Radio
MONTGOMERY WARD & CO.
Chicago - Kansas City - St. Paul - Portland, Ore - Oakland, Cal. - Ft. Worth
For Description and Price of the Set Shown Above See Page 17
Montgomery Ward & Co.'s Radio Guarantee

It is our intention that every article shown in this book shall be truthfully described and be exactly as pictured. We guarantee everything you buy from us to reach you in perfect condition, and to satisfy you in every particular. Any article shown in this catalogue, if not satisfactory, may be returned under the following conditions:

Thirty Days Trial in Your Own Home

That you may satisfy yourself as to the quality and value of Ward's Radio Sets and all Radio Parts by inspection and actual use in your own home, we agree to permit you to return within 30 days, any radio purchase made from this catalogue (except tubes—see special guarantee on Page 37) which does not fully satisfy you, and to refund promptly the purchase price and all transportation charges you have paid.

Your Order Filled Within 24 Hours

When your order comes to us it is given immediate attention. Just as soon as it reaches us the work of getting your goods together is started. Within 24 hours after your letter is received your goods will have been carefully selected, examined, packed and delivered either to the post office, express office or placed in the freight car and started on their way to you.

With the quality of everything you buy absolutely guaranteed, with prices the lowest at which reliable goods can be sold, and now—with 24 hour service—you secure every advantage in ordering from Montgomery Ward & Co.
Radio Has Come to Stay

Radio is rapidly becoming a necessary part of our business and social life. Nearly 600 powerful broadcasting stations costing up to $100,000 each, operated by the United States government, universities, churches, newspapers and private corporations, are broadcasting entertainment, news, educational and religious features daily. It is all free. Information that formerly took days or weeks to reach dwellers in remote places, is now available by radio almost instantly. The correct time, weather forecasts and market reports are broadcast from many places; and with the proper apparatus, can be heard daily almost anywhere. With Ward's equipment, radio reception has been so simplified that anyone can operate easily and successfully the radio receiving sets shown in this catalogue.

Ward's Sets Are Standard

In building radio sets, we have profited by the results of years of research and experimenting. The correctly designed sets we offer embody those principles accepted by radio experts as standard. In selecting a set from Ward's you are sure of getting one that will remain standard in principle. We have adopted only those developments which are of positively proved merit. Novelties which mean only added cost without increased efficiency have no place on the receiving sets we offer our customers. Neatness and efficiency without extravagance marks every radio outfit that Ward's offers. Complete instructions, printed so anyone can understand them, are sent with every set.

Prices Within Reach of All

Besides simplifying and standardizing the radio receiving sets, Ward's has greatly reduced the cost of manufacture of satisfactory outfits, and made it possible to sell you high grade receiving sets at prices lower in most instances than those asked for very ordinary outfits. Ward's sets are designed to give satisfactory service in any home; no previous radio experience is necessary to operate them. In dealing with Ward's you have every assurance that the set you choose will do what is claimed for it. If any radio set or equipment you buy from Ward's is not satisfactory in every respect, you have the advantage of being able to return it within 30 days at our expense; and all the money you have paid, including transportation charges, will be refunded promptly.

Ward's Sets Are Easy to Install

Simple instructions which are included with every Ward Receiving Set make it easy for anyone to put up the aerial, make the few necessary connections and operate the set. No matter what Radio Receiver you buy from Ward's, you will find it designed to operate with surprising simplicity. This is as true of the most sensitive multiple tube sets as of the more simple Ward receivers.
Importance of Radio on the Farm

The Dairy Farmer, in a recent editorial, said:

“TO THE FARMER radio means more than to any other class. It is the last and possibly the greatest step toward emancipation of the farmer. The time is not far distant when the farm that does not have a radio outfit will be a back number, sooner or later losing out in the progress of events.”

A recent survey of seventy-three Illinois counties showed 20,856 receiving sets on farms in these counties. One county recorded four rural schools having sets, and an increasing number of farm communities using receiving sets for their programs. Thousands of Ward’s Radio Sets are in daily use, distributed over every state in the Union, and we receive letters from enthusiastic owners everywhere telling of the pleasure and new interest these efficient outfits have brought into their homes.

What Results to Expect

In describing radio Receiving Sets in this book we have been very conservative in estimating their range. Thorough tests made by our own experts, and the experience of users, have demonstrated that these sets will, under favorable conditions and when properly operated, receive over distances much greater than the radius claimed for them. The range of a set depends so largely on the location, the aerial, weather conditions, the season of the year and time of day, the care used in operating it and the strength of the broadcasting stations, that it is impossible to guarantee any particular distance.

We have tried to tell you what each set has consistently done in tests under ordinary conditions, rather than lead you to expect unusual results. The distance a set will receive is not, as a general rule, determined by the number of tubes or the price of the set. Any good single tube receiving set, under favorable conditions, will receive signals almost the same distance as a multiple tube receiving set, but not with the same volume and clearness. Generally speaking, more tubes mean more volume, clearer reception and greater ease in tuning in far distant stations.

A Set for Every Purpose

We list Receiving Sets to meet the needs of almost any locality or any home, at prices within the range of all. In some homes our popular one-tube outfits, used with head sets and properly handled, will bring in almost all the stations that a high priced set would receive, and with sufficient volume for all ordinary purposes. In other localities, nearby broadcasting stations or other sources of interference make it necessary to use more selective sets, so distant stations can be heard when the nearby stations are broadcasting. Still other users demand sets which will cover great distances and bring in concerts and lectures with the loud speaker. Some require sets using dry batteries; others want to use storage batteries. Sets to meet all these requirements are offered here at prices considerably below those usually asked for receiving sets that are not nearly as complete or efficient. As a rule it pays to buy the larger and more complete sets; but you need not deprive yourself of the enjoyment of radio even if you do not want to invest the price of a larger set, for you will most assuredly get great pleasure out of any set listed in this book.

Winter Reception Is Best

Through some atmospheric condition which science has not yet satisfactorily explained, the effectiveness of radio broadcasting stations is very materially cut down in summer. Stations that regularly reach people 1500 to 2000 miles distant during the winter months, find the audience confined to a much smaller radius during the summer. Daylight also reduces very greatly the range of the sending stations. Those which can not be heard during daylight, often come in quite clearly after dark. This is true both in winter and summer. No matter how sensitive your receiving set, its range is reduced when the broadcasting stations are not peaking as far as usual. In most localities the best results are obtained from September to April, and poorest results in May, June, July and August. Do not expect the same results from your radio receiving set, no matter what the price or where you use it, during daylight hours or during the summer months, that you get at night or in winter.

You can build a successful radio set with Ward's Parts. Page 24
Reception Is Best on Farms

Long distance reception is much louder and clearer on farms and in small towns than in the cities, because there is not the interference caused in the cities by street cars, power plants, transforming stations, X-ray outfits, elevators and large buildings of structural steel. Practically all the best records in long distance reception have been made on farms and in small towns. As a general rule a single wire aerial, high up and clear of trees and buildings, will enable the radio owner in the country to do more with a small, moderately priced receiving set than the city dweller can hope to do with a much more powerful and expensive outfit.

Other Conditions That Affect Reception

Static is another factor that science has been unable to overcome to any great extent. This static, which seems to arrive with the coming of spring and usually leaves with the first frosts, is recognized by hissing, crackling and crashing noise in the head set or loud speaker. This is a condition that confronts all users of radio; and despite the claims of unscrupulous dealers to the contrary, no practical set has yet been built that really overcomes static. Fortunately this condition, met only during a few months, is not bad in some localities, and some nights even in summer is not present at all.

Dependable Quality Assured

In this catalogue you will find shown only radio receiving sets and equipment of reliable construction and quality, built for Ward's under the supervision of competent engineers, or bought from reliable manufacturers who, like Ward's, value their good reputation above quick profits. In building radio sets we have in view two objects—efficiency, and the lowest price consistent with good quality. In our laboratories and factories we have overcome many of the high production costs by quantity buying, efficient machinery, sensible designing and quantity production.

In buying equipment we demand the lowest possible price, justified by our large purchases for cash. This enables us to sell to you at extremely low prices. We add only one small profit to the cost of manufacture. You do not have to pay the high costs and profits which enter into the ordinary methods of manufacturing and selling radio equipment. When you buy radio goods from Ward's, you can feel the same confidence that you have when buying any other merchandise we sell. Ward's reputation has been built on 52 years of honest dealing.

Let Us Help You

For your convenience, we keep a force of competent radio experts who will gladly answer any questions regarding the installation and use of Ward's radio sets. If you find it hard to decide which outfit is best suited to your needs, write us. Should you encounter any difficulties in the successful operation of your set, do not hesitate to ask for assistance. Do not permit anyone to take your set apart if it isn't working right. These sets are properly designed and well constructed, and no re-arrangement of the parts ever is needed.

Safety in Buying from Ward's

When we entered the radio field several years ago, it was our determination to offer our customers only equipment that would measure up to the usual high quality standard of Ward's merchandise. It is safest and best to buy your radio set or equipment from an old, reliable concern that has an established reputation for square dealing and good, dependable merchandise. Our unusual 30-Day Trial Offer protects you and is evidence of our confidence in the high quality of Ward's Radio Sets and Equipment.
The Ultra Airline One-Tube Set

$19.95

Complete Nothing Extra to Buy

No Experience Needed—Anyone Can Use It

The Ultra Airline is a high grade vacuum tube Receiving Set. Perfected until it is so simple that anyone can set it up and use it successfully anywhere. No previous radio experience is needed. This set complete at this low price includes tube, batteries, head set and all antenna equipment; nothing extra to buy. You can set it up and be hearing programs an hour or two after you receive the set. The range of the Ultra Airline is remarkable. On cold nights, under favorable conditions, you will be able to enjoy programs regularly from stations up to 1000 miles distant, and much greater distances have been covered. It will give good service the year round.

The World's Best Entertainers
Right in Your Own Home

Simply turn the dial and from far off cities come voices singing, bands playing, people speaking, a church organ playing, and religious services. You hear them with startling clearness. A simple pressure of the fingers on the dial brings in another, and still another station; and you choose your own entertainment. You can hear the weather forecasts, the market reports, educational lectures, the correct time. You need never be lonely with an Ultra Airline in your home. Every evening is filled with pleasant entertainment which you and your friends will enjoy.

The Ultra Airline Is
Reliable and Economical

Reliable reception, ease of control and economy in operation are features of the Ultra Airline. The only parts to wear out are the batteries. The "B" battery with ordinary use will last several months. The "A" battery should last six weeks or more, according to its use, and is not expensive to replace. The set is small and self contained. You can take it on camping or touring trips. By adding more head sets, several can listen in at the same time. The addition of the two-stage amplifier unit shown on the next page will convert the Ultra Airline into a set that can be used with a loud speaker on stations several hundred miles away, and greatly increase the range and volume of far distant stations on the head sets.

Sensitive Head Sets with easily adjustable head bands. Page 42
Ward's Best Radio Value

Simple—Practical Efficient
Wonderful Long Range Records

Owners Enthusiastic
These two letters, selected from hundreds of similar enthusiastic messages from owners of the Ultra Airline Set, will give you an idea of what it will do for you.

It Is Easy to Install
Your Ultra Airline comes to you complete in every detail. Every set before being shipped is carefully tested. The vacuum tube is inspected and thoroughly tried out to insure that it is sensitive and high quality in every way. With each set you receive a book of simple instructions with plain diagrams, which makes it so easy to install the set that absolutely no previous knowledge of radio or mechanics is necessary.

You'll Never Tire of Radio
There's Always Something New

A Practical and Efficient Receiving Set at a Very Low Price
The Ultra Airline is a practical radio set for any home. It brings in the programs with great clearness; it occupies small space, is neat in appearance and requires no storage battery. Anyone can operate it. The upkeep expense is so little that it will hardly be noticed. Ward's price for this fine set is so low that no family without a radio set can afford to be without the many advantages the Ultra Airline will bring into the home.

Keeping Down the Cost. In the manufacture of this set, every step is taken down by planning it carefully in advance and then making or buying the parts in large quantities at low prices. This makes a big saving in the manufacturing costs. Our direct method of selling makes a still greater saving. When you buy an Ultra Airline you buy only proved parts assembled in a tested combination, which has shown itself to be good under many various conditions of radio reception.

Order Now—Don't Miss the Programs
Within 24 hours after receipt of your order, your Ultra Airline Set will be on the way; and soon you, too, will be enjoying the programs which are bringing interesting entertainment and instructive information into many hundreds of thousands of homes throughout the country. Buying a radio set is a purchase that will bring happiness to the entire family, and one that you will never regret.

Complete Equipment Is Included
This Ultra Airline Radio Receiving Set comes to you complete—nothing extra to buy. The following is a list of equipment you will receive with your set:

One-tube set with C-299 or UV-199 tube: 225-volt "B" battery; 4½-volt "A" battery and special 200-ohm coil. Together with complete antenna equipment consisting of 150 feet of copper antenna wire, 25 feet of flexible insulated connecting wire, four porcelain knobs, flexible lead-in insulated lightning arrester; ground clamp; 15 feet ground connecting wire; screw eyes and screws; complete installation instructions. The Dream of Ward.

Ward's Two-Stage Amplifier
A NOTHER achievement of Ward's. A fine quality two-stage Amplifier at an unusually low price. Made especially to use with Ward's Ultra Airline or Airline Special sets, which it matches in size and finish. Can be used, however, with any good one-tube set, or even with a crystal detector set.

Volume Enough for Loud Speaker
With this Amplifier connected to your Ultra Airline you can have all the advantages of a two-tube set. This amplifier not only makes it possible to use a loud speaker, but greatly increases the range of your set. Very far distant stations that are ordinarily too faint for clear head set reception on the tube, are heard with amazing clearness and volume when the amplifier and a head set are used. This amplifier can be used in connection with a crystal set and amplifies the clear, sweet tones of the crystal receiving set with wonderful effect.

Can Be Used with Dry Cells or Storage Battery
The Amplifier is mounted in a handsome cabinet finished in Adam Brown imitation Mahogany to match the Ultra Airline and Airline Special receiving sets. Two binding posts with flexible cord and plug attached provide a convenient means of connecting the amplifier to either set. This amplifier is provided with special shockproof sockets to accommodate the sensitive C-299 or UV-199 tubes. One rheostat controls both tubes and is fitted with a head dial. Room enough inside the set for the "A" and "B" batteries. Owing to the ease of the "B" batteries it is better to place them behind the cabinet. The transformers are high grade audio frequency type of well known make, and the rheostat and filament control are of fine quality. No tubes, batteries or loud speaker included.

Equipment Required for Amplifier
You will need the following equipment with amplifier 563 R 637: Two C-299 or UV-199 tubes listed on Page 18; two "A" batteries (63 R 632) listed on Page 28; 2½-volt or four 1½-volt "B" batteries listed on Page 30. With amplifier 563 R 634 you will need two C-301A or UV-201A 6-volt tubes or C-12 and WD-12 1½-volt tubes, also the same "B" battery listed above. Should you use the C-301A or UV-201A 6-volt tubes, you will require the storage battery listed on Page 39. The storage battery used with the receiving set will also operate the amplifier.
Airline Special Will Give Fine Results Anywhere
An Ideal Home Set At a Very Low Price

Licensed Under Arms特朗 Patent No. 1,113,149 for Amateur and Experimental Use

Designed for Close Tuning and Clear Reception

This Receiving Set differs from all the ordinary one-tube receiving sets in that it is built for sharper tuning, which means clearer reception where broadcasting stations using similar wave lengths are on the air at the same time. This refinement is accomplished by using a type of regenerative circuit that has proved itself capable of cutting out the undesired stations. It adds no additional controls, but enables you to separate the incoming programs with greater ease and to hear stations which might otherwise be crowded out by more powerful stations. For those who wish to hear as many stations as possible with a one-tube set, the Airline Special is sure to prove satisfactory. Our low price includes everything. You have no extras to buy.

With Dry Cell Equipment Complete
Only $27.50

Dry cell equipment is recommended where it is not possible to charge a storage battery. This set can be operated for a month or six weeks on one 4½-volt dry cell "A" battery. Equipment includes Airline Special as described, with special socket and rheostat particularly adapted to the C-299 or UV-199 tube. Set comes complete with one tested C-299 or UV-199 tube, 4½-volt "A" battery, 22½-volt "B" battery, 2000-ohm head set with attaching cord and plug, and complete antenna equipment and instructions for installation and operation. Both "A" and "B" batteries may be placed inside the cabinet, making a very neat and compact set that will give satisfactory results.

See opposite page for complete description.

With Storage Battery Complete Equipment
Only $37.75

Set complete with the same equipment as the dry cell set, except that the tube is a 6-volt storage battery type with suitable socket and rheostat, and the battery our best grade 6-volt 50 ampere-hour storage battery, built especially for radio use. This set gives increased volume, and we particularly recommend its use if the storage battery can be conveniently recharged. See opposite page for complete description.

The Antenna Equipment consists of 150 feet of copper antenna wire; 25 feet of weather-proof insulated ground wire; 25 feet of flexible connecting wire; four insulator knobs; two antenna insulators; new style lead-in lighting arresters; ground clamp; screw eyes, screws and instructions.

Distant stations come in loud and clear with an Airline De Luxe. Page 12

 Montgomery Ward 


THE Airline Special is one of the most practical and efficient single-tube Receiving Sets we have ever seen. It has all the advantages of fine material and workmanship at a low price. The regenerative circuit used in the Airline Special is recognized by radio engineers as one of the most practical and desirable arrangements for a radio set for ordinary reception. The value of this well known circuit has been greatly increased by its scientific application and the use of fine quality parts.

"I bought an Airline Special Radio Receiving Set from you last January. We have the best of entertainments in a radius of 120 miles. "We often get distant stations plainly, when others near us with 3-tube sets don't get them. I would not have to be without a radio, because it gives me comfort, and joy to be at home and to have friends in other parts of the country. We do not make extravagant claims as to the receiving range of any of our receiving sets. The customers whom others ask for the Airline Special, but whose letters you see here were inexperienced in radio at the time they purchased their set. What they have done you also can do with an Airline Special. On cold winter nights, when reception is at its best, this set will easily bring in powerful broadcasting stations located as much as 1000 miles distant; and if you tune very carefully and the conditions are favorable, you can cover distances up to 1500 miles or more even can be covered.

"The Airline Special Radio Receiving Set we ordered from you reached us four days after sending our order. It arrived in fine shape and was not just a set up with your simple instructions. We have heard Toronto, Can.; Havana, Cuba; Los Angeles and San Francisco, Calif.; San Antonio, Tex.; New York, N. Y.; and other long distance stations in the short time we have had it. We want to tell you it is the most remarkable set we have ever heard."  

Laurence A. Miller,  
Mahomet, Ill.

Printed with Mr. Miller's Permission

THE Dry Cell Set

Pictured on Opposite Page 
Cabinet. Finished in Adam Brown imitation Mahogany with hinged cover. All parts attached to the back panel which is removable. Size 7 1/2 by 7 by 11 inches. Non-scratching rubber feet. Controls. Consist of large tuning condenser dial with vernier adjustment; 4-point wave control switch; small dial to control regeneration; small rheostat dial. Tuning is mostly done with the large center dial.

The Parts. Low loss improved spider web type inductor and teflon coil; fine quality 22-plate variable tuning condenser with approved "piptal" connection and fine vernier adjustment to give very accurate tuning. Jacks and plugs correctly designed to prevent leaks. Page 53

"We received the Airline Special. I get stations in N. Y., Penn., Mass., Ga., and Tex. almost as clear as our local station."  
Walter L. Crum,  
California, Mo.

Interior of Airline Special Set

"I tune in such places such as QHPF, KIV, PWX, WTMY, KFBE, KPML and others from the set. An impression is very pleasant."  
E. G. Schuler,  
Akon, O.

"Although I have had my outfit but four weeks, I have received over forty stations. Some are Ottawa and Montreal, Can.; Louisville, Ky.; and Hastings, Neb."  
J. O. Higginbotham,  
Lowell, Mass.

Storage Battery Set

Pictured on Opposite Page 
Cabinet. Well made of carefully selected kiln dried wood, finished in imitation Brown Mahogany with hinged cover and space for the "B" battery. Rubber feet prevent sticking. Size 7 1/2 by 7 1/2 by 6 1/2 inches.

Controls. There are just three tuning controls and one rheostat dial. Tuning is accomplished mainly with the large center dial, and fine adjustment is made with the "B" dial. Correct wave length adjustment is made with the four-point switch. Regeneration is controlled by small dial at right. Rheostat has vernier attachment, permitting close adjustment.

Best Quality Parts. The inductors used are improved spider web type coils, known for their low loss characteristics. The 22-plate variable condenser has "piptal" connection on the rotor, the current being led through a flexible wire cable soldered on inside spring contact which often fails to work. Condenser is shielded by a brass plate. Jack is high grade and takes any standard plug. There are three binding posts; each plainly marked. Grid leak and grid condenser are especially suited to this set.

Set Complete. Complete as described in cabinet shown on preceding page. Contains all required equipment on opposite page, and the following:

- Cunningham or Radiotron vacuum tube, high grade 2000-ohm head set with cord and attaching plug: complete ammunition as listed on opposite page. Price, 4 1/2 volt "A" battery good for four to six weeks use: 254 volt "B" battery instruction book. Shipping weight, complete outfit, 35 pounds. Mailable.  
563 R 642—Airline Special complete.............$27.50

- Postage, complete outfit, 44 extra

- 63 R 671—Airline Special complete.............15.95

- Postage, set only, 64 extra

The Airline Special is especially adapted for use with our Two-Split Amplifiers described on Page 7. You can convert your one-tube set into a sensitive, three-tube set with sufficient volume to operate a loud speaker. The storage battery type Airline Special operates the same as the ordinary single-tube receiving set. The dry cell type requires two 4 1/2 volt additional dry cells to light the amplifier tubes.

Montgomery Ward & Co.*
A Practical, Convenient Radio Receiving Set for Sportsmen, Overland Tourists, Campers, Prospectors, Trappers, Surveyors, Range Riders, and for Home Use

Let radio furnish your entertainment wherever you may go. Take your set with you in the auto; take it to the camp, the seaside, on the hunting trip—anywhere. You don't need to miss the wonderful programs in the air when you go away from home.

You can listen in any time and anywhere if you own this 3-tube Portable Receiving Set. Just stretch out the antenna wire, attach the ground wire, insert the head set plug, and you are ready to hear the programs.

This portable set is only about half as large as a suit case and weighs only 15 pounds. It is entirely contained in an attractive imitation leather covered carrying case which holds the batteries, tubes, head sets, aerial and ground wire, as well as the set itself. You can stretch out the aerial in your hotel room and connect the ground wire to the radiator, or you can throw the aerial over a tree and fasten the ground to a pump. You can usually find a good place for the antenna and ground wire in any location.

This is a fine set for home use too. You can use it with an outdoor antenna and get the long distance stations, and on local stations it will operate a loud speaker with fair volume. It is ideal for home and outdoor use.

An Efficient, Well Built Set That You Can Use Anywhere

The three tubes in this Portable Set are the UV-199 or C-299 type, and both plate and filament current are supplied by compact dry cell batteries. The circuit provides one stage of tuned radio frequency amplification to build up the signals from distant stations, detector, and one stage of audio frequency amplification to increase the volume.

Easy to Tune—Equipment Is Complete

It is a sturdy constructed set, and the fine quality parts used make it very efficient. There are only two tuning dials, so that it is a simple matter to select the station you want to hear. The carrying case is covered with black imitation leather and is fitted with a leather covered handle and three metal catches. The corners are reinforced with metal plates.

The low price includes the set and equipment complete. You don't need to buy anything else, and you can be "listening in" in a few minutes after you receive your set. Besides the set, the outfit consists of three vacuum tubes, special dry cell "A" batteries, 45 volts of "B" battery, Airline 2000-ohm head set, insulated antenna and ground wire.

Priced Low—Always Convenient

This is a quality set in every respect, and you may be sure it is an exceptionally fine value that you would expect to cost more. And remember that this is a set you can use anywhere—it is always ready and convenient to give many hours of pleasure to yourself and your friends. Order this set and enjoy the fascinating programs in the air wherever you are.

$49.00—Complete outfit.

Keep your radio set working at its best. Read Page 63
The Approved Circuit Used Makes the 2-Tube Airline Very Easy to Operate

The circuit used in the Airline 2-Tube Receiving Set is one that has proved most satisfactory. It will bring in distant stations and is recognized as one of the most practical circuits to insure good results under all ordinary conditions. One great advantage of this Airline Set is that it is very easy to tune in.

Will Operate Loud Speaker on Nearby Stations

Because of the type of circuit used in this set it will bring in programs from great distances—more than a thousand miles under favorable conditions. The second tube furnishes a stage of audio frequency amplification which increases the volume. Under favorable conditions programs from nearby stations will come in loud enough so you can use a loud speaker with this set.

All Batteries Inside the Cabinet

The Airline 2-Tube Receiving Set is mounted on a panel 8 1/2 by 9 inches. The panel fits into a cabinet 7 1/2 inches deep, which also holds both the "A" and "B" batteries. The cabinet is Adam Brown Imitation Mahogany finish.

Since the small dry cell batteries are inside the cabinet, this set is so compact and convenient that you can easily move it from room to room, or even take it with you on trips and outings.

Equipment Is Complete

With the Airline 2-Tube Receiving Set we furnish two 1Y-199 or C-299 vacuum tubes, dry cell "A" battery and 45 volts of fresh "B" battery, Airline 2000-ohm head set with cord and plug, complete parts for efficient antenna, and ground wire and clamp. Everything you need is included. You are ready to listen in as soon as the antennas, ground and batteries are connected.

563 R 594—Airline complete ........................................ $33.50
Postage, 4c extra
563 R 595—Airline without tubes, batteries or other accoutrements included ........................................ $17.95
Postage, 26c extra

See our Loud Speakers on Pages 40 and 41

Light weight, substantial Head Sets are shown on Page 42
Airline De Luxe with Loud Speaker

For Dry Cell or Storage Battery Use

An extremely sensitive 3-tube Receiving Set of the well known regenerative type, furnished in either storage battery or dry cell type to meet your needs. Beautifully constructed and highly efficient. Equipped with high grade loud speaker; 2000-ohm Airline head set and all necessary equipment. No extras to buy.

Standard Equipment with Each Set

Equipment included consists of a 2000-ohm Airline head set with cord and plug, book of instructions and the following: Antenna equipment: 150 feet bare copper wire, 25 feet lead-in wire, 25 feet insulated wire, new type lead-in insulator that fits under the window, two porcelain insulators with screw eyes, four porcelain knobs with screws, lightning arrester and ground clamp.

With Storage Battery

$77.50

Included at this price you get our best 90-ampere hour 6-volt radio storage battery with tubes and "B" batteries as described on opposite page.

With Dry Cell Batteries

$66.50

The Dry Cell outfit includes tubes, "B" batteries and three heavy duty dry cells as described on opposite page.


Battery Tester Included

With each Airline De Luxe dry cell type set we include a "B" battery meter without extra cost. With storage battery types we include free a high grade hydrometer for testing storage battery, and also a "B" battery meter.

High Grade Loud Speaker

The loud speaker we include in this outfit is the high grade Airline Jr. described in detail on Page 40.

Attractive Radio Cabinets are moderately priced on Pages 66 and 67
Entertains Family and Friends

The De Luxe Receiving Set uses the well-known Armstrong regenerative principle, which many experts claim has never yet been excelled for general reliability and dependable signal strength. It employs two stages of audio frequency amplification, which increases the volume enormously and gives splendid loud speaker reproduction on programs from powerful stations up to 600 or 800 miles distant under favorable conditions. With head sets it will easily cover more than double the loud speaker range. The simplicity of operation commends the De Luxe to those who want quick, satisfactory results with the least complications. Tuning is done with one dial, which has a vernier attachment for very close tuning. This set has proved highly satisfactory to the thousands who are now using it.

View Showing Interior Construction

The De Luxe Receiving Set has been designed with economy in mind, and this is reflected in the price you pay. The cost for replacing dry cells is very small. With ordinary use a set of dry cells will give several weeks of satisfactory service. This set is the same as the De Luxe dry cell set described at the left in size, finish and equipment, with the exception of the tubes and batteries. In localities where the ordinary storage battery type is impractical, the De Luxe with dry cell equipment will give practically all the advantages of radio.

No Extras to Buy

You can order this set with the satisfaction of knowing that it will come to you complete in every detail, all ready to set up and use. The instructions included with the set makes it possible for anyone to install and operate it successfully.

Equipment Included with Dry Cell Type

The De Luxe Receiving Set with dry cell equipment includes three C-299 or UV-199 tubes and three heavy duty dry cells, antenna equipment, three sets, 90 volts of "B" battery, one "C" battery and loud speaker as described. Shipping weight, 65 pounds. Not mailable.

Postage, 64 extra

$66.50

563 R 647—Airline De Luxe without tube, batteries or other equipment

$37.50

Postage, 44 extra

Two Types to Choose From

Airline De Luxe Complete Receiving Set With Storage Battery

Where the facilities are at hand for charging a storage battery, we recommend the De Luxe equipped with 6-volt tubes. The operation of a set with storage battery is always more satisfactory because of the steady, dependable current and increased signal strength. The small additional cost is well justified. The battery furnished is our best 6-volt 90-ampere hour storage battery described on Page 38. The loud speaker requires no battery current. It is the high grade Airline Jr., described on Page 40 and gives splendid results. The cabinet is finished in Adam Brown imitation Mahogany with rubber feet to prevent scratching. Top has lid for convenience in handling tubes.

Complete Ready to Install

The De Luxe is shipped to you complete with everything needed. There are no extras to buy. The instruction booklet sent with each set tells you how to put up the serial and connect the batteries, and gives clear instructions for the use of the set in getting best results. It is exceedingly simple to operate, and the upkeep cost is trifling.

Equipment Included with Storage Battery Type

The Airline De Luxe with storage battery equipment includes three Cunningham or Radiotron tubes, a high grade 6-volt 90-ampere hour storage battery; 90 volts of "B" battery; loud speaker, and all other equipment as described. Shipping weight, 70 pounds. Not mailable.

663 R 626—Airline De Luxe complete set $77.50

663 R 628—Airline De Luxe without loud speaker. Shipping weight, 60 pounds. Not mailable $72.00

563 R 646—Airline De Luxe without tubes, batteries or other equipment $37.50

Postage, 44 extra

Airline De Luxe Complete Receiving Set With Dry Cell Battery

The Airline De Luxe with dry cell equipment is highly efficient. Many who could use storage batteries if they wished, prefer the dry cell type because of its compactness and portability. If good dependable dry cells such as we furnish are used, the owner of a De Luxe dry cell set will obtain a steady filament current and get satisfactory results from the set. The cost for replacing dry cells is very small. With ordinary use a set of dry cells will give several weeks of satisfactory service. This set is the same as the De Luxe dry cell set described at the left in size, finish and equipment, with the exception of the tubes and batteries.

No Extras to Buy

You can order this set with the satisfaction of knowing that it will come to you complete in every detail, all ready to set up and use. The instructions included with the set makes it possible for anyone to install and operate it successfully.

Equipment Included with Dry Cell Type

The Airline De Luxe with dry cell equipment includes three C-299 or UV-199 tubes and three heavy duty dry cells, antenna equipment, head sets, 90 volts of "B" battery, one "C" battery and loud speaker as described. Shipping weight, 65 pounds. Not mailable.

563 R 627—Airline De Luxe complete $66.50

563 R 645—Airline De Luxe without loud speaker. Shipping weight, 55 pounds. Not mailable $61.00

563 R 647—Airline De Luxe without tubes, batteries or other equipment $37.50

Postage, 44 extra

More than 500 broadcasting stations are listed on Pages 34 and 35
Graceful Queen Anne
Console Cabinet

The simple grace and quiet dignity of the Queen Anne period furniture has been faithfully reproduced in this Cabinet. It is made of seasoned wood, veneered with select Mahogany, stained and finished in a rich brown tone which brings out the beautiful grain. The cabinet work is excellent. The hand rubbed finish gives it the soft luster of the old masterpieces.

Utility Combined with Real Beauty

The Loud Speaker, which is built into the right side of the cabinet, is very much like the tone chamber of a phonograph with the addition of a high grade adjustable reproducing unit. The set is complete with storage battery, tubes, "B" batteries, head set, antenna equipment and a book of simple instructions for installing and operating. The batteries and all other equipment are concealed in the cabinets, which can be closed if you like when you have tuned in your favorite station. The price includes everything; there is nothing extra to buy. The complete equipment included with the set consists of three Cunningham or Radiotron tubes; 6-volt 90-ampere hour storage battery; 90 volts of strong fresh "B" battery; 2000-ohm head set with cord and plug, full antenna equipment described below and instructions for installing and operating. For estimated total freight charges, see information on Page 65.

663 R 588—Console Cabinet complete with storage battery equipment. Shipping weight, 250 pounds. $625.00

162 R 589—Receiving Set and Loud Speaker in cabinet for use with storage battery. No other equipment included. Shipping weight: 200 pounds. $92.50

Neat Panel Arrangement

Note the neat arrangement of the fine quality parts used in this De Luxe 3-tube receiving set. The panel is removable and has all parts attached. It will be noted that the set is shielded from body capacity, which insures easy tuning.

The equipment included consists of 6-volt 90-ampere hour storage battery; 2000-ohm head set; built in loud speaker; 90 volts "B" battery; and antenna equipment consisting of 150 feet of bare copper antenna wire, 25 feet of lead-in wire, 25 feet of connecting wire, new style lead-in (no holes to bore), Underwriters' approved lightning arrester, antenna insulators, porcelain knobs, screws and screw eyes. Also complete instructions, hydrometer and "B" battery meter included with each set.

The De Luxe Cabinet when closed is 32 inches high, 32 inches long and 20½ inches deep. The lid is divided in half. A handy tray is located under right hand lid for head sets, books and tools.

WARD'S famous 3-tube long range Receiving Set built into a handsome console cabinet of Queen Anne period design, which also has ample room for all accessories. This set is capable of bringing in stations up to 1500 miles satisfactorily on the head sets, and very much better records have been made with it. On the loud speaker, under favorable conditions, it will reproduce programs from stations up to 500 miles, and often will cover much greater distances.

Anyone Can Operate It

This set is simple to operate and very efficient. The loud speaker gives good volume in natural tones, so much desired. The high efficiency of the De Luxe insures receiving regularly the daily markets and weather forecasts, and it can be relied upon to give you a wide range of program from which to select your evening's entertainment. The price is very low for a set of this high quality.

Ward's guarantee insures your complete satisfaction. See Page 2
Long Range Console Model—Priced Low

An unusually good Receiving Set using two stages radio frequency, detector, and two stages of audio frequency amplification. This means the signals are amplified twice before and twice after detection. The principle used gives exceptional volume with great clarity over long range. Under favorable conditions, this set will easily receive stations up to 1800 miles with head sets and give good loud speaker volume on stations within a range of 1000 miles. You are sure to be satisfied with the performance of the Airline Lyric.

This Set Is Complete—There Are No Extras to Buy

All the advantages of a long range 5-tube set are here combined in an attractive period cabinet at about the price ordinarily asked for the set alone in a plain case and without a loud speaker. Although a multiple tube receiving set, the Airline Lyric is very easy to operate. Delighted owners have written us of really remarkable distances covered by this set both with loud speaker and with head sets. It uses the standard 6-Volt tubes and a built in loud speaker with the pleasing tone qualities of the best phonographs. The speaker unit has excellent volume and tone. The upkeep cost of the Airline Lyric is small. With this handsome set in your home, you and your family can depend on receiving the daily markets and weather forecasts and your choice of evening entertainment from the many programs "in the air."

Equipment included consists of 6-volt 90 ampere hour storage battery fully charged; 90 volts "B" battery; 3300-ohm high grade head set, five Cunningham or Radiootron tubes; 150 feet bare copper antenna wire; 25 feet lead-in wire; 25 feet connecting wire; new style lead-in, lightning arrester, antenna insulators; a set of instructions, porcelain knobs, screws and screw eyes; also hydrometer and "B" battery meter and complete instructions.

In the Lyric the tuning panel with simplified control is concealed under the lid, which may be closed when you have tuned in the station wanted. The scroll which covers the loud speaker is backed with a silk screen in harmonizing color, which adds to the attractiveness of the set.

The rich Mahogany veneer of this graceful period Console is stained, varnished and hand rubbed to a soft, deep Mahogany Brown finish. It is an elegant piece of furniture and conceals the radio receiving set with its wires and batteries very effectively, and thus makes it possible to enjoy the pleasures of radio in your best room. Space for the storage battery, "B" batteries and all accessories is provided for inside the cabinet. Built in loud speaker is concealed behind the silk covered grill.

The rich Mahogany veneer of this graceful period Console is stained, varnished and hand rubbed to a soft, deep Mahogany Brown finish. It is an elegant piece of furniture and conceals the radio receiving set with its wires and batteries very effectively, and thus makes it possible to enjoy the pleasures of radio in your best room. Space for the storage battery, "B" batteries and all accessories is provided for inside the cabinet. Built in loud speaker is concealed behind the silk covered grill.

Queen Anne Period Console Cabinet

The complete set includes a high grade 2000-ohm head set with plug, 6-volt 90-ampere hour storage battery; 90 volts of "B" battery, full antenna equipment, hydrometer and "B" battery meter, and instruction book.

For estimated total freight charges, see information on Page 66.

163 R 574—Complete with storage battery, tubes and storage battery equipment. Shipping weight, 225 pounds. $175.00
163 R 575—Airline Console complete with loud speaker, for use with your own storage battery, tubes and equipment. No tubes, batteries or other accessories included. Shipping weight, 180 pounds. $125.00

Complete With All Equipment
$175.00 Storage Battery Type
Long Range Console Model—Priced Low
Ward's Finest Receiving Set. Standard Cabinet Mounting—Remarkable Selectivity and Volume

Our finest Radio Receiving Set built into a handsome cabinet suitable for use on a table or stand. The cabinet is made of handsomely grained Oak in the popular silver gray waxed finish. The Super Airline is an improvement on one of the very latest receiving circuits, and is one of the most sensitive and selective radio receiving sets we have seen.

The advanced principle used has excited much favorable comment in radio publications. Under good receiving conditions this set will cover a wide range, and is particularly suited for loud speaker use. It will bring in stations on a loud speaker that are usually heard only with a head set. A conservative estimate of its range under good conditions is 2000 miles on head sets and up to 1200 miles with a loud speaker. Stations at much greater distances have been heard. The workmanship in this set is excellent. It is identically the same set used in our best console set described more fully on Pages 18 and 19.

As will be noticed in the illustration, the controls are three in number, each supplied in a variety for critical adjustment. With a Super Airline in your home you are sure of satisfactory service on market reports, weather forecasts and evening programs. By adding a good loud speaker you will have about all that one could desire in a radio receiving set.

Size of cabinet, 18 by 12 by 12 inches.

Full Equipment Included—No Extras to Buy—An Ideal Long Range Set

Included with the Super Airline, when you buy the set complete, you will receive the following: Five Cunningham or Radiotron tubes; one high grade 6-volt 90-ampere hour storage battery fully charged, or three dry cells; one fine quality 2000-ohm head set with cord and plug; 90 volts fresh "B" battery; 150 feet bare copper antenna wire; 25 feet insulated lead-in wire; 25 feet insulated connecting wire; new style lead-in (requires no holes); Underwriters' approved lightning arrester; insulators; ground clamp; porcelain knobs; hydrometer with storage battery set and "B" battery meter; also a complete book of instructions for installing and operating the set.

The dial setting on all three dials is always the same for the same station, making it easy to keep a record and quickly find the station you want. The circuit used gives exceptional clarity and volume.

663 R 585 Super Airline Receiving Set in standard cabinet. Complete with antenna equipment, storage "A" battery fully charged, 90 volts "B" battery, five C-301A or UV-201A tubes, 2000-ohm head set and plug, hydrometer and "B" battery meter, and book of instructions. Ship. wt., 100 lbs. $121.00

For estimated total freight charges, see Page 65.

563 R 586 Super Airline Receiving Set, only for use with storage battery tubes. No equipment included. Shipping weight, 40 pounds $75.00

563 R 590 — Complete Super Airline Set same as 663 R 585, except with C-299 or UV-199 dry cell tubes and dry cell "A" battery equipment. Shipping weight, 70 pounds $111.00

The whole family can enjoy the program with a Loud Speaker. Pages 40 and 41 for Speakers.
The Super Airline, using one of the latest improved Radio Receiving Set circuits is, we believe, the most dependable radio receiving set you can buy at any price. The set shown here is complete in every detail, including a built-in loud speaker. The receiving unit is identical with the same as that in our finest console receiving set. This model is mounted in an artistic, handsomely grained Oak cabinet, 28 by 12 by 12 inches, finished in a silver gray tone, waxed and hand rubbed.

The bakelite panel is handsomely engraved, and each of the three large control dials has a vernier knob for extremely fine adjustment. Under favorable conditions this set will easily cover distances up to 2000 miles with head sets, and up to 1200 miles with a loud speaker. Very much better records have been made repeatedly. It is a set that can be relied upon for a wide selection of programs from many stations, and also dependability in receiving the daily markets and weather forecasts.

A Fine Set for Any Home

This model Super Airline with built-in loud speaker is exceptionally handsome. All the Super Airline Sets shown on this page have loud speakers with one of our finest reproducing units and a sound chamber designed to give clear tones. For estimated total freight charges, see information on Page 65.

For Use with Storage Battery

- 563 R 582—Super Airline complete with storage battery equipment. Shipping weight, 125 pounds...
- 563 R 583—Super Airline without tubes, batteries or other equipment. Shipping weight, 60 pounds.

For Use with Dry Cells

- 563 R 592—Super Airline complete with dry cell equipment. Shipping weight, 90 pounds...
- 563 R 593—Super Airline without tubes, batteries or other equipment. Shipping weight, 60 pounds.

Uses a New Principle Which Gives Unusual Clearness and Volume

Radio engineers agree that a circuit using tuned radio frequency amplification, a method of amplifying the signals before detection, gives the best results with the greatest simplicity. The tendency of this type of Receiving Set however, is to oscillate, spoiling the tone quality of the radio broadcasting.

This undesirable tendency has been overcome in a number of sets on the market by the use of small balancing condensers which, however, cause losses of energy. Our radio engineers have perfected in the Super Airline a radio frequency circuit which eliminates oscillating without the use of these condensers and the losses they cause. The result is a receiving set more sensitive and selective, we believe, than has been produced before.

Wherever possible, we recommend the use of the storage battery set, as it gives greater distance and louder signals. The dry cell type is best suited for those who can not conveniently charge a storage battery.

A Fine Set for Any Home

Stations Always Come In at the Same Dial Setting on This Set

Full Equipment Is Included

This Super Airline model is furnished either with or without equipment. When full equipment is included it consists of our best 6-volt 90-ampere hour storage battery or three dry cells; five Cunning-ham or Radiotron tubes; high grade 2000-ohm head set; 90 volts fresh "B" battery; complete antenna equipment consisting of 150 feet bare copper antenna wire, 25 feet connecting wire, new style lead-in which does away with necessity of boring holes through window frame. Underwriters' approved lightning arresters, antenna insulators, porcelain knobs, screws, screw eyes, ground clamp, and complete instructions.

Vacuum Tubes are tested in our own laboratory. See Pages 36 and 37.
Let the Famous Artists Entertain You
in the Comfort of Your Own Home

Refined entertainment by celebrated artists is no longer exclusively for those who have the time and means to attend theaters. Radio brings it into the home. With this handsome long range Receiving Set you are in a position to enjoy the best that radio broadcasting offers. You can select the program that pleases you, or your family or friends, and the Super Airline will faithfully reproduce the music or speech in sufficient volume so all in the room may enjoy it. When the friends have departed and the family retired, the real radio lover can plug in the head set, lie back in a comfortable chair, and if conditions are favorable, enjoy programs from both coasts of California and Cuba. During the day the Super Airline will bring you the latest weather and market reports.

Fine Quality Loud Speaker

The Loud Speaker Unit is built into the right side of the cabinet, with a decorative scroll covering the front. This scientifically designed wood tone chamber gives the sound the sweet tone of an old violin. The speaker used is provided with adjustments to regulate the tone and volume.

The Beautiful Period Cabinet

All the grace and richness that marks the furniture of the Italian Renaissance Period is reproduced in the strikingly beautiful Console Cabinet which contains the Super Airline Receiving Set. The cabinet was designed especially for the radio set, and when closed one would think it was a handsome piece of period furniture. The cabinet work is the finest throughout. The select wood used is thoroughly seasoned, and the Walnut veneering is carefully matched for color and grain. The antique silver gray finish with dainty gold trimming, a masterpiece of the cabinet finisher's art, brings out the full beauty of the design and the grain of the wood, and makes this a truly beautiful addition to any home.

Equipment

The Super Airline Receiving Set comes complete with loud speaker built in and the following equipments: Six volt 60-ampere hour storage battery fully charged. 90 volt "B" battery. Five tested 300A or UV-201A tubes; one metal grade 2000 ohm head set with braid band, cord and plug; antenna outfit consisting of 150 feet of bare copper antenna wire, 25 feet of lead-in wire, 25 feet connecting wire, new style lead-in with no holes to bore. Underwriters' approved lightning arrestor, antenna insulators, porcelain knobs, screws, and screw eyes; also complete instructions for installing and using the set.

The Super Airline is a highly efficient radio set built into a full size console cabinet, handsome enough for the best room in any home. The beauty of this Italian Renaissance period console cabinet in silver gray Walnut finish, its compactness and convenience, will be appreciated by those who want elegance without extravagance.

The loud speaker and batteries are at all times concealed in the cabinet, giving a neat appearance and a pleasing air of refinement.

Serves as Beautiful Console Table

When closed, the Super Airline serves as a beautiful console table. You can tune in a station, then close the cabinet if desired, and have the console table effect even when operating. We do not know of a radio set of this type at anywhere near the price of the Super Airline, which combines so well genuine utility, fine appearance and efficient operation. The soft silver gray finish with gold trimming is the work of expert cabinet finishers, and gives to the beautifully grained walnut veneer a tone that will harmonize with almost any color scheme.

Combines Refinement with Utility

No detail in the design, construction or finish of the Super Airline Receiving Set or its cabinet has been neglected. It comes to you all ready to set in your home, complete with every necessary attachment and full instructions for connecting and operating. The set employs two stages tuned radio frequency and two stages audio frequency amplification, which means the signals are increased many times before detection and again amplified after detection. This is the reason the Super Airline gives superior selectivity and volume.

Receiving Set Worthy of Its Handsome Cabinet

The Super Airline Receiving Set is in every detail fully worthy of its cabinet. Under favorable conditions it will reproduce with the loud speaker the programs from stations up to 1200 miles distant. The loud speaker, built into the right side of the cabinet, is one of the best obtainable, and reproduces faithfully the fine tone qualities of the speech or music. With the head sets the range is much greater.
An Up to Date
Improved
Receiving Set

In keeping with the progress of radio
we have made the Super Airline a dis-
tinct improvement over all the similar
types of Receiving Sets that have ap-
peared on the market during the last
season.

Radio engineers have long agreed that
a circuit using tuned radio frequency
amplification would give the best re-
results with the greatest simplicity. This
is the method of amplification used in
the Super Airline. Always before there
had been a tendency for this type of re-
ciever to oscillate, spoiling the tone
quality of the set and usually preventing
the clear reception of the radio broad-
casting.

Improved Design

A number of sets have recently ap-
peared on the market in which this ten-
dency has been overcome by the use of
small balancing condensers. Our ra-
dio engineers have perfected in the Su-
per Airline a circuit which eliminates
those condensers and the losses they
cause. The result is a receiving set more
sensitive and selective than has been
produced before.

Easy to Operate

The set is extremely simple in opera-
tion. Three large, plainly marked dials
can be set quickly to bring in the desired
station. Record this setting; and when
you wish to hear that station again, sim-
ply turn the dials to the recorded posi-
tions and, if the station is broadcasting,
you will hear it. The ease with which
one station is tuned in and another
out with this set is remarkable; and
nearby stations cause little or no inter-
ference when it is desired to listen to
the distant ones.

The actual dimensions of the Super
Airline Console Model Receiving Set
are: Height, 33 inches; length, 43
inches; depth, 22 inches.

Superior Features

To those who have had radio
experience, the advantages of
the improved design and the
splendid workmanship in this
Receiving Set will be at once
apparent. This view of the in-
terior construction reveals the
fine quality low loss con-
densers the short wire leads,
the careful shielding the well
designed coils; transformers
and rheostats, all of which add
to the efficiency of this set.
Note the neat and compact
arrangement of the entire
panel. The same fine work-
manship is carried throughout
the entire set and its cabinet.
Let all the family hear the program. Loud Speakers on Pages 40 and 41

Airline Grand Tube Receiving Set

Complete With All Equipment $77.00

Long Range Set in Standard Cabinet
For those who want the advantages of tuned radio frequency and the added volume of two stages of audio frequency amplification, this set is an unusual value at Ward's low price. Under favorable conditions it will easily bring in programs from stations up to 1600 miles away with head sets, and powerful stations up to 500 miles distant with a loud speaker. It is built with great care. And, like all Ward's radio sets, contains only high quality parts assembled in a workmanlike manner following latest approved radio principles. Ward's low price includes everything needed; there are no extras to buy. It is all ready to put to work in your home.

 Anyone Can Use It Successfully
It requires no knowledge of radio to "set up and operate the Airline Grand. Practically all tuning is done with two dials. Our book of simple instructions tells how to erect the antenna and connect the set. The set is in a highly polished Adam Brown (dark brown) Mahogany finished cabinet, 7 by 8 by 21 inches.

What the Outfit Includes
The outfit includes the Airline Grand in a standard cabinet with four Cunningham or Radiotron tubes; 6-volt 90-ampere hour storage battery fully charged, or three dry cells; two 65-volt tapped "B" batteries; 150 feet antenna wire; 25 feet lead-in wire; 25 feet insulated wire for the connections inside the house; a new type lead-in insulator which fits under the window (no holes to drill); two porcelain antenna insulators with screw eyes; four porcelain knobs with screws; ground clamp, 2000-ohm high grade head set with plug. Underwriters' approved lightning arrester, and complete set of instructions.

For estimated total freight charges, see information Page 65.

For Use with Storage Battery
663 R 524—Airline Grand complete. Shipping weight, 115 pounds $88.50
663 R 525—Airline Grand without tubes, batteries, antenna or other equipment $49.50
Postage, 65c extra

For Use with Dry Cells
163 R 526—Airline Grand complete. Shipping weight, 75 pounds $77.00
663 R 527—Airline Grand without tubes, batteries, antenna or other equipment $49.50
Postage, 65c extra

Uses Radio and Audio Frequency
In this set the speech or music is amplified once before reaching the detector tube and twice after reaching the detector tube. Amplification before detection is known as audio frequency; after detection, audio frequency. Radio frequency amplification gives clear signals with great volume. Note the neat panel arrangement of this set.

Very Efficient Will Operate Loud Speaker
The 4-tube Airline Grand is a suitable Receiving Set for the home where the radio receiving set must be more than an investment for pleasure alone. It is dependable for market reports and weather forecasts, faithful in its reproduction of the evening entertainments, and sufficiently powerful to operate a loud speaker. The Airline Grand will open up to you a new world of information, instruction and entertainment. It has the necessary range and dependability to insure always getting the programs and the markets if it is at all possible to do so. This is a most desirable feature.

A Radio Often Saves Many Times Its Cost
The United States Department of Agriculture reports numerous instances where the receipt of government markets and weather reports over the radio has saved hundreds of dollars. A farm paper recently printed a letter from a sheep raiser who cleared $1200 additional profit by holding his wool shipment one day because of the information received by radio. The price of the Airline Grand is very low for a set of this quality. According to an investigation made recently by the United States Department of Agriculture, the average price paid on farms for manufactured radio sets using tubes and batteries is $112. Here is a 4-tube set of the latest approved design, guaranteed to satisfy in every way, yet priced a great deal lower than the estimated average price of radio receiving sets in use on farms. The Airline Grand is equally as effective in the city or town home as on the farm.
Airline Grand with Loud Speaker

4-Tube Receiving Set

$92.50

Complete

An Ideal Home Receiving Set

WARD'S price for this high grade Radio Receiving Set is much lower than the average price of radio receiving sets in use in country homes, according to the results of a survey made recently by the United States Department of Agriculture. Included at Ward's low price you get the advantage of a built in loud speaker of unusually fine quality. The receiving set and speaker are mounted in a handsome silver gray Oak cabinet of beautiful design. The receiving set itself is identical with that shown on the preceding page; and as arranged in this set, will give the same long range reception with head sets, and will easily bring in stations up to 500 miles or more with the loud speaker.

Let Your Family Benefit by the Advantages Radio Offers

No home can afford to be without a good radio set. The advantages of the refined entertainment and instructive lectures being broadcast from all big stations mean a great deal to the growing children, shut in housekeepers, invalids, and to those who come in tired at night after a hard day's work. No investment will pay greater dividends than a good radio set. We particularly recommend the Airline Grand with built in loud speaker, because of its many superior qualities which make it an ideal set for the average home where efficiency and attractive appearance are desired at the very lowest possible cost. Church services, the daily market reports, weather forecasts, lectures, music, news, announcements, the correct time, and many other features of daily broadcasting can be heard right in your home, and much of it on the loud speaker, if you install this set. It is very easy to operate; only two dials are used in tuning. Under favorable conditions you can listen to a score or more of different stations every night.

Everyting Needed Is Included

At This Low Price You get the Airline Grand Receiving Set with Built In Loud Speaker, Head Set, Storage Batteries, Antenna Equipment, "B" Batteries and Instruction Book.

This View Shows the Interior Construction of the Loud Speaker Supplied with This Set

Complete—No Extras to Buy

The silver gray Oak cabinet, 13 by 19 by 23 inches, encloses the set itself, the loud speaker and "B" batteries. The loud speaker included with all Airline Grand sets shown on this page is a new improved type with adjustable reproducing unit which gives remarkable volume with great clarity. The "A" battery supplied with this set is our best 6 volt 90-ampere hour radio storage battery or dry cell battery. The head set is high grade, 2000-ohm. Additional equipment includes four Cunningham or Radiotron tubes; two 45 volt tapped "B" batteries; 150 feet antenna wire; 25 feet lead-in wire; 25 feet insulated wire; a new type lead-in insulator which fits under the window; four porcelain knobs with screw eyes; four porcelain insulators with screw eyes; four porcelain knobs with screw; ground clamp; Underwriters' approved lightning arrester, and set of instructions.

For Use with Storage Battery

For estimated total freight charges, see information on Page 65.

663 R 522—Airline Grand complete with storage battery equipment. Shipping weight, 120 pounds. $104.00
663 R 528—Airline Grand without tubes, batteries or other equipment. Shipping weight, 65 pounds. $65.00

For Use with Dry Cells

563 R 523—Airline Grand complete with dry cell tubes and equipment. Shipping weight, 80 pounds. $92.50
563 R 529—Airline Grand without tubes, batteries or other equipment. Shipping weight, 65 pounds. $65.00
5 Tube Freed-Eisemann Neutrodyne

Well Known-Nationally Advertised
Long Range Receiving Set

An Unusually Good Value

$189.00

Complete with Loud Speaker

Those who are familiar with the famous Freed-Eisemann 5-tube Neutrodyne Receiving Sets will at once realize what a tremendous value this complete outfit is at our low price. Each set bears the unbroken Freed-Eisemann seal. The loud speaker included is the Atlas, famous for its volume and fine tone.

The painstaking accuracy with which this set is made and assembled is evident in every detail. This interior view shows the arrangement of the parts. It is a remarkable receiving set.

Popular Because of Its Selectivity and Volume

The Freed-Eisemann application of the Neutrodyne principle employs what is technically known as two stages of tuned and neutralized radio frequency amplification and two stages of audio frequency amplification, besides the detector. Described in non-technical language, this set is one in which the incoming signals are greatly magnified before and after they pass the detector tube. The result is a loud yet clear and pure reproduction of speech and music. This set is exceptionally fine for loud speaker use, and the famous Atlas loud speaker supplied provides a combination that will please the most sensitive musical ear. The Neutrodyne is very selective, allowing you to tune out undesired stations. This enables you to tune through nearby stations and listen to the distant ones.

The same station always will be found at the same dial setting. The range is astonishing. Under favorable conditions it is not at all unusual to receive stations up to 1500 miles distant on the loud speaker. Stations at much greater distances have been heard. Using a head set, it is possible to hear almost any broadcasting station in the country under proper receiving conditions.

Everything Needed Is Included—No Extras to Buy

The Freed-Eisemann set is mounted in a handsome cabinet in Mahogany finish. The panel is genuine bakelite with 4-inch tuning dials. All parts are mounted on the panel, with battery, aerial and ground binding posts projecting at rear. Cabinet is 24 by 7½ by 9 inches. The equipment included with this genuine Freed-Eisemann 5-tube Neutrodyne Receiving Set is all high grade. The loud speaker is the well known Atlas Amplitone, known for volume and purity of tone. It usually retails for $25. This speaker is fully described on page 40. Other equipment included: Head Sets. Our best 2000-ohm Airline head set with cord and plug—Storage Battery. Our best 6-volt 90-amere hour storage battery, fully charged ready for use and with brass wing nuts for attaching wires—"B" Batteries. Two high grade 65-volt tapped batteries—Tubes. Figured Cunningham C-301A or Radion UV-201A amplifier tube—Antenna Equipment. Consisting of 150 feet of antenna wire; 25 feet of lead-in wire; 25 feet of insulated wire for inside connections. Flexible flat lead-in insulator requiring no holes; two porcelain antenna insulators with screw eyes; aerial tee connection; four porcelain knobs with screws; ground clamp. Underwriters' approved lighting arrester; also complete instructions that make it easy for you to install and operate the set.

The batteries and tubes included with this set are carefully tested before shipment. The storage battery comes to you fully charged, ready for use.

The batteries and tubes included with this set are carefully tested before shipment. The storage battery comes to you fully charged, ready for use.

Included with the set is a book of instructions which makes it very easy to install and use this splendid set.

The Freed-Eisemann Receiving Set includes: loud speaker, antenna equipment, storage battery, "B" batteries, vacuum tubes and head set, as described above and at left. For estimated total freight charges, see information on Page 65. Shipping weight, 110 pounds. Not mailable. $189.00

It is easy to build a Neutrodyne radio set. Parts shown on Page 29
Build Your Own Radio Set and Save Money

THERE is great economy and a lot of satisfaction in building your own Radio Set. Thousands of people who know nothing about radio are building their own sets from our complete plans and instructions, and are obtaining fine results. By doing the work yourself you gain a valuable knowledge of the construction and operation of a radio set.

Sets Complete—Ready to Assemble
For those who wish to build their own set with the least amount of work, we offer on the following pages a number of sets ready to assemble. The panels are drilled—all you have to do is put the parts in place according to instructions and connect the wires. You have a choice of sizes and hookups. When put together, they are handsome outfits that will operate as successfully as factory made sets if instructions are followed carefully. With these sets we send simple but complete instructions. All the parts you need are included. No extras to buy.

Build from Blueprints If You Wish
Those who are handy with tools and who like to work out their own problems, will find it very easy to construct good radio sets from our blueprints and instruction sheets. These tell just what parts to use, how to drill the panels, where to connect the wires, and each step in the construction. This plan offers still greater economy, and permits you to build a high grade set at a cost far below that of a ready built set. On Page 38 you will find a list of blueprints which offer you an opportunity to build a radio set that will astonish your friends and be of great use and satisfaction to you. Many prefer to build their own sets in this way for the extreme pleasure that comes with creating with their own hands a sensitive, complicated looking instrument that brings into the home all the joys and marvels of radio.

High Grade Parts at Very Low Prices
We guarantee every piece of radio equipment we sell. We have carefully avoided untried radio goods of doubtful merit, and have included in this catalogue only Parts of known and proved worth. We buy from reliable manufacturers whose products are standard and known as strictly high grade. By purchasing in great quantities direct from the manufacturer, we are enabled to quote you prices which mean a great saving over the usual cost of the parts for a good radio set. Large stocks are carried at all times, and we give you our usual prompt 24-hour service on orders for radio parts.

Good Tools That Make Radio Work a Pleasure
For those who are accumulating a collection of Tools with which to experiment in the fascinating work of radio building, we have listed in this book a splendid assortment of those tools most necessary. On these, as on radio parts, you have Ward's guarantee of quality and a substantial saving on every purchase. Do not confuse Ward's quality tools with many of inferior quality being offered at our prices. Those listed here are strictly first quality, such as you will find in the kits of the very best mechanics. They cost you no more, and will give you many years of good service.

You Will Like Ward's Good Service
All Radio Parts sold by Ward's are subjected to exacting tests by our Radio Engineers. Every article sold must measure up to Ward's high standard of quality before it finds a place in this catalogue. The radio tubes you buy from Ward's are taken from the original package, put in a sensitive receiving set and given a thorough test to make sure the filament is good and that the tube is sensitive. Condensers, transformers—all parts—are inspected before shipping, in order that you may not suffer delay and disappointment through receiving faulty parts.
Three-Circuit Tuner and Detector

Build This Single Tube Three-Circuit Receiver
Standard Reliable Hookup Using Variocoupler, Variometer and Condenser. Very Sensitive and a Most Popular Receiver

Easily Assembled The construction work on this set has been carried to a point where all you have to do is fasten the parts in place, cut and fit the wires, solder them in place, put the set in its cabinet and you have a handsome and very reliable detector and tuner—a complete receiver—at a total cost far below that of a ready built set of the same kind. The hookup used is a standard regenerative three-circuit and is quite selective and very sensitive.

Some very remarkable long range receiving records have been made with sets using this circuit and many progressive radio builders consider it superior to most of the newer, more complicated arrangements. With this set you will be able to cover enormous distances under favorable conditions. Its wave length range covers all broadcasting stations. Very fine for reception of broadcasting and popular with operators who like to copy ships.

For the low price Comes Complete quoted you get all the parts necessary to build this fine set. The panel, measuring 6 by 16 inches, is drilled ready for assembling. The cabinet is dark mahogany finish, hand rubbed, and has a hinged lid.

In addition the set includes a moulded variometer; fine quality 180 degree vario-coupler; 600 plate variable condenser; three large engraved dials with popular taper knobs; two inductance control switches with necessary switch points and stops; grid leak and condenser, connecting wire; spaghetti insulation; tube socket for standard 6-volt tubes, specially made with binding posts for easy connections; rheostat; solderless jack and complete instructions for assembling. Wave length range is from 180 to 600 meters. No batteries, tube, nor other accessories included.

Postage, 24c extra

Single Circuit Tuner and Detector $13.50

Complete Single Circuit Parts Ready to Assemble
You Will Enjoy Putting This Set Together. A Worthwhile Saving Can Be Made by Ordering the Parts from Ward's and Doing the Work Yourself

Will Make You The single circuit hook fine receiver up used in this set is well and favorably known and is used in some of the most expensive sets. This set, when assembled, makes a very sensitive receiver capable of picking up stations at great distances. On nearby stations it will give remarkable volume. One of the easiest sets to tune. The wave length range covers all broadcasting stations. A loud speaker may be used by adding the two-stage amplifier shown on Page 27. The parts selected for this set are all excellent quality and particularly adapted to this circuit.

The panel is drilled all ready to assemble.

Cabinet, 11 by 7 Doing It Yourself by 7 1/4 inches, is finished in imitation dark mahogany and has hinged lid. Other parts are two 3-inch dials with taper knobs; engraved rheostat dial; 7 binding posts; solderless jack, vario-coupler; non-silk wire wound on composition tube; grid leak and condenser; 23-plate variable condenser; standard tube socket with binding posts for easy connection; rheostat; switch and switch points with stops; all necessary wire and instructions. No batteries, tube nor other accessories included.

Postage, 24c extra

24 Blue Prints and Instructions for Building Radio Sets are shown on Page 58.
Reinartz One-Tube Receiver Parts Complete $16.45

Easy to Build and Simple to Operate

Everything Needed to Construct This Popular
Long Distance Receiver at a Small Cost

Build Your Own Radio Set

After a little practice in operating the Reinartz set, you will be hearing programs from the distant stations. It is designed on a principle somewhat different from that of the ordinary receiver, and many radio enthusiasts consider it one of the best one-tube sets for dependable long distance reception. The Reinartz is a selective circuit, with a clear, pure tone.

The results depend greatly on the quality of the parts you use in your set, it is good policy to buy them from a well known company. At Ward's you are always sure of receiving parts that have passed rigid tests and careful inspection. You save by purchasing the parts for your Reinartz in this complete set. You are sure you have everything you need, too, so there is no delay in building the set on account of a missing part.

This receiver is easy to construct, as the connections are simple and the panel is already drilled for mounting the parts. In winter you should be able to receive stations as far away as 500 to 1500 miles. By adding a two-stage audio frequency amplifier (such as the one shown on Page 27) you can use a loud speaker.

The Adam brown cabinet is 16 by 7 by 6½ inches. The panel is cut to fit the cabinet and all the holes are drilled for mounting the instruments. The set includes a specially designed Reinartz spider-web coil and mounting, 2 vernier variable condensers, standard socket with binding posts for easy connections, rheostat, solderless jack, combination grid leak and grid condenser, 3 switch levers with switch points, dials, binding posts, wire, screws and complete instructions. Batteries, tube and other accessories not included.

563 R 538—Complete parts...$16.45

Postage, 25¢ extra

This illustration shows the Reinartz completely assembled in the handsome cabinet.

The interior of the Reinartz showing the parts on the panel.

$10.50 Ultraudion One-Tube Receiver Parts

A Long Distance Set Priced Low
With These Well Made Parts You Can Assemble a Thoroughly Reliable Set in a Few Hours

Distant Stations Although it costs but little to build, the Ultraudion has proved an excellent receiver for use under ordinary conditions. It is one of the most popular circuits on account of its ability to bring in distant stations clearly, and loud enough to be heard distinctly, though only one tube is used. It is also one of the most simple sets to construct. Tuning is accomplished with one dial, and the volume is controlled with a rheostat. Every member of the family can soon become expert at operating this set. You can use the Ultraudion with a loud speaker by adding the two-stage amplifier shown on Page 27.

The complete parts include a 6 by 7 by 3 inch cabinet finished in Adam brown; hard rubber panel cut to fit cabinet and drilled; special Ultraudion coil; vernier variable condenser with dial; rheostat with dial; high grade socket with binding posts for connections; fits tube with standard base; solderless jack, combination grid leak and condenser, switch lever with switch points, binding posts, wire and screws and complete instructions. No batteries, tube nor other accessories included.

563 R 538—Complete parts...$10.50

Postage, 25¢ extra

How the Ultraudion will look inside when assembled. The few connections are easy to make and although compact when assembled, there is plenty of room for mounting every part.

By following our instructions you can easily build this set in a short time.

Montgomery Ward & Co.

"A" Batteries are shown on Page 38
$16.50 Cockaday One-Tube Receiver

This shows you how the Cockaday Receiving Set appears when completed.

It Is Fun to Build Your Own

Unless you have built a set, you are not getting the most out of radio. It is fascinating work and by using Ward's parts you can complete a good set and be listening to the voices of the air in a few evenings.

The parts we supply in our knocked down sets are all listed separately in this catalogue. They are high grade instruments, carefully matched to give best results. By purchasing the complete set of parts you make a considerable saving.

You Hear But One Station at a Time If You Use the Cockaday.

An Extremely Selective Set
You Can Easily Assemble

The Cockaday Circuit was developed originally for use in districts where a set of great selectivity without any loss of volume is required because of local interference. We particularly recommend the Cockaday as an inexpensive set that will enable you to tune out nearby programs and listen to distant stations. The success of this circuit has been proved by its greatly increasing popularity.

Complete Parts at a Saving

Cabinet is 7 by 16 inches; drilled panel. Set also includes two variable condensers with vernier knobs, rheostat, special socket with binding posts for easy connections (fits tube with standard base). Cockaday coil unit, grid leak, grid condenser, solderless jack, binding posts, microphone, wire, screws and instructions. No tube, batteries or other accessories included.

$17.50 Push-Pull Power Amplifier Parts

This Amplifier will match up well with any set you may now have. Simply attach the two binding posts to the amplifier of your set.

Add This to the Set You Have

When the youngsters get together for a dance, when mother entertains the club or sewing circle, and when dad wants to give the neighbors the loudest music they ever heard over the radio, these are the times you need a Push-Pull power amplifier to attach to your radio. It is not necessary to buy a new radio set to get more volume. Simply add this amplifier to the set you already have. It will give you volume with clearness.

The Push-Pull Amplifier uses a circuit which divides the input load between two tubes instead of throwing it all on one tube as in ordinary audio amplification. As a result it is possible to secure greatly increased volume with this amplifier without any distortion. This feature makes the push-pull amplifier particularly suitable when it is desired to add still more volume to a set already equipped with amplifiers, but which does not give the desired volume for use in your churches, lodges, halls, schools or outdoors. This Amplifier is intended for use on any set of one or more tubes employing a storage "A" battery. It requires two C-301A, UV-201A or C-302 tubes. At least 90 volts of "B" battery are required for satisfactory operation. Also requires 4 1/2 to 9 volts of "C" battery. It may also be used as a speech amplifier for public speaking.

All Parts Ready to Assemble

The instructions for assembling this amplifier are easy to follow. The panel is ready drilled and fits the Adam brown hand finished cabinet which measures 6 by 7 by 7 1/4 inches. The other parts furnished are 2 All American push-pull power transformers, 2 sockets, 1 rheostat with dial, solderless jack, by-pass condenser, binding posts, wire, spaghetti tubing, screws and baseboard. Tubes, batteries and other accessories are not included.

Page 26

Ward's "B" Batteries insure loud, clear signals. Page 39

Montgomery Ward & Co.
Make Your One-Tube Set Loud Enough for a Loud Speaker with This Two-Stage Amplifier

All the Family Will Enjoy the Programs

Although Priced Low This Amplifier Gives Great Volume with Unusual Clearness

Driving to radio music—let the orchestras in the dining rooms of the big hotels furnish entertainment at meal time. You're missing half the enjoyment of radio if you don't have amplification for your set.

By building the two-stage Amplifier from parts shown here you can add a loud speaker to your one-tube set at small cost—then you can tune in far away stations loud and clear and use a loud speaker on the stronger stations. This amplifier will give plenty of volume and clear, mellow tones when used with a high grade loud speaker. Under good conditions you can hear stations several hundred miles distant on the loud speaker with almost as much volume as the nearby stations.

Build this addition to your set—it costs but little and will add much to your enjoyment of radio.

You Can Build This Amplifier in a Few Hours

It's Easy to Construct and You Save Enough to Buy a Good Loud Speaker

By using these parts and following the simple instructions, you can easily change your one-tube receiver into a three-tube set that will compare favorably with any ready made set you could buy. There is nothing complicated about assembling this amplifier.

We furnish all the parts—the panel is cut to fit the cabinet and all the necessary holes are drilled. The only tools required are a pair of pliers, a screw driver and a soldering iron. We tell you just what to do—no chance to go wrong.

You make a double saving by buying this amplifier. You not only save on the parts at Ward's low prices but you also save the cost of assembling the parts by doing the work yourself. Your total saving is enough to buy a good loud speaker. Only standard quality guaranteed parts are used.

This Two-Stage Amplifier May Be Used with Any One-Tube Receiving Set

The Single Circuit Receiver (listed on Page 24 of this catalogue) is shown at the right with the two-stage amplifier attached. This combination enables you to use a loud speaker with your set.

The illustration at the left shows how this two-stage amplifier may be used with the Reinartz Receiver (shown on Page 25).

At the right is the Cockaday Receiver (shown on Page 26) attached to the two-stage amplifier. This combination gives you a three-tube set.

The attractive Cabinet finished in Adam Brown imitation mahogany is 7 1/2 by 7 1/4 by 9 1/2 inches. The panel with holes drilled for mounting parts and attaching the screws is made to fit the cabinet. This outfit also includes two sockets which will fit any standard base; two audio transformers; rheostat; filament control jack; composition knob binding posts; wire, spaghetti; connecting lugs, and screws. Binding posts are inside so wires to your batteries are out of sight at the rear of the set. The complete instructions showing you how to assemble the amplifier are easy to follow. No batteries, tubes or loud speaker included. For most satisfactory results use 90 volts of "B" battery.

563R544—Complete parts

Postage, 14¢ extra

If you intend to use C-299 or UV-199 tubes, be sure to order two adapters for the sockets as shown on Page 44.

Here Is What the Set Includes

The attractive Cabinet finished in Adam Brown imitation mahogany is 7 1/2 by 7 1/4 by 9 1/2 inches. The panel with holes drilled for mounting parts and attaching the screws is made to fit the cabinet. This outfit also includes two sockets which will fit any standard base; two audio transformers; rheostat; filament control jack; composition knob binding posts; wire, spaghetti; connecting lugs, and screws. Binding posts are inside so wires to your batteries are out of sight at the rear of the set. The complete instructions showing you how to assemble the amplifier are easy to follow. No batteries, tubes or loud speaker included. For most satisfactory results use 90 volts of "B" battery.

563R544—Complete parts

Postage, 14¢ extra

If you intend to use C-299 or UV-199 tubes, be sure to order two adapters for the sockets as shown on Page 44.

You Can Build This Amplifier in a Few Hours

It's Easy to Construct and You Save Enough to Buy a Good Loud Speaker

By using these parts and following the simple instructions, you can easily change your one-tube receiver into a three-tube set that will compare favorably with any ready made set you could buy. There is nothing complicated about assembling this amplifier.

We furnish all the parts—the panel is cut to fit the cabinet and all the necessary holes are drilled. The only tools required are a pair of pliers, a screw driver and a soldering iron. We tell you just what to do—no chance to go wrong.

You make a double saving by buying this amplifier. You not only save on the parts at Ward's low prices but you also save the cost of assembling the parts by doing the work yourself. Your total saving is enough to buy a good loud speaker. Only standard quality guaranteed parts are used.

This Two-Stage Amplifier May Be Used with Any One-Tube Receiving Set

The Single Circuit Receiver (listed on Page 24 of this catalogue) is shown at the right with the two-stage amplifier attached. This combination enables you to use a loud speaker with your set.

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The attractive Cabinet finished in Adam Brown imitation mahogany is 7 1/2 by 7 1/4 by 9 1/2 inches. The panel with holes drilled for mounting parts and attaching the screws is made to fit the cabinet. This outfit also includes two sockets which will fit any standard base; two audio transformers; rheostat; filament control jack; composition knob binding posts; wire, spaghetti; connecting lugs, and screws. Binding posts are inside so wires to your batteries are out of sight at the rear of the set. The complete instructions showing you how to assemble the amplifier are easy to follow. No batteries, tubes or loud speaker included. For most satisfactory results use 90 volts of "B" battery.

563R544—Complete parts

Postage, 14¢ extra

If you intend to use C-299 or UV-199 tubes, be sure to order two adapters for the sockets as shown on Page 44.
$45.00 Complete Parts for Acme Four-Tube Reflex

Receives Distant Stations with Great Volume

Equal to 6-Tube Set—Build It Yourself and Save Money

Using an indoor loop antenna and no ground connection, the Acme Reflex will operate a loud speaker satisfactorily on long distance stations under favorable conditions. Two of the tubes are "reflexed"—they serve a double purpose. This means that the four tubes really do the work of six tubes. The signals pass through three stages of amplification before they are received by the crystal detector, thus permitting reception over great distances and are again amplified three times after detection to give large volume. The crystal detector gives unusual clearness under good conditions. This set has a usual range of more than 1000 miles on a loud speaker. The use of a loop makes the Acme very selective, though it is one of the simplest sets to operate. No loop included.

Complete Parts for the Phusiformer Set $43.00

Easiest Five-Tube Set to Build. Very Selective

The invention of the Phusiformer has greatly simplified and improved circuits employing tuned radio frequency amplification. The high grade phusiformers used in this 5-tube receiving set make it very easy to assemble the parts and make the few connections. Phusiformers are enclosed in molded cases, each containing a radio frequency tuning unit, which is so constructed that it is impossible for the vacuum tubes to "oscillate"—there are no squeals or howls, and the voice and music come in clear and unchaged. As this is an extremely selective set you will not be bothered by interference from other stations. The two stages of perfectly balanced radio frequency amplification which intensify the signals before they are received by the detector tube, are responsible for the amazing distance over which this set will operate satisfactorily. After detection, the sound is further amplified by two stages of audio frequency. A loud speaker may be used on distant stations.

A screw driver, pair of pliers, and soldering iron are all the tools you need to put the parts together. The set is made up of 24½ by 7½ by 7⅛-inch cabinet in the popular Adam Brown finish, panel drilled and cut to fit cabinet, 3 Phusiformers with dial, 2 rheostats with dial, 5 sockets to fit standard tubes, 2 solderless jacks, 2 fixed condensers, 2 radio transformers, combination grill leak and condenser, switch, binding posts, wire and screws. No batteries, loop antenna, tubes or other accessories included.

$563 R 546—Complete parts..........$45.00
Postage, 36¢ extra

Easiest Five-Tube Set to Build. Very Selective

The invention of the Phusiformer has greatly simplified and improved circuits employing tuned radio frequency amplification. The high grade phusiformers used in this 5-tube receiving set make it very easy to assemble the parts and make the few connections. Phusiformers are enclosed in molded cases, each containing a radio frequency tuning unit, which is so constructed that it is impossible for the vacuum tubes to "oscillate"—there are no squeals or howls, and the voice and music come in clear and unchaged. As this is an extremely selective set you will not be bothered by interference from other stations. The two stages of perfectly balanced radio frequency amplification which intensify the signals before they are received by the detector tube, are responsible for the amazing distance over which this set will operate satisfactorily. After detection, the sound is further amplified by two stages of audio frequency. A loud speaker may be used on distant stations.

A screw driver, pair of pliers, and soldering iron are all the tools you need to put the parts together. The set is made up of 24½ by 7½ by 7⅛-inch cabinet in the popular Adam Brown finish, panel drilled and cut to fit cabinet, 3 Phusiformers with dial, 2 rheostats with dial, 5 sockets to fit standard tubes, 2 solderless jacks, 2 fixed condensers, 2 radio transformers, combination grill leak and condenser, switch, binding posts, wire and screws. No batteries, loop antenna, tubes or other accessories included.

$563 R 548—Complete parts..........$43.00
Postage, 43¢ extra

Handy Tools make radio building easy. Pages 56 and 57
Assemble It Yourself and Save Money

This complete set of Parts, with simple instructions for assembling, makes it possible for you to own a high grade 5-tube Neutrodyne Receiving Set at a very small cost. Our low price, plus the saving you make by assembling the set yourself, makes your total saving approximately $75 off the usual retail price. Details that sometimes prove troublesome in building Neutrodyne sets have been taken care of in such manner that anyone can successfully assemble and operate this set.

Instructions Easy to Follow—You Can Do It Yourself

The bakelite panel, 1/4 inch thick by 27 inches long by 7 inches wide comes to you drilled, ready for mounting, the parts. Every part fits perfectly. The Neutrodyne parts, when in place, are at exactly the proper angle. No guesswork. You can't go wrong on this or any other important feature. Everything is made easy for you. The instructions tell you how to proceed, step by step, and the work is so simple that almost anyone can easily assemble the set in a few hours.

Set is Complete. Everything needed (except batteries, tubes, head set, antenna equipment and cabin) is included. Freed-Eisemann parts are recognized as standard in the construction of high grade Neutrodyne sets. Every part that enters into this set is of excellent quality and scientifically-corrected for the use intended.

Great Selectivity and Volume. Neutrodyne Receiving sets are supersensitive and under favorable conditions will receive, on a loud speaker, powerful broadcasting stations as much as 100 miles distant. We have testimonials from customers who have received even greater distances than this. Stations a few hundred miles away come in very loud. With headphones it is possible to receive stations satisfactorily. Nearby stations do not interfere with reception of distant stations.

Setting Always the Same. Once you locate a station on a Neutrodyne you always will find it—if it is broadcasting—at the same dial settings, provided no changes have been made in the aerial or ground wires.

You Can Use Dry Cell Tubes. This Neutrodyne will give best results if you use standard 6-volt tubes such as C-301A or UV-201A. If you can not use a storage battery, you can employ UV-199 or C-299 tube by using adapters 63 R 5003 shown on Page 44 and dry cells, and they will give excellent results.

Complete Box of Parts shown at right; shipping weight, complete set, 40 pounds. 63 R 667—Complete set...$63.00 63 R 6657—Special size cabinet to house all of above—finished in imitation Adam Brown Mahogany...$4.45

Radio Frequency Transformer

These provide means of neutralizing the capacity in a radio frequency circuit. Not suited for grid or shunting condensers, sold only in pairs for two-stage radio frequency circuits.

$20.75
Eight-Piece Set Genuine Freed-Eisemann Parts

For those who are well advanced in Radio construction work we offer this eight-piece set of genuine Freed-Eisemann parts at an attractively low price. The set includes only those parts built especially for Neutrodyne use and permits you to make your own selection of other parts or to use those you already have. The Neutrodyne parts are mounted on the panel. The condenser shunt and the condenser shaft, 1/4 inch. Tubes are formes. The Neutrodyne transformers will mount on the cabinet. The variable condenser (for two-stage circuits) is mounted in a holder, which can be removed for cleaning. Complete instructions for assembling the transformer are given in the Price List. The set includes all parts necessary to complete a Five-Tube Neutrodyne.

Tuned Radio Frequency Transformer

For use in tuned radio frequency circuits. Consists of a high grade variable condenser and tuned radio frequency transformer wound on ferrite tubing. Windings are all covered wire. Designed to cover all broadcasting wave lengths. To be used in sets of three. Diameter of condenser shaft, 1/4 inch.

$69.00
Genuine Freed-Eisemann Parts for K-D-50 Five-Tube Neutrodyne Set Complete, Ready to Assemble

Genuine Freed-Eisemann Parts for K-D-50 Five-Tube Neutrodyne Set $69.00

The famous Freed-Eisemann Neutrodyne is shown on Page 22

The Montevideo Ward Co.

As the Interior Looks When Finished

Freed-Eisemann 5-tube Neutrodyne set shown completely assembled here consists of the following: 3-Freed-Eisemann Neutrodyne, each mounted on its variable tuning condenser; 2 neutralizing condensers (neutrodons); 5 molded bakelite tube sockets; 3 dials (4-inch); 2 rheostat dials; 2 rheostats; 2 audio frequency transformers; 3 filament control jacks; bakelite panel, drilled; baseboard; tinned connecting wires; insulating tubing; grid leak; fixed condensers; binding posts; screws; soldering flux; complete instructions and blue prints.

Completed View of Receiver

Order a Handsome Cabinet for Your Neutrodyne Set

When assembled and fitted into a suitable cabinet, the Freed-Eisemann Neutrodyne Receiving Set is very attractive in appearance. The Cabinet, No. 563 R 6677, listed at the left, measures 7 by 9 by 27 inches. It is imitation Adam Brown mahogany, beautifully finished and has hinged lid. Better order the cabinet to come with the parts.
The Superheterodyne is probably the greatest advance in recent years in the perfection of radio receiving. Like all instruments of the higher class, it requires extreme care, skill and careful design to construct. When properly assembled it is a simple receiver to operate, having only two main controls. The reed switch or speech signal is clear and free from all foreign noises, being strained or filtered to cut out all sounds except the music or speech being broadcast which is reproduced as nearly like the original as possible. For the man who has built his own set and feels that he wants a finer and better receiver we recommend the superheterodyne. Because of the care necessary in building this set, we do not advise you to try to assemble it unless you have had some previous experience in radio construction.

**Remler Superheterodyne Parts**

<table>
<thead>
<tr>
<th>Part</th>
<th>Price</th>
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<tbody>
<tr>
<td>Antenna Coupling Coil</td>
<td>$1.89</td>
</tr>
<tr>
<td>Oscillator Coil</td>
<td>$1.89</td>
</tr>
<tr>
<td>Intermediate Frequency and Input Transformers</td>
<td>$4.20</td>
</tr>
</tbody>
</table>

This kit contains only the five essential parts for the construction of the Superheterodyne. Other parts necessary may be selected from this catalogue at money-saving prices. The optional coil is designed to operate at 3000 cycles. The transformers are all mounted in metal cases with the binding posts connections plainly marked. Oscillator coupler is adjustable so the set may be tuned properly to cover the entire broadcast band. The receiver is designed to operate efficiently. The filter transformer and three intermediate radio frequency transformers are tuned to cover all broadcast waves. The input transformer and the three intermediate radio frequency transformers are mounted in genuine bakelite cases with all binding post connections plainly marked. Each set of parts comes in a neat box and also contains test connections and wiring diagrams.

**Bakelite Superheterodyne Parts**

<table>
<thead>
<tr>
<th>Part</th>
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<tr>
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<td>Intermediate Frequency and Input Transformers</td>
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</tr>
</tbody>
</table>

A well known line of parts which usually sells for several dollars more than the low price listed. Test sets will come with sets constructed from these parts show them to be equal to the best. This kit consists of one carefully designed oscillator coupler, one tuned stage input transformer and three intermediate radio frequency transformers. The oscillator coupler is of solid bakelite construction and is wound with green silk wire. The filter transformer and the three intermediate radio frequency transformers are tuned to cover all broadcast waves. The input transformer and the three intermediate radio frequency transformers are mounted in genuine bakelite cases with all binding post connections plainly marked. Each set of parts comes in a neat box and also contains test connections and wiring diagrams.

**Useful Hints on Connecting Dry Cells**

1. **"C" Battery Used in Circuit**
   - The "C" battery cuts down "B" battery consumption, prevents distortion and gives louder and clearer signals. It is connected with the (+) or positive side to the (+) or positive terminal of the battery socket. The (-) or negative side of the "C" battery is connected to the F (-) or grid return lead of the amplifying transformer as shown. From 3 to 4 volts should be used with 80 volts of "B" battery. The best voltage is determined by experiment.

2. **Zinc**
   - We show here several different methods of connecting dry cells. With the aid of these instructions you will have no trouble in attaching them to your set properly.

3. **Single Dry Cell—Voltage 1/2 Amperage 30**
   - The center or carbon terminal of a standard Dry Cell is always the (+) or positive. The outside or zinc terminal is always (-) or negative.

4. **Dry Cells Connected in Series**
   - When connected in series the voltage of one cell is multiplied by the number of cells and the amperage is equal to that of one cell.

5. **Dry Cells Connected in Parallel**
   - When connected in parallel the amperage of one cell is multiplied by the number of cells and the voltage is equal to that of one cell.

See Page 63 for a chart on the care of your set.
Simplified Diagrams for Those Who Build Their Own Sets

On this and the next two pages we illustrate a number of simplified diagrams of radio circuits, showing you how to build your own radio set. They are all standard hookups and were chosen because they have proved satisfactory under all ordinary conditions. Some of the circuits are new, but most of them are the standard circuits that have been in use for a number of years. Some of them are the same circuits that we use in our own radio sets. There is nothing difficult about the building of any of them. You can easily construct the set you want from these diagrams, using the parts listed in this catalogue. For the man who builds his own set and wishes to select his own parts, these circuits offer a simple method of building a good Radio Set at a great saving. All of these sets will work well with either dry or storage "A" batteries. The two-stage amplifier shown on Page 27 may be added to any of the sets to give loud speaker volume.

The Single Circuit One-Tube Set

This single tube Receiving Set is quite selective. The consistent range is approximately 500 miles, while distances up to 1500 miles have been heard under favorable conditions. For greatest selectivity we recommend an antenna not over 75 feet long. A longer antenna will possibly give slightly greater signal strength, but in locations where there are several broadcasting stations nearby a short antenna makes it much easier to select the stations you wish to hear.

Parts Needed for the Single Circuit Tuner
Antenna Wires, Insulators, etc., or complete Antenna Equipment Pages 54, 55.
One Vacuum tube. Pages 38 and 37.
One .0005 mfd. (about 23 plate) Variable Condenser. Pages 46 and 47.
One 22 1/2-volt "B" Battery. Page 38.
One 22 1/2-volt "A" Battery, as desired. Pages 38 and 39.
One Open Circuit Jack. Page 53.
One or more Head Sets. Page 42.
Panel and Cabinet if desired. We recommend 6 by 9 inches. Pages 47 and 66.
Binding Posts. Page 53.
Connecting Wire, Screws, etc. Pages 55 and 57.

The Three Circuit One-Tube Set

One of the most sensitive and selective of radio Receiving Sets. Many of the finest sets now on the market use this circuit in some form. Although it is slightly harder to tune in than most receiving sets, wonderful results can be had with a little practice. The assembling is very simple, and the results obtained soon pay for the slight extra cost. It is adaptable to either dry cell or storage battery tubes, and will perform remarkably well with either type. The addition of the two-step amplifier shown on Page 33 makes this set the equal of many high priced 3-tube receiving sets.

List of Parts for the Three Circuit Tuner
Antenna Wire, Insulator, etc., or the complete Antenna Equipment Pages 54, 55.
One Vacuum tube. Pages 38 and 37.
One 0.001 mfd. (about 43 plate) Variable Condenser. Pages 46 and 47.
One Vacuum Tube. Pages 36 and 37.
One Socket to fit tube selected. Page 44.
One Rheostat to match tube selected. Page 45.
One 0.0005 mfd. Grid Condenser and one 2-megohm Grid Leak. Pages 36, 37.
One Storage or Dry Cell "A" Battery, depending on tube chosen. Pages 38 and 39.
One 22 1/2-volt "B" Battery. Page 38.
One Open Circuit Jack. Page 53.
One or more Head Sets. Page 42.
Binding Posts. Connecting Wires, Screws, etc. Page 53.
Panel and Cabinet, if desired. We recommend 7 by 21-inch. Pages 47 and 66.
(See above.)

One-Tube Ultradion Set

The Ultradion is probably the best known of the simple vacuum tube radio Receiving Sets. It is quite selective, and capable of receiving over remarkable distances under favorable conditions. The circuit is the same as used in our Ultra Airline. Particularly suitable to dry cell tubes, and for this reason makes an ideal one-tube portable set for vacation use.

List of Parts Necessary for the Ultradion
Antenna Wire, Insulator, etc., or complete Antenna Equipment Pages 54, 55.
Ultradion Coil. Page 49.
One 0.0003 mfd. (about 23 plate) Vernier Variable Condenser. Pages 46, 47.
One 0.0005 mfd. Grid Condenser and one 2-megohm Grid Leak. Pages 36, 37.
One Vacuum Tube, dry cell or storage battery type. Pages 36 and 37.
One Socket to match tube selected. Page 44.
One Rheostat to match tube selected. Page 45.
One Storage or Dry Cell "A" Battery, as desired. Pages 38 and 39.
One 22 1/2-volt "B" Battery. Page 38.
One Open Circuit Jack. Page 53.
One or more Head Sets. Page 42.
Binding Posts. Page 53.
Connecting Wires, Screws, etc. Pages 55 and 57.
Panel and Cabinet, if desired. We recommend 6 by 7-inch. Pages 47, 67.

It is easy to build a successful Radio Set. See Page 23.
One-Tube Reinarz Tuner

This set has earned a wide reputation for its long distance reception, selectivity and ease of operation. It may be used with either dry cell or storage battery tubes. Once the switch levers have been set for coarse adjustment the finer tuning is easily done with the two variable condensers. The addition of the 2-stage amplifier shown on the next page will give the Reinarz sufficient volume for the operation of a loud speaker. Amateurs will also find this set capable of bringing in the continuous wave wireless telegraph stations with an ease of control that makes it better than almost any other type of receiver.

List of Parts Necessary for Reinarz Tuner

Antenna wires, insulators, etc. or complete antenna equipment shown on Pages 54 and 55.
One Reinarz Coil shown on Page 48.
Two .0025 mfd. (about 11 plate) Vernier Variable Condensers. Pages 46 and 47.
One .00025 mfd. Grid Condenser and one 2-megohm Grid Leak. Pages 36 and 37.
One dry cell or storage battery Vacuum Tube as desired. Pages 36 and 37.
One Switch point (taps) and 3 switch levers. Page 53.
Two .0025 mfd. (about 11 plate) Vernier Variable Condensers. Pages 46 and 47.
One .00025 mfd. Grid Condenser and one 2-megohm Grid Leak. Pages 36 and 37.
One dry cell or storage battery Vacuum Tube as desired. Pages 36 and 37.
One dry cell or storage battery Vacuum Tube as desired. Pages 36 and 37.
One Switch point (taps) and 3 switch levers. Page 53.
Two .0025 mfd. (about 11 plate) Vernier Variable Condensers. Pages 46 and 47.
One .00025 mfd. Grid Condenser and one 2-megohm Grid Leak. Pages 36 and 37.
One dry cell or storage battery Vacuum Tube as desired. Pages 36 and 37.

One Tube Cockaday Receiving Set

The Cockaday is noted for its extreme selectivity—that is, its ability to tune out the nearby broadcasting stations and reach the distant ones. The wave trap principle employed permits the use of a larger antenna than is usually possible. This tends to slightly increase the range and strength of the set. As all the coils are built into one unit in the Cockaday, it is very compact and takes up much less panel space than other sets giving equal results. The addition of the 2-stage amplifier shown on Page 31 will give this set sufficient volume to operate a loud speaker on most distant stations.

List of Parts Necessary for Cockaday Tuner

Antenna Wire. Vacuum Tube, etc. or complete Antenna Equipment shown on Page 54 and 55.
One Cockaday Coil. Page 49.
One Dry Cell. Page 54.
One Rheostat to match tube selected. Page 45.
One Switch. Page 45.
One 1000 ohm Grid Condenser and one 2-megohm Grid Leak. Pages 36 and 37.
One dry cell or storage battery Vacuum Tube. Pages 36 and 37.

One-Tube Honeycomb Coil Set

Honeycomb coils offer a convenient method of combining a long and short wave receiver in one set. By using coils of different sizes it is possible to listen in on all waves now in use in radio from 180 meters to 25,000 meters. This enables you to listen in on the amateur short wave telegraphy, the broadcasting stations, ships on the Sea and Great Lakes and Government Weather and Time Stations besides many of the American and foreign Transatlantic and Transpacific sending stations. All that is in the air is yours. The set is of the 3-circuit type consisting of primary, secondary and tickler. However, instead of varying the wavelength with switch points it is done by changing the size of the coil. The honeycomb coil set has established itself as a long distance receiver and can be depended on to give excellent results.

List of Parts Necessary for the Honeycomb Coil Set

Antenna wires, insulators, etc. or complete antenna equipment shown on Pages 54 and 55.
At least 3 honeycomb coils and 3 coil mounting shown on Page 43.
Extra coils should be selected to receive over other wave lengths you wish to listen on.
Two .001 mfd. (about 53-plate) Variable Condensers. Pages 46 and 47.
One Vacuum Tube. Pages 46 and 47.
Two rheostats to match tube selected. Page 45.
One Switch point (taps) and 3 switch levers. Page 53.
One Coaxial Condenser shown in ground lead may be placed across antenna and ground as indicated by dotted lines.
One Vacuum Tube. Pages 46 and 47.
One Vacuum Tube. Pages 46 and 47.
One Rheostat to match tube selected. Page 45.
One Switch point (taps) and 3 switch levers. Page 53.
One Rheostat to match tube selected. Page 45.
One Switch point (taps) and 3 switch levers. Page 53.
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One Switch point (taps) and 3 switch levers. Page 53.
Save by Buying the Parts at Ward's

The Acme Reflex Set

This reflex is probably one of the finest present day radio receiving sets. With it you may secure 4-tube results with but 4 tubes. Employs three stages radio frequency amplification and a crystal detector. Because of this the signals are unusually clear. They are amplified by the three stages of audio frequency amplification to very great volume with a sweetness and clarity of tone not found in most receivers. This set will give excellent results on a loop antenna, enough volume for use of loud speaker being obtained on stations several hundred miles distant. We show Acme parts in this diagram and recommend them highly for best results.

Parts Necessary for Acme Reflex Set

Three Acme audio frequency Transformers. Page 50.
Acme R-2, R-3 and R-4 Radio frequency Transformers. Page 51.
One Variable Condenser. Pages 46 and 47.
One Rheostat and one Potentiometer. Page 45.
One Crystal Detector, fixed or semi-fixed preferable. Page 52.
Four Vacuum Tubes, storage or dry cell type as desired. Pages 36 and 37.
Four Sockets to fit tube selected. Page 44.
Three .00025 mfd. two .002 mfd. and one .005 mfd. Fixed Condensers.

Pages 46 and 47.
Dry Cell or storage "A" Battery. Pages 38 and 39.
90 volt "B" Battery. Page 39.
Loop Antenna. Page 51.
One or more Head Sets. Page 42.
Loud speaker if desired. Pages 40 and 41.
Panel and cabinet. We recommend 7 by 21 inch size. Pages 47 and 66.

Binding posts. Page 53.
Necessary connecting Wire, Screws, etc. Pages 55 and 57.

The Two-Stage Amplifier

The two stage Amplifier shown here may be attached to any single tube set or to any set having detector and two stages of radio frequency. This gives a combination that will successfully operate a loud speaker on all nearby and many of the distant broadcasting stations. Others will come in comfortably loud on the head set. The circuit shown here is standard and may be found in most all present day amplifiers. By building this up as a separate unit it is possible to use it with almost any set by simply plugging into the detector jack. Experimenters will find this a great convenience.

List of Parts Necessary to Construct Two-Stage Amplifier

Two audio frequency amplifying Transformers. Page 50.
Two Vacuum Tubes, dry cell or storage battery type. Pages 36 and 37.
Two Sockets to fit tubes selected. Page 44.
One Rheostat for use with tubes selected. Page 45.
Two double circuit and one single circuit Jacks. Page 53.
Storage or dry cell "A" Battery as desired. Pages 38 and 39.
At least 90 volts "B" Battery. Page 39.
Panel and Cabinet. We recommend 6 by 7 inch size. Pages 47 and 66.

Connecting Wire, Screws, etc. Pages 55 and 57.

The Phusiformer Set

The Phusiformer set is a recent development in a tuned and balanced radio frequency receiver. It has proved very successful in the past radio season, bringing in distant stations with great volume and clearness. It enables you to tune out easily the nearby broadcasting stations and listen to the distant ones. Designed for use with 5 tubes. The stations come in at the same dial setting night after night. After you hear a station once and record the dial setting you simply look up the dial settings of the station you wish to hear and fix your set accordingly. This is a great advantage over most sets and it is not necessary to hunt for stations you have had before. If they are broadcasting you will hear them.

List of Parts Necessary for a Phusiformer Set

Antenna wire, insulators, etc. or complete Antenna Equipment shown on Pages 54 and 55.
Three phusiformers. Page 49.
Five Dry Cell or storage battery Vacuum Tubes. Pages 36 and 37.
Five Sockets to match tubes selected. Page 44.
Two Rheostats. Page 45.
One .00025 mfd. Grid Condenser and one 2 megohm Grid Leak. Pages 46 and 47.
Storage or dry cell "A" Battery. Pages 38 and 39.
Battery Switch. Page 53.
90 to 120 volts "B" Battery. Page 39.
Two audio frequency Transformers. Page 50.
One open circuit and one double circuit Jack. Page 53.
Necessary Wire, Screws, etc. Pages 55 and 57.

Binding Posts. Page 53.
Panel and Cabinet. 7 by 26-inch size recommended. Pages 47 and 66.

For Prints of Other Radio Circuits and Diagrams
See Page 58
The operation of a broadcasting station is described on Page 62
Cunningham Low Voltage Detector and Amplifier Tubes

The tubes shown on this page are the latest improved low voltage type, which are not critical in adjustment. A set of ordinary dry cells will bring in these tubes for several hours each day for a period of several weeks. These tubes are the regular three-element types for use in any radio circuit, and function in exactly the same manner as the regular 6-volt grids. You would take their place wherever it is not practical to use storage batteries.

Cunningham C-11
Detector-Amplifier
Operates on One Dry Cell
$3.65

Cunningham C-12
Detector-Amplifier
Operates on One Dry Cell
$3.65

Although it requires but one dry cell of 1 1/2 volt for the "A" battery, the C-11 is a highly efficient detector or amplifier. It is identical to the regular Radio Corporation WD-11 type which has proved so popular over the past few years, and sells at the same price. The C-11 is the high vacuum type. Critical regulation of the filament current is not necessary and the ordinary type of rheostat, without vernier, is satisfactory. The rheostat should have a resistance of 250 ohms. As the filament of this tube consumes only 1/4 ampere, one dry cell will give hours of service. Since the C-11 is designed for a special type of grid leak, a clip must be used if your set is equipped with sockets for storage battery tubes.

Specifications
Filament voltage, 1.1 volt. Filament current, 1/4 ampere. Plate voltage, 22 to 45 volts for detector; 45 to 100 volts for amplifier. Grid condenser, .00025 mfd. Grid leak, 2 megohms. Complete instructions included with each tube.

63 R 5195
Postage, 6c extra

Coffman Mica Grid Condenser

These condensers are cartridge shape and made to fit in the grid mounting illustrated at the bottom of this page. A tube with grid leak and a suitable grid condenser mounted side by side in a double or triple mounting permits easy changing of grid leak or condenser value. These are the highest quality condensers of the finest workmanship and materials. These condensers are available in 100, 200, and 300 mfd. Capacitance, .00025 mfd. Grid leak, 2 megohms.

63 R 6372 — Capacitance, .00025 mfd.
Postage, 4c extra

$1.29

Cutler Hammer Variable Grid Leak

Mounts directly on the detector tube socket. Provides long shaft for front panel control. Adjustable to give any desired resistance. Mounted with adjustable mounting to take standard Dubilier 00025 mfd. grid condenser. No condenser included.

63 R 5530
Postage, 4c extra

$1.29

Good radio sets need good sockets. See Pages 44 and 45.
Storage Battery Tubes

Increased volume and clear reception over longer distances are two of the advantages you gain by the use of the Storage Battery Vacuum Tubes described on this page. For this reason, tubes of this type are especially recommended where there is ready availability for keeping a 6-volt storage battery charged. Another advantage is that a storage battery delivers current at a constant voltage until it is almost entirely discharged, so that the output remains steady. These tubes are all genuine Cunninham, and are licensed under existing patents for amateur and experimental use only.

Our Vacuum Tube Guarantee
Each radio vacuum tube you buy from us is tested in a radio set before shipment, and is guaranteed to reach you in perfect condition. We will replace any tube damaged in shipping. The filament in a vacuum tube, like that in the electric light bulb in your home, will burn out in time. Vacuum tubes with broken filaments cannot be returned for credit or exchange.

Cunningham 5-Watt Transmitting Tube C-302
Especially for low power 60-Watt telephone and C. W. telegraph sets. Two 5-Watt tubes in parallel, 220 to 440 volts. One tube as modulator and 250 volt plate will double the output. Base fits standard socket. Not for use in receiving sets or battery chargers.

Specifications
Filament voltage, 7.5 volts. Filament current, 2.35 amperes. Alternating current input voltage, 550 volts (stepped up from 110 volts). Direct current input, 50 watts. 5000 volts. Postage, 6¢ extra.

63 R 07020 - $7.60
63 R 0715 - $7.60

Cunningham Detector Tube C-300
An extremely sensitive Detector Tube licensed for amateur and experimental use only. A "beveled" type tube, very sensitive to weak distant signals. The C-300 is made for use with a 6-volt storage battery, and we recommend the use of a 6-es. 000-ohm resistor in the detector circuit where very close adjustment is necessary. A 225-volt, tapped "B" battery should be used. Base fits standard tube socket.

Specifications
Filament voltage, 5 to 15 volts. Filament current, 1.45 amperes. Plate voltage, 165 to 225 volts. Grid condenser, 6000 mfd. Grid leak, 2 megs. Complete instructions are included with each tube.

63 R 519B - $3.65
Postage, 6¢ extra.

Bradley Grid Leak
A very efficient Grid Leak with a smooth, even variation. The resistance is controlled by varying the pressure on graphite discs. Resistance, 10 to 800 megohms.

63 R 6223 - Grid Leak only, 1.95
63 R 6016 - Grid Leak with 6000 mfd. condenser, 195

C-R-I Grid Leak
This instrument enables you to adjust the grid voltage of the detector tube to the correct value which will give you the maximum signal strength. Adjustable for single hole plate mounting. Adjustable metal brackets on back to hold grid condenser. Length, 2½ inches.

63 R 6039 - Grid Leak only, 1.19
63 R 6039G - Grid Leak with 6000 mfd. condenser, 1.19

Cunningham Tube C-301A
For use in either radio or audio frequency amplification. Licensed for amateur or experimental use only. Cunningham amplifying tubes are of a high vacuum type and require no delicate adjustment of the filament which is usually supplied by a 6-volt storage battery. They are uniform and free from tube noises. May be used as detectors in some circuits with very good results. Base fits standard tube socket.

Circular Grid Condenser

63 R 6359 - $2.90
Postage, 6¢ extra.

Variable Grid Leak for Use with Above
For use with above condenser. Variable from 10 to 1 megohms.

63 R 6361 - $3.00
Postage, 6¢ extra.

Circular Grid Condenser and Grid Leak Combined

63 R 6357 - $4.90
Postage, 6¢ extra.

How to Order Tubes, Grid Leaks

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How to Order Tubes, Grid Leaks
Radio Storage Batteries, Chargers and Supplies

$9.95

Bulb Charger

Lakeside Battery Charger

Manufactured especially for Ward's by one of the largest and best known manufacturers of mechanical chargers. Neta appearing, substantially built and requires no attention or adjusting. Economical to operate. Anmeter shows rate of charge. Changes in either direction-no chance to connect up wrong. Has a long life when in operation. Long flexible battery leads, lead coated steel spring clips. Cord and screw plug for connecting to lighting socket. Works only on alternating current 110 volts, 60 cycles. Charges 12-volt battery at average rate of 5 amperes. $12.90

36 R 6182—Extra 2-ampere Bulb. 

Battery Chargers

Well made vibrating charger, low price but highly efficient. A big value that does not care for a charger in case. Mechanically, this charger is equal to many selling at higher prices.

653 R 5673—Charger complete with bulb. $9.95

Postage, 36 extra

“B” Battery Charger

Simple glass jar charger, 3½ inches high for charging "B" batteries used on 110-volt alternating current. Has a prong in the lighting circuit. Delivery against a prong in the lighting circuit. The charger is designed for proper charging. Safe and noiseless. Will charge two 22-volt batteries at a time. No acid required. For charging Storage "B" batteries. $8.95

Postage, 24 extra

Glass Battery Tray

To prevent acid from splashing on floors and rugs, we recommend the use of these handsome Battery Trays. Each tray is of special acid resisting glass heavy enough for ordinary use. Tray feet on all four corners. $1.19

63 R 6212—Inside size, 8½ by 11 inches. $1.19

63 R 6213—Inside size, 13½ by 17 inches. $2.38

Postage, 10 extra

Accurate Radio Hydrometer

Improved and simplified design. No confusing scales or figures to read. Simply dip in water to be tested. Cylindrical glass tubes. All three tubes of equal colored bulbs. If all three tubes are equally charged, if one tube is darker, then battery is overcharged. If one tube is lighter, then battery is undercharged. Practically no discharge in storage. Operate like a hydrometer. Sweet spot is in the center. Read scale by specially marked line. $65 extra

4½-Volt “A” “B” and “C” Battery Units

Small Units of 4½ volts each to be used in building up battery or for filling lamps for portable sets using D-209 or U-193 tubes. An advantage of these units in “B” battery conversion is that if one unit goes dead, you can replace it without disconnecting. Each of these units connected in series makes a 2½-volt “B” battery. Eight single units of 4½ volts in parallel. $1.38

Postage, 36 extra

Clips

Stout spring clips, 4½ inches long, with jaws to grip battery terminals. Set screw for adjusting clips. $1.35

63 R 61100—2 clips. $1.35

Postage, 2 cents extra

Read what users of our Airline Special say on Page 9

* Montgomery Ward Co.
Westinghouse Storage "B" Battery

The advantage of the Storage "B" Battery over the dry cell type is its full, steady voltage, almost internal temperature, and long life. Like the ordinary storage battery it can be charged occasionally, and is therefore available on hand for operating a radio or other equipment. Suitable for operating a radio, the Storage "B" battery is especially made of the best materials and designed for heavy duty. They are the well known "Crystal Case" type, compact, with less space required, and are needless in operation.

Storage "B" Battery

When you order "B" Batteries from Ward's you are sure of getting fresh batteries full of energy and capable of long service at the required voltage. Radio dry cell "B" batteries are composed of a number of small cells, similar in construction to flashlight batteries, connected in series and imbedded in wax to keep out moisture. Every cell of these batteries is tested before being put into a battery, which insures long reliable service. Sizes are approximate.

Battery Testers

Similar to 63 R 6587 shown below but better made and finished. Used infinitely in black nickel with glass face. Size: 1 1/2 in. Postage, 10 extra.

Voltmeter

The simple inexpensive battery tester shown below is a valuable addition to the home radio shop. It will show whether your "B" batteries are working properly and what voltage each cell is delivering. Reads directly in milliamperes.

Battery Tester

In black nickel case with glass face, flexible cord and contact points. Postage, 10 extra.

Oscilloscope

Portable, practical, and easy to use. Simplicity is its charm. Any radio enthusiast can use it. 63 R 6587 — 3 cells. $1.10 Postage, 10 extra.

Voltmeter

The simple inexpensive battery tester shown below is a valuable addition to the home radio shop. It will show whether your "B" batteries are working properly and what voltage each cell is delivering. Reads directly in milliamperes.

Oscilloscope

Portable, practical, and easy to use. Simplicity is its charm. Any radio enthusiast can use it. 63 R 6587 — 3 cells. $1.10 Postage, 10 extra.
Let All the Family Hear the Program

A good Loud Speaker added to your radio set greatly increases its usefulness. Best results are obtained from a loud speaker by using it in connection with sets having two or more tubes. Loud speakers can not be used successfully on crystal sets or the ordinary one-tube set. All of our loud speakers except the Magnavox M-4 are supplied without head set plugs. If your set is equipped with jacks you should order an extra head set plug.

See Page 53 for suitable plugs.

Magnavox Loud Speakers—Types M-4, M-1, R-3

Type R-3
$32

Type R-4 Requires Battery Current
$22

A good Loud Speaker must reproduce faithfully all sounds, from the lowest to the highest overtones of the piccolo or violin. It must reproduce the same remarkable volume and clear quality that we have made famous. The size of this speaker permits it to be carried along and used in any suitable set. It has been made so as to give great volume without harshness of tone. Requires no battery. The detachable horn is made of black Bakelite, finished in black enamel, Height 13 1/2 inches. Diameter of bell, 11 inches. Complete with adding cord and plug.

Western Electric $19

Loud Speaker

Western Electric products have been known for many years for their excellent performance and fine workmanship. Many experts consider this one of the best Loud Speakers on the market. It is an instrument that will give satisfactory performance under all conditions.

Western Electric Unit in the result of years of experimenting and testing by some of the best radio engineers in the country. The sain metal, die-cast housing has been perfected to give great volume without harshness of tone. Requires no battery. The detachable horn is made of brass material, finished in black enamel, Height, 13 inches. Diameter of bell, 9 inches. Complete with adding cord.

Light, substantial Head Sets are shown on Page 42

* Montgomery Ward & Co.
Good Loud Speakers at a Saving

The Loud Speakers shown in this catalogue are all fine instruments, while some are very low in price, all will reproduce programs in clear, distinct, natural tones with good volume. In selecting our units we have chosen instruments which in actual performance showed the greatest amplification and best tone quality. The reproducing qualities of any of these speakers will be found excellent. Most of the speakers shown require no additional batteries. For extreme volume, the Magnavox shown on opposite page is recommended. The extra volume soon repays for the small amount of current consumed.

Baldwin Loud Speaker

Baldwin Speakers are well known in Radio because of their clear natural tone and good volume. While some are very low in price, all will produce programs in clear, distinct, natural tones with good volume and good amplification. Baldwin's made a great favorite for home use. A unit with two or more stages of amplification. The reproducing unit in this loud speaker is specially constructed for loud speaker purposes.

Wood Compound Horn

The tone chamber and horn are of all wood construction, which does away with any mechanical vibration and reproduces faithfully the fine shadings of the voice and music. All who hear the Baldwin marvel at its remarkable beauty. The charm and beauty of the full round tones will thrill you and bring a smile to your enjoyment. The speaker is 22 inches high and the bell is 15 inches in diameter. Complete with connecting cord and loud speaker unit. Shipping weight: 15 pounds. Not available.

163 R 718

$22.50

Baldwin Phono Speaker

The widely known Baldwin Type C Receiver, especially adapted for use as a loud speaking unit to attach to your phonograph. Equipped with rubber and metal case supported by circular base with felt on bottom. Will work with standard phonographs. Complete with connecting cord.

Adapters for Attaching Phones or Unit to Phonograph

This Adapter enables you to fasten most any size phonograph unit or phone to the tone arm of your phonograph making an inexpensive and very satisfactory loud speaker. Will fit Victor and Sonora phonographs. May be adapted to any type of standard phonographs. Complete with connecting cord.

Baldwin Unit

Baldwin Type C Unit with a special diaphragm made according to the patented Baldwin principle which insures clearness and greatest volume. Supplied with connecting cord.

MeSCO Loud Speaker

When you hear the rich mellowness of the MeSCO Loud Speaker, you will understand why it is so often the choice of those who love fine music. Its faithful reproduction over a wide range will delight all who hear it. You will wonder how it is possible for a loud speaker to be so sensitive to the most minute changes in volume, yet capable of giving such excellent tone and great volume.

A special feature of this speaker is its adjustable concentration of the voice and music. This enables you to have the music soft or loud and to secure the best reception from your particular unit. The unit is chosen for its remarkable results under all conditions.

The horn made of specially selected fiber with a metal horn finish is 24 inches high. The bell is 10 inches in diameter. Complete with connecting cord and loud speaker unit.

163 R 702

Postage, 32c extra

$21.95

Phonograph Adapter

With these Adapters and almost any loud speaker unit you can convert your phonograph into a loud speaker. With all units which we list except No. 63 R 637, it takes less than a minute to make the change. Simply insert the adapter that fits your phonograph onto the loud speaker unit and slip it on the tone arm of the phonograph. Gives excellent results.

63 R 287—Adapter to fit Edison
63 R 288—Adapter to fit Columbia
63 R 758—Adapter to fit Columbia
63 R 759—Adapter to fit Columbia

Postage, $2c extra

Special Value Speaker Unit

This same Loud Speaker Unit regularly sells for a much higher price than we ask. A unit with clear tones free from distortions offered at a low price. On actual tests in our laboratories it has proved as good as many units selling at several times this price. Suitable for use on phonographs or in home made loud speakers. With polished nickel plated metal case. Complete with connecting cord.

564 R 775

Postage, 8c extra

$2.25

Baldwin Unit

Baldwin Type C Unit with a special diaphragm made according to the patented Baldwin principle which insures clearness and greatest volume. Supplied with connecting cord.

163 R 637

Postage, 6c extra

$4.95

Baldwin Phono Speaker

The widely known Baldwin Type C Receiver, especially adapted for use as a loud speaking unit to attach to your phonograph. Equipped with rubber and metal case supported by circular base with felt on bottom. Will work with standard phonographs. Complete with connecting cord.

Adapters for Attaching Phones or Unit to Phonograph

This Adapter enables you to fasten most any size phonograph unit or phone to the tone arm of your phonograph making an inexpensive and very satisfactory loud speaker. Will fit Victor and Sonora phonographs. May be adapted to any type of standard phonographs. Complete with connecting cord.

Baldwin Unit

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564 R 775

Postage, 8c extra

$2.25

Montgomery Ward & Co.

Increase range and clearness by adding a Two-stage Amplifier. Page 7
$315 Airline De Luxe Head Sets
Perfectly Matched—Sensitive

These Head Sets, manufactured exclusively for us, are equally as sensitive and as attractive in looks as many selling for much more. You will find the construction equal to that of much higher priced head sets. The coils, the heart of the head set, are carefully wound with wire of approved size and quality, and are perfectly matched to give the correct tone values.

Airline Head Sets are precision instruments built with the greatest care by skilled workmen. After tests in comparison with much higher priced head sets, and judging from testimonials received from users during the past few years, we believe the Airline is of the highest value ever offered. Made bakelite shells and caps are light weight and highly polished. Head bands of spring wire encased in heavy webbing are adjustable. New connecting cord with enclosed terminals. Equally suitable for use on the highest grade sets or on the inexpensive crystal sets. We guarantee these head sets; they must satisfy you or we will refund your money.

No Radio Receiving Set Is Complete Without a Good Head Set

No radio set is complete without at least one dependable Head Set. Even if you have a loud speaker, there are many times when it behooves you to use a pair of good head sets. When you are after long distance records or when you are tuning in a station before attaching your loud speaker, a sensitive head set is an absolute necessity. If you have a crystal or one-tube set you will need enough head sets so all may enjoy the program. You can save considerably on head sets if you buy at Wards money saving prices. Remember, we invite you to try out any of our radio supplies in your own home. Read our Special 30 Day Trial offer on Page 2.

All our head sets except the Baldwin are supplied without head set plugs. If your set is equipped with jacks a head set plug will be necessary. For complete line of Plugs, see Page 3.

Western Electric Head Sets

An efficient Head Set must respond to very slight impulses, and give loud clear signals. Western Electric head sets are exceptionally sensitive and many experts prefer them above all others. These are the same type phones used by the U. S. Army Signal Corps. The small, light weight metal cases are nickel plated, highly polished and covered with hard rubber caps. The government style head band is web covered. The sets are easily adjustable to fit the head comfortably. Complete with cord. 63 R 5165—Postage, 6¢ extra $10.75

Baldwin Type C Amplifying Head Set

These Head Sets operate on a principle patented by Nathaniel Baldwin. The special diaphragm receives the vibrations from a thin armature supersensitive to the slightest variation of current passing through the electro magnetic wave. Because of the unique Baldwin construction, are much more powerful than would be practical in the ordinary type of phone. Special construction enables signals to be heard which are too feeble in the ordinary type of head set. The tone quality and clearness of the signals are truly remarkable. The phones are carefully matched for tone quality and volume. The shells are of molded bakelite. Comfortable web covered head band with quick firm adjustment. Connecting cord fitted with Universal plug to connect to any radio set. 63 R 5164—Baldwin Type C Head Set. Complete with Plug $9.95

Leader Head Sets

Let all the family listen to the program, even if you have a crystal set or one-tube set. Two pairs of these Head sets sell for no more than the usual price of one ordinary good set, yet they equal in quality many selling at much higher prices. We buy these phones in such large quantities we can sell them for less than the usual price of head sets of this quality.

They are sensitive to weak signals and produce loud clear tones. Shell and caps of receivers made of molded composition. Pad the head comfortably as it is light in weight and adjustable. Equipped with connecting cord. 63 R 5166—Special Type Baldwin Head Set. A special value at our price $5.18

Extension Cord

Have dinner music by using this Extension Cord to place the loud speaker in the dining room. With it you can place the loud speaker in another room or on the porch without moving the radio set. A necessity in almost every home. Flexible cotton covered cord with plug at one end and jack at other. 63 R 5392—10-foot $1.68

Receiver Cord

Heavy mercerized cotton covered with nickelied brass wire. Very flexible and neat in appearance. Polar length, about 8 feet. Will not fit Brandes head sets. 63 R 5385—Postage, 6¢ extra

Frost Head Sets

Frost phones, made with watchlike precision are extremely sensitive. The workmanship throughout is excellent and the results obtained are extremely satisfactory. Equipped with a soft binaural head band, covered web cover and adjustable head bands, molded composition shells, solid brass plating. 63 R 5169—2000-ohm $4.44

Montgomery Ward Co.
All Wave Honeycomb Coils and Mountings

Back Panel Mounting
$3.95
For mounting honeycomb coils behind the panel. Well made of molded bakelite. Outside mountings required to form knob—center mounting stationery. Flexible connector and supports. May be fitted with dial and knob. Shaft, 3½ inch, complete with knob.
63 R 6544 Postage, 8 c extra

Movable Mounting
72¢
May be swung to completely cover the opening. Gold colored dustproofed bakelite plug with nickel-plated brass supports and screws. May be tilted or moved. Takes any standard coil plug.
63 R 6548 Postage, 6 c extra

Panel Mounting Plug
Has brass contacts. Gold colored bakelite plug with nickel-plated brass plugs and screw. Mounts in panel so coil will be completely covered by plug. Takes any standard coil plug.
63 R 6646 Postage, 36 c extra

Calibrated Knob and Dial
An especially attractive 3½ inch knob that looks well on any radio set. Made of molded polished black composition with scale engraved 0 to 1000. Complete with dial. Diameter, 2½ inches. (Fitted with one hole for set screw, 7½ inch, and one hole for shaft, 1 inch.)
63 R 6897 — For 1½ inch shaft...
63 R 6896 — For 2 inch shaft...
Postage, 2 c extra

Vernier Control Knob
Bakelite Knob with a vernier control. Ideal for those who wish to adjust the frequency of their radio receiver. Diameter, 2½ inches. (Fitted with one hole for set screw, 7½ inch, and one hole for shaft, 1 inch.)
63 R 6897 — For 1½ inch shaft...
63 R 6896 — For 2 inch shaft...
Postage, 2 c extra

Calibrated Knob and Dial
A new and improved bakelite Dial is the perfect combination of style and performance. Diameter, 2 inch, complete with one hole for shaft, 1 inch, and one hole for set screw, 7½ inch. Complete with dial. Complete with one hole for set screw, 7½ inch, and one hole for shaft, 1 inch.
63 R 6897 — For 1½ inch shaft...
63 R 6896 — For 2 inch shaft...
Postage, 2 c extra

Scrap Radio Dial and Knob
Made of polished, molded composition for use on variable condensers, varistors, varicouplers, etc. Fitted with metal, 2½ inch dial. Diameter, 2 inch, complete with one hole for shaft, 1 inch, and one hole for set screw, 7½ inch. Complete with dial. Complete with one hole for set screw, 7½ inch, and one hole for shaft, 1 inch.
63 R 6897 — For 1½ inch shaft...
63 R 6896 — For 2 inch shaft...
Postage, 2 c extra

Bakelite Dial and Knob
Dials and Knobs of genuine bakelite are practically unbreakable. Engraved scale filled with white enamel, for a finished appearance. Each dial is complete with shaft, 1 inch, and set screw, 7½ inch. Complete with dial. Complete with one hole for set screw, 7½ inch, and one hole for shaft, 1 inch.
63 R 6897 — For 1½ inch shaft...
63 R 6896 — For 2 inch shaft...
Postage, 2 c extra

For Fine Adjustment The Universal
One of the recent radio developments is the Universal control, which gives both coarse and vernier fine adjustment. It is mounted on a knob, 2½ inches, complete with dial and vernier scale, graduated from 0 to 1000. The vernier scale is engraved 0 to 1000. Complete with dial and vernier scale, graduated from 0 to 1000. Complete with dial and vernier scale, graduated from 0 to 1000.
63 R 6897 — For 1½ inch shaft...
63 R 6896 — For 2 inch shaft...
Postage, 6 c extra

True Turning Calibrated Dial
A new and improved bakelite Dial is the perfect combination of style and performance. Diameter, 2 inch, complete with one hole for shaft, 1 inch, and one hole for set screw, 7½ inch. Complete with dial. Complete with one hole for set screw, 7½ inch, and one hole for shaft, 1 inch.
63 R 6897 — For 1½ inch shaft...
63 R 6896 — For 2 inch shaft...
Postage, 2 c extra
Correct Sockets for All Tubes—Well Made—Priced Low

Porcelain V. T. Socket
Made of glazed porcelain—practically no electric leakage. Almost unbreakable. Post type contacts. Easily mounted. Nickel plated brass shell set into molded bakelite base. For standard base tubes. A very fine socket on panel but can also be used with most other sockets.

Combination Tube Socket
A high grade socket with polished nickel plated brass shell set into molded bakelite base. Made of rich brown color. For standard base tubes. A very fine socket on panel but can also be used with most other sockets. Illustration shows 63 R 5995.

Socket for C-299 or UV-199 Tubes
Made of molded heat resisting material with a layer of soft cushion rubber on the bottom to prevent vibration. Copper tube is likely to be jarred. Fine spring contacts. Nickel plated binding posts are clearly marked. Bayonet post not reinforced. Our price on this socket is low.

Remler Socket for C-299 or UV-199 Tubes
A well made Socket of molded bakelite. These sockets are used with the Remler Super Heavy Duty parts for perfectly. Base is fitted with soldering lug at back of posts which are clearly marked for easy connection. Strong, positive contact spring.

Socket for C-299 or UV-199 Tubes
For shelf mounting. A well made socket of molded bakelite. Strong, positive contact spring. Reinforced. Easy to use. A big bargain for those who want a good socket at a low price.

Na-ald De Luxe Socket
Genuine molded bakelite. Reinforced slot. Laminated phosphor bronze springs give double contact, side and bottom. Plugs test connections plainly marked. Standard base for shelf mounting. For C-12, WD-12, C-200 or 301A, UV-200, 301A, C-12 or WD-12. This socket is specially made of molded bakelite with strong reinforcement on the bayonet slot and screw holes. The strong, phosphor bronze springs are rigidly held in place and cannot slip. They provide a positive connection to the base of the tube. The nickel plated binding posts are clearly marked, making connection easy.

Standard Tube Socket
A popular type Socket. Polished nickel finshed metal is inserted in molded bakelite base. Special type contacts. Binding post connections clearly marked.

Kellogg Standard Base Sockets
Kellogg products have won a high reputation for quality and superior construction. You can save money by buying these parts at Ward's. Carefully made of genuine bakelite. Strong spring ensures firm and positive contact to tube. Reinforced at screw holes and points of strain. Nickel plated binding posts are clearly marked. Soldering lugs also supplied. A high grade socket.

Kellogg C-299 and UV-199 Socket
The improved design and construction of this socket makes it unecessary to rewrite when changing from standard base to C-299 or UV-199 tubes. Contact springs are so arranged that connecting posts are in the same position as on a standard socket. Made of genuine bakelite with strong binding posts and soldering lugs plainly marked. Screw holes for mounting.

Rubber Socket Cushion Base
To be placed under sockets. Prevents microphonic noises due to loud vibes. Especially suitable for portable sets and sets using several stages of audio frequency amplification. Fits all sockets.

Adapter for C-299 Tubes
Use with C-299 or UV-199 tubes in any standard socket with this Adapter. Molded composition with strong contact spring. It is not necessary to buy new sockets to use dry cell tubes.

Genuine Molded Bakelite Sockets
That a good Radio Socket need not be high in price is demonstrated by the Airline. Exceptionally well made and fine in appearance. You can rest assured you are putting a first class socket into your set when you use the Airline. These sockets are for standard base tubes such as C300, 301A, UV-200, 301A, C-12 or WD-12. This socket is carefully made of molded bakelite with strong reinforcement on the bayonet slot and screw holes. The strong, phosphor bronze springs are rigidly held in place and cannot slip. They provide a positive connection to the base of the tube. The nickel plated binding posts are clearly marked, making connection easy.

Special C-299 or UV-199 Socket
An especially well made Socket for C-299 or UV-199 tubes. Designed for improved reproduction of radio frequency losses. Made of genuine molded bakelite in a rich brown color. Strongly reinforced at points of strain. Nickel plated binding posts with connections plainly marked. Strong positive contact spring can not work loose or turn. Screw holes for mounting.

Frost 612 Socket
for C-299 or UV-199 Tubes
Genuine bakelite, room finish. Post type socket mounting. Binding posts plainly marked.

C-11 or WD-11 Socket
Extra strong molded construction. Heavily reinforced at points of strain. Contact springs make firm contact with tube inserting positive connection. Nickel plated binding posts plainly marked for easy connection.

Standard 3-Gang Socket
Each unit makes a very handy method of mounting a detector and two stage amplifier in a small space. Made entirely of molded bakelite with nickel plated tube sockets. To be used for base mounting. Binding posts are plainly marked. Strong contact springs make perfect contact.

Frost 3-Gang Socket

Frost Cushion Base Socket for Standard Tubes
Post type No. 619. This special Socket for use in detector and two stage amplifier sets. Or in thre stage radio or amplifier. Made of rich brown color molded bakelite with cushion rubber sub-base. Phosphor bronze contact springs. Nickel plated binding posts. Plainly marked. Takes C-12, WD-12, C-300, UV-200, C-301A and UV-201A tubes. For panel mounting only.

Frost Socket Sponge Rubber
To be placed under sockets. Prevents tube vibration. Easily slipped on and off. Size 4 by 12 inches, 1/2 inch thick.

44 Variometers adapted for use with the new circuits. Pages 48 and 49, Montgomery Ward Co.
Fine Quality Rheostats and Potentiometers

Cutler-Hammer
Dram Type Rheostat
Copper wire is stationary and turning knob revolves resistance element which is wound on circular form. Requires three holes in mounting. 36 R 5097-20-ohm for C-299, C-301 and UV-200A tubes $1.29
36 R 5097-4-ohm for C-300 and UV-200 tubes 50c
36 R 5097-2-ohm for C-300 and UV-200 tubes 65c
36 R 5097 for 1-ohm for C-300 and UV-200 tubes 85c
Potentiometer, Matches above rheostat in design and appearance. Smooth, quiet action. 36 R 5035-400 ohms $1.69
Postage, each 6¢ extra

Howard Rheostat
Potentiometer
Known for Reliability
Panel mounts type Rheostat with knob and pointer. Requires two holes for mounting. 36 R 6031-6 to 7-ohm plain type for C-300 and UV-200 tubes. 36 R 6030-6 to 7-ohm vernier type for C-300 and UV-200 tubes 50¢ each
36 R 6032-3-ohm vernier for C-300 and UV-200 tubes 35¢ each
36 R 6039-3-ohm for plain type for C-300 and UV-200 tubes 60¢ each
36 R 6040-3-ohm for plain type for C-300 and UV-200 tubes 60¢ each
Potentiometer to match above rheostat 50¢ each. 36 R 6053, 6054, Resistance, 6-ohm $1.05
Postage, each 6¢ extra

Frost Rheostats
One of the Leaders
Marbon bakelite knob, bakelite frame. Single hole mounting. 36 R 6080-Frost No. 661, 6-ohm with vernier for C-300 and UV-200 tubes. 60¢ each
36 R 6081-Frost No. 662, 6-ohm for C-300 and UV-200 tubes. 60¢ each
36 R 6083-Frost No. 655, 35-ohm with vernier for C-299, C-301 and UV-200 tubes. 60¢ each
36 R 6084-Frost No. 665, 1-ohm with vernier for C-300 and UV-200 tubes. 65¢ each
36 R 6085-Frost No. 654, Resistance, 0.5-ohm 65¢ each
Postage, each 6¢ extra

Frost Metal Frame
Rheostat
Brass frame with bakelite knob. Single hole mounting. 36 R 6060-6-ohm plain for C-300 and UV-200 tubes 50¢ each
36 R 6061-6-ohm plain for C-300 and UV-200 tubes 50¢ each
36 R 6062-3-ohm for C-300 and UV-200 tubes 45¢ each
36 R 6063-3-ohm for C-300 and UV-200 tubes 45¢ each
36 R 6064-3-ohm for C-299, C-301 and UV-200 tubes 45¢ each
36 R 6065-3-ohm for C-300 and UV-200 tubes 45¢ each
Potentiometer to match above rheostat 75¢ each. 36 R 6066, 6067, 200 ohms. 45¢ each
36 R 6068, 6069, 400 ohms. 45¢ each
Postage, each 6¢ extra

Amsco Double Rheostat
New style combination Rheostat. Genuine bakelite frame and handle. Separate resistance units wound on high grade spools and solidly set into frame. Combined styles have two separate settings. Exclusively well suited for use with direct tube sets, providing individual control of all tubes. Small knob is provided. 36 R 5985-One circuit 6-ohm vernier. Marked vernier value setting arrows. 75¢ each
36 R 5986-Two 20-ohm rheostat combined in one housing. Controls separately both front and back tubes. Ranges Radio with indicating arrows. 75¢ each
36 R 5987-Similar above but marked for Sate Audio for audio control. 98¢ each
36 R 5988-Similar to 5985 and 400 ohm potentiometer combined. Marked with indicating arrows. Postage, each 10¢ extra

Amsco Plain Rheostat
Same style and construction as combination Rheostats listed at left but with only one winding and knob. Genuine bakelite knob and all parts. 36 R 5989—20-ohm for C-301 and UV-200A tubes 50c
36 R 5990—30-ohm for C-299 and UV-199 tubes 75c
Postage, each extra

Well Made Smooth Operating Rheostat and Potentiometer
These Rheostats and Potentiometers are the smoothest in operation of any we have found. Maintains a constant wound on heat resisting resins. Complete with 2 1/2" dia. dial, engraved from 0 to 100 over 360 degrees, with frame and composition dial. 36 R 5991-20-ohm for C-301A, UV-201A, C-299 and UV-199 tubes 95¢
36 R 5992—40-ohm for C-299 or UV-199 tubes $1.39
36 R 5993—100-ohm potentiometer $1.48
Postage, each 6¢ extra

Bradleystat Graphite
Vernier Rheostat
For Extremely Fine Adjustment
Resistance is controlled by varying pressure on graphite discs and gives practically perfect control of filament current. New universal model battery tubes are varied to fit all hole tubes. Use anywhere. 36 R 6406—10-ohm $1.74
36 R 6469—Resistance, 200 ohms. $1.89
36 R 6470—Resistance, 50 ohms. 75¢
Postage, each 6¢ extra

Knob and Pointer
Rheostat
At Ward’s you can save money on quality equipment by ordering these Rheostats for your set. A new style for panel mounting and fitted with a knob and pointer. Three hole panels required for mounting. Only one winding and knob. Genuinely fine Rheostats with quality guaranteed. 36 R 6406—10-ohm $1.74
36 R 6407—Resistance, 50 ohms. 75¢
Postage, each 6¢ extra

Rheostat and Potentiometer
Well Made and Priced Low
An especially well made Rheostat that will give extra good service and look well in any set. Wire resistance is wound on heat resisting molded composition dial. Choice of three holes and many measurements in mounting, as only one in the panel is required. The resistance element is wound on a heat resistant bakelite base. Complete with knob and pointer. Marked with vernier for use with amplifier and detector tubes. 36 R 6019—6-ohm for C-300 and UV-200 tubes 60¢
36 R 6020—20-ohm for C-301A, UV-201A, C-299 and UV-199 tubes 84¢
36 R 6021—30-ohm for C-299 and UV-199 tubes 84¢
Postage, each extra

Vernier Rheostat
Resistance wire is wound around outside of bakelite form so contact arm passes through entire length. Built in switch. Three holes required for mounting. Fitted with special cut off switch so current can be turned on and off without changing settings of resistance. 36 R 6506—6-ohm for C-300 tubes. 45¢
36 R 6507—10-ohm for C-1 tubes or for C-301A tubes 40¢
36 R 6508—Right for C-301A tubes 40¢
36 R 6509—Right for C-1 tubes or for C-301A tubes with storage battery. 51¢
36 R 6510—500 for C-299 tubes. 51¢
36 R 6519. Postage, each 6¢ extra

C.R.L. Potentiometer
Non-Inductive Potentiometer
Contact is quiet in operation, and is not subject to contact resisitance. Mounts with one hole. 36 R 6037—400 ohms for use with storage batteries. 65¢
36 R 6038—200 ohms for use with dry cells. 53¢
Postage, each 6¢ extra

Resistance Unit
to Protect Tubes
For attaching to 6-ohm rheostats in sets designed for use with storage batteries, dry cells or C-299 or UV-199 tubes and three dry cells. Resists resistors over 360 degrees. 36 R 6040. 14¢
Postage, 6¢ extra

Amplifier Automatic
Current Adjuster
Regulates tube current automatically. No rheostat or potentiometer at points of highest efficiency. Complete with mounting. For C-301A and UV-200A tubes except when used as detector tubes. 36 R 6017 Postage, each 6¢ extra

Frost Resistance Unit
Mounts on socket, panel or rheostat housing. 6-ohm, which may be varied by turning the knob. 36 R 6036—For C-301A or UV-201A, or with C-299, or UV-199 tubes and 6-ohm rheostat when using a storage battery. 84¢
Postage, 6¢ extra

Montgomery Ward & Co. Efficient Grid Leaks and Grid Condensers are listed on Pages 36 and 37
**Your Radio Set Needs Good Condensers**

### Low Loss Variable Condenser Vernier and Plain Type

<table>
<thead>
<tr>
<th>Type</th>
<th>Capacity</th>
<th>mfd 1 plate</th>
<th>2 plate</th>
<th>3 plate</th>
<th>Postage, $ extra</th>
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<tr>
<td>Low Loss</td>
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<td>Very High Loss</td>
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<td>$3.15</td>
<td>$3.85</td>
<td>$4.45</td>
<td>$3.85</td>
</tr>
</tbody>
</table>

**Stop the Leaks**

Radio impulses or currents are known technically as high frequency alternating currents. They travel on the surface and have a tendency to escape across any material that offers an easy path. This means lost energy. These Condensers are designed to prevent such leakage.

**Radio Leaks Reduced to a Minimum**

In this new low loss Condenser we have safeguarded to prevent current losses or leaks. The perfectly formed plates stamped from heavy aluminum are properly spaced and the rotating shaft works in hardened steel bushings in a manner that insures all metal to metal contact in turn are accurately centered in the heavy aluminum end plates. Large bearing surface makes proper contact with rotor plates, Triple hole mounting. In either vernier or plain type. Dials not included.

### New Type Low Loss Condenser

A new type low loss Condenser which is sure to be a great improvement of various sizes solid and in series to reduce losses. Rotor plates are grounded to end plate. Body capacity of body plates suspended on hard rubber strip, resists increased efficiency. Knob controls rotor plates through rubber tube. Condenser is supplied with paper dial on which you mark the location of various condensers, conveniently arranged. This is one of the best values in condensers we have ever offered.

**Excellent Results - Low Cost**

"With the Radio Parts I bought from you I have built a one- tube regenerative set at a minimum cost and have had best results with it."

"I have heard Havana, Cuba; Mexico City, Mexico; Pittsburgh, Pa.; Los Angeles, San Francisco and Oakland, Calif.; Zion, Ill.; Motherwell, Pa.; J. B., Mephis, Tenn.; Chicago, III.; Louisville, Ky., and numerous other places. I plan on enlarging my outfit and adding two more tubes. Expect to purchase these accessories from you."  

J. M. Drisk.  
R. A. Box 62, O'Keene, Okla.

Printed with Mr. Drisk's Permission

---

**Low Loss Vernier Condenser**

A new style low loss Condenser that will improve the operation of any set. Plates are of hard aluminum which will not bend insuring constant capacity and eliminating danger from short circuits. Plates are of the famous "straight line" type, making it easy to log stations. Rotor plates are connected to hard aluminum end plates, eliminating body capacity. The insulator between stator and rotor plates consists of bakelite bushings, located at the extreme edges of the end plates. This construction reduces the losses due to condenser to a minimum. Pigtail connections to rotor plates also help eliminate losses and prevent noisy contacts. These condensers have a new type vernier control. Small knob in center of large dial moves rotor plates a few degrees so fine tuning is easy. Condensers are fitted with attractive 3-inch dials.

<table>
<thead>
<tr>
<th>Capacity</th>
<th>mfd 1 plate</th>
<th>2 plate</th>
<th>3 plate</th>
<th>Postage, $ extra</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0005</td>
<td>$2.45</td>
<td>$3.00</td>
<td>$4.00</td>
<td>$3.00</td>
</tr>
<tr>
<td>0.001</td>
<td>$2.75</td>
<td>$3.50</td>
<td>$4.50</td>
<td>$3.50</td>
</tr>
</tbody>
</table>

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**Large Capacity Fixed Condenser**

Many of the condensers are of the latest type, reflex and superheterodyne type, and are very useful in the hands of a larger size than are usually shown. These condensers are the product of a well-known manufacturer and are of excellent material and workmanship throughout. They are mounted on metal cases and provided with soldering posts for easy connections. These condensers will stand much higher voltages and are usually found in receiving sets. Tested under all conditions as these condensers are a real bargain.

<table>
<thead>
<tr>
<th>Capacity</th>
<th>mfd 1 plate</th>
<th>2 plate</th>
<th>3 plate</th>
<th>Postage, $ extra</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.001</td>
<td>$2.95</td>
<td>$4.00</td>
<td>$5.00</td>
<td>$4.00</td>
</tr>
<tr>
<td>0.0015</td>
<td>$3.00</td>
<td>$4.00</td>
<td>$5.00</td>
<td>$4.00</td>
</tr>
</tbody>
</table>

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**Micadon Condenser Type 610**

A model of the famous DuBillet Condenser that has met with much success. Used in the manufacture of radio equipment and fitted with binding posts for easy connection. Provided with screw holes and may be used for field or home use. These condensers have many uses in home and radio sets.

<table>
<thead>
<tr>
<th>Capacity</th>
<th>mfd 1 plate</th>
<th>2 plate</th>
<th>3 plate</th>
<th>Postage, $ extra</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.001</td>
<td>$2.95</td>
<td>$4.00</td>
<td>$5.00</td>
<td>$4.00</td>
</tr>
<tr>
<td>0.0015</td>
<td>$3.00</td>
<td>$4.00</td>
<td>$5.00</td>
<td>$4.00</td>
</tr>
</tbody>
</table>

---

**Micadon Condenser Type 601**

Same high grade condenser as Type 610 shown above, but without the composition case and intended for use behind the tubes and not for connection.

<table>
<thead>
<tr>
<th>Capacity</th>
<th>mfd 1 plate</th>
<th>2 plate</th>
<th>3 plate</th>
<th>Postage, $ extra</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.001</td>
<td>$2.95</td>
<td>$4.00</td>
<td>$5.00</td>
<td>$4.00</td>
</tr>
<tr>
<td>0.0015</td>
<td>$3.00</td>
<td>$4.00</td>
<td>$5.00</td>
<td>$4.00</td>
</tr>
</tbody>
</table>

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**Acme Variable Condenser**

These ACME Condensers have proved to be the best in the variable type and are made with the best material and design and the losses are reduced to a minimum. Both vernier and plain type. Dials not included. Rotor plates suspended on hard rubber strip. Brass plates soldered to eliminate losses. Enameled in celluloid case. Capacity, .0005 mfd.; 29 plates, shunt, .04 inch. Complete with flexible vernier 3-inch dial. No dial included.

<table>
<thead>
<tr>
<th>Capacity</th>
<th>mfd 1 plate</th>
<th>2 plate</th>
<th>3 plate</th>
<th>Postage, $ extra</th>
</tr>
</thead>
<tbody>
<tr>
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<td>$2.18</td>
<td>$2.95</td>
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</tr>
<tr>
<td>0.001</td>
<td>$2.35</td>
<td>$3.50</td>
<td>$4.50</td>
<td>$3.50</td>
</tr>
<tr>
<td>0.0025</td>
<td>$3.18</td>
<td>$4.00</td>
<td>$5.00</td>
<td>$4.00</td>
</tr>
</tbody>
</table>

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**Low Loss Capacitor Type 606**

A model of the latest type, reflex and superheterodyne type, and is particularly suited for use behind the tubes and not for connection.

<table>
<thead>
<tr>
<th>Capacity</th>
<th>mfd 1 plate</th>
<th>2 plate</th>
<th>3 plate</th>
<th>Postage, $ extra</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0005</td>
<td>$2.45</td>
<td>$3.00</td>
<td>$4.00</td>
<td>$3.00</td>
</tr>
<tr>
<td>0.001</td>
<td>$2.75</td>
<td>$3.50</td>
<td>$4.50</td>
<td>$3.50</td>
</tr>
<tr>
<td>0.0025</td>
<td>$3.15</td>
<td>$4.00</td>
<td>$5.00</td>
<td>$4.00</td>
</tr>
</tbody>
</table>

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**Cotoc Coil Variable Condenser**

Rigid construction, fitted with dial and vernier control knobs. Friction drive vernier permits very fine adjustment. Brass plates, soldered continuously. Very low losses. Flat, diameter, 1/4 inch. Three inch dial engraved 0 to 100 over 180 degrees.

<table>
<thead>
<tr>
<th>Capacity</th>
<th>mfd 1 plate</th>
<th>2 plate</th>
<th>3 plate</th>
<th>Postage, $ extra</th>
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</thead>
<tbody>
<tr>
<td>0.0025</td>
<td>$2.95</td>
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</tr>
<tr>
<td>0.005</td>
<td>$3.50</td>
<td>$4.50</td>
<td>$5.50</td>
<td>$4.50</td>
</tr>
</tbody>
</table>

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**Cosewell Low Loss Variable Condenser**

Has aluminum plates and end pieces. The plates of this condenser are so shaped that the dial distance of both the upper and lower end of the condenser equal variations in wave lengths, which is not the case with most other condensers. Genuine bakelite bushings Diameter of shaft, 1/8 inch. Complete with shoulder dial knob of genuine bakelite. Dial is neatly engraved 0 to 100 over 180 degrees. Engraved scale is set off in contrast while closed. Complete with adjusting screws. Pigtail connection from rotor.

<table>
<thead>
<tr>
<th>Capacity</th>
<th>mfd 1 plate</th>
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<th>3 plate</th>
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</thead>
<tbody>
<tr>
<td>0.0005</td>
<td>$3.95</td>
<td>$4.95</td>
<td>$5.95</td>
<td>$4.95</td>
</tr>
<tr>
<td>0.001</td>
<td>$4.20</td>
<td>$5.20</td>
<td>$6.20</td>
<td>$5.20</td>
</tr>
</tbody>
</table>

---

**Low Loss Vernier Condenser**

A new style low loss Condenser that will improve the operation of any set. Plates are of hard aluminum which will not bend insuring constant capacity and eliminating danger from short circuits. Plates are of the famous "straight line" type, making it easy to log stations. Rotor plates are connected to hard aluminum end plates, eliminating body capacity. The insulator between stator and rotor plates consists of bakelite bushings located at the extreme edges of the end plates. This construction reduces the losses due to condenser to a minimum. Pigtail connections to rotor plates also help eliminate losses and prevent noisy contacts. These condensers have a new type vernier control. Small knob in center of large diameter moves rotor plates a few degrees so fine tuning is easy. Condensers are fitted with attractive 3-inch dials.

<table>
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<tr>
<th>Capacity</th>
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<td>0.001</td>
<td>$3.15</td>
<td>$4.00</td>
<td>$5.00</td>
<td>$4.00</td>
</tr>
</tbody>
</table>

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**Postage, $ extra**

$3.15

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**Micadon Condenser Type 610**

A model of the famous DuBillet Condenser that has met with much success. Used in the manufacture of radio equipment and fitted with binding posts for easy connection. Provided with screw holes and may be used for field or home use. These condensers have many uses in home and radio sets.
**Variable and Fixed Condensers**

**Continental Low Loss Condenser**

High efficiency with exceptionally low losses can be secured with this condenser. The stationary plates are set in slotted square brass bars and soldered into one unit. All plates are carefully machined to ensure uniform capacitance. The major unit is on a rigidly supported frame. Body capacity, new postioner is controlled by a small knob mounted on it. When the rotating plate, a single movable plate, is controlled only by the small knob, it should be removed to avoid damage. Body capacity. New postioner is controlled by a small knob mounted on it. When the rotating plate, a single movable plate, is controlled only by the small knob, it should be removed to avoid damage.

**Hard Rubber Insertion**

63R 5545-00025 mfd. with vernier...

63R 5546-0005 mfd. with vernier...

63R 5547-0005 mfd. with vernier...

63R 5548-0005 mfd. with vernier...

Postage, each, $ extra

**High Grade Variable Condensers Vernier Type**

A Vernier Variable Condenser permits much sharper tuning than is possible with the ordinary condenser. When the best adjustment obtainable is secured by turning the three-hole panel. Three-hole panel is not used in any adjustment. On some sets the mere turning of the vernier plate will bring in three or four different wavelengths. $1.85

Complete with Dial and Knob

Genuine bakelite insulation. Fitted with knob and three-inch dial engraved in white enameled. Three-hole panel counterclockwise. The workmanship on this condenser is very fine and it is an excellent value. Remarkable results are obtained when used in selective circuits. On some sets the mere turning of the vernier plate will bring in three or four different wavelengths. $1.85

**Freshman Condensers**

Well known mica insulated Condenser. Very accurate and convenient.

63R 6200-Quantity, 0.005 mfd...

63R 6201-Quantity, 0.005 mfd...

63R 6202-Quantity, 0.005 mfd...

63R 6203-Quantity, 0.005 mfd...

Postage, 4c extra

**Freshman Midget Condensers**

Small condensers, mica insulated Condenser, 3/4 inch wide.

63R 6204-Quantity, 0.005 mfd...

63R 6205-Quantity, 0.005 mfd...

63R 6206-Quantity, 0.005 mfd...

Postage, 2c extra

**Eyelot Condensers**

A very well made, accurate Condenser. Connections brought to convenient connecting eyela in ends of fiber strip. Every condenser tested. Length 3/4 inches, width, 1/4 inch.

63R 6349-Quantity, 0.005 mfd...

63R 6351-Quantity, 0.005 mfd...

63R 6353-Quantity, 0.005 mfd...

63R 6355-Quantity, 0.005 mfd...

Postage, 2c extra

**Variable Fixed Condenser**

Capacity variable in steps from 0.005 to 0.002 mfd. Adjusted by removing plates. Adapter unit is provisioned for this purpose. A great help in building your own and other circuits.

63R 6214...

Postage, 2c extra

**Condenser Adapter**

A real time and labor saver for anyone building a radio set. With this Condenser Adapter you can make a single hole mounting condenser from any three-hole mounting condenser. Has three slots which fit over the corresponding screws in the condenser and a fourth hole for mounting on your panel. Priced unusually low—each one will more than pay for itself in the time it will save in drilling.

63R 5550...

Postage, 3c extra

---

**More Savings for You**

**Fine quality Panel, beautifully finished and accurately cut to standard sizes, fit the radio cabinets shown on the next page. These panels are smooth and true and perfectly flat, with clean, square cut edges.**

When a panel is made with fine sandpaper the high glass finish can easily be reduced. The soft rich edge shell finish preferred by some. Each panel packed separately in a scratch proof container.

**Bakelite Radio Panels**

**Size 6 by 7**

<table>
<thead>
<tr>
<th>Article Number</th>
<th>Each</th>
<th>Article Number</th>
<th>Each</th>
<th>Size</th>
<th>Postage Extra</th>
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</thead>
<tbody>
<tr>
<td>63R 6971</td>
<td>1.10</td>
<td>63R 6971</td>
<td>1.10</td>
<td>6 by 7</td>
<td>1.10</td>
</tr>
<tr>
<td>63R 6971</td>
<td>1.10</td>
<td>63R 6971</td>
<td>1.10</td>
<td>6 by 7</td>
<td>1.10</td>
</tr>
<tr>
<td>63R 6971</td>
<td>1.10</td>
<td>63R 6971</td>
<td>1.10</td>
<td>6 by 7</td>
<td>1.10</td>
</tr>
<tr>
<td>63R 6971</td>
<td>1.10</td>
<td>63R 6971</td>
<td>1.10</td>
<td>6 by 7</td>
<td>1.10</td>
</tr>
</tbody>
</table>

**Base Boards**

All Cabinets 18c Size 6 1/2 by 6 1/2

Correct sizes for all cabinets listed in this catalogue. Cut from clear grain, non-warping 3/2-inch wood, nicely finished and shellacked.

**Panel Engravings and Binding Post Markers**

Produce an effect similar to real engravings. Works like a transfer label but on regular white matrix. Very similar to machine markings. Complete set of titles for marking binding posts, jacks, control dials, etc., on your radio panel. Very easily applied.

63R 6529-Per set...

Postage, per set, 1c extra

**Decal Transfers**

These Transfers take only a moment to apply to the panel, and once on last indefinitely. They are neat in appearance and make the finished radio set look very similar to a professionally made set. With the various dials and binding post markers it will be much easier to identify your set. Complete set consists of insulators—every title needed on any set. Black lettering on gold background. Complete sets only.

63R 6602-Per set...

Postage, per set, 2c extra

**Adjustable Template for Locating Holes**

With this inexpensive device you can be sure that you will have holes in the panel drilled accurately. One hole imprinted means a whole new panel. Center fits over 3/4- and 3/4-inch shafts. Arms adjustable to locate screw holes.

63R 5552...

Postage, 2c extra
Bakelite VarioCoupler

Genuine Bakelite

$1.68

4 8

180 Degree Coupler
A well made low
priced Vario-Coupler of the 180 Degree Prefix e.

$2.10

W o o d F o r m V a r i o m e t e r

An especially well built
VarioMather, w o r d e r
rotor forms of silk dries
wood. Will not shrink
or warp. Windings are
properly designed for use
on all broadcasting wave
lengths. Shaft is 5/4 inch i n
diameter. For panel or
table mounting. Users of
this variometer claim that it is one
of the best variometers on
the market for satisfactory results.

$1.95

Postage, 6c extra

Postage, 6c extra

$3.65

W o o d F o r m V a r i o m e t e r

A compact and versatile
VarioMather, w o r d e r
rotor forms of silk dries
wood. Will not shrink
or warp. Windings are
properly designed for use
on all broadcasting wave
lengths. Shaft is 5/4 inch i n
diameter. For panel or
table mounting. Users of
this variometer claim that it is one
of the best variometers on
the market for satisfactory results.

$5.36

Postage, 6c extra

Low Priced
Vario-Coupler

90c

May be used in either single
or two variometers to
match, in a
three-circuit tuner.

$3.95

Postage, 6c extra

Postage, 6c extra

Postage, 6c extra

Raven Bakelite
VarioMeter

Small compact 12.6.
High quality moldedsilk
VarioMeter of approved
design. Silk covered
winding with connections
bracketed on nickel plated
binding posts. Positive
shaft connections. Conventional
broadcasting wave lengths.

$2.88

Postage, 6c extra

Molded Bakelite VarioMeters and Couplers
Tuning Units and Inductances

$3.95
Spider Web Variometer and Vario-coupler

$2.95
Ward's DeLuxe Vario-coupler

$3.80

The remarkable efficiency, sharp tuning, and sensitiveness to distant signals of this Coupler are due to the superior design and com- plete absence of absorbing materials in the magnetic field. Primary has a 4.45 inch. Perfect coupling. Geared secondary gives great selectivity. Covers all existing wave lengths. Dial and knob included. Shaft, 3/4 inch.

63 R 6158
Postage, 6c extra...

A well made, high grade Coupler at an unusually low price. Designed to meet the needs of the average set and has proved very efficient under rigid tests. It is handsomely finished and first class in every particular. When used with a 23-plate variable condenser in series with the antenna, the wavelength range of the coupler is from 150 to 650 meters. Recommended for use in all standard single circuit or radio frequency and reflex circuits. Wound with silk covered wire on fiber composition tube. Arranged for panel mounting. Shaft diameter, 3/4 inch. Signed by our engineers and built especially for Ward's. Thousands of these couplers have been used in single circuit regeneration throughout the country with unusually satisfactory results.

63 R 6300
Postage, 6c extra...

Molded Phusiformer

This instrument is important as a radio frequency amplifying transformer, but it may be employed effectively in many other radio receiving circuits. The Phusiformer is specified by the experimenter who does not wish to spend a large deal of money on his outfit at once.

A number of suggested circuits are included which show how the Phusiformer can be used in various ways. By using these charts the initial cost for a receiving set can be kept at an absolute minimum while from time to time a slight additional expenditure will improve your set until it will be the equal of any receiving set.

Composition case 4 1/2 inches square by 2 inches deep. Four binding posts on top. For panel and table mounting. Complete with 3/4-inch black composition dial.

63 R 6158
Postage, 10c extra...

Single Circuit Tuner


63 R 6156
Postage, 6c extra...

Coupled Circuit Tuner

(Overmount)

Takes the place of a variable condenser and varicoupler in a coupled circuit receiving set. Produces uniform results when used with a good vacuum tube detector and two-stage amplifier. Only one adjustment. Rotor and stator forms of coupling. Coils are silk covered copper wire. Shaft, 6c. Inch. Diagram of connections included.

63 R 6173
Postage, 10c extra...

Coupled Circuit Tuner

(Mounted)

Same as Coupled Circuit Tuner (Overmount) as shown above, except that this is mounted on a panel. Coils are covered with bakelite. Panel attractive-ly engraved and fitted with control knob, pointer and inden- tation switches.

63 R 6174
Postage, 14c extra...

Coil for the Cockaday Circuit

The circuit employing the Cockaday unit has many advantages over similar types of regenerative circuits. One coil in it is really an absorption coil to prevent feed back into the antenna. The feed-back coil that causes regeneration also causes oscillation in the grid. This is prevented by the use of this unit in an absorption circuit. An inductive coupling is employed. This coil is correctly designed for use in the Cockaday circuit. Consists of four hand wound "D" coils, primary and secondary coupling and stabilizer coils. Wound on non-swarving forms. Length of "D" coil, 2 inches, 7 taps. Length of primary coil, 6 inches. An important unit in your regenerative set. We offer you this at a price that means a great saving.

63 R 6228
Postage, 10c extra...

What Our Customers Say

"I received my Radio apparatus all O. K. That Coupler is certainly a fine one. This morning about 8:00 o'clock I heard a station in Caliifornia, O.K., using this coupler. How is that for distance?" W. F. Burgiss, Elkin, N.C.

"I greatly appreciate your sending me the goods so promptly. Have my machine all completed and will say the radio supplies purchased from Ward's are better than I could buy here. Have saved about $20 buying from you."

Howard C. S. Ephrath, N. Y.

"On an order for radio material amounting to $36, I saved over ten dollars by purchasing from you instead of through the local merchants."

Robert F. Stiles, Walkerton, Ind.

All Letters Printed by Permission

Loose Couplers and Crystal Sets Parts are shown on Page 52...
Popular Audio Frequency Transformers

$4.38 Acme Transformer

The Acme Transformer is the simplest and least expensive introduction to radio engineering. It is built by transformer manufacturers with the same care and precision as the best. It gives high amplification without distortion. The transformer is constructed so that it will meet all radio requirements and suit for either first, second or third stages of audio frequency amplifiers. The transformer is easily mounted. The binding posts are brought out to tapped binding posts mounted on the chassis. May be mounted on any audio frequency circuit. A new price. Sales 62.

*Price 6 extra

Amercan Transformer

Comparatively new in the radio field but already adopted by many manufacturers is the American Transformer. It gives high amplification without distortion. The transformer is designed to the usual radio requirements and is the American Transformer functions with any of the new day vacuum tube. The shell type of a transformer that are brought out to tapped binding posts mounted on the chassis. May be mounted on any audio frequency circuit.

*Price 6 extra

Jefferson Transformer

Another Big Saving

A recent addition to the well known line of Jefferson transformers. During tests in our laboratory, this transformer has come to be one of the best satisfactory transformers we have seen. It is of the shell type with molybdenum for amplification and is the only transformer that has been tested to date. The transformer is a multi-stage amplifier, binding posts are provided for easy connection. We recommend this transformer to the radio and transistory enthusiast thoroughly satisfactory and a fine value at our price.

*Price 6 extra

Thoradson Amplifying Transformer

Long before radio became popular the Thoradson Amplifier was known to the world. The transformer is used for audio frequency circuits. The transformer may be used for any audio frequency circuit. The transformer has been tested to date.

*Price 6 extra

Ward's Special/Audio Transformer

$1.95

Although this Transformer is built to sell at a very low price yet it measures up to Ward's high standard of quality in every way. The Transformers are high quality and the binding posts are marked with a shell type of binding tape. The transformer will produce results equal to transformers costing many times more.

*Price 6 extra

Sampson Audio Transformer

In the Sampson Audio Frequency Transformers the best of high standards is used for both the primary and secondary coils. The transformer is built with very high standard of quality and the binding posts are gold. A quality instrument selling at a very low price. This transformer is one of the best audio frequency transformers on the market.

*Price 6 extra

Kellogg Transformer

This Transformer is the result of scientific design by radio engineers and is considered by many radio experts the best design of all transformers of this type. The transformer is built with very high standard of quality and the binding posts are gold. A quality instrument selling at a very low price. This transformer is one of the best audio frequency transformers on the market.

*Price 6 extra

K. C. Transformer

This make of Transformer is characterized by the skilled workmanship in their construction, as well as the high grade of material used. Quite free from distortion, natural, round tones and low transference. Results secured by the use of these transformers.

*Price 6 extra

All American Transformer

Now $2.95

Only

Radio enthusiasts over the country are using All American Transformers with splendid results. They provide maximum amplification without loss of quality. Windings are shielded in a metal case. Three different types are made for use respectively in the first, second or third stages of the amplifier. The first type with a ratio of 10 to 1 is in single use, the second with a ratio of 5 to 1 is used in the first stage of a two stage amplifier, and the third type with a ratio of 6 to 1 is used as the last transformer in a two stage amplifier.

*Price 6 extra

Coto Coil Transformer

Now $3.95

Only

Certain features make this transformer desirable for home radio amplifiers in audio frequency amplifying circuits. Windings are properly designed for maximum amplification without loss of quality. This transformer gives great efficiency. Losses through leakage are reduced to a minimum. Resonance is secured at all frequencies used in broadcasting which means true high fidelity. A compact and can be mounted in a small space. You will find this transformer satisfactory and we strongly recommend it for use in first and second stage amplifiers. Binding posts are brought out to tapping points and are plainly marked. May be mounted on the chassis or on the table. Our price gives you a substantial saving.

*Price 6 extra

Erla Audio Transformer

Especially designed for Erla Reflex circuits but recommended also for any audio frequency circuits. Amplifiers with practically no distortion. Mounted in note case with binding post connections. A standard well known product at a reduced price.

*Price 6 extra

All American Power Transformers

To be used in pairs in push-pull (power) Amplifiers, and also for any audio frequency circuits. The ordinary 3-tube set of loud speakers will give sufficient volume to fill a large room or hall. Also used as speech amplifiers. Black enamel case with five plainly marked binding posts. A standard well known product at a reduced price.

*Price 6 extra

Hegehod Audio Transformer

A compact audio frequency Transformer that will give extreme high fidelity to any audio frequency circuit. Because of its small size it will be found especially useful in portable sets and other receivers where compactness is desired. Produces exceptional volume with surprising clarity in the first, second and third stages of the amplifier.

*Price 6 extra

NOTE: The tone quality of the audio frequency transformers may be greatly improved by connecting a grid leak across the secondary winding of one or both transformers. Volume is reduced slightly but quality is improved. A variable leak is best. See Pages 36 and 37.

Let all the family hear the program. Loud Speakers shown on Pages 40 and 41.
Radio Frequency Transformers

Especially suited to reflect circuits, Acme Transformers are among the best known of the popular radio frequency transformers. Designed by the Acme engineers, who have been working with transformers for years. These transformers are of the iron core type. Windings are mounted on a bakelite base with all binding posts marked. Built in four types, each ultra-selective over certain wave lengths, but resulting in a wide range when used in combinations of one, two or three stages.

63R654 - Type RI for amateur waves. 100 to 350 meters. $4.38
63R645 - Type R5 for first stage amplifier. 4.38
63R647 - Type R6 for second stage amplifier. 4.38
63R648 - Type R8 for third stage amplifier. 4.38

Postage, each, 6¢ extra

A Moderately Priced Radio Frequency Transformer

A well designed Transformer for use in any standard radio frequency circuit. Will give excellent results in a combination of one or two stages. The windings are mounted in a molded bakelite case with all binding posts marked and mounted on the base of the cabinet or on the panel. Binding posts are plainly marked. This transformer is designed for reception on the usual broadcasting wave lengths, and will be found to be very efficient.

$9.30

63R6571 - For first stage amplifier. $3.38
63R6572 - For second stage amplifier. $3.65

Postage, each, 6¢ extra

Kibbourn & Clarke Radio Frequency Transformer

These Radio frequency transformers are the result of much research work by radio engineers, and are remarkably efficient units. Inductance variable to give highest efficiency on all broadcast wave lengths. All binding posts marked. Footed connections. Each stage of amplification adjustable. Moulded bakelite. For panel or table mounting.

$9.18

63R6183 - Two stage. $4.65

Postage, 1¢ extra

Radio Frequency Amplifying Transformer

An Amplifying Transformer made by the Radio Corporation of America. Type UV-177. Has been designed to handle the peculiar amplifying requirements that are met in picking up and delivering very weak signals. Has found many uses in circuitry where a high degree of selectivity is desirable. Growth in broadcast wave lengths, and will be found to be very efficient.

$4.95

63R6497 - For first stage amplifier. $4.20

Postage, 6¢ extra

Dubbler Radio Frequency Transformer


$3.48

63R6573

Postage, 6¢ extra

The Erla Selectoformer Replaces the Vario Coupler in Many Circuits

The Erla Selectoformer was especially designed to take the place of vario couplers except the single circuit regenerative amplifier. Complete design is for wave lengths. Mounted in a case with binding posts marked. Comes with an instruction book.

$4.20

63R6601

Postage, 6¢ extra

Coto Coil Radio Frequency Amplifying Coil

Brings in Long Distance Stations

This Transformer is of the tapped type so that maximum efficiency is obtained over all broadcast wave lengths. Change is made by a switch mounted on the end of the case. It is one of the most efficient radio transformers obtainable. It will give a high degree of selectivity at a cost that can not be got by ordinary methods. Suitable for use in one or more stages and as many as three can be mounted on one shaft.

$5.00

63R6637 - Extension Shafets $1.79
63R6648 - 8 inches for 2 transformers. 10c
63R6649 - 30 inches for 3 transformers. 30c
Postage: Transformers, 6¢ extra; shafts, 6¢ extra

Improved Radio Frequency Transformer

Very Low Price

A new Radio Frequency Transformer that has met with general favor. Built on a new principle with a compensating winding between the primary and secondary windings which overcomes the trouble due to eddy currents in the circuits and changes in the load. Mounted in a bakelite case with binding posts marked for connection. Built for panel or shelf mounting. This transformer is highly recommended, and the price is lower because of quantity production and efficiency. Only the best materials are used in the production of this transformer.

$1.79

63R6547 - For UV-191 and 201A tubes... $1.79
63R6548 - For UV-190, 201B and 201A tubes. $1.79
Postage, each, 6¢ extra

Erla Reflex Transformer

Gives Excellent Results

Especially well suited to reflect circuits where the utmost transformer efficiency is necessary. The circuits using the Erla Reflex transformers are natural built by anyone who can follow a simple diagram. A one tube reflex set is equal to the ordinary two tube set if properly built. These transformers are the result of one experiment and have proved capable of remarkable results. Erla Reflex transformers are furnished with each transformer.

$3.95

63R6592 - For first stage reflex. $3.95
63R6579 - For second stage reflex. $3.95
Postage, each, 6¢ extra

When and Where to Use a Loop Antenna

The Loop Antenna does away with the usual aerial and ground wires and can be used in crowded apartments or hotel rooms. The energy gathered by a loop antenna is much smaller than an outside antenna, therefore a loop should be used only with an extremely sensitive multiple tube receiver, such as reflect, radio frequency, super heterodyne and other sets employing much amplification. An advantage gained in that the loop is directional. That is, it brings in signals from a given station when pointed directly toward that station. It also cuts out interferences and has the advantage of portability. Loop reception should not be attempted except with super sensitive amplifying sets.

$3.75

63R655 - Postage, 1¢ extra

Folding Loop Antenna

Very Desirable for Portable Sets

Folding type loop recommended for portable sets. Can be folded and put into small tubular case. 5 inches long by 3 inches in diameter. Covers all broadcast wave lengths. Complete wood frame and stand with binding posts marked for connections. Size of loop is 2 feet by 2 feet each side. Gives good results with modern radio frequency amplifiers and super heterodyne circuits. Complete wood frame and stand with binding posts marked for connections. Reception over distances of 200 to 5000 miles is common, and many long distances have been reported. Shipped taken apart.

$3.25

563R650 - Postage, 1¢ extra

Box Type Loop Antenna

Very Easily Assembled and Taken Down

Very convenient and practical. Can be assembled and taken down easily. Complete wood frame and stand with binding posts marked for connections. Size of loop is 2 feet by 2 feet each side. Gives good results with modern radio frequency amplifiers and super heterodyne circuits. Complete wood frame and stand with binding posts marked for connections. Reception over distances of 200 to 5000 miles is common, and many long distances have been reported. Shipped taken apart.

$3.25

563R650 - Postage, 1¢ extra

Montgomery Ward Co.
Tools for use in the radio workshop are shown on Pages 56 and 57

51
Crystal Detectors—Tuning Coils and Parts

Crystal Receiving Sets
For those who live within 20 to 30 miles of a powerful radio broadcasting station, an ordinary tuner with crystal detector will often give all the volume desired. A crystal set, however, can not be used to operate a loud speaker. It is important to use a good aerial with crystal sets so as to get the full benefit of the received broadcast impulses. The aerial should be erected with just as much care as for a tube set. Many who own sensitive vacuum tube receivers and who are not far from a powerful station, keep a good crystal receiving set and head set for use in listening to the nearby station. The crystal detector gives less volume and shorter distance, but a sweet and clear reception.

Push-Pull Switch
Required only one hole 3/4 inch in diameter in panel. Used to control current or make and break circuits. Fits panel up to 3/4 inch. 63 R 5614. Postage, 3c extra.

Low Priced Crystal Set
This complete outfit requires only the antenna, ground connection and a head set to receive stations 10 to 20 miles distant. The entire set is mounted in an insulating case, covered over, 5 inches. Binding posts are provided on the hard rubber plate for connection to antenna, ground and head set. The crystal detector is easily adjusted. Tuning is done with knob in center of panel. Galena crystal is held in a nickel plated cup, mounted in metal plate. 63 R 6293. Postage, 25c extra.

Adjustable Crystal Detector
An efficient Crystal Detector especially suited for all ordinary crystal and reflex circuits. Semi-fixed type requiring little adjustment to find sensitive spots. Equipped in hard rubber tubing with nickel plated ends. Has brass screws for mounting on panel. Complete with control and switches for control and installation. 63 R 5562. Postage, 5c extra.

Mounted Crystal
Genuine Arlington Tested Crystals. Produce loud and clear signals in crystal sets.

63 R 5320—Single pole, single throw switch. 3/8 inch.
63 R 5322—Super-sensitive Galena Coll. 1c.
63 R 5321—Super-sensitive Silicon Coll. 1c.

Broadcast Tested Crystals
Each Crystal is carefully tested on signals from broadcasting stations to find sensitive spots. Gives louder signals than most crystals. Can be adjusted for sensitivity, needs no adjustment.

63 R 5537—Single mounted. 5c.
63 R 5538—Single silicon mounted. 7c.

Grewol Fixed Crystal
Recommended for use in reflex and other sensitive crystal circuits. Gives louder signals than most crystals. Can be adjusted for sensitivity, needs no adjustment.

63 R 6597. Postage, 2c extra.

Two-Slide Radio Tuning Cell
Machine supplied with wire windings on non-shrinkable tubing. Windings can not come loose. Control is moved with knobs. In some machines, Mahogany finished, piece. Range up to 500 meters. Send 2c extra for 100 meters. 63 R 5104. Postage, 12c extra.

Cardboard Tubes
Used for making tuning coils, loading coils and for other radio purposes. They are made extra hard to prevent paper from getting in. Separate wood pulp and are treated so they will hold their shape permanently with ordinary care. Easily cut to any length desired. All sizes 1 foot long.

63 R 6567—Diameter, 3 inches. 1c.
63 R 6568—Diameter, 4 inches. 1c.
63 R 6569—Diameter, 5 inches. 1c.

Bakelite Tubing
Grade 3 BX Bakelite-Dictio. No tubing. These tubes for winding all your coils. Very strong, will not burn. All sizes 3 inches long.

63 R 6670—Inside diameter, 3/8 inches. .5c.
63 R 6671—Inside diameter, 1/2 inches. .5c.
63 R 6672—Inside diameter, 3/4 inches. .5c.

Slide Rods
Used in building tuning coils. Made of 3/4 inch square brass rod, smooth polished finish. Screw holes in each end.

63 R 2689—20 inches long. 2 rods. 1c.
63 R 6577—12 inches long. 2 rods. 1c.

Test Buzz Button
For use with test buzz, or circuit checker. Battery operated. Push button. Switch on pole. 63 R 5177. Postage, 2c extra.

Potentiometer Switch
For cutting the potentiometer out of the aerial circuit and leaving the circuit still in operation. 63 R 5049. Postage, 2c extra.

Porcelain Base Knife Switch
Porcelain base provides extra good insulation. Provides a convenient means of making connection. 63 R 2684—Single pole, single throw switch. Base size, 1/4 by 3/8 inches. 1c.
63 R 2687—Single pole, double throw switch. Base size, 1/2 by 3/4 inches. 1c.
63 R 2688—Double pole, single throw. 2c.
63 R 2689—Double pole, double throw. 3c.

Erla Fixed Crystal
Mounted in convenient dustproof case with screw for easy mounting. Suitable for Erla reflex and other reflex or plain detector crystal circuits. No adjustment required.

63 R 6595. Postage, 2c extra.
Latest Improved Radio Accessories Priced Low

Inductance Switch and Dial

Takes the place of switch point or the panel of your set. Arranged so the dial and knob are easily reached from side of the panel. The rest of the mechanism is mounted on the cord feeding switch points. May be mounted on the panel up to 1/4 inch by drilling only one hole. For use with all standard plugs. Made of polished black enameled brass. 

Frost Radio Jacks

Fine quality Jack especially designed for radio use. May be mounted on any panel up to 1/4 inch by drilling only one hole. For use with all standard plugs. Soldering lug tinned. Frosted inlay. Black composition knurled parts highly polished. 

Frost Tip Jacks


Marked Binding Posts


Switch Stops

Handy Switch Lever Stops that prevent the same position of switch lever. Made of brass, black composition knob with nut on threaded shaft. Will add to the appearance of any set.

Double Binding Posts


Eby Binding Posts

Fine quality Binding Posts. Open for series connection in both composition and brass connections. 

Series Automatic Plug

Add an orignal improvement to your set by using one or more of these Automatic Plugs. Will take all standard plugs. Made of polished black barreled. Connections easily made. Will give long satisfactory service.

Good Quality Low Priced Plug


Binding Posts

Nickel plated brass finish. 

<table>
<thead>
<tr>
<th>No.</th>
<th>Length</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>63 R 5636</td>
<td>3/8 inch</td>
</tr>
<tr>
<td>2</td>
<td>63 R 5602</td>
<td>1/4 inch</td>
</tr>
<tr>
<td>3</td>
<td>63 R 5603</td>
<td>5/8 inch</td>
</tr>
<tr>
<td>4</td>
<td>63 R 5636</td>
<td>3/4 inch</td>
</tr>
<tr>
<td>5</td>
<td>63 G 5644</td>
<td>1 inch</td>
</tr>
</tbody>
</table>

Three-Plug Adapter

A handy device that permits you to use three head sets or two head sets and a two-head set at the same time. Can be attached to cabinet or edge of table. Arranged to take three plugs in series. Pulling out one plug leaves others connected. 

Two-Cord Plug

With this new style plug you can use two sets without having a number of unsightly connections. A well made plug that has connectors for two sets of cord tips. Connections are made quickly and easily. Plug is brass with fiber handle. At least one of these plugs should be in every home with a radio set.

Pacent Duc-Jac

For connecting head set or loud speaker to set, has binding post connections instead of jacks. Adjustable to fit any set of binding posts. Takes two head sets and a sound speaker plug. Will not take two 63 R 6935 Plugs shown at bottom of page. Treatment of twelve-inch flexible cord and attaching plug included. 

Frost Four-Way Plug

Use this 4-way Plug on your panel and let the whole family listen in. Takes 4 pairs of plugs. Not required. Metal parts of brass. 

Special Jacks

Well made with strong springs. Silver contacts.

63 R 6826 —Postage, 4c extra 

63 R 6826 —Postage, per dozen, 3c extra

63 R 6825 —Postage, 4c extra 

63 R 6825 —Postage, per dozen, 3c extra

63 R 6824 —Postage, 4c extra 

63 R 6824 —Postage, per dozen, 3c extra

63 R 6823 —Postage, 4c extra 

63 R 6823 —Postage, per dozen, 3c extra

63 R 6822 —Postage, 4c extra 

63 R 6822 —Postage, per dozen, 3c extra

63 R 6821 —Postage, 4c extra 

63 R 6821 —Postage, per dozen, 3c extra

63 R 6820 —Postage, 4c extra 

63 R 6820 —Postage, per dozen, 3c extra

63 R 6819 —Postage, 4c extra 

63 R 6819 —Postage, per dozen, 3c extra

63 R 6818 —Postage, 4c extra 

63 R 6818 —Postage, per dozen, 3c extra

63 R 6817 —Postage, 4c extra 

63 R 6817 —Postage, per dozen, 3c extra

63 R 6816 —Postage, 4c extra 

63 R 6816 —Postage, per dozen, 3c extra

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63 R 6810 —Postage, per dozen, 3c extra

63 R 6809 —Postage, 4c extra 

63 R 6809 —Postage, per dozen, 3c extra

63 R 6808 —Postage, 4c extra 

63 R 6808 —Postage, per dozen, 3c extra

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63 R 6806 —Postage, 4c extra 

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63 R 6801 —Postage, per dozen, 3c extra

63 R 6800 —Postage, 4c extra 

63 R 6800 —Postage, per dozen, 3c extra

63 R 6899 —Postage, 4c extra 

63 R 6899 —Postage, per dozen, 3c extra

63 R 6898 —Postage, 4c extra 

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63 R 6896 —Postage, 4c extra 

63 R 6896 —Postage, per dozen, 3c extra

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63 R 6888 —Postage, 4c extra 

63 R 6888 —Postage, per dozen, 3c extra

63 R 6887 —Postage, 4c extra 

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63 R 6881 —Postage, 4c extra 

63 R 6881 —Postage, per dozen, 3c extra

63 R 6880 —Postage, 4c extra 

63 R 6880 —Postage, per dozen, 3c extra

63 R 6879 —Postage, 4c extra 

63 R 6879 —Postage, per dozen, 3c extra

63 R 6878 —Postage, 4c extra 

63 R 6878 —Postage, per dozen, 3c extra
An Efficient Antenna Is Easy to Build

Location and Construction of the Antenna

A necessary part of every radio set is the Aerial or Antenna, which is a single wire or a combination of wires for the purpose of gathering the electrical impulses sent out by broadcasting stations. The most efficient antenna is the outdoor type, which should be placed as high as possible and located where it will not come in contact with trees or other obstructions.

It may be erected on the roof of your house, or it may be suspended between the house and barn, between the house and a tree, or between two trees or buildings. The surrounding will determine the most advantageous location, and you should be particularly careful to keep your aerial as far as possible from, and running at right angles to, electric power lines. For convenience, one end of the antenna should be almost directly above the receiving set, so that only a short lead-in wire will be required to connect the antenna to the set.

A single wire, 75 to 125 feet long and 35 feet or more above the ground, will usually give the best results. Be sure it has an Insulator at each end. To insure a weather-proof connection to the aerial or use Connector 63 R 620, above on this page. If it is not practical to erect a single wire antenna of this length on account of limited space between supports, a two-wire antenna of 56 to 75 feet, or a four-wire antenna less than 50 feet long, will be satisfactory. The wires must be spaced at least 36 inches apart to give good results. The arrangement of the different kinds of antennas is shown in the diagram above.

Although a radio antenna is less likely to affect lightning than a telephone wire, your set should be protected in the same manner as the telephone is protected, with an adequate lightning protector or a ground switch. On this page we show you several which have been approved by the insurance companies.

From House to Barn

From House to Tree

From House to Wind Mill

Two or Four Wires 40 to 75 Feet

Porcelain Aerial Insulator

High grade glazed porcelain, deeply corrugated to prevent leakage. Made of best quality material. Strong and durable. You may feel sure that your antenna is properly insulated if you use these. Diameter, both sizes, about ½ inch, 3.6 ft-$1.19

Porcelain Strain Insulator

A well made, glazed finish porcelain Insulator, strong and durable. Holes at each end for attaching wires. Satisfactory for the ordinary revolving aerial. Size, about 2¾ inches long by about ¼ inch in diameter. 3.6 ft-$1.15

Porcelain Strain Inulator

Extra strong. Especially desirable for long aerials and guy wires. May be used in series. Does not allow wire to come apart if insulator breaks. Used and recommended by amateur and licensed radio stations all over the country. Using these insulators will help prevent antenna troubles. Size, about ¼ inch. 6.3 ft-$1.19

Fahnestock Aerial Connector

Coil wire, saves time and saves trouble. 3.6 ft-$1.19

Ground Clamp

Made of copper. 6.3 ft-$1.19

Neat and compact Loop Antennae are shown on Page 51
Copper Antenna Wire
63 R 5150 - Aerial Cable made of stranded hard drawn copper wire. High tensile strength, large area giving low resistance. Supplied only in lengths listed.
100 ft. 49c 150 ft. 3.75
For job lengths add 1.05c per ft.
63 R 5036 - Size 4 for ground lead.
25 feet 1.67 Postage, 100 feet 5c extra

Cotton Lamp Cord
Double conductor new code Lamp Cord. Conductors consist of fine copper wires stranded together and insulated with rubber compound. Covered with fine quality interwoven yellow and green cotton. Two such wires are twisted together to make double cord. Sold only in lengths as listed.

Article Size Number Feet
63 R 3175 16 4 272 $ .55 1.79 $ 4.25
63 R 3165 18 4 169 $ .69 8.00 8.90
63 R 3150 20 4 93 $ 1.05 3.25 9.50
Postage, 100 feet, 5c extra

Tinned Copper Wire
Special drawn tinned Copper Bus Wire, for connections requiring a soft enough to permit making a neat, efficient job.

Table for tinned Copper Bus Wire:

<table>
<thead>
<tr>
<th>Article</th>
<th>Size</th>
<th>Number</th>
<th>Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 R 7055</td>
<td>4</td>
<td>round</td>
<td>10 feet</td>
</tr>
<tr>
<td>63 R 6904</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Postage, 10 feet, 5c extra</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Antenna Wire
Connector Block
If you have an antenna of more than one wire, you should connect the wires together with this Connector block. Black cotton is woven a black cotton making a neat, efficient link.

Table for Antenna Wire Connector Block:

<table>
<thead>
<tr>
<th>Article</th>
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<th>Number</th>
<th>Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 R 6294</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Postage, 3c extra</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Lamp Cord Connectors
For quickly making or breaking connection between two lengths of lamp cord. Easily and quickly attached to cord. Very neat and compact; connecting parts imbedded in molded composition.

Table for Lamp Cord Connectors:

<table>
<thead>
<tr>
<th>Article</th>
<th>Size</th>
<th>Number</th>
<th>Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 R 5151</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Postage, 3c extra</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Iron Core Rod
Length, 5 feet. Heavily galvanized. Handy for use with any radio outfit to insure perfect ground contact without the use of cement or nails. Shipping 4 pounds. Not available. 163 R 1081

Table for Iron Core Rod:

<table>
<thead>
<tr>
<th>Article</th>
<th>Size</th>
<th>Number</th>
<th>Feet</th>
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<tbody>
<tr>
<td>63 R 1081</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Postage, per set, 6c extra</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cable Antenna Wire
63 R 5150 - Aerial Cable made of stranded hard drawn copper wire. High tensile strength, large area giving low resistance. Supplied only in lengths listed. 100 ft. 49c 150 ft. 3.75
For job lengths add 1.05c per ft.

Table for Cable Antenna Wire:

<table>
<thead>
<tr>
<th>Article</th>
<th>Size</th>
<th>Number</th>
<th>Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 R 5150</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Postage, per set, 3c extra</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Copper Clad Antenna Wire
Made with a steel core coated with a layer of pure copper. Very smooth Size No. 14

Table for Copper Clad Antenna Wire:

<table>
<thead>
<tr>
<th>Article</th>
<th>Size</th>
<th>Number</th>
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</thead>
<tbody>
<tr>
<td>63 R 5154</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Postage, per coil, 8c extra</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Braided Antenna Cable
Light-Durable
This Cable was specially developed for radio use. It is made of fine stranded high grade copper, braided into a low cost cable allowing in circumference. This makes about twice the circumference of the ordinary antenna wire, and especially desirable for use on outdoor and loop antennas.

Table for Braided Antenna Cable:

<table>
<thead>
<tr>
<th>Article</th>
<th>Size</th>
<th>Number</th>
<th>Feet</th>
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</thead>
<tbody>
<tr>
<td>63 R 6246</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Postage, per coil, 10c extra</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ground Switch
Aerial ground switch approved by underwriters. This 600-volt, 100-ampere switch is single pole, double throw type. Mounted on an asbestos composition base which has high insulating properties. Rated for 600 volts, 14½ inches; sizes are approximate.

Table for Ground Switch:

<table>
<thead>
<tr>
<th>Article</th>
<th>Size</th>
<th>Number</th>
<th>Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 R 5359</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Postage, 1c extra</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Lightning Arrester
Uses safety gap principle. Points are set close together inside a porcelain weatherproof base. Made of porcelain giving low resistance to electrical storms. Not suitable for use in wire, or fastened to any support. For outdoor use.

Table for Lightning Arrester:

<table>
<thead>
<tr>
<th>Article</th>
<th>Size</th>
<th>Number</th>
<th>Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 R 6611</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Postage, 8c extra</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Porcelain Enclosed Lightning Arrester
Uses safety gap principle. Points are set close together inside a porcelain weatherproof base. Made of porcelain giving low resistance to electrical storms. Not suitable for use in wire, or fastened to any support. For outdoor use.

Table for Porcelain Enclosed Lightning Arrester:

<table>
<thead>
<tr>
<th>Article</th>
<th>Size</th>
<th>Number</th>
<th>Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 R 6611</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Postage, 8c extra</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Porcelain Tubes

Table for Porcelain Tubes:

<table>
<thead>
<tr>
<th>Article</th>
<th>Size</th>
<th>Number</th>
<th>Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 R 3907</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Postage, per dozen, 3c extra</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Glazed Porcelain Cleats
Tube No. 10 or smaller insulated wires. Also make very satisfactory antenna insulators. Have wire centers 2½ inches apart. Hold two wires. For job lengths add 1.4c per pair to price shown.

Table for Glazed Porcelain Cleats:

<table>
<thead>
<tr>
<th>Article</th>
<th>Size</th>
<th>Number</th>
<th>Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 R 3920</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Postage, per dozen pairs, 3c extra</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Solid Porcelain Knobs
Porcelain Knobs should be used to support lead-in wire wherever it touches a house. Made of high quality solid porcelain, new code. Height, 1½ inches. Diameter, 1½ inches. Hole, ¾ inch. Groove, ½ inch. Sold by dozen only.

Table for Solid Porcelain Knobs:

<table>
<thead>
<tr>
<th>Article</th>
<th>Size</th>
<th>Number</th>
<th>Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 R 3927</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Postage, per dozen pairs, 23c extra</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pipe Mast Fittings
Pipe Fittings for antenna mast sold only in sets of four, consisting of roof fittings. Fittings are available for flat or gable roofs; pulley fitting with holing for hanging any wire with fitting set screw to prevent slipping. No pipe included. Made of porcelain and heavily glazed. ½ inch roof fitting has only two feet.

Table for Pipe Mast Fittings:

<table>
<thead>
<tr>
<th>Article</th>
<th>Size</th>
<th>Number</th>
<th>Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 R 6416</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Postage, per set, 4c extra</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>63 R 6418</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Postage, per set, 6c extra</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Porcelain Bracket Insulator
For attaching lead-in or ground wire to any pole or wall. Screws to bracket. Screw mounting. Heavy porcelain insulator and galvanized screw. Size, insulation 1½ inches. Diameter, 1½ inches. 63 R 6591

Table for Porcelain Bracket Insulator:

<table>
<thead>
<tr>
<th>Article</th>
<th>Size</th>
<th>Number</th>
<th>Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 R 6591</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Postage, 3c extra</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Soldering Supplies are shown on Page 57
Lakeside Compass Saw

**Goof, Handy Tools for Radio Building**

**Compass extra with steel blade. Thin back, hand-hammered, field and set. coated with brass. price: compass, $1.00. workers find many uses for this saw. Shipment weight, 1 pound. State size wanted.**

<table>
<thead>
<tr>
<th>Length</th>
<th>12 inches</th>
<th>14 inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>84 R 71</td>
<td>48¢</td>
<td>55¢</td>
</tr>
</tbody>
</table>

**Handy Bench Vise**

Extra quality vise finely milled and fitted, with holding, turn-(ed) tube while drilling and many other uses. 

<table>
<thead>
<tr>
<th>Size</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>84 R 116</td>
<td>39¢</td>
</tr>
</tbody>
</table>

**Automatic Drill**

Genuine Millers Falls two-speed Bench Drill with hand crank, and slotted, adjustable radius table. Offered at less than usual wholesale price. At Ward's price you save about one-third. Suitable for the man who has a large amount of drilling. 

Genuine this drill essential for their work. 

**Coil Winder**

Strong steel frame. Holds blades 8 to 12 inches long. Adjustable to face at four different angles. Hand adjustment. As firm as a solid frame, when build in position. Complete, with 8-inch blade. An excellent saw for cutting bakelite, sheet copper or rubber sheets. 

<table>
<thead>
<tr>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>$9.95</td>
</tr>
</tbody>
</table>

**Hand Drill**

For Radio and $165

For Hand and $1.65

**Radio Drills**

Set of six Drills—wire gauge number 10, 15, 20, 25, 30, 40—to drill holes to be tapped for standard radio screws 4/36, 6/32, 8/32, 10/32, 12/24, 14/20.

<table>
<thead>
<tr>
<th>Set</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>84 R 1053</td>
<td>55¢</td>
</tr>
</tbody>
</table>

**Wire Solder**

Half and half tin and lead. Diameter, 1/16 inch. Special solid brass. 

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 quart</td>
<td>$3.85</td>
</tr>
</tbody>
</table>

**Gasoline or Kerosene Blow Torch**

A good quality Blow Torch. Complete with flexible hose and tip. 

<table>
<thead>
<tr>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>84 R 5220 — $3.85</td>
</tr>
<tr>
<td>84 R 5221 — $4.25</td>
</tr>
</tbody>
</table>

**Radio Soldering Set**

A Soldering set of suitable size for radio work. Complete with boric acid, flux, and atactic gum. A perfect set for experimental work. 

<table>
<thead>
<tr>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>84 R 5217 — $7.95</td>
</tr>
</tbody>
</table>

**Diagonal Side Cutting Pliers**

**Greenfield Button Die**

**Polishing Head**

**Cotton Buffing Wheels**

**Klein’s Pattern Pliers**

High quality forged steel. Lap joint. Bevelled head. Nicely finished and correctly tempered. Has large radius forming for cutting insulated wire. A strong convenient tool for radio or electrical use, especially for work where heavier wires are used. 

**Build your own radio. Unassembled Sets are shown on Pages 24 to 30.**
Supplies for the Radio Workshop

Automatic Blow Torch
With this blow torch you can make neat, clean soldered wire connections easily and quickly without the use of a soldering iron. The flame can be directed to the exact spot to be soldered. A 3% inch nozzle is recommended for a very small flame. Metal parts of brass, polished metal finish, 3 inches long, 2 inches wide cylinders, 3½ inch diameter, will operate ten minutes on one filling of alcohol.

63 R 5 876 ... Postage, 4¢ extra

Alcohol Blow Torch
Gives hot spotless flame. Fills cylinder with denatured alcohol, light and ready to use. By blowing through rubber tube a rod and hot flame is obtained. Can be directed to the exact spot to be soldered. Burns twenty minutes on one filling. Height, 3 inches; cylinder diameter, ¾ inch. Brass cylinder fine polished nickel finish.

63 R 5 878 ... Postage, 6¢ extra

Makes a Soldered Joint with Heat of a Match
A paste combination of soldering metal and soldering flux. Ideal for electrical and mechanical connection.

63 R 5 823 ... Per tube Postage, 3¢ extra

Resin Core Solder
The only safe and non-corosive solder for radio use. Used in electrical equipment for soldering work.

63 R 5 862 ... Postage, per bottle, 2¢ extra

Radio Insulating Cement
Use this compound to prevent the wire on your radio from loosening. Dries quickly and produces a hard film. Free from capacity effect and easy to apply. Per bottle.

63 R 6 762 ... 2-ounce bottle Postage, per bottle, 2¢ extra

Radio Shellac Compound
If you paint the parts of your set with this quick drying shellac Compound they will hold their shape better and will not absorb moisture. It is a good insulator and improves the general appearance of the apparatus.

63 R 6 673 ... 2-ounce bottle Postage, per bottle, 2¢ extra

Beads at a Saving
To be inserted in holes in the panel of your set. Adds greatly to the appearance. For solid metal frames. Pile panel to 1½ inch thick.

63 G 6 886 ... Diameter, 1½ inch hole, 10¢; per portable sets 5¢
63 G 6 888 ... Diameter, 1 inch hole, 10¢; per portable sets 5¢
63 G 6 889 ... Diameter, ¾ inch Postage, 4¢ extra

Bezel Cutter
Cuts clean true bezel holes through rubber or bakelite panels up to ½ inch thick.

63 G 6 888 ... Cuts ¾ inch hole Postage, 3¢ extra
63 G 6 889 ... Cuts 1½ inch hole Postage, 7¢

Tinfoil
You can make your own radiator for your radio set by using this tinfoil. It can be obtained at a small quantity store. Also has many other uses such as for shielding. In sheets, size 6½ by 8½ inches. Approximately 1½ oz. per sheet.

63 R 5 680 ... Per pound, 2¢ extra

Sheet Mica
Used as non-conducting insulator for fixed condensers. Clean, firm sheets. Also available to have a supply in your radio tool kit.

<table>
<thead>
<tr>
<th>Article Number</th>
<th>Size, Inches</th>
<th>Dozen Sheets</th>
<th>Postage, per mad.</th>
<th>Extra</th>
<th>Postage, per mad.</th>
</tr>
</thead>
<tbody>
<tr>
<td>86 R 6 2699</td>
<td>1½ by 3</td>
<td>S 21</td>
<td>2¢</td>
<td></td>
<td>2¢ extra</td>
</tr>
<tr>
<td>86 R 6 2700</td>
<td>½ by 5</td>
<td>S 34</td>
<td>4¢</td>
<td></td>
<td>4¢ extra</td>
</tr>
<tr>
<td>86 R 6 2701</td>
<td>3½ by 5</td>
<td>S 50</td>
<td>6¢</td>
<td></td>
<td>6¢ extra</td>
</tr>
</tbody>
</table>

For Better Radio Connections Use An Electric Soldering Iron
For anyone who owns a radio set should have this convenient Electric Soldering Iron.

Simply connect to the electric light socket, allow it to heat a few minutes and it is ready for work—no running back and forth to the stove; no trouble from the iron getting cold in the middle of a job. You will be surprised how much better and neater joints you can make and how quickly the job is done with this electric soldering iron.

It is full sized and well made with durable heating element. The solid copper tips are the right convenient size and shape for radio work and for use around the house. Non-insulated or direct current (any city lighting current). Complete with about 5 foot cord and attaching plug. Small size, with ¼-inch copper tips.

63 R 5 850 ... Postage, 10¢ extra

Iron Set Screws
A handy accessory that every radio owner should have. Size, 6-32. For fastening diodes to shafts.

63 R 6 887 ... ⅛ inch long. Per dozen 1¢
63 R 6 888 ... ⅜ inch long. Per dozen 1¢
63 R 6 889 ... ½ inch long. Per dozen 1¢
63 R 6 890 ... ¾ inch long. Per dozen 1¢

Postage, per dozen, 1¢ extra

Do Faster, Neater Work With An Electric Drill

Cuts Fast Clean and True
For Home or Shop Use

Small and compact enough to be handy on all jobs, but strong enough to be the hardest kind of drill work. For use wherever there is need of drilling holes up to ⅛ inch. Self-starting, and the switch built into pistol grip makes current control easy and positive. Series wound, universal motor operated from any alternating or direct current. Actual weight only five pounds. Ship. weight, 5 pounds.

63 R 5 580 ... 17.95
63 R 5 581 ... Set of attachments for above drill consisting of 2-inch eyewheel, steel wire brush, about ⅜ inches in diameter, cutter for fastening drill to work bench and wrench. Shipweight, 12 pounds ... 4.35

Fanhnestock Connector
May be fastened to binding post or wire. Connecting wire instantly attaches any fanhnestock to make a triode connection by pushing down spring clip. 1 length, 1 inch.

63 R 5 561 ... Per 200 17¢

Postage, per dozen, 3¢ extra

Double Fanhnestock
A device for making connections between two or more tubes. Wires are held firmly in spring grip, but may be instantly removed. About 2 inches long.

63 R 5 5608 ... Per dozen 39¢

Postage, per dozen, 4¢ extra

Upright Fanhnestock
Machine screw in base to mount on panel or board. By removing screw they may be fastened to binding posts or cells to secure tight connections. Lathe turned.

63 R 5 6622 ... Per dozen 34¢

Postage, per dozen, 4¢ extra

Copper Lugs
Prevent leakage of current and secure better results from your set by using these lugs at connections. Fill on make-up screws.

<table>
<thead>
<tr>
<th>Article Number</th>
<th>Fitting</th>
<th>Screws per</th>
<th>Postage, per dozen,</th>
<th>Per Gross</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 6 6982</td>
<td>1 inch</td>
<td>4-32</td>
<td>7¢</td>
<td>60¢</td>
</tr>
<tr>
<td>63 6 6983</td>
<td>3 inch</td>
<td>4-32</td>
<td>7¢</td>
<td>60¢</td>
</tr>
<tr>
<td>63 6 6984</td>
<td>6 inch</td>
<td>4-32</td>
<td>6¢</td>
<td>56¢</td>
</tr>
</tbody>
</table>

Screw Assortment
A complete assortment of wood screws for attaching to baseboards or cabinets. Brass, copper, and solid brass washers, and nuts for the man who owns a radio set and does his own repairs. You can readily get the right size and style you need when making a change in connecting or repairing your set. A handy assortment to have about the house at all times.

63 R 5 6639 ... Postage, 4¢ extra

Oval Head Screws
About four dozen nickel plated, oval head wood screws in convenient sizes for attaching to baseboards or cabinets.

63 R 5 579 ... Postage, 4¢ extra

Machine Screws
Brass, with accurately cut threads. The terms 6-32, 8-32 and 10-32 mean 6, 8 and 10 wire screws with 32 threads to the inch. Sold only in lots of a dozen. Sizes are: 6, 8, ⅜ inch and 10, ⅜ inch.

<table>
<thead>
<tr>
<th>Length</th>
<th>Article Number</th>
<th>Per Doz.</th>
<th>Postage, per dozen,</th>
<th>Per Gross</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-32 Roundhead</td>
<td>8-32 Roundhead</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>⅛ inch</td>
<td>63 G 6 691</td>
<td>12¢</td>
<td>7¢</td>
<td>60¢</td>
</tr>
<tr>
<td>⅜ inch</td>
<td>63 G 6 692</td>
<td>16¢</td>
<td>7¢</td>
<td>60¢</td>
</tr>
<tr>
<td>½ inch</td>
<td>63 G 6 693</td>
<td>13¢</td>
<td>7¢</td>
<td>60¢</td>
</tr>
<tr>
<td>⅜ inch</td>
<td>63 G 6 694</td>
<td>15¢</td>
<td>7¢</td>
<td>60¢</td>
</tr>
</tbody>
</table>

63 R 5 6621 ... 12¢

8-32 Flathead

[Table continued]

Threading Brass Rod
A high quality, cut with clean, accurate threads. Sold only in three 8-inch lengths.

63 R 6 860 ... 3-4-5 Groove 20¢

Postage, per doz, 1¢ extra

Brass Washers
63 R 6 863 ... Size 3-4-5 Groove 18¢

63 R 6 864 ... Size 6-8-10 Groove 23¢

63 R 6 865 ... Size 8-12 Groove 25¢

Postage, 3 lengths, 4¢ extra

Solid Brass Rod (Round)
To be used for lugs, shunt, socket, or vario- couplers, etc. You will find a few lengths of the various sizes of brass rod very handy, around your workshop. About 1 inch long in three lengths.

63 R 6 880 ... Size 6. Three lengths 15¢

63 R 6 883 ... ½ inch. Three lengths 17¢

63 R 6 885 ... ⅜ inch. Three lengths 20¢

63 R 6 884 ... ⅜ inch. Three lengths 30¢

Postage, 3 lengths, 4¢ extra

Montgomery Ward Co. Attractive Radio Desks are shown on Pages 66 and 67
How to Build the Set You Want

33c How to Make a Neutrodyn

The Neutrodyn is one of the most successful of the new radio sets, and it is suitable for the construction of a certain number of station sets. A thorough study of the operation of the set will prove that a good result can be obtained with this set. The instructions in this catalogue are based on the Neutrodyn set, and they will prove very satisfactory for building this set.

How to Make Your Own Radio Set

More advanced amateurs who prefer to select their own parts and build their own sets can find in your Radio Instruction Plan for building this set. The instructions in this catalogue are based on the Neutrodyn set, and they will prove very satisfactory for building this set.

How to Make a Cockade Set

Contains instructions, diagrams, blueprints and lists of materials for building the Cockade Set for the Cockade Set. This circuit has been used for some time, and it gives very satisfactory results. The instructions in this catalogue are based on the Cockade Set, and they will prove very satisfactory for building this set.

How to Build a Crystal Set

Especially designed for those persons without technical knowledge of radio circuits, diagrams, photographs and blue prints. This circuit has been used for some time, and it gives very satisfactory results. Standard parts are used in this circuit, and they will prove very satisfactory for building this set.

The Radio Constructor

Pamphlet giving blueprint, diagrams, notes and instructions on how to build and wire various popular sets. Included with each pamphlet is a list of parts necessary for the construction of the different sets. The instructions are thoroughly explained and easy to follow.

Description of Contents

Trouble chart, circuit diagrams, labels, instructions.


24 Radiophone Diagrams

Consists of twenty-four Blueprint Diagrams, 8½ by 11 inches, and one 4-page Detailed Circuit Diagram containing Complete Symbol Key Chart, directions on how to read Diagrams. The following are included:


Parts Made Specially for Set 63 R 6340

63 W 3632—Primary Inductance Tube for use with above set. Diameter, 4½ inches; length, 5½ inches; 1½ lbs. 63 P 424. 63 R 6333—Tie tube to 1½ in., 2½ lbs. 63 R 6334—No. 23 Wire, green silk covered, for above set. 4 oz. 63 P 224. 63 R 6335—Brass Bearings with nuts, 8 oz. 63 P 234. 63 R 6149—Postage, 4c extra

All About Aerials

A properly constructed aerial is of greatest importance for good results from your radio set. We have developed a set of aerials that are suitable for any of the practical and efficient aerials. Among these aerials you will be able to find the one you need.

Ward's "B" Batteries insure loud, clear signals. See Page 39

How to Make an Ultradyn

Complete instructions, diagrams, blueprints and lists of parts necessary for building the Ultradyn set. A recently developed 6-tube superhet set which is very easy to build. This set has been used for some time, and it gives very satisfactory results. Instructions in one volume, and you will be able to build this set.

Popular Radio Circuits

Gives plans for full-size panel in instructions and complete instructions.

63 R 6324—Postage, 4c extra

Radio Formulas and Diagrams

This packet contains four different sets of radio formulas and diagrams, covering schematics, vacuum tube charts, measurements and radio tables. Not intended for beginners, but especially valuable for experienced radio men, engineers and experimenters.

63 R 6150—Postage, 4c extra

How to Make an Autoplex

Complete set of plans, instructions, blueprints and lists of parts necessary for building the Autoplex Set. This circuit has been used for some time, and it gives very satisfactory results. The instructions in this catalogue are based on the Autoplex Set, and they will prove very satisfactory for building this set.

63 R 6151—Postage, 4c extra

How to Build a Crystal Set

Especially designed for those persons who have no technical knowledge of radio circuits, diagrams, photographs and blue prints. This circuit has been used for some time, and it gives very satisfactory results. Standard parts are used in this circuit, and they will prove very satisfactory for building this set.

63 R 6152—Postage, 4c extra

Ward's "B" Batteries insuure loud, clear signals. See Page 39
Learn More About Radio

Radio Simplified
What It Is—How to Build and Operate the Apparatus

By A. H. Hyatt Verrill

A splendid guide to helping amateur radio operators understand radio telephone and telegraphy. Teaches the function of the receiving station, the operator's part, and the apparatus used. Also gives full instructions for building and installing sets. Cloth bound, 5% by 7% inches; 232 pages; 106 illustrations. 57 R 3594

Postage, 6¢ extra

Radio for the Amateur

Simple—Thorough—Practical

By A. H. Packer and R. R. Haughey

Everything you need to know to build a radio set or to own one, or are at all interested in the subject, you should read this very instructive book. It explains simply and thoroughly all about the fascinating science of radio—why it works as it does, how to locate the cause when your set gives trouble, and how to build your own equipment and have it work successfully. Tells what part electricity or magnetism plays in radio, what wave lengths are and how they are picked up when coming from a distance; describes the different parts and tells the results they give. Cloth bound, 5% by 7% inches; 207 pages; 71 good, helpful illustrations that you will appreciate. 57 R 3590

Postage, 6¢ extra

Radio for Amateurs

By C. R. Smith

A new Book of practical, up-to-date receivers and radio transmitting apparatus, with complete electrical design. Simple enough for the beginner, yet detailed enough for the more advanced experimenter to appreciate it. Paper bound, 5% by 7% inches; 271 pages; 244 illustrations. 57 R 3595

Postage, 6¢ extra

Radio Telephony for Amateurs

By A. C. Lescarbour, A. C. Lescarbour, A. C. Lescarbour

A splendid book about radio, including parts and wiring diagrams of various kinds. With principles simply explained, wiring diagrams and detailed specifications. Cloth bound, 5% by 7% inches; 150 pages; 135 illustrations. 57 R 3596

Postage, 6¢ extra

Experimental Wireless Communication

By Philip E. Edelman

A remarkably fine book for those who have a bare knowledge of the principles of electricity and mathematics. Not only tells how to make simple and effective wireless electrical and telegraphic radio messages, starting with simple crystal detector set and government to the most sophisticated receiving station. Paper bound, 5% by 7% inches; 67 pages; 80 diagrams. 57 R 4028

Postage, 6¢ extra

How to Make Radio-Phone Receiving Set

By R. L. Lescarbour

Written for beginners and laymen who know of electricity and wireless and are illiterate. Complete, simple instructions for building the receiver and operating it. A splendid book to have before you. Cloth bound, 5% by 7% inches; 125 pages; well illustrated. 57 R 3589

Postage, 6¢ extra

The Home Radio

By A. C. Lescarbour

A splendid guide to helping amateur radio operators understand radio telephone and telegraphy. Teaches the function of the receiving station, the operator's part, and the apparatus used. Also gives full instructions for building and installing sets. Cloth bound, 5% by 7% inches; 232 pages; 106 illustrations. 57 R 3594

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Postage, 6¢ extra

The Book of Radio

By C. R. Smith

A splendid guide to helping amateur radio operators understand radio telephone and telegraphy. Teaches the function of the receiving station, the operator's part, and the apparatus used. Also gives full instructions for building and installing sets. Cloth bound, 5% by 7% inches; 232 pages; 106 illustrations. 57 R 3594

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Postage, 6¢ extra
Fine Quality Transmitting Accessories

All meters are fine quality precision instruments made by the Jewell Electrical Instrument Co. and have genuine supplied by Ward's. For flush panel mounting. Two sizes of the instrument are supplied. We carry in stock and can make prompt shipments on meters with the calibrations more commonly used.

We can also supply meters of any other calibration within ten days after receipt of order. All meters have black encased ranges with white faces and accurate scales, marked by very plain figures. The other equipment and accessories listed equal high quality, and our prices will give you a substantial saving.

Direct Current Ammeters

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Flange diameter, 3/4 inch; case diameter, 3 inches.</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 R 7140</td>
<td>0-15 amperes.</td>
</tr>
<tr>
<td>63 R 7141</td>
<td>0-5 amperes.</td>
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</tbody>
</table>

Pattern 33

<table>
<thead>
<tr>
<th>Flange diameter, 3/4 inch; case diameter, 2 1/2 inches.</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 R 7146</td>
</tr>
</tbody>
</table>

Postage, 10¢ extra

Direct Current Milliampere Meters

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Flange diameter, 3/4 inch; case diameter, 3 inches.</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 R 7150</td>
<td>0-10 milliamperes.</td>
</tr>
<tr>
<td>63 R 7151</td>
<td>0-50 milliamperes.</td>
</tr>
<tr>
<td>63 R 7152</td>
<td>0-300 milliamperes.</td>
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</tbody>
</table>

Pattern 33

<table>
<thead>
<tr>
<th>Flange diameter, 3/4 inch; case diameter, 2 1/2 inches.</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 R 7160</td>
</tr>
<tr>
<td>63 R 7161</td>
</tr>
<tr>
<td>63 R 7162</td>
</tr>
</tbody>
</table>

Postage, 10¢ extra

Direct Current Voltmeters

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Flange diameter, 3/4 inch; case diameter, 3 inches.</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 R 7150</td>
<td>0-10 volts.</td>
</tr>
<tr>
<td>63 R 7151</td>
<td>0-50 volts.</td>
</tr>
<tr>
<td>63 R 7152</td>
<td>0-300 volts.</td>
</tr>
</tbody>
</table>

Pattern 33

<table>
<thead>
<tr>
<th>Flange diameter, 3/4 inch; case diameter, 2 1/2 inches.</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 R 7160</td>
</tr>
<tr>
<td>63 R 7161</td>
</tr>
<tr>
<td>63 R 7162</td>
</tr>
</tbody>
</table>

Postage, 10¢ extra

C.W. Coil

A rugged, dependable and efficient C.W. Inductance. Taps are brought out at each turn in the form of studs fastened to the wire. Five insulated terminals for fastening to connecting wires are supplied. Five separate connections may be made on the inductance, each one capable of being varied; one turn at a time while the tubes are in operation.

$5.85

Radio Phone


63 R 7011 $5.85

Postage, 8¢ extra

Our Special Power Tube Rheostat

A well designed, moderately priced rheostat of 5 ampere capacity and 1 1/2 ohms resistance. Base will stand heat up to 900 degrees Fahrenheit. Can be mounted on panels up to 1/8 inch thick.

63 R 7197 Postage, 6¢ extra

89¢

Transmitting Grid Leak

Necessary in tube transmitting circuits. May be shunted across grid condensers of oscillating tubes, they limit the potential of the grid and thus control the output to the antenna and also the character of the antenna oscillations. Resistance element contained in a heat resistant tube that will withstand sudden and extreme changes in temperature. Metal terminals for connection. Resistance, 2000 ohms with center tap at 2500 ohms. For use with 6-watt transmitting tubes. Size, 3 x 5 inches.

63 R 7024 Postage, 6¢ extra

$1.10

Thordarson Special Transformer

Designed to handle one 5-watt tube. Wiring diagrams are supplied with each transformer, with show box and some voltage readings. Results can be obtained on either C.W. telephony or telegraphy. For stations where a range of only 50 or 100 miles is required, this transformer, with the other necessary accessories, can be built into a very effective unit at a low cost. Plate voltage, 600 volts; filament voltage, 10 volts. Built shell type, unmounted only, with complete wire analogue construction, the coils being so arranged as to give the best operation.

63 R 7075 Postage, 14¢ extra

$6.90

Radio Frequency Ammeters

A radio frequency Ammeter in the antenna is a necessity to properly control the operation of a C.W. tube set. This meter is a high class instrument of the thermo-couple type. An adjusting-screw permits any correction for shift of the instrument due to room temperature. This type of instrument is equally accurate on direct or alternating currents of any frequency.

63 R 7180 $0.15 amperes. $11.22

63 R 7182 $0.50 amperes. $11.22

63 R 7183 $1.00 amperes. $11.22

Postage, 10¢ extra

Alternating Current Voltmeters and Ammeters

Pattern 74. Very accurate, steady readings. Flange diameter, 3/4 inch; case diameter, 3 1/2 inches.

63 R 7190 0-30 volts. $7.20

63 R 7191 0-60 volts. $7.20

Postage, 10¢ extra

Standard Radio Key

A heavy type of Radio Key designed for larger capacity radio work. The arm, base, and supporting frame are made of heavy cast brass, and the key is of rugged construction, so it will stand up well under heavy usage. The contact points are large which assists materially in the dissipation of the heat produced. They are made of a metal which will resist arcing. The lower contact point is well insulated from the base and connected to the binding post by a heavy insulated wire.

63 R 5352 Postage, 6¢ extra

$2.48

Amateur Telegraph Sets

An excellent set for code practice when connected singly with a dry cell. Can also be connected with another similar set and used for short distance transmitting. The 500 ohm set may be used on lines between farms. Consists of a standard telegraph key and sounder mounted on a polished base and connected with three binding posts so it may either be hooked up singly or circuit with another set. Price includes manual of Morse code and instructions for telegraphing.

63 R 1713 With 200-ohm sounder. $2.65

63 R 1721 With 100-ohm sounder. $2.98

Postage, 9¢ extra

Steel Lever Keys

Railroad type Key with steel lever. Switch strap and lever heavily nickel plated. Heavy brass base of skeleton type on the bottom on which is mounted set of buttons. Good for desk or table. Can be had without keys.

63 R 1739 Key with screw legs to go through table or desk. $1.69

63 R 1731 Key without screw legs on top of desk. Postage, 6¢ extra

Postage, 9¢ extra

Aerial Change Over Switch

A neat, compact Switch for stations doing transmitting and receiving. Enables you to instantly change from receiving to transmitting and vice versa. Throwing the switch into the sending position closes the power circuit and the antenna, circuit and the receiving circuit, cut off from the transmitting side. Changing the switch to the receiving position shuts off the power, drafts the antenna and finally closes the receiving circuit. Base and support of formica. Metal parts satin nickel finish. Binding posts for all connections. Large knob makes operation easy. Length, 3 inches wide, 1/4 inches.

63 R 7052 Postage, 8¢ extra

$5.25
Standard Transmission Apparatus

A Few Words to the Amateur

It is not necessary to pay high prices for transmission apparatus. At Ward's you can save considerable on the purchase of nationally advertised first quality merchandise. Many of us here are amateurs and ex-amateurs and are deeply interested in the welfare of the amateur and experimenter. Our aim in this catalogue has been to secure for you better merchandise at lower prices—the kind of merchandise we would be proud to have in our own stations.

You will find such well known brands as Acme, Radio Corporation, Thordarson, Jewell, etc. Most of this apparatus is sufficiently well known to require no comment whatever. A close inspection of the prices will indicate the savings made possible by dealing with Ward's. We invite you to make your headquarters for transmission apparatus.

Acme Choke Coils

1 1/2 Henrys

The Acme Choke Coil is used to smooth out the pulsations in the direct current supply to keep a constant current and when modulation or for pure C.W. These coils have a soft iron core wound with copper wire of proper gauge so as to prevent the high frequency waves from passing through the power supply. Recent results are obtained with a coil in each side of the line. The double coil is used for this purpose. Size, 3 1/2 inches high, 3/4 inches wide, and 2 1/2 inches deep.

Porcelain Transmitting Socket

A porcelain socket designed especially for use with a 5-watt tube for the transmitting station. This socket has the new type of screw grips, and is practically eliminated due to the high grade porcelain used. The contacts are far enough apart to prevent the current from crossing. The socket is highly glazed and the binding posts are plainly marked. A set of these sockets would also be a good addition to any receiving set. An exceptionally high grade socket at a low price.

Beginners' Wireless Practice Set

Anyone learning wireless telegraph transmission should have this practice set. Suggested for use in the Wireless Practice Set and see how easy it is to learn. This set consists of a key and buzzer mounted on a polished wood base. Buzzer reproduces accurately the high-pitched sounds of wireless code stations. Connect a dry battery to the binding posts on the set by means of a short piece of wire; press the key and a buzzing sound will be produced. In a very short time your ear will become accustomed to the various combinations of dots and dashes representing different letters and numbers. Practice until you can understand all the speed sent by average stations, and you have completed the most difficult part of wireless telegraphy. Chart included with each set. Base size, 7 inches long by 4 1/2 inches wide.

Radio Motor Generator

A direct coupled Generator of superior construction especially designed to supply plate circuit current for transmitting tubes. The motor is of standard make, and will stand up well under heavy operation. The set is of very rugged four-bearing construction and will deliver rated capacities on continuous run. Connect it up with power circuit and it will deliver current of the proper voltage and amperage. The motor supplied is for standard 110-volt 60-cycle alternating current, but sets with motor for any current can be made to order.

The Radio Dynamo for Low Power Transmission

To Operate from 32-Volt Direct Current

This combination Motor and Generator makes an ideal unit for the small, short range transmitting set where source of electrical power is of low voltage. The Dynamoator operates from any 32-volt farm electric plant, or from any direct current source of 32 volts direct current without delivering 32 volts. This generator connected to a 32-volt current produces 500 volts, 75 watts, which will take care of four 5-watt tubes, either as oscillators or power amplifiers. The proper combination of this generator can be built up into a transmitting set having a radio-phone range of 200 miles and upward. The circuit combination puts it within the reach of those who would like to operate a small transmitting station without the high cost and the long time that have been required of high quality. Shipping weight, 45 pounds. Shipped from factory in Chicago. Allow 15 days for shipment to be made.

To Operate from a 6-Volt Battery

This Dynamoator is a very simple in construction to the filament current used in C.W. It is truly a storage battery. The coil unit and the high voltage current obtained from the current output of the Dynamoator is also used on the automobile, in motor boat, or in the station. Very rugged and durable in construction, and is entirely closed in. Delivers 350 volts, and 15 1/2 amperes, which will handle one 5-watt tube very nicely. With proper accessories, a transmitting set using this Dynamoator should have a range of 100 miles and up. Shipping weight, 30 pounds. Shipped from factory in Chicago. Allow 15 days for shipment to be made.

Transmitting Tubes at money saving prices are shown on Page 37

Montgomery Wards Co.
Last Minute Specials

**Tuned Radio Frequency Coil**

A new and improved design in Tuned Radio Frequency Transformers. Consists of diamond wound coupled primary and secondary coil wound on a rigid fiber tube. Windings of green silk covered wire. Coil has metal bracket for mounting on base board or variable condenser. Bracket is bent so coil mounts at the proper angle. Lugs for easy connection to the set. To be used in tuned and balanced radio frequency circuits.

- **Price:** $0.98
- **Postage:** 6c extra

**Reduced prices on Genuine Cunningham Vacuum Tubes. See Pages 36 and 37.**

**New Style Loud Speaker**

**Special Low Price**

The new and improved design is specially designed for loud speaker use and gives plenty of volume with a clearness and sweetness of tone that is surprising. The small size of the horn construction is very in appearance. At this time all radio owner can afford to be without one or more of these handy, new style speakers.

- **Price:** $7.95
- **Postage:** 6c extra

**Improved Radio Plug**

A new and improved design. Provides positive connection for both horizontal and vertical mounting. Simply thread phone cord through large hole in plug in bottom of plug and insert plug in holes. Can not pull out. Made in nickel plated finish. Mount on any panel up to 3/16 inch thick. Made only in open and double circuit type.

- **Price:** $0.34
- **Postage:** 6c extra

**Easy Soldr Radio Jacks**

New Radio Jacks designed for convenience in soldering: Connections are arranged to allow plenty of room for soldering and lugs do not interfere with each other. Jacks are strongly constructed and of neat appearance. Heavy springs insure positive contact. Mount on panel up to 1/4 inch thick.

- **Price:** $0.27
- **Postage:** 6c extra

**Battery Connecting Leads**

Flexible connecting wire with lugs and lead covered clips. Complete with extra cord and plug for attaching to 120 volt 60-cycle alternating circuits. This special 10c price offer. Not for "A" Battery.

- **Price:** $0.69
- **Postage:** 6c extra

**Rubber Head Set Cushions**

Soft rubber head set cushions for comfort and style. Includes all external ear sets. Fit all makes and models.

- **Price:** $0.42
- **Postage:** 6c extra

**Solderless Radio Jacks**

Single Circuit

34c

- **Price:** $0.29
- **Postage:** 6c extra

**Two Low Capacity Condensers**

A set of three tuned radio frequency transformers and two low capacity condensers to be used in any make of radio. Condensers wound with cloth covered wire. Suitable for use in any model at any time. A set of five parts.

- **Price:** $0.95
- **Postage:** 6c extra

**How to Build the**

- **Harkness Reflex Set**

- **Price:** $1.85
- **Postage:** 6c extra

**Storage "B" Battery Charger**

A vibrating "B" Battery Charger at a great saving. Specially designed for charging storage "B" batteries. Charge 24 or 48-volt batteries at a rate of about 200 milliamperes. Practically silent in operation and current consumption is very low. Indicator shows if battery is charging properly. Has long rugged connecting leads with lead covered clips attached. Complete with extra cord and plug for attaching to 120 volt 60-cycle alternating current. This special 10c price offer. Not for "A" Batteries.

- **Price:** $0.795
- **Postage:** 18c extra

**Rubber Head Set Cushions**

Soft rubber head set cushions for comfort and style. Includes all external ear sets. Fit all makes and models.

- **Price:** $0.42
- **Postage:** 6c extra

**Furnished with the set is turn-off, A B."**

**Harkness Reflex Set**

- **Price:** $1.85
- **Postage:** 6c extra

**Improved Radio Plug**

A new and improved design. Provides positive connection for both horizontal and vertical mounting. Simply thread phone cord through large hole in plug in bottom of plug and insert plug in holes. Can not pull out. Made in nickel plated finish. Mount on any panel up to 3/16 inch thick. Made only in open and double circuit type.

- **Price:** $0.34
- **Postage:** 6c extra

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**Harkness Reflex Set**

- **Price:** $1.85
- **Postage:** 6c extra
It Is Easy to Order from This Radio Catalogue

It will take you only a few minutes to make out your order. We have enclosed an order blank for your convenience, or you may use any plain sheet of paper if you so desire.

How to Order

Go through this catalogue, select the articles you want and write out the following information:

1. State article number of each item, quantity desired, name of article, size and other information according to merchandise ordered.

2. State the exact amount of money sent us with your order. Send remittance in the form of postoffice or express money order, bank draft or personal check. If cash, send by registered mail, securely folded in heavy paper.

3. Be sure to give complete shipping instructions. There are three methods of transportation—parcel post, freight and express.

Ward's Simplifies Freight and Postage

If you want your order shipped by parcel post send additional amount for transportation. You will notice that on most of the articles shown in this catalogue we tell you just what amount to send for postage so that it is not necessary for you to figure it out.

When you wish your order shipped by freight and there is a freight agent at your station, you need not send money for transportation charges. We will ship the goods and you pay the freight charges to the agent when you receive them. If there is no freight agent at your station, however, you should send additional money for freight charges.

When your order is to be shipped by express and there is no express agent at your town or station you should give us the name of the town nearest you where there is an express agent. You pay him the express charges when the goods reach you.

How to Figure Freight Rates

To help you estimate the freight charges on larger sets, we include below under “Estimated Total Freight Charges,” the approximate cost of shipping sets of various weights by freight for distances of 150 miles, 300 miles and 500 miles. We also give express charges in the same way for smaller shipments. This table will give you a good idea of what your total shipping charges will be if your order is to be sent by freight or express. If you live within 150 miles you will understand that your charges would be somewhat less than the 150 mile estimate; if you live between 150 and 300 miles, your amount will be somewhere between the two amounts shown for the two distances, and so on.

<table>
<thead>
<tr>
<th>Ship Wt</th>
<th>150 Miles</th>
<th>300 Miles</th>
<th>500 Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 pounds</td>
<td>$ .65</td>
<td>$.85</td>
<td>$1.16</td>
</tr>
<tr>
<td>150 pounds</td>
<td>$1.00</td>
<td>$1.25</td>
<td>$1.77</td>
</tr>
<tr>
<td>200 pounds</td>
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<tr>
<td>250 pounds</td>
<td>$1.65</td>
<td>$2.15</td>
<td>$2.90</td>
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Estimated Total Express Charges

<table>
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<tr>
<th>Ship Wt</th>
<th>150 Miles</th>
<th>300 Miles</th>
<th>500 Miles</th>
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</thead>
<tbody>
<tr>
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<tr>
<td>100 pounds</td>
<td>$2.39</td>
<td>$2.97</td>
<td>$3.97</td>
</tr>
</tbody>
</table>

How to Send Goods to Us

1. To return by parcel post, pack securely in heavy paper and tie with a strong tape. Address the package to us and write your name and address on it. Write a letter telling why goods are returned and that we are to do. Enclose this letter in an addressed envelope. Seal the envelope and paste it on the package under the heading, as shown in the diagram. Do not seal the package. Place a two-cent stamp on the envelope to satisfy post-office regulations.

2. To return goods by express or freight, be sure that your name and address are on the package. Do not put the goods in a crate. Enclose the agent's receipt in your letter and mail it to us.

3. If the merchandise is shipped to you direct from one of our factories, be sure to write us for shipping instructions before returning.
Radio Cabinets

Radio Cabinet Desk
A Tudor design Radio Cabinet Desk that will harmonize with any other furniture in your living room. Built with furniture cabinet makers and finished in a rich Mahogany. Everything about this cabinet suggests refinement and good taste. An attractive two-tone finish enriches the beauty of the doors of the cabinet which conceal the entire set from view. Just below the top is a small drawer for tools and wire so you have them handy while making adjustments or alterations of your radio set. The large compartment below has sufficient space to hold any radio set including the neotrode.

There is also space for the "A" and "B" batteries and battery charger. The Mahogany finish of the cabinet is hand rubbed to a rich dull finish. Size of the top is 16 by 30 inches. Entire height, 30 inches. This makes a very convenient height for using the cabinet as a desk or table when the set is not in use. Your radio set in this cabinet will add as much beauty to your living room as any piece of high grade furniture. Shipped packed apart ready to set up, Shipping weight, 50 pounds. 163 R 6906 $14.95

A Beautiful Radio Cabinet
A handsome combination Cabinet in which you can build your radio set and also enclose the "B" batteries. Beautifully designed in dark imitation mahogany. Access to the set is through removable rear panels now in use. Finished in a dark imitation mahogany, hand rubbed to a beautiful finish. Very attractive in appearance, it matches especially well with the furnishments of any room in the house. Matches especially well with the grained desk listed at Left.

Knocked Down Radio Cabinet
Save money on a good Radio Cabinet. These cabinets can be put together in a fury without any tool. Made of good quality wood selected for strength and even grain, sanded smooth but not stained or varnished. A screwdriver is the only tool necessary. When finished as an attractive setting for your set.

Standard Cabinet
These standard Cabinets are recommended for those who build their own radio set. In sizes that will take all the standards now in use. Finished in a dark imitation mahogany, hand rubbed to a beautiful finish. Very attractive in appearance, it matches especially well with the furnishments of any room in the house. Matches well with the grained desk listed at Left.

Radio Cabinet
With Built-in Loud Speaker
Our newest and most popular Radio Cabinet. Designed to harmonize with your present furniture. An attractive cabinet of convenient size to use in almost any corner or small wall space. This cabinet is especially designed to be a convenient piece of furniture for your living room. Everything is concealed from view—no unsightly battery on your floor or loose wires exposed. The lower compartment is large enough to contain storage battery, "B" batteries and battery charger. A clear tone quality is provided by the unit and the set is built inside the cabinet. This built-in feature assures you of unusual reproduction and exceptional clearness of tone. The built-in horn is shown above.

Size of top is 13½ by 20 inches. Has two 5-inch leaves hinged to sides making a total width at top of 30 inches. Entire cabinet 30 inches high. The panels are beautifully grained Mahogany. Veneer finished in a rich dull rubberized. If you plan on building a good radio set you will want this attractive and serviceable cabinet. It provides a neat and convenient place for batteries and also accessories. Sound chamber and compartments are all protected from doors. Shipping weight, about 70 pounds. 163 R 6667 $29.95

Radio Cabinet
With Built-in Horn
After you have completed your radio set, put it in one of these Cabinets. They will give your set the appearance of being a work of a master cabinet. You can set your friends will admire and you will be proud to show it to them when they come to "listen in."

New Design Cabinet
A combined Loud Speaker and Cabinet. The entire bottom compontent supports the radio speakers and cabinet. Makes your radio set dothout the usual stand. A cabinet of solid Oak finished Silver Gray. Does not mar easily nor show finger marks. The loud speaker unit takes the place of a separate loud speaker, and gives you the same results.

One of the outstanding features of this cabinet is its combination loud speaker. It takes the place of a separate loud speaker and gives you the same results.

Finished in hard rubbed solid mahogany. Low part of the cabinet contains the loud speaker horn. The end of the loud speaker is covered with a silk screen which adds richness to the cabinet. A clip suitable for attaching a loud speaker unit such as the Baldwin is included. No extra cost.

563 R 6669 Takes panel, 7 by 21 in. $11.95
563 R 6621 Takes panel, 6 by 24 in. $12.95
563 R 6623 Takes panel, 7 by 26 in. $13.83
Postage, 5¢ extra

Radio Desk
A Radio Desk designed and built by one of the foremost furniture manufacturers in the country. It will appeal particularly to the radio enthusiast who has its own radio room and needs a desk as well as a place to put the radio. Has compartments on both sides large enough to hold either batteries, battery charger and phones. In planning and building the desk no detail has been overlooked to make the finest type of radio desk cabinet as well as a beautiful piece of furniture. Finished in an Adam brown, imitation mahogany. It is almost the color of walnut yet has the deep rich coloring of a shade. Height, 33 inches; length, 40 inches. Shipping weight, 60 pounds. Not available. 163 R 6840 $19.95

Consol Style Cabinet
Atractive Mahogany finished console model Radio Cabinet, as beautifully finished as any piece of furniture, can be built into compartment. Takes 7 by 33-inch panel or smaller panel can be used by blocking out any part. From 1 inch to 3 inches deep. Left side is large enough to hold "A" battery. Right side is large enough to hold "B" batteries and head set. Size, over all, 36 inches wide by 39 inches high and 14 inches deep. Bottom compartments are 16 inches wide by 12 inches high. Besides being an attractive and compactly arranged cabinet this is a very useful piece of furniture. Shipping weight, 60 pounds. 163 R 6878 $33.50

Radio Table
A Table that has been designed particularly for radio users, but can be used in other places equally well. The top is large enough to accommodate the largest set and the shelf below provides a place for the batteries and charger. Construction is built, well finished and will hold the heaviest radio set.

A substantially construction of hardwood and finished in Mahogany, hand rubbed to a rich dull finish. This beautiful table will match up well in any room and finish to the best furniture in your home. Small drawer furnishes a handy place for your tools, 7 by 15 inches. Height, 38 inches. Shipping weight, 4 pounds. 563 R 6805 $6.95

See Index and How to Order Instructions on Page 65

It is easy to build your own radio set with Ward's parts. Page 23 Montgomery Ward & Co.
Build Your Radio Set In a Cabinet Worthy of Your Best Room

For Descriptions See Opposite Page

Montgomery Ward & Co.
Chicago Kansas City St. Paul
Portland, Ore. Oakland, Calif. Fort Worth
You Are Never Alone When You Have A Radio Set In Your Home

"LISTEN in" and enjoy all the entertaining and instructive Radio programs which fill the air, and let radio keep you in touch with world events. This is what a ranchman's wife of the Northwest, writing to Farm Life, recently said: "I wonder if anyone living in the city or a thickly settled farming community can realize what radio means out on the windswept prairies, far from the town and neighbors. The summers are not so bad, as we have an automobile and miles make little difference to a swift running car; but when the winter's cold and storms have shut us in, it has been lonely beyond description. I have sometimes felt that I could not stay here in winter; but since installing our radio set the loneliness has gone and we seem to be living at the center of the world. "What manner miles of silent prairie covered with ice and snow when at night radio brings the world to our door? Great orators speak to us. Famous singers sing for us. Bands and orchestras and entertainers are ours without ticket or fee; and if any program becomes tiresome, we have an advantage over the theatergoer, for we can leave without disturbing the audience and attend another program perhaps 1000 miles farther on. "We look over the program of the coming events furnished by the principal broadcasting stations, and discuss what program we will attend just as the city dweller looks over the theater advertisements in the daily papers; but we do not have to buy a ticket or leave our home. At the market hour we get the stock markets. At the weather hour we are warned of approaching storms which are always so dangerous to the rancher. Important news comes in regularly. We no longer are isolated."

Radio No Longer Simply a Pastime
What radio has done for this family it does in a greater or less degree for anyone who cares to invest the price of a good radio set. Nearly 600 broadcasting stations are filling the air day and night with instructive and entertaining, useful information and up-to-date news. "Listening in" is no longer simply a pastime; it has become a necessary part of American home life. Sooner or later you, too, will own a radio set.

Get the Government Market Reports
Broadcast Daily by Radio from 86 Big Stations

To many users of radio the daily markets broadcast by the U. S. Department of Agriculture are of greater importance than the splendid musical and educational programs which fill the air. Most of the powerful radio stations in the country are authorized by the government to render this special service, and the information is furnished directly by agents of the U. S. Department of Agriculture and the U. S. Weather Bureau, and are therefore thoroughly reliable.

Stations in All Parts of the Country
The outline map above shows how these stations are distributed so as to make this service of value to the greatest number of persons. Reports to the Department of Agriculture indicate that farmers, stockmen, millers, commission merchants, grain dealers, bankers and others are now getting the daily quotations from leading markets from 15 to 30 hours ahead of the receipt of daily newspapers. Instances have been reported of farmers and stockmen who have saved several times the cost of a good radio set by profiting by this free market and weather forecasting service.

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