

EDISON
LIGHT-O-MATIC
RADIO

**INSTRUCTION
BOOK**

**FOR
MODELS R-6 AND R-7**

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THOMAS A. EDISON, INC.
ORANGE, N. J.

PATENTED

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1,173,079	1,385,873	1,504,537	1,670,893
1,195,632	1,387,984	1,520,984	1,675,186
1,201,272	1,403,475	1,537,708	1,687,245
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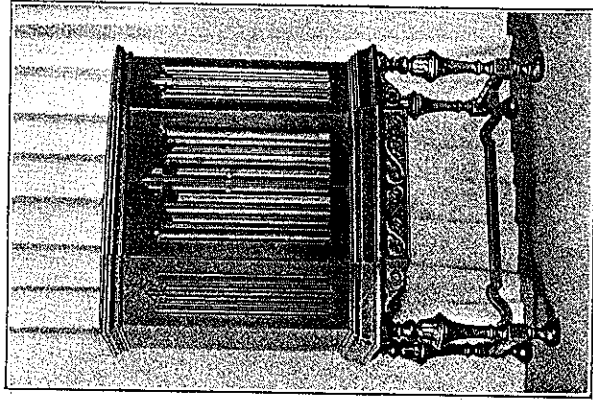
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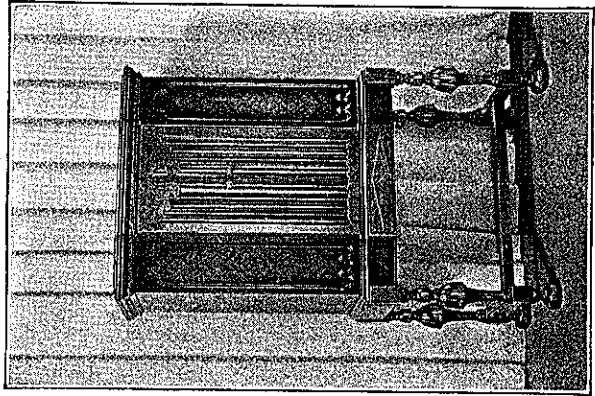
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EDISON
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MODEL R-6



EDISON
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MODEL R-7

FOREWORD

It is within the memory of many now living, of a world without electric lights, telephones and electric railways. Many recall days when such things as phonographs, business dictating machines, movies and radios were unheard and undreamt of. And yet today, these are all commonplace.

The wonder is not so much that we have these and many other marvelous conveniences, but that they emanated, either completely or in major part, from the brain of one man, Thomas Alva Edison. His fundamental inventions, improvements and discoveries have wrought wondrous changes in human life during the last fifty years.

The art of radio, in particular, is absolutely dependent on Edison's basic work, for in 1875 he discovered the hitherto unknown phenomenon caused by electric waves in free space, which he called "Ethereic Force." This discovery might well be called the birth of radio, for without "Ethereic Force," radio might never have been thought of. In 1883 Edison discovered the "Edison Effect"—the fundamental principle on which every radio tube is based. The microphone, so indispensable in broadcasting, is merely a glorified form of the carbon telephone transmitter, entirely the invention of Edison. Generation of electric current, systems for its distribution, and methods for its measurements, all important to radio in these days of electrical receivers, were all made possible by the work of the great inventor.

Ever since Thomas Alva Edison invented the phonograph in 1877, the Edison Laboratories have continued their tireless search for greater and greater perfection in reproducing music. And now they introduce to the world the Edison Light-O-Matic Radio, a product that represents the culmination of more than fifty years' successful experience in the building of sound reproducing equipment. Being a development of the Edison Laboratories, where researches are inspired by Mr. Edison's own genius, there is assured every purchaser of the Edison Light-O-Matic Radio a mechanical correctness, a standard of inbuilt quality, and a degree of performance that one would expect from a radio receiver bearing the great name of Edison.

THE INDUSTRIES THAT MAKE THE EDISON LIGHT-O-MATIC RADIO

In one form or another, Thomas A. Edison has maintained a corporate organization for the promotion of his various enterprises continuously for a period of over fifty years. This organization has successfully weathered many periods of depression and panic and has endured seven times the average corporate lifetime.

The Thomas A. Edison Industries, sometimes called the "House of Edison," is today a world-wide organization creating, manufacturing and marketing many different articles of merchandise through a number of major divisions, each operating independently of the other, yet all responsible to the general executive board, of which Thomas A. Edison himself is chairman, and his son, Charles Edison, president.

The plants of the Edison Industries are located at Orange, Newark, Bloomfield, Kearny and Stewartville, N. J.; at New London, Wisconsin; and at St. Thomas, Ontario, Canada. Business offices are maintained in the principal cities of this country, in London, England, and in Australia. The Edison Export Division directs the distribution of Edison-made products to the farthest corners of the world.

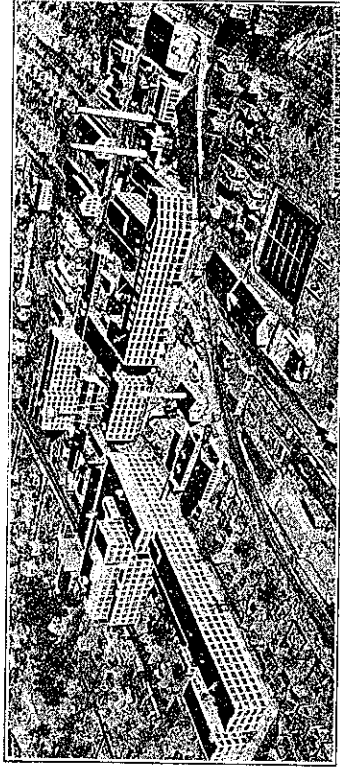
The plants of the Edison Industries are on properties totalling over 1,500 acres of land. While the money value of the plants runs into large figures, this enduring organization, being founded and guided by Mr. Edison, himself, has never subjugated its interests to the making of unreasonable profits, but has dedicated its entire resources to the service of the public by building useful and enduring articles of quality that materially contribute to the well-being of mankind.

The Edison Industries manufacture and distribute Edison Storage Batteries, Edison Mine Safety Lamps, Edison Portland Cement, Ediphones for business dictation, Edicraft Automatic Electrical Appliances, Edison Primary Batteries, stock tickers, call boxes and other telegraph equipment, mechanical and electrical parts and equipment and card tables, juvenile furniture, wood products, electro-platings and, of course, Edison Light-O-Matic Radios and Radio-Phonograph Combinations.

The Edison Wood Products Co., located at New London, Wisconsin, is one of the largest plants in this country for the manufacture of the finest furniture. Here are made all the cabinets for Edison Radios.

Also associated with the "House of Edison" are the Edison Botanic Research Corporation, investigating domestic production of rubber; the E-K Medical Gas Laboratories, producing medical gases, oxygen and nitrous oxide (laughing gas); the Ediplate Corporation, producing seamless floats and other electro-deposition products; Emark Battery Corporation, building automotive storage batteries, and the Edison Laboratories, where extensive experiments and researches are carried on, and where machinery is designed and manufactured for the various divisions.

This is a brief description of the industries that developed and manufacture the outstanding radio receiver of today—the Edison Light-O-Matic Radio. This great institution, the Thomas A. Edison Industries, with a past replete with achievement, and a future promising even greater accomplishments, is staunchly built on a foundation upholding the high standards and noble ideals of the genius, Thomas A. Edison, whose immortal work inspired and created it.



TO THE PURCHASER OF AN EDISON LIGHT-O-MATIC RADIO

In presenting to the public the Edison Light-O-Matic Radio, our aim has been to incorporate into each receiver the finest expressions of engineering research and skill that have been developed in the art of sound reproduction. We offer you your Edison Light-O-Matic Radio with the hope that in it you will find the perfection, both musically and artistically, for which the world of music lovers has so eagerly awaited.

Your Edison Light-O-Matic Radio has undergone the most thorough inspections all through the various processes of its manufacture. Before it left our factory as a finished product, it passed a rigid test to determine whether it fully met the exacting requirements that are set for all Edison-made products. Please remember, that every Edison Radio set is a sensitive electrical apparatus, built with scientific precision, which we have designed to perform even under extraordinary conditions. It will give uniformly satisfactory service unless subjected to abuse. Should you at any time encounter conditions which are not fully described and explained in this booklet, do not fail to get in touch with the Edison dealer from whom you purchased your instrument. Edison Radio dealers have been selected with great care and we are confident you will find their service reliable.

It is a matter of greatest interest to Thomas A. Edison, Inc., that your ownership of an Edison Radio or Radio-Phonograph Combination should provide you with a maximum of enjoyment and satisfaction. With this thought uppermost in our minds, we recommend to your careful reading the following instructions, in order that you may become fully acquainted with the proper installation, operation and care of your Edison receiver.

GENERAL DESCRIPTION

Models, Parts and Accessory Equipment

MODELS

Models R-6 and R-7 are designed to operate on 60 cycle alternating current electric power lines at voltages of 100 to 130 volts. (These models are also available for 25, 30 and 40 cycle operation.)

Models R-6 and R-7 differ only in design and artistry of cabinet. Each is equipped with a phonograph switch and jacks for the connection of an external electric phonograph pick-up.

Edison Light-O-Matic tuning is a feature of both models.

CABINETS

All cabinets are made of selected stock, in our own wood-working plants, with the superior craftsmanship so long associated with Edison products. Each model represents the mature experience of competent designers and are masterpieces of artistic furniture that will harmonize with the decoration of any home.

Model R-6 is a massive cabinet of dignified appearance, bearing the impress of the world's finest artistry. It is of walnut finish, high-lighted to bring out the rich coloring and the effect of the raised "linen-fold" panels. Its dimensions are $48\frac{1}{4}'' \times 34\frac{1}{2}'' \times 18\frac{1}{8}''$.

Model R-7 is a strikingly handsome cabinet, utilizing the same "linen-fold" design on the doors, with recessed panels of diamond matched walnut on each side. The size is $47\frac{1}{4}'' \times 27\frac{1}{4}'' \times 16\frac{3}{4}''$.

RECEIVER UNIT (Type A-R)

A standard receiver unit is used in both of the Light-O-Matic Models R-6 and R-7, containing a three stage pre-selector, two stages of tuned and one of semi-tuned radio frequency amplification (using screen grid tubes), detector, first and second stages of audio amplification and the Light-O-Matic Mechanism.

The receiver unit may be easily removed from the cabinet after removing the control knobs and unscrewing the "Pal" nuts underneath the receiver unit shelf.

The dimensions of the R-6 and R-7 receiver unit are $17\frac{1}{4}'' \times 11\frac{3}{4}'' \times 7\frac{1}{2}''$.

Approximate weight is 24 lbs..

LIGHT-O-MATIC MECHANISM

The Edison Light-O-Matic mechanism is a part of the dial drum assembly. It provides for the convenient registering or logging of all important stations and affords ready means for locating them. Its operation is explained under "OPERATING INSTRUCTIONS."

VARIABLE TUNING CONDENSERS

A two gang condenser is mounted on one side of the Light-O-Matic dial mechanism and a three gang condenser on the other. Three point suspension is employed in mounting and each gang condenser is completely insulated from the mounting panel. Each condenser is separately shielded and each gang is enclosed in an individual shield housing.

Each condenser has slotted end plates to permit accurate matching at the factory, while compensating condensers are provided for minimum capacity adjustment when required. These condensers are matched within limits of one micro-microfarad, plus or minus. Such accuracy is seldom, if ever, maintained in any other commercial product.

CIRCUIT

The radio frequency unit comprises a pre-selector and screen grid circuit designed by Edison Laboratory Engineers to provide "constant gain or sensitivity" over the entire dial range of 550 to 1500 kilocycles.

AUTOMATIC VOLUME CONTROL

The automatic volume control is in reality an automatic *gain* control which regulates the amount of energy fed to detector and prevents blasting of the speaker when the tuning dial is rotated through a number of stations.

MANUAL VOLUME CONTROL

The manual volume control regulates the audio volume, operating smoothly and quietly to permit gradual regulation.

When using a phonograph pick-up, use this same control to adjust the volume of record reproduction.

tone control

A tone control is conveniently located on the front panel. This should be adjusted for the most pleasing acoustical effect or to suit individual tone requirements. Emphasis of the BASS is obtained by rotating the control in a clockwise direction, while rotating this control in a counter-clockwise direction provides emphasis of the TREBLE.

LOCALTONE SWITCH

The localtone switch is provided to permit the purest tone quality obtainable from an extremely powerful broadcasting station.

ANTENNA CONNECTIONS

Every Light-O-Matic Model has a built-in antenna which can be satisfactorily used for reception from local broadcast stations. Light-O-Matic Models, however, will perform more efficiently when connected to an outside antenna.

sockets

Self centering sockets are employed, rendering easy the insertion of tubes under all lighting conditions. All sockets are color coded, reducing the hazard of inserting tubes in wrong sockets. All sockets are marked with tube numbers, indicating the tubes they accommodate.

PHONOGRAPH SWITCH

A phonograph switch is incorporated in each Edison Radio Receiver. In Models R-6 and R-7 it is operated by turning the station selector knob as far as possible in a counter-clockwise direction.

ELECTRIC PICK-UP JACKS

Electric pick-up jacks are provided on the receiver unit shelf. When the phonograph switch is operated, the jacks are automatically connected to the audio system of the receiver, thus providing for its use as an amplifier for the electrical reproduction of phonograph records.

LINE VOLTAGE REGULATION

The primary winding of the power transformer is provided with three taps, each of which is connected to a fuse receptacle located on the power unit and readily accessible after removal of the fuse box cover. These fuse receptacles are plainly marked for line voltages of 105, 115 and 125.

This provision makes it possible to maintain proper tube voltages under all practical line voltages which will be encountered, ranging from 100 to 130 volts.

PUSH-PULL AUDIO AMPLIFIER

Two of the type '45 tubes are employed in a push-pull third stage audio circuit which affords a total undistorted output exceeding three watts.

FIXED CONDENSERS

Fixed condensers in all Light-O-Matic Models are manufactured to our own specifications. Filter condensers are manufactured in our own plants. The latter are built up from four layer dielectric and exhaustive tests give proof of an ample safety factor.

TRANSFORMERS

Audio Transformer. The push-pull input transformer is a high grade audio frequency transformer using silicon steel core laminations which are shown by Laboratory tests to have a very high permeability.

Power Transformer. The power transformer has a core section $1\frac{3}{8}'' \times 1\frac{7}{8}''$ and develops 350 volts on each plate of the 280 tube. The primary is wound with No. 20 enameled wire and wire as large as No. 30 is employed in the secondary.

RECTIFIER

A single type '80 tube (full wave rectifier) is employed in the power circuit for supplying direct current to the electro-dynamic speaker field winding and to the plates of all tubes.

TUBES

The following tubes must be employed in Light-O-Matic Models R-6 and R-7:

Position	Type of Tube
<i>Receiver</i>	'24
1st R. F.	'24
2nd R. F.	'24
3rd R. F.	'27
Detector	'27
1st A. F.	'27
2nd A. F.	'27
3rd A. F.	Two '45s
<i>Power Unit</i>	'80
Rectifier	

SHIELDING

Auto body steel is employed in chassis and housing structures. Radio frequency coils are completely shielded within copper and aluminum containers. Variable condensers are shielded from one another and each condenser assembly is housed in a complete shield.

HUM ADJUSTER

A variable hum adjuster is located on the power unit to correct possible excessive hum due to varying line conditions and slight differences in individual vacuum tubes.

POWER UNIT

Each model has a separate power unit, containing a third audio stage in push-pull arrangement, rectifier, power transformer, filter condensers, chokes and electro-dynamic speaker.

Dimensions of the R-6 and R-7 power unit are $17\frac{1}{4}'' \times 11'' \times 12''$.

Approximate weight is 35 lbs.

Underwriters' requirements are fully complied with. All high voltage wires and connections are completely insulated and inaccessible to the owner, thereby eliminating all possibility of electric shock under normal operating conditions.

ELECTRO-DYNAMIC SPEAKER

The electro-dynamic speaker used in the Edison Light-O-Matic Radio is especially designed to give a uniform response curve. More than one hundred speakers were tested in the Edison Laboratories and after careful scientific comparisons, this speaker was selected because of its excellent tone quality, its efficiency, and its mechanical and electrical correctness.

POWER RATING

Both Light-O-Matic Models R-6 and R-7 have a power input rating of 125 watts.

Although designed for operation on 60 cycle alternating current, each of the Light-O-Matic Models will perform quite satisfactorily on 50 cycle alternating current.

INSTALLATION

Construction of the Antenna. Lightning Arrester. Ground. Location of the Receiver in Your Home. Insertion of Tubes. Line Voltage Adjustment. Connection of the Receiver to Power Line. Adjustments to be Made When the Receiver is Installed.

ANTENNA CONSTRUCTION

(See Figure 1, next page)

Where it is not possible or desirable to construct an outside antenna, the "built-in" antenna shown in Figure 1 will be found to function admirably for all local broadcasting stations. Wherever possible, however, an outside antenna should be erected. Great care should always be exercised in making such an antenna installation.

The flat top portion of the antenna system should preferably be made up of seven strand phosphor bronze wire. If this is not available, single strand No. 14 copper wire may be employed. It is recommended that the overall length of the antenna be from 75 to 125 feet. The insulators at each end of the flat top portion should be attached to masts or other supports, but wherever possible, such supports should be placed so that the antenna will be as high as possible above surrounding structures.

The lead-in wire should be of the same size wire as that used in the flat top portion of the antenna, and soldered to it at "E". It should be kept clear of the building as much as possible, and never be tacked directly to the side of the building. Whenever practical, the clearance should be approximately two feet to the point of entrance into the room containing the receiver.

As shown in Figure 1, a lead-in strap can be used for bringing the lead-in wire through the window opening. Connections to the lead-in strap, both outside and inside the window, should be soldered. If it is desired, or when a lead-in strap is not obtainable, the lead-in wire itself can be continued through the building wall, passing through a porcelain tube, as shown by the dotted outline in Figure 1.

The lead-in wire is continued inside the room to the receiver unit and connection is made to the post marked "ANT."

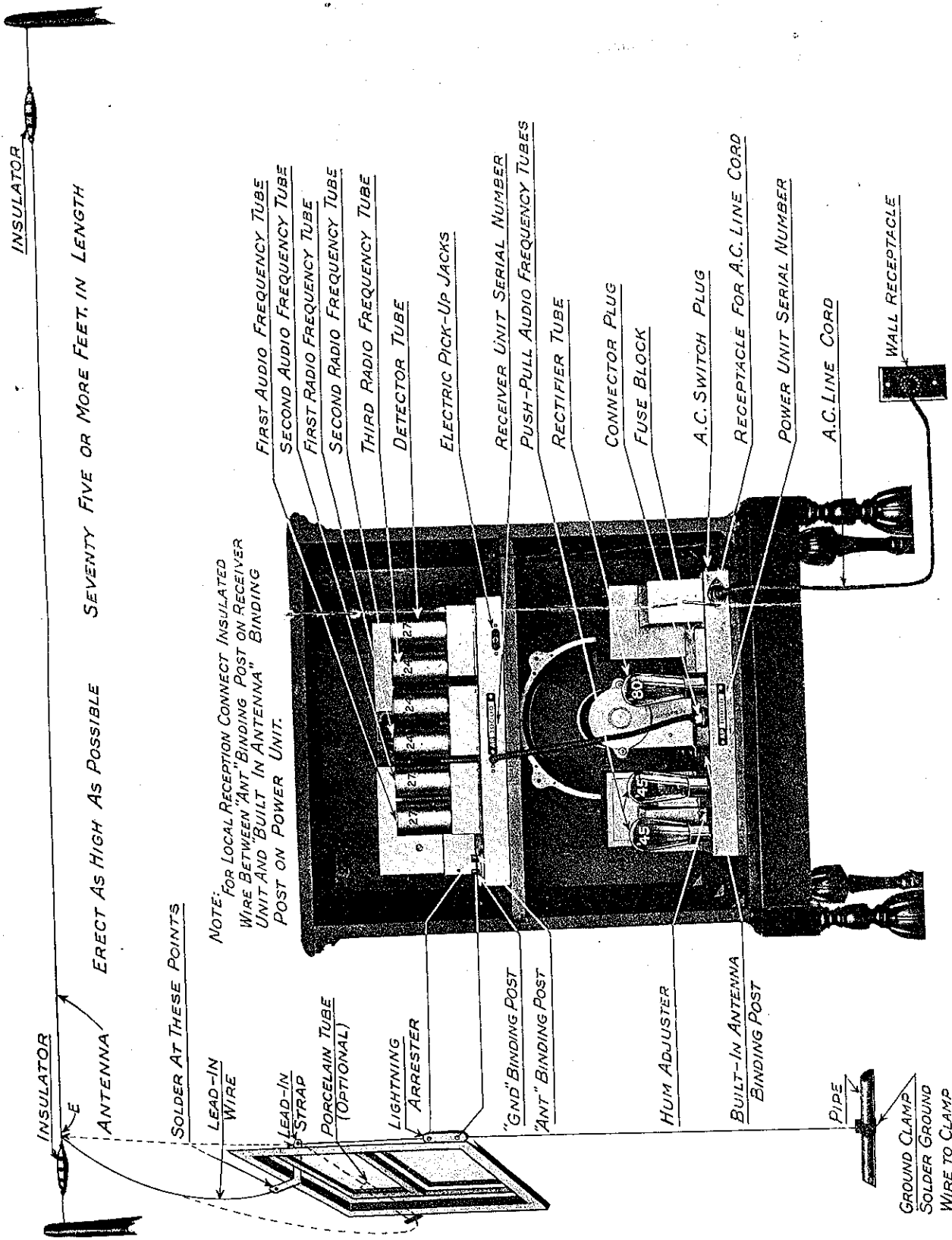


FIGURE 1

Never connect both the "built-in" and outside antenna to the antenna post simultaneously, as the selectivity of the set will be impaired.

LIGHTNING ARRESTER

A lightning arrester must be used on all outside antenna systems to conform with Fire Underwriters' Regulations. Your dealer will recommend the one to be used and it should be installed in accordance with instructions accompanying it.

GROUND

The ground connection is also important. It should be as short and direct as possible. The ground connection is made from the post marked "GND" to a cold water-pipe, whenever possible. If a cold water-pipe is not available, use a radiator, but never a gas-pipe. If it is not possible to make the ground connection to a water-pipe or radiator, connection may be made to a galvanized pipe or rod, or to a copper plate that has been buried in damp ground. In making the ground connection use a copper strap firmly clamped around the pipe, radiator, etc., being sure to scrape the metal clean before affixing the strap. The ground wire should be soldered to the strap or plate.

LOCATION OF RECEIVER IN THE HOME

The receiver should be placed as near as possible to the point of entrance of the lead-in wire from the antenna system (where outside antenna is used) and convenient to a power outlet or wall receptacle.

INSERTION OF TUBES

All radio tubes should be handled carefully. Follow Figure 1, Pages 16 and 17, to aid in locating sockets for the proper tubes. Unless tubes are placed in their proper positions, serious damage or the complete destruction of them may result.

All sockets are plainly marked for the tubes that go into them. Note that the receiver unit has six tube sockets, three taking the type '27 tube, and three, the type '24. The tube shields must be removed in order to insert the tubes in their respective sockets. *Be sure* to place shields back in position after the tubes are in place.

It is to be noted that the tube shields are made in two pieces to permit their use with the type '24 screen grid tubes. After inserting the screen grid tubes in their respective sockets, remove the cap from the tube shield and place the shield in position, locating

the slot so as to permit fastening the shield grid lead to the tip of the tube. Then replace the tube shield cap.

The power unit has three tube sockets, the two on the left taking type '45 tubes, and the one on the right taking the type '80 rectifying tube.

WARNING: Type '45 tube filaments will be immediately destroyed if a type '45 tube is placed in the type '80 socket.

LINE VOLTAGE ADJUSTMENT

When installation is made and before operating the receiver, the line voltage should be measured at the electric wall receptacle or lamp socket to which the set will be connected.

If the line voltage is between 110 and 120 volts, no adjustment is necessary. All power units are adjusted for these voltages when shipped from the factory.

Should the line voltage be lower than 110 or higher than 120 volts, it is necessary to remove the fuse receptacle cover and place the fuse in the position designated for the line voltage present in your location, if best results are to be obtained and the life of the tubes are to be prolonged.

Figure 2, Page 20, shows the location of the fuse block. When the set leaves the factory, the fuse is placed in the central position labeled "115." This is the correct position for all line voltages between 110 and 120, and is so made because approximately 70% of the power lines in this country deliver voltages ranging from 110 to 120 volts.

When the line voltage measures less than 110 volts, the fuse should be removed from its position and placed in the position labeled "105." Similarly, if the line voltage is found to be more than 120 volts, the fuse should be moved to the position labeled "125."

WARNING: To avoid danger of injury, set must be disconnected from light socket or wall receptacle before fuse block cover is removed to change the position of the fuse for various line voltages. For the same reason, fuse block cover must be replaced after position of fuse is changed.

If a fuse having a capacity exceeding two amperes is used for replacement, the guarantee on the receiver will be void.

CAUTION: Correct line voltage adjustment is absolutely necessary to insure longest possible life from all vacuum tubes. Low line voltage will endanger the life of some tubes just as much as

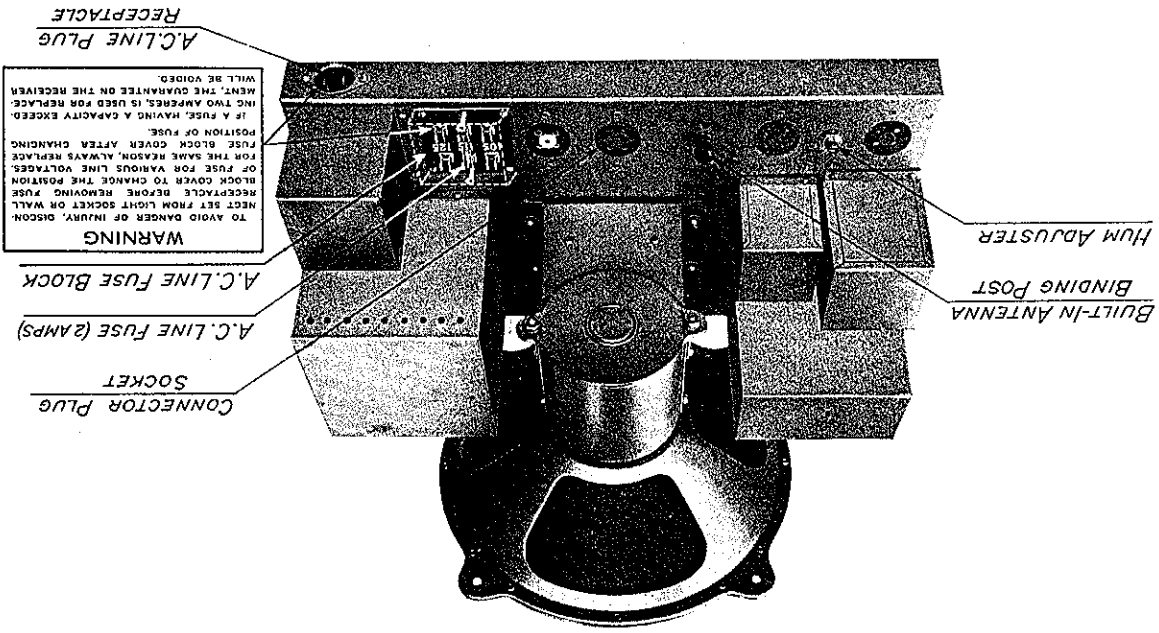


FIGURE 2
POWER UNIT

will high line voltage. It is therefore necessary that this adjustment be given proper consideration and correct adjustment be made when the instrument is installed.

CONNECTION OF RECEIVER TO POWER LINE

A line cord equipped with a standard socket plug and a special plug to fit the receptacle at the rear of the power unit (See Figure 1) is provided with each receiver. The standard socket plug must be inserted into an electric wall receptacle or lamp socket supplying alternating current, 100 to 130 volts and the special plug on the other end of the line cord must be plugged into the receptacle at the rear of the power unit.

The receiver is now ready to operate.

ADJUSTMENTS TO BE MADE WHEN RECEIVER IS INSTALLED

Elimination of Hum. Located on the power unit base at the point indicated in Figure 2, will be found an adjustment screw. This screw operates a variable resistance which is known as the hum adjuster. By inserting a screw driver and turning this adjustment screw from extreme left to extreme right you will note one position, approximately midway between the extremes, which is free from hum, or where the hum level is at a minimum.

The attainment of zero hum level is governed almost entirely by the tube characteristics and general line conditions. That is, with a set of perfect tubes and proper line conditions, no hum will exist after correct adjustments have been made.

OPERATING INSTRUCTIONS

(See Figure 3, Page 22)

To turn on power, push "On-Off" toggle switch to the right. A short time, a matter of seconds, is required for the tubes to warm up, after which the set is ready to operate. The calibrated dial window is illuminated when the "On-Off" toggle switch is pushed to "On" position, unless the pilot light is loose in socket or is burned out.

To turn off power, push "On-Off" toggle switch to the left and the calibrated dial will no longer be illuminated.

The volume control knob controls the audio volume of the receiver. Turning it in a clockwise direction increases the volume and in a counter-clockwise direction decreases the volume. (When using an electric pick-up, this volume control also regulates the volume of record reproduction.)

Tuning the receiver for the broadcasting station desired is accomplished by rotating the station selector knob (See Figure 3) which actuates the dial mechanism and its associated parts. Rotation of this knob moves the calibrated dial, seen through the left hand window in the escutcheon plate, and enables the operator to select any station from 550 to 1,500 kilocycles.

Care must be exercised to insure that the desired station is properly tuned in. That is, the dial must be stopped at the point where the tone quality is best and the noise level is lowest. This is the exact point of resonance and if care is not exercised to attain this point, the purest tone quality will not be obtained.

The localtone switch, which has two positions, should be rotated to the position that permits the greatest volume on a weak or distant station. This is the position of maximum sensitivity in which the switch should always be kept *except* under the following conditions: When an extremely powerful station is tuned in, it may be necessary, in certain locations, to rotate this control in the *opposite* direction to obtain purest tone quality.

With a radio station tuned in and the volume control knob adjusted for normal room volume, it is possible, due to the action of the automatic volume control within the receiver, to rotate the station selector knob without any undesirable blasting, unless the receiver is located in close proximity to a powerful local station. In this case it is necessary to rotate the localtone switch knob, as outlined above, in order to eliminate the blasting of this particular station and to obtain purest tone quality. It is of course understood that for weak stations it is necessary to turn the volume control on full.

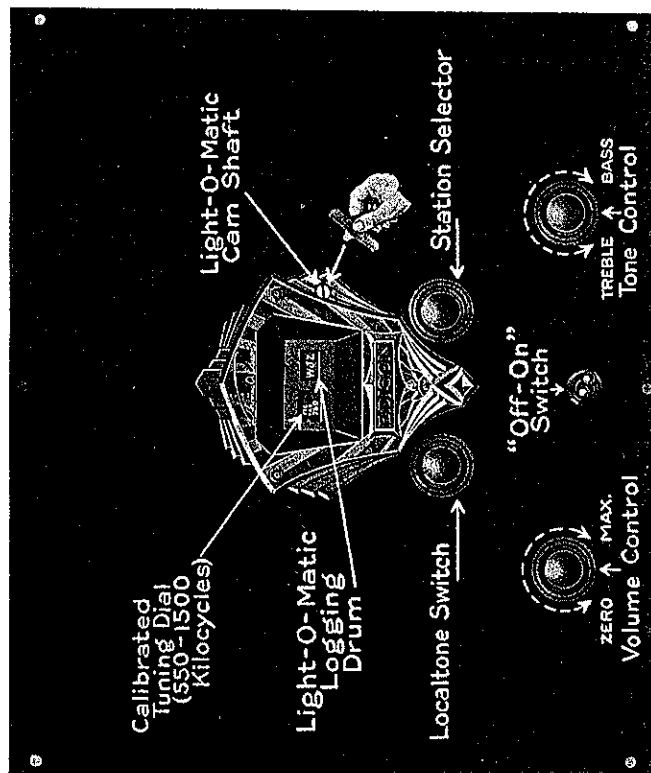


FIGURE 3

CONTROL PANEL

(Light-O-Matic Models R-6 and R-7)

OPERATION OF EDISON LIGHT-O-MATIC TUNER

(See Figure 3, Page 22)

To operate the Edison Light-O-Matic Tuner, rotate the station selector knob until a station is heard. Reduce the volume as low as possible, and again rotate this knob back and forth, stopping the dial in the position that permits the best tone quality. If care is not exercised to attain this point, the purest tone quality will not be obtained.

Then, and then only, write or preferably print on the Light-O-Matic dial that is seen through the smaller window at the right of the escutcheon plate, the call letters of the station to which you are listening.

Now insert the Light-O-Matic key (one accompanies each receiver) into the Light-O-Matic key receptacle and turn the key a complete revolution in a clockwise direction. As the key is turned, a punching pin embosses a copper disc, which in turn operates a contact plunger, closing the filament circuit of the Light-O-Matic lamp. This illuminates the call letters within the Light-O-Matic window. Thereafter, to tune in this same station all one need do is to turn the tuning knob until the call letters of this station are automatically illuminated within the Light-O-Matic window.

In this same way any station can be registered or logged and thereafter instantly located with precision tuning.

It is quite possible to register or log approximately forty stations on the Light-O-Matic dial. Logging need not necessarily be restricted to local stations. Any desired distant station, once located on the tuning dial, may then be registered on the Light-O-Matic dial and tuned in at will, whenever reception of that station is possible.

NOTE: To protect the dial from scratches during manufacture, a thin sheet of glazed paper is attached to the celluloid dial. If this paper is attached to the dial when the set is installed, the paper should be removed, otherwise it will be impossible to write the stations thereon. (This paper is cemented at the extreme ends of the dial.)

The Light-O-Matic dial assembly contains a copper embossing disc secured to the dial drum by a metal clamping plate. When it is desired to change the location of stations on the dial (as might be necessary in the event of reallocation of wavelengths by the Federal Radio Commission), the markings on the Light-O-Matic drum can be easily erased, the clamping plate removed (as shown in Figure 4) and the embossing disc lifted from the dial assembly. Then insert a new disc in the dial assembly and push the clamping plate back in place. The Light-O-Matic dial can again be logged, recording the stations desired.

Care must be exercised in installation to avoid bending the copper disc. Two small holes will be observed in the periphery of the disc. These holes are spaced so as to line up with two locating pins which project from the inner side of the dial scale supporting drum.

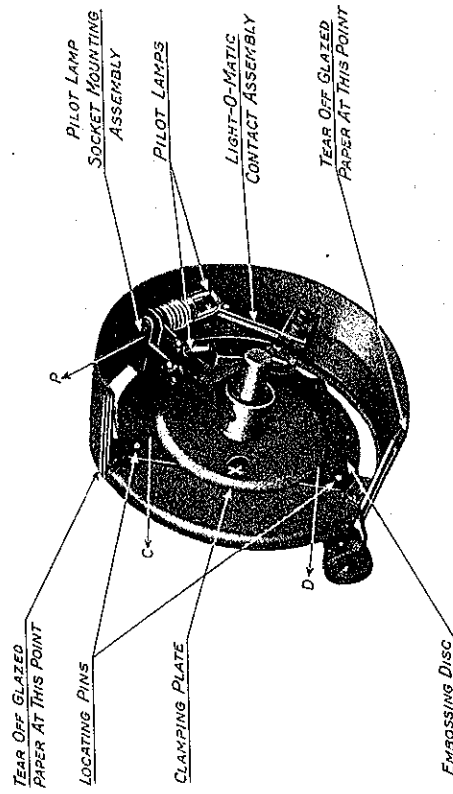


FIGURE 4
LIGHT-O-MATIC DIAL MECHANISM ASSEMBLY

DIRECTIONS FOR REMOVING EMBOSSING DISC AND REPLACING PILOT LIGHTS

REMOVING EMBOSSING DISC (See Figure 4).

First remove the clamping plate by grasping it at point X, and pulling away from shaft in direction indicated by arrows at C and D. The copper embossing disc may now be removed by prying it away from the metal drum until clear of locating pins, rotating it 180 degrees and pulling it away from the shaft in the direction indicated by arrows at C and D in Figure 4.

To replace, slide copper disc in position against drum, rotating it 180 degrees until it slips over the locating pins and push the clamping plate back into position. It is absolutely necessary that the copper embossing disc rest flat against the supporting drum.

TO REPLACE PILOT LAMPS (See Figure 4).

Rotate the tuning knob until the dial drum scale is set for 1500 Kilocycles. The pilot lamp socket mounting assembly is now accessible and can easily be withdrawn from the holding plate by pulling in the direction indicated by the dotted line at "P".

Replacement of either or both lamps can now be made by simply unscrewing and removing the defective one and screwing the new one into the socket.

INTERFERENCE

NOISES—SOMETIMES REFERRED TO AS "MAN-MADE STATIC"

In some locations sounds will be emitted from the loud speaker not associated with entertainment as transmitted from the broadcast stations. The radio listener may attribute such noises to the radio receiver. Generally this is an incorrect assumption because most properly designed radio sets are free from inherent noises when properly installed.

Usually one can quickly determine if such noises originate within the set itself or from outside sources by momentarily disconnecting the antenna lead-in wire from the antenna binding post. If the noises cease when the lead-in wire is removed it is usually an indication that the noise is being generated by an outside source and not due to any fault within the receiver.

Such interfering noises are caused by electrical and mechanical devices and may be effectively eliminated if traced to their sources.

These noises can originate from the following sources: corroded or otherwise defective joints and connections in power lines, leaky insulators, defective lightning arresters, transformers, generators and motors. Other sources of interference are: arc light circuits, telephone and telegraph equipment and lines, pole changers and converters, improperly bonded rails on street car and electric railway systems, smoke and dust precipitators, and sign flashers.

Household appliances such as electric pads, violet ray machines, flat irons, door bells, light switches, vacuum cleaners, washing machines, electric fans, etc., are frequent sources of interference.

Interference may also come from: X-Ray machines, storage battery chargers, annunciator systems, stock tickers, ignition systems, electric elevators, electric furnaces, moving picture equipment, high voltage test equipment, electric curling irons, percolators, leaky cables, bad connections in lighting systems, printing presses, hair clippers, motor brushes, leaky transformer fuses, defective light sockets.

Electrical appliances such as are used in the home should be properly maintained to eliminate this source of interference. Street

car interference usually prevails in smaller municipalities, but is rapidly being overcome, as is also telephone and telegraph interference. When X-Ray machines and high frequency apparatus are sources of trouble, the condition should be called to the attention of the owners or operators, who will usually make immediate correction rather than incur the ill will of their neighbors.

Static.

There is another kind of interference commonly called "static," caused by atmospheric disturbances over which man has no control.

This interference is more prevalent in summer than in winter, and is often annoying, especially when one is selecting or listening to distant stations. Static noises accompany atmospheric disturbances and science has failed to discover ways and means of eliminating entirely their effect on radio reception.

Summer static originates with lightning and thunderstorms, manifesting itself before as well as throughout the duration of the disturbance.

Snow and rainstorms sometimes are and sometimes are not accompanied by static noises in the radio receiver.

Intense static noises at sea invariably announce the approach of a squall, in some cases before the storm may otherwise be observed.

Northern lights or auroral displays are credited with responsibility for the prevalence of static noises; however, it is known that static does not always accompany auroral displays.

POOR RECEPTION

Outlining Some of its Causes and Suggested Remedies.

Lack of Volume.

Lack of volume or low volume may be caused by poorly soldered antenna and lead-in connections or by antenna or lead-in wire touching and shorting to some metal fixture such as a fire escape, copper gutter, etc.; or the lead-in wire may be broken within the insulation, such a break usually occurring at a sharp bend or turn. It is of course understood that the antenna and lead-in wire should be clear of all obstructions such as tree foliage, roofs, etc., which, when wet, would cause a lack of volume and probably intermittent noises.

Defective tubes will result in loss of volume. If any one tube is low in emission, or as sometimes styled "weak," volume will be reduced. When you are sure that no trouble, as above described, exists in the antenna installation it is advisable to have all the tubes tested. Any reliable radio shop will test them for little or no charge, when the tubes are delivered to the shop.

If the volume is normal when the set is first turned on and then gradually fades away to stillness it is possible that a type '24 or '27 tube has a defective filament which opens when heated and closes when cool, that is, lighting up and going out intermittently. This of course rarely occurs. Such a tube is defective and must be replaced with a perfect tube.

Fading.

Fading is very often attributed to the radio receiver when it is most probably caused by a poor antenna connection. The lead-in wire may not be soldered to the antenna or the lead-in wire may be touching intermittently the gutter or other metal objects. The lead-in wire may be broken within its insulating cover, providing intermittent connection with the swaying movement of the wire. If a lead-in strip is used the wires attached thereto may not be soldered. Any badly corroded connection in the antenna system may cause fading.

There are certain atmospheric conditions that can cause fading, while in certain locations particular stations are known to fade consistently on every radio receiver. Sometimes nearby stations may fade badly. This condition prevails in certain localities, that is, the same station may be received consistently at more remote places. This condition may result from absorption or deflection of the waves from the transmitting station.

Extremely distant stations are expected to fade in and out in accordance with atmospheric conditions. Stations that come in clearly one night may be barely audible the following night.

However with these models, fading will not be apparent on stations that can be brought in loud enough to listen to comfortably, because in such cases the automatic volume control will maintain a constant signal. (If a station is very distant or is a low-powered station and cannot be brought in with any volume, fading may be quite apparent.)

Heterodyning.

Heterodyning describes the whistling sounds which may accompany reception from certain stations. These noises arise from broadcast difficulties, such as shifting wavelengths, etc., and cannot be controlled in receiver design.

If a station should vary badly from its allotted frequency so that it is trespassing on another station's frequency, a heterodyne, resembling a high pitched whistle, might be set up and spoil reception of that particular station entirely.

Microphonic Howling or Moaning Sounds.

Such noises usually result from defective tubes, or tubes with loose, vibrating elements. If, after the receiver is turned on and the tubes begin to warm up, a faint howl is heard which grows louder, it is best to try different tubes in either the detector or first audio frequency socket as this sound is probably caused by a microphonic type '27 tube.

NOTE: Make sure the detector shield cover is in its proper position, otherwise the above noise may be heard.

Interference Between Stations.

There is always the possibility that one of the smaller or less powerful stations may vary from its allotted frequency, in which

case there is the possibility of its interfering with another station, rendering both stations unintelligible. A likely cause for interference between stations might be the use of too long an antenna.

Intermittent Buzzing.

Such interference, similar to the noise emitted by a bumble bee, is usually caused by a defective type '27 detector tube. Most of the tubes manufactured today are designed to eliminate this source of trouble; however, you may occasionally find a tube subject to such noise.

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