Instructions 25006
for
RCA "World-Wide" Antenna System

INTRODUCTION

The RCA "World-Wide" Antenna System makes available to every owner of a short-wave or all-wave radio receiver the advantages of a scientifically-correct antenna. Through its installation are overcome the two major faults common to any antenna of the conventional type: (1) Lack of uniform reception over the short-wave broadcast range—nominally 16 to 49 meters, and (2) severity of local noise interference produced at the higher frequencies by electrical appliances, power lines, street cars, automobiles and other devices.

Briefly, this system embodies two separate antennas of the efficient *doublet* type, a twisted-pair lead-in (hereinafter called the transmission line), and a special coupling transformer for the receiver. The two antennas are tuned respectively to opposite ends of the short-wave range and cross-connected to provide uniform performance at all intervening frequencies. Signals collected by the antenna are transferred to the receiver with negligible loss since the transmission-line length has been selected to insure proper *electrical matching*. Signals "picked-up" by the transmission line itself, however, are rejected because of the special characteristics of the coupling transformer. Noise interference, which ordinarily is "picked-up" along this length, is thereby reduced to a negligible value or entirely eliminated.

An additional feature of this system is the wavelength-transfer switch incorporated in the coupling transformer. By means of this switch, the antenna may be converted for use in the standard broadcast band (540 to 1500 kc) and in the police, aviation and amateur bands at frequencies up to 6000 kc. The system then functions as a conventional antenna without the coupling transformer, both transmission line conductors being common and connected directly to the receiver. Since the transmission line when so converted becomes part of the effective antenna length, better reception of weak or distant stations in the lower-frequency bands is thus attained. Obviously, however, local or strong stations in those bands may be received well, even though the switch is set for short-wave operation.

INSTALLATION

A typical installation of the RCA "World-Wide" Antenna System is shown in the full-page illustration (Figure 1). Although various forms of installation are possible to satisfy space limitations, the arrangement illustrated is convenient and practical and therefore should be used if possible. All parts necessary for this arrangement, except the supporting poles, are supplied.

Equipment

The following parts are supplied in each kit:

2 Stranded antenna wires, each 46½ feet long.
1 Transmission line, 110 feet long.
1 Receiver coupling transformer with wavelength-transfer switch.
4 Porcelain strain insulators.
1 Porcelain crossover insulator.
2 Porcelain insulator knobs (for supporting transmission line outside dwelling).
2 Pieces cambric tubing (for protecting insulation of transmission line at crossover insulator and knob).
1 Porcelain entrance-tube insulator.
1 Cleat (for supporting transmission line inside receiver cabinet).
1 Ground clamp.

Dependent upon the available facilities and space limitations of, or local ordinances at, any given installation, the following items may be necessary:

1 or more additional lengths of transmission line—procurable from dealer.
1 or 2 antenna masts with auxiliary apparatus such as the rope halyards, metallic guy wires, pulleys, iron pipes, base blocks and base flanges shown in Figure 1.
2 Loading coils (for reducing the required length of antenna span—procurable from dealer).
2 Lightning arrestors (inside or outside dwelling to comply with local codes).

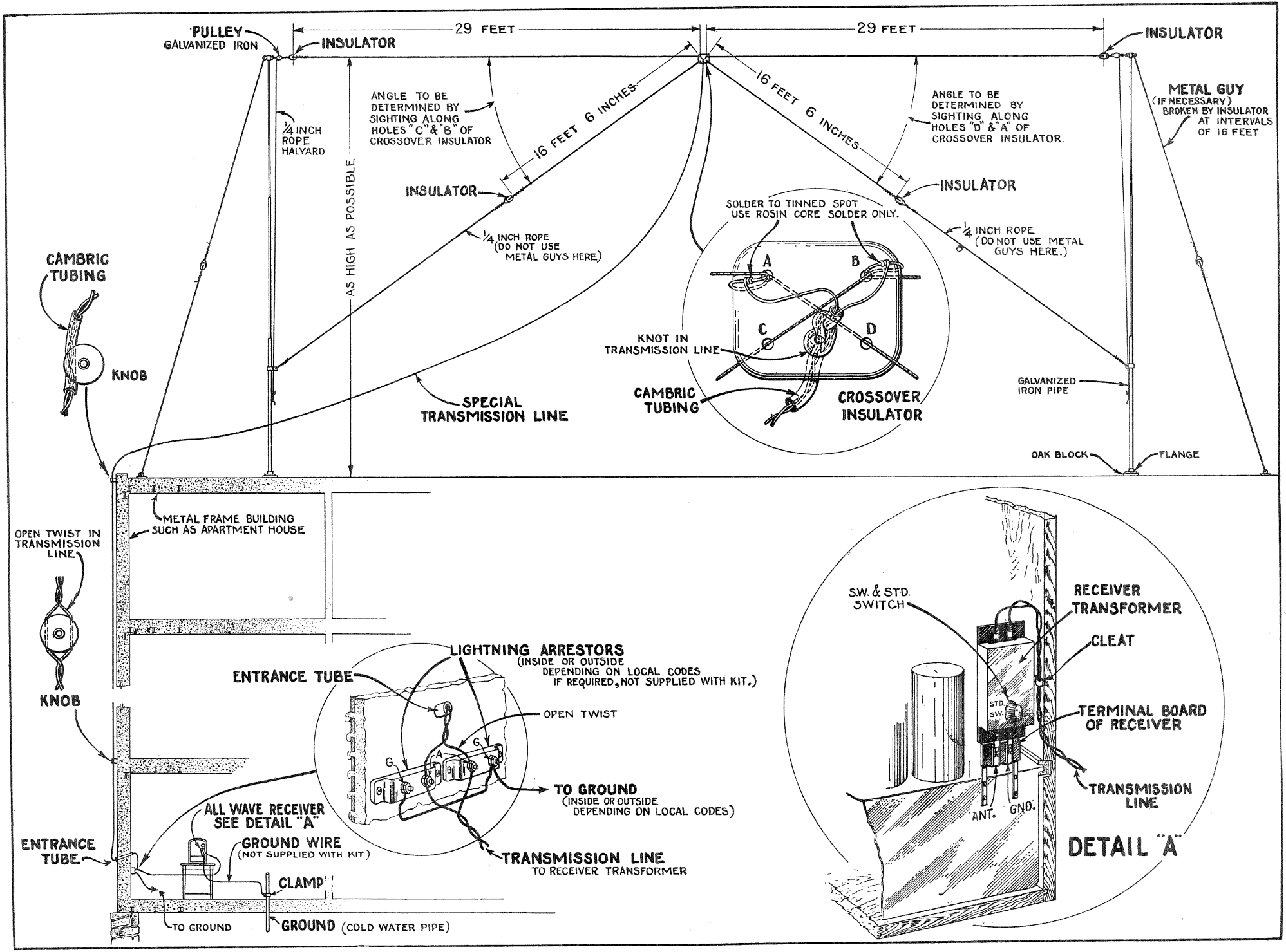
PULLEY
GALVANIZED IRON
INSULATOR
29 FEET
29 FEET
INSULATOR
METAL GUY
(IF NECESSARY)
BROKEN BY INSULATOR
AT INTERVALS
OF 16 FEET
¼ INCH
ROPE
HALYARD
AS HIGH AS POSSIBLE
ANGLE TO BE
DETERMINED BY
SIGHTING ALONG
HOLES "C" & "B" OF
CROSSOVER INSULATOR
16 FEET 6 INCHES
16 FEET 6 INCHES
ANGLE TO BE
DETERMINED BY
SIGHTING ALONG
HOLES "D" & "A" OF
CROSSOVER INSULATOR.
INSULATOR
INSULATOR
¼ INCH ROPE
(DO NOT USE
METAL GUYS HERE.)
¼ INCH ROPE
(DO NOT USE METAL
GUYS HERE.)
SOLDER TO TINNED SPOT
USE ROSIN CORE SOLDER ONLY.
A
B
C
D
CAMBRIC
TUBING
KNOB
KNOT IN
TRANSMISSION LINE
SPECIAL
TRANSMISSION LINE
CAMBRIC
TUBING
CROSSOVER
INSULATOR
GALVANIZED
IRON PIPE
OAK BLOCK
FLANGE
METAL FRAME BUILDING
SUCH AS APARTMENT HOUSE
OPEN TWIST IN
TRANSMISSION
LINE
KNOB
LIGHTNING ARRESTORS
(INSIDE OR OUTSIDE
DEPENDING ON LOCAL CODES
IF REQUIRED, NOT SUPPLIED WITH KIT.)
ENTRANCE TUBE
OPEN TWIST
G
A
G
TO GROUND
(INSIDE OR OUTSIDE
DEPENDING ON LOCAL CODES)
ALL WAVE RECEIVER
SEE DETAIL "A"
ENTRANCE
TUBE
GROUND WIRE
(NOT SUPPLIED WITH KIT)
TRANSMISSION LINE
TO RECEIVER TRANSFORMER
CLAMP
TO GROUND
GROUND (COLD WATER PIPE)
SW. & STD.
SWITCH
RECEIVER
TRANSFORMER
CLEAT
STD.
SW.
TERMINAL BOARD
OF RECEIVER
TRANSMISSION
LINE
ANT.
GND.
DETAIL "A"

Figure 1

General Considerations

To insure the greatest possible benefits from the RCA "World-Wide" Antenna System, three important considerations should be observed during its installation:

(a) Height above ground.

(b) Distance from local sources of noise interference, such as power lines, street railroads and automobile highways.

(c) Direction of span.

Height above Ground — This consideration probably is the most important since it directly affects the strength at which signals will be received. Ordinarily, the antenna will be erected either upon the roof of a building or suspended between that roof and a nearby tree or pole. For the usual dwelling having a roof and framework of non-metallic materials, the height will be measured with respect to the actual surface of the earth. However, if the opposite condition exists, as in the case of a modern apartment house or hotel, effective ground shall be assumed as at the metal roof. For good results, the horizontal wires of the antenna should be at least 30 feet above the effective ground.

Distance from Sources of Interference—Since the antenna system excludes from the receiver all interference signals "picked-up" by the transmission line, the antenna should be erected as far as possible from sources of interference in the immediate locality. The antenna proper may be located up to 500 feet distant from the receiver, adding one or more lengths of transmission line to the length furnished, as required. To maintain the correct *electrical matching*, any excess length of transmission line should not be removed unless two or more full lengths have been added. Where the required length of line is less than one or two full lengths, the excess line should be coiled up neatly at the end nearest the receiver.

Direction of Span—This antenna system exhibits a slight directional effect—that is, the geographical position of the span may have some effect upon the intensity of incoming signals. Wherever possible, therefore, the antenna should point in a direction at right angles to that of the transmission path from favored broadcasting stations. If the antenna must be located near a street railroad or a much-traveled highway, direct "pick-up" of interference signals on the doublets can be minimized by erecting the span to point toward the source of interference.

Mounting Procedure

The actual set-up of the antenna system is very simple and can be performed by practically anyone. Since the means of supporting the antenna will of necessity be different in almost every case, that portion of the installation will not be discussed herein. General recommendations in this respect, however, are contained in Figure 1. Insofar as possible, the intent of such recommendations should be observed, even for different forms of mounting.

Assembly—As shown in Figure 1, the two doublet antennas which comprise this system are formed by the two stranded wires supplied with the kit. By means of the porcelain crossover insulator, these wires are crossed to produce two horizontal sections, each 29 feet in length, and two angularly-displaced sections, each 16½ feet in length. An extra length of six inches is afforded at each end of both continuous wires for connection to the porcelain strain insulators, both (as noted under "Equipment") being 46½ feet long. In assembling these wires to the crossover insulator, be careful that the actual cross occurs on opposite sides of the insulator.

The transmission line finally should be connected to the antenna wires as indicated by the detail illustration of the crossover insulator in Figure 1. A tinned spot on each wire is provided to identify the points at which the transmission line should be attached. Make certain to insert the piece of cambric tubing at the insulator and to use only rosin-core solder for the connections as recommended. The antenna now may be suspended between the masts or intended points of support.

Connection to Receiver—The opposite end of the transmission line should be led to the receiver, using the porcelain insulator knobs (if required) and the porcelain entrance-tube insulator. Then install the coupling transformer upon the antenna-ground terminal board of the receiver, as shown in Detail A of Figure 1, and attach the transmission line to this transformer. A metal cleat and wood screw are provided to secure the transmission line to the receiver cabinet.

NOTE—For models having no terminal board, it is very important that the transformer be installed as near to the chassis as possible. To insure best noise elimination, this connection should be no longer than one inch. The connection to the antenna also should be kept as short as possible, although it is more important to avoid too close proximity of this wire to grid terminals of the receiver tubes.

Connection to Ground—A ground clamp is supplied for securing a tight and permanent connection of the ground wire from the receiver to a water pipe in the basement or to an external metallic stake driven from five to eight feet into the soil. The ground wire should be No. 14 or larger (rubber-covered) and should follow as short and direct a route as possible. Since the length required will be different for each installation, this wire is not furnished with the kit, but may be obtained locally.

ALTERNATIVE ANTENNA ARRANGEMENTS

In certain installations, space limitations may prevent the use of the full antenna span—approximately 60 feet. Three alternative arrangements, listed in order of preference, are possible:

(a) Reduced overall length through the use of loading coils.

(b) Reduction of the horizontal angle from a straight line span (180 degrees) to any other of not less than 90 degrees.

(c) Vertical suspension.

The first arrangement (a), in which loading coils are inserted to replace lengths removed from the horizontal sections of the antenna as illustrated by Figure 2, is recommended as the preferred alternative. In this manner, the overall span is reduced to approximately 34 feet, without impairing the original tuning characteristics of the system except in the region of 31 meters. The loss encountered within the broadcast band at this wavelength, however, will not be serious.

Using the second alternative (b), the length of the antenna span is decreased by reducing the horizontal angle between the halves of the system (as viewed from above), rather than by shortening the lengths of the horizontal sections. While loading coils are not required, a third support for the antenna at the crossover insulator must be provided, the installation therefore being usually more difficult than for either *straight-line* arrangement. The antenna efficiency naturally will be lowered as the angle is decreased, resulting in a signal-strength loss on all bands of approximately 30 percent at an angle of 90 degrees.

If vertical suspension (c) is employed, much less ground space than for any horizontal form of antenna is necessary. Although somewhat inferior in noise ratio to the horizontal type, the vertical system enjoys an additional advantage of being practically non-directional. Such an installation, however, is usually both difficult and expensive, but can be simplified to a large extent through the use of loading coils.

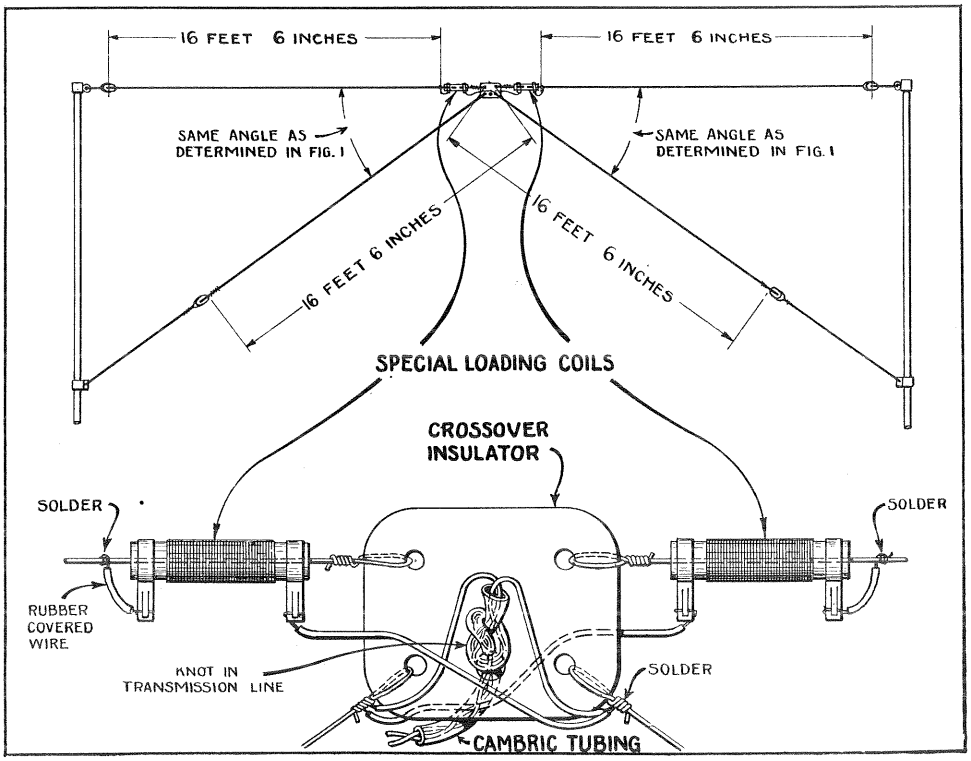

Figure 2

REPLACEMENT PARTS

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers

Stock No.	DESCRIPTION	List Price	Stock No.	DESCRIPTION	List Price
4324	Transformer (Coupling transformer and switch assembly)—For replacement purposes only; item to be replaced must be returned with order	$2.50	4327	Insulator (Crossover insulator)—For replacement purposes only; item to be replaced must be returned with order	$0.10
4325	Knob (Switch knob)—Package of 5	1.00	4328	Transmission line (special lead-in—110 feet long)	3.72
4326	Wire (2 rolls stranded wire, each 46½ feet long)	1.16	4329	Transmission line (special lead-in—220 feet long)	7.44
			4330	Transmission line (special lead-in—330 feet long)	11.16
			6958	Coil—Antenna loading coils—1 pair	.60