
RECEIVING ANTENNAS

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BACKGROUND

The introduction of all-wave broadcast receivers in the 1930's precipitated the development of effective broad-band receiving antennas applicable to the home environment.

These designs have been largely forgotten, but can still provide excellent performance for the radio aficionado, and with modern materials can be fairly easily reproduced.

AGENDA

Antenna basics

The Fundamental Problems

The Classic Solutions

The late 20th Century

Antenna Basics

The Antenna System Mission: Capture a clean signal and deliver it to the receiver.

The Hertz

The Marconi

Non-resonant "compromise" antennas.

The Hertizian Antenna

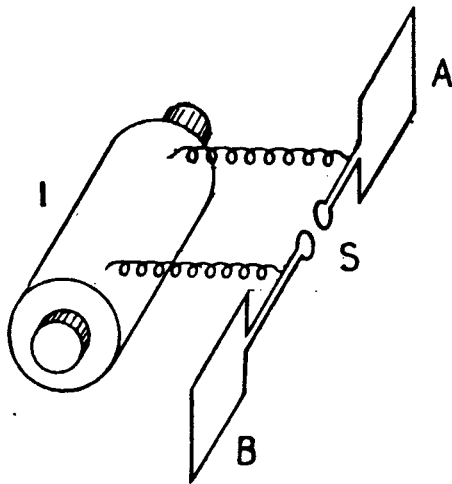
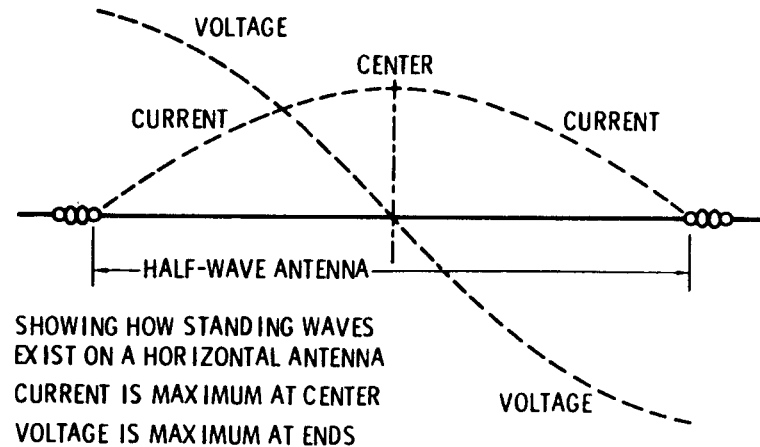


FIG. 9.—A Hertizian oscillator (AB) charged by an induction coil I.



SHOWING HOW STANDING WAVES EXIST ON A HORIZONTAL ANTENNA
CURRENT IS MAXIMUM AT CENTER
VOLTAGE IS MAXIMUM AT ENDS

Figure 7. The Resonant Antenna

The greatest amount of current flows in the antenna when it is resonant. The shortest conductor that is self-resonant at a given frequency is one that is about a half-wavelength long. The reflection pattern on the antenna creates a standing wave of both voltage and current. The half-wave, center-fed antenna is often called a "doublet."

The Marconi Antenna

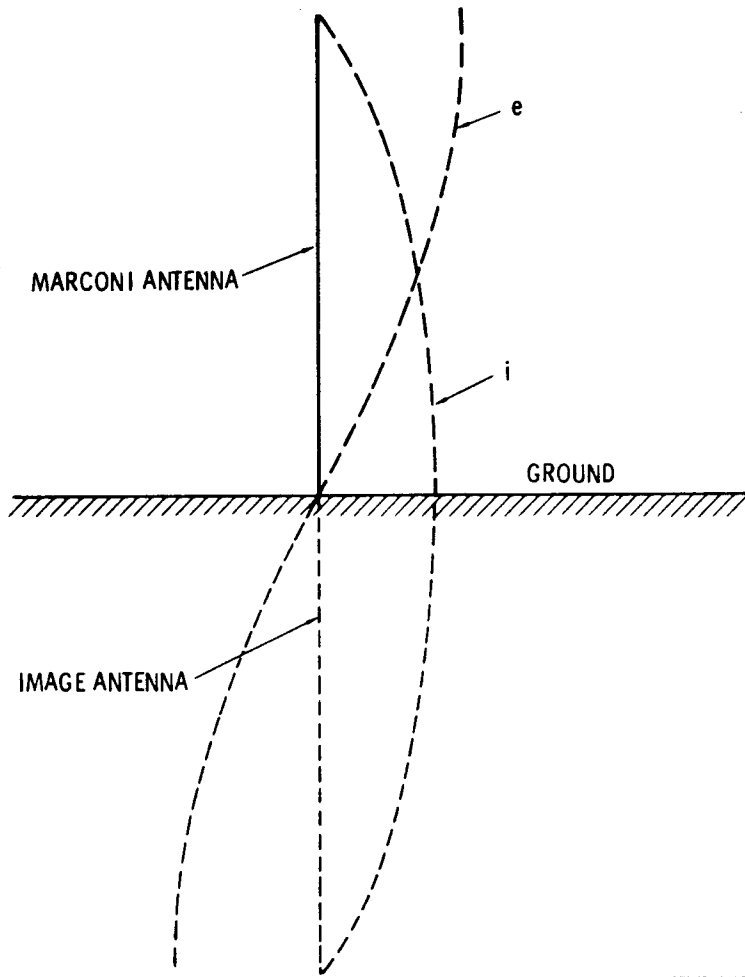


Figure 18. Marconi Antenna and Ground Image

The missing half of the dipole antenna is supplied by the ground image for the case of the Marconi antenna. Antenna feedpoint impedance is one-half that of dipole, or about 36.5 ohms.

Problems

A half wavelengeth at 1500 KHz is over 300 feet.

A quarter wavelength at 600 KHz is over 375 feet.

The Saving Grace

Because background noise is high, and receivers are fairly sensitive; a receiving antenna does not need to be highly efficient.

Signal to noise ratio is far more important than absolute signal level.

A modest size skywire can give excellent results.

The Old Standby: The Inverted-L

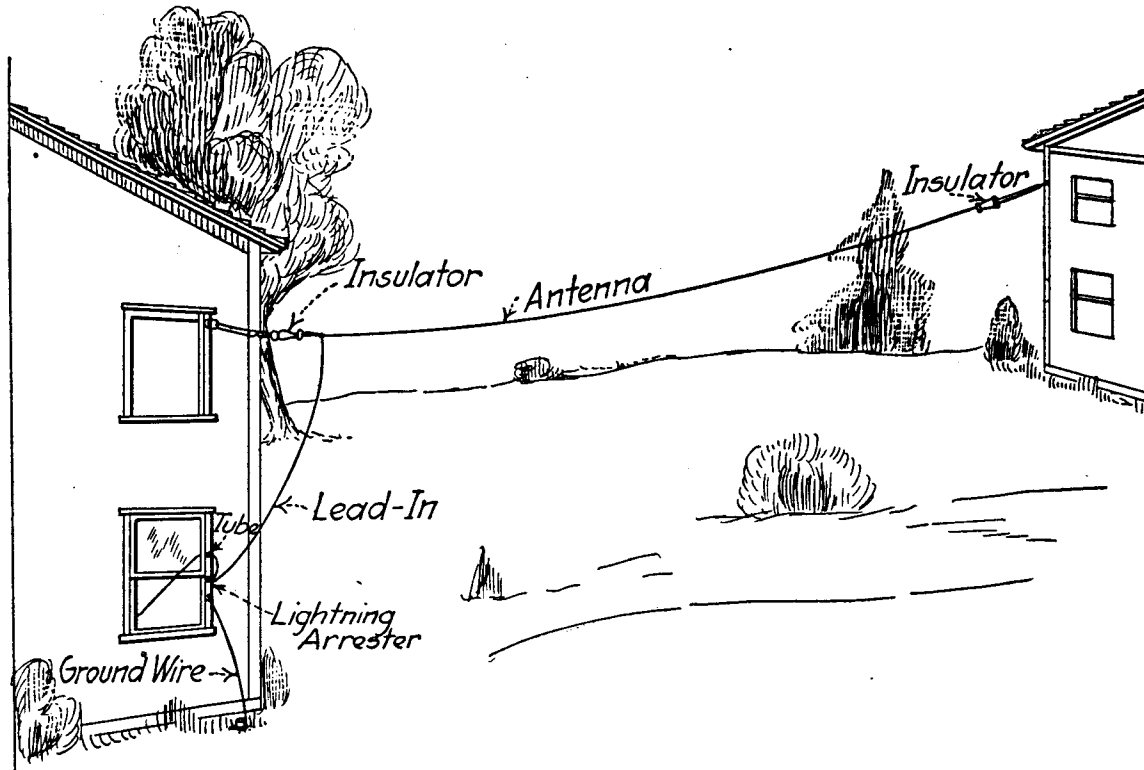


FIG. 9.—Typical outside antenna.

THE INTERFERENCE ZONE

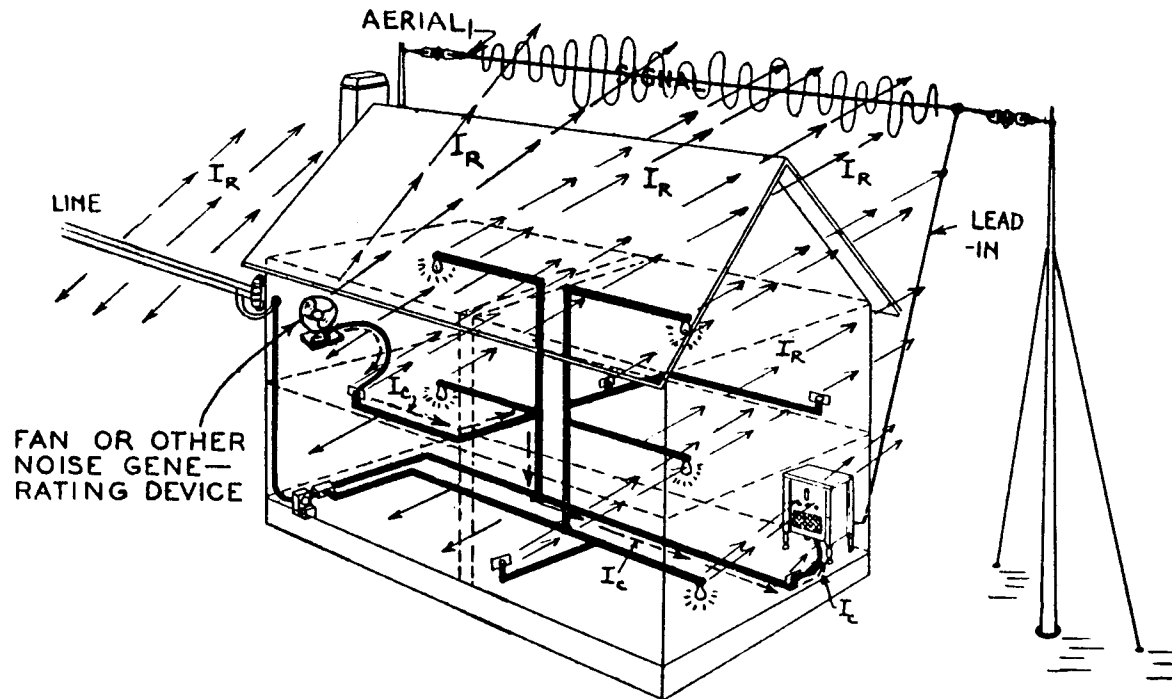


FIG. 30-4.—How an electrical device located in one part of a building can produce electrical interference part of which (I_c) is conducted directly through the electric light wiring to radio receivers operating from the same lighting line; the other part (I_R) may be radiated either directly from the device or from the electric light circuit wiring in the building to the aerial, lead-in and ground wires of the receiver, inducing interference voltages in them. These are heard in the radio receiver as disturbing noises of a certain character depending upon the nature of the interfering device (see Art. 30-16).

INDOOR ANTENNA

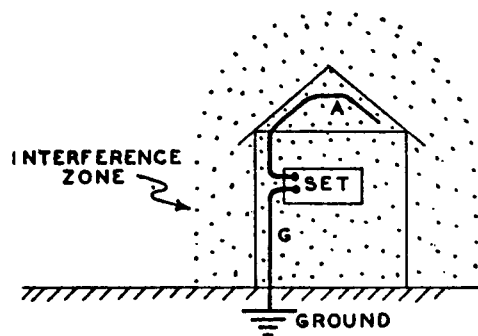


FIG. 30-24.—A typical example of an indoor aerial installed in a location full of interference. Both the indoor aerial, the lead-in and the ground wires run right through the strong interference zone and all of them pick up the disturbances. Noisy reception is bound to result.

