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AN-58 Loop Ant Instruc



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AN-58 = Loop Antenna



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AN-58 ANTENNA

A. INTRODUCTION

The AN-58 is a loop type antenna designed primarily for indoor use with a transmitter with 5 to 10 watts of output power. It may also be used outside but has no waterproofing and will not withstand rough handling. The antenna may also be used as a receiving antenna when it is not being used for transmitting.

B. DESCRIPTION

The AN-58 consists of a loop type antenna, a transmission line and a tuning box, as shown in Figure 1. The transmission line has two pin connectors for insertion into the transmitter ANTENNA and GROUND terminals. The tuning box has a tuning knob and a neon bulb to indicate correct tuning adjustment.

C. NUMBER OF ANTENNAS REQUIRED

1. Normally, one AN-58 and a 100-foot (30.4 metre) single-wire emergency antenna will be supplied. A single AN-58 antenna will operate over a 2.4-to-1 frequency ratio. The basic range of the AN-58 is 4 to 9 megacycles or 4,000 to 9,000 kilocycles. A 4-to-9 megacycle antenna will have 40 feet (12.2 metres) of wire in its loop. Antennas with less wire have higher frequency ranges as listed below:

<u>Length of Loop Wire</u> <u>(Feet)</u>	<u>(Metres)</u>	<u>Frequency Range of the Antenna</u> <u>(Megacycles)</u>
35	10.7	4.5 to 10.2
30	9.16	5.0 to 11.3
25	7.63	5.5 to 13.2
20	6.1	6.0 to 16.0

2. When a single AN-58 will not cover the frequency range needed, two are supplied. It is customary to adjust one to cover 4 to 9 megacycles and the second one to cover 6 to 16 megacycles. Of these, the 4-to-9 megacycle antenna has the larger amount of wire. Note that either of the two antennas can be used between 6 to 9 megacycles as their ranges overlap. The overlap makes it usually unnecessary to change antennas during a contact because of transmitting frequency changes. However, if there is any choice, use the larger antenna in the 6-to-9 megacycle range whenever possible because the larger antenna is somewhat more efficient than the smaller one.

D. CHOICE OF INDOOR OPERATING LOCATIONS

Good, fair and poor indoor operating locations may be identified by the following factors:

- a. GOOD - A frame (wooden) building.
 - The top floor of a building.
 - A room with windows facing the base station.
 - A room with no large metal objects.
- b. FAIR - A brick or stone building with no metal reinforcement.
 - An intermediate floor of a building.
 - A room with windows not facing the base station.
 - A room with some metal objects but away from the antenna.
- c. POOR - A building with metal reinforcement.
 - The ground floor of a multi-story building.
 - A room with no windows.
 - A room with large metal objects near the antenna.

E. OPERATION IN GOOD INDOOR LOCATIONS

1. Often, it is easiest to erect the antenna horizontally, suspending the loop on furniture as shown in Figure 2. The tuning box and the transmitter should be located near each other on a table. The transmission line pin connectors are inserted into the transmitter ANTENNA and GROUND terminals. When the antenna is mounted horizontally, its radiation will be about the same in all directions in ideal surroundings. However, almost every type of building will affect the shape of the radiation of the antenna. There is more power on the T-junction side of the antenna, and the radiation from the T-junction side is least affected by surroundings. Therefore, the T-junction side of the antenna should normally be located near the wall with windows, preferably along a wall facing the base station.

2. It may be more convenient to erect the antenna vertically, suspending the loop from the ceiling and walls of the room. Door knobs, door hinges, picture frames, etc. may be used to support the loop. Adhesive tape, thumb tacks (drawing pins) may be used to support the loop but they may leave telltale marks. The T-junction side of the antenna should be located close to a wall with windows facing the base station. The tuning box should be located in a direction opposite from that of the base station.

3. The antenna may be laid out in the shape of a square, triangle or a diamond as shown in Figure 3. All sides should be of equal length.

4. The antenna wires should be as straight as possible but need not be pulled tight. They should be laid out in such a way that it is still possible to walk in the room without stumbling over the antenna, thereby breaking the antenna or damaging the transmitter.

F. OPERATION IN FAIR AND POOR INDOOR LOCATIONS

1. Most buildings can be called FAIR or POOR operating locations. Most buildings have some type of metal objects which have a major effect on the performance of an indoor antenna. Even the electrical wiring in a wooden building will have some effect. It is normal to encounter places in a room where radio signals are cancelled (dead spots). There may be places in the room where radio signals are not cancelled and may even be reinforced (hot spots). It is extremely important to locate the T-junction side of the antenna in a hot spot.

2. A hot spot can be located by using the AN-58 as a receiving antenna, listening to the base station with a receiver while moving the antenna about the room until the strongest signal is heard.

3. First, erect the antenna either horizontally or vertically, as recommended for GOOD indoor locations. Insert the antenna pin connectors into the ANTENNA and GROUND terminals of the receiver and tune the receiver to a frequency on which the base station can be heard. When the receiver is properly tuned, slowly rotate the AN-58 tuning control until the base station signal is loudest. Keep the volume control on the receiver down so that the base station can just barely be heard in the earphones at all times when tuning the receiver and the antenna. If the signal becomes louder when the antenna is moved, turn the volume control down again until the signal is barely heard. The human ear can detect small changes in loudness only when the sound in the earphone is kept at a very low level.

4. Move the antenna about the room until the base station signal is the strongest. The antenna must be kept in the shape of a square, triangle or diamond. Each time the antenna is moved, the antenna tuning knob should be readjusted for best reception. When the best location has been found, try the antenna both vertically and horizontally in that location and choose the position that provides the best reception.

5. If the base station cannot be heard at first, listen to any radio station which can be heard on the receiver and find the best antenna location for that station. This location will not necessarily be the best one, but it may make it possible to hear the base station if the base station signal is not strong. When the base station can be heard, the antenna must be moved to the location of best reception for the signal from the base station.

6. Finding a "hot spot" in a room may be a difficult process but the effort will result in better communications, or may make the difference between communications or no communications in a particular room. Once the best location for the antenna is found in a room, it is only necessary to erect the antenna exactly the same way for each later contact from the same room.

G. USING THE AN-58 FOR INDOOR RECEPTION

1. When using the receiver to listen to base broadcasts, the AN-58 may be used as a receiving antenna. When the transmitter is used, it is normal to use the AN-58 with the transmitter and a separate antenna wire for the receiver. Some transmitters have a provision for using the transmitting antenna for both transmitting and receiving by means of a cable connecting the receiver to a connector on the transmitter or its power supply. In this case, a separate receiving antenna may not be needed if the base station's signal is normally strong. If the base signal is weak, this arrangement may not be usable because the AN-58 would be tuned to the field transmitting frequency not to the base transmitting frequency.

2. If base broadcasts are normally strong, a single-wire antenna should be used with the receiver for convenience. When the base broadcasts are weak or when there is high noise or other radio interference on the base frequency, the AN-58 may provide improved reception. It is recommended that the AN-58 be erected vertically for receiving, as it has some directional effects when it is vertical. Interference may be reduced, and the base station signal may be increased by rotating the antenna. To rotate the antenna, keep the T-junction side of the antenna in one place and move the tuning-box side of the antenna around the room, without changing the shape of the antenna.

H. OUTDOOR USE OF THE AN-58

1. The AN-58 can be used out-of-doors with better results than from inside a building.

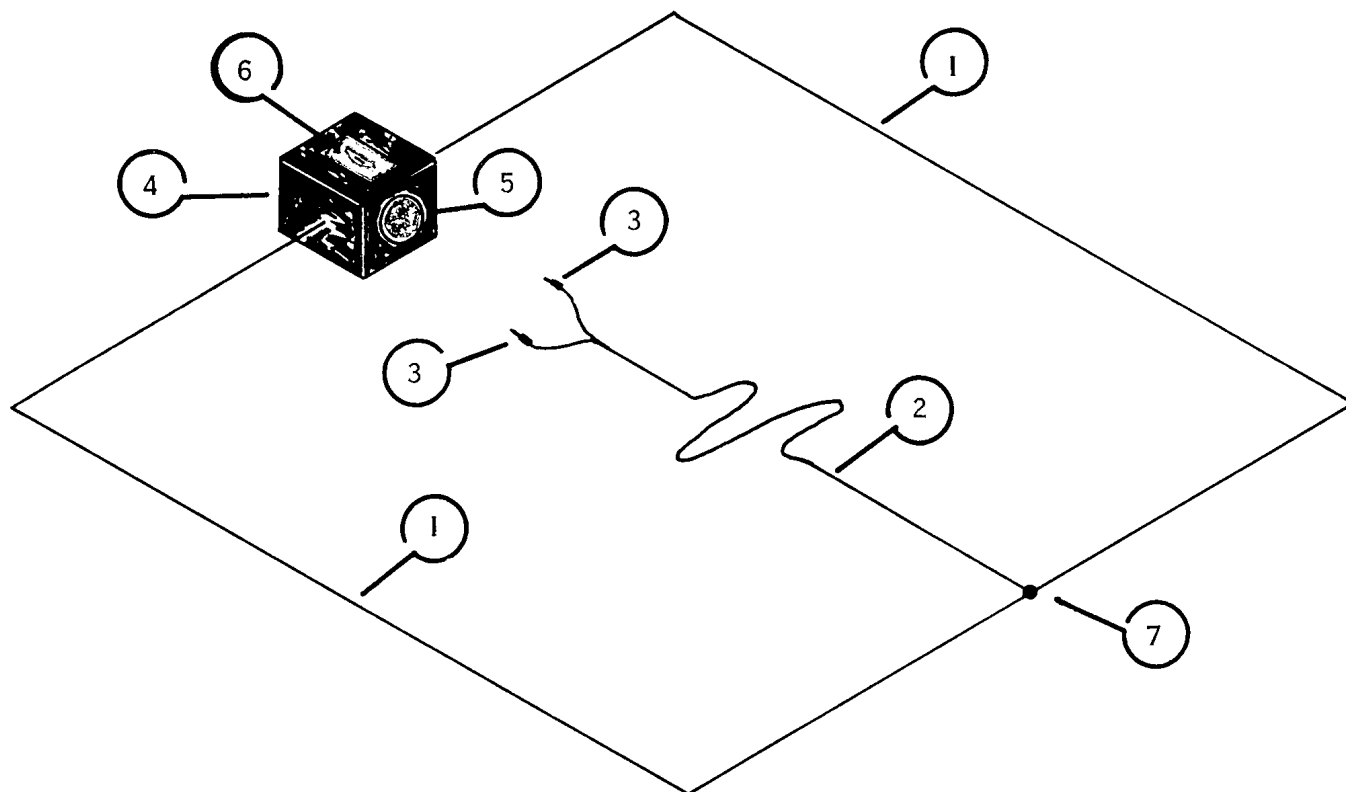
2. The antenna should be erected as a vertical triangle as shown in Figure 4. The T-junction should be at the top corner of the triangle, and the tuning box should be at the bottom. The bottom side of the triangle should be kept at least one foot (30 cm) above ground for best results.

3. The T-junction may be supported from a nail driven into a tree about 12 feet (4 metres) above ground. String or wire can be tied to the tree to support the antenna. A wooden or bamboo pole about 4 metres long will also make a good support for the antenna.

4. When erected vertically, the antenna radiates best off the ends of the loop. It has minimum radiation in a direction broadside to the loop. Figure 5 shows the radiation pattern of the AN-58 as viewed from above the antenna.

I. TUNING THE AN-58

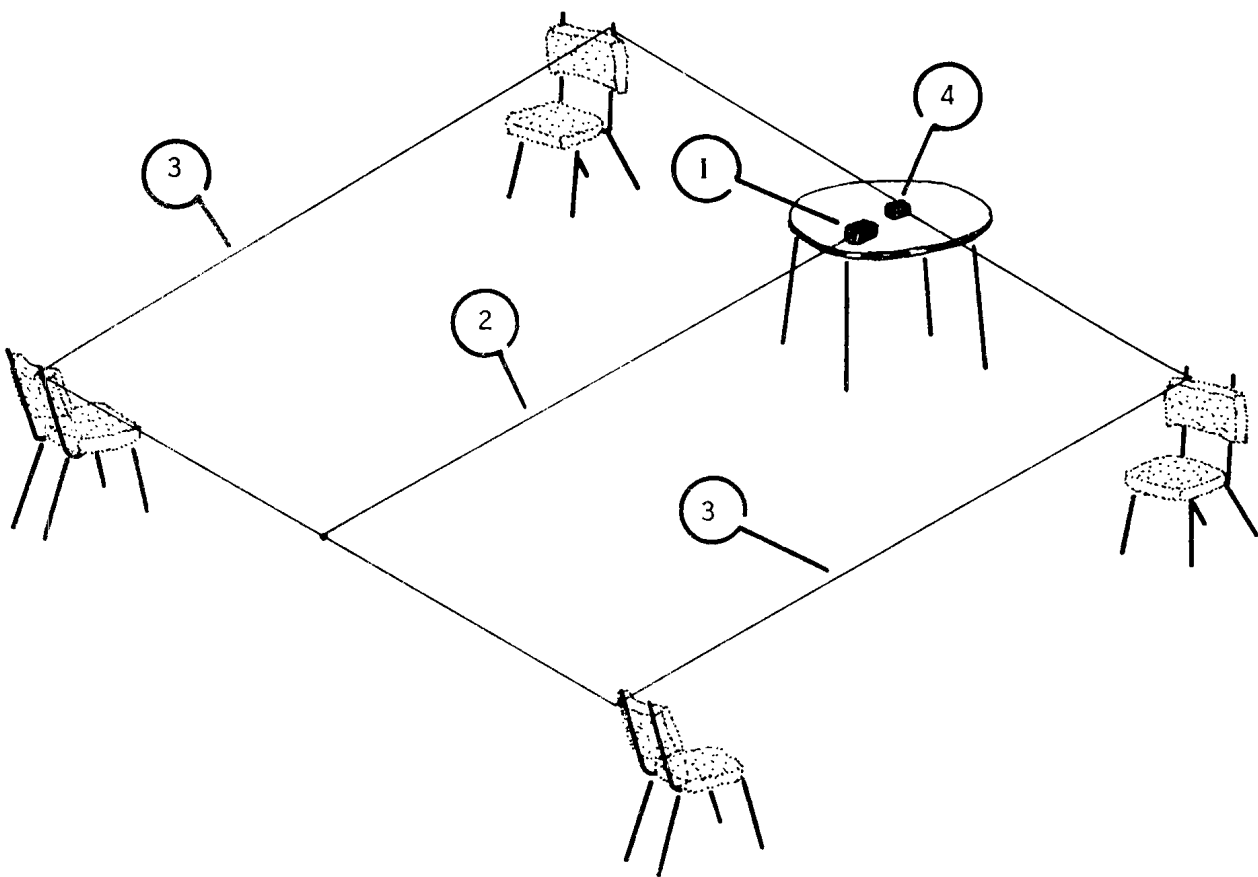
Tuning instructions for the AN-58 accompany your transmitter instructions.



1-ANTENNA WIRE
2-TRANSMISSION LINE
3-PIN CONNECTORS FOR
TRANSMITTER
4-TUNING BOX

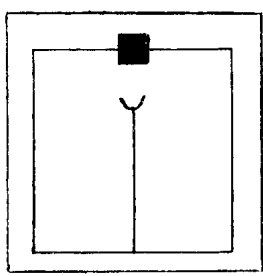
5-TUNING KNOB
6-NEON BULB TUNING
INDICATOR
7-"T" JUNCTION

FIGURE I

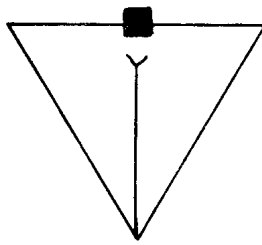


- 1-TRANSMITTER
- 2-TRANSMISSION LINE
- 3-ANTENNA WIRE
- 4-TUNING BOX

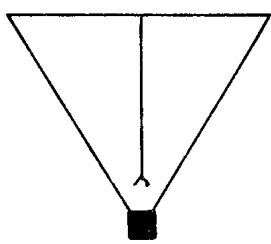
FIGURE 2



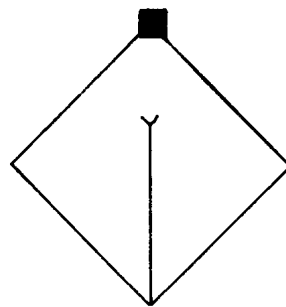
SQUARE



TRIANGLE

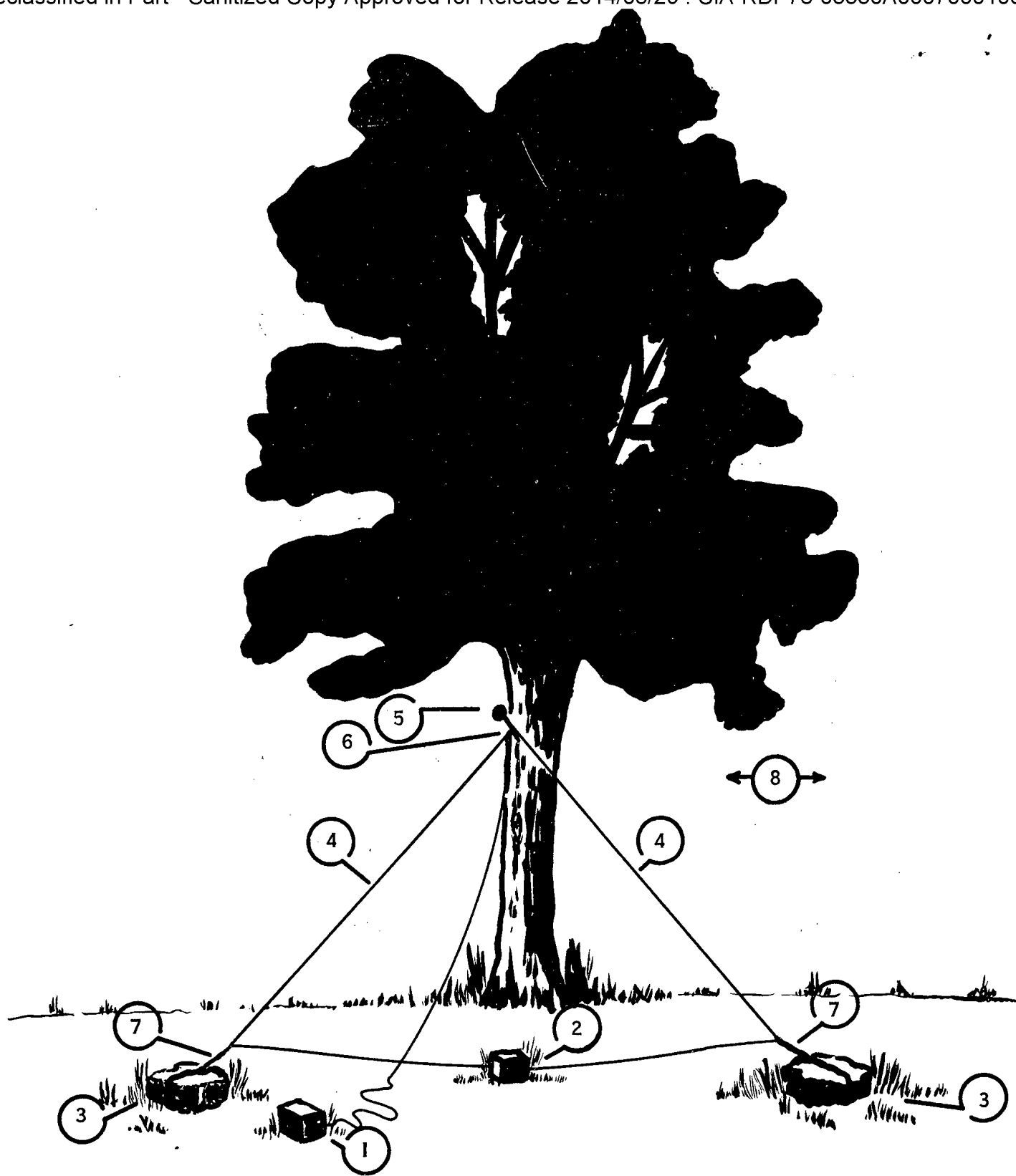


TRIANGLE



DIAMOND

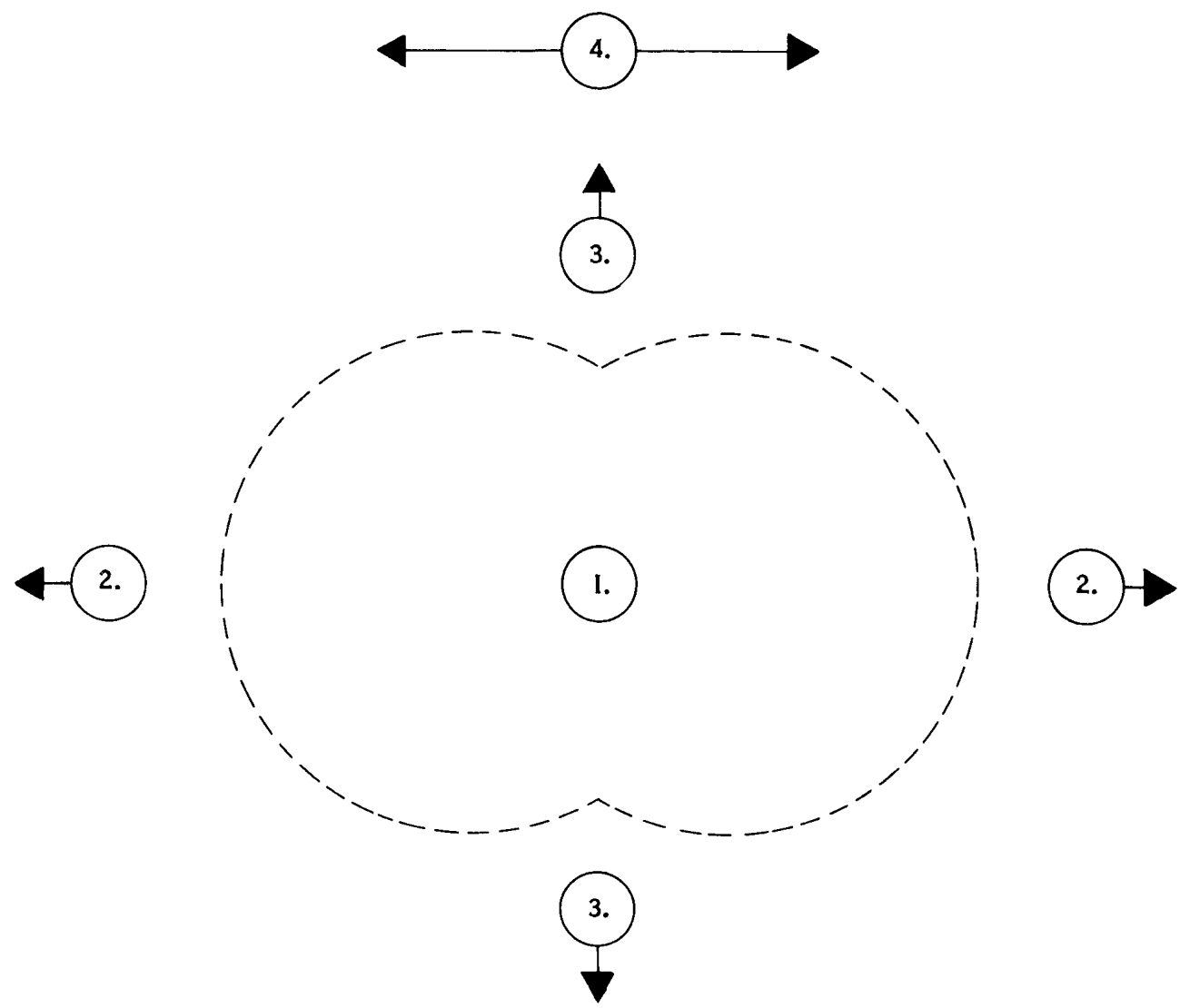
FIGURE 3



1-TRANSMITTER
2-TUNING BOX
3-ROCK OR OTHER WEIGHT
4-ANTENNA WIRE

5-NAIL OR OTHER FASTENER
6-'T' JUNCTION
7-STRING
8-DIRECTION TOWARD BASE STATION

FIGURE 4



- 1. VERTICAL AN-58 (TOP VIEW)
- 2. MAXIMUM RADIATION
- 3. MINIMUM RADIATION
- 4. DIRECTION OF BASE STATION

FIGURE 5