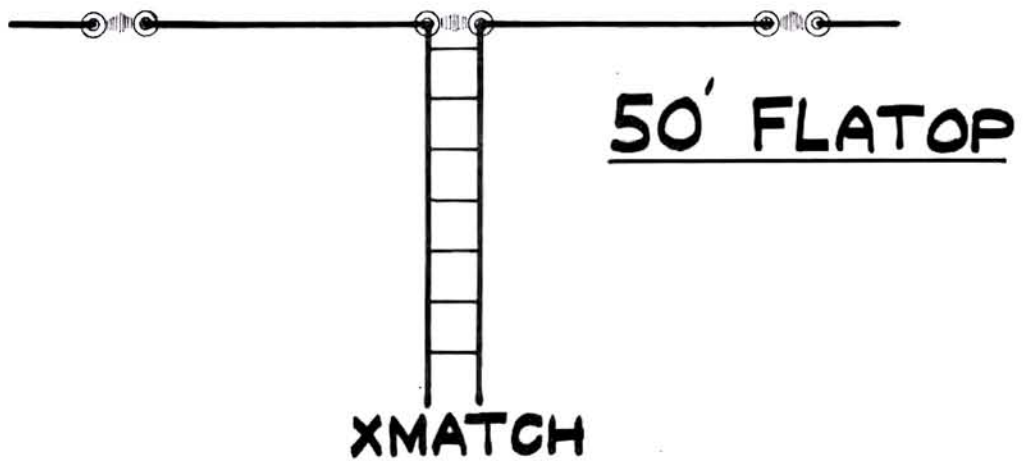
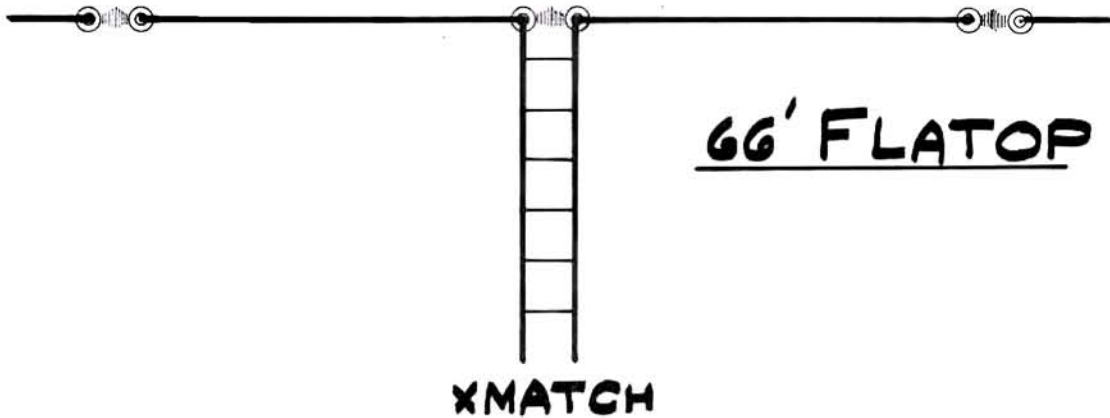
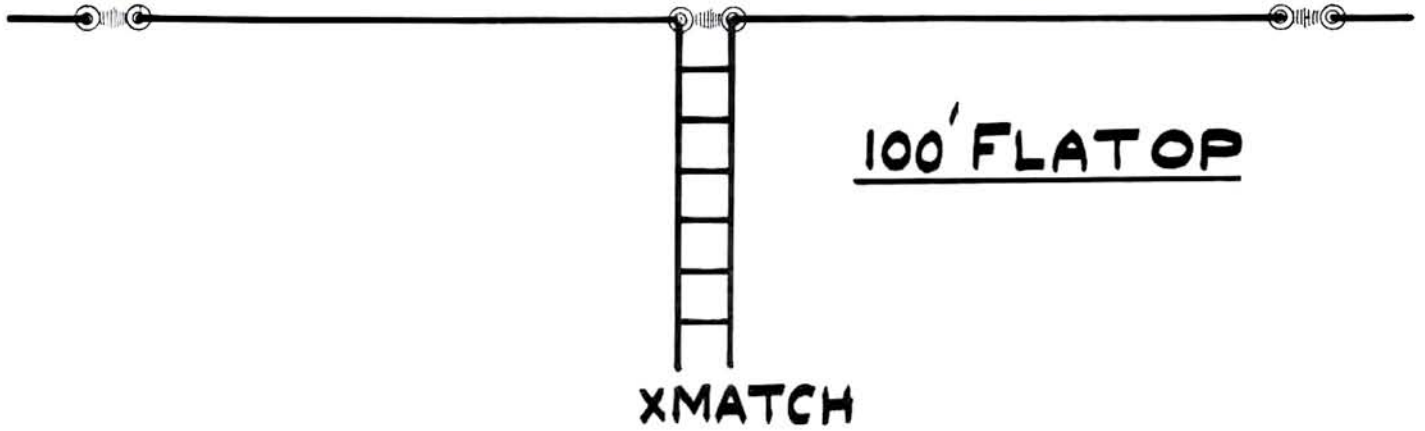
4. NO XMATCH NEEDED

5. INVERTED.



END-FED
ZIPP
FLAT TOP TOO
SHORT.

SUGGESTED LENGTHS



WORK ALL BANDS (XCEPT #3)

TRANSMISSION LINES:


CHOICE -

- 1) DEPENDS ON MANY FACTORS
- 2) ANY TYPE POSSIBLE TO USE
- 3) PROPER COUPLING METHOD

PURPOSE -

- 1) PROVIDE PATH FOR RF
- 2) EFFICIENTLY AS POSSIBLE

FEEDPOINT CHARACTERISTICS -

- 1) PRESENTS AN IMPEDANCE
- 2) AT RESONANCE = SIMPLE RESIST.
- 3) OHMIC
 - a) HEAT  OF WIRE
 - b) NEGLECTIBLE

RADIATION RESISTANCE - ENERGY AS RADIO WAVES

IMPEDANCE = OHMIC + RADIATION
(IF RESONANT)

AT OFF-RESONANCE -

- 1) REACTANCE ADDED
- 2) OPPOSES RF FLOW
- 3) EXPRESSED IN Ω
- 4) DUE TO CAP. & INDUCTIVE
EFFECTS

5) IMPEDANCE CAN BE:

• LOW AS 10 Ω

• HIGH AS 1000 Ω

FEEDLINE LOSS

DB. ATTENUATION / 100'

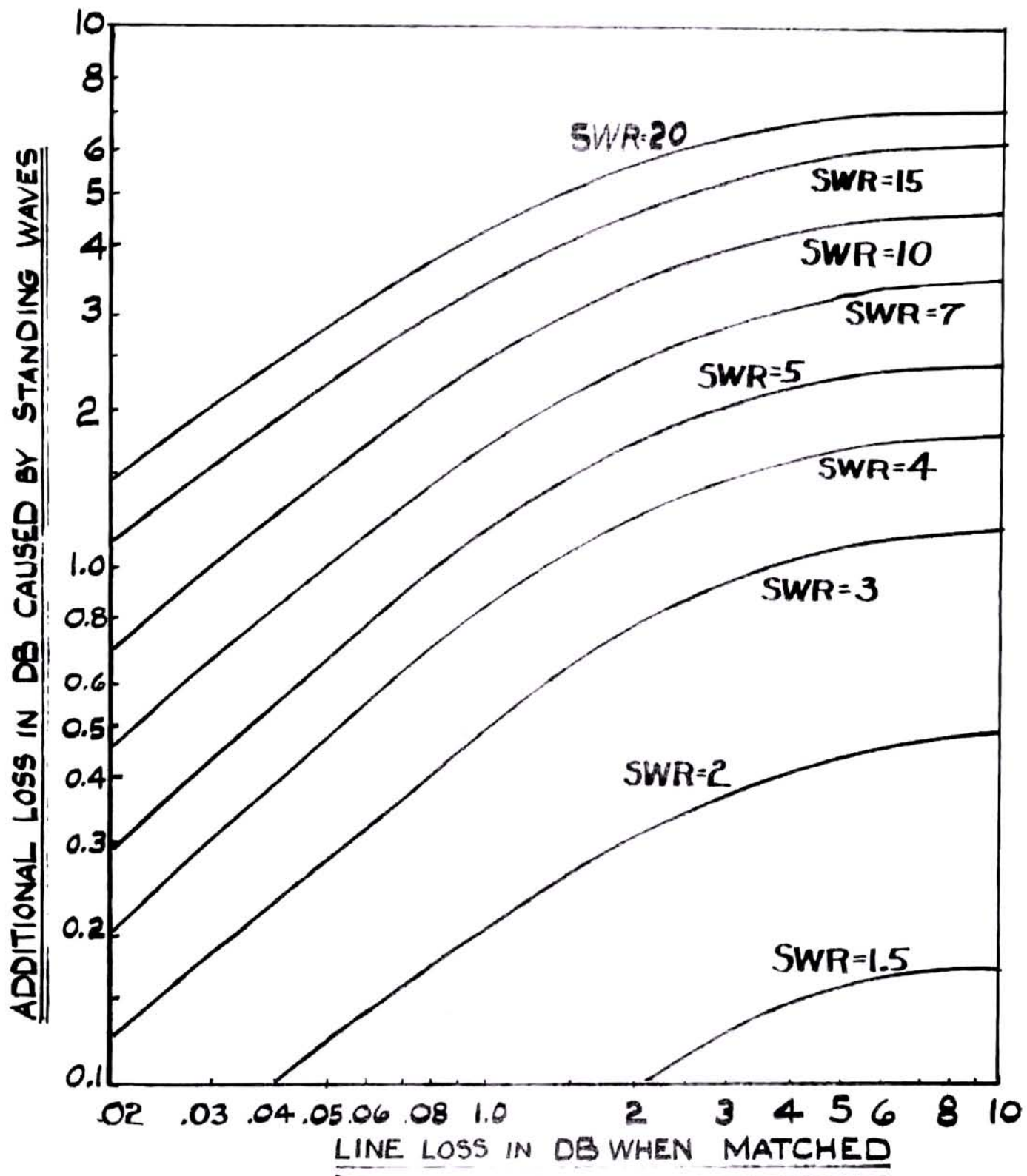
<u>TYPE</u>	<u>3.5Mc</u>	<u>7 Mc.</u>	<u>14 Mc.</u>	<u>21 Mc.</u>	<u>28Mc.</u>	<u>50Mc.</u>	<u>144Mc.</u>
<u>RG-58/U</u> 53.5-	0.78	1.1	1.7	2.2	2.5	3.5	6.3
<u>RG-8/U</u> 52-	0.30	0.45	0.66	0.83	0.98	1.35	2.5
<u>TWIN LEAD</u> 300- REC.	0.19	0.28	0.41	0.52	0.60	0.85	1.5
<u>TWIN LEAD</u> 300- XMT	0.10	0.15	0.24	0.31	0.37	0.52	1.0
<u>OPEN WIRE</u>	0.03	0.05	0.07	0.08	0.1	0.13	0.25

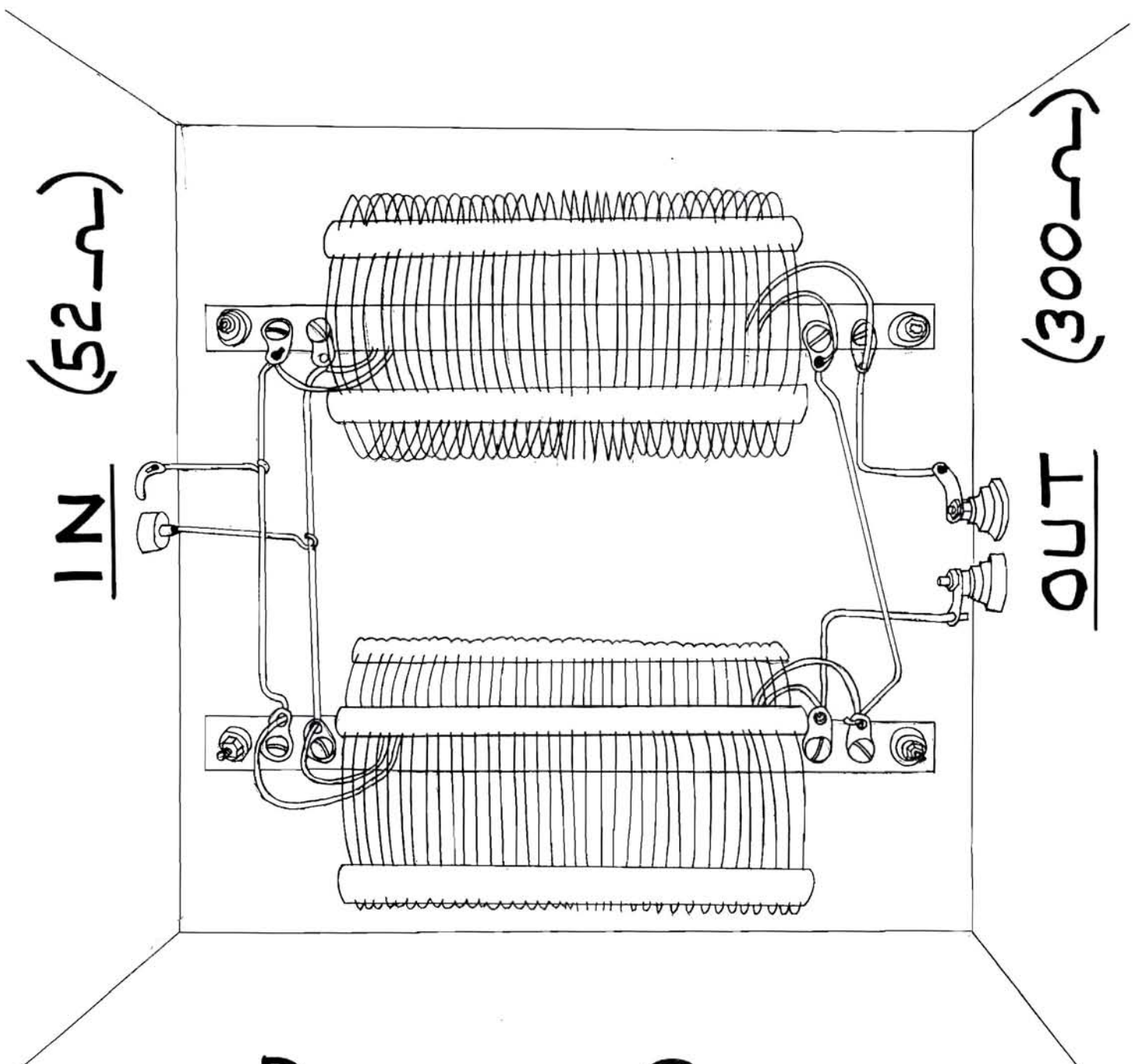
COUPLER / DETAILS

1. USE A MONOMATCH
2. CIRCUIT IS SIMPLE
3. USE COIL-LINK ASSEMBLY
4. ARRL HANDBOOK CIRCUITS
5. USE SMALL CLIPS OR
SELECTOR SWITCH.
6. USE PI-COUPLER FOR
RANDOM WIRE.
7. CURR. MIN. - PARALLEL TUNE
8. CURR. MAX. - SERIES TUNE
9. ALWAYS READ 1:1 SWR

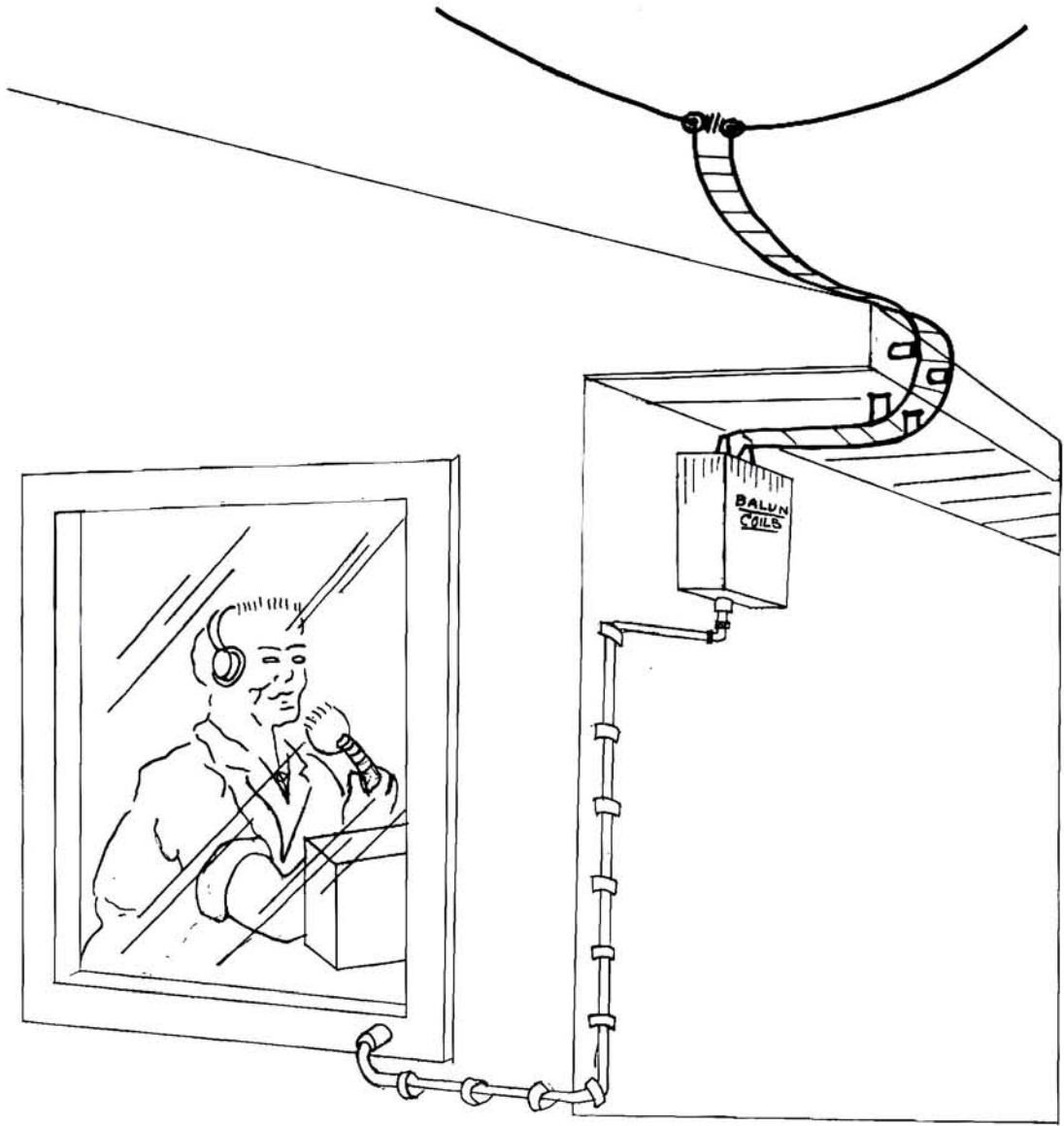
COUPLER ADVANTAGES:

1. EXCELLENT XMTR-LINE MATCH.
2. SWR 1:1 ALL FREQ.
3. FUNDAMENTAL ONLY.
4. IMPROVES RECEPTION.
5. GOOD EFFICIENCY. ALL FREQ.
6. MAY ELIMINATE TVI.
7. ALLOWS L.P. FILTER USE.
8. ALL BANDS - ONE ANTENNA.
9. PERMITS LOW-LOSS LINE.
10. PROPER ADJ. XMTR - LOAD.
11. ANT. LENGTH NOT CRITICAL.
12. KEEPS A BALANCED SYSTEM.
13. WILL REPLACE BALUNS.





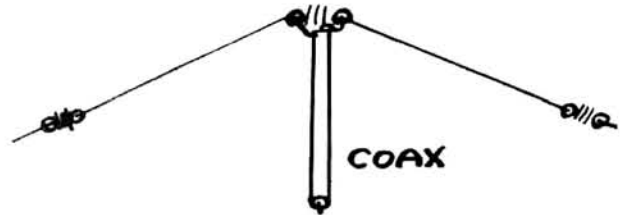
BALUN COILS



ONE METHOD OF LOCATING
BALUN COILS

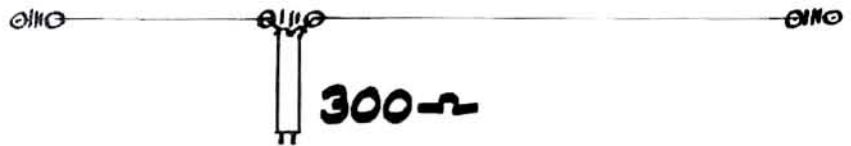
OTHER TYPES

1. INVERTED V.



2. WINDOM

- A) 300- Ω
- B) ALL BAND
- C) 138 FT.
- D) NO TRAPS
- E) BALUNS OR COUPLER
- F) FEED AT 46 FT.

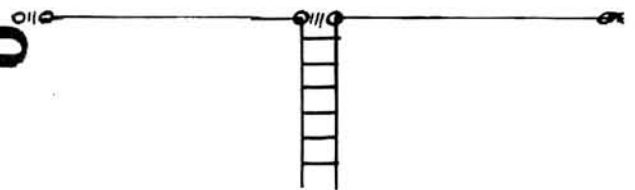
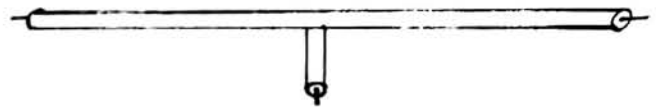


3. COAX TYPE

4. 100', 66', 50'

LOW LOSS, BALANCED

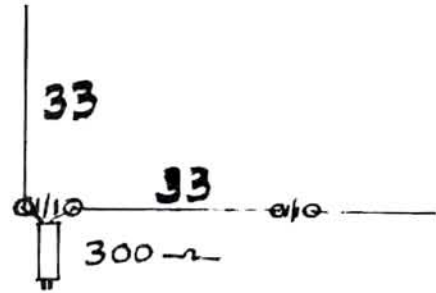
SWR 1:1, ALL BAND



5. METAL MOLDING

OTHER

6. HORIZ.-VERT.



7. EAVE TROUGHS - GUTTERS.

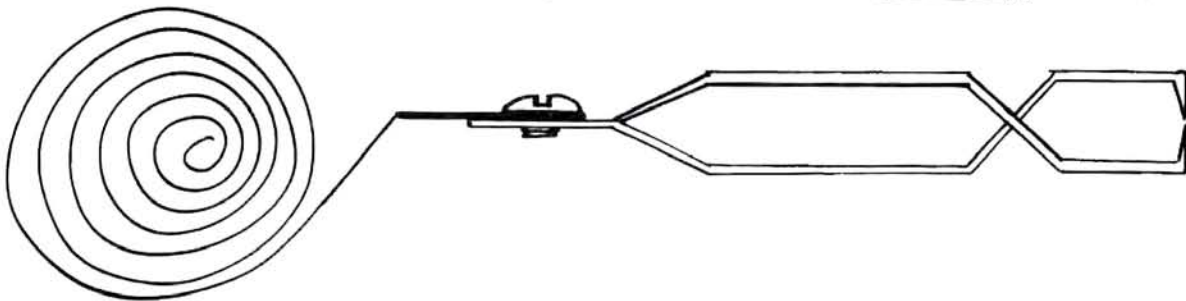
8. DOWNSPOUTING.

9. RANDOM LENGTH HANGDOWN.

#28 WIRE, SINKER RUBBER BALL.

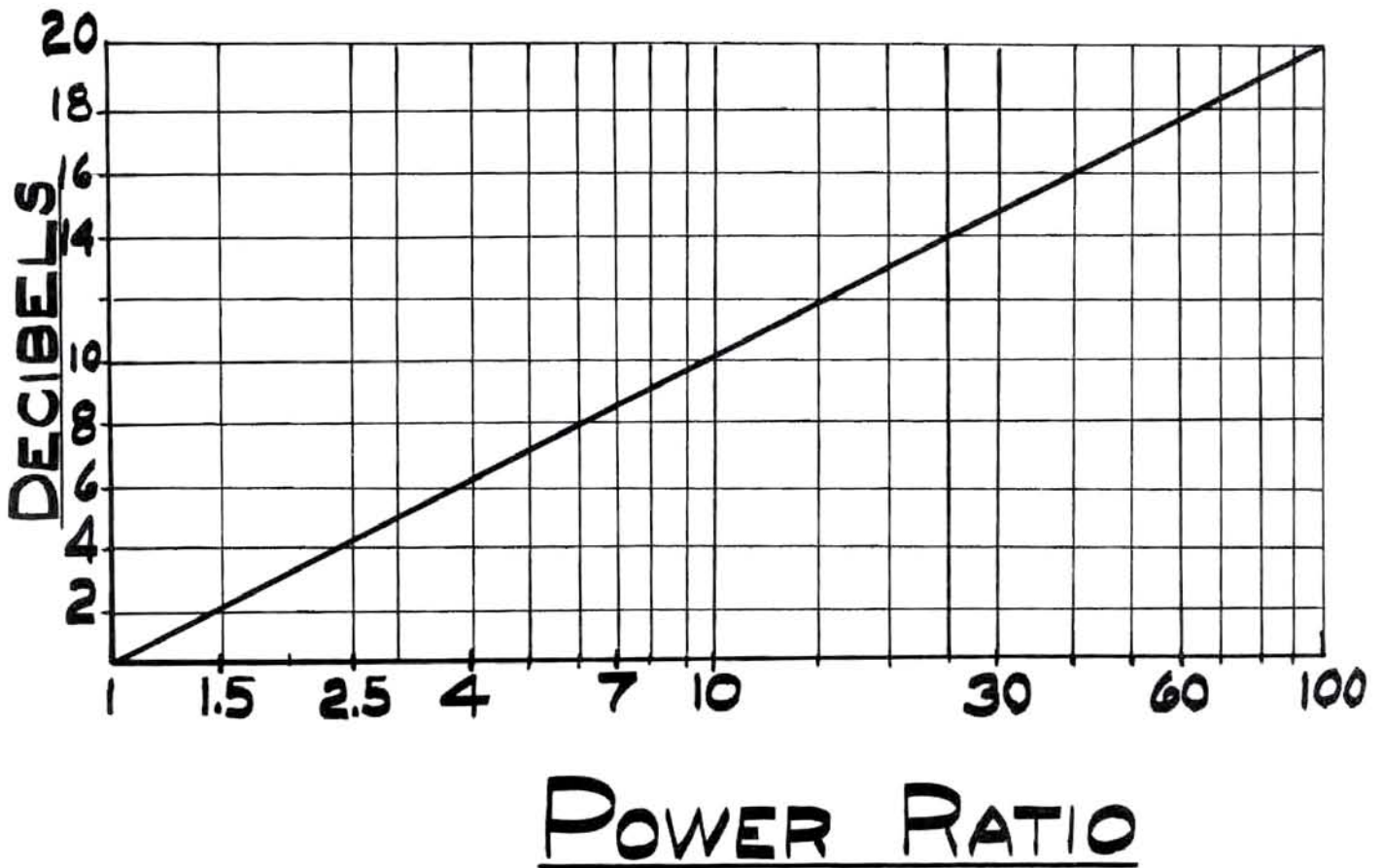
10. CLOTHES LINE OVER PULLEYS.

11. TIN ROOFS - WIRE FENCES.





1. NEAR STRUCTURES
2. HOUSE WIRING
3. EAVES - CLOTHESLINES
4. DOWN SPOUTING - TREES
5. POWER MAINS
6. GROUND - TV ARRAYS
7. COAX BRAID AT GROUND
8. SHIELDED 1/2 OVER HOUSE
9. OTHER 1/2 ANT. OVER YARD
10. CHECK SWR, CUT OR TRIM
TO SWR 1:1



EXAMPLE:

-6DB = 6DB LOSS OR
POWER HAS BEEN
DIVIDED BY 4.

(END-FED)

INSTALL SWR BRIDGE

TUNE FOR DIP-XMTR & REF. PWR

START END OF COIL

SHORT 1-TURN AT A TIME

RECORD CAP./COIL POS.

OTHER TIPS

USE WT-PULLEY AT TREE

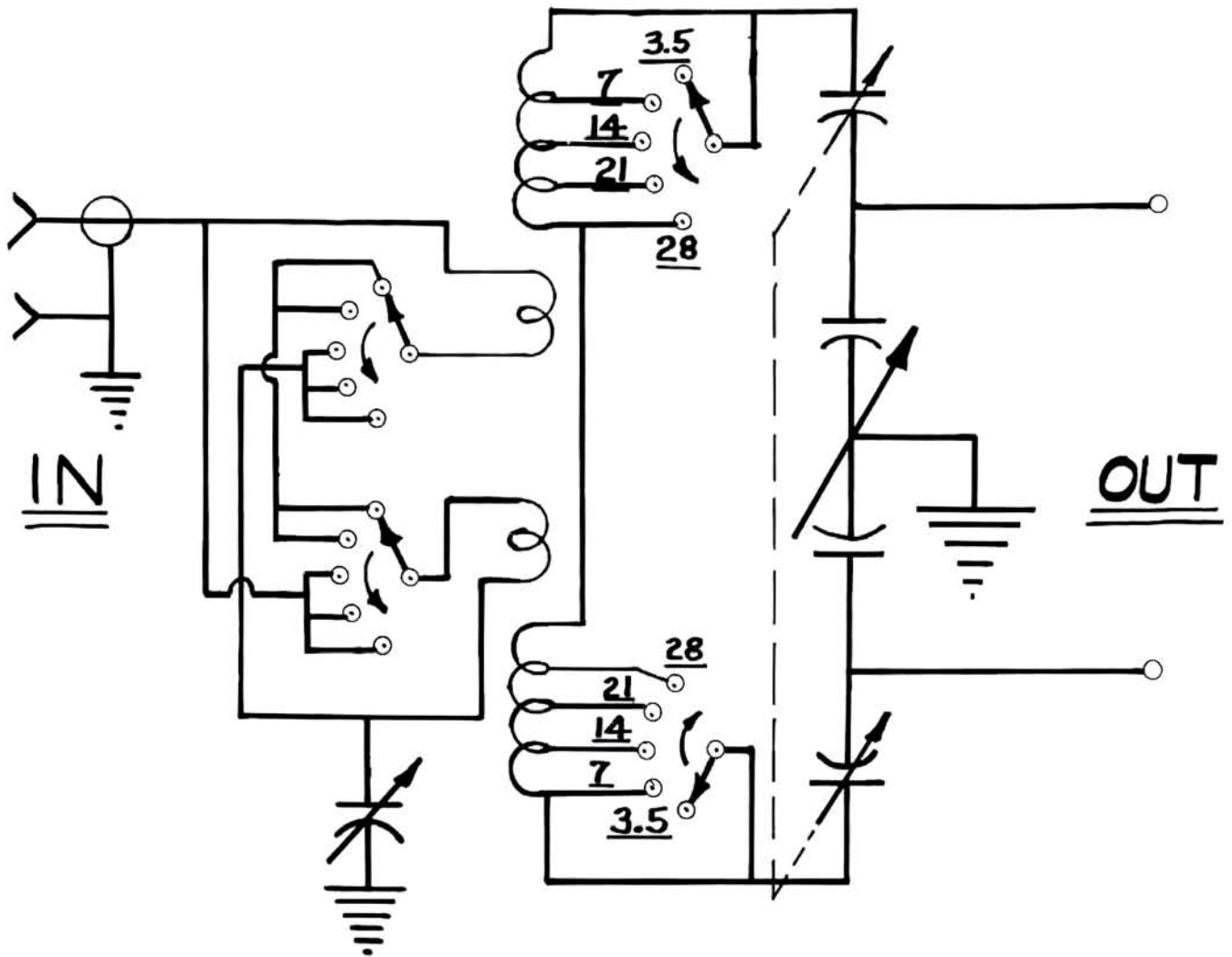
PRESTRETCH WIRE

FEED AT MAX. OR MIN. CURRENT.

USE TV STAND-OFFS.

END-FED ZEPP -

1. RADIATES ^{FM} FLATOP ^{ONLY} IF RESONANT
2. TWO-WIRE FEEDLINE - 1 CONNECT'D
3. OTHER WIRE LEFT "FLOATING"
4. FEEDERS ARE INSULATED
5. MIN. CURRENT AT FEED POINT
6. ACTUALLY A SINGLE WIRE PLUS
PARALLEL FEED WIRE
7. FEEDER RADIATION CANCELS
8. ALL POWER TO FLATOP
9. UNBALANCED FEEDLINE IF NOT
RESONANT
10. FEEDLINE RADIATES (EAVETROUGH+S, ETC.)
11. CURR. MIN. DWN 1 WIRE ONLY
12. POWER IS WASTED!



ANTENNA COUPLER

