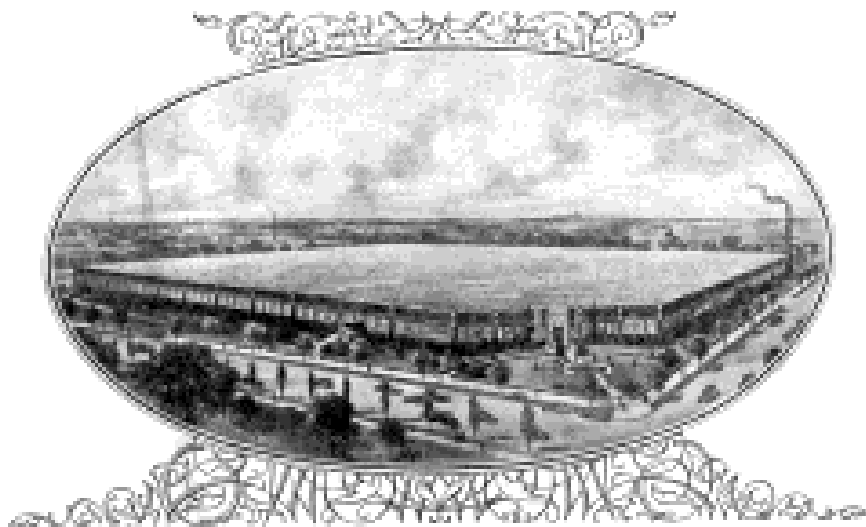


# ATWATER KENT RADIO INSTRUCTION BOOK

Vol. 2

PART No. 3852

PRICE 50 CENTS



ATWATER KENT MFG. COMPANY

4700 Wissahickon Avenue

*Philadelphia*

## **PREFACE**

*This book has been prepared with the idea of helping owners of Atwater Kent Receiving Sets to get the most out of their radio installation with the least possible trouble and expense. We have endeavored to answer, before they are asked, most of the questions that arise in the minds of the beginner in Radio and many that might trouble an experienced operator.*

*We earnestly recommend that before you purchase any additional equipment or attempt to install and operate your Receiving Set, you read over most carefully PARTS I and II of this book*

# Part I. INSTALLATION

## CHAPTER 1.

### Equipment Necessary for Installing any Type of Atwater Kent Radio Receiving Set

**RADIO SPEAKER OR PHONOGRAPH ATTACHMENT.** A high grade receiving set is worthy of a high grade speaker-in fact the speaker or phonograph attachment that you select will have a very great deal to do with the success of your radio installation. For this reason we strongly recommend that you use an Atwater Kent Radio Speaker or Phonograph Attachment, with your receiving set. If you have already purchased another make of speaker or phonograph attachment, we suggest that you immediately arrange to try out an Atwater Kent noting the improvement in the volume and quality of tone delivered by the Atwater Kent apparatus.

**TUBES. FOR MODELS 10, 12, 19, 20, 24 AND MODEL 20 COMPACT.** 5-volt, 1/4 ampere tubes should be used in all models, and it is recommended that all tubes be tested by the dealer before delivery.

**BATTERIES, FOR MODELS 10, 19, 20 AND 24.** Two kinds are necessary viz., an "A" battery and a set of "B" batteries. The "A" battery should be of the storage type, 6 volts and 80, 100 or 120 ampere. hour capacity, although a 60 ampere-hour battery is practical. The "B" batteries may be of the "dry" or "storage" type, composed of sufficient cells or units to produce 90 to 100 volts. If dry "B" batteries are used, the heavy duty types are recommended.

**BATTERIES. FOR MODEL 12.** Same as above but with the addition of a 22 1/2-volt dry cell "B" battery, which must be used for the Detector Tube of the Model 12.

**BATTERIES. FOR THE MODEL 20 COMPACT.** Same as given above, but with the addition of a 4 1/2-volt "C" battery.

**BATTERY CABLE OR WIRE.** For connecting the batteries to receiving set. Models 10, 12 and 20 Compact have a complete battery cable attached to them at the factory. For use with Models 19, 20 and 24, we recommend our special Atwater Kent Battery Cable.

When wire is used instead of the special cable, we suggest the following: for wires leading from receiving set to the "A" battery, No 14 Rubber Covered, solid or stranded: for wires leading from "B" batteries to receiving set, No. 18 Rubber Covered, solid or stranded. In either case a stranded wire is more flexible.

**BATTERY CABLE FUSE BLOCK.** It is recommended that a fuse block having the approval of the Underwriters' Laboratories, and made up of from four to six plugs or cartridge fuses, be inserted between the ends of the battery cable wire and the "A" and "B" batteries. Two (2) ampere fuses should be used for the "A" battery wires and one (1) ampere fuses for the "B" battery wires.

#### For The Model 21 Compact Dry Cell Receiver

**TUBES.** Three (3) volt, .06 ampere tubes should be used in all sockets. It is recommended that all tubes be tested by the dealer before delivery. CAUTION.-Tubes should be handled with care to prevent breakage.

**BATTERIES.** Six (6) 1 1/2-volt, dry cell "A" batteries. One (1) 4 1/2-volt "C" battery. Two (2) 45-volt or four (4) 22 1/2-volt dry cell "B" batteries. The large size or "heavy duty" dry cell "B" batteries are recommended as a good investment, due to their longer life.

**BATTERY CABLE.** A battery cable is supplied with the set.

**BATTERY CABLE FUSE BLOCK.** It is recommended that a fuse block having the approval of the Underwriters' Laboratories, and made up of five 1-ampere cartridge or plug fuses, be inserted between the ends of the battery cable and the "B" batteries. See page 19.

#### For an outside Antenna Installation

**ANTENNA WIRE.** 100 feet of 7-strand No. 22 gauge, phosphor bronze or copper. Bronze wire is recommended, as it is less liable to stretch and sag.

**LEAD-IN AND GROUND WIRE.** No. 14 Rubber Covered, stranded, of sufficient length to reach from the antenna to the Radio-Phonograph Cabinet and from the Cabinet to the ground, and also from the lightning arrester to its ground. Usually 50 feet is more than sufficient.

**GROUND CLAMPS.** Two (2). One used for grounding the set and the other for grounding the lightning arrester.

**LIGHTNING ARRESTER.** One that bears the approval of the Underwriters' Laboratories.

**INSULATORS.** (Strain Type.) Usually two are sufficient. They should be of the large size and preferably made of porcelain or glass.

**A PORCELAIN TUBE.** Usually 10 inches long, to be used for insulating the lead-in wire where it enters the building.

**INSURANCE UNDERWRITERS' CERTIFICATE OF INSPECTION.** In order that your radio installation may not affect the validity of your fire insurance policies, it is recommended that when your installation is complete, you secure a certificate of approval from the Insurance Underwriters having jurisdiction in your locality.

#### **For an Inside Antenna Installation**

**ANTENNA AND GROUND WIRE.** A sufficient length of some light weight insulated wire, either stranded or solid, such as No. 18 Bell Wire.

**GROUND CLAMP.** Only one is necessary as a lightning arrester and its ground, etc., are not required for an inside antenna installation.

## CHAPTER 2

### LOCATING AND ERECTING THE ANTENNA AND INSTALLING THE LIGHTNING ARRESTER AND GROUND.

The function of the antenna is to collect the electrical waves radiated from the various broadcasting stations and carry this electrical energy, via the antenna lead-in wire, to the receiving set.

To quote a homely simile, we might liken the antenna to the gutter on your roof and the lead-in wire to the down spout or rain conductor. A short gutter will collect and deliver to the down spout but a small amount of water—a very long gutter will deliver too much water for the down spout to handle. A radio antenna that is too short will not collect enough electrical energy, broadcast from distant stations, to enable you to tune in the signals. An antenna that is too long will collect so much electrical energy sent out from nearby broadcasting stations, that you will be unable to tune them out—that is, your set will not be "selective."

Again, referring to our simile, a gutter that drains a roof shaded by trees or other overhanging obstacles will not collect as much rain water as a gutter that drains a roof completely exposed to the elements, therefore your antenna should be raised as far as possible above trees, chimneys, etc., and the walls of your own, or adjoining buildings, so that it may have a chance to collect all the radio waves possible to collect.

Again, if a gutter is filled with leaves, dirt or ice, it will not deliver all the water to the down spout, for varying amounts will spill over the edge and drop to the ground. Likewise your antenna will not deliver all the electrical energy to your receiving set (through the lead-in wire), if it is so placed that it touches, or is even too near to other wires, metal roofs, gutters, chimneys, trees and the like, for the electricity will run from the antenna through these conductors to the ground, instead of to the ground through the lead-in wire and your receiving set.

An excellent antenna for Atwater Kent Receiving Sets is one composed of a single wire 80 feet in length in a straight line, stretched at least 30 feet above the ground and at least 10 feet above all trees, roofs, chimneys, etc., over which it passes, and 10 feet away from all walls, trees and the like. The lead-in wire might be anywhere from 15 to 35 feet in length, or a combined length of antenna and lead-in wire of from 95 to 115 feet.

Unfortunately it is difficult to give definite instructions as to the antenna you should erect, for after all is said and done, the antenna you will install will depend mostly on your location and surroundings.

If you live out in the great open spaces, and at a considerable distance from broadcasting stations, you will no doubt find that an antenna which is considerably longer than 80 feet will give you most satisfactory results.

If on the other hand, you live in a big city with its network of telephone, electric light and electric power wires, numerous local broadcasting stations and its many other forms of local interference, you will very likely get the most satisfactory results with an antenna which is considerably shorter than 80 feet in length.

Another determining factor is your physical location. That is to say, if your property is only 20 feet wide by 50 feet deep you cannot very well erect an antenna 80 feet long in a straight line—if the building you live in is only a few stories in height and is surrounded by towering buildings, you cannot be expected to raise your antenna 10 feet above their walls.

On the whole we recommend the installation of an antenna that is too long rather than too short, for, it is much easier to shorten an antenna after it is installed than it is to lengthen it in a straight line after it is installed See illustration 36

In order to assist you in selecting the type of antenna that most nearly fits your requirements, we give on the following pages several diagrammatic pictures of typical antenna installations.

# OUTSIDE ANTENNAS

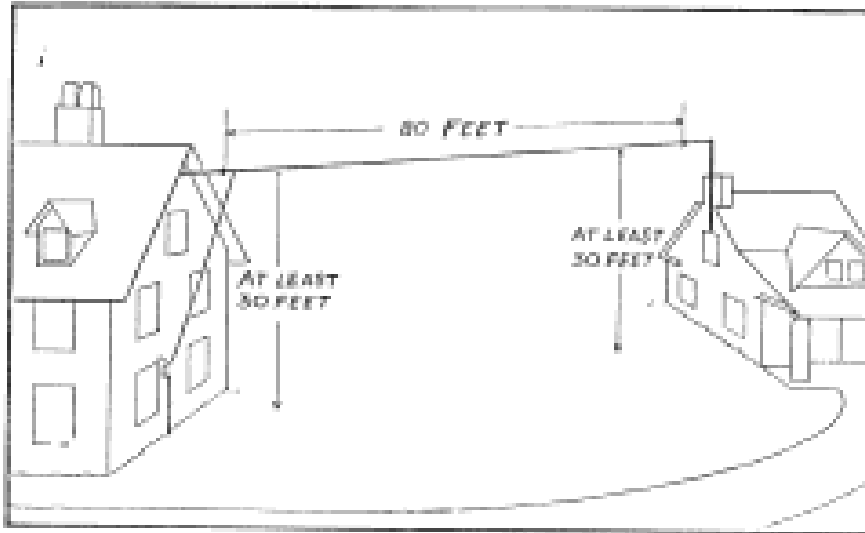


Illustration 1.

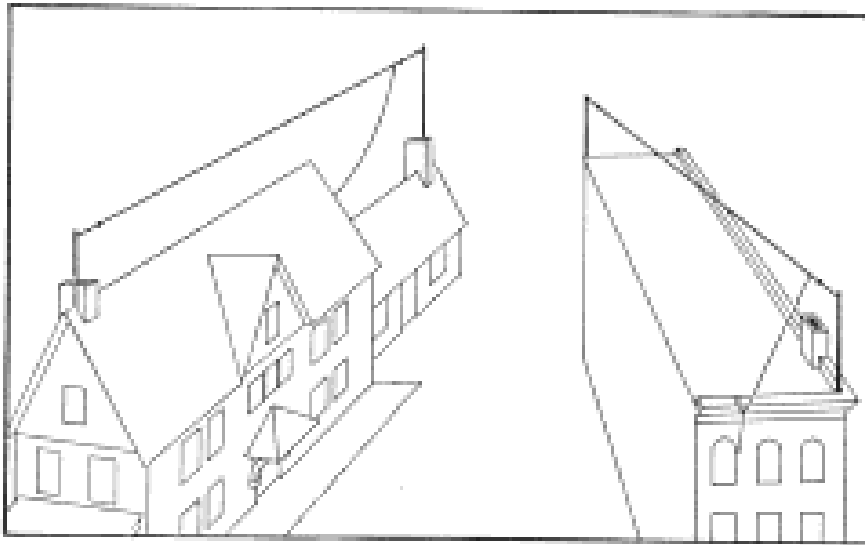


Illustration 2.

## OUTSIDE ANTENNAS

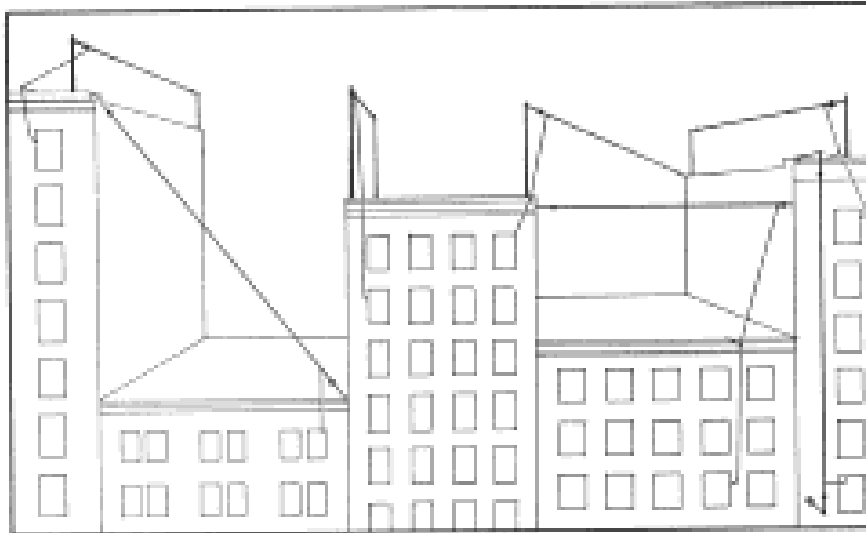


Illustration 3

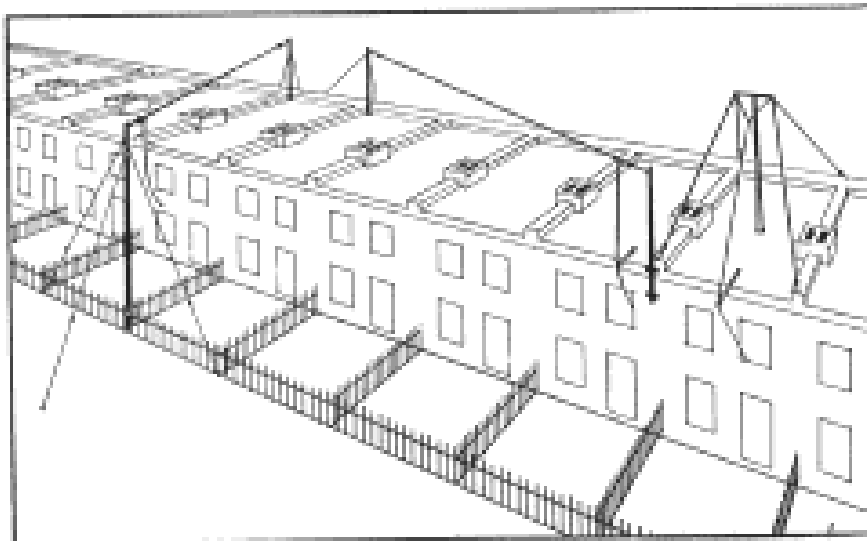


Illustration 4

## INSIDE ANTENNAS.

Whenever possible we recommend a full sized, outside antenna but, where this is impossible, very good results can be obtained from a properly installed inside antenna. We do not, however, recommend a "loop antenna" and wherever it might seem desirable or necessary to use one, a carefully planned inside antenna will be found to produce much better results.

In planning an inside antenna, endeavor to place it as high as possible in the building—in the attic or in a room on the top floor of the building.

Illustrations 5 and 6 show respectively an attic and a top floor room installation, both of which have been very successful. The type of antenna shown in Illustration 7 is also suitable for an attic installation.

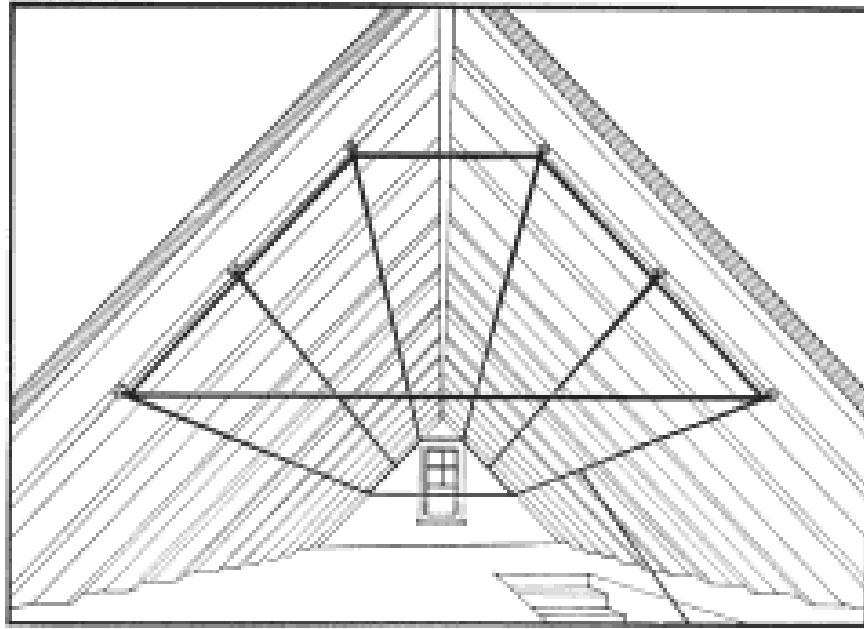


Illustration 5

In either case insulated wire is preferable, although not absolutely necessary, and the wires should be strung at least 2 feet 6 inches apart and 3 feet or more apart, if possible. In planning antennas of this character it should be remembered that doubling the number of wires does not double the effectiveness of the antenna. In other words, two wires each 40 feet in length or four wires each 20 feet in length are not the equal of a single wire 80 feet in length in a straight line. Hence it is desirable that the total length of the wires used should amount to considerably more than eighty feet, wherever this is possible.

In installing an antenna in an unfinished attic it is advisable to string the wires on porcelain insulators. Do not allow the wires to touch electric light wires, and when it is necessary for the antenna wires to pass over or under electric light wires, they should be encased in porcelain tubes or other approved insulating material.

Poor reception may be experienced if the antenna wires are run near, and parallel to, electric light wires for any appreciable distance.

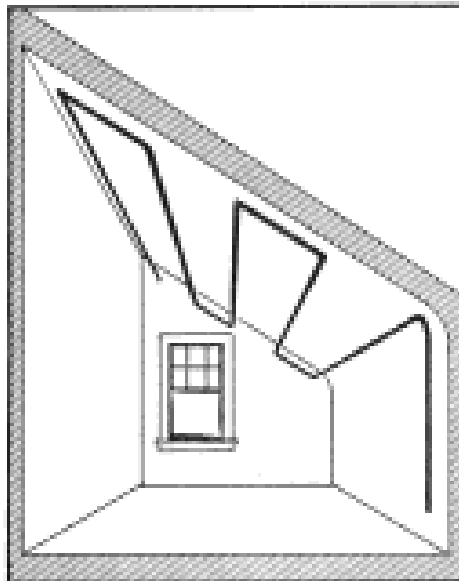


Illustration 6

Illustration 7 shows an excellent type of antenna for use in a Living Room or any other room of fairly large dimensions.

Usually the antenna wire is laid along the top of a picture moulding and held in place with glass headed tacks or light wire nails.

The results obtained with this type of antenna will depend to a considerable extent on the distance it is located above the ground and the size of the room, which governs the total length of the wire used. Where there are several small rooms, it is often found practical to string the wire around the walls of several of the rooms, although if this be done care should be taken that the wire does not cross itself at any point nor come closer to itself than the breadth of the average doorway— 2 feet 8 inches.

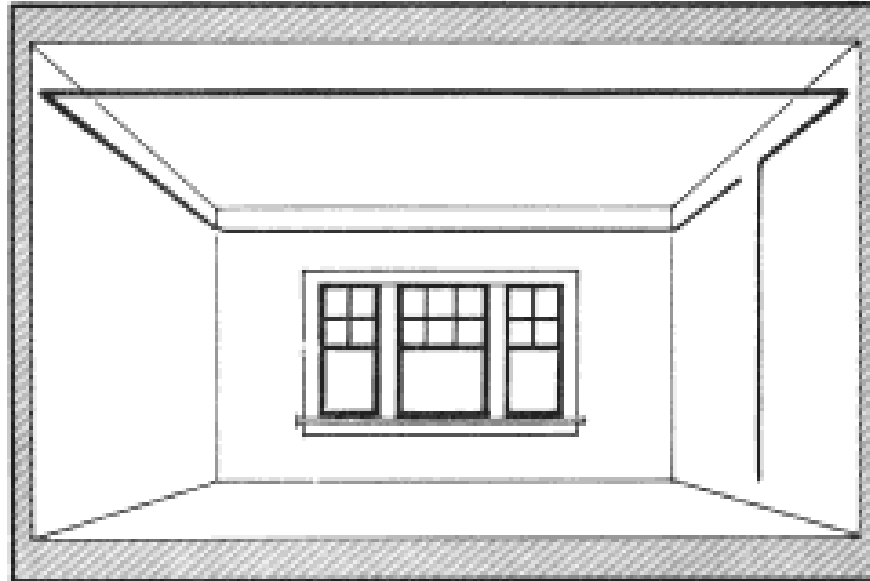


Illustration 7

### ERECTING AN OUTSIDE ANTENNA.

In erecting your antenna, care should be taken to see that the antenna wire is tightly stretched, and that the screw eyes or other terminals be firmly attached to a non-moving surface. Otherwise your antenna will be apt to be broken down by an accumulation of ice or snow, or blown down in a gale.

For this reason trees are not a desirable anchorage for antenna terminals. If a tree is the only possible place to attach one end of your antenna, be sure to use a pulley and counter-weight. If long poles are used to support your antenna, they should be made rigid by the use of guy wires, or a pulley and counter-weight should be used. The wheel of the pulley (P) should be of large diameter so that the continued movement of the rope over it will not quickly wear the rope through.

Usually the supporting wires CC (illustration 8) are composed of pieces cut from the coil of antenna wire. They should be long enough to make the insulators BB at least two feet from the terminal supports DD, or nearby cornices, etc. When a counter-balanced arrangement is used, the supporting wire C should be as short as possible, and the rope R long enough to place insulator B at least two feet beyond all nearby branches. If attached to a tree the supporting wire C should be incased in a piece of garden hose, or otherwise prevented from cutting into the bark.

The lead-in wire E should be soldered firmly to the antenna and the joint bound tightly with electric tape. It should be made to enter the building as far as possible above the ground and should not be run near to the ground wire F. nor near and parallel to metal gutters, rain conductors, electric light and telephone wires, gas, water or heating pipes.

The lightning arrester's ground wire should follow as nearly as possible a straight line from the lightning arrester to its ground.

In most localities it is allowable to ground the lightning arrester on a metal pipe (or other metal object) embedded in the earth or on an exterior or interior water pipe. In order that you may conform to your local requirements, we recommend that you secure a copy of you! local "Fire Underwriters' Regulations."



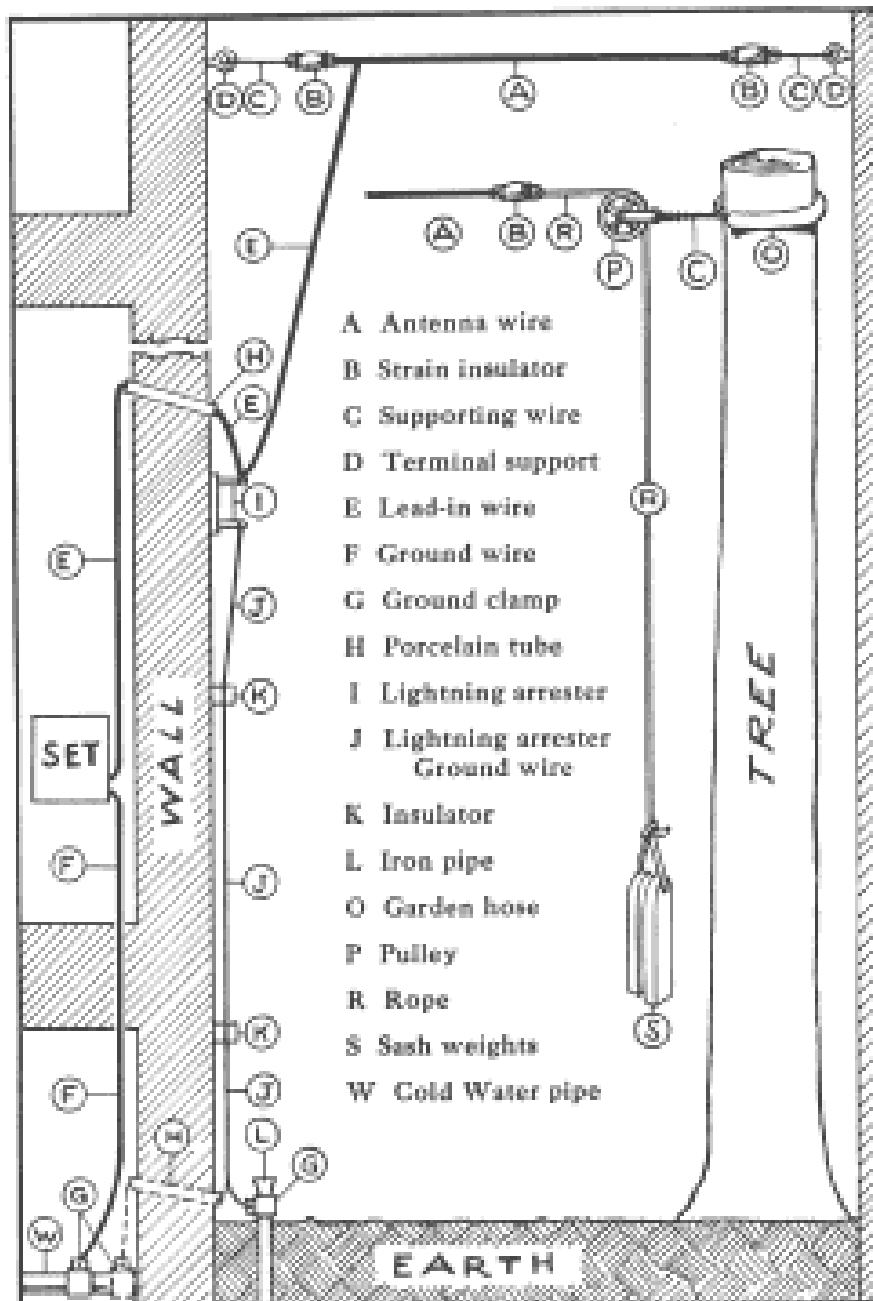


Illustration 8

DETAIL DRAWING OF AN OUTSIDE ANTENNA INSTALLATION

## CHAPTER 3

### Installing the Receiving Set

**LOCATING THE RECEIVING SET AND RADIO SPEAKER.** In the first place, the Receiving Set and Radio Speaker should be located in that part of the house or apartment where the whole family may have a chance to enjoy it. This usually means the living or sitting room, main hall, enclosed porch or in fact any place where the family and friends congregate.

In the second place, try to place the Receiving Set where it can be reached without the necessity of standing up or leaning over in an uncomfortable position. A small table, book-rack, piano bench, desk or other small piece of furniture will make an excellent place on which to put the Receiver, and it should be located near where artificial light is available for use at night.

The speaker is usually located close to the receiving set, in order to have it near the operator when distant stations are being tuned in, although this is not absolutely necessary. By adding to the length of the cable supplied with the speaker or phonograph attachment, either may be placed in any part of the room. For further information see Part III.



Illustration 9—This is the way George Ade has installed his Atwater Kent receiving set and radio speaker.

In order to help you select a place to put your receiver, we give here with several views showing how other owners of Atwater Kent Radio have installed their Receiving Sets and Speakers.

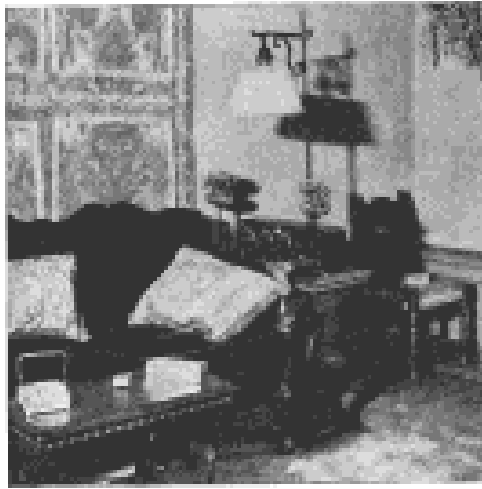


Illustration 10  
In the home of Irvin Cobb (above) and Julian Street (at the right), the Model 38 Compact runs on a little end table.



Illustration 11



Illustration 12  
An increasing setting in the home of Wallace Irwin.



Illustration 13  
Buck Turkington has placed his receiver in a corner of the hallway.

### Connecting the Speaker or Phonograph Attachment to the Receiving Set.

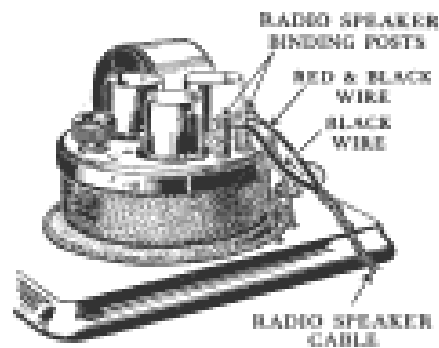


Illustration 14

**MODELS 10 AND 12.** In Models 10 and 12 this is done by inserting the red and black wire (issuing from the end of the radio speaker or phonograph cable) into the hole of the plus B binding post on the receiving set, and screwing in the knurled screw. Then attach the black wire to the other binding post. See illustration 14.

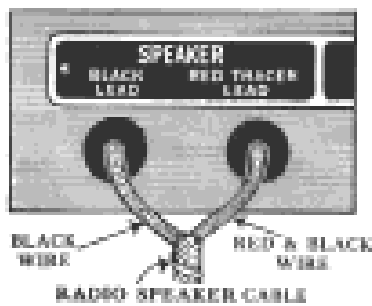


Illustration 15

**MODELS 19, 20 AND 24.** In Models 19, 20 and 24 the connection is made by inserting the red and black wire through the hole in the back of the cabinet marked "red tracer lead" and attaching it to the binding post opposite. The black wire should go through the hole marked "black lead" and thence to its binding post —illustration 15. For location of Speaker Binding Posts, see pages 24 and 25.



**MODELS 20 & 21 COMPACT.** In Models 20 and 21 Compact, a special clip type binding post is used. Attachment of the Speaker wires is made through the single hole in the back of the Cabinet marked "black lead-red tracer lead," by pushing the terminals of the black wire and red and black wire in the spring clips located there.

### Connecting the Antenna Lead-in to Receiving Set

**MODELS 10 AND 12 (OPEN RECEIVERS).** Unscrew the nut on the binding post (located on the left end of the receiving set) marked "ANT," and, lifting off the small brass washer, wrap the end of the lead-in wire around the binding post screw, place the washer over the wire and screw down tightly (using fingers only) the knurled nut. See illustrations on pages 27 and 28 for location of Antenna Binding Post.

**MODELS 19, 20 AND 24.** Pass the end of the lead-in wire through the hole in the back of the cabinet, marked "ANT" and attach to binding post opposite. See illustrations on pages 24, 25 for location of Antenna Binding Post.

**MODELS 20 AND 21 COMPACT.** The binding posts used in these Models are operated by pressing down the top of the post until the end of the lead-in or ground wire can be inserted in the hole on the side of the post. Removing the finger allows the top of the post to spring up, clamping the end of the wire in place. See page 26.

**NOTE:** Before attaching lead-in or ground wires to Open Receiving Sets, a full inch of insulation should be removed from the end of each wire and the wire scraped clean and bright. For the Cabinet Models, remove but a scant half inch of insulation and then scrape wires clean and bright.

**CONNECTING RECEIVING SET TO GROUND.** The next step is to attach one end of the ground wire to the binding post marked "GROUND." On the open receiving set it is located at the left end, and in the cabinet receivers it is opposite the hole in the back of the cabinet marked "GROUND." See illustrations on pages 24 to 28, inclusive, for location of Ground Binding Post.

The remaining end of the ground wire should be attached to a cold water pipe as near as possible to where it enters the building. See illustration 8 on page 13. If this is impossible, use any convenient hot water or radiator pipe, but never a gas pipe. The objection to a hot water or radiator pipe is the fact that the current must flow through the entire heating system to reach the incoming cold water pipe and thence to the ground (earth) outside.

To make a proper joint between ground wire and water pipe, file or scrape to shiny brightness, a band completely around the pipe and clamp the wire, by means of the ground clamp, as tightly as possible on this spot, using screw driver and pliers or wrench.

### **LOCATING THE BATTERIES.**

The best place to put the batteries is in the cellar or basement, placing them immediately under the receiving set, so that they will be as near to it as possible.

If it is impracticable to locate the batteries in the cellar or basement, they may be concealed by placing them in an "Atwater Kent Battery Container" (see page 48 for full description) or back of a couch, in a closet, bookcase or other convenient place. However, we do not advise the placing of storage batteries in, or near fine furniture, unless special precautions are taken to guard against damage by the acid contained in all storage batteries.

### **CONNECTING CABLE OR WIRE TO RECEIVING SET** (Models 19, 20 and 24).

We suggest that cable or wires be attached to receiving set before being connected to the batteries. If cable is used, first make the connections to the receiving set. If wires are used it will be safest to make but one connection at a time, that is, place one wire in the binding post of the receiving set and connect that wire to the proper terminal on the battery.

NOTE: The tag attached to Atwater Kent Battery Cable is affixed to the end of the cable that is to be connected to the battery.

**RUNNING CABLE TO BATTERIES.** If batteries are located in the cellar or basement, the battery cable or wires can be run through the floor by boring a 1/2 inch hole through it. By raising the metal ring which covers the hole (where radiator or other pipes come up through the floor) it is frequently found that this hole is large enough to allow the cable or wires to be slipped down alongside of the pipe. All excess cable should be coiled up at the battery end of the installation, that is, away from the Receiving Set. In coiling the cable near storage batteries, care should be taken that it is not laid, or does not pass over the top of storage batteries, otherwise the cable or wire covering is apt to be eaten away by the acid fumes.

**CONNECTING CABLE OR WIRE TO BATTERIES.** On pages 21, 22 and 23 are wiring diagrams showing the proper connections of cable or wire leading from the receiving set to the batteries. Follow your diagram carefully in making your battery connections. Be sure that all storage battery binding posts are bright and clean and that nuts are screwed down tightly, using pliers if necessary. If the storage battery does not have binding posts it is suggested that two lead-coated battery "pinch clips" be purchased and soldered to the ends of the battery cable or wires.

**BATTERY CABLE FUSE BLOCK.** The battery cable fuse block is recommended for the same reason that fuses are installed in all house electric light and power circuits which are to be approved by the Fire Underwriters. The fuse block should be fixed firmly to a rigid support and as near to battery terminals as it is conveniently possible to locate it. The wires leading from the fuse block to the battery terminals should be stiff and heavily insulated. No. 14 rubber covered (electric light) wire is recommended.

In place of the six fuses shown in the illustration, four may be used, if desired. In this case the yellow and black wires are run directly from the end of the battery cables to the battery terminals..

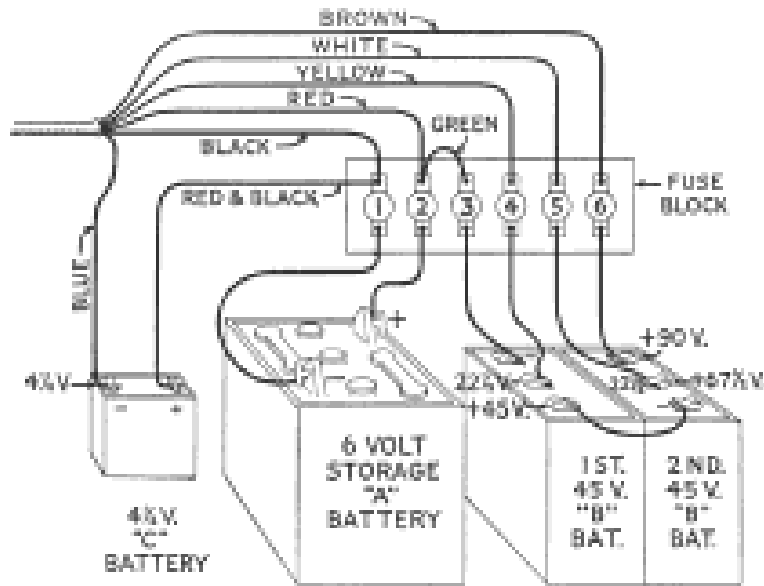


Illustration 17. SHOWING RELATIVE POSITIONS OF FUSE BLOCK, BATTERY CABLES AND BATTERIES.

Fuses 1 and 2. each 2-ampere capacity. Fuses 3, 4, 5 and 6 should be 1-ampere capacity.

NOTE: There will be no white wire with Models 10,12,19, 20, 24 and 71 Compact hence fuse No 5 is not necessary.

**CONNECTING STORAGE BATTERY TO BATTERY CHARGER.** It is recommended that a two-way switch be used as a means of connecting the storage battery to a battery charger. It is preferable to have the storage battery located at some distance from the charger and switch, as illustrated below.

If a fuse block is used, the storage battery can be placed in a different position than shown in illustration 17 and the two wires marked "to set" in illustration 18 can be attached to the lower terminals of fuses 1 and 2.

NOTE: If "C" battery is not used, be sure to connect together the ends of the "blue" and "red and black" wires and cover these connections with insulating tape

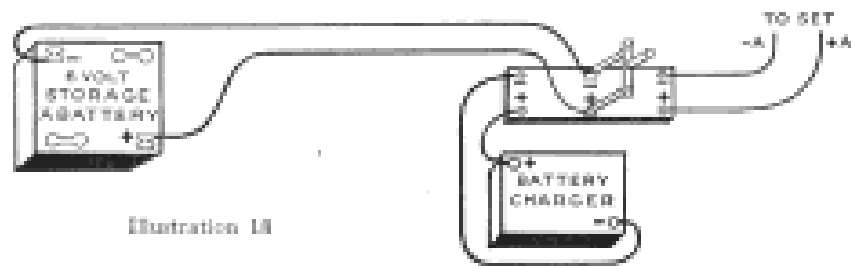


Illustration 18

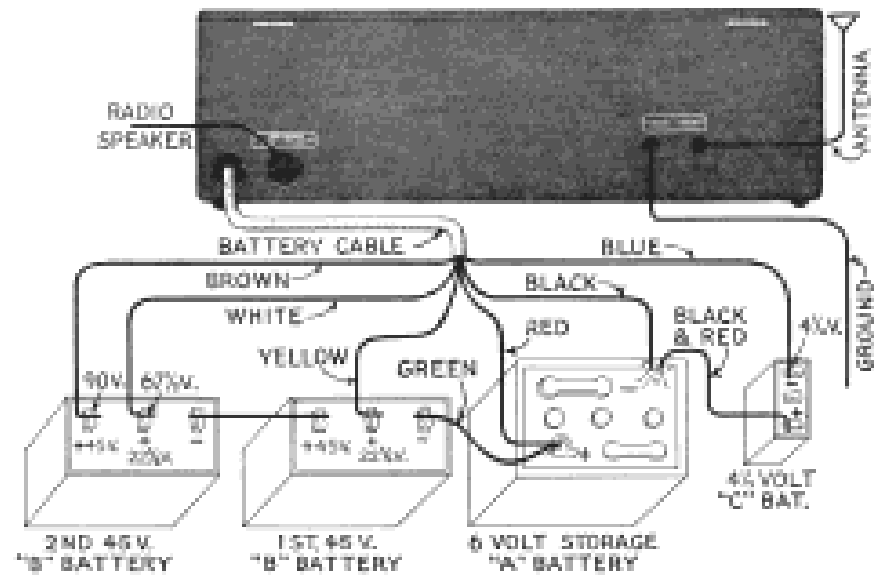


Illustration 19—WIRING DIAGRAM FOR MODEL 30 COMPACT

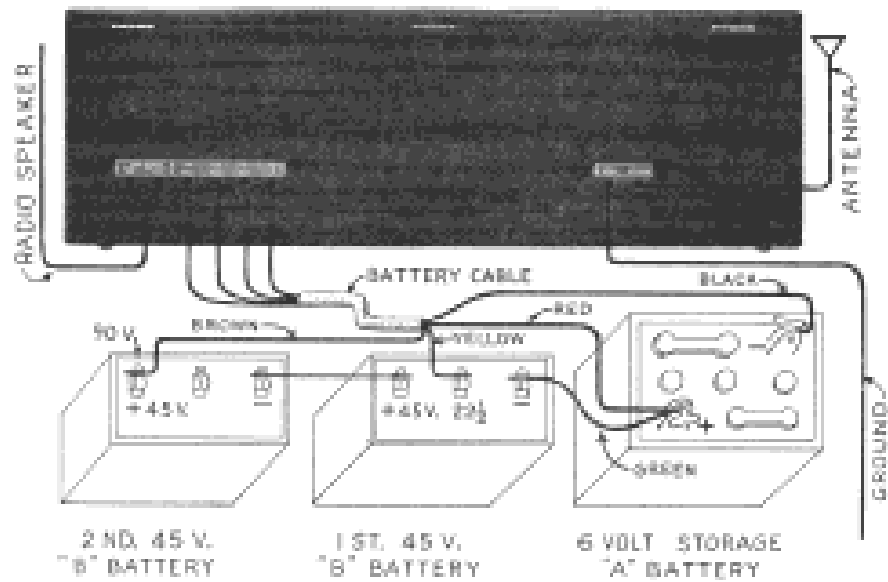


Illustration 20—WIRING DIAGRAM FOR MODELS 19, 20 AND 24, USING ATWATER KENT BATTERY CABLE

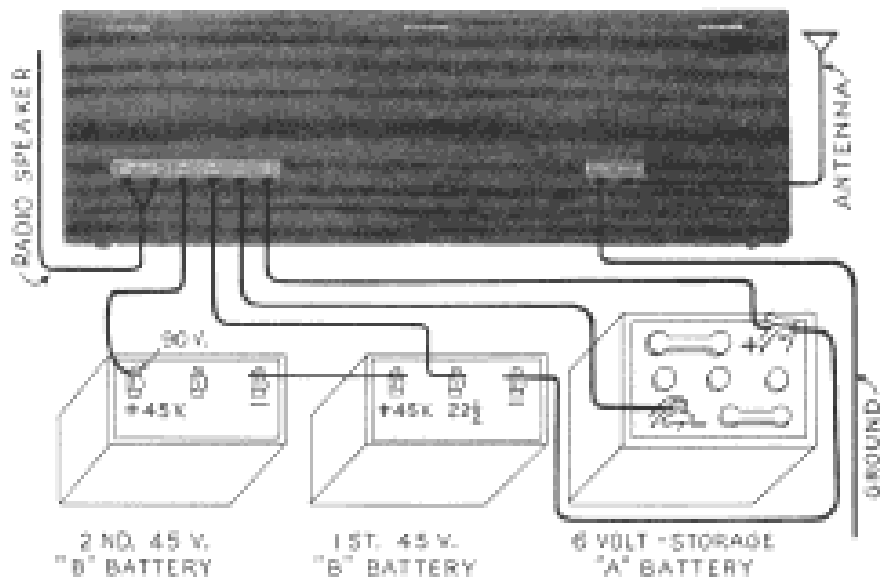


Illustration 21—WIRING DIAGRAM FOR MODELS 19, 20 AND 24, USING YOUR OWN WIRES



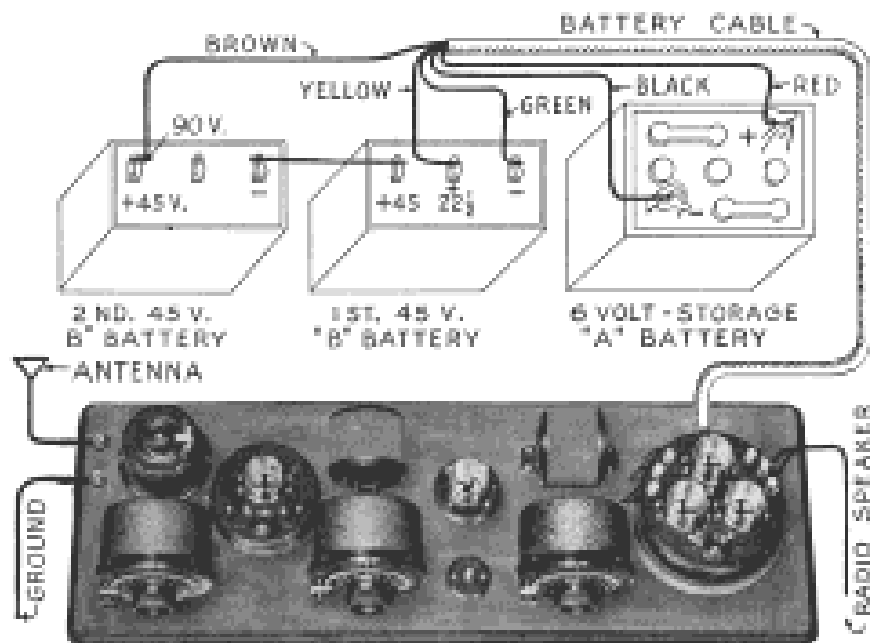


Illustration 22—WIRING DIAGRAM FOR MODELS 9 AND 10

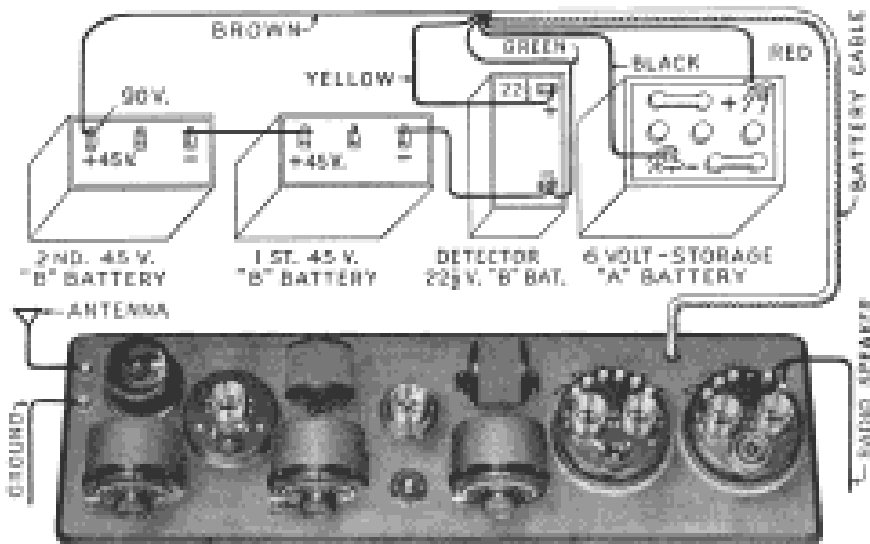


Illustration 23—WIRING DIAGRAM FOR MODEL 12

NOTE:—A separate 22½ Volt, dry cell "B" battery must be used for the Detector Tube, with the Model 12 Receiver.

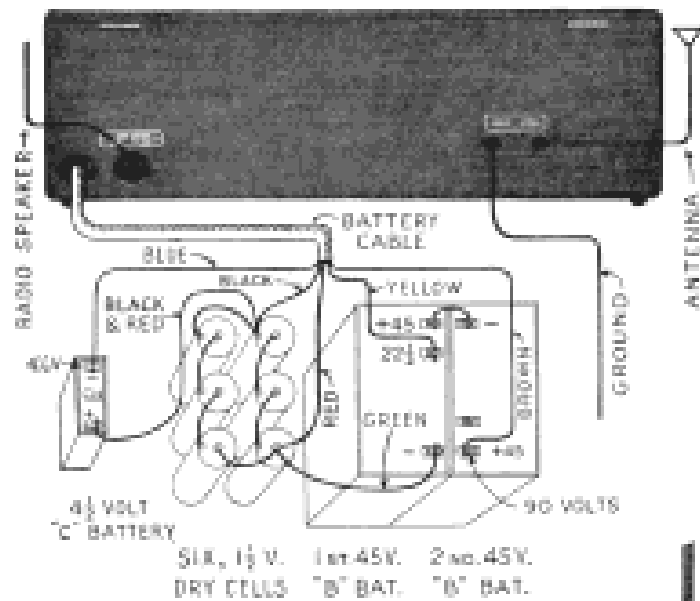


Illustration 24

**WIRING DIAGRAM FOR MODEL 31 COMPACT**

NOTE:—If "C" battery is not used, be sure to connect together the ends of the "blue" and "red and black" wires and cover this connection with insulating tape.

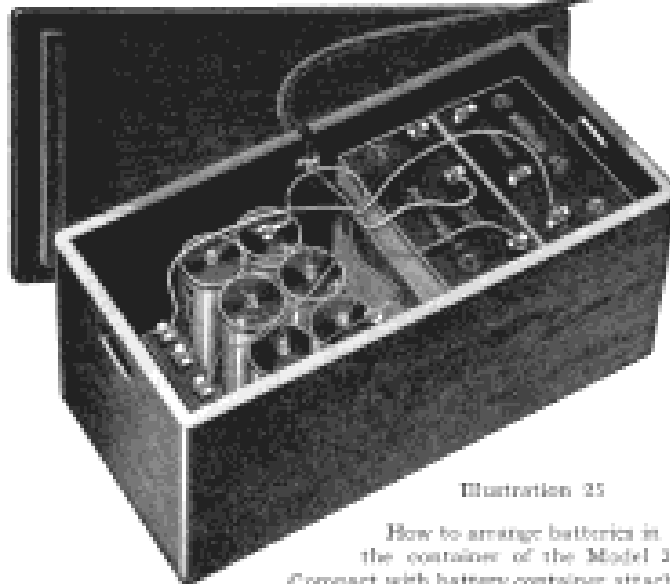


Illustration 25

How to arrange batteries in the container of the Model 31 Compact with battery container attached.

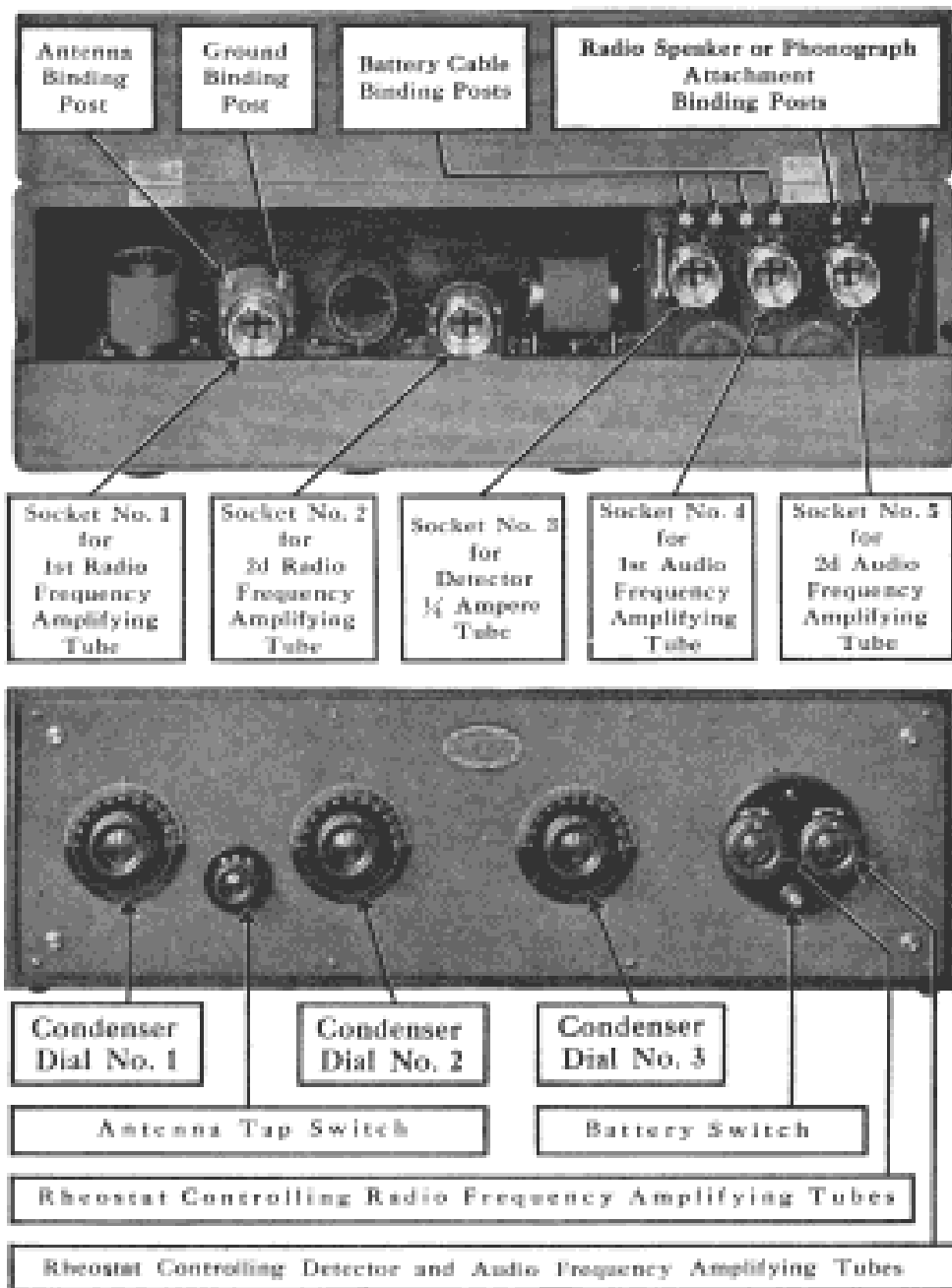


Illustration 28  
 LOCATION OF CONTROLS, ETC. MODELS 30 AND 34

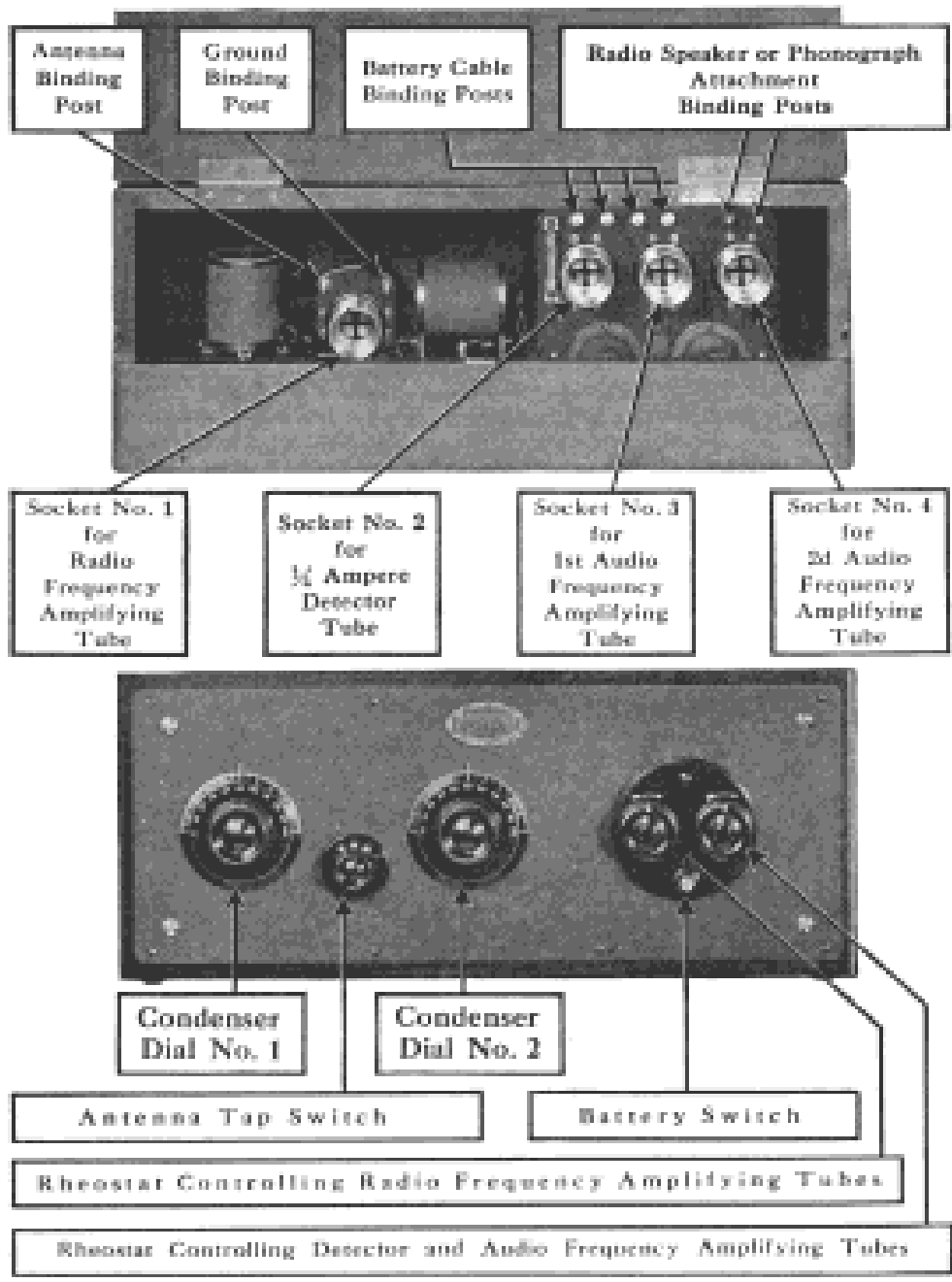


Illustration 27  
 LOCATION OF CONTROLS, ETC. MODEL 19 RECEIVER

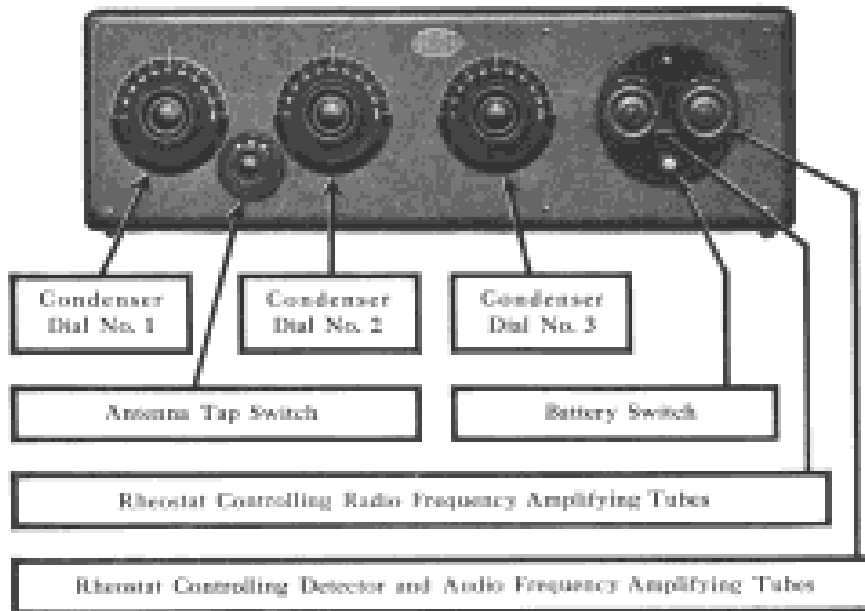
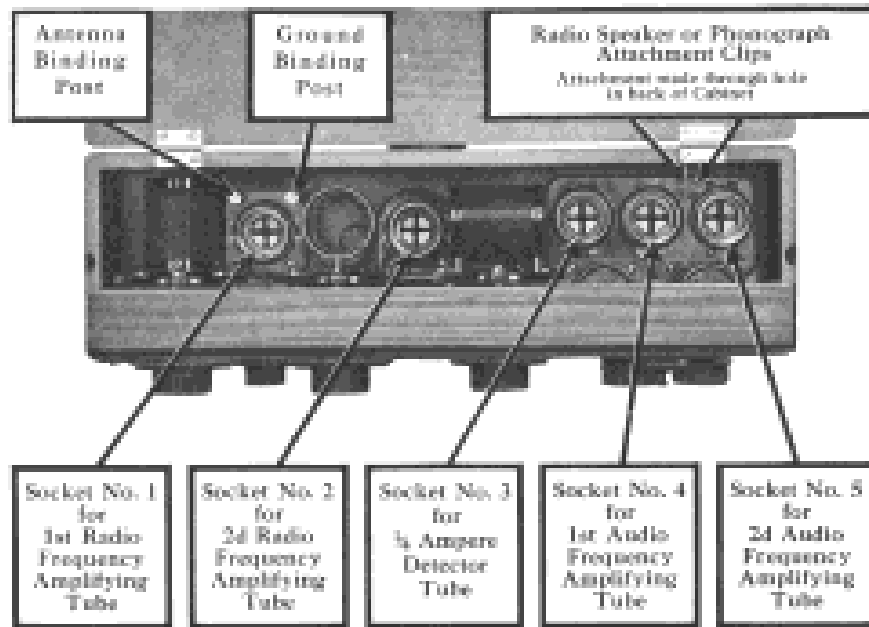


Illustration 28

LOCATION OF CONTROLS, ETC. MODELS 20 AND 21 COMPACT

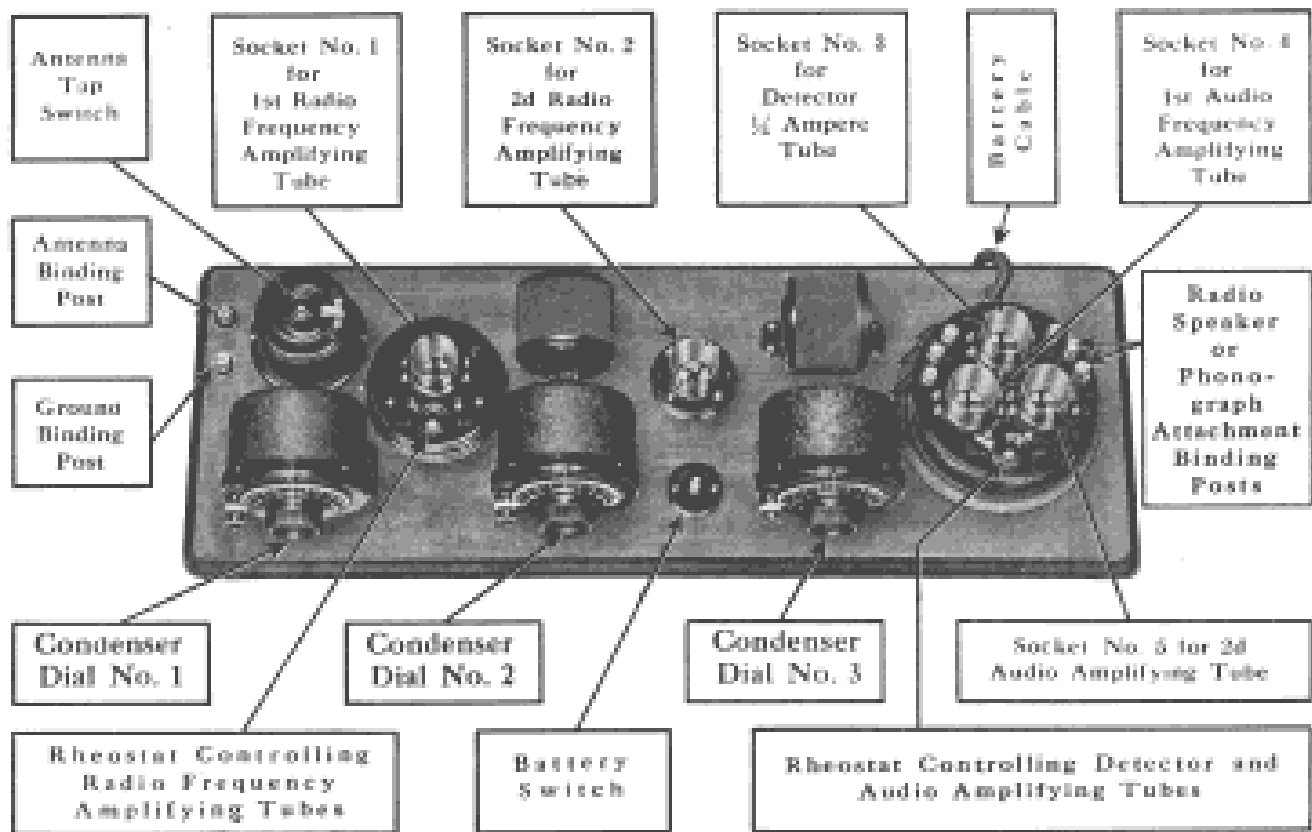


Illustration 28

LOCATION OF CONTROLS, ETC., MODEL 10 RECEIVER

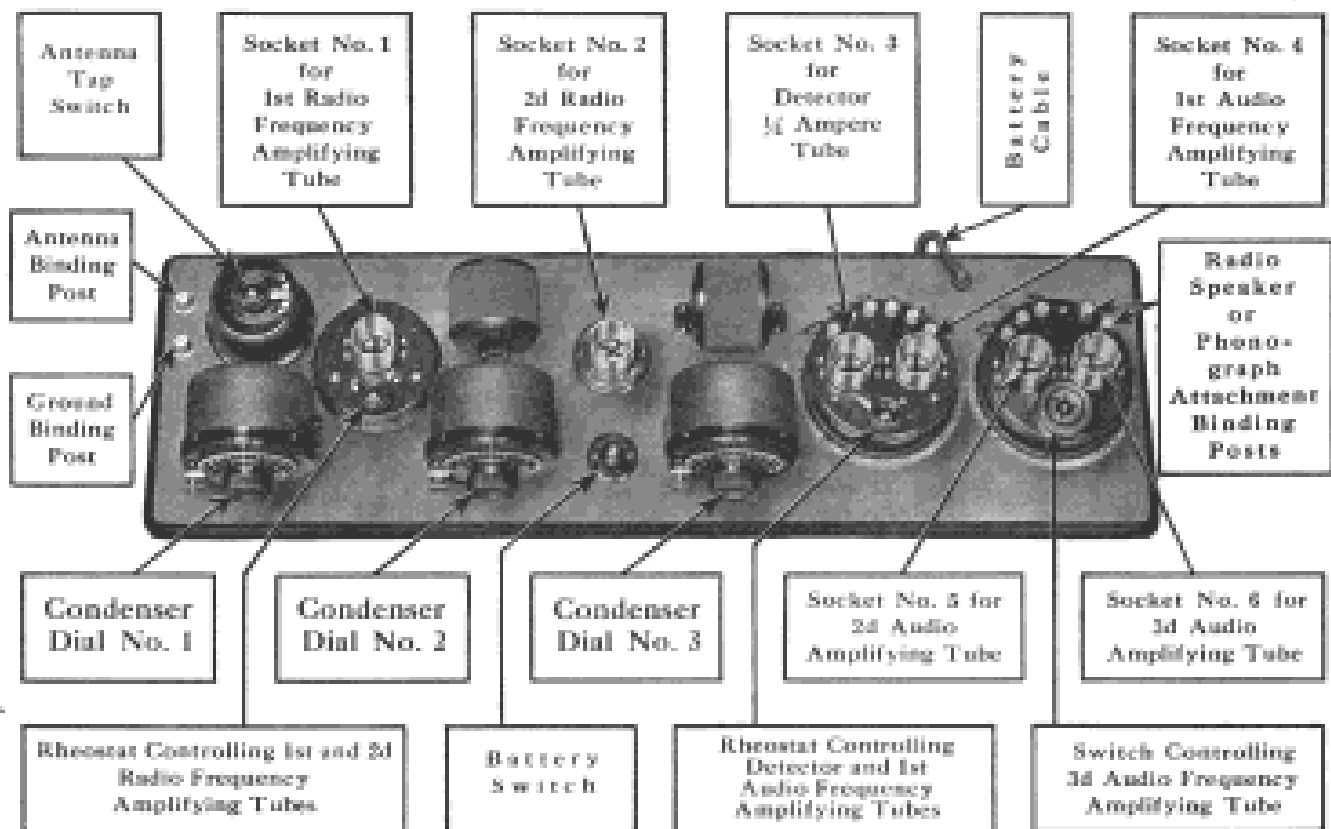


Illustration 29

LOCATION OF CONTROLS, ETC., MODEL 12 RECEIVER

**CAUTION:** Be sure and check most carefully all battery connections before proceeding further.

**INSERTING TUBES AND TESTING.** (Refer to illustrations on pages 24 to 28 incl.) After all battery connections have been made and checked, insert one tube in any one of the tube sockets and pull out the battery switch. Now turn both rheostat knobs to the right (clockwise). About three-quarters of their total turning distance should be sufficient. When lighted, the tube should glow but faintly with a dull golden color, sometimes difficult to see in the day time.

**NOTE: DRY CELL SETS:**—It is important with fresh 1.5-volt dry batteries that the indicators on the rheostats be turned not more than one-quarter way on, or at the nine o'clock position. Serious damage to tubes may result if this instruction is not carried out. The volume falls after the batteries have been in use and the rheostats may then be gradually advanced to bring back the volume.

If the tube does not light up, again check all battery connections, as it is possible that you have attached an "A" battery connection to a "B" battery binding post, thus allowing considerably more than 5 volts to be applied to the tube filament, and have burned out the tube. If the battery connections are absolutely correct, try another tube in the socket, as tubes are sometimes found to be imperfect after purchase.

By inserting one tube and testing, as outlined above, you will be safeguarded against the possibility of burning out all your tubes in case you have made a mistake in your wiring connections.

If the first tube you insert burns properly, you can now proceed to insert the rest of the tubes in the remaining sockets.

**NOTE:** The Six tube Receivers have two rheostats and a switch (see illustration opposite), all of which must be turned on to light up all six tubes. The knob for switching this last stage of audio amplification on and off is located directly in front of the last two tubes.

Turning this to the left (or counter clockwise) cuts out the 3rd audio amplifying tube.

**ADJUSTING THE ANTENNA TAP SWITCH.** On the Open Models the ANTENNA TAP SWITCH is placed on the top of the first transformer which is located at the left end of the set. On the Cabinet Models it is located between the first and second dials on the metal panel that forms the front of the cabinet. (See illustrations on pages 24 to 28.)

Turn the switch so that the contact spring rests on tap 2, the center tap. This is usually found to be the most satisfactory tap for the average antenna installation, and will no doubt give you excellent results, at least for the initial operation of your set. For further information regarding the functions and uses of the Antenna Tap Switch see PART III.

## **SUMMARY**

If you have followed instructions carefully, you now have your RECEIVING SET properly connected to the ANTENNA and GROUND, the SPEAKER or PHONOGRAPH ATTACHMENT and the BATTERIES. Your TUBES are all in their sockets and BURNING PROPERLY, because the BATTERY SWITCH is pulled OUT and BOTH RHEOSTATS are turned about THREE QUARTERS to the RIGHT (clockwise). And lastly, your ANTENNA TAP SWITCH is placed on the SECOND OR MIDDLE TAP.

You are now ready to TUNE your RECEIVING SET to RECEIVE BROADCASTING. See PART II "OPERATION."

## Part II.

### OPERATION

**TUNING THE SET TO RECEIVE BROADCASTING.** Due to the difference in "day and night range" (see PART V), for further information), the best results in radio reception will be obtained after night fall, although even a beginner should experience no difficulty in tuning in a "local broadcasting station" (one that is located within a few miles radius) in daylight hours.

In order to select the broadcasting stations nearest to you, refer to your local newspaper and see what stations are broadcasting at the particular time you are ready to start tuning. Your paper should not only give you the nearest stations broadcasting, but also their respective WAVE-LENGTHS.

Tables on pages 33, 34 and 35 give the Wave Lengths of a number of well known broadcasting stations with the DIAL SETTINGS that brought in their broadcasting, using various models of Atwater Kent Receiving Sets. Refer to the table which lists the dial settings for your set, and pick out from it the Wave Length most nearly corresponding to the Wave Length of the station you wish to try to tune in. Now turn the dials of your receiving set so that the numbers (or divisions) engraved on their outer rims, corresponding to the numbers given in the table, come directly under the little white line, engraved on the receiving set. as shown in illustration 31

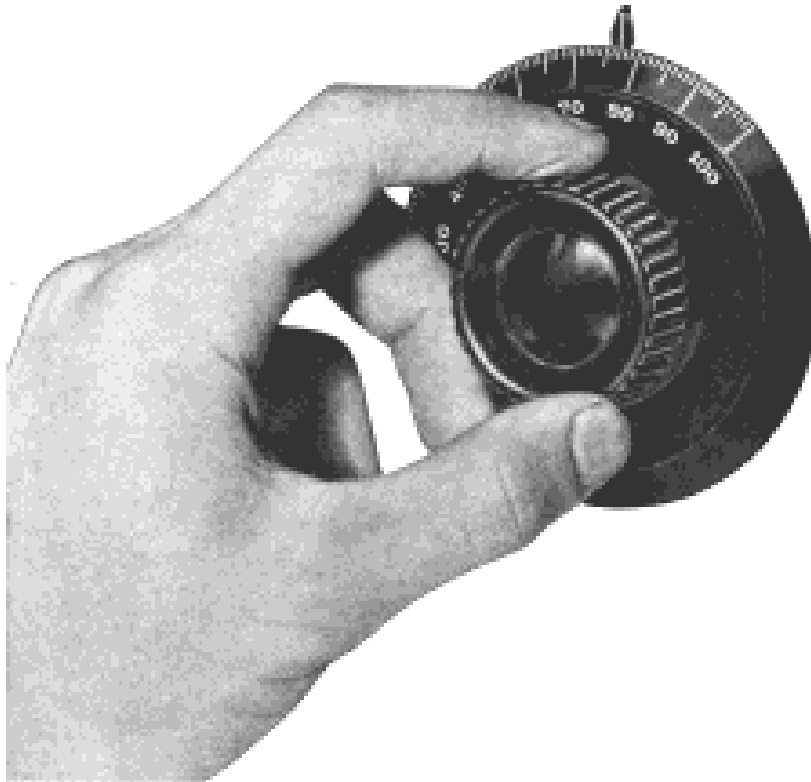


Illustration 31

As your particular receiving set may vary slightly from the one used to secure the dial settings given in the tables, or if you are endeavoring to tune in a station with a slightly longer or shorter wave length than any given in the column headed "WAVE LENGTH," your first setting of the dials may not bring the desired results. In this case the dial to the right (dial No. 3) should be turned a division or so to the right. Then dial No. 2 should be turned a division or so to the right and dial No. 1 should be revolved slowly several divisions to right and left of the number given in the table.

If no results are obtained continue the operation outlined above by turning dial No. 2 a division or so to the right t, then. 3 a division or so to the right, and revolve dial No. 1 to right and left several divisions. Continue this operation until all dial No the dials have been turned so that they are five or six divisions to the right of the numbers given in the table. If after turning the dials to the right as outlined above, you do not hear signals, return your dials to the original setting (the numbers given in the table) and proceed to follow the instructions given in the above paragraphs, only this time turn the dials to the left.



When voices or music are once heard, the dials should each be very slowly turned to right and left, until maximum volume and clearness are obtained.

Experience will soon show you whether your settings should be lower or higher than those given in the accompanying table. The reason that you are instructed to turn dial No. 1 several divisions to right and left instead of but a division or so in one direction, is that your setting for dial No. 1 will practically never correspond to the setting given in our table, as the setting of your dial No. 1 depends on the size of the antenna you have installed

Do not be discouraged if your first attempts at tuning bring more or less disappointing results; practice makes perfect, and in a very short time you should be able to tune in practically any desired station with rapidity and sureness. LOGGING THE DIALS. When once a station has been tuned in, it can again be tuned in by turning the dials to the same setting, provided, of course, that the same station is broadcasting and that atmospheric conditions are the same or better than when the station was originally tuned in.

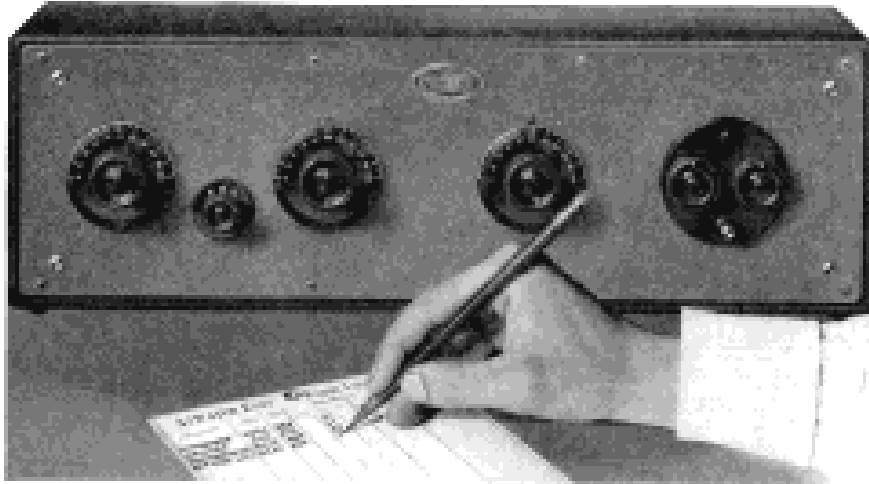


Illustration 32  
LOGGING THE DIALS

It is therefore a good plan to start immediately to keep a "log" of the various stations you have tuned in, writing down the State, City, Call Letters and Dial readings on the log cards supplied with your receiving set. By logging the dials in this way you will soon have a list of stations with accurate dial settings, for ready reference.

IT IS 15 RECOMMENDED that as soon as you feel thoroughly familiar with the operation of your set that you read carefully PART 111 of this book, dealing with the improvement of reception.

**DIAL SETTINGS FOR MODELS 20 AND 21 COMPACT RECEIVERS**

CITY	CALL LETTERS	WAVE LENGTH	DIAL SETTINGS				
			1			2	3
			Tap 1	Tap 2	Tap 3		
Hastings.....	KPRX	288.3		23		34	34
Atlantic City.....	WPG	299.8		25		36	36
Providence.....	WJAR	305.9		27		38	38
Pittsburgh.....	KDKA	309.1		28		39	39
Buffalo.....	WGR	319.0		30		31	31
Cincinnati.....	WSAI	325.9		31		33	33
Springfield.....	WSE	331.1		32		33	33
Zion.....	WCBD	344.8		33		36	36
Detroit.....	WWJ	352.7		36		37	37
Schenectady.....	WOY	379.5		42		43	43
Philadelphia.....	WFI	394.5		46		47	47
Newark.....	WOR	401.2		48		49	49
Minn.-St. Paul.....	WCCO	418.4		51		52	52
Cincinnati.....	WLW	422.3		52		53	53
Atlanta.....	WSB	428.3		54		55	55
Jefferson City.....	WOS	440.9		58		59	59
Chicago.....	WMAQ	447.5		60		61	61
New York.....	WJZ	454.3		62		63	63
Pittsburgh.....	WCAR	461.3		64		65	65
Los Angeles.....	KFI	469.0		66		67	67
Boston.....	WBZ	475.9		68		69	69
Davenport.....	WOC	482.6		71		72	72
New York.....	WEAF	491.5		74		75	75
Philadelphia.....	WOP	508.3		79		80	80
Chicago.....	KYW	515.4		90		91	91
St. Louis.....	KSD	545.1		96		96	96

**DIAL SETTINGS FOR MODEL 19 RECEIVER**

CITY	CALL LETTERS	WAVE LENGTH	DIAL SETTINGS			
			1			2
			Top 1	Top 2	Top 3	
Hastings.....	KPKX	288.3		23		24
Atlantic City.....	WPG	299.8		25		26
Providence.....	WJAR	305.9		26		27
Pittsburgh.....	KDKA	309.1		27		28
Buffalo.....	WGR	319.0		29		30
Cincinnati.....	WSAI	323.9		30		31
Springfield.....	WRZ	333.1		33		34
Zion.....	WCBD	344.6		35		36
Detroit.....	WWJ	353.7		37		38
Schenectady.....	WGY	379.5		43		43
Philadelphia.....	WPI	394.3		46		47
Newark.....	WOR	403.3		48		49
Minn.-St. Paul.....	WCCO	416.4		51		52
Cincinnati.....	WLW	422.3		52		54
Atlanta.....	WSB	438.3		54		55
Jefferson City.....	WDS	440.9		56		58
Chicago.....	WMAQ	447.5		60		61
New York.....	WJZ	454.3		61		62
Pittsburgh.....	WCAB	461.3		63		64
Los Angeles.....	KFI	469.0		65		66
Boston.....	WEEI	473.9		67		68
Davenport.....	WOC	483.6		70		71
New York.....	WEAF	491.5		72		73
Philadelphia.....	WOO	508.3		78		79
Chicago.....	KYW	535.4		88		89
St. Louis.....	KSD	545.1		91		92

**DIAL SETTINGS FOR MODELS 20 AND 24 RECEIVERS**

CITY	CALL LETTERS	WAVE LENGTH	DIAL SETTINGS				
			1			2	3
			Top 1	Top 2	Top 3		
Hastings.....	KPKX	288.3		23		24	
Atlantic City.....	WPG	299.8		25		26	
Providence.....	WJAR	305.9		26		27	
Pittsburgh.....	KDKA	309.1		27		28	
Buffalo.....	WGR	319.0		29		30	
Cincinnati.....	WSAI	323.9		30		31	
Springfield.....	WRZ	333.1		33		34	
Zion.....	WCBD	344.6		35		36	
Detroit.....	WWJ	353.7		37		38	
Schenectady.....	WGY	379.5		44		45	
Philadelphia.....	WPI	394.3		47		48	
Newark.....	WOR	403.3		49		50	
Minn.-St. Paul.....	WCCO	416.4		52		53	
Cincinnati.....	WLW	422.3		53		54	
Atlanta.....	WSB	438.3		55		56	
Jefferson City.....	WDS	440.9		58		59	
Chicago.....	WMAQ	447.5		61		62	
New York.....	WJZ	454.3		63		64	
Pittsburgh.....	WCAB	461.3		65		66	
Los Angeles.....	KFI	469.0		67		68	
Boston.....	WEEI	473.9		69		70	
Davenport.....	WOC	483.6		71		72	
New York.....	WEAF	491.5		73		74	
Philadelphia.....	WOO	508.3		78		79	
Chicago.....	KYW	535.4		88		89	
St. Louis.....	KSD	545.1		91		92	

**DIAL SETTINGS FOR MODELS 10 AND 12 RECEIVERS**

CITY	CALL LETTERS	WAVE LENGTH	DIAL SETTINGS				
			1			2	3
			Tap 1	Tap 2	Tap 3		
Hartings.....	KPRX	288.3		17		18	18
Atlantic City.....	WPG	293.8		19		20	20
Providence.....	WJAR	305.9		20		21	21
Pittsburgh.....	KDKA	309.1		21		22	22
Buffalo.....	WGR	319.0		23		24	24
Cincinnati.....	WSRI	325.9		24		25	25
Springfield.....	WBS	331.1		25		26	26
Zion.....	WCBD	344.6		27		28	28
Detroit.....	WWJ	351.7		29		30	30
Schenectady.....	WGY	379.5		35		36	36
Philadelphia.....	WPT	394.5		38		39	39
Newark.....	WOR	405.2		40		41	41
Minn.-St. Paul.....	WCCO	418.4		42		43	43
Cincinnati.....	WLW	422.3		44		45	45
Atlanta.....	WSB	428.3		46		47	47
Jefferson City.....	WGB	440.9		49		50	50
Chicago.....	WMAQ	447.5		51		52	52
New York.....	WJZ	454.3		53		54	54
Pittsburgh.....	WCAX	461.3		55		56	56
Los Angeles.....	KFI	466.0		57		58	58
Boston.....	WEEI	475.9		60		61	61
Davenport.....	WOC	485.6		62		63	63
New York.....	WEAP	491.5		63		64	64
Philadelphia.....	WOO	508.3		69		70	70
Detroit.....	WCX	516.9		71		72	72
Chicago.....	KYW	525.4		77		78	78
St. Louis.....	KSD	545.1		79		80	80

## Part III

### IMPROVING RECEPTION

#### CHANGING THE ANTENNA TAP SWITCH.

In PART I, under the heading "LOCATING AND ERECTING THE ANTENNA," we explained to you how too short an antenna will not collect enough electrical energy to enable you to tune in distant broadcasts, and how too long an antenna will collect so much electrical energy from nearby stations that you will be unable to tune them out-that is your set will not be "selective." The Antenna Tap Switch is for the purpose of overcoming these difficulties. When placed on Tap I it has the effect of shortening your antenna, thereby increasing the selectivity of your set. When placed on Tap 3 it has the effect of lengthening your antenna, thereby increasing volume. It was because of this difference in the results obtained, when the first and third taps are used, that we directed you to use Tap 2 when you made your first attempt to tune your set.

If the combined length of your antenna and lead-in are unusually long you will no doubt secure best results by using Tap 1 or Tap 2. If the combined length of your antenna and lead-in is comparatively short, best results should be secured with Tap 2 or Tap 3. But do not hesitate to change your antenna taps, even during reception of broadcasting, in order to secure maximum selectivity and volume. When tuning in stations whose dial readings on the 2nd and 3rd dial lie between 0 and 20 on the dials, best results will be obtained by using the 1st or 2nd antenna tap.

NOTE: Changing the antenna taps will change the readings of dial No. 1, that is, Tap 1 will give higher readings, while Tap 3 will give lower readings than those given in the Dial Setting Tables printed on pages

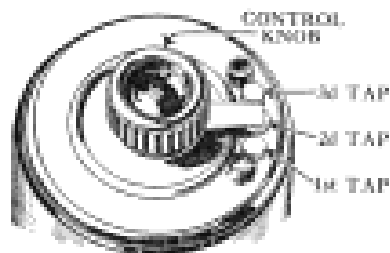


Illustration 33  
ANTENNA TAP SWITCH OPEN  
MODELS

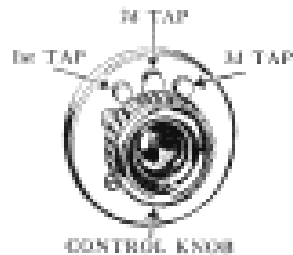


Illustration 34  
ANTENNA TAP SWITCH CABINET  
MODELS

#### ADJUSTING THE RHEOSTATS.

Originally you were instructed to turn the rheostat knobs to the right about three-quarters of their total turning distance, but a slight variation of this position for one or both of the rheostats often improves reception. In order to determine the best setting for your rheostats, tune in a distant station, one that comes in with very little volume and slowly turn the rheostats to right and left. When the best position for them has been once determined, it is seldom necessary to readjust them, as the operation of the set can be started and stopped by means of the battery switch. However, it is not a bad idea to occasionally check up their setting, as others who use your receiving set are apt to tamper with them.

It should be remembered that the less distance the rheostats are turned on the longer your tubes should last, because the less they are turned on, the less current flows through their delicate filaments. For the same reason, the less the rheostats are turned on, the less drain there will be on your batteries-hence the longer they will remain efficient and give satisfactory results.

NOTE: The fact that rheostat knobs become heated during operation of set need cause no concern.

**FOR LOCAL RECEPTION.** Often it is found that broadcasts received from local stations are too loud. This may be overcome by de-tuning, or, by turning the rheostats almost all the way off. The latter has the added advantage of saving battery current and tubes. **DETERMINING WHICH OF YOUR TUBES ARE BEST SUITED FOR SOCKETS 1, 2 and 3.** It is quite usual to find that out of every set of tubes bought for your receiving set, certain of them will give better results when used in sockets 1, 2 and 3 than when used in any of the other sockets. Hence it is a good plan to take steps to determine which tubes are best suited for these particular sockets. (See illustrations on pages 24 to 28.)

The test should be made as follows: Tune in a rather distant station, one that does not come in with any great volume. With all tubes burning, interchange tubes from sockets 1 and 2, and adjust the first rheostat so as to secure maximum volume. Note carefully any betterment in reception, then replace the tubes in their original sockets and try the same experiment by interchanging the tubes

from sockets 1 and 3. Then interchange 1 and 4. In each case be sure to adjust the first rheostat to secure maximum volume and note carefully any improvement in reception. If yours is a five or six tube set, proceed with the experiment until you have tried out all the tubes you have.

It may be necessary to try the same experiment with certain tubes over again several times before you can be sure which one brings in the very best results, when placed in socket No. 1.

When you finally determine which tube is best for Socket No. 1, leave it there and proceed to try the same test with the remaining tubes, by placing them alternately in Socket No. 2. If yours is a five or six tube set, proceed with the test by placing the remaining tubes alternately in Socket No. 3, the Detector Tube Socket.

The remaining tubes will doubtless prove satisfactory when placed in the remaining sockets-the Audio Amplification Tube Sockets, however, if any of your tubes were found to give very weak signals when tested in Sockets 1, 2 or 3 (the Radio Frequency Amplification and Detector Tube Sockets) they should be immediately returned to your dealer to be tested, so that they may be returned to the manufacturer if found defective NOTE: For special information regarding Model 12 (six tube receiver) see Part VI.. USING A SEPARATE "B" BATTERY FOR THE DETECTOR TUBE Often a slight whistling noise occurs after the "B" batteries have been used for some time, caused by the fact that the No. 1 battery supplies current to the Detector as well as the Amplifying Tubes, thus weakening the first "B" battery before the others are affected. When this whistling occurs the first "B" battery should be replaced. In order to guard against this possible trouble, some owners use a separate "B" battery to supply current to the Detector Tube, altering their wiring connections as shown in illustration 23, page 22.

ALTERING THE LENGTH OR HEIGHT OF AN ANTENNA OR CHANGING ITS SHAPE. If after you have made the tests and experiments with your Antenna Taps, Rheostats and Tubes, you still feel that you are not getting the best possible results in the way of reception, you might find it advantageous to study over your present antenna installation with the idea of bettering it.

The two things that your antenna has most to do with, are volume and selectivity. If you think you should be getting more volume, you might experiment with ways and means of lengthening your antenna, preferably in a straight line. If this is impossible and your antenna is very short, that is, under 50 feet in length, you might try placing two or more wires in parallel. Details showing how the wires should be spaced and attached to the "spreaders," etc. are shown on page 39. It should be noted, however, that doubling the number of wires does not double the effectiveness of the antenna. As an example, two wires each forty feet long, stretched parallel to each other are not twice as effective as one forty foot wire, nor are they equal to a single wire 80 feet long in a straight line.

Another method of increasing volume is to raise your antenna higher above the ground. And by "ground" we do not mean simply the earth, but any surface that may act as a ground, such as a roof tree, chimney or the like. Speaking generally, an antenna cannot be raised too high, unless by so doing the lead-in wire is increased in length to such an extent as to make the combined length of antenna and lead-in so great as to affect selectivity.

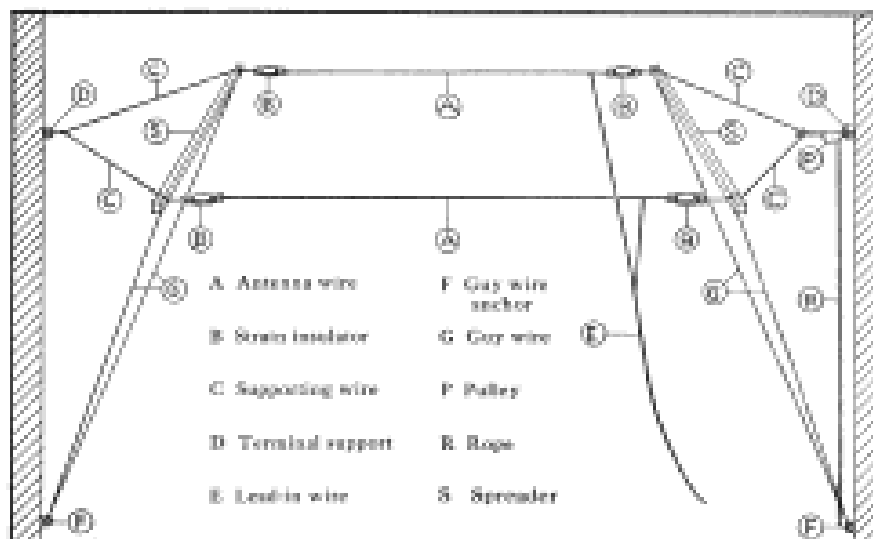


Illustration 23

Note: The minimum width of the "Spreaders" should not be less than 3 ft. 6 in. and 3 ft. or more if possible.

If you have ample volume but lack selectivity, it may be that your antenna is too long. In this case the remedy should be easy to apply — simply shorten your antenna by cutting off a piece from the end furthest from the lead-in, as illustrated below.

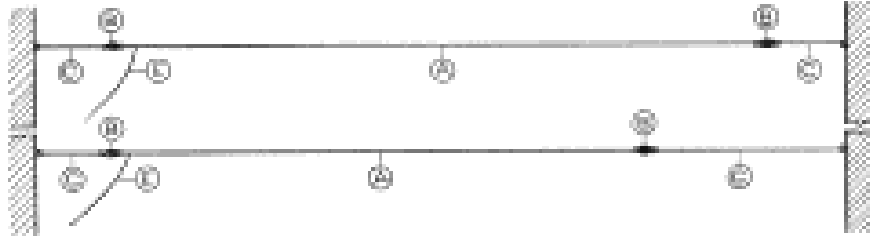


Illustration 26

Showing how an Antenna can be shortened without changing its terminal supports.

#### **CHANGING THE LOCATION OF THE SPEAKER OR PHONOGRAPH ATTACHMENT.**

While it is usually desirable to have the Radio Speaker located close to the Receiving Set, so that it is easily heard when tuning in a distant station, it is sometimes found advantageous to move it to another part of the room so that the natural acoustical properties of the room can be used to maximum advantage.

#### **USING ONE OR MORE RADIO SPEAKERS IN ADDITION TO THE ORIGINAL SPEAKER OR PHONOGRAPH ATTACHMENT.**

If your receiving set is located in an unusually large room and you wish to entertain a goodly number of people, either seated or dancing, it is recommended that you try the effect of using one or two Radio Speakers in addition to your original Speaker or Phonograph Attachment. They should be placed in widely separated parts of the room and should be wired in parallel—that is, all red tracer wires should go to one binding post on the receiving set and all black wires to the other.

The use of more than one Speaker assures that the volume of sound, heard in all parts of the room, is of practically the same intensity.

#### **ADJUSTING ATWATER KENT HORN TYPE SPEAKERS OR PHONOGRAPH ATTACHMENTS.**

The adjustment mechanism is not to be considered as an aid to better tuning, to be constantly changed. All Speakers and Phonograph Attachments are tested for volume and tonal quality, and are adjusted by experts, before leaving our factory. Under ordinary conditions, and when used with Atwater Kent Receiving Sets, the factory adjustment should prove entirely satisfactory. If however, the adjustment has been tampered with or is not just as it should be, due to some other cause, it is very easily readjusted. Simply tip back the Speaker on its base, while a powerful station is tuned in, and turn the knurled cap (located in its base) to right or left until maximum volume and clearness are obtained. Usually, it is best to start by turning to the right (clockwise) until the music or voices suddenly become muffled, often accompanied by a rattle and general loss in volume. Then, very slowly and carefully turn the knurled cap to the left (counter clockwise) until the voices or music suddenly come out clear, loud and free from rattle. STOP ADJUSTMENT AT THIS POINT—to turn further only reduces the clarity and volume of tone. The Phonograph Attachment is adjusted in the same manner.

## **Part IV.**

# **MAINTENANCE**

Proper care of your batteries will go further towards assuring continued and successful operation of your receiving set than any other thing you can do. Many times when poor reception is blamed on the receiving set, the fault lies with the operator, who has neglected to keep storage batteries charged or has allowed dry batteries to run down until they are practically worthless.

### **CARE OF STORAGE BATTERIES.**

All first-class manufacturers of storage batteries supply their customers with full information as to the proper care and maintenance of their batteries. Be sure to get their printed instructions and read them through carefully.

**CAUTION:** Never use a lighted match, candle or other flame to see if the battery needs to be filled with water, as the fumes of the acid inside are explosive. If your battery is located in a dark room use a regular electric light or flashlight, or disconnect the battery and carry it to the daylight or to a place where an electric light is located.

### **CHARGING STORAGE BATTERIES.**

To possess your own battery charging apparatus is an advantage, but care should be exercised in its installation and use. Always disconnect both the wires (running from the battery to the receiving set) from the storage battery before connecting the battery charger wires to the storage battery and starting the charger.

A better method is to use a two-way switch (see illustration 18) in which case all chance for accident is reduced to a minimum. In either case, always turn off the charger at the house current socket, before reconnecting the battery to receiving set. The frequency with which it will be necessary for you to charge your battery will depend on the ampere hour capacity of the particular battery you possess, and the length of time you use your set between charges; to determine this a frequent check should be kept on charging by use of a "hydrometer" unless some other means is included with the battery. The use of a voltmeter is not recommended for checking the "A" battery as it does not give a true indication of the "A" battery's condition, but a battery should be charged at least once each month whether the receiving set has been used or not, so the deterioration in the battery will be prevented.

The length of time your battery should be charged at any one time will depend upon its capacity (in ampere hours) and the rate with which your charger charges, but always check by use of a hydrometer unless some other means is included with your particular battery.

Due to the fact that corrosive fumes are given off from storage battery when it is being charged, it is recommended that it be removed from any cabinet or other piece of fine furniture while being charged, unless special provision has been made for the escape of the gases generated in the battery during charging.

It is advisable to allow an hour's time to intervene between the time that you stop charging a storage "A" or "B" battery and the time you begin to use your set, otherwise you may be bothered with a crackling noise during reception.

**CARE OF DRY CELL "A" BATTERIES.** For testing battery voltage, the use of a low range voltmeter is advisable. In checking up the voltage of dry cells, only one cell at a time should be tested. Any one cell registering less than 1.1-volt should be discarded.

**CARE OF DRY "B" BATTERIES.** Run down "B" batteries are one of the most frequent causes of poor reception. In order to guard against this trouble we recommend that you purchase a high grade "voltmeter" and test the voltage of your "B" batteries at frequent intervals. A 45-volt "B" battery is practically useless when it registers less than 34 volts. A 22 1/2-volt battery when it registers less than 17 volts. As one "dead" cell or battery will stop the flow of current through all the rest, it must be removed and replaced with a new one to secure satisfactory results.

"C" Batteries should last several months, but their voltage should be checked occasionally, and if it is found to be as low as 3 volts, it should be replaced with a new one.

### **TUBES.**

As all tubes deteriorate in time, it is suggested that at least once a year all tubes be taken to your dealer for testing, or borrow an extra tube (one known to be perfect) and try it out in each socket in turn, thus comparing each of your old tubes with it.

**WIRING CONNECTIONS.** Due to jarring and vibration, wiring connections are sometimes loosened, and it is recommended that at least once a month all binding posts on both the receiving set and batteries be gone over, and all knurled nuts screwed down as tightly as possible, using the fingers only.



## Part V. Some Causes of Poor Reception

### **DAY AND NIGHT RANGE.**

Reception of broadcasting is always very much better after night fall. It is considered good reception conditions when a standard five tube set will bring in satisfactory broadcasting from stations located not more than 200, or even 100 miles away, in the day time. Whereas, under the same conditions the same set will bring in with volume and clearness, at night, stations located more than 1000 miles distant.

### **ATMOSPHERIC CONDITIONS.**

One of the most usual causes of poor reception is due to atmospheric conditions. If you suddenly experience trouble in bringing in more or less distant stations, and your tubes are comparatively new and your batteries seem all right when tested, call up one or more neighbors and find out if they are experiencing the same difficulty-if they are, you can feel pretty sure that your trouble is not due to any part of your radio installation. However, if your neighbors are not experiencing the difficulty that you are encountering, you had better go over your complete installation in order to locate the possible cause of the trouble. Some of these possible causes are as follows:

**LOOSE OR CORRODED WIRING CONNECTIONS.** Try tightening all knurled nuts and examine all connections to see that they are bright and clean.

**DEFECTIVE LIGHTNING ARRESTER.** Test for this trouble by disconnecting the wire leading from the arrester to its ground, and see if it makes any difference in reception-if it does, put in a new lightning arrester.

**DEFECTIVE OR WORN OUT TUBES.** See PART IV

**ANTENNA GROUNDED OR BROKEN DOWN.** Examine your antenna and make sure it is not broken down, or that it has not sagged down on, or near some object that is grounding it. Or it may be that other wires, branches of a tree or the like, have sagged down or been blown across your antenna. Follow this examination of your antenna by a study of your lead-in, from where it is attached to the antenna to where it is attached to the receiving set. See PART I. Chapt. 2.

**CABLE FROM RECEIVING SET TO BATTERIES IMPROPERLY PLACED.** See PART I, Chapt. 3,

**FUSE BURNT OUT.** If you have installed a series of fuses (as recommended in Part I, Chapt. 3) it may be that one or more of these fuses has been burned out, due to a short circuit in the wires running between the fuse block and the Receiving Set, or in the wiring of the set itself. Or one of your tubes may be defective.

Examination of your fuses will quickly tell whether any of them have been burned out. If this be the case, do not replace it with a new one until you have located the trouble and have had it corrected.

**FADING.** The "fading" of signals, which means that the voices or music first come in distinctly, then fade away only to come in strongly after a short period of time, can hardly be classed as poor reception, for, as a rule this condition will be found to exist with only one or two stations on a given evening, while broadcasting will be heard from other and equally distant stations, without intermission or fading of any kind. Fading is attributed to atmospheric conditions that are more or less localized and therefore do not affect all broadcasting reception on any given night.

## **PART VI.**

### **SOME CAUSES OF DISTURBING NOISES**

Noises that disturb the pleasure of Radio Reception can be divided roughly into two classes: noises generated in some part of your Radio Installation—usually easily remedied, and noises due to conditions outside of your Radio Installation—often difficult or impossible to remedy.

To find out whether the disturbing noise is generated inside of your Radio Installation, tune in a station and then disconnect the antenna lead-in and ground wires from the receiving set. If the noise continues, it is no doubt due to something inside of your installation—most likely your batteries. Look to your "A" battery terminals to be sure they are not corroded, but are bright and clean. Next, test your "B" batteries and note whether all cells register the required voltage. See PART IV, and the voltages required as noted on the "WIRING DIAGRAMS."

A CRACKLING, SIZZLING NOISE is usually due to run down "B" batteries, and can be remedied by replacing the exhausted batteries with new ones.

A SLIGHT WHISTLING NOISE is often due to the fact that the No. 1 "B" battery, which supplies the Detector, as well as the Amplifying Tubes, is run m down or exhausted, even though the rest of the batteries (or cells) are in excellent condition. By replacing the first "B" battery with a new one this trouble should disappear. See PART III.

A CONTINUED SINGING NOISE Heard while the set is connected to the antenna and ground. Sometimes due to the fact that the Radio Speaker is placed too close to the Receiving Set—try moving it further away from the set and see if the noise stops. MODEL 12. A humming noise is sometimes caused in six tube receivers by the particular tubes used in sockets 3 and 4. To locate the source of this noise, turn the 2nd rheostat (detector tube) all the way off and then all the way on—if the noise is due to the tubes in sockets 3 and 4, it will vary in intensity as the rheostat is varied. If this is the case, interchange tubes from sockets 1, 2, 5 and 6 with the tubes in sockets 3 and 4, until the noise disappears.

SOME OTHER NOISES, USUALLY DUE TO CONDITIONS OUTSIDE OF YOUR RADIO INSTALLATION, AREAS FOLLOWS: AN INTERMITTENT BUZZING. A strong, intermittent buzzing is usually caused by a commercial or governmental radio sending station.

AN INTERMITTENT "PEEPING" NOISE. An intermittent "peeping" noise, varying in intensity and sounding like the chirping of a little bird, is usually caused by an amateur sending station.

A CONSTANT, HIGH PITCHED WHISTLE. This is known as a "heterodyne whistle" and is due to the fact that another station is broadcasting on very nearly the same wave length as the station you have tuned in. Very fine tuning will sometimes better the condition, but as a rule, it is best to give up attempting to tune in the station you are endeavoring to tune in, until the other station has signed off.

SCREECHING OR "BOB WHITE CALLS. These noises vary in intensity and are usually due to some other receiver that is being tuned in, in your immediate neighborhood. Nothing can be done to remedy this trouble it is a case of "grin and bear it." However, you should remember that your Atwater Kent Set does not radiate, hence it does not annoy others as your neighbor is annoying you.

A CONSTANT CRACKLING, CLATTERING AND CRASHING. Usually due to static electricity generated in the upper atmosphere, which is picked up by your antenna wire and runs through your receiving set to the earth (ground). These noises are known as "static," and while a perfectly harmless phenomena, are at times exceedingly annoying. Nothing can be done to remedy them, but a change in the weather will entirely dispel them and reception will again be "as clear as a bell."

A CONSTANT HUMMING. Usually due to a dynamo located somewhere in your immediate neighborhood, or even at a distance, in which latter case the hum of the dynamo is transmitted through electric light or power wires, near which you have placed your antenna or lead-in. This is particularly apt to be the case if your antenna parallels electric light or power lines. By changing the location, or altering the direction of your antenna, you may be able to eliminate, or at least reduce this trouble.

A CONTINUED OR INTERMITTENT BUBBLING. Often due to a so-called "leak" in a nearby high powered electric transmission line and most apt to be noticed in wet weather.

OTHER NOISES. There are numerous other conditions that may cause annoying noises, such as X-Ray, Moving Picture or Violet Ray machines, located either in the same building that you are in or in your immediate neighborhood. Or near you may be an arc light, flashing electric sign, an electric welder or a similar electrical device. Likewise any piece of apparatus using an electric motor, such as a vacuum cleaner, air pump, vibrator, etc., is apt to cause annoyance at various times.

CONCLUSION. In concluding we would like to impress upon you that almost invariably you will find that poor reception, disturbing noises and other like troubles are not due to any defect in your Atwater Kent Receiving Set, Radio Speaker or Phonograph Attachment, provided they have not been tampered with since leaving our factory.

All parts used for the assembly of Receiving Sets are thoroughly tested, and the completed sets are carefully inspected and tested for actual receipt of signals. All Speakers are tested for tonal quality and volume, and are adjusted to give maximum results.

If you experience trouble of any kind in operating your set, first study over your installation, starting with your batteries, then the wiring, tubes, antenna, lead-in and ground, before you decide that the trouble lies in the receiving set or radio speaker. If, after carefully examining and testing the various parts of the installation, as suggested in the various parts of this book, you are convinced that the receiving set or speaker is at fault, do not attempt to locate and remedy the trouble yourself, but take the set or speaker to your dealer for examination by his experts.

## ATWATER KENT RADIO SPEAKERS

The apparatus which transforms the electrical impulses generated in the Receiving Set into audible sound, is called a Radio Speaker. This wonderful piece of mechanism is a most important part of a radio installation, for it must be capable of re-creating the music, voices and other sounds exactly as they were broadcast, otherwise false notes, distorted voices and noisy vibrations will be the result. Only after months of scientific research and almost endless tests and experiments were Atwater Kent Radio Speakers and Phonograph Attachments offered to the public. As a result, their ability to re-create voices, music and other sounds is truly marvelous! No Atwater Kent Receiving Set is complete without one, and the full beauty and clearness of your Receiver's reception of broadcasting will not be appreciated until you have heard it re-created by an Atwater Kent Radio Speaker. The very best of materials go into their construction and all parts are of ample size and sturdiness, so that with ordinary care they should last a lifetime.

Atwater Kent Radio Speakers and Phonograph Attachments are made complete in the Atwater Kent Factory and each Radio Speaker and Phonograph Attachment is thoroughly tested and adjusted to give best results before being packed for shipment. If you have not already purchased an Atwater Kent Radio Speaker, it will pay you to secure one from your dealer and give it a thorough trial.

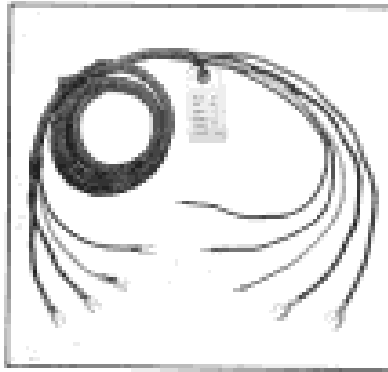


Illustration 37

Battery Cables (For Models 19, 20 and 24)  
Part No. 4903, 6 ft. cable. Part No. 4905. 10 f t. cable.

These cables are especially designed for Atwater Kent Receiving Sets.

The strands are proportioned to the load they must carry, and each strand is of a distinctive color with special metal terminal, thus assuring correct and permanent connection between instrument and battery.

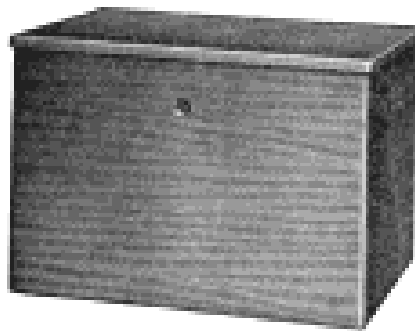


Illustration 38

Part No. 7740, Battery Container-illustration 38.

### Battery Containers

These Containers are substantially made, and finished in a rich mahogany brown. The lids are not hinged, but are so constructed as to be quickly and easily removed, giving convenient access to all batteries, for testing, etc., without removing them from the container.

For use with receiving sets when storage batteries are used. Dimensions: 18 inches long, 13 1/2 inches wide and 12 1/2 inches high.

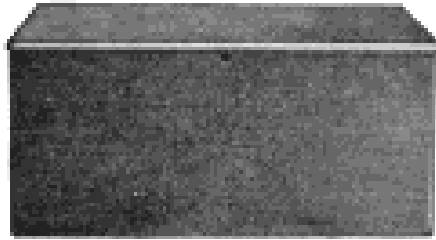


Illustration 39

Part No. 7790, Battery  
Container-Illustration 39.

For use with dry cell receiving sets. Dimensions: 22 1/2 inches long, 10 1/2 inches wide and 10 1/4 inches high.

For prices, see your dealer.