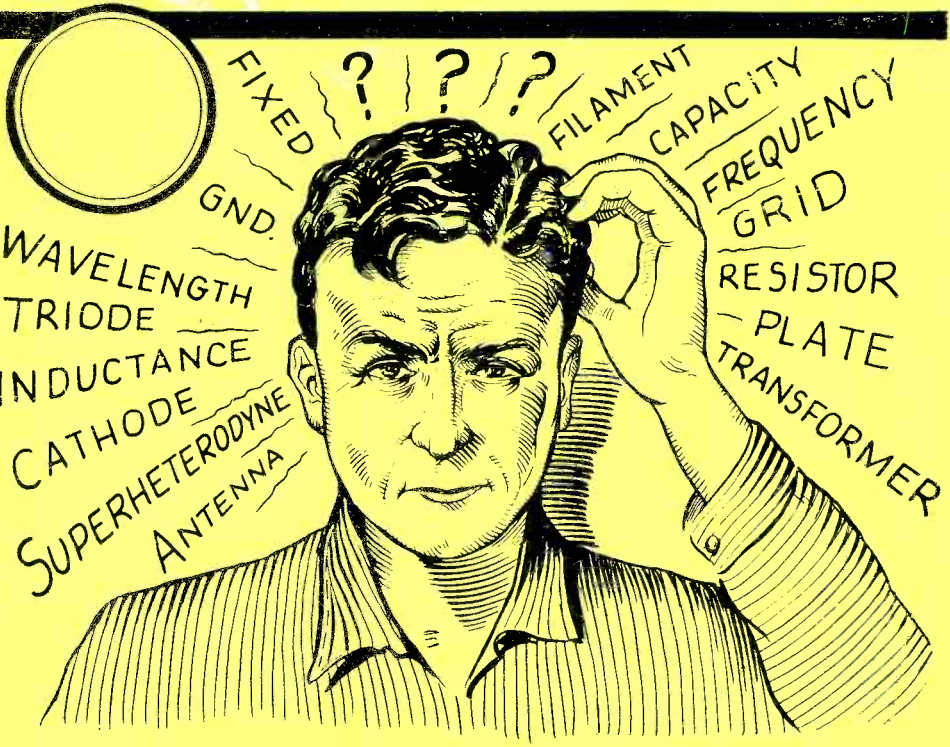
# BEGINNERS' RADIO DICTIONARY



# INTRODUCTION

IT is obviously impossible for the novice to understand even the simplest book or article on radio if it bristles with words which are unfamiliar to him. Therefore, in order to acquaint the newcomer to this fascinating field with the most widely used terminology, the following list of radio expressions and their meanings has been compiled. It is presented with the hope that it may clarify obscure expressions, and afford the man or woman interested in radio a new understanding of mysterious expressions — each of which, however, has a very definite meaning.

THE PUBLISHERS

# A

**Acceptor**—A combination of capacity and inductance attuned to the frequency of a desired signal, and connected in series with the aerial. The opposite of a Rejector circuit, which see.


**"A" BATTERY** — A source of supply for the filament power in a receiver operated by a battery. It is of low voltage but usually high amperage.

**Aerial Wire**—See Antenna.

**Air Condenser**—A variable condenser having air as the dielectric, with the support made of a minimum of solid dielectric. Also a trimmer using air as a dielectric.

**Alexanderson Alternator**—An alternating current generator of the inductive type which directly generates currents of sufficiently high frequency to be used in Radio Telegraphy.

**Alternating Current** — An electrical current, the value of which alternates from zero to maximum positive to zero to maximum negative to zero several times per second.

**Alternating Current, Damped**—See Damped Wave.

**Alternating Current, Forced** — See Forced Alternating Current.

**Alternating Current, Free**—See Free Oscillations.

**Alternating Current, Undamped** — See Undamped Waves.

**Alternation**—One-half of an electrical cycle (see Alternating Current) or the rise and fall of a current in one direction.


**ALTERNATOR** — A generator for producing alternating currents.

**Amateur Call Letters** — Certain combinations of letters that are assigned to amateur radio stations for purposes of identification.

**Amateur Publications** - Books and magazines that are published for the use of Amateur Radio Operators.

**Amateur Radio Operator**—A person licensed to operate an amateur radio station.

**Amateur Station License**—The permit issued by the government to amateur radio operators owning transmitting sets.

**American Wire Gauge** — The arbitrary series of numbers assigned to wires to indicate their sizes.


**AMMETER**—An instrument for measuring electric current intensity in a circuit in Amperes.

**Ampere**—The standard unit of electrical current. This is the current flowing in a circuit of one ohm resistance under a pressure of one volt. It is abbreviated as I.

**Ampere-Hour**—Unit for expressing the quantity of electricity passing in a circuit. This is a current of one ampere flowing for one hour.

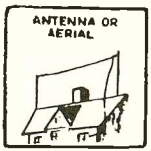
**Amplification Factor**—The ratio between the plate voltage and grid voltage for constant plate current.

**Amplifier**—A device or arrangement to augment or strengthen feeble oscillations (either of audio or radio frequency). It is customarily one or more tubes coupled into the circuit by means of transformers, condenser-resistance combinations, or condenser-inductance combinations.

**Amplitude** — The measure of the maximum, positive or negative, deviation of an electric wave from its zero point.

**Anode**—The positively charged electrode (plate) which attracts the electrons in a vacuum tube. Anodes also have various other electrical applications.

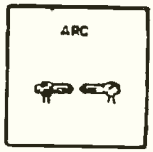
**ANTENNA**—A conductor designed to intercept or radiate the energy of radio waves.




**Antenna Resistance**—The opposition offered to the passage of an electric current by the electrical properties of the antenna. See Radiation Resistance.

**Arc Converter**—An electric arc used for the conversion of direct to alternating or pulsating current.

**ARC** — The completion of an electric circuit through a gas or vapor, the conductivity of which is due to the ionization of that gas or vapor. Used as a source of undamped electrical oscillation.




**Armature Core** — The iron mass which supports the armature winding.

**Armature Winding**—The conductors in which an electric current is induced by the action of the electromagnetic field in an electric generator, or of a motor's rotor.

**Atom**—The particle of matter that is a component of the molecule. The smallest particle of matter that can enter into combination.

**Atmospheric Absorption**—The part of the total loss of radiated electrical energy by atmospheric conductivity, reflection and refraction.

**Attenuation**—The decrease, with distance from the source, of the magnitude of amplitude (i.e., strength) of any radiated electric or magnetic wave.

**Audibility** — The ratio between the current producing a signal in the receivers and the current producing a barely audible signal.

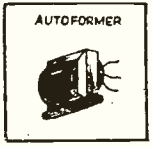
**AUDIO FREQUENCY TRANSFORMER** — A metal-core transformer, designed to amplify voltages, the currents of which are alternating at

audio frequencies, or direct currents which are pulsating at audio frequencies.

**Audion**—See Vacuum Tube.

**Audio Frequency** — A frequency capable of producing sound in the human ear. Considered to be below ten thousand cycles per second.

**Autodyne Reception**—See Self-Heterodyne.



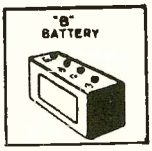

**AUTOFORMER** — A transformer having but a single winding which is tapped to afford primary and secondary.

**Automatic Frequency Control** — A circuit in a radio receiver; automatically brings the tuning units of the set into resonance with a wave which is partially tuned in.

**Automatic Volume Control**—A circuit in a radio receiver; automatically maintains various received transmissions at approximately the same volume.

## B

**"B" BATTERY** — A battery used as the source of current in the plate circuit of a vacuum tube.




**Baffle** — A partition used with a loud speaker to prevent air vibrations from the back of the diaphragm from cancelling out the vibrations from the front of the diaphragm. Particularly valuable in the reproduction of bass notes.

**Bakelite**—A high grade and efficient insulating material of the phenolic (synthetic resin) group.

**Band, Wave Length** — The "side waves" due to the varying amplitude and frequencies of the modulating wave.

**Band-Pass Filter**—An electrical filter circuit designed to pass one continuous band of frequencies, and to cut off all frequencies lying above or below such band.

**Beat Frequency**—The frequency resulting when an oscillation of one frequency is "beat" or heterodyned against an oscillation of different frequency. The figure given is normally in cycles per second.

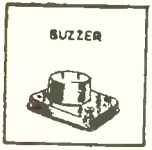
**Beat Reception**—The resultant audible frequency when two sources of unequal undamped electrical oscillations of constant amplitude act simultaneously in the same circuit.

**Bias**—Electric potential, generally as applied to the grid of a vacuum tube.

**Biasing Potential**—The potential impressed on the grid of a vacuum tube to cause it to operate at the desired part of its characteristic curve.

**Biasing Resistor**—A resistor, as connected in a radio circuit which carries current. The potential drop through the resistor is used as a biasing voltage.

**Broadcast**—One way transmission of news, music or other matter interesting to the public. Not point-to-point transmission of commercial messages, nor of messages directed to individuals.

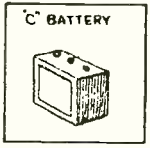



**BUZZER** — An electromagnetic device with a vibrating member opening and closing its own circuit.

**Buzzer Modulation**—A process for varying the output power of a continuous wave generator at the frequency of vibration of the buzzer used.

**By-Pass Condenser**—A fixed capacity offering infinite resistance to direct current, high impedance to currents of low (audio) frequency but lower impedance to currents of high (radio), the amount of impedance depending upon the value of the condenser.

## C




**"C" BATTERY** — A source of low potential used in the grid circuit of a vacuum tube to cause operation to take place at the desired point on the characteristic curve.

**Cage Antenna**—An antenna having conductors arranged cylindrically.

**Call Letters** — Certain combinations of letters assigned to radio stations by the government. The group of letters assigned the U. S. by the International Radiotelegraph Convention are all three and four letter combinations beginning with N and/or W and all combinations of KDA to KZZ inclusive.

**Capacity** — The measure of the amount of electrical energy a condenser can store up. The unit of capacity is the farad, which see.

**Capacitative Coupling**—The coupling of one circuit to another whereby the energy transfer is by means of condenser action.

**Capacitative Reactance**—The opposition offered to an alternating current by a condenser.

**Cathode**—The heated element which emits electrons in a vacuum tube. It may be a filament, or may be a separate element, heated by proximity to a filament. It is maintained at a negative potential in respect to the anode or plate. Cathodes have other applications, also.

**Cathode Ray**—The beam of electrons emitted by a cathode.

**Cathode-Ray Tube**—A tube, used in television and oscilloscope work. It has a source of electrons, a means of focussing these electrons into a beam, and means for causing this beam to move across ("scan") a fluorescent screen at the end of the tube.

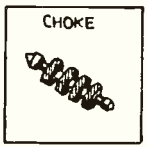
**Carrier Wave**—The radio frequency wave generated at a transmitting station for the purpose of carrying the modulated or audio frequency wave.

**Carborundum**—A synthetic crystalline material (silicon carbide) used as a detector.

**Carbon Rheostat**—A rheostat using carbon as the resistance material. See Rheostat.

**Cascade Amplification**—The method of successively using two or more vacuum tubes for amplification at radio, intermediate or audio frequencies.

**Chemical Rectifier**—A chemical device for changing alternating current to pulsating direct, usually used for storage battery charging.




**CHOKE**—An inductance with either an air or iron core, designed to retard certain frequencies; as a radio frequency choke (illustrated at left) or an audio frequency choke.

**Circular Mil**—The measure of sectional area of a wire.

**Coil Antenna**—One consisting of one or more complete turns of wire. (See Loop Antenna).

**Condenser Antenna** — An antenna consisting of two capacity areas.

**Coupling** — The relation which permits the transfer of electrical energy between two circuits, or two components of a circuit.

**Coupling, Capacitative**—See Capacitative Coupling.

**Coupling, Direct**—See Direct Coupling.

**Coupling, Inductive** — See Inductive Coupling.

**Coupling, Resistance** — See Resistance Coupling.


**CHOKE COIL** — A coil so wound as to offer a retarding or self inductance effect to an alternating current.

**Chopper** — A device for rapidly opening and closing a circuit.

**Circuit**—A path through which an electric current may be established.

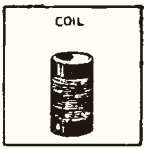
**Circuit Breaker**—A special type of switch arranged to open a circuit when overloaded, without injury to itself.

**Close Coupling** — The condition in which two coils are placed in close magnetic relation to each other, thus establishing a high degree of mutual induction.

**Closed Core**—A core in which the magnetic path of iron is unbroken.

**Coated Filament** — A vacuum tube filament coated with a metallic oxide to provide greater electron emission and longer life.

**Code** — The system of dots and dashes used to represent the letters of the alphabet, numerals, and other symbols.




**COIL**—A number of turns of wire, so wound as to afford inductance.


**COLLECTOR RING**—Metallic ring generally on the armature of a generator in contact with brushes for completing the circuit to a rotating member.

**Commutator**—A device used on a dynamo to reverse the connection periodically in order to cause the current to flow in one direction, i.e., to produce direct current.

**Condenser**—A device for storing up electrical energy and consisting of two or more conducting surfaces or electrodes separated by an insulating medium called a dielectric.


**CONDENSER MICROPHONE** — microphone which operates through changes in capacitance caused by vibrations of its conductive diaphragm.

**Conductance** — The opposite of resistance; i.e., a measure of the ease with which an electric current will flow through a circuit. The unit of conductance is the Mho (a reversed spelling of Ohm, which see).

**Conducting Materials** — Substances which offer relatively little resistance to the passage of an electric current.

**Conductivity**—The measure of the current carrying power of a substance. The opposite of specific resistance.

**Conductor**—A substance which offers a relatively small opposition to the passage of an electric current. A wire is generally meant when the word is used.


**CONNECTION**—An electrical continuity of circuit between two wires or two units, in a piece of apparatus.

**Continuous Waves** — A series of wave or cycles of current all of which have a constant or unvarying amplitude.

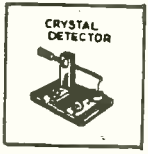
**Converter** — A vacuum tube which combines the functions of oscillator and mixer tube. Also an electrical machine for changing A.C. to D.C. and vice versa

**Counter Electromotive Force**—An E. M. F. or voltage that opposes the E. M. F. or voltage causing it.

**Coulomb**—The quantity of electricity transferred by a current of one ampere in one second. The unit of quantity in measuring electricity.

**Counterpoise**—A system of electrical conductors used to complete the antenna capacity effect of the antenna system in place of the usual ground connection.

**Coupler**—A device for the transfer of the energy of radio oscillations from one circuit to another.




**CRYSTAL DETECTOR**—A form of detector or sensitive rectifier of low current making use of the contact between a metal point and any one of certain metallic crystals, or using two crystals for the detector action.

**Crystal Microphone**—A microphone, the diaphragm of which is attached to a piezo-electric crystal, which generates electrical currents when torque is applied, due to the vibration of the diaphragm.

**Current**—A flow of electricity manifesting its presence by the magnetic or heating effects it produces. The unit of current is the Ampere and is the rate of flow in a circuit of one ohm resistance under a potential of one volt. The abbreviation for current is I.

**Cycle**—One complete set of one positive and one negative alternation of current. See Alternating Current.

# D

**Damped Wave**—A wave consisting of a series of oscillations or cycles of current of gradually decreasing amplitude.

**Damping**—The decreasing of the amplitude of oscillations caused by resistance in the circuit.

**Decibel**—The transmission unit of the decimal system. Used in measuring increase or decrease of power, etc.

**Detector**—A device which converts or rectifies high frequency oscillations into a pulsating direct current or which translates radio frequency power into a form suitable for the operation of an indicator. This is most frequently a vacuum tube, less commonly a crystal. Coherers and delicate chemical rectifiers were used in former years.

**Diaphragm** — The vibrating membrane in a reproducer (such as a telephone receiver or a loud speaker) which gives an audible sound under the influence of an alternating or pulsating direct electric current.

**Dielectric**—An insulating substance which allows electrostatic induction to act across it, as in the insulating medium between the plates of a condenser. Also an insulating material otherwise used (e.g.—a Bakelite panel, or the cambric covering of a wire is a dielectric material).

**Dielectric Absorption**—The penetration of a dielectric by the electric strain during a period of time.

**Dielectric Strength**—The property of material which resists the passage of an electric current. It is measured in terms of voltage required to break down this resistance.

**Dielectric Constant** — The ratio of the capacity of a condenser with a given dielectric to the capacity of the same condenser with air as the dielectric.

**Diode**—A two-element vacuum tube, consisting of filament (or cathode) and plate.

**Direct Coupling**—Association of two radio circuits by having a condenser, a resistor, or an inductor common to both circuits.

**Direct Current**—A flow of electricity always in the same direction.

**Directional Antenna** — An antenna which impels electrical waves with more energy in one direction than in

another, or which receives electrical waves more readily from one direction than from another.

**Distortion**—Unfaithful reproduction. Output which differs from input.

**Distributed Capacity**—The capacity in a coil due to the proximity of the turns.

**Double Modulation**—Modulation of a carrier wave of one frequency by a signal wave, this carrier then being used to modulate another carrier wave of different frequency.

**Down Lead**—See Lead-In.

**Dry Cell**—A type of primary cell in which the electrolyte is in the form of a paste rather than that of a liquid.

**Dry Electrolytic Condenser** — An electrolytic condenser in which the electrolyte is in the form of a paste or jelly rather than that of a liquid.

**Duplex Reception**—The simultaneous reception of two series of signals by a single receiving station.

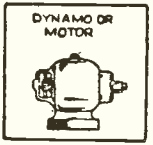
**Duplex Operation**—The simultaneous transmission and reception of signals in both directions between two stations.

**Duplex Transmission** — The simultaneous transmission of two series of signals by a single operating station.

**Dynamic Loud Speaker** — A loud speaker in which the diaphragm is driven by means of a small "voice coil" (which see) suspended in a powerful magnetic field.

**Dynamic Microphone** — A microphone, the coil of which is moved in a strong magnetic field by vibrations striking the diaphragm to which it is attached. Electrical currents are thus generated in the moving coil.

**DYNAMO**—An electrical machine which generates a direct current.




**Dynamotor**—A direct current machine having two windings on its armature: one acting as a motor, the other as a generator.

## E

**Eddy Current Losses** — Losses in electrical devices using iron, due to the currents set up in it by magnetic action.

**Edison Battery**—A type of storage battery in which the elements are nickel and iron and the electrolyte is potassium hydroxide.

**Edison Effect**—The phenomenon attributed to Edison, that when a filament is incandescent a current will flow between it and another electrode in the tube.

**Electrolyte** — A chemical solution used in batteries, chemical rectifiers, and certain types of fixed condensers.

**Electrolytic Condenser**—A fixed condenser in which the dielectric is an electrolyte.

**Electrolytic Rectifier** — See Chemical Rectifier.

**Electrical Oscillation** — A complete cycle of high frequency current.

**Electromagnetic Lines of Force** — The lines of force existing about an electromagnet or a current carrying conductor.

**Electromagnetic Wave**—The electric wave propagated by an electrostatic and magnetic field of varying intensity. Its velocity is 186,300 miles per second.

**Electromotive Force** — The voltage or electric pressure that causes electricity to flow in a circuit. It is abbreviated as E. M. F. or, more simply, as E. Its unit is the volt.

**Electron**—The smallest known particle of matter assumed to be a particle or charge of negative electricity.

**Electron Tube**—A device whose operation depends primarily upon the flow of electrons from one element to another.

**Electron Tube Rectifier** — A device for rectifying an alternating current by utilizing the flow of electrons between a hot cathode and a relatively cold anode.

**Electrostatic Charge** — An electric charge at rest.

**Electrostatic Coupling**—See Capacitive Coupling.

**E. M. F.**—See Electromotive Force.

**Emission (of Electrons)**—The freeing of particles or negative charges of electricity from metals the temperature of which is raised above red heat, or when illuminated.

**Enameled Wire**—Wire which has a covering of enamel for insulating purposes.

**Ether**—The medium which, according to one theory permeates all space and matter and which transmits all electromagnetic waves.

**Exciter**—A small dynamo used to excite the field coils of a larger and alternating current machine. Also a device used to supply current to the field coil of a dynamic loud speaker.

**Expansion Type Ammeter**—A current measuring device which operates by the expansion of a metal by the heating effect of the current being measured. Similar to a Hot Wire Ammeter.

## F

**Facsimile**—A system for transmitting and receiving stationary images by means of radio or wire lines, and recording them permanently at the receiver.

**Fading** — The variation of the strength of received radio signals over temporary periods. Said to be caused by interference between "earth" and "sky" components of the same transmitted wave, shifting of the Heaviside Layer (which see), magnetic storms, etc.

**Fan Antenna**—An aerial consisting of a number of wires radiating upwards from a common terminal to points on a supporting wire.

**Farad**—The practical unit of capacity. A capacity which retains a

charge of one coulomb with a potential difference of one volt.

**Feed Back** — The coupling of the plate circuit back to the grid circuit of a vacuum tube so that there is induced in the grid circuit a larger voltage than that originally acting. Used in regenerative circuits.

**Ferromagnetic Modulation** — A system of using the energy absorption of iron, or the variation of the inductance of iron core coils, to vary the amplitude of a radio frequency current in accordance with a desired form.

**Fibre**—An insulating material.

**Field**—The name given to that part of an electrical system in which electromagnetic lines of force are established.

**Field Rheostat** — A variable resistance used in the field circuit of a generator or motor to control the field current and consequently the strength of the electromagnetic field, thereby regulating the speed or power of the motor, or the output of the generator.

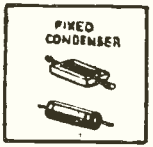
**Filament** — An electrically heated wire in an evacuated glass bulb, forming one element (the cathode) of a vacuum tube.

**Filament Supply** — A source of low potential used to send a current through a filament to heat it.

**Filter**—A combination of inductance and capacity arranged so as to eliminate undesirable signals from a receiving circuit, or to remove the "ripple" from the rectified current in a power pack, which see.

**Fire Underwriters** — The rules for the safe installation of electrical and radio apparatus as set down by the National Board of Fire Underwriters.

**FIXED CONDENSER** — A condenser, the plates of which are stationary and the capacity of which cannot be changed.




**Flat Top Antenna** — An aerial consisting of one or more parallel horizontal wires supported between masts. The "T" type and the inverted "L" type belong in this class.

**Fleming Valve**—A two element vacuum tube generally used as a detector. Rectifier tubes are also of this class.

**Flow of Electrons**—The basis for the "Edison Effect." The passage of electricity from a heated filament to a plate in a vacuum tube where the flow consists of negative charges of electricity or electrons.

**Flux**—The electromagnetic lines of force produced by a current in a wire or coil.

**Forced Alternating Current** — An electrical current which has a frequency and wave form which are equal to the frequency and wave form of the impressed electromotive force.

**Free Oscillations** — The alternate flow of electricity through a circuit

(first in one direction and then in the other) when no outside source of E. M. F. is acting in the circuit.

**Frequency** — The number of complete cycles of current occurring in one second. See Alternating Current.

**Frequency Changer**—A device which delivers alternating current at a frequency different from the frequency of the supply current.

**Frictional Electricity** — Static electricity produced by friction (e.g., by rubbing a hard rubber rod with a silk cloth.)

**Full Wave Rectifier**—A device to rectify and render available both halves of an alternating current wave.

**Fundamental** — The basic frequency generated by a vibrating body or an oscillating circuit.

**Fundamental of an Antenna**—The lowest frequency of free alternating current in an unloaded antenna.

**Fuse**—An element of a circuit designed to melt or fuse at a predetermined value of current. It is used to protect the circuit from excessive current.

## G

**Galena**—A natural crystalline structure of lead sulphide used as a detector.

**Galvanometer** — A delicate instrument used for measuring minute currents.

**Gap**—An open space in a circuit through which a condenser discharges for producing electric oscillations.

**Gaseous Conductors** — The gases which, when ionized by an electric field, permit the passage of an electric current.

**Gauge (Wire)**—The method of specifying the size of wire. The two important American gauges are the American Wire Gauge (Brown and Sharpe) and the Steel Wire Gauge.

**Gauss**—The unit of magnetic field intensity in terms of the lines of force per square centimeter.

**General Call**—The letter CQ in the international code and used as a general inquiry call.

**German Silver**—An alloy consisting of nickel, copper, and zinc. It is used as a resistance material.

**Government Radio Publications** — Publications on radio subjects by the Bureau of Standards and Signal Corps and sold by the superintendent of Documents, Government Printing Office, Washington, D. C.

**Gravity Cell** — A closed circuit cell used where a continuous flow of current is desired. This type consists of copper and zinc electrodes with copper sulphate and zinc sulphate electrolyte. These are separated because of difference in their specific gravity.

**Grid**—That element in a vacuum tube having the appearance of a grid and which controls the flow of

electrons from the filament to the plate. "Grid" generally refers to the control grid. See also Screen Grid and Suppressor grid.

**Grid Battery**—The battery which is sometimes connected in the grid circuit of a vacuum tube to control the plate current. Same as "C" Battery.

**Grid Bias**—Voltage applied to the grid of a vacuum tube.

**Grid Condenser** — The condenser connected so as to give its charge to the grid in an electron tube.

**Grid Leak** — The high resistance sometimes connected from the grid to the filament of a three electrode tube, in parallel with a condenser, to maintain the potential of the grid at a certain average value.

**Grid Resistor**—A resistor connected in a grid circuit, generally to suppress oscillations.

**Grid Voltage**—The voltage impressed upon the grid of a vacuum tube, by means of a biasing resistor or a grid battery. See Grid Battery, also.


**GROUND**—An electrical connection with the Earth.

**Ground Lead** — The conductor leading to the ground connection.

**Guy Wire**—A wire used to support a radio mast.

## H

**Half-Wave Antenna** — An antenna which is half as long as the wave being received.

**Hard Rubber** — A hard insulating material made of rubber, and having a dielectric constant of from two to four.

**Hard Tubes**—Vacuum tubes having a high vacuum.

**Harmonic**—A frequency which is an exact multiple of a fundamental frequency.

**Heat**—Electromagnetic waves of a frequency between that of light waves and radio waves. A form of energy.

**Heater**—An electrical element in a vacuum tube, designed to supply heat to an indirectly heated cathode.

**Heat Losses**—Loss of energy due to the heating effect of an electric current.

**Heaviside Layer**—A layer of ionised gas far above the surface of the earth. It is said to reflect radio waves.

**Henry**—The inductance in a circuit in which the electromotive force induced is one volt when the inducing current varies at the rate of one ampere per second. It is 1,000,000,000 electromagnetic units, and is the unit of inductance.

**Hertzian Wave**—A name sometimes given to electromagnetic waves.

**Heterodyne Action**—See Beat Reception.

**High Fidelity** — Systems of radio transmission and reception which permit a wide band of audio fre-

quencies to be transmitted and/or reproduced.

**High Frequency Alternator**—An alternating current generator designed to produce current at a high frequency.

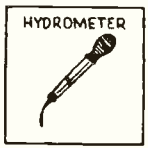
**High Voltage** — Potential of great electromotive force.

**Honeycomb Coil**—A type of inductance in which the turns do not lie adjacent to each other.

**Horsepower**—A unit of power equivalent to 550 foot pounds per second or to 746 watts.

**HORSE SHOE MAGNET** — A magnet which has the shape of a horse shoe.


**Hot Wire Ammeter**—See Expansion Type Ammeter.




**HYDROMETER** — instrument for determining the density of liquids. Formerly in wide use for testing radio storage "A" batteries.

## I

**Ignition Key** — A rod arranged to strike the arc in an arc generator of high frequency currents.

**Impedance**—The total opposition of a circuit to the passage of an alternating current.

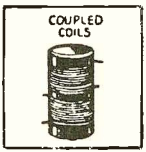
**Inclined Coil Instrument**—A type of instrument in which an element, or elements, are inclined.

**Inductance**—The property of a circuit which allows it to store up electrical energy in electromagnetic form.

**Induction** — Electromagnetic transfer of energy from one coil to another.

**Induction Coil**—A coil having a high turn ratio used for raising the voltage. A step-up transformer.

**INDUCTIVE COUPLING**—The coupling of one circuit to another whereby the energy transfer is by means of induction. (See Capacitative Coupling and Coupler.)




**Inductively Coupled Receiver** — A radio receiver in which the energy in the antenna circuit is transferred to the secondary circuit by induction.

**Inductivity**—A term sometimes used to denote the dielectric constant or the specific inductive capacity.

**Input Circuit**—The grid circuit of an electron tube.

**Inspector, Radio**—The United States is divided into nine radio districts in each of which there is a Radio Inspector who issues licenses and takes charge of other radio matters under direction of the Federal Communications Commission.

**Insulated Wire**—Wire which has a non-conducting covering.

**Insulating Materials** — Those substances which oppose the passage of an electric current through them.

**Insulation**—The material used for insulation purposes.

**Interference** — The interruption of radio reception from sources such as other transmitting stations, static, etc.

**Intermediate Frequency Transformer**—A transformer designed to amplify the intermediate frequencies generated in a superheterodyne radio receiver. These are normally sharply tuned to a single frequency band.

**Internal Drop**—That part of the E. M. F. generated that is expended in the generator. The internal resistance of a battery is one cause of such voltage drop.

**Internal Output Resistance** — The resistance to small alternating currents which exists between the plate and the filament in a vacuum tube.

**International Ampere**—The current which will in one second deposit 0.001118 gram of silver from a neutral solution of silver nitrate.

**Interrupter** — A device so arranged as to rapidly make and break a circuit.

**Interrupted Continuous Wave**—The name applied to a continuous wave which is interrupted, as by a chopper, before it is sent out. It consists of a series of wave trains, each cycle, however, having the same current amplitude. (Abbreviation—I. C. W.).

**Invar**—A special alloy used for standard resistance units. Changes in temperature cause but minute variations in its resistance, so small as to be well-nigh negligible.

**Ionization**—The process of breaking up molecules into positively and negatively charged carriers of electricity called ions.

**Ion**—A neutral atom or molecule to which has been added an electron or from which an electron has been taken.

## J

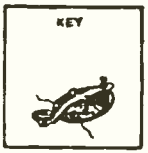
**Jamming**—Transmission of waves of high decrement, that is, highly interfering waves.

**Joule**—The unit of work or energy. The energy expended when a current of one ampere flows through a resistance of one ohm for one second.

**Joule's Law**—The heat produced in a circuit in joules is proportional to the resistance, to the square of the current and to the time.

## K

**KEY**—A special form of switch arranged for rapid operation to form dots and dashes of the telegraph code.




**Keying Flicker**—The flickering of lights connected to the same circuit from which a radio transmitter is operating.

**Key Click** — Interfering radio frequency waves caused by opening and closing the circuit of a C. W. Transmitter.

**Kick Back** — The passage of radio frequency currents back into the low frequency side of the circuit with consequent burn out of transformer or other apparatus.

**Kilo**—Prefix meaning 1000.

**Kilocycle**—One thousand cycles.

**Kilovolt**—One thousand volts.

**Kilovolt-Ampere**—The unit used in rating alternating current generators, being product of kilovolts and amperes (i.e., 1000 watts).

**Kilowatt**—One thousand watts.

## L

**"L" Type Antenna**—A single wire antenna, to one end of which the lead-in is connected.

**Lagging Current**—The phase difference in an inductive alternating current circuit where the current does not reach maximum until after the E. M. F.

**Lambda**—The Greek letter used as a symbol for wave length.

**Laminations** — Thin sheets of steel used as the magnetic core in electrical apparatus, (e.g., the core of an audio frequency transformer is normally composed of laminations).

**Laws, Radio** — Regulations under which radio communication is carried on.

**Lead-In**—The conductor from the antenna to the radio receiver.

**Leading Current**—The phase difference in a capacitive alternating current where the current leads the E. M. F.

**Lead Storage Battery**—A secondary battery in which the plates are of lead and lead peroxide and the electrolyte of dilute sulphuric acid.

**Leak, Grid**—See Grid Leak.

**Leakage Current**—The small current which is lost through insulators under certain circumstances.

**Left Hand Rule**—A rule for indicating the direction of motion due to a force acting on a wire, when a current flows in the wire which is at right angles to a magnetic field. Extend the forefinger of the left hand in the direction of the magnetic field and hold the middle finger at right angles to it in the direction of the current. The extended thumb, held at right angles to both the other directions, indicates the direction of the motion.

**Lenz's Law**—Whenever an induced current arises, by reason of some change in linkings, the magnetic field about the conductors carrying induced current is in such a direction as to oppose the change.

**Leyden Jar**—A type of condenser jar having a coating inside and out but not connected. (See Condenser).

**License**—The law provides that in order to operate a radio transmitting station, both a station license and an operator's license must be secured.

**Light**—A manifestation of electromagnetic waves ordinarily applied to those having a wave length of from .000075 cm. (the red ray) to .000038 cm. (the violet ray).

**Lightning**—The discharge of atmospheric electricity

**Line Drop**—That part of the E. M. F. which is expended in sending current through the wire line.

**Lines of Force**—The directional lines of magnetic or static field which represent the stresses.

**Linkage** — The interlinking of the lines of magnetic flux with the wire turns.

**Litz Wire**—See Litzendraht.

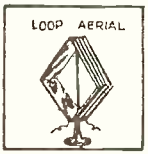
**Litzendraht**—A conductor consisting of several insulated wires woven so that they form a single conductor of low resistance to high frequency alternating currents. Commonly known as Litz Wire.

**Load Flicker**—The flickering of electric lights on lines supplying radio transmitting sets, due to the varying load. (See Keying Flicker.)

**Loading Coil**—The inductance coil added to radio circuits to increase their wave length.

**Local Action**—The corrosion of the zinc in primary batteries due to the action between the zinc and impurities in it.

**LOOP ANTENNA**—An antenna consisting of one or more complete turns of wire, both ends of which are to be connected to the input circuit of the radio receiver.




**Loose Coupling**—The interlinking of only a small part of the flux set up by one coil with that of another coil.

**LOUD SPEAKER**—An assembly of devices by means of which received sounds are made audible without the use of telephone receivers held to the ears.


## M

**Magnetism** — The manifestations of the force in nature which is seen in the magnet.

**Magnetic Amplifier**—A variable impedance connected in shunt with the external circuit of the Alexanderson Alternator for control of signalling.

**Magnetizing Current** — The current which flows in the primary winding of a transformer when the secondary has "no load" or an "open" circuit. It is less than the current which flows when the secondary is under load.

**Magneto**—A small alternating current generator using permanent field magnets.

**Magnet, Electro**—A magnet formed by passing an electric current

through a solenoid or a coil of wire. Such magnets are normally provided with metal cores.

**Manganese Dioxide** — An oxygen-emitting substance used to prevent polarization in sal ammoniac batteries, such as dry cells.

**Masts**—Supporting towers for radio antenna.

**Mechanical Rectifier**—A device for rectifying alternating current by mechanical means. (See Vibrator.)

**Mercury Vapor Rectifier**—A low-resistance two-element rectifier tube which contains a small amount of mercury which vaporises during operation.

**Meg.** — A prefix meaning 1,000,000. Used alone, it means 1,000,000 ohms.

**Megohm**—A resistance of 1,000,000 ohms.

**Meter**—The metric unit of length, equivalent to 39.37 inches. An instrument for measuring quantities of length. Also a device for measuring electrical currents, potentials, etc. (See Ammeter, Milliammeter, Millivoltmeter, Voltmeter, etc.)

**Mho**—The unit of conductivity. (See Conductivity).

**Mica**—An mineral insulating material having a dielectric constant of 4 to 8 and a dielectric strength of from 700 to 1500 volts per mil.

**Micro.**—A prefix meaning 1/1000,000.

**Microampere**—One one-millionth of one ampere, which see.

**Microfarad**—The one-millionth part of the farad which is the practical unit of capacity.

**Microhenry** — A millionth of a Henry, the practical unit of inductance.

**Microhm**—A millionth of an ohm.

**Micro-microfarad**—A millionth of a microfarad.


**MICROPHONE** — A device by means of which sound vibrations are caused to make corresponding variations of an electric current.

**Microvolt**—One one-millionth of one volt, which see.

**Mil**—A unit of length used in measuring the diameter of wires. It is equal to one thousandth of an inch. Used alone, it means 1/1000 of one ampere. (See Circular Mil.)

**Milli**—A prefix meaning 1/1000.

**Milliammeter** — An instrument for measuring small currents. Usually calibrated in 1/1000 amperes.

**Milliampere**—One one-thousandth of one ampere.

**Millihenry**—One thousandth of a Henry.

**Millivolt** — One one-thousandth of one volt.

**Millivoltmeter** — An instrument for measuring small differences in potential. Usually calibrated in 1/1000 volts.

**Mixer Tube**—The "first detector" of a superheterodyne, in which the locally generated oscillation is combined with the incoming carrier frequency, to produce the intermediate frequency beat note.

**Modulated Waves**—Alternating current waves which have their amplitude varied periodically. The signals transmitted by a radio station are examples of a modulated wave.

**Modulating Action** — The action where a radio frequency wave is modulated by an audio frequency wave.

**Modulation**—The act of varying the amplitude of radio frequency oscillations by the action of an audio frequency oscillation impressed thereon.

**Modulation Frequency Ratio**—The ratio of modulation frequency to wave frequency.

**Modulator**—The device used for the purpose of modulating the alternating current wave.

**Morse Code**—A system of dots and dashes for signalling and used by the land telegraph companies. Continental Code is used in radio work. It is not altogether unlike Morse Code.

**Motor** — An electrical machine for converting electrical energy into mechanical energy.

**Motor-Generator** — A motor and generator connected so as to deliver electrical energy of the desired kind. It may be an A.C. motor driving a D.C. generator, a D.C. motor driving an A.C. generator, a D.C. motor driving a D.C. generator of different voltage, or an A.C. motor driving an A.C. generator of different voltage and frequency.

**Multiple Tuned Antenna** — An antenna with connections through inductances to ground at more than one point and so determined that the total reactances in parallel are equal to those necessary to give the antenna the desired natural frequency.

**Multiplex Telegraphy** — The transmission of several messages over the same wire without one interfering with another. This is usually done by using different carrier frequencies.

**Multipolar Machine** — An electric machine having several pairs of field poles.

**Mutual Inductance** — The term applied to designate the inductance produced by a current change in one of two independent circuits which react upon each other.

## N

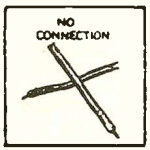
**National Electrical Code** — See Fire Underwriters.

**Natural Frequency**—The frequency of the oscillations that normally take place in a circuit of inductance, capacity, and resistance.

**Natural Magnet**—The black oxide of iron found in the earth. It is called magnetite and has strong magnetic properties.

**Natural Period**—The period of the free oscillatory discharge of a condenser through an inductance.

**Negative Electricity** — Supposedly those charges of electricity which are called electrons.




**NO CONNECTION** —Generally used in describing a diagram where two lines representing wires cross, but where no electrical connection between the two wires thus represented exists.

**Non-Conductors**—Those substances which do not ordinarily conduct electricity.

**Non-Synchronous Gap** — A rotating spark gap which runs without regard to the generator speed.

## O

**Ohm**—The practical unit of resistance. The resistance that will allow one ampere of current to pass at the electrical potential of one volt.

**Ohm's Law**—The relation between the current, electromotive force and resistance in a D.C. circuit:

Amperes=Volts divided by Ohms.
Volts=Product of Amperes and Ohms.
Ohms=Volts divided by Amperes.

**Oil Cooled Transformer** — One in which the windings are immersed in oil for the purpose of dissipating the heat loss.

**Open-Core Transformer** — A transformer having the path of the magnetic flux partly through air.

**Operator's License**—See License.

**Oscillator, Hertzian** — An apparatus for generating electromagnetic waves.

**Oscillator, Tube**—The electron tube made to generate high frequency currents by proper adjustment of the electrical constants.

**Oscillations**—Alternating currents of high frequency.

**Oscillation Transformer** — An open type of transformer primarily used for transferring oscillating energy from one circuit to another.

**Oscillatory Circuit**—A circuit of capacity and inductance in which oscillations occur.

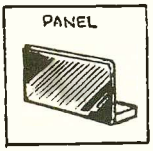
**Oscilloscope** — A cathode-ray tube with associated circuits, causing an impressed electric wave to appear visibly upon the fluorescent screen. Also called an Oscillograph.

**Overmodulation** — The distortion of speech caused by too great variation of the amplitude of the modulating audio frequency.

**Oxide Coatings** — The coatings of the filaments of some vacuum tubes by the oxides of barium, calcium, or thorium to cause greater electron emission.

## P

**Pancake Coil**—A type of inductance having flat spiral windings.




**PANEL**—A sheet of insulating material or of metal on which electrical apparatus is mounted.

**Paper, Dielectric, Constant of** — Dry paper has a dielectric constant of 1.5 to 3.

**Paraffin**—A crude oil derivative having good insulating qualities and a dielectric constant of 2 to 3.

**Parallel Connection**—A connection in which the current divides, only a part of the total current passing through each device.

**Parallel Connection of Condensers**—An arangement whereby a number of capacities connect to the same two points. Since the capacity is proportional to the plate area and parallel connection simply increases the area, the total capacity is equal to the sum of the separate capacities. $C=C_1+C_2 \ . \ . \ . \ +C_n$

**Parallel Connection of Resistors**—An arrangement whereby a number of conductors connect to the same two points. From this the total resistance is; the sum of the reciprocals of the separate resistances in parallel is equal to the reciprocal of the resultant resistance.

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} \ . \ . \ . + \frac{1}{R_n}$$

**Peak**—The point or points of maximum amplitude on a voltage, current or resonance curve.

**Peanut Tube**—A name given to the smaller sizes of vacuum tubes.

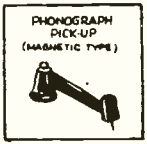
**Pentode** — A five-element vacuum tube, consisting of filament (or cathode), grid, screen grid, suppressor grid (or space charge grid) and plate.

**Period**—The time required for one cycle.

**Permeability, Magnetic** — The ratio of the induction to the magnetizing force in a substance.

**Permanent Contact Crystal Detector**—A crystal detector which does not require adjustment.

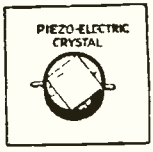
**Phenolic Insulating Materials** — A type of insulating materials, one of which is bakelite.




**PHONOGRAPH PICK-UP**—A mechanism which generates audio frequency currents or voltages from the movement imparted to it by the movement of a needle in the groove of a phonograph record.

**Phosphor-Bronze**—An alloy of high tensile strength and often used as antenna wire.

**Photo Tube**—A photo-electric cell. A vacuum tube in which electron emission (i.e., current) is produced by light striking an electrode.




**PIEZO - ELECTRIC CRYSTAL** — A type of crystal which, when subjected to mechanical stress, generates current; or which, when subjected to varying electrical stresses, gen-

erates mechanical movement. Most familiar type is Rochelle Salts crystal.

**Plate**—The anode in a vacuum tube, which collects the electrons emitted by the filament.

**Plate Battery**—The source of E. M. F. connected in the plate circuit to give the plate element its positive charge.

**Plate Circuit**—That part of the vacuum tube circuit including all the devices connected directly in the circuit between the filament and the plate elements.

**Plate Current**—The current passing between the plate and heated cathode or filament, in a vacuum tube.

**Plate Resistance**—See Internal Output Resistance.

**Plate Modulation** — Modulation by variation of the input plate power.

**Plate Voltage** — The potential applied to the plate of the vacuum tube by the plate voltage supply.

**Polarization** — The formation of a film of hydrogen gas on the positive plate of certain primary cells which tends to reduce the current flow.

**Poles, Battery** — The terminals of batteries to which the external circuit is connected.

**Poles, Magnetic** — The points at which magnetic lines of force appear to enter.

**Positive Electricity** — The electrical charge of the atom which has lost some of its electrons.

**Potentiometer**—An arrangement for securing any desired voltage by utilizing the voltage drop across a portion of a current-carrying resistance.

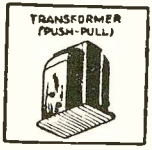
**Power Detector** — A detector the power output of which is fed directly to the output stage. Also a detector used with sufficiently high plate voltage to permit the undistorted detection of powerful R.F. signals.

**Power Pack** — The device used to supply filament, grid and plate voltage to the vacuum tubes in a radio receiver.

**Primary Cell**—A type of cell whose voltage is directly due to the chemical decomposition of matter.

**Primary**—The winding of a transformer to which current or voltage is applied. (See Secondary).

**Pulsating Current**—A periodic current the average value of which is not zero. A pulsating current is the sum of an alternating and a direct current.




**PUSH - PULL TRANSFORMER**—A transformer with a center tapped secondary or primary, used for connecting to the input or output of a push-pull stage, respectively.

## Q

**Quarter Wave Antenna**—An antenna, the length of which is ¼ that of the wave length received.


**QUENCHED GAP**—A spark gap so arranged that the spark is quenched quickly by a cooling effect. A method used to give impulse excitation.

## R

**Radiation**—The emission of energy from a source—as of electromagnetic waves from an antenna.

**Radiation Efficiency** — The ratio of power radiated to the total power delivered to an antenna at a given wave length.

**Radio Communication**—The science, art and act of transmitting and recording knowledge by means of radio.

**Radio Compass**—The name applied to a type of receiving apparatus used for taking direction bearings.

**Radio Frequency**—Currents considered as having a frequency of 10,000 cycles or more.

**Radio Frequency Amplifier**—An amplifier in which the signals are amplified while oscillating at radio frequencies, and before reaching the detector.

**Radio Frequency Transformer**—An air-core transformer, usually tuned by means of a variable condenser. It is designed to amplify voltages, the currents of which are alternating at radio frequencies, or direct currents which are pulsating at radio frequencies. Untuned radio frequency transformers, which sometimes have metal cores, are now comparatively rare.

**Radiogoniometer** — The direction finder.

**Radiogram** — A telegram sent by radio.

**Radiophone** — Apparatus for transmitting and/or receiving speech or music by radio.

**Radiotelephony** — The science, art and act of transmitting speech by means of radio.

**Radio Waves**—The electromagnetic waves produced by an oscillatory discharge and which move at right angles to the line of propagation with the speed of light.

**Ratio of Transformation**—The ratio of the induced voltage of the secondary to the voltage impressed on the primary.

**Reactance** — The opposition offered to the flow of an alternating current which is due to the presence of inductance or capacity or both, in the circuit.

**Reactance Coil**—See Choke Coil.

**Reactance Factor**—The ratio existing between the reactance of a circuit and its ohmic resistance.

**Reactive Drop**—The drop in potential caused by reactance as distinguished from that caused by ohmic or simple resistance.

**Reactor**—See Choke Coil.

**Receiver, Radio**—Apparatus for the reception of broadcast material. (See Receiving Apparatus.)

**Receiver, Telephone** — A device by means of which the variations in an electric current reproduce the corresponding sounds by means of a vibrating diaphragm.

**Receiving Apparatus**—All the associated apparatus used for receiving and rectifying radio waves.

**Reception, Beat**—See Beat Reception.

**Reciprocal**—Unity (the number 1) divided by quantity (the given number). Multiplying by the reciprocal of a number is equivalent to dividing by the number.

**Rectifier**—Any device for converting alternating current into direct or pulsating current.

**Reflex Circuit**—A circuit in which the signal is amplified at radio frequencies, detected, and then amplified at audio frequencies in the same tube or tubes.

**Regenerative Circuit** — A vacuum tube circuit in which additional amplification is produced by feeding back some of the energy of the plate circuit into the grid circuit.

**Rejector** — A supplementary closed resonant circuit, consisting of a low resistance inductance and a condenser and tuned to the frequency of the desired signal, connected as a loop in shunt across the receiving primary circuit and acting to provide a low impedance by-pass for all frequencies except that of the desired signal. (Sometimes called a "shunt trap.")

**Relay** — A device actuated by an electric current to open or close another circuit.

**Remote Control**—Controlling a radio receiver or a transmitter from a distant point.

**Resistance**—The opposition to the passage of an electric current by any substance or material. The unit is the ohm.

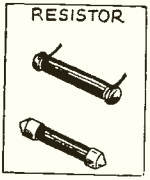
**Resistance Coupling** — Most commonly, the coupling between two stages of a receiver, a resistor being in the plate circuit of the preceding stage, another resistor being in the grid circuit of the succeeding stage, this plate and grid being connected through a fixed condenser. The coupling between two circuits when they have a resistance in common.

**Resistance, Internal Input of Tube**—The ratio of voltage change to current change, the grid voltage being constant.

**Resistances, Series Connection**—An arrangement of resistors whereby the total resistance is equal to the sum of the resistances.

**Resistance, Parallel Connection** — See Parallel Connection of Resistors.

**Resistivity**—The measure of the resistance of a material to the passage of electricity.




**RESISTOR**—A unit designed to oppose, but not completely obstruct, the passage of current.

**Resonance** — The condition that exists when the effects of the capacity and inductances of a circuit are balanced.

**Resonance Curve**—A curve which shows the change of current in a circuit, when changes are made which cause the resonance condition to be somewhat departed from.

**Resonance Frequency** — The frequency which makes the capacitative and inductive reactances equal.

**Rheostat**—A resistance device, usually variable.

**Right Hand Rule**—A rule for indicating the direction of magnetic effect. Grasp the wire with the right hand and with the thumb extended along the wire in the direction of current. The curved finger tips will indicate the direction of the magnetic effect.

**Ring Winding**—A certain type of armature winding.

**Rotary Converter**—A machine for converting A.C. to D.C. and vice versa. See Synchronous Converter.

**Rotor**—The rotating part of a motor, generator or other electrical machines.

## S

**Sal Ammoniac**—A compound (ammonia chloride) used in solution as the electrolyte in certain primary batteries.

**Saturation, Tube**—The condition existing when the space charge caused by the large number of negative electrons in the tube fully counteracts the influence of the positive charges on grid and plate.

**Scale**—A series of dimensions arranged to give numerical readings of the setting of the device to which it is connected.

**Screen Grid**—An additional element in a vacuum tube to reduce the capacity between the other electrodes. Its practical purpose is to prevent the tube circuit from oscillating.

**Secondary Battery**—A type of chemical electric generator which must be recharged but which cannot generate its own current as does the Primary Battery, which see. The storage battery is a secondary battery.

**Secondary**—The winding of a transformer from which voltage or current is drawn. (See Primary.)

**Secondary Emission**—Electron emission in which the exciting agency is bombardment of the emitting material by the electrons.

**Self-Inductance**—The property of an electrical circuit which tends to prevent any change in the current established in the conductor.

**Self Heterodyne**—A system for receiving continuous wave signals by the production of audio frequency beats, through the use of a device which is both a radio frequency generator and a detector of the audio frequency beat currents produced.

**Sending Station**—One equipped with apparatus for producing and radiating radio waves.

**Sensitivity**—The degree to which a radio receiver responds to the wave to which it is tuned.

**Series Condenser, Antenna**—When a fixed or variable condenser is connected in series with an antenna the condition of series condensers exists and the wave length of the antenna circuit is reduced.

**Series Connection**—A connection of electrical apparatus or circuits in which all of the current passes through each of the devices in succession, or one after the other.

**Series Connection of Condensers**—An arrangement of capacities wherein the same charge is given to each condenser and the total voltage is subdivided among the condensers in direct ratio to their capacities. The formula is:

$$\frac{1}{C} = \frac{1}{C_1} + \frac{1}{C_2} \ldots + \frac{1}{C_n}$$

**Series Connection of Resistors**—An arrangement of resistors wherein the same current must pass through each resistor in turn, the effect being additive. The formula is:

$$R = R_1 + R_2 + R_n$$

**Series Resistance**—See Series Connection of Resistors.

**Shape Factor**—A numerical quantity in formulae for the calculation of the inductance of coils.

**Sharp Tuning**—The generation of a fundamental of a pure wave, in which practically no harmonics are present as applied to a transmitter. As applied to a receiver, the ability to discriminate between two or more signals of nearly identical frequency. This is desirable to allow freedom from interference.

**Sharp Wave**—A "pure wave" or one which has energy at or nearly only one wave length—as indicated by a "sharp" resonance curve.

**Shellac**—A material used for insulating and binding purposes, having a dielectric constant of from 3 to 3.7.

**Shell Transformer**—A transformer having the primary and secondary coils within the iron shell which constitutes the magnetic circuit.

**Shunt Circuit**—An arrangement of apparatus or circuits in which the total current is subdivided. Same as Parallel Circuit.

**Shunt Winding**—The connection of field and armature windings of motors or generators in parallel.

**Signal**—The speech, music or other effect (e.g., code) conveyed in a radio transmission.

**Silicon Steel** — Steel containing a small amount of silicon. Highly desirable for its magnetic properties.

**Single Side-Band** — A system of transmission which suppresses one side-band of the carrier frequency at the source. Also applied to receiving systems designed to reproduce such transmissions.

**Single Layer Coil** –A coil having all turns side by side and in only one layer.

**Skin Effect**—The tendency of an alternating current to pass through the outer portion rather than through the center of a conductor.


**SOCKET** — As used with radio, a fitting with a number of holes, underneath which are contacts, used to hold tubes, plug-in coils, etc.

**Solder**—An alloy of lead and tin having a low melting point.

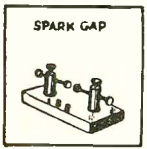
**Soft Tube**—A vacuum tube having a lesser degree of vacuum than the hard tube, which see.

**SOLENOID**—A coil consisting of a number of turns in cylindrical form.


**Sound Waves** — The waves given off by a vibrating body, which are transmitted by an elastic material medium( such as the air) and which can be detected by the ear.

**Spark**—An arc of very short duration.

**Spark Frequency** — The number of sparks that occur per second.




**SPARK GAP** — Terminals or electrodes designed to permit spark discharges to take place across a gap.

**Specific Gravity**—The weight of a material in proportion to the weight of an equal volume of water.

**Specific Inductive Capacity** — The direct measure of the ability of a substance to store up electrical energy when used as a dielectric material in a condenser.

**SPIDER WEB COIL** —A special type of open weave flat inductance coil which has low distributed capacity and high efficiency.


**Stagger-Wound Coil**—A type of inductance coil which has its layers staggered with reference to each other, or its turns staggered—as in the spider web coil.

**Standards, Bureau of**—A Bureau of the Federal government, established for the purpose of scientific investigation.

**Standard Cell**—A type of cell which has a steady or standard E. M. F. The Cadmium Cell.

**Static** — Atmospheric electricity, or "stray" electrical charges.

**Static Electricity**—Defined as electricity at rest, in contradistinction to current electricity. (See Frictional Electricity.)

**Station License**—A permit to operate a transmitting station, granted by the Federal Communications Commission of the United States government.

**Stator**—That part of an electrical machine or device which remains fixed.

**Step-Down Transformer**—A transformer wound to give a lower voltage on the secondary side than that impressed on the primary. (The current, however, will be stepped up). It has more primary than secondary turns.

**Step-Up Transformer**—A transformer wound to give a higher voltage on the secondary side than that impressed on the primary. (The current, however, will be stepped down). It has fewer primary than secondary turns.

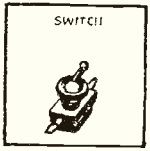
**Storage Cell** — A type of cell in which the chemical changes of discharge may be reversed by application of an electric current to charge it.

**Strays**—"Man-made static." Disturbances in radio reception due to electromagnetic fields other than those caused by radio transmitting stations. Strays are often caused by sparking commutators, sparks on trolley lines, controllers, ignition systems, etc.

**Sulphation**—The formation of lead sulphate on the plates of the lead acid cell. It results in harm to the cell and is particularly harmful if the cell is left in an uncharged condition.

**Superheterodyne** — A type of radio receiver operating on the heterodyne or beat principle.

**Surface Leakage**—The loss of current due to a conducting film on insulators.




**SWITCH**—A simple means of making and breaking a circuit, also a means of changing connections from one circuit to another.

**Synchronous**—Simultaneous. Occurring at the same time.

**Synchronous Alternator**—An alternating current generator operating or capable of being operated in synchronism with another generator.

**Synchronous Converter**—A rotating machine having a field excited by direct current and an armature connected to a commutator and a set of collector rings, used to convert direct to alternating or the reverse.

**Synchronous Motor** — A machine constructed similar to a separately excited alternator but operated as a motor. These are used in some systems of television and facsimile transmission and reception.

## T

**Telegraph Key** — A type of switch for making and breaking a circuit at will for the purpose of transmitting dots and dashes.


**TELEPHONE RECEIVER**—A device for producing sound impulses from electric current variations.

**Telephone Transmitter**—A device for converting sound pulsations into electric current variations. See Microphone.

**Television**—A system for transmitting and receiving moving images by means of radio or wire lines. The images appear upon a screen at the receiver.

**Tetrode** — A four-element vacuum tube, consisting of filament (or cathode), grid, screen grid and plate.

**Thermal Ammeters**—Current measuring instruments that operate due to the heating effect of an electric current.

**Thermionic Emission**—The emission of electrons or ions under the influence of heat, as in a vacuum tube cathode.

**Thermocouple**—A junction of two different metals which develops an E. M. F. when heated. Used with ammeters to measure small currents.

**Thermoelectricity** — The electrical energy, which is transformed from heat energy in the thermocouple.

**Tickler**—The coil in the plate circuit of a regenerative radio receiver. Used to feed some of the energy back into the grid circuit. (See Feed Back).

**Tikker**—A device for rapidly and somewhat irregularly making and breaking the circuit of a receiver for reception of undamped waves.

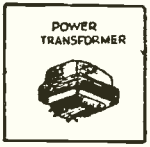
**Time Signals**—Signals transmitted each day for indication of correct time by certain radio stations (e.g., station NAA).

**Tone Modulation** — The chopper, buzzer and sine-wave modulation system are referred to as "tone modulation."

**Train Frequency** — The number of groups or trains of waves per second.

**Trains, Wave**—Groups of alternating current waves of both the continuous and discontinuous type.

**TRANSFORMER**—A device for transferring energy from one circuit to another.

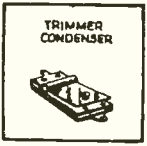



**Transmission, Radio**—The propagation of electromagnetic waves from a transmitting station.


**TRANSMITTER — MICROPHONE** Any type of microphone may be referred to as a transmitter, but the usual reference is to a single button carbon microphone, as used in telephone transmitters.

**Transmitting Antenna**—An arrangement of conductors connected to a generator of high frequency currents for the radiation of radio waves.

**TRIMMER CONDENSER** — A small condenser used to balance a circuit. Frequently used to compensate for variations between the sections of a ganged condenser.



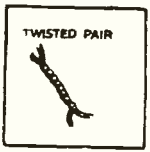
**Transmitting Circuit**—The arrangement of and connections to pieces of apparatus used in the generation of currents of high frequency for radio transmission.

**Triode**—A combination of a heated cathode, a relatively cold anode, and a third electrode for controlling the current flowing between the other two; the whole enclosed in an evacuated bulb. Variously called, audion, pliotron, radiotron, oscillion, audiotron, aerotron, electron tube, vacuum tube, etc.

**Tuned Circuit**—A circuit having its value of capacity and inductance such that the period of oscillation corresponds to a desired value.

**Tuning**—The adjustment of a circuit to resonance with a frequency.

**Tungar Rectifier** — A vacuum tube device for changing alternating to direct current.




**TWISTED PAIR** — Two conductors which are twisted together, though insulated from each other. Often refers to a pair of twisted wires used as lead-in from a doublet antenna, etc.

**Two Electrode Vacuum Tube** — A vacuum tube having a hot cathode and a relatively cold anode, i.e., one with filament and plate only.

**"T" Type Antenna**—A flat top antenna in which the lead-in is taken from the center of the horizontal portion.

## U

**Umbrella Type Antenna** — An antenna the conductors of which form elements of a cone with the apex at the top, to which the lead in is connected.

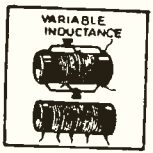
**Undamped Waves, Radio** — Waves representing a true alternating current. Those of constant amplitude are called continuous waves. (See Continuous Waves.)

**Underground Antenna**—An antenna consisting of an insulated wire, placed a short distance under the surface of the ground.

## V

**VACUUM TUBE** — See Electron Tube.

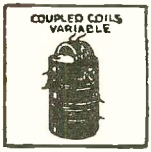

**VARIABLE CONDENSER** — A condenser, the electrical capacity of which may be varied.




**VARIABLE INDUCTANCE**—An inductance which may be varied. As a slide tuner, a tapped coil, etc.

**VARIABLE RESISTOR** — A resistance element which may be varied to afford various values.


**VARIO - COUPLER** —An arrangement of two or more coils in




such a manner that the movement of the coils will vary the coupling.

**Variometer**—A variable inductance controlled by altering the relative position of two coils.


**Velocity**—Speed. As applied to radio waves, it is 186,300 miles per second.

**Velocity Microphone**
A microphone in which a stretched metallic ribbon in a magnetic field replaces the more usual diaphragm.

**Voltage Amplification**—The ratio of the voltage change produced in the amperage and voltage.

**Vernier Condenser**—A variable condenser having small capacity.

**Vernier Dial**—Loosely, a tuning dial which moves the unit it controls through a short arc when its control knob is turned through a greater arc.

**Vibrator**—A device, most commonly used in auto-radio receivers, to interrupt the direct current from the storage battery, so that it becomes pulsating D.C., which may be stepped up by means of a transformer, to provide plate potential for the vacuum tubes in the receiver.

**Voice Coil**—A small coil of wire attached to the diaphragm of a dynamic speaker. Voice currents from the audio amplifier, flowing through the voice coil, cause it to move in the magnetic field in which it is placed.

**Voice Modulation**—The variation of amplitude of an alternating current wave by means of the voice.

**Volt** — The unit of electromotive force. The electrical pressure required to send a current of one ampere through a resistance of one ohm.

**Voltage Amplification**—The ratio of the voltage change produced in the output apparatus in the plate circuit to the change in the voltage impressed on the grid.

**Voltage Divider**—A tapped resistor. When a voltage is applied across its extremes, intermediate voltages may be secured from its taps. Much used in power packs.

**VOLTMETER** — A device for measuring the difference of potential in volts.


**Voltage Drop in Generator or Battery** — See Internal Drop.

**Vulcanized Fibre** — An insulating material having a dielectric constant of from 5 to 8.

**"V" Type Antenna** — Two sets of horizontal wires supported by three masts so that the horizontal portions form an angle.

## W

**Water Pipe Ground**—A water pipe to which connection is made for the ground.

**Water Rheostat**—A rheostat which uses the resistance properties of water or some salt in solution.

**Watt**—The unit of electrical power and representing the product of amperage and voltage.

**Wave Antenna**—A horizontal antenna the physical length of which is approximately equal to the length of the radio waves to be received, and which is used so as to be directional.

**Wave Changer**—A transmitting device for rapidly changing the radiated wave length.

**Waves, Continuous**—See Continuous Waves.

**Wave, Damped**—See Damped Wave.

**Wavemeter**—A radio instrument for measuring frequency and, consequently, wave length.

**Wave Length** — The distance between peaks of an electromagnetic (or other) wave. The distance traveled by such a wave during one complete cycle.

**Wave Train**—See Trains, Wave.

**Wave, Undamped** — See Undamped Wave.

**Wheatstone Bridge**—An instrument for measuring resistances.

**Wired Radio**—The guidance of radio waves by conductors.

**Wire Telephony**—The transmission of speech over wires.

**Wood's Metal**—An alloy having a low melting point, used for mounting crystals for detector purposes.

## X

**"X's"**—A term sometimes used to designate static, strays, atmospherics, etc.

## Y

**Yoke, Dynamo** — The frame from which the poles project radially inward.

## Z

**Zero Beat Reception** — Also called "homodyne" reception. A method of reception using a radio frequency current of the proper magnitude and phase relation so that the voltage impressed on the detector will be of the same nature as that of the wave.

**Zinc Spark Gap**—A spark gap having zinc as the electrode.

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