



For Description and Price of the Set Shown Above See Page 17

# Radio

**MONTGOMERY WARD & CO.**

Chicago - Kansas City - St. Paul - Portland, Ore - Oakland, Cal. - Ft. Worth





# 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.

Make out your order in the usual way, using the Order Blank enclosed, or any plain piece of paper if you prefer. Enclose remittance to cover the purchase price and postage, and send to the Montgomery Ward & Co. store nearest you. The goods will be shipped promptly.

All we ask is that you show good faith by giving the merchandise reasonable care and a fair trial, and make your decision within 30 days.

## Your Order Filled Within 24 Hours Delivery from Our House Nearest You

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

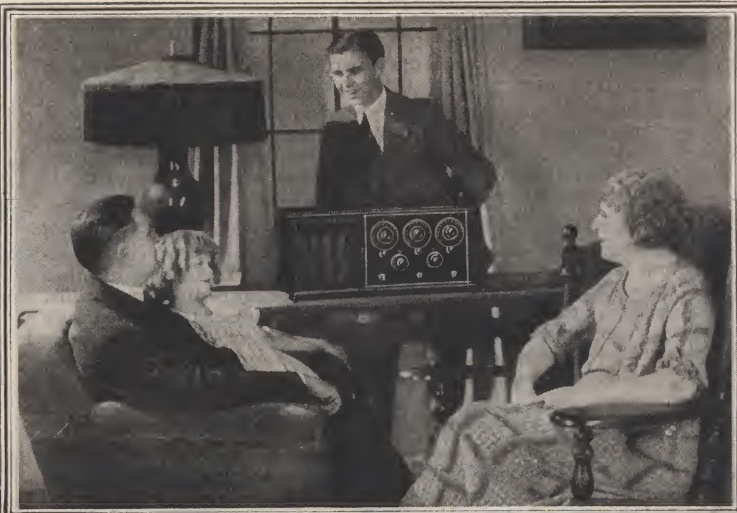
office or placed in the freight car and started on their way to you.

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.

# Montgomery Ward Co.

Satisfaction Guaranteed or Your Money Back





## Radio Has Come to Stay

**R**ADIO 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.



The Famous Symphony Orchestras Play for You

### Ward's Sets Are Standard

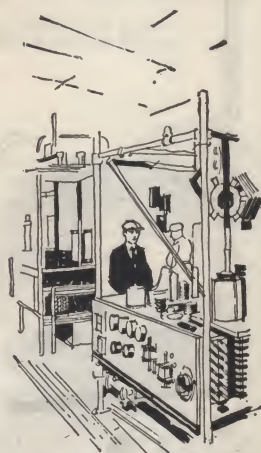
In building radio sets, we have profited by the results of years of research and experimenting. The correctly designed sets we offer you embody those principles accepted by radio experts as standard. In selecting a set from Ward's you are sure of getting one that will remain standard in principle. We 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.



Costly Apparatus Kept Up for Your Entertainment



Dance to the Music of the Finest Orchestras



## 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

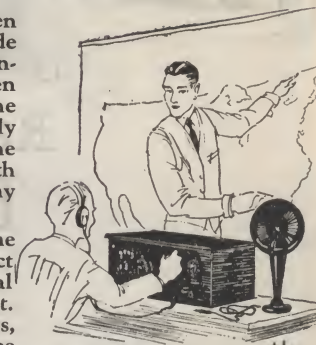
We list Receiving Sets to meet the needs of almost any locality or any home, at prices within the range of all. In some homes our popular one-tube outfits, used with head sets and properly handled, will bring in almost all the stations that a high priced set would receive, and with sufficient volume 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 often 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 can not penetrate 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.



Snowbound, but in Touch with The World



Enjoy the Thrill of Listening to Programs Being Broadcast from Distant Stations



Entertainment for Large Audiences



Radio—A Constant Companion



## 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 noises 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 with 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 rearrangement 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.



Reception Is Best on the Farm



Engineers and Scientists Are Constantly Experimenting to Improve Radio



Thousands of Radio Sets Produced Yearly



Chicago Building



Oakland, Cal. Building



Kansas City Building



Saint Paul Building



Fort Worth Building

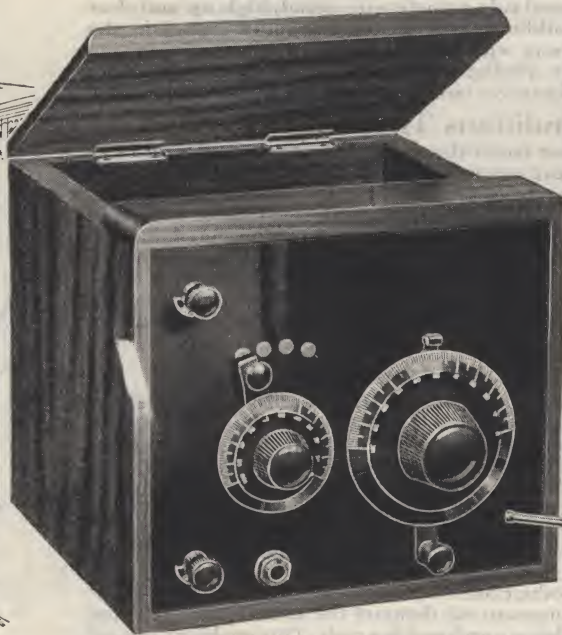
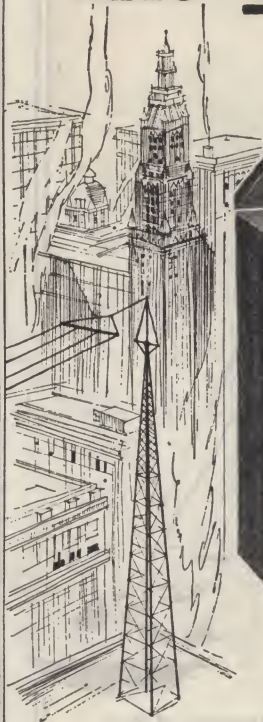


Portland, Ore. Building



# The Ultra Airline One-Tube Set

**\$19<sup>95</sup>**  
 Complete  
 Nothing  
 Extra  
 to Buy



## No Experience Needed—Anyone Can Use It

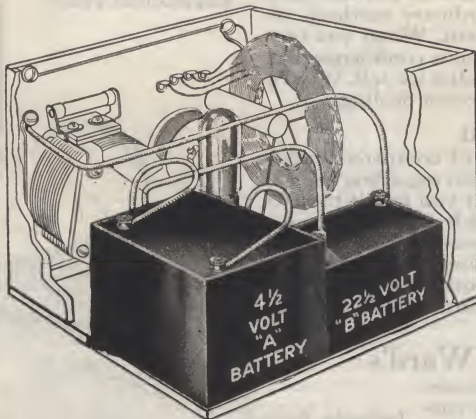
**T**HE Ultra Airline is a high grade vacuum tube Receiving Set perfected until it is so simple that anyone can set it up and use it successfully anywhere. No previous radio experience is needed. This set complete at this low price includes tube, batteries, head set and all antenna equipment; nothing 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.

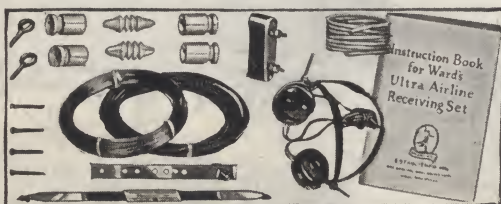
## The Ultra Airline Is Reliable and Economical

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.



### View Showing Interior of Ultra Airline

The above view shows the compact interior arrangement of the Ultra Airline. Note that the batteries are contained in the cabinet, hiding all except the antenna and ground wires. This improves the appearance of the set and makes it adaptable for a portable set.



Complete Antenna Equipment is included. Nothing extra to buy



# 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 a great satisfaction to purchase a receiving set which is better than you better represented, than the Ultra Airline is for the money."  
Earle R. Evans,  
Albans, W. Va.  
Printed by Permission

"I observe you advertise your Ultra Audion as being a long range receiving set, and that on your tests you received Schenectady from Chicago. I think you don't need to be so conservative. I receive consistently stations 1200 miles and my record is Denver, Colo., fifteen hundred miles away."  
C. H. Osborne,  
Fulton, N. Y.  
Printed by Permission.

**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 longer 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 we have kept the cost 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.

**No Detail is Slighted.** Every part used in this set is strictly first class and the workmanship is good throughout. Our purpose is to give you a practical receiving set, up-to-date in every way and handsome in appearance without extravagance. The Ultra Airline, regardless of the low price, is good enough in every way for any home.

**Description of Set.** The Ultra Airline is mounted in a handsome, well made wood cabinet, about 7 by 7½ by 8 inches, in Adam Brown Imitation Mahogany finish. The panel is genuine bakelite. The circuit used requires tuning adjustments to only one dial with vernier for fine tuning. The tuning element is a spider web coil of silk covered wire with four taps for coarse wave length adjustment. The tube socket is the latest noiseless rubber base type. All binding posts are plainly marked. The head set plug automatically lights the filament when inserted in the jack.

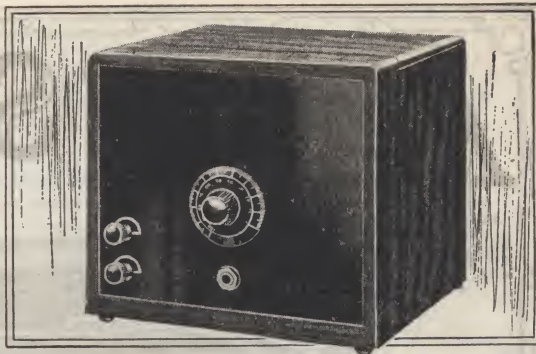
## Order Now—Don't Miss the Programs

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 hundred 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

The Ultra Airline Radio Receiving Set comes to you complete—you have 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; 22½-volt "B" battery; 4½-volt "A" battery and special 2000-ohm head set as shown in illustration, together with complete antenna equipment consisting of 150 feet of copper antenna wire; 25 feet of flexible insulated connecting wire; two porcelain insulators; four porcelain knobs; flexible lead-in insulator; lightning arrester; ground clamp; 25 feet ground connecting wire; screw eyes and screws; connecting block, and complete instructions.**

- 563 R 636**—Ultra Airline outfit..... **\$19.95**  
Postage, 44¢ extra
- 563 R 616**—Ultra Airline without tubes, batteries or other equipment... **\$11.95** ◦  
Postage, 16¢ extra



## Ward's Two-Stage Amplifier \$15.00

**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 3-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 one 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.



This illustration shows how you can connect your Ultra Airline and the two-stage Amplifier for use with any good Loud Speaker

## 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 neat dial. Room enough inside the set for the "A" and "C" batteries. Owing to the size 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 jack are fine quality. No tubes, batteries or loud speaker included.  
**563 R 637**—For dry cell tubes..... **\$15.00**  
Postage, 14¢ extra

We can also furnish the above Amplifier fitted with standard sockets to take C-301A, UV-201A, C-12 or WD-12 tubes. This type should be used with the Storage Battery Airline Special.  
**563 R 634**—For standard base tubes..... **\$15.00**  
Postage, 14¢ extra

## 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 5623) listed on Page 27; two 45-volt or four 22½-volt "B" batteries listed on Page 39.

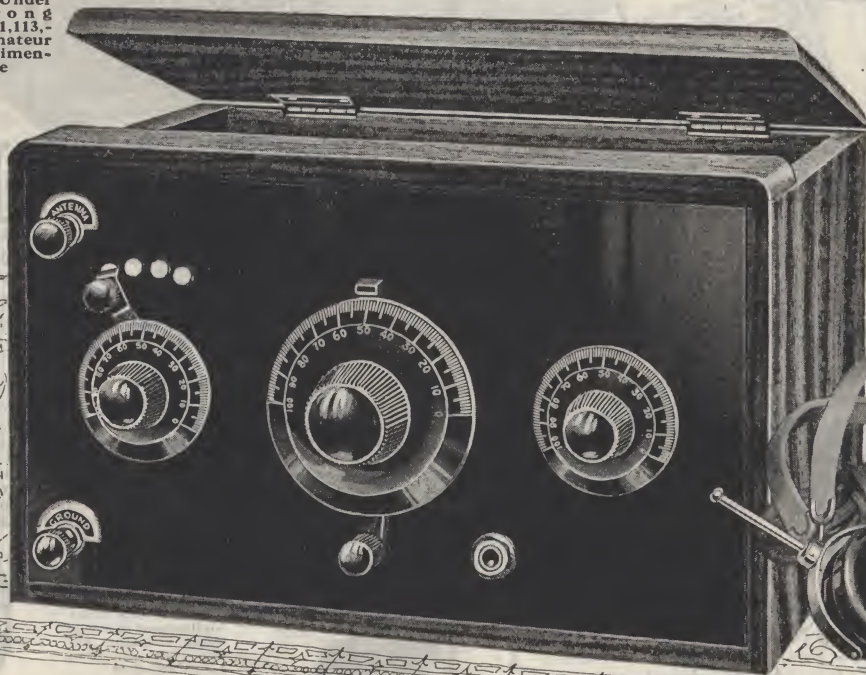
With amplifier 563 R 634 you will need two C-301A or UV-201A 6-volt tubes or C-12 and WD-12 1½-volt tubes; also the same "B" batteries listed above. Should you use the C-301A or UV-201A 6-volt tubes, you will require the storage battery listed on Page 38. The storage battery used with the receiving set will also operate the amplifier.



# Airline Special

Will Give  
Fine Results  
Anywhere

Licensed Under  
Armstrong  
Patent No. 1,113,-  
149 for Amateur  
and Experimental  
Use



An Ideal  
Home Set  
At a Very  
Low Price

## 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

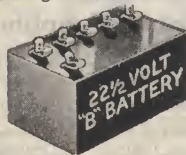
separate the incoming programs with greater ease and to hear stations which might otherwise be crowded out by more powerful stations. For those who wish to hear as many stations as possible with a one-tube set, the Airline Special is sure to prove satisfactory. Our low price includes everything. You have no extras to buy.

## With Dry Cell Equipment Complete

Only \$ **27<sup>50</sup>**

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.



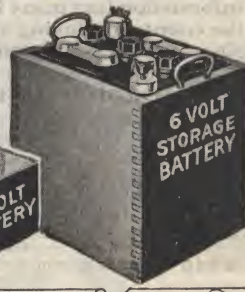
The Antenna Equipment consists of 150 feet of copper antenna wire; 25 feet of weather-proof insulated ground wire; 25 feet of flexible connecting wire; four insulator knobs; two antenna insulators; new style lead-in lighting arrester; ground clamp; screw eyes, screws and instructions.

## with Storage Battery Complete Equipment

Only \$ **37<sup>75</sup>**

Set complete with the same equipment as the dry cell set, except 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.





# Ward's Best One-Tube Receiving Set

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 rec-

ognized 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.

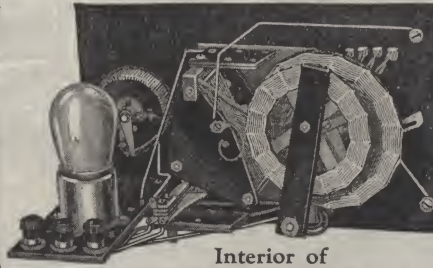


"I bought an Airline Special Radio Receiving Set from you last January. We have the best of entertainments in a radius of 1200 miles.

"We often get distant stations plain, when others near us with 3-tube sets don't get them. I would not like to be without a radio, because it gives more amusement and joy in a home than anything else for the cost. We are much pleased with our set. A radio is just as important on a farm as an automobile."

J. Paxson Johnson,  
Ellendale, Del.

Printed with Mr. Johnson's Permission



Interior of  
Airline Special Set

"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 no trick to 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

## Users Are Enthusiastic About The Airline Special - It Fills a Long Felt Want

The demand for an efficient one-tube set, built so anyone can use it anywhere and always get good results, has been met in the Airline Special. The thousands of enthusiastic letters we have received from owners of this set convince us it is an excellent choice for the average home. Even those living far from battery charging stations can use the Airline Special with dry

cell equipment and get satisfactory results. Our customers' letters printed on this page tell just what the Airline Special is doing today in homes all over the country. We do not make extravagant claims as to the receiving range of any of our receiving sets. The customers 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, distances up to 1500 miles or even more can be covered.

## You Won't Find a Better Radio Value Anywhere

The Prices Quoted Include Everything Needed - No Extras to Buy

### The Dry Cell Set

Pictured on Opposite Page

**Cabinet.** Finished in Adam Brown imitation Mahogany with hinged cover. All parts attached to the bakelite panel which is removable. Size 7½ by 7 by 11 inches. Non-scratching rubber feet.

**Controls.** Consist of large tuning condenser dial with vernier attachment; 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 primary and tickler coils; fine quality 23-plate variable tuning condenser with approved "pigtail" connection and fine vernier adjustment. No losses from poor contacts. Condenser shielded from body capacity with brass plate which prevents squealing which occurs in some sets when you touch the controls; high grade special jarproof socket for C-299 or UV-199 tubes. High grade Jack, grid leak and grid condenser of proper values. Five binding posts plainly marked.

**Set Complete.** Consists of Airline Special Tuner in imitation mahogany cabinet with the following equipment: Cunningham C-299 or Radiotron UV-199 vacuum tube; one high grade 2000-ohm head set with flexible cord and attaching plug; complete antenna equipment as listed on opposite page; fresh 4½-volt "A" battery good for four to six weeks use; 2½-volt "B" battery; complete instruction book. Shipping weight, complete outfit, 35 pounds. **Mailable.**

**563 R 642**—Airline Special complete, ..... **\$27.50**

Postage, complete outfit, 44¢ extra  
**63 R 670**—Airline Special without tube, batteries, head sets or other equipment ..... **15.95**  
Postage, set only, 16¢ extra

These  
Letters  
Are  
Printed  
By  
Per-  
mission

"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.

"The Airline Special was easy to set up and easy to tune. The first evening I tuned New York City, Atlanta, Ga., and Omaha, Neb., and many local stations."  
E. C. Schroler,  
Akron, O.

"It is when I tune in on stations such as KFI, PWX, CFCF, CHCF and others that I am fully impressed with my set."  
F. L. Tyree,  
Paris Island, S. C.

"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."  
John Higgins,  
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 scratching. Size, 7½ by 7 by 11 inches.

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

**Best Quality Parts.** The inductances used are improved spider web type coils, known for their low loss characteristics. The 23-plate variable condenser has "pigtail" connection on the rotor, the current being led through a flexible wire cable soldered on instead of a 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 five binding posts; each plainly marked. Grid leak and grid condenser are especially suited to this set.

**Set Complete.** Consists of Airline Special Tuner complete in cabinet as described, with the following equipment: Cunningham or Radiotron vacuum tube; high grade 2000-ohm head set with cord and attaching plug; complete antenna equipment as listed on opposite page; best quality 6-volt, 50-ampere hour storage battery, fully charged; 2½-volt "B" battery; instruction book. Shipping weight, complete outfit, 60 pounds. **Not mailable.**

**563 R 639**—Airline Special complete, ..... **\$37.75**

**563 R 640**—Airline Special without tube, batteries, head sets or other equipment ..... **\$18.85**

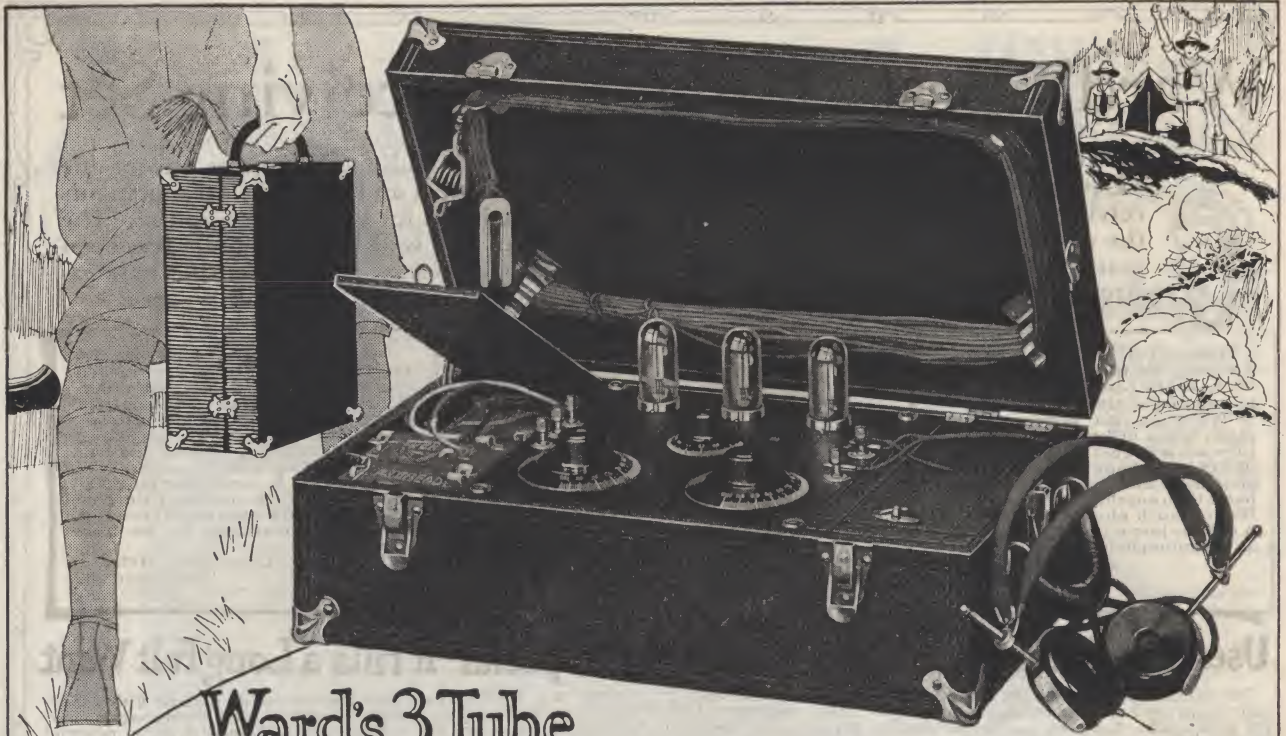
Postage, set only, 16¢ extra



Use an Amplifier  
So All Can Hear

The Airline Special is especially adapted for use with our Two-Stage Amplifier described on Page 7. With it 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 amplifier from the same battery as the receiving set. The dry cell type requires two 4½-volt additional dry cells to light the amplifier tubes.





# Ward's 3 Tube Portable Receiving Set-Complete \$49<sup>00</sup>

A Practical, Convenient Radio Receiving Set for Sportsmen, Overland Tourists, Campers, Prospectors, Trappers, Surveyors, Range Riders, and for Home Use

**L**ET 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.

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.

## Easy to Tune—Equipment Is Complete

It is a sturdily 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.

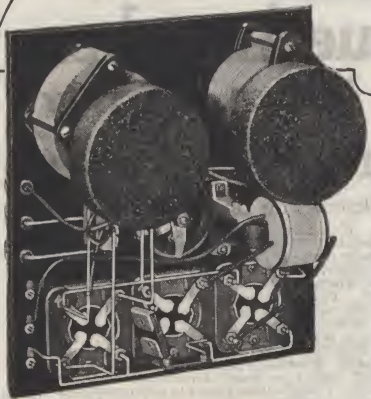
The low price includes the set and equipment

## 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.

**563 R 560—Complete outfit . . . . \$49.00**  
Postage, 38¢ extra



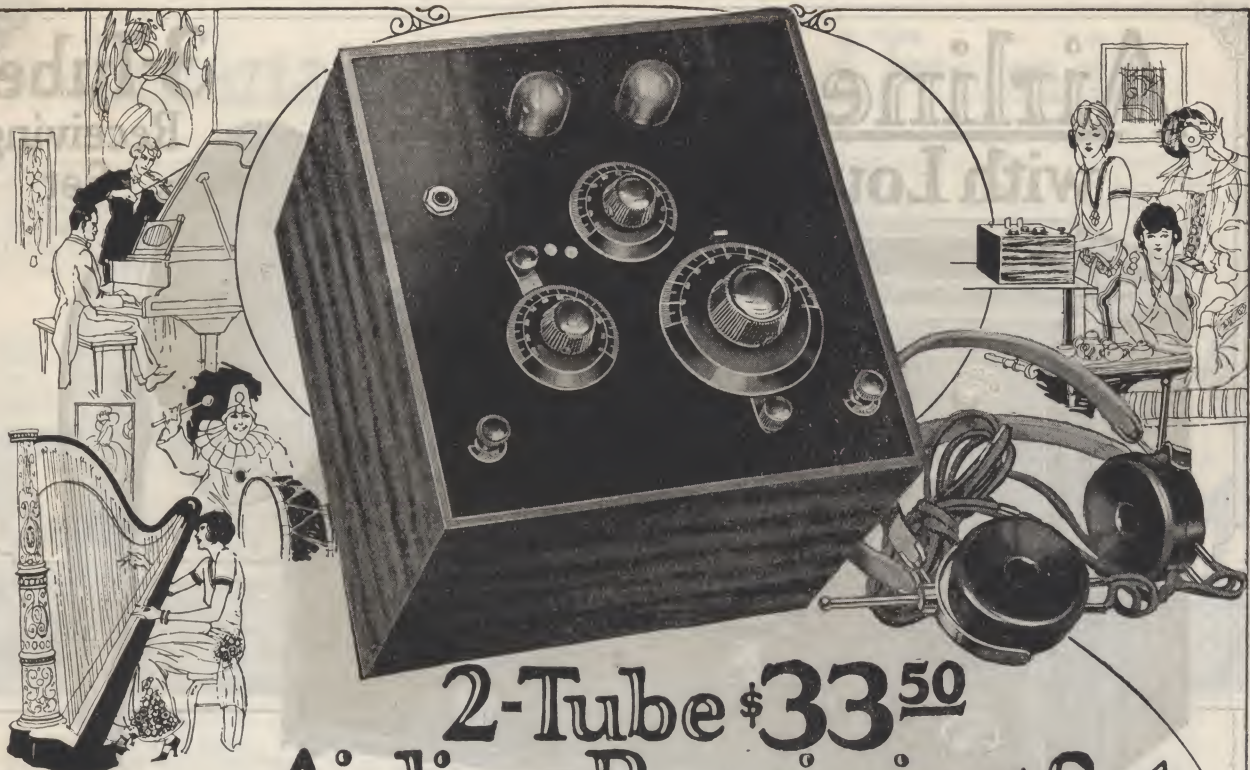
The wiring leads are very short, and all parts are mounted rigidly on the under side of the panel. The panel is held in place by four screws and may be taken out for inspection.



Whether you go to the woods, the lakes, the seashore or the mountains, a Portable Radio Set will keep you in touch with the world.



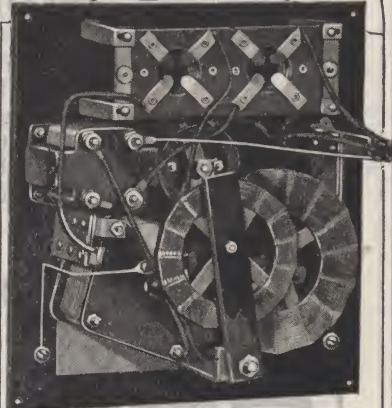




# 2-Tube \$33<sup>50</sup> Airline Receiving Set

## Long Distance Receiver Dry Cell Type

Small and compact, yet reliable and sensitive enough to bring in the distant stations with clearness and good volume. The Airline 2-Tube Receiving Set is low priced too, and it will give you pleasure all out of proportion to its small cost. Very satisfactory for receiving weather and market reports, as well as musical programs, news bulletins, speeches and time signals which are sent out through the air every day. The range of this set, under favorable conditions on winter nights, is about 1000 miles with head sets and 300 miles with a loud speaker, although much better records have been made.



This shows how all the instruments are arranged on the under side of the panel. An example of the careful workmanship found on all of Ward's radio sets.

## 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 8½ by 9 inches. The panel fits into a cabinet 7½ 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 UV-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 antenna, ground and batteries are connected.

**563 R 594**—Airline complete..... **\$33.50**  
Postage, 44¢ extra  
**563 R 595**—Airline without tubes, batteries or other accessories included..... **\$17.95**  
Postage, 26¢ extra



## 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.

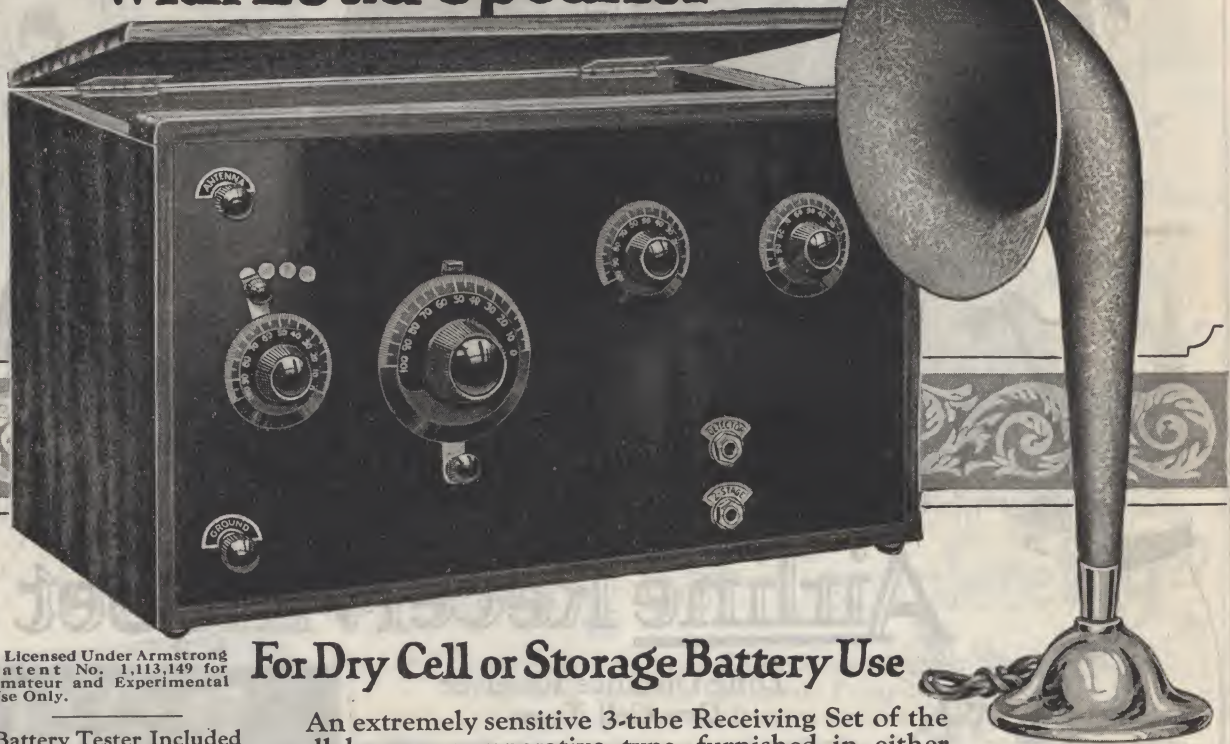
You Can Use a Loud Speaker on Local Stations See Our Loud Speakers on Pages 40 and 41





# Airline De Luxe with Loud Speaker

## 3-Tube Receiving Set



Licensed Under Armstrong Patent No. 1,113,149 for Amateur and Experimental Use Only.

### For Dry Cell or Storage Battery Use

#### 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.

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.

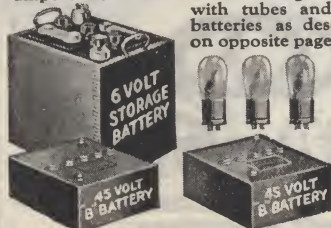
#### High Grade Loud Speaker

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

## With Storage Battery

# \$ 77<sup>50</sup>

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.



#### 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 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 Dry Cell Batteries

# \$ 66<sup>50</sup>

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





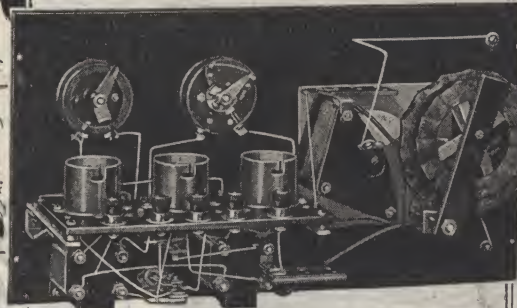
# Entertains Family and Friends

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 Airline De Luxe is carefully assembled and the interior arrangement is along the most approved lines.

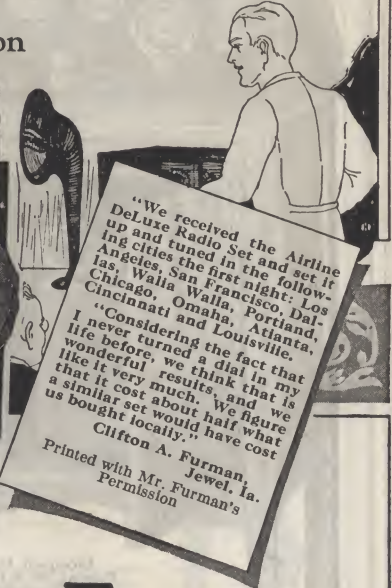


The De Luxe construction permits inspection of the set at any time by simply raising the lid. The wiring is neat, with short leads, which adds to the efficiency of the set. Well constructed in every way.



### Loud and Clear So All Can Hear

Stations several hundred miles distant can be brought in loud and clear on the loud speaker with this set. The price you pay covers everything needed, including the loud speaker and high grade head set. The Airline De Luxe is an exceptional value.



"We received the Airline De Luxe Radio Set and set it up and tuned in the following cities the first night: Los Angeles, San Francisco, Dallas, Walla Walla, Portland, Chicago, Omaha, Portland, Cincinnati and Louisville. "Considering the fact that I never turned a dial in my life before, we think that is wonderful" results, and we like it very much, and we think it cost about half what a similar set would have cost us bought locally."

Clifton A. Furman, Jewel, Ia. Printed with Mr. Furman's Permission

# Two Types to Choose From

**Airline De Luxe Complete Receiving Set With Storage Battery \$77<sup>50</sup>**

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 aerial 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 available.

- 663 R 628—Airline De Luxe complete set..... \$77.50
- 663 R 638—Airline De Luxe without loud speaker. Shipping weight, 60 pounds. Not available..... \$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 \$66<sup>50</sup>**

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 storage battery type described at the left in size, finish and equipment, with the exception of the tubes, sockets and "A" battery. 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 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 available.

- 563 R 627—Airline De Luxe complete..... \$66.50
- 563 R 645—Airline De Luxe without loud speaker. Shipping weight, 55 pounds. Not available..... \$61.00
- 563 R 647—Airline De Luxe without tubes, batteries or other equipment..... \$37.50

Postage, 44¢ extra



# Airline De Luxe-Console Model 3-Tube Set



Licensed Under Armstrong  
Patent No. 1,113,149 for Amateur  
and Experimental Use Only

## 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.



**\$125<sup>00</sup>** Complete With All  
Equipment Ready to Install  
**An Ideal Set  
Built-in Loud Speaker**

**W**ARD'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.

## 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 cabinet, 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. . . . . **\$125.00**

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

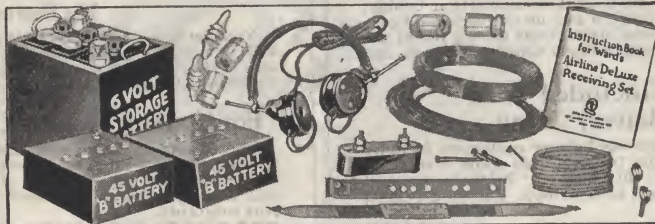
## Anyone Can Operate It

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.

## 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.



# The Airline Lyric 5-Tube Set

With Built-in  
Loud Speaker



Complete  
With All  
Equipment **\$175<sup>00</sup>**  
Storage Battery Type

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 clearness 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.



Queen Anne Period  
Console Cabinet

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.

## This Set Is Complete—There Are No Extras to Buy

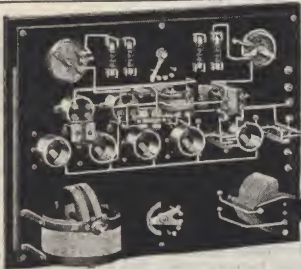
All the advantages of a long range 5-tube set are here combined in an attractive period cabinet at about the price ordinarily asked for the set alone in a plain case and without a loud speaker. Although a multiple tube receiving set, the Airline Lyric is very easy to operate. Delighted owners have written 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 phonograph. 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."

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.

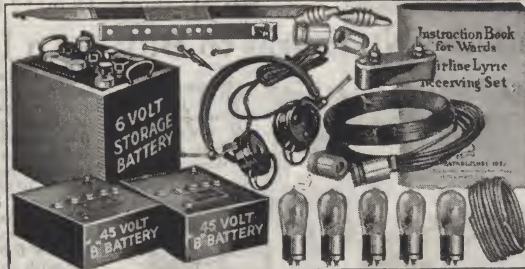
For estimated total freight charges, see information on Page 65.

**163 R 574**—Complete with storage battery, tubes and storage battery equipment. Shipping weight, 225 pounds. . . . . **\$175.00**

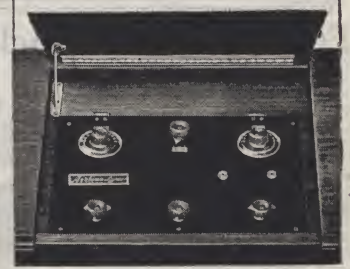
**163 R 575**—Airline Console complete with loud speaker, for use with your own storage battery, tubes and equipment. No tubes, batteries or other accessories included. Shipping weight, 180 pounds. . . . . **\$125.00**



This view shows the arrangement of the Parts in this set. Latest approved practices in radio construction are followed, and only the best quality parts used. Mounting is entirely on the panel, making the set easily available for inspection at any time.



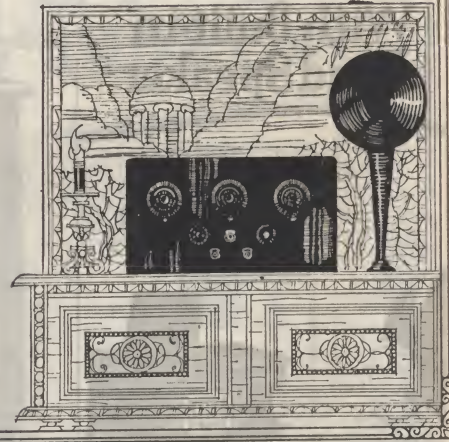
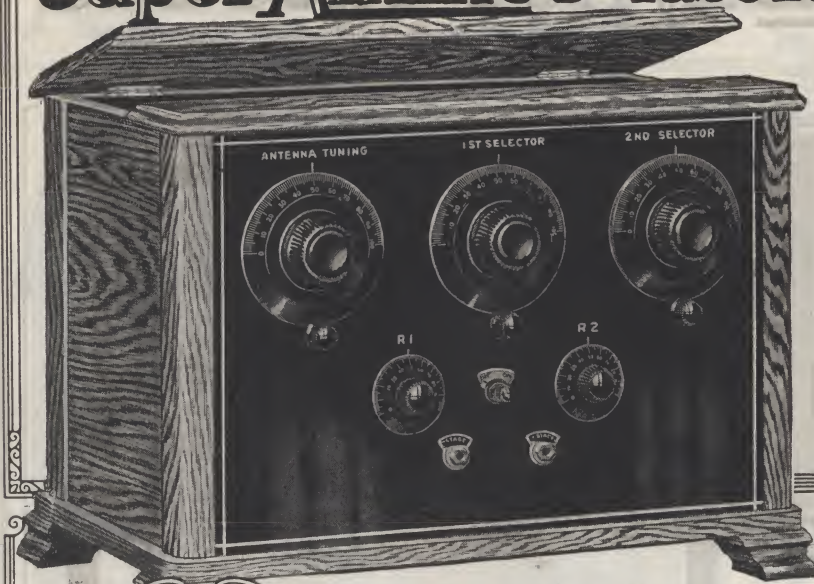
Equipment included consists of 6-volt 90 ampere hour storage battery fully charged; 90 volts "B" battery; 2000-ohm high grade head set, five Cunningham or Radiotron tubes; 150 feet bare copper antenna wire, 25 feet lead-in wire, 25 feet connecting wire, new style lead-in, lightning arrester, antenna insulators, aerial tee connection, 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 net in harmonizing color, which adds to the attractiveness of the set.



# Super Airline 5-Tube Receiving Set



Gives Wonderful Results on Any Loud Speaker  
See Pages 40 and 41 for Speakers

\$111<sup>00</sup>

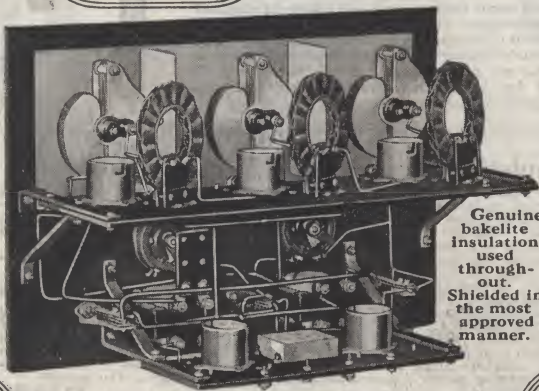
Ward's Finest Receiving Set. Standard Cabinet Mounting—Remarkable Selectivity and Volume

**O**UR 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 with a vernier 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.

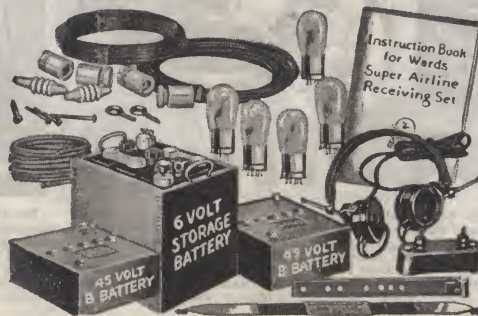
Size of cabinet, 18 by 12 by 12 inches.



Genuine bakelite insulation used throughout. Shielded in the most approved manner.

## 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 clearness 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.

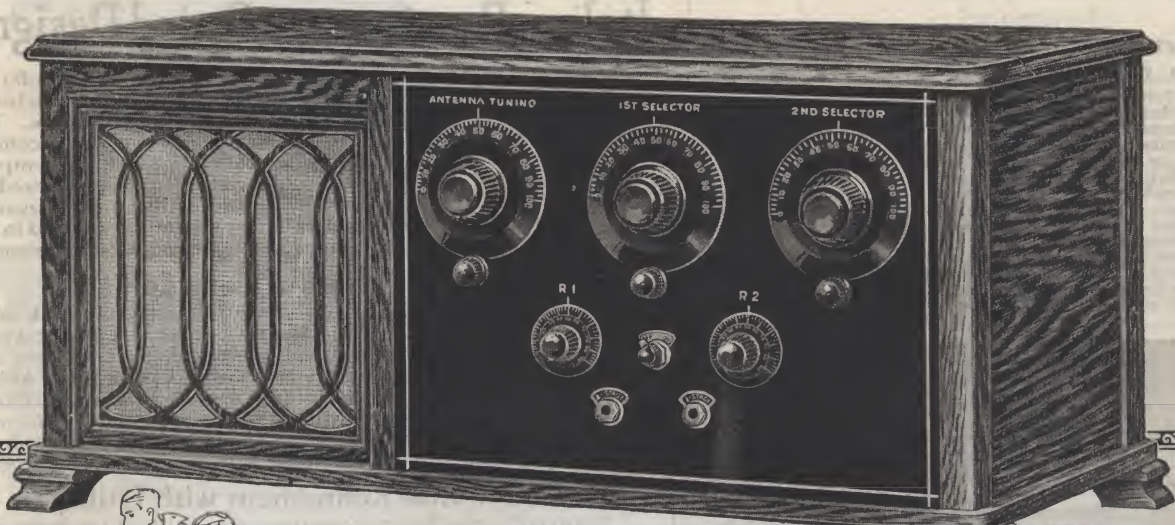
**563 R 586**—Super Airline Receiving Set, only for use with storage battery tubes. No equipment included. Shipping weight, 40 pounds . . . . . \$75.00

**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

**563 R 591**—Super Airline Receiving Set, only for use with dry cell tubes. No equipment included. Shipping weight, 40 pounds . . . . . \$75.00



# Super Airline <sup>5</sup>-Tube Set with Loud Speaker



Noted for Its Dependability and Long Range—A Splendid Value

**\$126<sup>00</sup>**

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

Uses a New Principle Which Gives Unusual Clearness and Volume

This 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.

**T**HE 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 identically 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

**663R 582**—Super Airline complete with storage battery equipment. Shipping weight, 125 pounds **\$136.00**

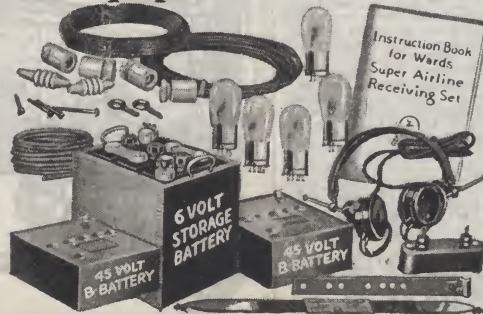
**563R 583**—Super Airline without tubes, batteries or other equipment. Shipping weight, 60 pounds. **\$90.00**

### For Use with Dry Cells

**563R 592**—Super Airline complete with dry cell equipment. Shipping weight, 90 pounds... **\$126.00**

**563R 593**—Super Airline without tubes, batteries or other equipment. Ship. weight, 60 pounds. **\$90.00**

## Full Equipment Is Included



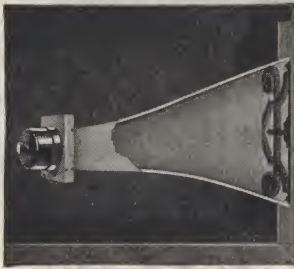
This Super Airline model is furnished either with or without equipment. When full equipment is included it consists of our best 6-volt 90-ampere hour storage battery or three dry cells; five Cunningham or Radiotron tubes; high grade 2000-ohm head set; 90 volts fresh "B" battery; complete antenna equipment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



# The New Super Airline Five-Tube Set

## 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, or Canada 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 opening. The scientifically designed wood tone chamber gives the speaker the sweet tones 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.

## Italian Renaissance Period Design



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

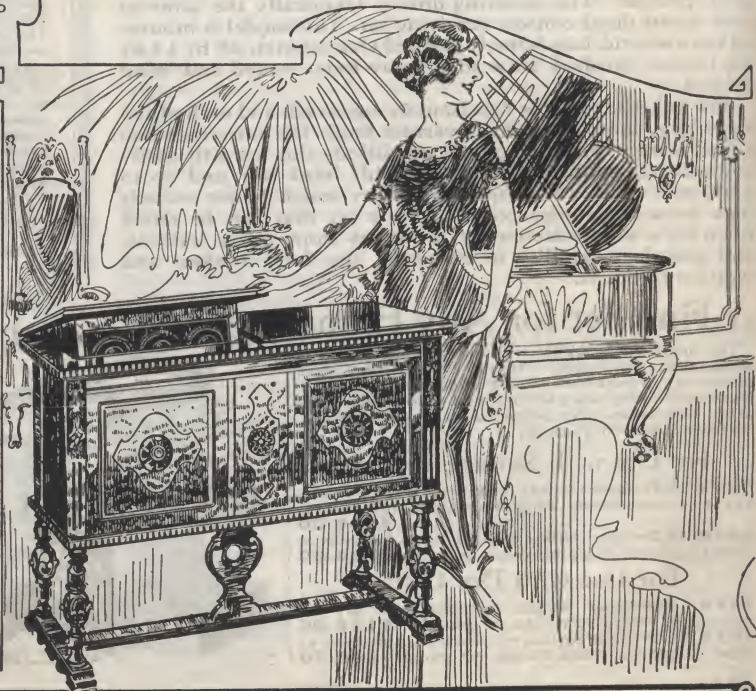
No detail in the design, construction or finish of the Super Airline Receiving Set or its cabinet has been neglected. It comes to you all ready to set in your home, complete with every necessary attachment and full instructions for connecting and operating. The set employs two stages tuned radio frequency 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 Setting

The Super Airline Receiving Set is in every detail fully worthy of its fine 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.

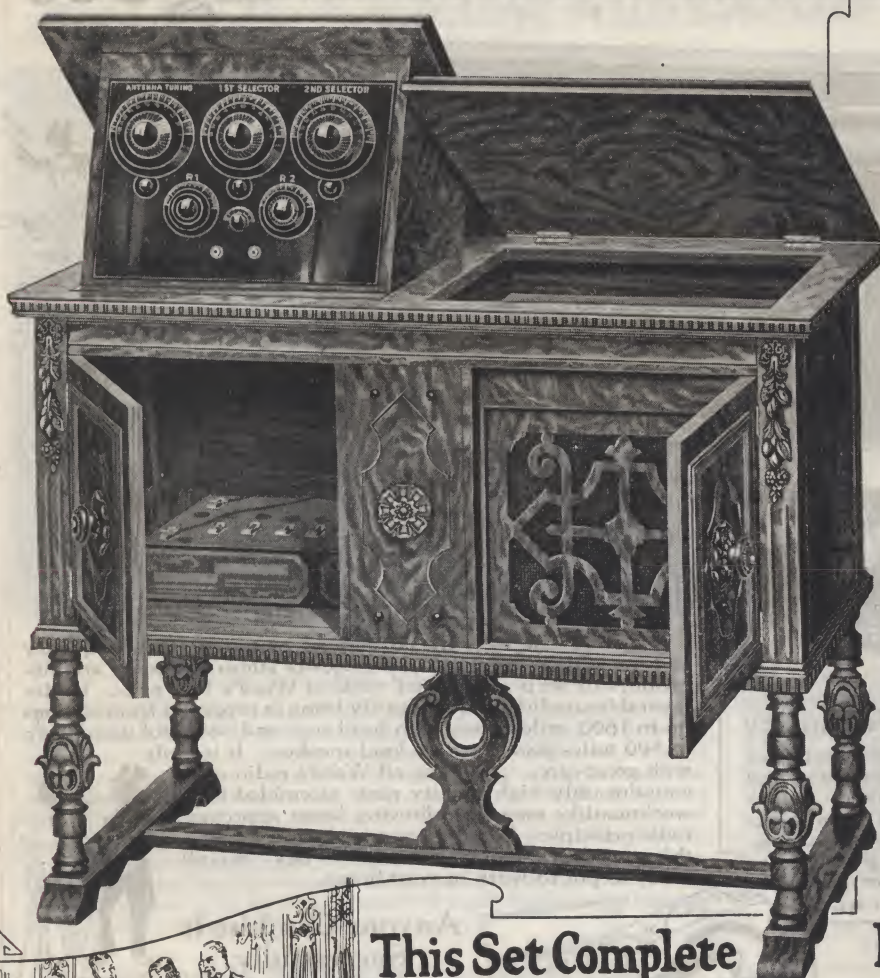
### Equipment

The Super Airline Receiving Set comes complete with loud speaker built in and the following equipments: Six-volt 90-ampere hour storage battery fully charged; 90 volts "B" battery; five tested C-301A or UV-201A tubes; one high grade 2000-ohm head set with headband, 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 arrester, antenna insulators, porcelain knobs, screws and screw eyes; also complete instructions for installing and using the set.





# Ward's Most Beautiful Console Model



## An Up to Date Improved Receiving Set

In keeping with the progress of radio we have made the Super Airline a distinct improvement over all the similar types of Receiving Sets that have appeared on the market during the last season.

Radio engineers have long agreed that a circuit using tuned radio frequency amplification would give the best 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 receiver to oscillate, spoiling the tone quality of the set and usually preventing the clear reception of the radio broadcasting.

## Improved Design

A number of sets have recently appeared on the market in which this tendency has been overcome by the use of small balancing condensers. Our radio engineers have perfected in the Super 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 operation. 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, simply turn the dials to the recorded positions 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 interference 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.

## This Set Complete

## Ready to Use

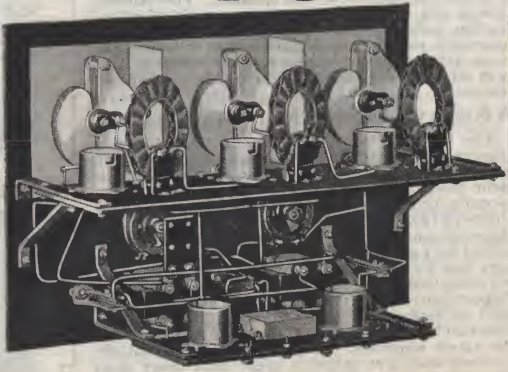
This price includes the storage battery, head set, built in loud speaker, "B" batteries, five tubes, complete antenna equipment, and instructions for installing and using the Super Airline. For estimated total freight charges, see information on Page 65.  
**663 R 580**—Super Airline complete. Shipping weight, 273 pounds. . . . . **\$236.00**  
**163 R 581**—Super Airline without tubes, batteries or other equipment. Shipping weight, 225 pounds. . . . . **\$190.00**

# \$236<sup>00</sup>



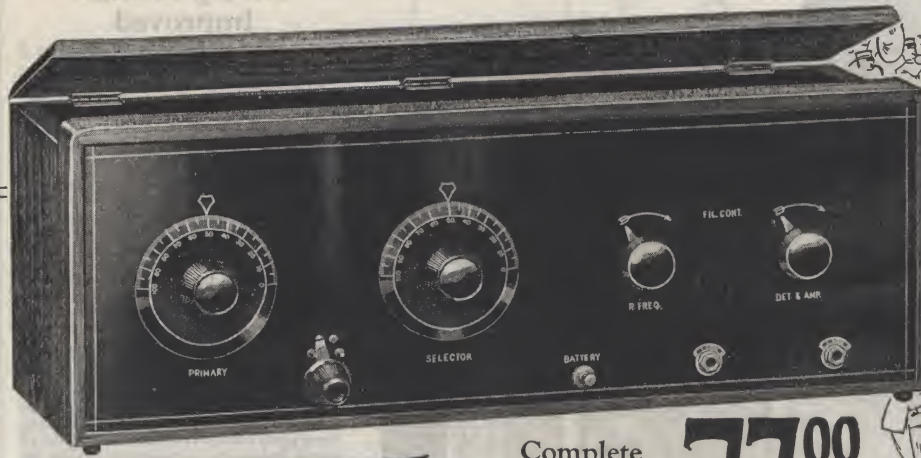
## Superior Features

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 interior construction reveals the fine quality low loss condensers; the 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 workmanship is carried throughout the entire set and its cabinet.





# Airline Grand<sup>4</sup> Tube Receiving Set



Complete  
With All  
Equipment

**\$77<sup>00</sup>**

## 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 in 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 45-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.

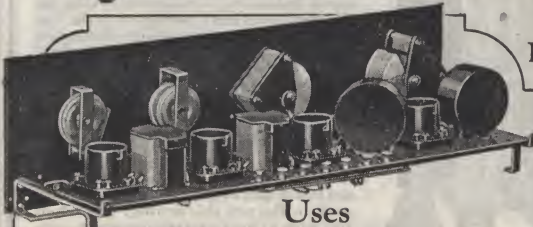
For estimated total freight charges, see information Page 65.

### For Use with Storage Battery

663 R 524—Airline Grand complete. Shipping weight, 115 pounds ..... \$88.50  
563 R 525—Airline Grand without tubes, batteries, antenna or other equipment ..... \$49.50  
Postage, 64¢ extra

### For Use with Dry Cells

163 R 526—Airline Grand complete. Shipping weight, 75 pounds ..... \$77.00  
563 R 527—Airline Grand without tubes, batteries, antenna or other equipment ..... \$49.50  
Postage, 64¢ 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 radio 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 \$172. 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.



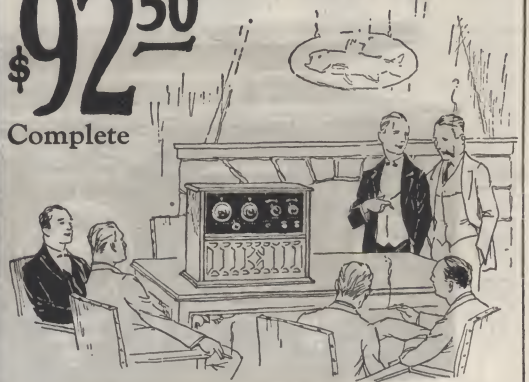
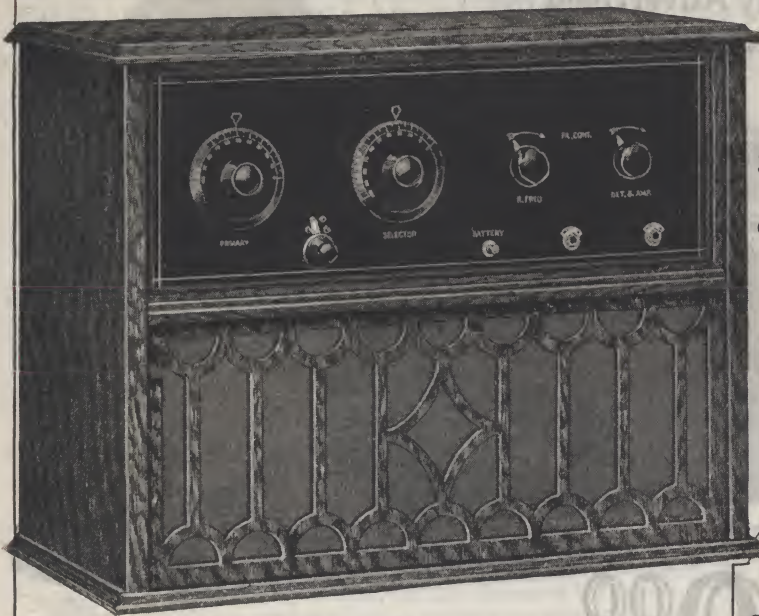


# Airline Grand with Loud Speaker

## 4-Tube Receiving Set

# \$92<sup>50</sup>

Complete



### An Ideal Home Receiving Set

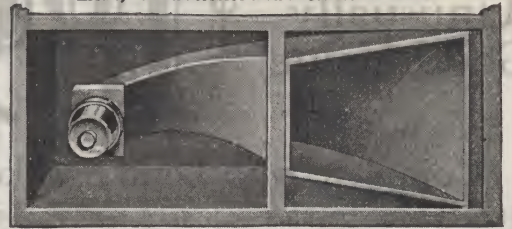
**W**ARD'S price for this high grade Radio Receiving Set is much lower than the average price of radio receiving sets in use in country homes, according to the results of a survey made recently by the United States Department of Agriculture. Included at Ward's low price you get the advantage of a built 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.

### Everything Needed Is Included

At This Low Price You Get the Airline Grand Receiving Set with Built In Loud Speaker, Head Set, Tubes, 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 clearness. 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 (no holes to drill); two porcelain antenna insulators with screw eyes; four porcelain knobs with screws; 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

563 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

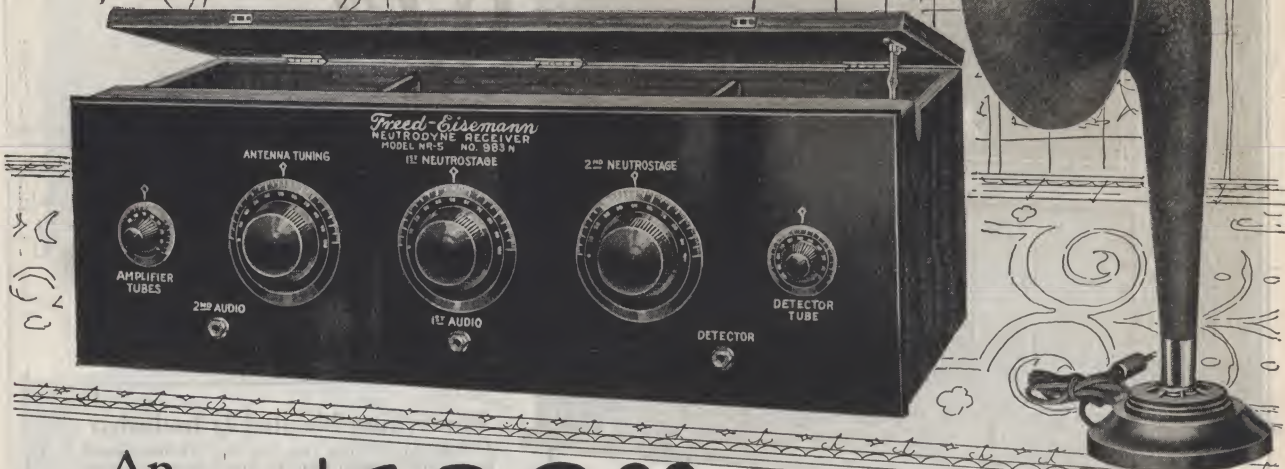
563 R 529—Airline Grand without tubes, batteries or other equipment. Shipping weight, 65 pounds. . . . . \$65.00





# 5 Tube Freed-Eisemann Neutrodyne

Well Known - Nationally Advertised  
Long Range Receiving Set

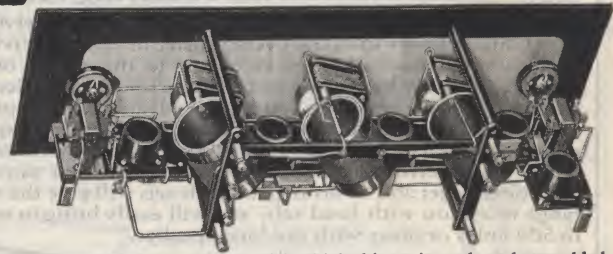


An Unusually Good Value

# \$ 189<sup>00</sup>

Complete with Loud Speaker

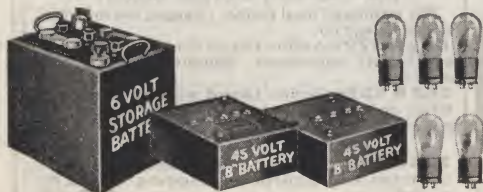
Those who are familiar with the famous Freed-Eisemann 5-tube Neutrodyne Receiving Sets will at once realize what a tremendous value this complete outfit is at our low price. Each set bears the unbroken Freed-Eisemann seal. The loud speaker included is the Atlas, famous for its volume and fine tone.



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.



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

## 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.

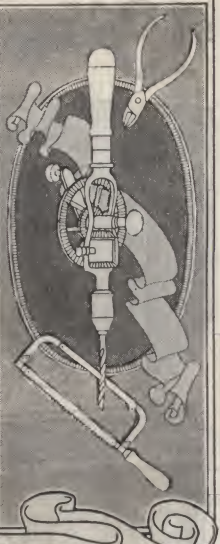
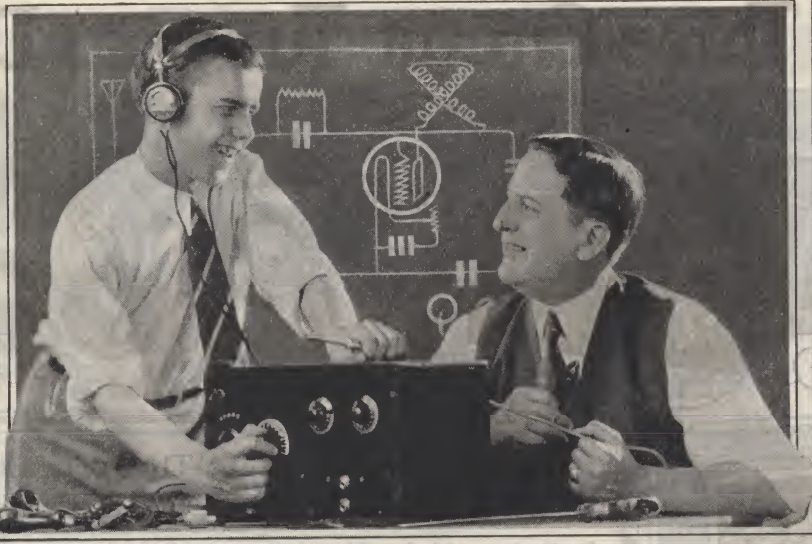
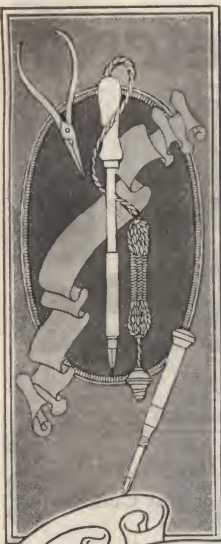
## Everything Needed Is Included—No Extras to Buy

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 fastened to the panel, with battery, aerial and ground binding posts projecting at rear. Cabinet is 28 by 7 3/4 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 includes: Head Sets. Our best 2000-ohm Airline head set with cord and plug.—Storage Battery. Our

best 6-volt 90-ampere hour storage battery, fully charged ready for use and with brass wing nuts for attaching wires.—"B" Batteries. Two high grade 4.5-volt tapped batteries.—Tubes. Five tested Cunningham C-301A or Radiotron UV-201A amplifier tubes.—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 lightning arrester; also complete instructions that make it easy for you to install and operate the set.

Complete 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. **663 R 674—Freed-Eisemann, Complete . . . . . \$189.00**





# Build Your Own Radio Set and Save Money

**T**HERE 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 58 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 about 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.



Building radio sets is a fine recreation for dad and also educational for the boy.



When family and friends gather round to hear your set, that is when the real thrill comes.

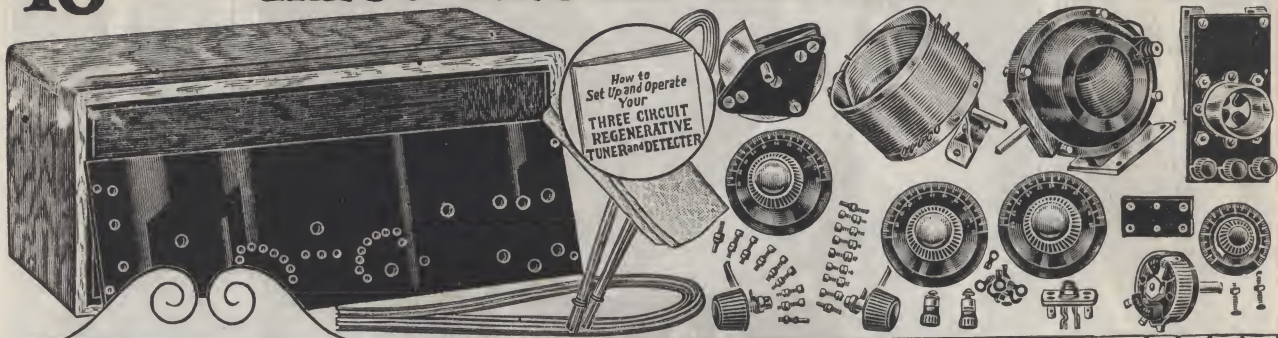


Ward's Blueprints and instructions shown on Page 58 are not technical. You can easily understand them. There is unusual satisfaction in creating a radio set from blueprints; and the information thus obtained is very helpful in operating your set or in helping friends who are in trouble with theirs.

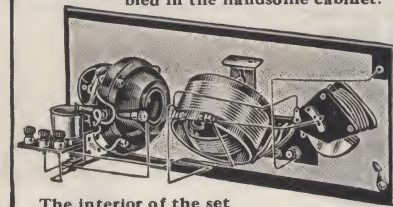


\$18<sup>25</sup>

# Three-Circuit Tuner and Detector



This illustration shows the Three Circuit Tuner and Detector completely assembled in the handsome cabinet.



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

## Build This Single Tube Three-Circuit Receiver

Standard Reliable Hookup Using Variocoupler, Variometer and Condenser. Very Sensitive and a Most Popular Receiver

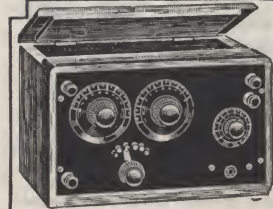
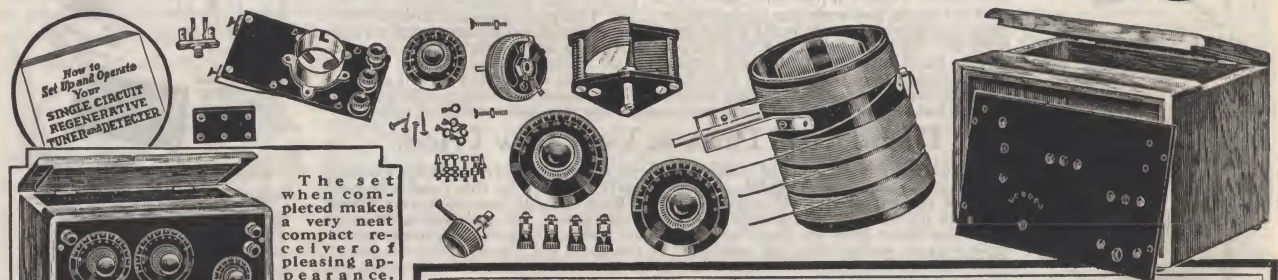
**Easily Assembled Means Big Saving** The construction work on this set has been carried to a point where all you have to do is fasten the parts in place, cut and fit the wires, solder them in place, put the set in its cabinet and you have a handsome and very reliable detector and tuner—a complete receiver—at 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.

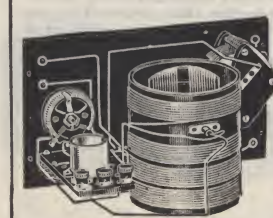
For the low price quoted you get all parts necessary to build this fine set. The panel, measuring 6 by 16 inches, is drilled ready for assembling. The cabinet is dark mahogany finish, hand rubbed, and has a hinged lid.

In addition the set includes a moulded variometer; fine quality 180 degree variocoupler; .0005 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. **563 R 532—Complete parts... \$18.25** Postage, 26¢ extra

# Single Circuit Tuner and Detector \$13<sup>50</sup>



The set when completed makes a very neat compact receiver of pleasing appearance. It will look just like the ready made sets you see offered for a great deal more.



The illustration at left shows you how the parts look mounted on the panel ready to be put in the case. Notice especially that only a few simple connections are necessary to build this set.

## 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 Fine Receiver** The single circuit hookup used in this set is well up 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.

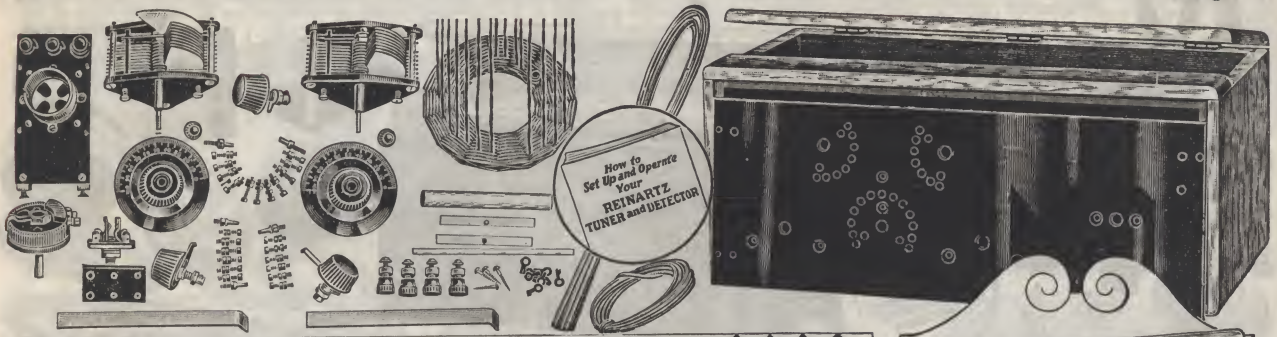
The panel is drilled all ready to assemble.

Cabinet, 11 by 7 by 7 1/2 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, variocoupler, green 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.

**563 R 534—Complete parts... \$13.50** Postage, 24¢ extra



# Reinartz One-Tube Receiver Parts Complete \$16<sup>45</sup>



## 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.

As 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 al-

ready 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.

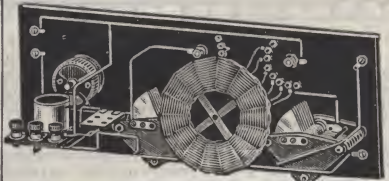
The Adam brown cabinet is 16 by 7 by 6 1/2 inches. The panel is cut to fit the cabinet and all the holes are drilled for mounting the instruments.

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 535**—Complete parts... \$16.45  
Postage, 28¢ extra

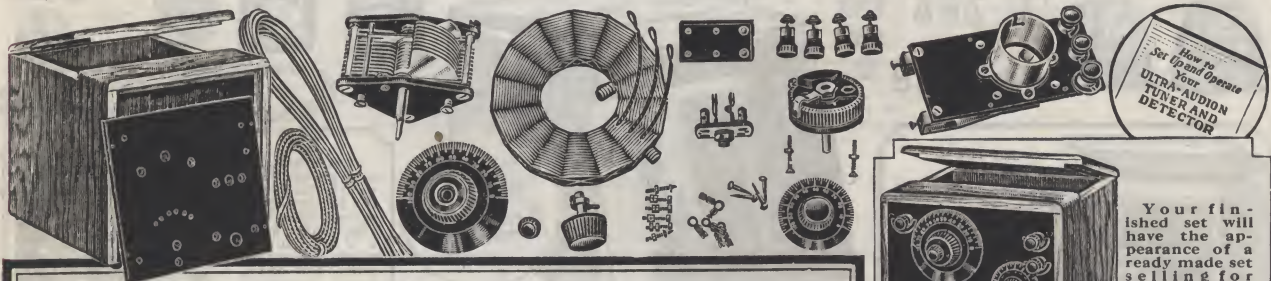


This illustration shows the Reinartz completely assembled in the handsome cabinet.



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

# \$10<sup>50</sup> Ultraudion One-Tube Receiver Parts

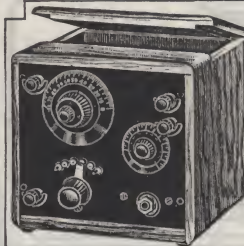


## A Long Distance Set Priced Low With These Well Made Parts You Can Assemble a Thoroughly Reliable Set in a Few Hours

**Distant Stations With One Tube** 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.

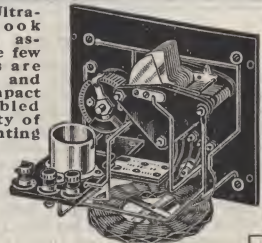
The complete parts for the Ultraudion include a 6 by 7 by 7 1/2-inch cabinet finished in Adam brown; hard rubber panel cut to fit cabinet and drilled; special Ultraudion coil; vernier variable condenser with dial; rheostat with dial; high grade socket with binding posts for connections (fits tubes with 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, 27¢ extra



Your finished set will have the appearance of a ready made set selling for much more. All wires to batteries are in rear out of sight.

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.





# \$16<sup>50</sup> Cockaday One-Tube Receiver



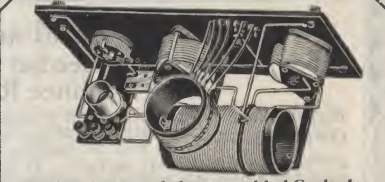
This shows you how the Cockaday Receiving Set appears when completed.

## 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.

### A Handsome Set

Because we know you want your radio to fit in with the furnishings of your home, we have carefully designed this set so it is neat and compact. The cabinet is finished in Adam brown imitation mahogany, and the dials and knobs are carefully matched. There are only two tuning dials. Every member of the family can quickly learn to bring in the daily programs. Music and voices are reproduced clearly and naturally—the tone is remarkable.



Behind the panel the assembled Cockaday set appears as shown in this picture. Notice the neat arrangement of the parts.

### 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.

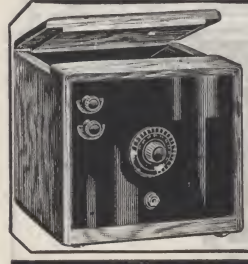
The parts we supply in our knocked down sets are all listed separately in this catalogue. They are high grade instruments, carefully matched to give best results. By purchasing the complete set of parts you make a considerable saving.

### Complete Parts at a Saving

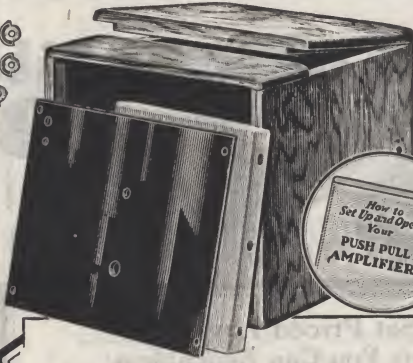
Cabinet is 7 by 16 inches; drilled panel. Set also includes two variable condensers with vernier knobs, rheostat, special socket with binding posts for easy connections (fits tube with standard base), Cockaday coil unit, grid leak, grid condenser, solderless jack, binding posts, mica condenser, wire,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

563 R 540—Complete Parts..... \$16.50  
Postage, 24¢ extra

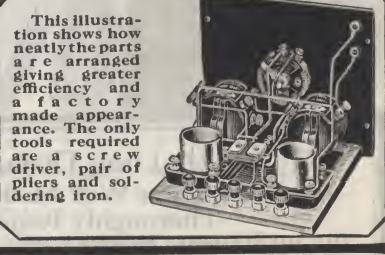
# Push-Pull Power Amplifier Parts \$17<sup>50</sup>



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.



How to Set Up and Operate Your PUSH PULL AMPLIFIER



This illustration shows how neatly the parts are arranged giving greater efficiency and a factory made appearance. The only tools required are a screw driver, pair of pliers and soldering iron.

## Works on New Principle Gives Great Volume

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 4½ 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 7½ 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.

563 R 542—Complete Parts..... \$17.50  
Postage, 14¢ extra

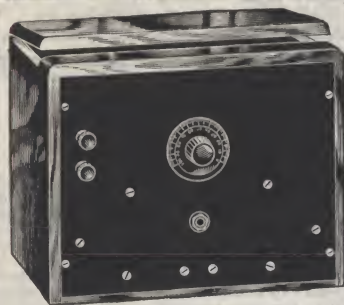
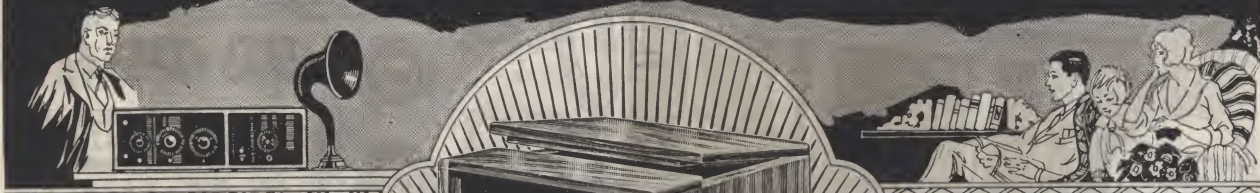
### Add This to the Set You Have

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



# Make Your One-Tube Set Loud Enough for a Loud Speaker with This Two-Stage Amplifier



All the Family Will Enjoy the Programs

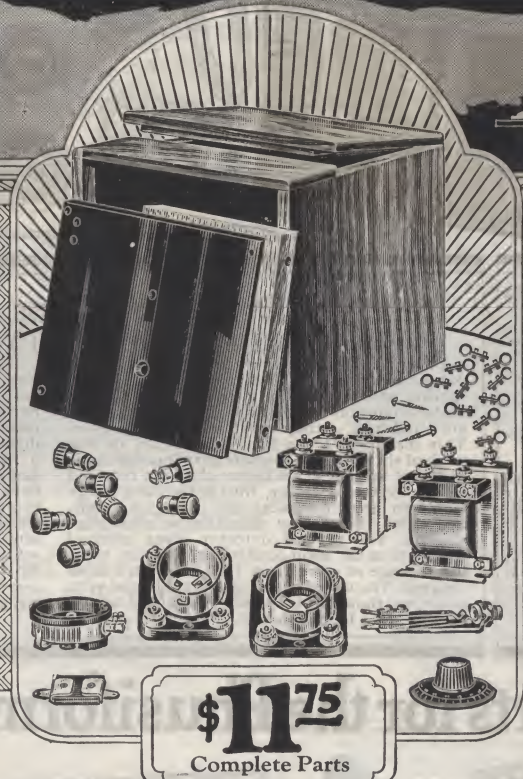
Although Priced Low This Amplifier Gives Great Volume with Unusual Clearness

**D**ANCE 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.



**\$11<sup>75</sup>**

Complete Parts

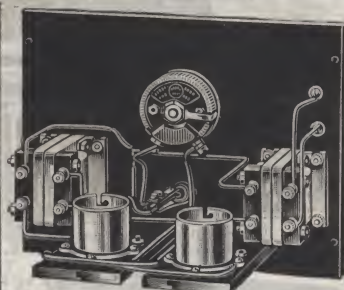
## Here Is What the Set Includes

The attractive Cabinet finished in Adam Brown imitation mahogany is 7¼ by 7¼ by 9½ 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.

563 R 544—Complete parts ..... \$11.75

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

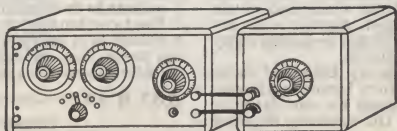
By using these parts and following the simple instructions, you can easily change your one-tube receiver into a three-tube set that will compare favorably with any ready made set you could buy. There is nothing complicated about assembling this amplifier. We furnish all the parts—the panel is cut to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



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

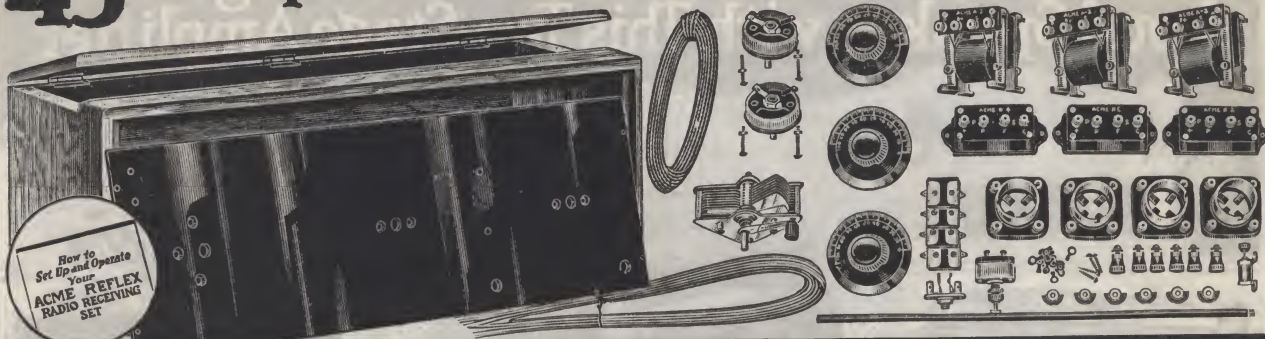
At the right is the Cockaday Receiver (shown on Page 26) attached to two-stage amplifier. This combination gives you a three-tube set.



At the left is the Ultra Air-line (shown on Page 6) or the Ultra Audion Receiving Set (listed knocked down on Page 25) together with the two-stage amplifier. With this hookup you have a three-tube set that will bring in stations hundreds of miles away strong enough to use a loud speaker so all may hear.



# \$45<sup>00</sup> Complete Parts for Acme Four-Tube Reflex



How to Set Up and Operate Your ACME REFLEX RADIO RECEIVING SET

## 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.

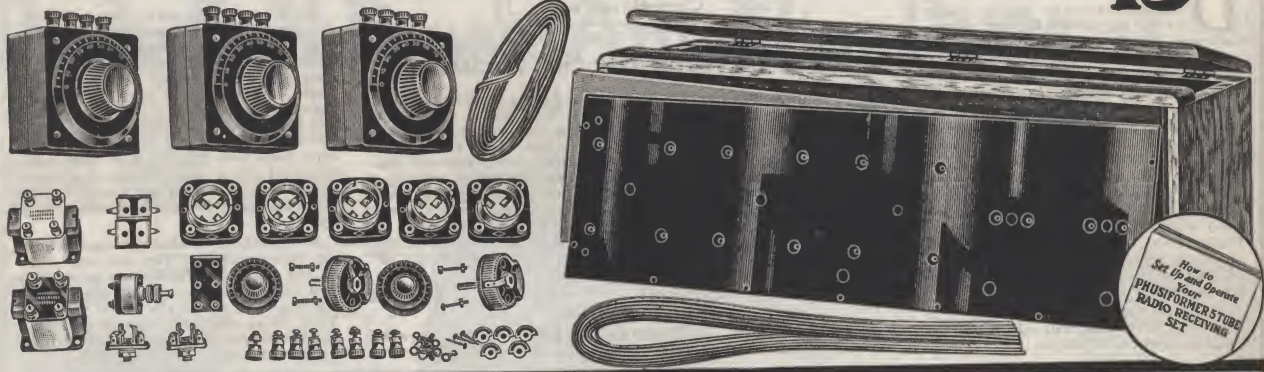
Complete instructions and all the parts necessary for assembling this set are included. The hardwood cabinet, neatly finished in Adam Brown mahogany is about 21½ by 8 by 7½ inches. The panel, made to fit the cabinet, is drilled for mounting the parts. Set also includes 3 Acme radio frequency transformers and 3 Acme audio frequency transformers, 4 standard base sockets specially designed to make connections easy, low loss variable condenser, potentiometer, rheostat, 5 fixed condensers, switch, semi-adjustable crystal for mounting on panel, solderless jack, binding posts, wire and screws. No batteries, loop antenna, tubes or other accessories included.

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

The set completed and enclosed in the handsome, Mahogany finished cabinet.

The inside of your set will look like this if you follow the instructions.

# Complete Parts for the Phusiformer Set \$43<sup>00</sup>



How to Set Up and Operate Your PHUSIFORMER TUBE RADIO RECEIVING SET

## 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 squeaks or howls, and the voice and music come in clear and unchanged. 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 24¼ by 7½ by 7¾-inch cabinet in the popular Adam Brown finish, panel drilled and cut to fit cabinet, 3 Phusiformers with dials, 2 rheostats with dials, 5 sockets to fit standard tubes, 2 solderless jacks, 2 fixed condensers, 2 audio transformers, combination grid leak and condenser, switch, binding posts, wire and screws. No batteries, tubes or other accessories included.

563 R 548—Complete parts.....\$43.00  
Postage, 42¢ extra

The finished set, showing the way the front of the panel appears.

Interior view of the completed set.



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

Complete, Ready to Assemble



## 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 Neutrodynes 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, ¼ inch thick by 27 inches long by 7 inches wide comes to you drilled, ready for mounting the parts. Every part fits perfectly. The Neutroformers, 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 just 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 cabinet) 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 correct for the use intended.

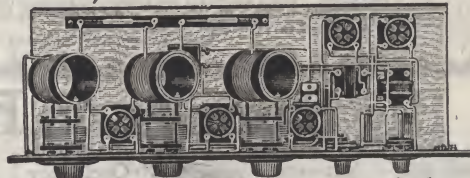
Great Selectivity and Volume. Neutrodyne Receiving Sets are super-sensitive and under favorable conditions will receive, on a loud speaker, powerful broadcasting stations as much as 1000 miles distant. We have testimonials from customers who have received even greater

distances than this. Stations a few hundred miles away come in very loud. With headphones it is possible to cover amazing distances 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—it is broadcasting—at the same dial settings, provided no changes have been made in the aerial or ground wires.

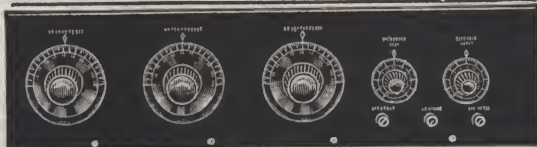
You Can Use Dry Cell Tubes. This Neutrodyne will give best results if you use Standard 6-volt tubes such as C-301A or UV-201A. If you can not use a storage battery you can employ UV-199 or C-299 tubes by using adapters 63 R 5203 shown on Page 44 and dry cells, and they will give excellent results.

Complete list of Parts shown at right. Shipping weight, complete set, 40 pounds.  
**563 R 676—Complete set. . . \$69.00**  
**563 R 6657—Special size cabinet to fit above set. Size, 7 by 27 inches. Finished in imitation Adam Brown Mahogany. . . . . \$4.45**  
 Postage, 32¢ extra



## As the Interior Looks When Finished

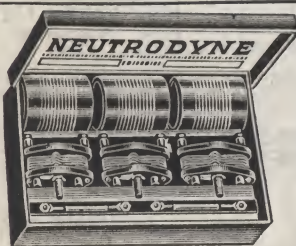
Freed-Eisemann 5-tube Neutrodyne set shown completely assembled here consists of the following: 3 Freed-Eisemann Neutroformers, each mounted on its variable tuning condenser; 2 neutralizing condensers (neutrodons); 5 molded bakelite tube sockets; 3 dials (4-inch); 2 rheostat dials; 2 audio frequency transformers; 3 filament control jacks; bakelite panel, drilled; baseboard; tinned connecting wires; insulating tubing; grid leak; fixed condensers; binding posts; screws; soldering lugs; 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 6657, 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.



Contains the Five Essential Parts for the Neutrodyne

## \$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 Neutroformers are mounted on the variable condensers at the factory in their correct position. Condenser shaft, ¼ inch. Tubes are formica. The Neutrodons, or neutralizing condensers, are mounted on a bakelite strip. Screws for mounting. Set includes working diagram and instructions for 5-tube Neutrodyne.

**63 R 6114. . . . . \$20.75**  
 Postage, 30¢ extra



## 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 formica tubing. Windings are silk covered wire. Designed to cover all broadcasting wave lengths. To be used in sets of three. Diameter of condenser shaft, ¼ inch.

**63 R 6120—Each. . . . . \$2.95**  
**63 R 6134—Set of 3. . . . . 7.95**  
 Postage, each, 10¢ extra



## Micro Condenser

These provide a 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.

**63 R 6118—Per pair. . . . . 57¢**  
 Postage, per pair, 6¢ extra



## Radio Frequency Transformer

For use on all wave lengths. Wound on formica tubes. It is advisable to use condensers of 00025 capacity with these transform rs.

**63 R 6487—Each. . . . . \$1.48**  
**63 R 6499—Set of 3. . . . . 4.35**  
 Postage, each, 4¢ extra



# Superheterodyne Parts at Ward's Low Prices

The Superheterodyne is probably the greatest advance in recent years in the perfection of radio receiving. Like any instrument 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 principal controls. The received music or speech 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 sets 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

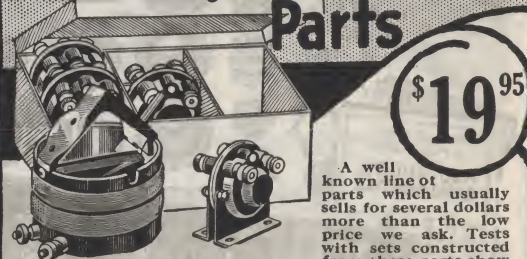


**\$21.95**

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 outfit consists of an oscillator coupler, one tuned stage input transformer, three intermediate radio frequency transformers. The input transformer and the three radio frequency transformers are carefully designed to operate at 45000 cycles. The transformers are all mounted in neat metal cases with the binding post connections plainly marked. Oscillator coupler is adjustable in range. Because of the small size of the Remler parts Superheterodynes built up of them take less space than is usually required. With each kit we supply a wiring diagram, and full size baseboard layout of parts. See Page 44 for Remler sockets.

63 R 6225—Per set ..... **\$21.95**  
Postage, per set, 8¢ extra

## Bakelite Superheterodyne Parts



**\$19.95**

A well known line of parts which usually sells for several dollars more than the low price we ask. Tests with sets constructed from these parts show them to be equal to the best. The 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. It is adjustable and may be set to cover the entire band of broadcasting 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 instructions and a wiring diagram.

63 R 6226—Per set ..... **\$19.95**  
Postage, per set, 11¢ extra

# Big Savings on Fine Quality Ultradyne Parts



**Antenna Coupling Coil \$1.89**

Consists of correctly designed primary and secondary coils carefully wound with green silk covered wire on a formica tube 3 inches in diameter. Primary untuned, secondary to be tuned with a variable condenser. Binding post connections and metal brackets for table or panel mounting. Designed to cover all broadcasting waves.

63 R 6094 ..... **\$1.89**  
Postage, 6¢ extra



**Oscillator Coil \$1.89**

Designed for use in the Ultradyne circuit. Consists of two windings on a formica tube 3 inches in diameter. One winding is for the grid and the other is for the plate circuit. Correctly proportioned to cover all broadcasting waves. Has binding post connections and metal brackets for table or panel mounting. Windings of silk covered wire. You make a saving at Ward's low price.

63 R 6095 ..... **\$1.89**  
Postage, 5¢ extra



**Intermediate Frequency and Input Transformers**

Well made Ultradyne Transformers. In sets of four consisting of one input transformer and three intermediate radio frequency transformers. Transformers are carefully wound and designed to operate efficiently. Hand-somely mounted in bakelite case, 3/4 inches in diameter, fitted with plainly marked binding posts for easy connection. Metal brackets for panel or table mounting.

63 R 6096—  
Set of 4 ..... **\$21.50**  
Postage, per set, 8¢ extra

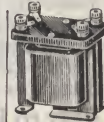


**Acme 30 K.C.**

**\$4.20**

The Acme 30 K.C. Transformer is of the iron core type. The windings are designed to give greatest amplification at 30 kilocycles or 10,000 meters. It is arranged for table or panel mounting and connections are brought out to plainly marked binding posts mounted on a bakelite terminal board.

63 R 6093 ..... **\$4.20**  
Postage, 5¢ extra



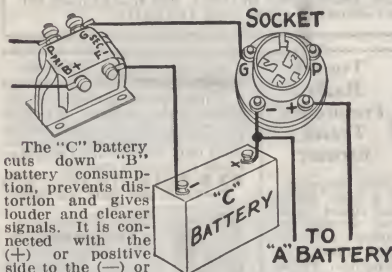
**Kellogg / Superheterodyne Transformers**

Iron core type, enclosed in a metal shell with a bakelite terminal board on top. Plainly marked nickel plated binding posts. Designed for use in sets of four consisting of three superheterodyne and one filter transformer. Filter transformers designed to peak sharply at 45 kilocycles and superheterodyne transformers from 35 to 45 kilocycles.

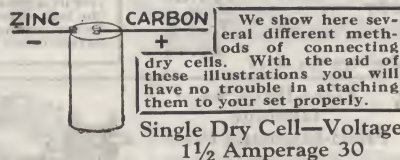
63 R 6005—Superheterodyne transformer ..... **\$4.19**  
63 R 6006—Filter transformer ..... **\$4.19**  
Postage, each, 6¢ extra

# Useful Hints on Connecting Dry Cells

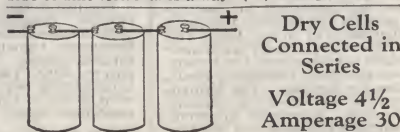
## "C" Battery Used in Circuit



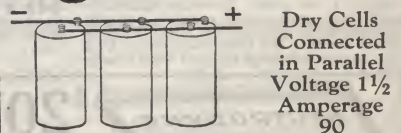
The "C" battery cuts down "B" battery consumption, prevents distortion and gives louder and clearer signals. It is connected with the (+) or positive side to the (-) or negative filament terminal of the tube socket. The (-) or negative side of the "C" battery is connected to the F (-) or grid return lead of the amplifying transformers as shown. From 3 to 4 1/2 volts. Should be used with 90 volts of "B" battery. The best voltage is determined by experiment.



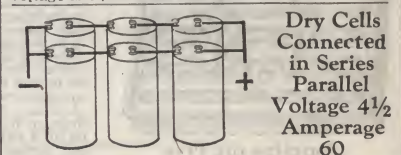
The center or carbon terminal of a standard Dry Cell is always the (+) or positive. The outside or zinc terminal is always (-) or negative.



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.



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.



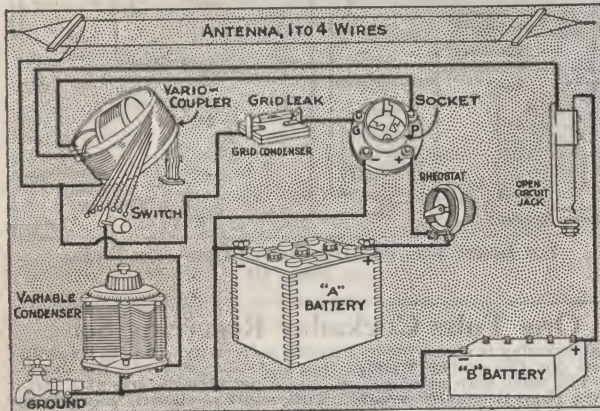
By a combination of series and parallel connection any desired voltage and amperage may be obtained.



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.

# Standard Radio Circuits



## 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 extra 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

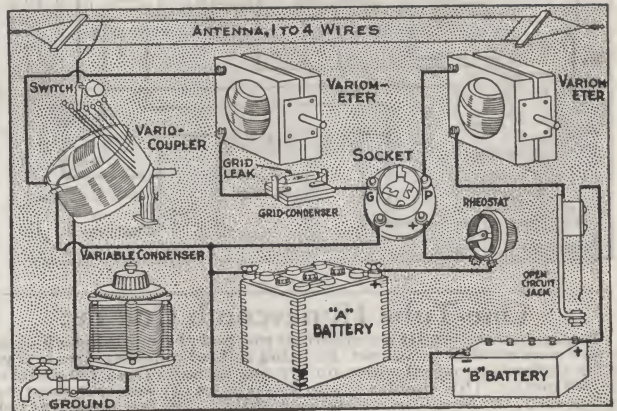
- Antenna Wires, Insulators, etc., or complete Antenna Equipment, Pages 54, 55.
- One Variocoupler. Pages 48 and 49.
- One .0005 mfd. (about 23 plate) Variable Condenser. Pages 46 and 47.
- Switch Lever and Switch Points (taps). Page 53.
- One .00025 mfd. Grid Condenser and one 2-megohm Grid Leak. Pages 46, 47.
- One Vacuum Tube, storage or dry cell type. Pages 36 and 37.
- Socket to fit tube selected. Page 44.
- One rheostat to match tube selected. Page 45.
- One 22½-volt "B" Battery. Page 38.
- Storage or Dry Cell "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-stage amplifier shown on Page 33 makes this set the equal of many high priced 3-tube receiving sets.

### Lists of Parts for the Three Circuit Tuner

- Antenna Wire, Insulator, etc., or, the complete Antenna Equipment Pages 54 55.
- One Variocoupler. Pages 48 and 49.
- Switch Lever and Switch Points (taps). Page 53.
- Two Variometers. Pages 48 and 49.
- One .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 .00025 mfd. Grid Condenser and one 21-megohm Grid Leak. Pages 36, 37.
- Storage or Dry Cell "A" Battery, depending on tube chosen. Pages 38 and 39.
- One 22½-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.)

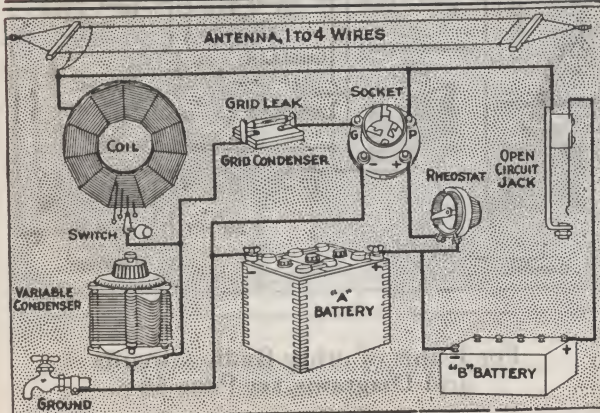


## One-Tube Ultraudion Set

The Ultraudion 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 for dry cell tubes, and for this reason makes an ideal one-tube portable set for vacation use.

### List of Parts Necessary for the Ultraudion

- Antenna Wire, Insulators, etc., or complete Antenna Equipment. Pages 54, 55.
- Ultraudion Coil. Page 49.
- Switch Lever and Switch Points. Page 53.
- One .0005 mfd. (about 23 plate) Vernier Variable Condenser. Pages 46, 47.
- One .00025 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.
- Storage or Dry Cell "A" Battery, as desired. Pages 38 and 39.
- One 22½-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.





# Choose the Circuit You Like Best

## One-Tube Reinartz 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 Reinartz 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 Reinartz Tuner

Antenna wires, insulators, etc. or complete antenna equipment shown on Pages 54 and 55.

One Reinartz Coil shown on Page 49.

Switch points (taps) and 3 switch levers, Page 53.

Two .00025 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 Socket to match tube selected. Page 44.

One Rheostat to match tube selected. Page 45.

Storage or dry cell "A" Battery depending on tube chosen. Pages 38 and 39.

22½-volt "B" Battery. Page 39.

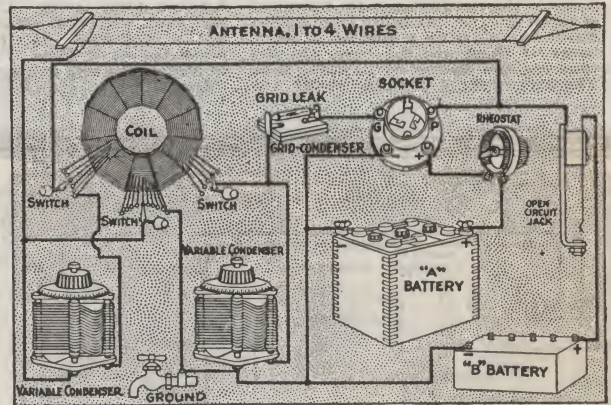
One open circuit Jack. Page 53.

One or more Head Sets. Page 42.

Panel and Cabinet if desired. We recommend 7 by 16-inch. Pages 47 and 66.

Necessary Binding Posts. Page 53.

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



For Interesting and Instructive Books on Radio, see Page 59

## 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, Insulators, etc. or complete Antenna Equipment shown on Pages 54 and 55.

One Cockaday Coil. Page 49.

Switch Taps and Switch Lever. Page 53.

Two .0005 mfd. Vernier Variable Condensers (about 23-plate). 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. Pages 36 and 37.

Socket to fit tube selected. Page 44.

One Rheostat to match tube selected. Page 45.

One Storage or Dry Cell "A" Battery depending on tube chosen. Pages 38 and 39.

22½-volt "B" Battery. Page 39.

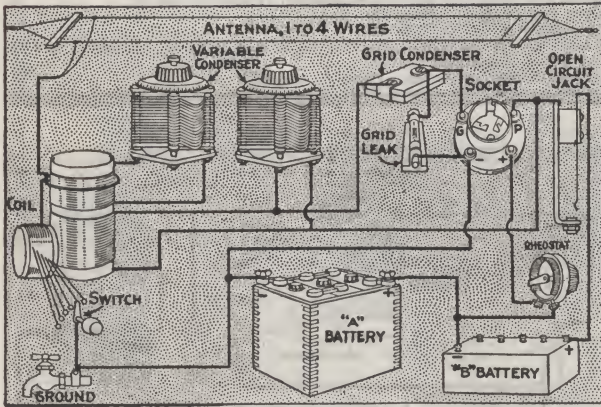
One open circuit Jack. Page 53.

One or more pairs of Head Sets. Page 42.

Panel and Cabinet if desired. We recommend 6 by 16-inch size. Pages 47 and 66.

Necessary Binding Posts. Page 53.

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



## 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 100 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 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 wave length 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, 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 43-plate) Variable Condensers. Pages 46 and 47.

Variable Condenser shown in ground lead may be placed across antenna and ground as indicated by dotted lines.

One Vacuum Tube storage or dry cell battery type. Pages 36 and 37.

One Socket to fit tube selected. Page 44.

One Rheostat to match tube selected. Page 45.

One .00025 mfd. Grid Condenser and 2 megohm Grid Leak. Pages 36 and 37.

One storage or dry cell "A" Battery as desired. Pages 38 and 39.

22½-volt "B" Battery. Page 39.

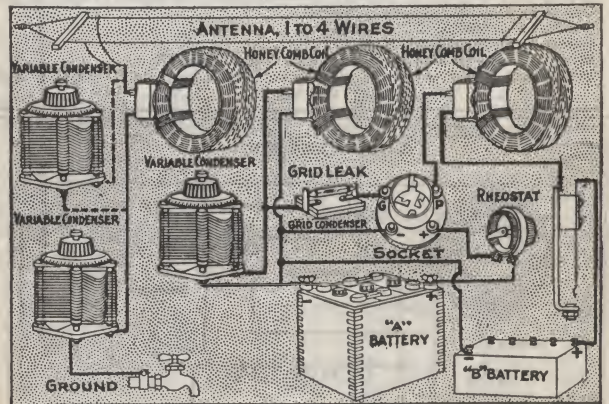
One open circuit Jack. Page 53.

One or more Head Sets. Page 42.

Panel and Cabinet. We recommend 7 by 18-inch size. Pages 47 and 66.

Binding Posts. Page 53.

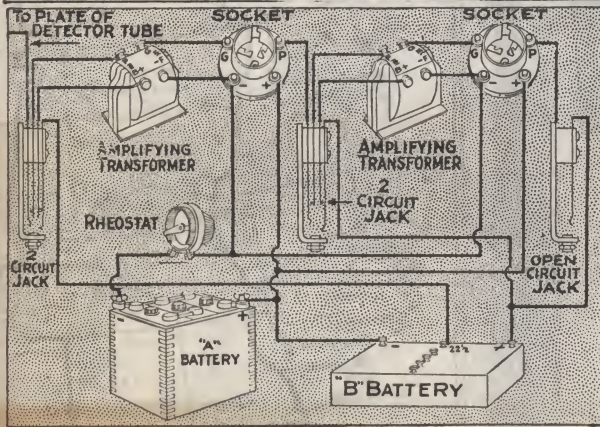
Necessary connecting Wire, Screws, etc. Pages 55 and 57.



For Prints of other Radio Circuits and Diagrams, see Page 58



# Save by Buying the Parts at Ward's



## 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

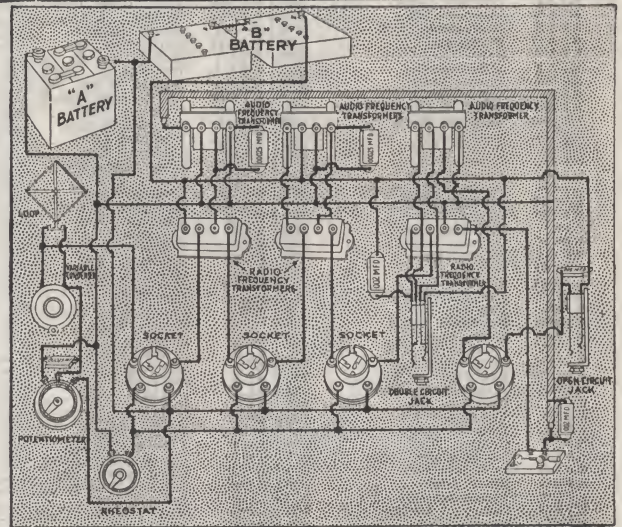
- Two audio frequency amplifying Transformers. Page 50.
- Two Vacuum Tubes, dry cell or storage battery type. Pages 36 and 37.
- Two Sockets to fit tubes selected. Page 44.
- One Rheostat for use with tubes selected. Page 45.
- Two double circuit and one single circuit Jacks. Page 53.
- Storage or dry 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.
- Necessary Binding Posts. Page 53.
- Connecting Wire, Screws, etc. Pages 55 and 57.

## The Acme Reflex Set

This reflex is probably one of the finest present day radio receiving sets. With it you may secure 6-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.
- One double circuit Jack. One single circuit Jack. Page 53.
- 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.

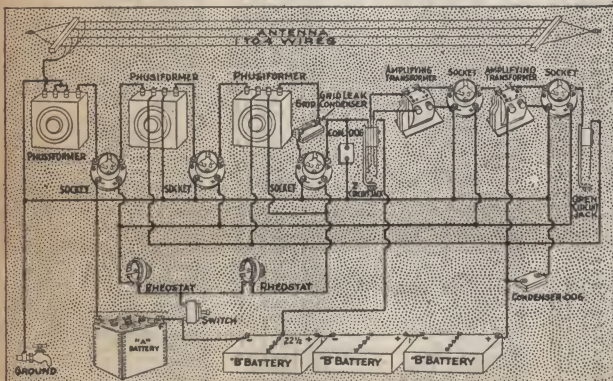


## The Phusiformer Set

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.
- Two .006 mfd. Fixed Condensers. Page 46.
- 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





"Uncle Bob"  
K Y W



Musical Director  
W L A G

List of United States Broadcasting Stations

Call Letters	City	Wave Length In Meters	Call Letters	City	Wave Length In Meters
KDKA	East Pittsburgh, Pa.	326	KFLE	Denver, Colo.	268
KDPM	Cleveland, O.	270	KFLH	Salt Lake City, Utah	261
KDPT	San Diego, Calif.	244	KFLP	Cedar Rapids, Ia.	240
KDYL	Salt Lake City, Utah	280	KFLQ	Little Rock, Ark.	261
KDYO	Portland, Ore.	360	KFLR	Albuquerque, N. M.	254
KDYW	Phoenix, Ariz.	360	KFLU	San Benito, Tex.	236
KDYX	Honolulu, Hawaii	360	KFLV	Rockford, Ill.	229
KDZB	Bakersfield, Calif.	240	KFLW	Missoula, Mont.	234
KDZE	Seattle, Wash.	270	KFLX	Galveston, Tex.	240
KDZF	Los Angeles, Calif.	278	KFLY	Fargo, N. D.	231
KDZI	Wenatchee, Wash.	360	KFLZ	Atlantic, Ia.	273
KDZO	Denver, Colo.	360	KFMB	Little Rock, Ark.	254
KDZR	Bellingham, Wash.	261	KFMR	Sioux City, Ia.	261
KFD	Phoenix, Ariz.	360	KFMS	Duluth, Minn.	275
KFAE	Pullman, Wash.	330	KFMT	Minneapolis, Minn.	231
KFAF	Denver, Colo.	360	KFMX	Northfield, Minn.	283
KFAJ	Boulder, Colo.	360	KFMY	Long Beach, Calif.	229
KFAN	Moscow, Ida.	360	KFMZ	Roswell, N. Mex.	250
KFAR	Hollywood, Calif.	280	KFNF	Shenandoah, Ia.	266
KFAU	Boise, Ida.	238	KFNH	Springfield, Mo.	236
KFAW	Medford, Ore.	283	KFNY	Helena, Mont.	231
KFAY	Medford, Ore.	283	KFNZ	Burlingame, Calif.	231
KFBB	Havre, Mont.	360	KFOA	Seattle, Wash.	455
KFBC	San Diego, Calif.	278	KFOB	Minneapolis, Minn.	224
KFBE	San Luis Obispo, Calif.	360	KFOC	Whittier, Calif.	236
KFBG	Tacoma, Wash.	360	KFOF	Marshallfield, Ore.	240
KFBK	Sacramento, Calif.	283	KFOH	Portland, Ore.	233
KFBL	Everett, Wash.	224	KFOJ	Moberly, Mo.	246
KFBU	Laramie, Wyo.	283	KFON	Long Beach, Calif.	234
KFCB	Phoenix, Ariz.	238	KFOP	Dallas, Tex.	268
KFCF	Walla Walla, Wash.	360	KFPB	Seattle, Wash.	224
KFCG	Billings, Mont.	360	KFSG	Los Angeles, Calif.	278
KFCO	Ogden, Utah	360	KGB	Tacoma, Wash.	252
KFCV	Portland, Ore.	360	KGC	Portland, Ore.	360
KFCZ	Omaha, Neb.	258	KGN	Portland, Ore.	360
KFDA	Baker, Ore.	360	KGO	Oakland, Calif.	312
KFDD	Boise, Ida.	252	KGU	Honolulu, Hawaii	360
KFDH	Tucson, Ariz.	360	KGW	Portland, Ore.	492
KFDJ	Corvallis, Ore.	360	KGY	Lacey, Wash.	258
KFDK	Denver, Colo.	360	KHJ	Los Angeles, Calif.	360
KFDO	Bozeman, Mont.	248	KHO	Seattle, Wash.	360
KFDR	York, Neb.	360	KJO	Stockton, Calif.	360
KFDV	Fayetteville, Ark.	360	KJR	Seattle, Wash.	283
KFDX	Shreveport, La.	360	KJS	Los Angeles, Calif.	360
KFDY	Brookings, S. D.	360	KLS	Oakland, Calif.	360
KFDZ	Minneapolis, Minn.	241	KLY	Oakland, Calif.	360
KFE	Denver, Colo.	360	KLZ	Denver, Colo.	360
KFEJ	Tacoma, Wash.	248	KMJ	Fresno, Calif.	273
KFEL	Denver, Colo.	360	KMO	Tacoma, Wash.	360
KFEV	Casper, Wyo.	263	KNT	Aberdeen, Wash.	263
KFEK	Minneapolis, Minn.	261	KNV	Los Angeles, Calif.	256
KFEZ	St. Louis, Mo.	360	KNX	Los Angeles, Calif.	360
KFF	Boise, Ida.	240	KOB	State College, N. M.	345
KFFE	Pendleton, Ore.	360	KOP	Detroit, Mich.	286
KFFO	Colorado Springs, Colo.	360	KPO	San Francisco, Calif.	423
KFFR	Sparks, Nev.	226	KOV	Pittsburgh, Pa.	360
KFFV	Lamoni, Ia.	360	KOW	San Jose, Calif.	360
KFFX	Omaha, Neb.	278	KRE	Berkeley, Calif.	275
KFFY	Alexandria, La.	275	KSD	St. Louis, Mo.	546
KFFZ	Dallas, Tex.	226	KSS	Long Beach, Calif.	360
KFGC	Portland, Ore.	360	KTW	Seattle, Wash.	360
KFGD	Baton Rouge, La.	254	KUO	San Francisco, Calif.	360
KFGF	Chickasha, Okla.	248	KUS	Los Angeles, Calif.	360
KFGG	Boone, Ia.	226	KUS	Los Angeles, Calif.	360
KFGH	Berrien Springs, Mich.	268	KWG	Stockton, Calif.	360
KFHA	Gunnison, Colo.	252	KWH	Los Angeles, Calif.	360
KFHB	Hood River, Ore.	240	KWD	Modesto, Calif.	352
KFHD	St. Joseph, Mo.	226	KYO	Honolulu, Hawaii	270
KFHF	Shreveport, La.	266	KYW	Chicago, Ill.	536
KFHH	Neah Bay, Wash.	261	KZM	Oakland, Calif.	360
KFHI	Santa Barbara, Calif.	360	KZV	Salt Lake City, Utah	360
KFHR	Seattle, Wash.	283	KZN	Wenatchee, Wash.	360
KFHS	Little River, Ore.	240	WA	San Francisco, Calif.	360
KFHX	Hutchinson, Kan.	229	WAAC	New Orleans, La.	266
KFI	Los Angeles, Calif.	469	WAAD	Cincinnati, O.	360
KFIF	Portland, Ore.	360	WAAF	Chicago, Ill.	286
KFIO	Spokane, Wash.	252	WAAM	Newark, N. J.	263
KFII	Yakima, Wash.	242	WAAN	Columbia, Mo.	254
KFIS	Juneau, Alaska	246	WAAP	Omaha, Neb.	360
KFIT	Independence, Mo.	243	WABA	Springfield, Ill.	266
KFJB	Marshalltown, Ia.	248	WABB	Harrisburg, Pa.	266
KFJC	Seattle, Wash.	270	WABD	Dayton, O.	283
KFJD	Oklahoma City, Okla.	252	WABE	Washington, D. C.	283
KFJE	Astoria, Ore.	252	WABG	Jacksonville, Fla.	275
KFJM	Grand Forks, N. D.	280	WABH	Sandusky, O.	240
KFJN	Kingston, N. D.	240	WAAW	Taylor, Mo.	240
KFJO	Stevensville, Mont.	258	WABK	Worcester, Mass.	252
KFJP	Fort Dodge, Ia.	246	WABM	Saginaw, Mich.	254
KFJQ	Fort Worth, Tex.	254	WABN	La Crosse, Wis.	244
KFKA	Greeley, Colo.	248	WABO	Rochester, N. Y.	252
KFKB	Milford, Kan.	286	WABP	Haverford, Pa.	261
KFKC	Butte, Mont.	283	WABR	Toledo, O.	270
KFKD	Hastings, Neb.	344	WABS	St. Louis, Mo.	244
KFKZ	Colorado Springs, Colo.	234	WABT	Washington, Pa.	252
KFLA	Butte, Mont.	283	WABU	Camden, N. J.	226
KFLB	Menominee, Mich.	248	WABV	Nashville, Tenn.	263

Almost 600 Broa  
in the Unit



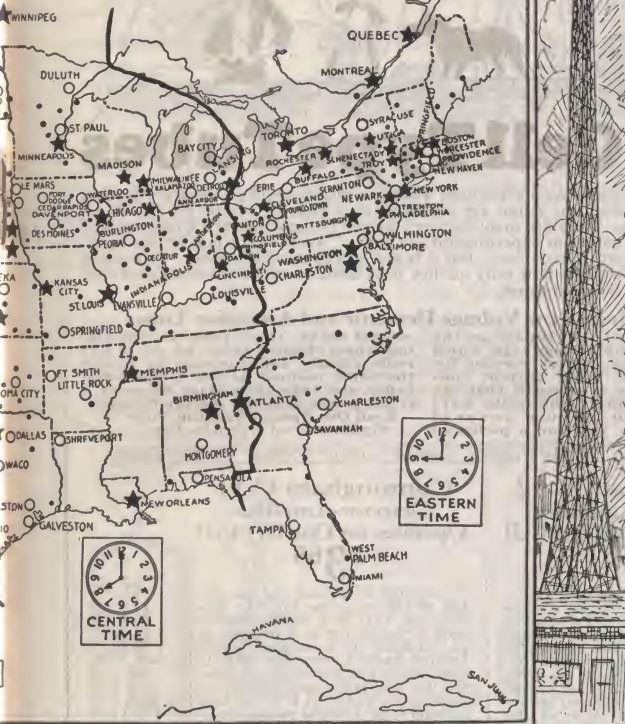
No matter where you live, there are Broadcasting Stations near you. This map shows only the largest stations. Listed on this page, however, you will find practically all the most prominent stations with call letters and wave lengths up to date. When you remember that each of these stations has a range of hundreds of miles, and the largest ones thousands of miles, you will appreciate what wonderful radio opportunities are yours with a Radio Set in your home.

Call Letters	City	Wave Length In Meters	Call Letters	City	Wave Length In Meters
WABX	Mt. Clemens, Mich.	270	WCAY	Milwaukee, Wis.	261
WABY	Philadelphia, Pa.	242	WCBA	Allentown, Pa.	280
WABZ	New Orleans, La.	263	WCBC	Ann Arbor, Mich.	280
WBAD	Minneapolis, Minn.	360	WCBD	Zion, Ill.	345
WBAH	Minneapolis, Minn.	417	WCBE	New Orleans, La.	263
WBAN	Paterson, N. J.	244	WCBG	Pascagoula, Miss.	254
WBAP	Fort Worth, Tex.	476	WCBH	Oxford, Miss.	242
WBAV	Columbus, O.	390	WCK	St. Louis, Mo.	360
WBAX	Wilkesbarre, Pa.	360	WCM	Austin, Tex.	360
WBAY	New York, N. Y.	492	WCX	Detroit, Mich.	517
WBBA	Newark, O.	240	WDAE	Tampa, Fla.	360
WBBD	Reading, Pa.	234	WDAF	Kansas City, Mo.	411
WBBE	Syracuse, N. Y.	246	WDAG	Amarillo, Tex.	263
WBBF	Atlanta, Ga.	270	WDAH	El Paso, Tex.	268
WBBI	Port Huron, Mich.	246	WDAK	Hartford, Conn.	261
WBBS	Indianapolis, Ind.	244	WDAO	Lancaster, Pa.	360
WBBJ	West Palm Beach, Fla.	258	WDAP	Chicago, Ill.	360
WBBL	Richmond, Va.	283	WDAR	Philadelphia, Pa.	395
WBBN	Wilmington, N. C.	275	WDAS	Worcester, Mass.	360
WBBO	Pawtucket, R. I.	252	WDAU	New Bedford, Mass.	360
WBBR	Rossville, N. Y.	244	WDAY	Fargo, N. D.	244
WBBS	New Orleans, La.	250	WDIC	Lancaster, Pa.	283
WBBT	Philadelphia, Pa.	264	WDM	Washington, D. C.	234
WBVB	Johnstown, Pa.	248	WEAA	Flint, Mich.	250
WBVV	Norfolk, Va.	222	WEAF	New York, N. Y.	492
WBWB	Charleston, S. C.	268	WEAH	Wichita, Kan.	280
WBW	Indianapolis, Ind.	227	WEAJ	Ithaca, N. Y.	286
WBZ	Springfield, Mass.	337	WEAL	Vermillion, S. D.	283
WCAD	Canton, N. Y.	280	WEAM	North Plainfield, N. J.	252
WCAG	Pittsburgh, Pa.	462	WEAN	Providence, R. I.	273
WCAN	New Orleans, La.	268	WEAO	Columbus, O.	360
WCAP	Houston, Tex.	263	WEAP	Mobile, Ala.	360
WCAL	Northfield, Minn.	360	WEAR	Baltimore, Md.	360
WCAO	Baltimore, Md.	360	WEAS	Washington, D. C.	360
WCAR	Washington, D. C.	469	WEAU	St. Louis, Mo.	273
WCAS	San Antonio, Tex.	360	WEBH	Chicago, Ill.	370
WCAT	Minneapolis, Minn.	280	WEV	Houston, Tex.	360
WCAX	Little Rock, Ark.	360	WEW	St. Louis, Mo.	261
WCAY	Burlington, Vt.	360	WEA	Dallas, Tex.	476
WCAX	Burlington, Vt.	360	WFAB	Syracuse, N. Y.	234
WCAX	Burlington, Vt.	360	WFVX	Poughkeepsie, N. Y.	360
WCAX	Burlington, Vt.	360	WFAH	Port Arthur, Tex.	236
WCAX	Burlington, Vt.	360	WFAJ	Asheville, N. C.	360



# Broadcasting Stations

## United States



Most of these stations transmit programs during the day and at night. The programs and time of broadcasting usually are printed in local newspapers. The heavy lines and clock faces on the map show the time changes in different parts of the country. They will help you determine the hour you can expect to listen in on stations in other time zones. The wave lengths given with each station will be useful in tuning for stations at a long distance.

Call Letters	City	Wave Length in Meters	Call Letters	City	Wave Length in Meters
WFAN	Hutchinson, Minn.	360	WJAO	Topeka, Kan.	360
WGAN	Pensacola, Fla.	360	WJAR	Providence, R. I.	360
WGAO	Shreveport, La.	252	WJAS	Pittsburgh, Pa.	250
WGAW	Altoona, Pa.	261	WJAT	Marshall, Mo.	360
WGAZ	South Bend, Ind.	360	WJAX	Cleveland, O.	390
WGI	Medford Hillside, Mass.	360	WJAZ	Chicago, Ill.	448
WGL	Philadelphia, Pa.	360	WJD	Granville, O.	229
WGN	Chicago, Ill.	370	WJH	Washington, D. C.	273
WGR	Buffalo, N. Y.	319	WJX	New York, N. Y.	360
WGV	New Orleans, La.	242	WJO	New York, N. Y.	405
WGY	Schenectady, N. Y.	380	WJY	New York, N. Y.	455
WHA	Madison, Wis.	360	WKAA	Cedar Rapids, Ia.	268
WHAA	Iowa City, Ia.	484	WKAD	East Providence, R. I.	240
WHAB	Galveston, Tex.	360	WKAF	Wichita Falls, Tex.	360
WHAD	Milwaukee, Wis.	280	WKAN	Montgomery, Ala.	226
WHAG	Cincinnati, O.	222	WKAQ	San Juan, Porto Rico.	360
WHAK	Clarksburg, W. Va.	258	WKAR	East Lansing, Mich.	280
WHAM	Rochester, N. Y.	283	WKAV	Laconia, N. H.	254
WHAR	Atlantic City, N. J.	231	WKAY	Gainesville, Ga.	280
WHAS	Louisville, Ky.	400	WKY	Oklahoma, Okla.	360
WHAV	Wilmington, Del.	360	WLAG	Minneapolis, Minn.	417
WHAZ	Troy, N. Y.	380	WLAI	Syracuse, N. Y.	234
WHB	Kansas City, Mo.	411	WLAL	Waco, Tex.	360
WHK	Cleveland, O.	283	WLAK	Bellows Falls, Vt.	360
WHN	New York, N. Y.	360	WLTA	Tulsa, Okla.	360
WIAB	Rockford, Ill.	252	WLAP	Louisville, Ky.	360
WIAC	Galveston, Tex.	360	WLAQ	Kalamazoo, Mich.	283
WIAD	Philadelphia, Pa.	254	WLAW	Pensacola, Fla.	254
WIAG	New Orleans, La.	234	WLAX	New York, N. Y.	354
WIAI	Springfield, Mo.	252	WLAX	Greencastle, Ind.	231
WIAJ	Nenah, Wis.	221	WLAX	Minneapolis, Minn.	360
WIAK	Omaha, Neb.	278	WLS	Chicago, Ill.	345
WIAO	Milwaukee, Wis.	360	WLW	Cincinnati, O.	423
WIAQ	Marion, Ind.	226	WLAB	Oklahoma, Okla.	360
WIAF	Paducah, Ky.	360	WMAF	Dartmouth, Mass.	360
WIAS	Burlington, Ia.	360	WMAH	Lincoln, Neb.	250
WIAU	Le Mars, Ia.	360	WMAJ	Kansas City, Mo.	275
WIVL	Washington, D. C.	360	WMAK	Lockport, N. Y.	360
WIP	Philadelphia, Pa.	509	WMAL	Trenton, N. J.	256
WJAD	Waco, Tex.	360	WMAN	Columbus, O.	286
WJAF	Muncie, Ind.	360	WMAQ	Chicago, Ill.	448
WJAG	Norfolk, Neb.	283	WMAW	New York, N. Y.	250
WJAK	Greentown, Ind.	254	WMAZ	St. Louis, Mo.	280
WJAM	Cedar Rapids, Ia.	268	WMAZ	Macon, Ga.	268
WJAN	Peoria, Ill.	280	WMC	Memphis, Tenn.	500

### The "Hired Hand" W B A P



"The Sandman" W O C



Chief Announcer K D K A

Call Letters	City	Wave Length in Meters
WMU	Washington, D. C.	261
WNAJ	Boston, Mass.	278
WNAO	Norman, Okla.	360
WNAI	Omaha, Neb.	266
WNAK	Syracuse, N. Y.	286
WNAQ	Springfield, O.	275
WNAQ	Charleston, S. C.	360
WNAS	Austin, Tex.	360
WNAU	Philadelphia, Pa.	360
WNAV	Knoxville, Tenn.	236
WNAW	Fort Monroe, Va.	360
WNAZ	Yankton, S. D.	244
WNJ	Albany, N. Y.	360
WOAC	Lima, O.	266
WOAE	Fremont, Neb.	360
WOAF	Tyler, Tex.	360
WOAG	Belvidere, Ill.	273
WOAH	Charleston, S. C.	360
WOAI	San Antonio, Tex.	385
WOAP	Kalamazoo, Mich.	283
WOAT	Wilmington, Del.	360
WOAV	Erie, Pa.	242
WOAW	Omaha, Neb.	526
WOAX	Trenton, N. J.	240
WOC	Davenport, Ia.	484
WOD	Ames, Ia.	309
WOO	Philadelphia, Pa.	360
WOQ	Kansas City, Mo.	360
WOR	Newark, N. J.	405
WOS	Jefferson City, Mo.	441
WPAB	State College, Pa.	283
WPAC	Okmulgee, Okla.	360
WPAD	New Haven, Conn.	283
WPAK	Agricultural College, N. D.	360
WPAL	Columbus, O.	286
WPAM	Topeka, Kan.	360
WPAT	El Paso, Tex.	360
WPAZ	Charleston, W. Va.	273
WPB	Parkersburg, Pa.	360
WQAD	Waterbury, Conn.	242
WQAE	Springfield, Vt.	275
WQAF	Sandusky, O.	240
WQAM	Miami, Fla.	283
WQAN	Seranton, Pa.	280
WQAO	New York, N. Y.	360
WQAP	Lowell, Mass.	266
WQAV	Greenville, S. C.	266
WQAW	Washington, D. C.	236
WQAX	Peoria, Ill.	360
WQY	Chicago, Ill.	448
WRAA	Houston, Tex.	360
WRAD	Marion, Kan.	248
WRB	Providence, R. I.	281
WRAL	St. Croix Falls, Wis.	248
WRAM	Galesburg, Ill.	244
WRAO	St. Louis, Mo.	360
WRAP	Yellow Springs, O.	242
WRB	Reading, Pa.	238
WRAX	Gloucester City, N. J.	268
WRAY	Cape Girardeau, Mo.	281
WRB	Seranton, Pa.	283
WRZ	Newark, N. J.	233
WRC	Washington, D. C.	469
WRE	Schenectady, N. Y.	360
WRM	Urbana, Ill.	360
WRN	Dallas, Tex.	360
WRB	Cape Girardeau, Mo.	360
WSAD	Providence, R. I.	248
WSAG	St. Petersburg, Fla.	244
WSAH	Chicago, Ill.	248
WSAI	Cincinnati, O.	309
WSAN	Allentown, Pa.	229
WSAR	Cape River, Mass.	254
WSB	Atlanta, Ga.	430
WSY	Birmingham, Ala.	360
WTF	New Orleans, La.	268
WTAF	Providence, R. I.	258
WTAG	Portland, Me.	236
WTAH	Toledo, O.	252
WTAL	Cleveland, O.	390
WTAM	Cambridge, Ill.	242
WTAN	Norfolk, Va.	280
WTAP	Elgin, Ill.	286
WTAR	Boston, Mass.	244
WTAU	Tecumseh, Neb.	360
WTAV	College Station, Tex.	280
WTAW	Streator, Ill.	231
WTAX	Cambridge, Ill.	242
WTAY	Norfolk, Va.	280
WTB	Elgin, Ill.	286
WTC	Boston, Mass.	244
WTD	Tecumseh, Neb.	360
WTE	College Station, Tex.	280
WTF	Streator, Ill.	231
WTF	Oak Park, Ill.	283
WTF	Manhattan, Kan.	360
WTF	Trenton, N. J.	226
WTF	Philadelphia, Pa.	360
WTF	Joliet, Ill.	227
WTF	Houghton, Mich.	231
WTF	Dearborn, Mich.	273
WTF	Detroit, Mich.	517
WTF	New Orleans, La.	280

**Have You Heard Them?**  
We show here photographs of persons whose familiar voices are heard over the air each night. These people and hundreds of others are working and striving to provide clean amusement for radio enthusiasts. You, too, may hear them with one of Ward's Receiving Sets.

### List of Cuban Broadcasting Stations

Call Letters	City	Wave Length in Meters
PWX	Havana	400
5EV	Colon	360
6KW	Tuinueu	340
6CX	Cienfuegos	170
6EV	Calbarren	225
7AZ	Camaguey	255
8AZ	Santiago de Cuba	240

### List of British Broadcasting Stations

Call Letters	City	Wave Length in Meters
2LO	London	365
5IT	Birmingham	475
23Y	Manchester	375
2BD	Aberdeen	495

### List of French Broadcasting Stations

Call Letters	City	Wave Length in Meters
YX	Lyon	740
FL	Paris (Eiffel Tower)	2600
8AJ	Paris	1780
ESP	Paris	450

### List of Mexican Broadcasting Stations

Call Letters	City	Wave Length in Meters
CYB	Mexico City	440
CYL	Mexico City	500
CYB	Mazatlan, Sinaloa	440

### List of Canadian Broadcasting Stations

Call Letters	City	Wave Length in Meters
CFAC	Calgary, Alta.	430
CFCA	Toronto, Ont.	400
CFCB	Vancouver, B. C.	440
CFCE	Halifax, N. S.	440
CFCH	Montreal, P. Q.	440
CFCI	Iroquois Falls, Ont.	400
CFCK	Edmonton, Alta.	410
CFCL	Calgary, Alta.	440
CFCL	London, Ont.	430
CFCL	Fort Frances, Ont.	410
CFCT	Toronto, Ont.	420
CFYC	Vancouver, B. C.	400
CHBC	Calgary, Alta.	410
CHCA	Vancouver, B. C.	430
CHCF	Winnipeg, Man.	420
CHCG	London, Ont.	410
CHCH	Montreal, P. Q.	420
CHXC	Ottawa, Ont.	450
CJBC	Montreal, P. Q.	420
CJCA	Edmonton, Alta.	450
CJCB	Nelson, B. C.	400
CJCC	Vancouver, B. C.	420
CJCF	London, Ont.	410
CJCI	St. John, N. B.	400
CJCN	Toronto, Ont.	410
CJCS	Halifax, N. S.	420
CJCX	Olds, Alta.	400
CJCY	Calgary, Alta.	420
CJCG	London, Ont.	430
CJCH	Winnipeg, Man.	410
CKAC	Montreal, P. Q.	430
CKCB	Winnipeg, Man.	410
CKCE	Toronto, Ont.	450
CKCK	Regina, Sask.	420
CKCB	St. John, N. B.	400
CKCC	Toronto, Ont.	430
CKOC	Hamilton, Ont.	410
CKY	Winnipeg, Man.	450



# Cunningham Radio Tubes



## Dry Cell Type Tubes

The name Cunningham on a Vacuum Tube is a guarantee of excellence. All tubes manufactured under this name are accepted as standard, as also are the Radio Corporation tubes. They are manufactured by the General Electric Company and are licensed for amateur or experimental use only. Avoid imitations at any price. A licensed tube costs a little more, but it is well worth the difference. In keeping with our fixed policy of selling only quality merchandise, we fill all orders with only genuine standard licensed tubes.

### Cunningham Low Voltage Detector and Amplifier Tubes

The Tubes shown on this page are the latest improved low voltage type, which require no storage battery current for filament lighting. Their current consumption is so small that one set of ordinary dry cells will be sufficient for use several hours each day for a period of

several weeks. These tubes are the regular three element tubes for use in any radio circuit, and function in exactly the same manner as the larger 6-volt tubes, and take their place wherever it is not practical to use storage batteries. Read Our Special Vacuum Tube Guarantee on Opposite Page.



### Cunningham C-299 Detector Amplifier

Using less current than any other type of Radio Vacuum Tube, the Cunningham C-299 works equally well as a detector or amplifier and is not critical in adjustment. As a detector it brings in distant signals without exact adjustment of the filament current, and is extremely sensitive. As an amplifier the C-299 gives remarkably good results.

For the "A" battery (4½ volts), three ordinary No. 6 dry cells connected in series are recommended. As this tube consumes only .06 (six one-hundredths) of one ampere, one set of batteries will give many hours service. A 30-ohm rheostat should be used. The tube base fits a special socket; but by using an adapter (63 R 5203, Page 44) this dry cell tube will fit the standard socket used for storage tubes. C-299 is identical to the Radio Corporation UV-199 tube and sells at the same price.

**Specifications**  
Filament voltage, 4½ volts. Filament current, .06 amperes. Plate voltage, 16 to 45 volts for detector; 45 to 90 volts for amplifier. Grid condenser, .00025 mfd. Grid leak, 2 megohms. Instructions included with each tube.  
**63 R 5197.....\$3.65**  
Postage, 6¢ extra

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



The C-12 is the same as C-11, except that it fits any standard socket for 6-volt tubes. This means that you can change from storage battery to dry cell tube equipment by substituting these tubes for those now in your radio set without changing sockets or using adapters. Equally efficient as detector or amplifier. It is of the "hard" type, and is therefore not critical in adjustment—a vernier type rheostat is unnecessary. It operates on one standard 1½-volt dry cell as "A" battery with a 6-ohm rheostat. A single dry cell will give several weeks of service, as the C-12 has a special oxide coated filament which uses only ¼ of an ampere. The C-12 is identical to the Radio Corporation WD-12 tube and sells at the same price.

**Specifications**  
Filament voltage, 1.1 volt. Filament current, ¼ ampere. Plate voltage, 22½ 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 5196.....\$3.65**  
Postage, 6¢ extra

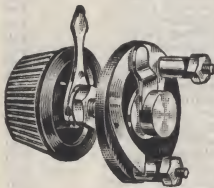
### Cunningham C-11 Detector-Amplifier Operates on One Dry Cell \$3.65



Although it requires but one dry cell of 1½ volts for the "A" battery, the C-11 is a highly efficient tube for use either as a detector or an amplifier. It is identical to the famous Radio Corporation WD-11 type which has proved so popular the last few years and sells at the same price. The C-11 is of 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 6 ohms. As the filament of this tube consumes only ¼ ampere, one dry cell will give many hours of service. Since the C-11 is designed to fit a special socket, adapters must be used if your set is equipped with sockets for storage battery tubes.

**Specifications**  
Filament voltage, 1.1 volt. Filament current, ¼ ampere. Plate voltage, 22½ to 45 volts for detector; 45 to 90 volts for amplifier. Grid condenser, .00025 mfd. Grid leak, 2 megohms. Complete instructions included with each tube.  
**63 R 5195.....\$3.65**  
Postage, 6¢ extra

### Variable Grid Leak



For single hole panel mounting. Fitted with knob and pointer for close adjustment. A brass strip makes variable contact with resistance element on bakelite disc. Binding posts for connections.

**63 R 6413**—Resistance 0 to about 3 megohms.....**69¢**  
Postage, 6¢ extra  
**63 R 6414**—.00025 Grid Condenser to fit across posts of above grid leak.....**19¢**  
Postage, 2¢ extra

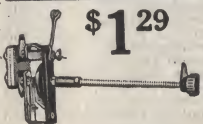
### Freshman Variable Grid Leak



Mounted in molded case with screw holes and binding posts for panel or base board mounting. Knob gives easy, accurate adjustments from 0 to 5 megohms.

**63 R 5343**—Without condenser.....**48¢**  
**63 R 5344**—Same as above, except with high grade .00025 grid condenser in base.....**69¢**  
Postage, 4¢ extra

### Cutler Hammer Variable Grid Leak



Mounts directly on the detector tube socket. Provided with long shaft for front panel control. Adjustable to give any desired resistance. Fitted with adjustable mounting to take standard Dubilier .00025 mfd. grid condenser. No condenser included.  
**63 R 5510.....\$1.29**  
Postage, 4¢ extra

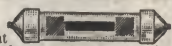
### Cartridge Mica Grid Condenser



These Condensers are cartridge shape and made to fit in the grid mountings listed at the bottom of this page. A tubular grid leak and a tubular grid condenser mounted side by side in a double or triple mounting permits easy changing of grid leak or condenser value. These are accurate high quality condensers of the finest workmanship and materials.

**63 R 6371**—Capacity, .0001 mfd.....**36¢**  
**63 R 6373**—Capacity, .00025 mfd.....**36¢**  
**63 R 6375**—Capacity, .0005 mfd.....**36¢**  
Postage, 3¢ extra

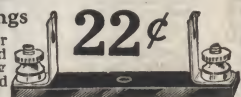
### Cartridge Type Grid Leak



Different detector circuits require Grid Leaks of different values. The resistance values of these cartridge type grid leaks are fixed and the ratings are accurate. Various resistances can be obtained by using two or three in series or multiple.

**63 R 6372**—Resistance, .5 megohm.....**10¢**  
**63 R 6374**—Resistance, 1 megohm.....**10¢**  
**63 R 6376**—Resistance, 1.75 megohms.....**10¢**  
**63 R 6378**—Resistance, 2.5 megohms.....**10¢**  
**63 R 6390**—Resistance, 5 megohms.....**10¢**  
Postage, 2¢ extra

### Grid Leak and Condenser Mountings



Two bronze spring clips to hold condenser or leak cartridges, with screw connections mounted on a bakelite base, with screw hole for fastening to set. An efficient, low priced condenser and grid leak mounting.  
**63 R 6370**—Single mounting.....**11¢**  
**63 R 6363**—Double mounting.....**22¢**  
**63 R 6365**—Triple mounting.....**30¢**  
Postage, 3¢ extra



# The 20th Century Aladdin's Lamp



## 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 always recommended where there are facilities 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 rheostats do not require frequent adjustment to make up for a drop in voltage. These tubes are all genuine Cunninghams, and are licensed under existing patents for amateur and experimental use only.

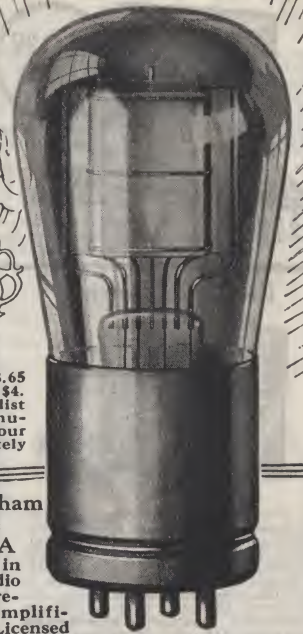
### Our Vacuum Tube Guarantee

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 bulbs in your home, will burn out in time. Vacuum tubes with burned out filaments can not be returned for credit or exchange.



### Special Price Note

All tubes listed at \$3.65 have a retail list price of \$4. Should this established list price be reduced by manufacturer at any time, our price will be proportionately lower.



### Cunningham Kenotron Rectifier Tube C-316

For use with 5-watt power tubes in transmitting sets; rated at 20 watts. Changes the alternating current taken through a power transformer to a direct current which is suitable for plate operation, making a motor generator unnecessary for high voltage. The output is at a maximum when the load is such that the direct current is between 350 and 400 volts. Two tubes in a full wave rectification circuit 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 output, 20 watts, 350 volts.  
**63 R 7020.....\$7.60**  
Postage, 6¢ extra

### Cunningham 5-Watt Transmitting Tube C-302

Especially for low power radio telephone and C. W. telegraph sets. Two 5-watt tubes in parallel, using one tube as modulator and one as oscillator, will put about 1.5 ampere into the aerial. The radiophone range is then about 40 miles. The C. W. telegraph range is four times that distance or farther. Four or five 5-watt tubes may be worked in parallel with increased range. Operate on either alternating or direct current. Also used in pairs as power (push pull) amplifiers in radio receiving circuits. Base fits standard socket.



**Specifications**  
Filament voltage, 7.5 volts; filament current, 2.35 amperes; plate voltage, 350 volts normal; plate current, 0.45 ampere. Watts output, 5 watts normal.  
**63 R 7015.....\$7.60**  
Postage, 6¢ extra

### Cunningham Detector Tube C-300

An extremely sensitive detector tube licensed for amateur and experimental use only. A "soft" type tube, very sensitive to weak, distant signals. The C-300 is made for use with a 6-volt storage "A" battery, and we recommend the use of a 6-ohm vernier rheostat in the detector circuit where a very close adjustment is necessary. A 22½-volt, tapped "B" battery should be used. Base fits standard socket.

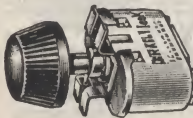


**Specifications**  
Filament voltage, 5 to 5½ volts. Filament current, 1 ampere. Plate voltage, 16½ to 22½ volts. Grid condenser, .00025 mfd. Grid leak, 2 megohms. Complete instructions are included with each tube.  
**63 R 5198.....\$3.65**  
Postage, 6¢ extra

### Cunningham Tube C-301A

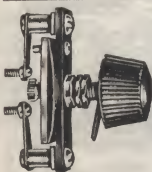
For use in either radio or audio frequency amplification. Licensed for amateur or experimental use only. Cunningham amplifying tubes are of a high vacuum type and require no delicate adjustment of the filament current, which is usually supplied by a 6-volt storage battery. They are uniform and free from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

**Specifications**  
Filament voltage, 5 to 5½ volts. Filament current, ¼ ampere. The normal plate voltage is approximately 40 volts, although increasing amplification can be obtained at plate voltage ranging up to 100 volts.  
**NOTE:** Discoloration of glass is due to the process used in creating high vacuum, and in no way affects the efficiency of the tube. Complete instructions included.  
**63 R 5199.....\$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, ¼ to 8 megohms.  
**63 R 6223—Grid Leak only.....\$1.74**  
**63 R 6224—Grid Leak with .00025 mica condenser.....1.95**  
Postage, 6¢ extra



### C-R-L 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 from ¼ to 8 megohms. Designed for single hole panel mounting. Adjustable metal brackets on back to hold grid condenser. Length, 2¾ inches.  
**63 R 6016—Grid Leak only.....\$1.05**  
**63 R 6039—Grid Leak with .00025 condenser.....1.19**  
Postage, 4¢ extra



### Dubilier Grid Condenser with Grid Leak Mounting

A well known product at a very attractive price. A standard Dubilier Grid Condenser fitted with spring clips to hold standard tubular grid leak cartridge. A combination that produces excellent results. Grid leak not included.  
**63 R 6466—Capacity, .0001 mfd.....37¢**  
**63 R 6467—Capacity, .00025 mfd.....37¢**  
**63 R 6468—Capacity, .0005 mfd.....37¢**  
Postage, 3¢ extra

### Circular Grid Condenser

Mica insulated Grid Condenser. Capacity, .00025 mfd. Aluminum conductor plate. Brass lugs. Formica end plate. Diameter, 1½ inches. A high quality, low priced grid condenser.  
**63 R 6359.....29¢**  
Postage, 2¢ extra

### Variable Grid Leak for Use with Above

For use with above condenser. Variable from ¼ to 1 megohms.  
**63 R 6361.....39¢**  
Postage, 2¢ extra

### Circular Grid Condenser and Grid Leak Combined

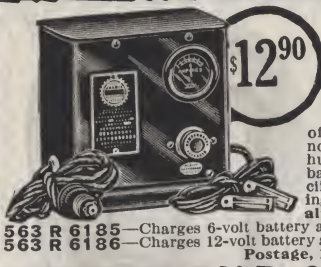
For panel mounting. Diameter, 1½ inches. Condenser mica insulated. Capacity, .0003 mfd.; leak, 2 megohms.  
**63 R 6357.....49¢**  
Postage, 3¢ extra

### How to Order Tubes, Grid Leaks Grid Condensers and Batteries

Tube Type	"A" Battery	D-detector "B" Bat.	Amplifier 45-90-v.	Grid Resistance 2-megohm	Grid Condenser .00025	Rheostat 30-ohm
C-299	3-dry cells	22½-v.	45-90-v.	2-megohm	.00025	30-ohm
C-11	1-dry cell	22½-v.	45-90-v.	2-megohm	.00025	6-ohm
C-12	1-dry cell	22½-v.	45-90-v.	2-megohm	.00025	6-ohm
C-300	6-v. stor. bat.	22½-v.	45-90-v.	2-megohm	.00025	6-ohm
C-301A	6-v. stor. bat.	22½-v.	45-90-v.	2-megohm	.00025	25-35-ohm



# Radio Storage Batteries, Chargers and Supplies



**Lakeside Battery Charger**

Manufactured especially for Ward's by one of the largest and best known manufacturers of mechanical chargers. Neat appearing, substantially built, and requires no attention or adjusting. Economical to operate. Ammeter shows rate of charge. Charges in either direction—no chance to connect up wrong. Has a low hum when in operation. Long flexible battery leads, with lead coated steel spring clips. Cord and screw plug for connecting to lighting socket. Works only on alternating current 110, volts, 60 cycles.

**563 R 6185**—Charges 6-volt battery at average rate of 7 amperes. **\$12.90**  
**563 R 6186**—Charges 12-volt battery at average rate of 5 amperes. **12.90**  
 Postage, 24¢ extra

**Bulb Charger** **\$9.95**


Employs the two element rectifying tube instead of the mechanical vibrator. Practically silent in operation. Small and compact. Scientifically designed and mechanically perfect. Will charge your "A" batteries or auto batteries at small cost for current. Operates on 110-volt 60-cycle alternating current. Can be attached to any lighting socket. Will soon pay for itself and save you many trips to the charging station.

Charging rate, 2 amperes. Comes complete with bulb, fuse plug, flexible battery cord with lead covered clips, and flexible attaching cord with plug.

**563 R 6180**—Charger complete with bulb. **\$9.95**  
 Postage, 24¢ extra  
**563 R 6182**—Extra 2-ampere Bulb. **\$3.50**  
 Postage, 6¢ extra



**Electron Charger**



This compact, light weight Charger is practically noiseless in operation. Fully enclosed in enameled metal case. Uses standard rectifying bulbs. Made in two sizes—5-ampere and 2-ampere. Charges "A" or "B" batteries up to 90 volts; also useful for charging auto batteries. Plenty of cord for ease in connecting. Operates on alternating current—110 volts, 60 cycles. Complete directions included. Uses no more current than an ordinary electric bulb. Costs but a few cents to charge ordinary 6-volt 60-ampere storage battery. No meter included with the 2-ampere size rectifier. Prices include bulb.

**563 R 6175**—2-amp. size **\$15.80**  
**563 R 6176**—5-amp. size **24.95**  
**563 R 6182**—Extra 2-ampere Bulbs. Each **\$3.50**  
**63 R 6177**—Extra 5-ampere Bulbs. Each **\$6.95**  
 Postage: Chargers, 30¢ extra; bulbs, 6¢ extra

**\$8.75 Airline Storage "A" Batteries**



Ward's Radio Storage Batteries are built especially for radio use. They are clean and quiet in operation and are designed to give you long, steady service under conditions which would break down an ordinary storage battery. Ward's Radio Storage Batteries will take a full charge and deliver a full voltage until practically discharged. They will maintain their voltage for a long period of intermittent use, and give slow discharge without excessive sulphation. The internal action is silent—a necessary feature in radio batteries. Cells are hard rubber. Note the extra large capacities.

Plates and spacers are of most approved construction designed for long life. Cells are contained in dovetailed wood case, well finished with holdfast carrying handles. A feature of Ward's Radio "A" batteries is the non-corrosive wing nut terminals, which enable you to make a clean, positive connection to the battery. Batteries are shipped fully charged ready for use.

**Accurate Radio Hydrometer**

Improved and simplified design Hydrometers. No confusing scales or figures to read. Consists of three different colored balls. If all three balls float, battery is charged; if one sinks, nearly charged; if two sink, charge is low; three sink, battery is dead. Acid container made of glass, with good quality rubber bulb and nozzle. To get best results your storage battery should be tested every week or ten days, and kept fully charged if possible.

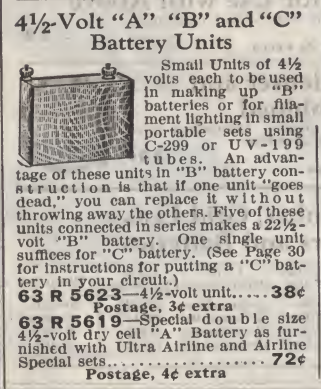
**63 R 5512**..... **65¢**  
 Postage, 6¢ extra



**4 1/2-Volt "A" "B" and "C" Battery Units**

Small Units of 4 1/2 volts each to be used in making up "B" batteries or for filament lighting in small portable sets using C-299 or UV-199 tubes. An advantage of these units is that if one unit "goes dead," you can replace it without throwing away the others. Five of these units connected in series makes a 22 1/2-volt "B" battery. One single unit suffices for "C" battery. (See Page 30 for instructions for putting a "C" battery in your circuit.)

**63 R 5623**—4 1/2-volt unit..... **38¢**  
 Postage, 3¢ extra  
**63 R 5619**—Special double size 4 1/2-volt dry cell "A" Battery as furnished with Ultra Airline and Airline Special sets..... **72¢**  
 Postage, 4¢ extra



**Ten Days Trial Offer**

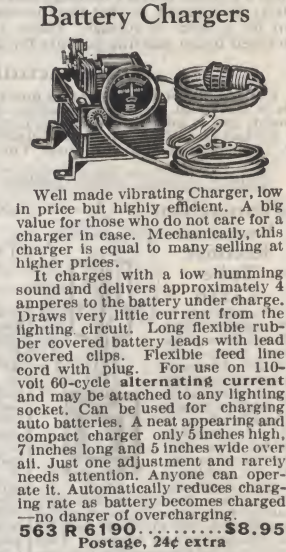
Order your Battery in the usual way. If after 10 days trial you are not satisfied, write us for shipping instructions. We will refund every cent you have paid, including shipping charges both ways.

**663 R 492**—6-volt 50-ampere hour. Ship. wt., 30 lbs. **\$ 8.75**  
**663 R 494**—6-volt 90-ampere hour. Ship. wt., 42 lbs. **12.95**  
**663 R 493**—6-volt 150-ampere hour. Ship. wt., 62 lbs. **15.75**

**Keep Your Batteries Fully Charged**

If your radio set is to operate to the best advantage, your Storage Battery must deliver an even, full voltage current. To keep the battery in good condition there are a few simple instructions you should follow closely. The caps should be removed and the cells inspected about once a week. The solution should never be allowed to evaporate below the tops of the plates, and should be replenished with distilled water only. Never add acid, as the acid content of solution does not evaporate and therefore remains constant. To get the most satisfactory results from your set, and to extend the life of the battery test it frequently with a good hydrometer such as No. 63 R 5512 on this page.

**Battery Chargers**



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

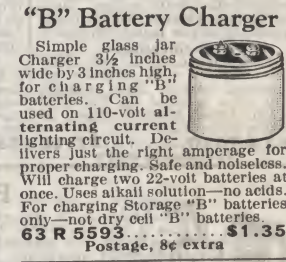
It charges with a low humming sound and delivers approximately 4 amperes to the battery under charge. Draws very little current from the lighting circuit. Long flexible rubber covered battery leads with lead covered clips. Flexible feed line cord with plug. For use on 110-volt 60-cycle alternating current and may be attached to any lighting socket. Can be used for charging auto batteries. A neat appearing and compact charger only 5 inches high, 7 inches long and 5 inches wide over all. Just one adjustment and rarely needs attention. Anyone can operate it. Automatically reduces charging rate as battery becomes charged—no danger of overcharging.

**563 R 6190**..... **\$8.95**  
 Postage, 24¢ extra

**"B" Battery Charger**

Simple glass jar Charger 3 1/2 inches wide by 3 inches high, for charging "B" batteries. Can be used on 110-volt alternating current lighting circuit. Delivers just the right amperage for proper charging. Safe and noiseless. Will charge two 22-volt batteries at once. Uses alkali solution—no acids. For charging Storage "B" batteries only—not dry cell "B" batteries.

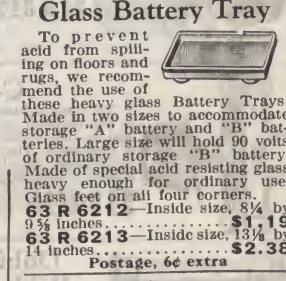
**63 R 5593**..... **\$1.35**  
 Postage, 8¢ extra



**Glass Battery Tray**

To prevent acid from spilling on floors and rugs, we recommend the use of these heavy glass Battery Trays. Made in two sizes to accommodate storage "A" battery and "B" batteries. Large size will hold 90 volts of ordinary storage "B" battery. Made of special acid resisting glass heavy enough for ordinary use. Glass feet on all four corners.

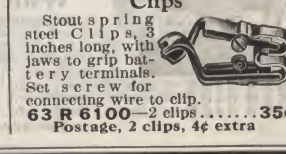
**63 R 6212**—Inside size, 8 1/4 by 9 3/4 inches..... **\$1.19**  
**63 R 6213**—Inside size, 13 1/4 by 14 inches..... **\$2.38**  
 Postage, 6¢ extra



**Clips**

Stout spring steel Clips, 3 inches long, with jaws to grip battery terminals. Set screw for connecting wire to clip.

**63 R 6100**—2 clips..... **35¢**  
 Postage, 2 clips, 4¢ extra





# High Grade "B" Batteries and Standard Dry Cells

## Westinghouse Storage "B" Battery



The advantage of the Storage Type "B" Battery over the dry cell type is its full, steady voltage, noiseless internal action, and long life. Like the ordinary storage battery it must be charged occasionally, therefore is available only to those who have facilities for operating a simple charger such as 63 R 6175 (shown on Page 38) on 110-volt alternating current.

### Specifications

The Westinghouse Storage "B" Battery is the well known "Crystal Case" Type 22 LG-2 11-unit battery, each unit in a separate compartment in glass container. The lid is of hard rubber imbedded in compound. The Units are thoroughly sealed, with screw caps for replenishing the water. The battery shown delivers 22 volts and is 14 by 3 1/2 by 5 1/2 inches. Capacity, 4500 milliamperes hours. One such battery should be used in the plate circuit of the detector and two or more such units in the amplifying plate circuits. Two of these batteries can be connected so the voltage of the detector battery is added to that of the amplifier batteries. Westinghouse batteries carry a full charge, lose very little when standing idle, and are noiseless in operation. Shipped fully charged. Shipping weight, complete, 22 pounds. **Not mailable.**  
**663 R 5682 ..... \$10.75**

## FRESH Standard Dry Cells

**3 Cells for 97¢**



Fresh Dry Cells that test 1 1/2 volts, 25 to 30 amperes each for lighting C-12, C-11, UV-199 and C-299 tubes. Also suitable for auto ignition or any purpose where steady reliable electrical energy is required. Our price saves you from 10¢ to 15¢ on each cell.

These dry cells are carefully made of the best materials and designed for heavy duty. They are the well known No. 6 type; size, 2 1/2 by 6 inches.  
**63 R 2501—Each ..... 33¢**  
**63 R 2503—3 Dry Cells ..... 97¢**  
 Postage, 3¢ extra  
 Postage, 3 cells, 9¢ extra

### Storage "B" Battery



**\$5.45**

This reliable Storage "B" Battery is offered to you at a substantial saving. The semi-liquid electrolyte used makes it practically impossible to spill the acid. It is made up of twelve 2-volt cells, making a total of 24 volts and has a capacity of about 2500 milliamperes. Easily recharged by using charger 63 R 6175 shown on Page 38. Will last for years with good care. The complete battery is mounted in a sturdy case and the glass cells are fully covered for protection from dust. Has convenient terminals for easy connections to the set. Shipping weight, 18 pounds. **Not mailable.**  
**663 R 5515 ..... \$5.45**

### Battery Testers



Similar to 63 R 6587 shown below but better made and finished. Case finished in black enamel with glass front. Scale reads from 0 to 50 volts and scientific construction insures accuracy. Scale calibrated for close readings. Flexible cord for connecting. Approximate diameter, 2 in.  
**63 R 6593 ..... \$1.98**  
 Postage, 6¢ extra



**Voltmeter**  
 This simple inexpensive battery Voltmeter, although low in price is accurate and will show at a glance whether your "B" batteries are giving necessary voltage. Reads from 0 to 50 volts.

In neat metal case, with glass face, flexible cord and contact points.  
**63 R 6587 ..... 79¢**  
 Postage, 6¢ extra

**Save Money On "B" Batteries**

**89¢**

### Strictly Fresh Batteries

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.

- 63 R 5618—Small size, 22 1/2-volt. Not tapped. For 1-tube sets or where larger battery can not be used. Size 2 by 2 1/2 by 3 1/2 in. 89¢**  
 Postage, 12¢ extra
- 63 R 5604—Medium size, 22 1/2-volt. Tapped for 22 1/2, 21, 19 1/2, 18 and 16 1/2 volts. Size 2 1/2 by 2 3/4 by 4 1/4 inches. .... \$1.25**  
 Postage, 14¢ extra
- 63 R 6455—Large size, 22 1/2-volt. Tapped for 22 1/2, 21, 19 1/2, 18 and 16 1/2 volts. Size 3 by 4 by 6 1/2 inches. .... \$1.55**  
 Postage, 14¢ extra
- 63 R 6461—Upright style, 22 1/2-volt. Not tapped. Size, 3 1/4 by 2 1/2 by 5 1/2 inches. Saves space on table or in cabinet. .... \$1.45**  
 Postage, 14¢ extra
- 63 R 6457—Large size, 45-volt. Tapped for 45, 22 1/2, 21, 19 1/2, 18 and 16 1/2 volts. Size 6 1/2 by 3 by 3 inches. .... \$2.75**  
 Postage, 22¢ extra
- 63 R 5651—Large size, 45-volt, upright style battery, size, 7 by 8 by 3 inches. Tapped at 22 1/2 and 45 volts. .... \$2.75**  
 Postage, 22¢ extra

### Storage "B" Battery



**\$3.95**

Cut down on "B" Battery expense with these batteries. May be recharged easily and will last for years with good care. Have ample capacity for any purpose for which a "B" battery may be required. Made up in a unit of 12 cells of 2 volts each making a total of 24 volts. Capacity, about 2500 milliamperes. Built into a composition case that protects cells from dust and keeps acid from spilling. Heavy lead plates insure long life and steady noiseless service. Our low price offers you a substantial saving on storage "B" batteries. Shipping weight, 12 pounds. **Not mailable.**

**663 R 5514 ..... \$3.95**

### Dry Cell "A" Batteries



Fresh, high grade, large size Dry Cells in sealed containers insuring long, steady service.

- 663 R 5625—2-cell unit; 1 1/2 volts. For operating a single WD-11, WD-12, C-11 or C-12 tube. .... 79¢**
- 663 R 5626—6-cell unit; 1 1/2 volts. For operating one to three WD-11, WD-12, C-11 or C-12 tubes. .... \$2.68**
- 663 R 5627—3-cell unit; 4 1/2 volts. For operating one to three UV-199 or C-299 tubes. .... \$1.40**

Postage, 16¢ extra

**98¢**

2 1/2-Volt Size

**AMERICAN RADIO BATTERY**  
**30 Cells**  
**45 Volts**  
**NATIONAL CARBON CO. INC.**

American "B" Batteries are the best product of one of the leading battery manufacturers of the country. Every battery can be relied upon to measure up to the usual high quality of Ward's merchandise and to give long and satisfactory service. Our low price is possible only because we are able to buy in large quantities. The saving we make is passed on to you. So many radio enthusiasts take advantage of Ward's low prices on good batteries that we receive a new supply every few days which assures you of strictly fresh, full strength batteries. Your set will not operate properly

## American "B" Batteries

when the voltage of the 45-volt battery drops below 34 volts and the 22 1/2-volt below 17 volts. Sizes given below are approximate.

- 63 R 5685—Small 22 1/2-volt size, 2 by 2 1/2 by 3 1/2 inches. For use in a single tube compact set. This size is not recommended if a larger size can be conveniently used. Not tapped. .... \$1.69**
- 63 R 5686—Large 22 1/2-volt size, 3 by 4 by 6 1/2 inches. Tapped. .... \$1.69**
- 63 R 5687—Upright size, 3 1/4 by 2 1/2 by 5 1/2 inches. Very convenient for installing inside of cabinets. Not tapped. .... \$1.59**  
 Postage, 14¢ extra
- 63 R 5688—Large 45-volt size, 3 1/4 by 7 by 8 inches. Tapped. .... 3.00**  
 Postage, 22¢ extra
- 63 R 5689—Upright 45-volt size, 3 1/4 by 7 by 8 inches. 3 taps. .... 3.00**  
 Postage, 22¢ extra
- 63 R 5690—Jumbo 45-volt Battery especially designed for sets having 4 or more tubes. Size 8 1/4 by 4 1/2 by 7 3/4 inches. Less expensive in the end, as they last longer. Tapped for 22 1/2 and 45 volts. .... \$3.79**  
 Postage, 30¢ 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



Clear and Pure in Tone

**\$5.95**

**Airline Junior Loud Speaker**

The Airline Junior is the result of much experimenting to produce a Loud Speaker to please the most critical musical ear. For some time we have been trying to find a speaker that would measure up to our standard of quality, that could be sold at a price within reach of all radio owners; a truly good speaker that would give that great volume and sweetness of tone so much desired. After experiments with a number of designs and materials, we produced the Airline Junior.

### A Quality Instrument at a Low Price

Low in price only because of quantity production, it performs equally as well as many speakers selling for more than double the low price we ask. The unit is specially designed for loud speaker use, and will reproduce the loudest tones with a clearness that is surprising. Of neat appearance, the Airline Junior will make a handsome addition to any radio set. The detachable horn is artistically designed and is beautifully finished in crystalline black. It is constructed of a special fiber compound, free from rattles and metallic sounds. The Airline Junior is 22 inches high and has a 10-inch bell. It comes to you complete with a long connecting cord with head set tips ready to connect to binding posts or head set plug. If your set is equipped with jacks, we recommend an extra plug for convenience in changing from head set to speaker. For Plugs see Page 53.

563 R 761.....\$5.95  
Postage, 20¢ extra

Type R-3  
**\$32.15**

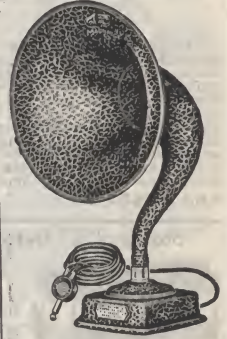


**Type R-3 Requires Battery Current**  
Specially designed for use on storage battery sets. Requires connection to 6-volt storage "A" battery. A new and exclusive feature of this type Loud Speaker is the volume control which enables you to regulate the volume to the desired degree. Finished in the popular crystalline enamel. Mounted on a felt covered base. Binding post connections. Height, 23 inches. Diameter of bell, 14 inches.  
563 R 690—Type R-3.....\$32.15  
**Type M-1 Requires No Outside Current**  
Same size as R-3, but requires no battery connection. Not equipped with modulator.  
563 R 701—Type M-1.....\$26.95  
Postage, 38¢ extra

A good Loud Speaker must reproduce faithfully all sounds, from the lowest tones of the organ to the highest overtones of the piccolo or violin. It must respond to sound vibrations ranging from fifty per second to frequencies as high as ten thousand per second.

In reproducing the orchestra music, it sometimes must reproduce the sounds of a great many instruments at once, and each must be loud and clear and easily distinguishable. It can readily be imagined how sensitive the reproducing unit of a good loud speaker must be.

The loud speakers shown here have been selected from many as being the very best in reproducing qualities, general design and workmanship, and most suitable for home use with the average receiving set.



Type M-4  
**\$22.50**

**Type M-4 Requires No Outside Current**  
A new style Magnavox built in response to the demand for a good Loud Speaker of small size for use on dry cell and storage battery sets. Smaller in size than the R-3 and M-1, but capable of giving the same remarkable volume and clear tone qualities that have made the Magnavox speakers so popular. The size of this speaker permits it to be carried along on a camping trip for use on portable sets. The detachable horn is finished in crystalline enamel. No battery current is required to operate it. Height, 18½ in. Diameter of bell, 11 inches. Complete with attaching cord and plug.  
563 R 762.....\$22.50  
Postage, 15¢ extra

**\$22.45** **Atlas Loud Speaker**



You want a Loud Speaker with clear, sweet tones and enough volume so all may hear in any part of the room. Thousands of radio owners have chosen the Atlas after trying many makes, because they find it gives remarkably satisfactory results when used on any radio set having two or more tubes.

The detachable horn, made of a special fiber compound free from metallic vibration, is dark brown color and has an attractive crystalline finish. The base which contains the Atlas Unit's genuine molded bakelite in maroon color. The rich tones of the Atlas unit are due largely to the patent double action diaphragm which is adjustable. Height over all, 21 inches. Diameter of bell, 10½ inches. Complete with cord.  
563 R 742.....\$22.45  
Postage, 16¢ extra

**Western Electric \$19.75**  
**Loud Speaker**

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

The tones are clear and pure, with plenty of volume for even the largest room. The specially designed Western Electric Unit is the result of many years of experimenting and testing by some of the best radio engineers in the country. The large size metal diaphragm has been perfected to give great volume without harshness of tones. Requires no battery. The detachable horn is made of non-resonant material, attractively finished in black enamel. Height, 23 inches. Diameter of bell, 10 inches. Complete with cord.  
563 R 765.....\$19.75  
Postage, 34¢ extra



### Morrison Loud Speaker Unit



**\$4.45**

A good Loud Speaker Unit at a moderate price. For use in Loud Speaker Cabinets shown on Page 67, or home made loud speaker.

Will be found highly satisfactory. An excellent device for converting your phonograph into a loud speaker. It has an adjustment on the back so you can regulate the volume and modify the tone to a considerable extent. Mounted in an attractive metal case.

63 R 780—Complete with attaching cord \$4.45  
Postage, 8¢ extra

### Atlas Loud Speaker Unit



The same adjustable Unit with double diaphragm which is used in the Atlas Loud Speaker, is equipped with coupling so it may be used on most phonographs. Molded bakelite case. Complete with cord.  
63 R 770.....\$10.95  
Postage, 8¢ extra

### Western Electric Unit

You can quickly attach this Loud Speaking Unit to your phonograph tone arm. No outside battery current is required. The large metal diaphragm gives this unit surprisingly great volume, and the tones are clear and distinct. Mounted in a metal case with felt covered base. We also recommend this unit for use in home made loud speakers and the loud speaking cabinets shown on Page 67.

63 R 746.....\$10.75  
Postage, 8¢ extra



# Go! Loud Speakers at a Saving

The Loud Speakers shown in this catalogue are all fine quality; and while some are very low in price, all will reproduce programs in clear, distinct, natural tones with good volume. In selecting loud speakers 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 tones. The mellow tones and large volume produced by the Baldwin Loud Speaker make it a great favorite for home use on any radio set having two or more stages of amplification.

The reproducing unit in this loud speaker is the widely known Baldwin phone specially constructed for loud speaker purposes.

The superior amplifying properties of the Baldwin unit are due largely to the patented principle which permits of the use of unusually powerful magnets and an extremely sensitive diaphragm.



\$22.50

## Wood Compound Horn

The tone chamber and horn are of all wood compound 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 tone quality. The charm and beauty of the full round tones will thrill you and bring greater radio enjoyment. The speaker is 22 inches high and the bell is 15 inches in diameter. Complete with connecting cord and loud speaking unit. Shipping weight, 15 pounds. Not mailable.

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. Enclosed in durable metal case supported by circular base with felt on bottom. Will fit most standard phonographs. Complete with attaching cord.



63 R 6385.....\$8.75  
Postage, 8¢ extra

## 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.



63 R 6367.....\$4.95  
Postage, 6¢ extra

## Adapters for Attaching Phones or Unit to Phonograph

This Adapter enables you to fasten most any loud speaker unit or phone to the tone arm of your phonograph making an inexpensive and satisfactory loud speaker. Will fit Victor and Sonora phonographs with fitting included and can be adapted to fit almost every make of phonograph with aid of adapters shown below. Simply fasten screw to hold unit in place and slip bottom part over tone arm. Made of aluminum with felt to protect face of unit and rubber to protect tone arm.



63 R 740.....\$1.69  
Postage, 6¢ extra

## Loud Speaker Adapter

Made in the form of a spring clip which holds the loud speaker unit in a firm grip. The horn of the loud speaker is fastened to the small end. This adapter is worth many times its small cost to those who wish to make their own loud speakers. Made of metal, nickel plated. Diameter of small opening, 1/8 inch.



63 R 741.....22¢  
Postage, 6¢ extra

Adaptophone. Of soft rubber with large opening at one end to hold receiver. Other end shaped to fit tone arm of phonograph or loud speaker horn. With this device you can attach phone speaker unit to any phonograph except Brunswick. Especially recommended for use with Baldwin Type C Unit shown above at right.



63 R 6299.....39¢  
Postage, 4¢ extra

## Mesco Loud Speaker

When you hear the rich mellow tones 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 signals, yet capable of giving such excellent tone and great volume.



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

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

63 R 702.....\$21.95  
Postage, 32¢ extra

## Phonograph Adapter

With these Adapters and almost any loud speaker unit you can convert your phonograph into a loud speaker. Will fit all units which we list except No. 63 R 6367. 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 787—Adapter to fit Edison.....37¢  
63 R 785—Adapter to fit Columbia, Federal, Pathé and Vocalion.....17¢  
63 R 786—Adapter to fit Brunswick.....25¢  
63 R 788—Adapter to fit Ceclilian.....17¢  
Postage, each, 2¢ extra



\$8.95

## Airline Loud Speaker

Voices sound natural and music is sweet and pleasing to the ear when reproduced with the Airline Loud Speaker. It was designed by our own radio experts and is manufactured for us in large quantities to give the fullest price advantage of low production cost. In designing the speaker our object was to produce one that would have all the good qualities of the best speakers to be had and yet sell at a price that would put it within the reach of all. The results obtained with the Airline are surprising even to those who have heard many of the most expensive speakers and we do not feel it is an exaggeration to say it is one of the best values ever offered the owners of radio sets.

The horn is made of wood fiber compound that will not produce any annoying mechanical sounds. The reproducing unit is the best of the many tested. It is especially designed for the purpose and gives remarkable results. The horn and base are finished in a mottled gold and black. The Speaker is 26 inches high; the bell 13 1/2 inches in diameter. Complete with attaching cord. If your set is equipped with jacks, we recommend an extra plug for the loud speaker. For plugs see Page 53.

563 R 763.....\$8.95  
Postage, 32¢ extra

## Special Value \$2.25 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.

63 R 775.....\$2.25  
Postage, 8¢ extra



# \$3.15 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 one of the best head set values ever offered. Molded bakelite shells and caps are light weight and highly polished. Head bands of spring wire encased in heavy webbing are Army and Navy style and adjustable. Neat 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.

63 R 5168—2000 ohms total resistance.....\$3.15  
 63 R 5169—3000 ohms total resistance (very sensitive).... 3.75  
 Postage, 8¢ extra



**\$10<sup>75</sup>**  
 2200 Ohms

### 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.....\$10.75  
 Postage, 8¢ extra



**\$2<sup>55</sup>**  
 2000 Ohms

### 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 bakelite. Fits the head comfortably as it is light in weight and adjustable. Equipped with connecting cord. Resistance, 2000 ohms.

63 R 60.....\$2.55  
 Postage, 8¢ extra

### 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 you will want 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 Ward's 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 53.



**\$9<sup>95</sup>**  
 2000 Ohms

Complete with Plug

### Baldwin Type C Amplifying Head Set

These Head Sets operate on a principle patented by Nathaniel Baldwin. The special diaphragms receive the vibrations from a thin armature supersensitive to the slightest variation of current passing through the electro magnets, which, because of the unique Baldwin construction, are much more powerful than would be practical in the ordinary type of phone. This special construction enables signals to be heard which are not audible in the ordinary 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.

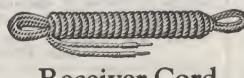
63 R 5164—Baldwin Type C Head Set.....\$9.95  
 63 R 5166—Special Type Baldwin Head Set. A special value at our price..... 5.18  
 Postage, 8¢ extra



### 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  
 Postage, 6¢ extra  
 63 R 5393—30-foot..... 2.11  
 Postage, 8¢ extra  
 63 R 5394—50-foot..... 2.54  
 Postage, 10¢ extra



### Receiver Cord

Heavy mercerized cotton covered with nicked brass tips. Very flexible and neat in appearance. Length, about 5 feet. Will not fit Brandes head sets.

63 R 5385—For double head set.....36¢  
 63 R 5390—For single set or loud speaker 29¢  
 Postage, 4¢ extra  
 Similar to above cord for single head set, but 20 feet in length for using single head set, loud speaker or loud speaker unit away from set.  
 63 R 5391.....95¢  
 Postage, 5¢ extra



**\$4<sup>85</sup>**  
 2000 Ohms

### Well Known Brandes Matched Tone Head Sets

Brandes Head Sets are not only super-sensitive, but the phones in each set are carefully matched for pure tone quality. For satisfactory reception both phones of the head set should operate with equal quality and volume.

These head sets are popular with radio experts who demand extremely sensitive phones. Polished aluminum shells with molded composition caps. Army and Navy type adjustable head bands that fit comfortably. Complete with connecting cord.

63 R 5380—Superior type; 2000-ohm.....\$4.85  
 63 R 5381—Navy type; 3000-ohm 6.50  
 Postage, 8¢ extra



**\$3<sup>57</sup>**  
 2000 Ohms

### Frost Head Sets

Frost phones, made with watchlike precision are extremely sensitive. The workmanship throughout is excellent and the results obtained are very satisfactory. Equipped with comfortable web covered adjustable head bands, molded composition shells (except 63 R 5167) and caps.

63 R 5160—2000-ohm.....\$4.44  
 63 R 5161—3000 ohm..... 5.34  
 63 R 5167—2000-ohm; alum. shell 3.57  
 Postage, 8¢ extra



# All Wave Honeycomb Coils and Mountings

## Back Panel Mounting



**\$3.95**

For mounting honeycomb coils behind the panel. Made of molded bakelite. Outside mountings geared to front knob—center mounting stationary. Flexible connectors with lugs. May be fitted with dial and knob. Shaft, 3/16 inch. Complete with knobs.

63 R 6544.....\$3.95  
Postage, 10¢ extra

## 72¢ Movable Coil Mounting



May be swung to any position desired. Complete with adjustable anti-capacity handle. Makes your fine long wave tuning easy.

63 R 6548.....72¢  
Postage, 6¢ extra

## Panel Mounting Plug



Has brass contacts. Genuine bakelite plug with nicked brass supports and screws. Either stationary or movable. Takes any standard coil plug.

63 R 5468.....39¢  
Postage, 4¢ extra



## Vernier Control Knob

Bakelite Knob with a soft rubber face. Mounts next to edge of dial by drilling one hole. Spring presses rubber against edge of dial permitting very fine adjustment of condenser.

63 R 6931.....12¢  
Postage, 2¢ extra



## Calibrated Knob and Dial

An especially attractive 3-inch Knob that looks well on any radio set. Made of molded polished black composition with scale of 0 to 100 engraved over 180 degrees. Also engraved with white arrow showing directions of rotation. Fluted with set screw to fasten to shaft.

63 R 6805—For 3/16-inch shaft...20¢  
63 R 6806—For 1/4-inch shaft...20¢  
Postage, 2¢ extra



## Finest Bakelite Dial Tapered Knob

Genuine molded bakelite Dial of fine design and construction. Beautifully finished and engraved in white enamel with the knob deeply knurled. Large deeply fluted taper knob allows positive grip. Metal bushings with a set screw insures a true turning dial. For 1/4-inch shaft only.

63 R 5980—Diameter, 4 inches. Scale 0 to 100 over 180 degrees.....79¢  
63 R 5981—Diameter, 3 inches. Scale 0 to 100 over 180 degrees.....43¢  
63 R 5982—Diameter, 2 inches. Scale 0 to 100 over 180 degrees.....34¢  
63 R 5983—Diameter, 2 inches. Scale 0 to 50 over 180 degrees.....34¢  
Postage: 2 and 3-inch, 2¢ extra; 4-inch, 3¢ extra



## Scranton Radio Dial and Knob

Made of polished, molded composition for use on variable condensers, variometers, varlocouplers, etc. Fluted with metal insert and set screw. Scale engraved 0 to 100 over 180 degrees in contrasting white enamel.

63 R 6766—Diameter, 3 inches. For 3/16-inch shaft...19¢  
63 R 6767—Diameter, 3 inches. For 1/4-inch shaft...19¢  
Postage, 2¢ extra

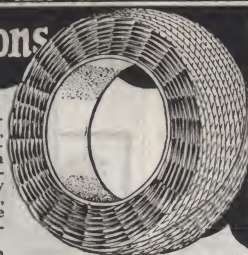
63 R 6768—Diameter, 3 1/2 inches. For 3/16-inch shaft...31¢  
63 R 6769—Diameter, 3 1/2 inches. For 1/4-inch shaft...31¢  
Postage, 3¢ extra

Small Dial and Knob. For rheostats. Diameter, 2 inches. Scale 0 to 100 over 270 degrees. Match above dials.  
63 R 6764—For 3/16-inch shaft.....14¢  
63 R 6765—For 1/4-inch shaft.....14¢  
Postage, 2¢ extra

## Get the Long Wave Stations

Learn the continental code and tune in Germany, France, England, Italy. Hear the ships, government and commercial stations. A simple tuner that will bring in all radio telegraph signals by using these inductances can be constructed from parts shown on this page. By using coils of correct values for primary, secondary and tickler you can bring in long wave Transatlantic Stations or you can plug in smaller coils and listen to broadcasting stations.

Diagram of good honeycomb coil set is shown on Page 32. These inductances can be mounted in any way you please, either in front or behind the panel. Hear the big Naval Station at Arlington tick off the time and send press reports.



### Mounted Coils

Same as above illustration, except with standard mounting plug attached.

Article Number	Turns	Approx. Length	Wave Range	Each
63 R 5485	25	130	370	\$ .87
63 R 5486	35	180	532	1.02
63 R 5487	50	250	748	1.04
63 R 5488	75	400	1062	1.10
63 R 5489	100	500	1438	1.15
63 R 5490	150	600	2160	2.45
63 R 5499	1250	6590	18730	

Postage, each, 5¢ extra

### Unmounted Coils

Same as above illustration, no mounting plug.

Article Number	Turns	Approx. Length	Wave Range	Each
63 R 5470	25	130	370	29¢
63 R 5471	35	180	532	29¢
63 R 5472	50	250	748	29¢
63 R 5473	75	400	1062	34¢
63 R 5474	100	500	1438	38¢
63 R 5475	150	600	1200	52¢

Postage, each, 5¢ extra

## Coil Mounting Strap

For mounting unmounted honeycomb coils to plugs. Made of fiber. Sold in 2-foot lengths only.

63 R 5466—2-foot length.....15¢  
Postage, per length, 2¢ extra

coll by using Strap shown at left. Has screw down clamps for holding mounting strap tight.

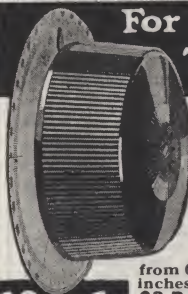
63 R 5469.....39¢  
Postage, 4¢ extra



# Dials and Verniers

All Dials Are Fitted with Metal Bushings

All of the Dials shown on this page are equipped with solid brass bushings. These bushings prevent the dials from becoming loose with wear, and make the dial turn smoother and easier.



## For Fine Adjustment The Univernier

One of the recent radio developments is the Univernier control, which gives both coarse and vernier adjustment. Enclosed in the large knurled composition Knob is a set of gears arranged so the knob is turned twelve times to one turn of the shaft. This gives extra fine adjustment. A slight push inward on the knob makes possible direct turning without the vernier. The beautiful white silver finish dial is marked from 0 to 360 degrees. Diameter of knob, 2 1/2 inches; scale, 3 1/4 inches.

63 R 6770—For 3/16-inch shaft...\$1.06  
63 R 6772—For 1/4-inch shaft...1.06  
Gold Finish Type. Same as above, except with gold finish dial and mahogany finish knob.  
63 R 5516—For 3/16-inch shaft...\$1.24  
63 R 5517—For 1/4-inch shaft...1.24  
Postage, 6¢ extra

**12 to 1 Ratio**

## Vernier Control Knob

Molded Knob with soft rubber face. Mounts next to dial by drilling one hole. Spring tension holds rubber face away from dial edge when not in use.

63 R 6930.....48¢  
Postage, 3¢ extra



## Rheostat Knob and Dial

A small 2-inch Dial and Knob molded of polished black composition with an especially fine finish. Scale is engraved from 0 to 100 through 270 degrees. Knob also has white arrow to indicate direction of rotation. Recommended for rheostats.

63 R 6807—For 3/16-inch shaft...17¢  
63 R 6808—For 1/4-inch shaft...17¢  
Postage, 2¢ extra



## Bakelite Dial and Knob

Dials and Knobs of genuine bakelite are practically unbreakable. Engraved scale filled with white enamel. Scale graduated from 0 to 100 over 180 degrees on 3 and 4-inch; 2-inch dial, over 270 degrees. A beautiful dial that will improve the appearance of almost any radio set.

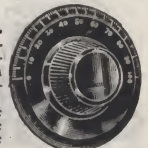
63 R 6809—Diameter, 2 inches. For 3/16-inch shaft...29¢  
63 R 6810—Diameter, 2 inches. For 1/4-inch shaft...29¢  
63 R 6811—Diameter, 3 inches. For 3/16-inch shaft...39¢  
63 R 6812—Diameter, 3 inches. For 1/4-inch shaft...39¢  
63 R 6813—Diameter, 3 inches. For 3/16-inch shaft...59¢  
63 R 6814—Diameter, 3 inches. For 1/4-inch shaft...59¢  
63 R 6815—Diameter, 3 inches. For 3/16-inch shaft...59¢  
63 R 6816—Diameter, 3 inches. For 1/4-inch shaft...59¢  
63 R 6817—Diameter, 3 inches. For 3/16-inch shaft...59¢  
63 R 6818—Diameter, 3 inches. For 1/4-inch shaft...59¢  
63 R 6819—Diameter, 3 inches. For 3/16-inch shaft...59¢  
63 R 6820—Diameter, 3 inches. For 1/4-inch shaft...59¢  
Postage: 2 and 3-inch, 2¢ extra; 4-inch, 3¢ extra



## True Turning Calibrated Dial

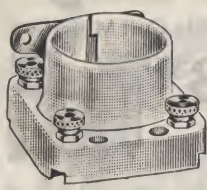
A well made Dial adds greatly to the attractive appearance of any radio set. Moulded from polished black composition and are neat and attractive in shape. Metal bushings with set screw for fastening to shaft makes dials run true. Neatly engraved scale graduated 0 to 100 over 180 degrees on 3 and 4-inch sizes; 2 1/4 inches, over 270 degrees.

63 R 6821—Diameter, 2 1/4 in. For 1/4-inch shaft...14¢  
63 R 6822—Diameter, 2 1/4 in. For 3/16-inch shaft...14¢  
63 R 6823—Diameter, 3 in. For 1/4-inch shaft...21¢  
63 R 6824—Diameter, 3 in. For 3/16-inch shaft...21¢  
63 R 6825—Diameter, 4 inches. For 1/4-inch shaft...27¢  
63 R 6826—Diameter, 4 inches. For 3/16-inch shaft...27¢  
63 R 6827—Diameter, 4 inches. For 1/4-inch shaft...27¢  
63 R 6828—Diameter, 4 inches. For 3/16-inch shaft...27¢  
Postage, 2 and 3-inch, 2¢ extra; 4-inch, 3¢ extra

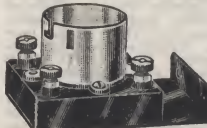




# Correct Sockets for All Tubes-Well Made-Priced Low

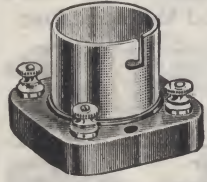


**Porcelain V. T. Socket**  
Made of glazed porcelain. Practically no electric leakage. Almost unbreakable. Positive contacts. Easily mounted on panel or base. For standard base amplifier, detector or power tubes.  
**63 R 5519**..... 21¢  
Postage, 6¢ extra

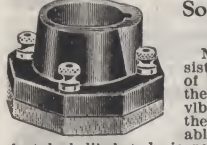


**Combination Tube Socket**  
A high grade Socket with polished nickel plated brass shell set into molded bakelite base. By means of bracket listed below may be mounted on panel. Binding posts plainly marked. For standard base tubes. A very nice socket at a low price. Illustration shows 63 R 5995 socket mounted on 63 R 5996 bracket.  
**63 R 5995**..... 63¢  
Postage, 6¢ extra

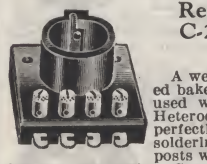
**63 R 5996**—Metal bracket. Designed to mount above socket on panel but can also be used with most other sockets..... 19¢  
Postage, 2¢ extra



**Standard Tube Socket**  
A popular type Socket. Polished nickel finish metal tube inserted in molded bakelite base. Special type contacts. Binding post connections plainly marked.  
**63 R 6434**..... 49¢  
Postage, 6¢ extra



**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 from reaching the tube. Splendid for portable sets. A necessity where the tube is likely to be jarred. Fine spring contacts; nickel plated binding posts plainly marked. Bayonet slot reinforced. Our price on this socket is low.  
**63 R 6439**..... 59¢  
Postage, 4¢ extra



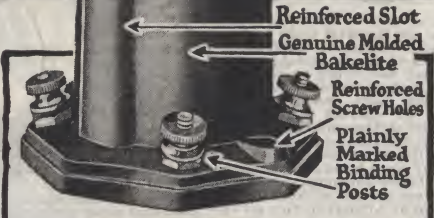
**Remler Socket for C-299 or UV-199 Tubes**  
A well made Socket of molded bakelite. These sockets are used with the Remler Super Heterodyne parts. Fit diagram perfectly. Base is fitted with soldering lugs and also binding posts which are plainly marked for easy connection. Strong, positive contact springs.  
**63 R 6479**..... 59¢  
Postage, 6¢ extra



**Socket for C-299 or UV-199 Tubes**  
For shelf mounting. A well made Socket of genuine molded bakelite. Strong, positive contact springs. Reinforced at bayonet slot. A big bargain for those who want a good socket at a low price.  
**63 R 6495**..... 39¢  
Postage, 2¢ extra



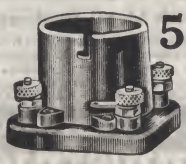
**Na-ald De Luxe Socket**  
Genuine molded bakelite. Reinforced slot. Laminated phosphor bronze springs give double contact, side and bottom. Binding post connections plainly marked. Standard base for shelf mounting. For C-12, WD-12, C-300 or 301A, UV-200 or 201A tubes. One of the best made and neatest looking sockets.  
**63 R 6022**..... 63¢  
Postage, 3¢ extra



## Genuine Molded Bakelite Socket

That a good Radio Socket need not be high in price is demonstrated by the Air-line. 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 Air-line. These sockets are for standard base tubes such as C300, 301A, UV-200, 201A, C-12 or WD-12. This socket is carefully made of moulded bakelite with strong reinforcement on the bayonet slot and screw holes. The strong phosphor bronze springs are rigidly held in place and can not slip. They provide a positive connection to the base of the tube. The nickel plated binding posts are plainly marked, making connection easy.

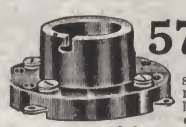
**63 R 6431**..... 25¢  
Postage, 3¢ extra



## 59¢ 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 springs insure firm and positive contact to tube. Reinforced at screw holes and points of strain. Nickel plated knurled binding posts plainly marked. Soldering lugs also supplied. A high grade socket.

**63 R 5521**..... 59¢  
Postage, 4¢ extra



## 57¢ Kellogg C-299 and UV-199 Socket

The improved design and construction of this Socket make it unnecessary to rewire 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.

**63 R 5522**..... 57¢  
Postage, 3¢ extra



## 29¢ Rubber Socket Cushion Base

To be placed under sockets. Prevents microphonic noises due to jolts or vibration of the tube. Especially suitable for portable sets and sets using several stages of audio frequency amplification. Fits all sockets.

**63 R 6012**—One cushion..... 29¢  
**63 R 6013**—Three cushions..... 79¢  
Postage, each, 2¢ extra



## Adapter for C-299 Tubes

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

**63 R 5203**..... 38¢  
Postage, 4¢ extra

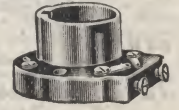


## Special C-299 or UV-199 Socket

An especially well made Socket for C-299 or UV-199 tubes. Designed for lowest possible 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 springs can not work loose or turn. Screw holes for mounting.

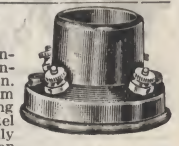
**63 R 6321**..... 29¢  
Postage, 2¢ extra

## Frost 612 Socket for C-299 or UV-199 Tubes



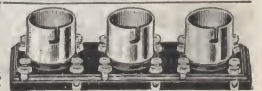
Genuine bakelite, maroon finish. For panel or shelf mounting. Binding posts plainly marked.  
**63 R 6044**..... 41¢  
Postage, 3¢ extra

## C-11 or WD-11 Tube Socket



Extra strong molded construction. Heavily reinforced at points of strain. Contact springs make firm contact with tube insuring positive connection. Nickel plated binding posts plainly marked for easy connection.  
**63 R 6412**..... 42¢  
Postage, 4¢ extra

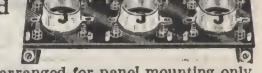
## Standard 3-Gang Socket



This 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.

**63 R 5524**..... \$1.10  
Postage, 6¢ extra

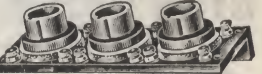
## C-299 and UV-199 Sockets



Especially arranged for panel mounting only. Brass socket shells on genuine bakelite base. Entire unit supported on rubber shock absorbers to prevent tube noises. Binding posts and soldering lugs provided for attaching wires.

**63 R 6501**—Single socket for one-tube sets..... \$ .39  
**63 R 6502**—Two-gang socket for two-tube sets..... .79  
**63 R 6503**—Three-gang sockets for three-tube sets..... 1.19  
Postage, 6¢ extra

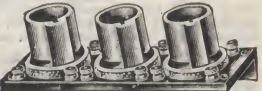
## Frost 3-Gang Socket



Shock absorber Socket for UV-199 and C-299 tubes. Made of genuine molded bakelite. Cushion rubber sub-base. Binding posts plainly marked. Strong spring contacts. Bracket for panel mounting only.

**63 R 6045**—Frost No. 616, 3 gang socket..... \$2.32  
**63 R 6046**—Frost No. 617, single socket..... .84  
Postage, 3-gang, 6¢ extra; single, 3¢

## Frost Cushion Base Socket for Standard Tubes



Frost No. 619. Three-gang Socket for use in detector and two-stage amplifier sets or in three-stage radio or audio frequency amplifiers. 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.

**63 R 6048**..... \$2.32  
**63 R 6047**—Single gang socket..... .84  
Postage, 6¢ extra

## Tube Socket Sponge Rubber



To be placed under sockets. Prevents tube vibrations. Easily cut to size desired. Size, 4 by 12 inches; 1/2 inch thick.  
**63 R 6015**—Per piece..... 42¢  
Postage, per piece, 2¢ extra



# Fine Quality Rheostats and Potentiometers



## Cutler-Hammer Drum Type Rheostat

Contact arm is stationary and turning knob revolves resistance element which is wound on circular form. Requires three holes for mounting.

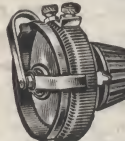
- 63 R 6026—30-ohm for C-299, UV-199, C-301A and UV-201A tubes. . . . . \$1.23
  - 63 R 6027—4-ohm for C-300 and UV-200 tubes. . . . . 85¢
  - 63 R 6028—25-ohm for C-300 and UV-200 detector tubes. . . . . \$1.23
  - 63 R 6028—125-ohm for operating C-299 and UV-199 tubes on storage battery. . . . . \$1.23
- Potentiometer. Matches above rheostat in design and appearance.
- 63 R 6025—Resistance 300 ohms. . . . . \$1.23
- Postage, each, 6¢ extra



## Howard Rheostat and Potentiometers Known for Reliability

Panel mounting type Rheostats with knob and pointer. Requires three holes for mounting.

- 63 R 6031—6 to 7-ohm plain type for C-300 and UV-200 tubes. . . . . 95¢
  - 63 R 6030—6 to 7-ohm vernier type for C-300 and UV-200 detector tubes. . . . . \$1.19
  - 63 R 6032—25-ohm plain type for C-300 and UV-200 tubes. . . . . 95¢
  - 63 R 6033—40-ohm plain type for UV-199 and C-299 tubes. . . . . 95¢
- Potentiometers. Matches above rheostat in design and appearance. Smooth, quiet action.
- 63 R 6034—400 ohms. . . . . \$1.19
  - 63 R 6035—400 ohms. . . . . \$1.69
- Postage, each, 6¢ extra



## Frost Rheostats One of the Leaders

Maroon bakelite case. Black bakelite knobs. Single hole mounting.

- 63 R 6080—Frost No. 651 6-ohm with vernier for C-300 and UV-200 tubes. . . . . \$1.05
  - 63 R 6081—Frost No. 650, 6-ohm plain for C-300 and UV-200 tubes. . . . . 84¢
  - 63 R 6083—Frost No. 653, 35-ohm with vernier for C-299, UV-199, C-301A and UV-201A tubes. . . . . \$1.05
  - 63 R 6082—Frost No. 652, 35-ohm plain for C-299, UV-199, C-301A and UV-201A tubes. . . . . 84¢
- Potentiometer to match above rheostat
- 63 R 6084—Frost No. 655. Resistance, 200-ohms. . . . . \$1.05
  - 63 R 6085—Frost No. 654. Resistance, 400-ohms. . . . . \$1.05
- Postage, each, 6¢ extra



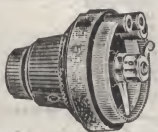
## Frost Metal Frame Rheostats

Brass frame with bakelite knob. Single hole mounting.

- 63 R 6065—Frost No. 600, 6-ohm plain type for C-300 and UV-200 tubes. . . . . 49¢
  - 63 R 6066—Frost No. 601, 6-ohm with vernier C-300 and UV-200 Detector tubes. . . . . 63¢
  - 63 R 6067—Frost No. 602, 35-ohm plain for C-299, UV-199, C-301A and UV-201A tubes. . . . . 49¢
  - 63 R 6069—Frost No. 603, 35-ohm with vernier for C-299, UV-199, C-301A and UV-201A tubes. . . . . 63¢
- Potentiometer to match above rheostats.
- 63 R 6068—Frost No. 605, 200 ohms. . . . . 49¢
  - 63 R 6070—Frost No. 603, 400 ohms. . . . . 49¢
- Postage, each, 6¢ extra

## Amsco Double Rheostat

New style combination Rheostats. Genuine bakelite frame and knobs with resistance units wound on high grade heat resisting strips and solidly set into frame. Combined styles have two separate windings. Exceptionally well suited for use in four or five tube sets, providing individual control of all tubes. Small knob is engraved.



- 63 R 5985—One circuit 6-ohm vernier. Marked vernier with indicating arrows. . . . . 98¢
  - 63 R 5986—Two 20-ohm rheostat combined in one mounting. Controls separately both radio frequency tubes. Marked 2nd Stage Radio with indicating arrows. . . . . 98¢
  - 63 R 5987—Same as above but marked 2nd Stage Radio for anode control. . . . . 98¢
  - 63 R 5988—6-ohm rheostat and 400-ohm potentiometer combined. Marked with indicating arrow. . . . . \$1.19
- Postage, 6¢ extra

## Single-Hole Mounting Rheostat

59¢



Great Time and Labor Saver  
Good Quality Throughout

No Panel Screws Needed

A Big Value

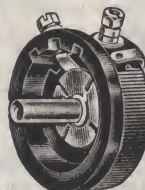
Although Ward's prices are lower than those usually asked, you can order with confidence that you will find every purchase highly satisfactory. These instruments are correctly designed, strongly and accurately constructed, and thoroughly dependable in operation.

The Single Hole genuine bakelite Rheostat shown here saves much time and many measurements in mounting, as only one hole in the panel is required. The resistance element is wound on a heat resisting bakelite base. Complete with knob.

- Rheostats of this type are recommended for use with amplifier and detector tubes.
- 63 R 6019—6-ohm for C-300 and UV-200 tubes. . . . . 59¢
  - 63 R 6020—20-ohm for C-301A, UV-201A, C-299 and UV-199 tubes. . . . . 62¢
  - 63 R 6021—30-ohm for C-299 and UV-199 tubes. . . . . 65¢
- Postage, each, 6¢ extra

## Rheostat and Potentiometer Well Made and Priced Low

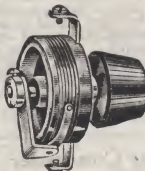
An especially well made Rheostat that will give extra good service and look well in any set. Wire resistance is wound on heat resisting molded composition base. Furnished without knob so you can use a dial such as those shown on Page 43. These rheostats are made in all the necessary resistances to accommodate various tubes. Three holes in panel are required for mounting. Shaft diameter, 1/4 inch.



- 63 R 6506—6-ohm for C-300 tubes. . . . . 45¢
  - 63 R 6507—10-ohm for C-11 tubes or for C-301A tubes where three or more are controlled by one rheostat. . . . . 47¢
  - 63 R 6508—20-ohm for C-301A tubes. . . . . 45¢
  - 63 R 6509—30-ohm for C-299 with dry cells or C-301A tubes with storage battery. . . . . 51¢
  - 63 R 6518—50-ohm for C-299 tubes. . . . . 53¢
- Potentiometer matches above rheostats. Resistance, 375 ohms.
- 63 R 6519. . . . . 65¢
- Postage, 6¢ extra

## Vernier Rheostat

Resistance wire is wound around outside of bakelite form so contact arm passes over its 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 setting of resistance.

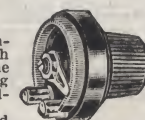


- 63 R 6460—Resistance, 6 ohms for C-300 and UV-200 tubes. . . . . \$1.48
  - 63 R 6536—Resistance, 25 ohms for UV-201A and C-301A. . . . . \$1.48
  - 63 R 6464—Resistance, 40 ohms for C-299 and UV-199 tubes. . . . . \$1.48
- Postage, 6¢ extra

For Very Fine Control of Tubes

## Amsco Plain Rheostat

Same style and construction as combination Rheostats listed at left but with only one winding and knob. Genuine bakelite frame and knob, with indicating arrow. A high grade rheostat at a moderate price.



- 63 R 5989—20-ohm for C-301A and UV-201A tubes. . . . . 79¢
  - 63 R 5990—30-ohm for C-299 and UV-199 tubes. . . . . 79¢
- Postage, 6¢ extra

## Well Made Smooth Operating Rheostat and Potentiometer

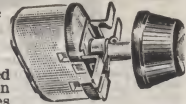
These Rheostats and Potentiometers are the smoothest in operation of any we have seen. Resistance units are wound on heat resisting strips. Complete with 2-inch dial, engraved from 0 to 100 over 360 deg. Molded bakelite frame and composition dial.



- 63 R 5991—20-ohm for C-301A, UV-201A, C-299 and UV-199 tubes. . . . . 82¢
  - 63 R 5992—40-ohm for C-299 or UV-199 tubes. . . . . \$ .82
  - 63 R 5993—200-ohm potentiometer. . . . . .98
  - 63 R 5994—400-ohm potentiometer. . . . . 1.12
- Postage, 6¢ extra

## Bradley Graphite Vernier Rheostat for Extremely Fine Adjustment

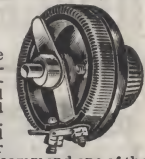
Resistance is controlled by varying pressure on graphite discs and gives practically perfect control of filament current. New universal model. Resistance can be varied to handle all tubes. Three holes required for mounting on panel.



- 63 R 6406. . . . . \$1.74
  - Bradleyometer Potentiometer
  - 63 R 6469—Resistance, 200 ohms. . . . . \$1.89
  - 63 R 6470—Resistance, 400 ohms. . . . . \$2.89
- Postage, each, 6¢ extra

## Knob and Pointer Rheostat

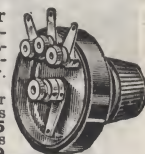
At Ward's you can save money on quality merchandise by ordering these Rheostats for your set. Arranged for panel mounting and fitted with a knob and pointer. Three holes in panel required for mounting. When C-300 or UV-200 tubes are used, we recommend one of the vernier type rheostats shown elsewhere on this page.



- 63 R 6401—Resistance, 6 ohms. For C-301A and UV-201 A. . . . . 32¢
  - 63 R 6400—Resistance, 10 ohms. For two or more C-301A tubes. . . . . 33¢
  - 63 R 6408—Resistance, 20 ohms. For single UV-301A or UV-201A. . . . . 34¢
  - 63 R 6411—Resistance, 30-ohms. For C-299 and UV-199 tubes with dry cells. . . . . 35¢
  - 63 R 6415—Resistance, 50-ohms. For C-299 and UV-199 tubes with 6-volt storage battery. . . . . 45¢
- Potentiometer to match above rheostats
- 63 R 6444—Resistance, 200 ohms. . . . . 49¢
  - 63 R 6447—Resistance, 400 ohms. . . . . 49¢
- Postage, 5¢ extra

## C-R-L Potentiometer

Non-inductive Potentiometer. Contact is quiet in operation. Contact disc makes contact on C-R-L type resistor. Mounts with one hole.



- 63 R 6037—400 ohms for use with storage batteries. . . . . \$1.05
  - 63 R 6038—200 ohms for use with dry cells. . . . . \$1.19
- Postage, 6¢ extra

## Resistance Unit to Protect Tubes

For attaching to 6-ohm rheostats in set designed for storage battery tubes. For use with C-299 or UV-199 tubes and three dry cells. Resistance 25 ohms.



- 63 R 6040. . . . . 14¢
- Postage, 1¢ extra

## Amperite Automatic Current Adjuster

Regulates tube current automatically. No rheostat needed. Tube operates at point of highest efficiency. Complete with mounting. For C-301A and UV-201A tubes except when used as detector tubes.



- 63 R 6017. . . . . 97¢
- Postage, 4¢ extra

## Frost Resistance Unit

Mounts on socket, panel or rheostat. Total resistance, 35 ohms, which may be varied by moving contact arm. For use with C-301A or UV-201A, or with C-299 or UV-199 tubes and 6-ohm rheostat when using a storage battery.



- 63 R 6036. . . . . 20¢
- Postage, 2¢ extra



# Your Radio Set Needs Good Condensers

**Low Loss**

## Variable Condenser Vernier and Plain Type

**\$2.18**



**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 Leakages Reduced to a Minimum

In this new low loss Condenser every safeguard is provided to prevent current losses or leakages. The perfectly formed plates stamped from heavy aluminum are properly spaced and the rotating shaft works in brass bearings set in discs of high insulating material which in turn are accurately centered in the heavy aluminum end plates. Large bearing surface makes perfect contact with rotor plates. Triple hole mounting. In either vernier or plain type. Dials not included. Both styles have 1/4-inch shaft. Vernier type has the single plate controlled by lever.

For Vernier Type (Order 3-inch Dials)			
63 R	6061	.0025 mfd.; 14 plate	\$2.18
63 R	6062	.005 mfd.; 26 plate	3.90
63 R	6063	.01 mfd.; 46 plate	3.85
Plain Type			
63 R	6115	.0025 mfd.; 13 plate	\$1.85
63 R	6116	.005 mfd.; 23 plate	2.10
63 R	6117	.01 mfd.; 43 plate	2.85

Postage, 8¢ extra

### Single Hole Mounting Variable Condenser



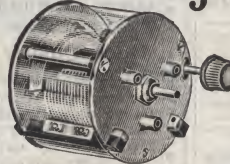
**\$2.18**

These Condensers requiring single hole mounting are especially suitable for neutrodyne sets as with this method of mounting coils can be easily adjusted to the desired angle in a few seconds with no new holes being required in panel. Bakelite end pieces. Aluminum plates. Split bronze contact spring insures positive contact. Diameter of shaft, 1/4 inch.

63 R	6121	.0025 mfd.; 11 plate	\$2.18
63 R	6122	.005 mfd.; 23 plate	2.35
63 R	6123	.01 mfd.; 43 plate	3.18

Postage, 8¢ extra

### Acme Variable Condenser



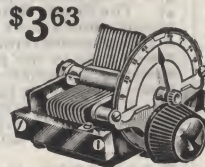
**\$5.10**

The Acme Low Loss Condenser has proved to be one of the very best variable condensers made. Due to its high grade design and material the losses are reduced to a minimum. Rotor plates are grounded to condenser end plate. Stator plates suspended on hard rubber strips. Brass plates soldered to eliminate losses. Enclosed in celluloid case. Range, .000016 to .0005 mfd.; 29 plates. Shaft, 1/4 inch. Complete with friction vernier. Uses 3-inch dial. No dial included.

63 R	6119		\$5.10
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Postage, 8¢ extra

### New Type Low Loss Condenser



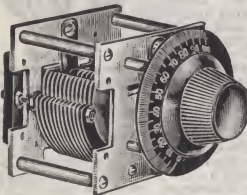
**\$3.63**

A new type low loss condenser which is sure to be popular. Brass plates soldered together to reduce losses. Rotor plates are grounded to end plates. No body capacity. Stator plates suspended on hard rubber strips resulting in increased efficiency. Knob controls rotor plates through rubber friction vernier. Condenser is supplied with paper dials on which you may mark the locations of various broadcasting stations. This is one of the best values in condensers we have ever offered.

63 R	6165	.0025 mfd.; 11 plate	\$3.63
63 R	6166	.005 mfd.; 23 plate	3.95

Postage, 8¢ extra

### Low Loss Variable Condenser

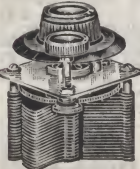


After looking over all the new types of Condensers we selected this type as being one of the most desirable. Due to its high grade material and efficient design the losses are reduced to an extremely low point. Rotor plates grounded to end plates. No body capacity. Fitted with metal dial geared to the shaft with a 5 1/2 to 1 ratio producing a vernier action over entire scale. Stator plates insulated with hard rubber strips.

63 R	6128	.0025 mfd.	\$4.45
63 R	6129	.005 mfd.	4.95
63 R	6130	.01 mfd.	5.85

Postage, 8¢ extra

### Coto Coil Variable Condenser

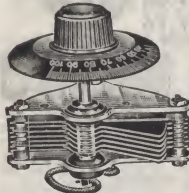


Rigid construction. Fitted with dial and vernier control knobs. Friction drive vernier permits very fine adjustment. Brass plates, soldered connections. Very low losses. Shaft diameter, 1/4 inch. Three-inch dial engraved 0 to 100 over 180 degrees.

63 R	6125	.0025 mfd.; 11 plate	\$3.95
63 R	6126	.005 mfd.; 21 plate	4.95
63 R	6127	.01 mfd.; 43 plate	4.95

Postage, 8¢ extra

### Cogswell Low Loss Variable Condenser

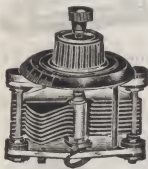


Has aluminum plates and end pieces. The plates of this condenser are so shaped that the dial divisions at both the upper and lower ends of the scale indicate equal variations in wave lengths, which is not the case with most other condensers. Genuine bakelite bushings. Diameter of shaft, 1/4 inch. Complete with 3-inch taper knob dial of genuine bakelite. Dial is neatly engraved 0 to 100 over 180 degrees. Engraved scale is set off in contrasting white enamel. Complete with attaching screws. Pigtail connection from rotor.

63 R	6131	13 plate; capacity, .0025 mfd.	\$2.95
63 R	6132	13 plate; vernier control	3.90
63 R	6133	43 plate; capacity, .01 mfd.	4.10

Postage, 8¢ extra

### Low Loss Vernier Condenser



A new style low loss Condenser that will improve the operation of most 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 the hard aluminum end plates, eliminating body capacity. The insulation between stator and rotor plates consists of small bakelite bushings located at the extreme edges of the end plates. This construction reduces the losses due to absorption to a minimum.

Pigtail connections to rotor plates also helps 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.

63 R	5533	Capacity, .0025 mfd.	\$2.65
63 R	5534	Capacity, .005 mfd.	3.15
63 R	5535	Capacity, .01 mfd.	3.65

Postage, 8¢ extra

## 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.; Morristown, N. J.; Davenport, Ia.; Memphis, Tenn.; Chicago, Ill.; Louisville, Ky., and numerous other places. I plan on enlarging my outfit and adding two more tubes. Expect to purchase these accessories for you."

J. M. Droke,

R. A. Box 62, O'Keene, Okla.

Printed with Mr. Droke's Permission

### Micadon Condenser Type 610



A model of the famous Dubiller Condenser that has met with much widespread popularity among the more particular radio enthusiasts. Consists of a high grade mica insulated condenser mounted in an easily adjusted case with sliding posts for easy connection. Provided with screw holes and may be used for either panel or table mounting. These condensers have many uses in home built radio sets.

63 R	6215	Capacity, .01 mfd.	\$ .98
63 R	6216	Capacity, .02 mfd.	1.15

Postage, 4¢ extra

### Micadon Condenser Type 601



Same high grade construction as Type 610 shown above, but without the composition case and intended for use behind panel. Fitted with eyelets for easy connection.

63 R	6236	Capacity, .0001 mfd.	29¢
63 R	6237	Capacity, .00025 mfd.	32¢
63 R	6238	Capacity, .005 mfd.	32¢
63 R	6239	Capacity, .01 mfd.	32¢
63 R	6240	Capacity, .02 mfd.	32¢
63 R	6241	Capacity, .025 mfd.	32¢
63 R	6242	Capacity, .03 mfd.	39¢
63 R	6243	Capacity, .04 mfd.	39¢
63 R	6244	Capacity, .05 mfd.	45¢
63 R	6224	Capacity, .006 mfd.	57¢

Postage, 3¢ extra

### Large Capacity Fixed Condenser



Many of the new circuits such as the Neutrodyne, reflex and superheterodyne call for fixed condensers 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 in neat metal cases and provided with soldering lugs to make connection easy. Constructed so they will stand much higher voltages than are usually found in receiving sets. Tested under 500 volts direct current. At our prices these condensers are a real bargain.

63 R	6029	Capacity, 1/2 mfd.	\$ .54
63 R	6037	Capacity, 1 mfd.	.62
63 R	6098	Capacity, 2 mfd.	1.30

Postage, 3¢ extra



# Variable and Fixed Condensers



## Continental Low Loss Condenser

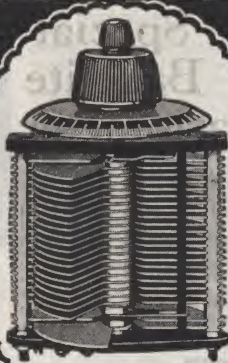
High efficiency with exceptionally low losses can be secured with this condenser. The stationary plates are set in slotted square brass bars, drilled through and soldered into one unit. All plates are carefully machined to prevent brush discharge losses. The stator unit is on hard rubber entirely free from the frame which carries the rotating section. Rotor plates grounded to end frames. No body capacity. A new positive vernier is controlled by a small knob made to project through the panel below the dial. Shaft, 1/4 inch. Dial not included.

**\$3.79** Hard Rubber Insulation

- 63 R 5545—00025 mfd. without vernier.....\$3.79
- 63 R 5546—0005 mfd. without vernier.....4.19
- 63 R 5547—00025 mfd. with vernier.....4.69
- 63 R 5548—0005 mfd. with vernier.....4.98

Postage, each, 8¢ 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 large knob which moves the rotary plates, a single movable plate, controlled only by the small knob, permits you to secure further sharp tuning. Plates are of hard aluminum, accurately cut, pressed and evenly spaced.

### Complete with Dial and Knob

Genuine bakelite insulation. Fitted with knob and three-inch dial engraved in white enamel. Three-hole panel mounting. The workmanship on this condenser is very fine and it is an excellent value. Remarkable results are possible when used in selective circuits. On some sets the mere turning of the vernier plate will bring in three or four different stations of similar wave lengths.

- 63 R 6108—12 plate; .00025 mfd.....\$1.85
- 63 R 6109—22 plate; .0005 mfd.....2.30
- 63 R 6110—42 plate; .001 mfd.....2.45

Postage, 8¢ extra



## Freshman Condensers

Well known mica insulated Condenser. Very accurate and convenient.

- 63 R 6201—Capacity, .0025 mfd.....28¢
- 63 R 6202—Capacity, .005 mfd.....35¢
- 63 R 6203—Capacity, .01 mfd.....69¢

Postage, 4¢ extra

## Freshman Midget Condensers

Small eyelet type, mica insulated condenser, 3/4 inch wide.

- 63 R 6204—Capacity, .0025 mfd.....18¢
- 63 R 6205—Capacity, .0005 mfd.....18¢
- 63 R 6206—Capacity, .0008 mfd.....21¢

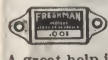
Postage, 2¢ extra

## Eyelet Condensers

A well made, accurate Condenser. Connections brought to convenient connecting eyelets in ends of fiber strip. Every condenser tested. Length 2 1/2 inches; width, 1/2 inch.

- 63 R 6349—Capacity, .006 mfd.....14¢
- 63 R 6353—Capacity, .002 mfd.....8¢
- 63 R 6351—Capacity, .001 mfd.....7¢
- 63 R 6355—Capacity, .0005 mfd.....6¢
- 63 R 6382—Capacity, .00025 mfd.....6¢
- 63 R 6383—Capacity, .00025 mfd with 1 megohm india ink leak.....9¢

Postage, 1¢ extra



## Variable Fixed Condenser

Capacity variable in steps from .0005 to .002 mfd. Adjusted by removing plates from condenser until proper capacity is reached.

- A great help in reflex, neutrodyne and other circuits.
- 63 R 6214.....59¢

Postage, 2¢ 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.

- 63 R 5550.....19¢

Postage, 3¢ extra

More Savings for You

# High Insulation Radio Panels



Fine quality Panels, beautifully finished and accurately cut to standard sizes to fit the radio cabinets shown on the next page. These panels are smooth and true and perfectly flat, with clean, square cut edges. When rubbed down with fine sandpaper the high gloss finish can be easily reduced to the soft rich egg shell finish preferred by some. Each panel packed separately in a scratchproof container.

## Bakelite Radio Panels

**55¢**

Size 6 by 7

Genuine Bakelite panels of extra fine quality. Well finished surfaces and edges. Will not warp nor absorb moisture. Easy to drill and may be quickly cut to special sizes.

1/4 Inch Thick		3/16 Inch Thick		Size Inches	Postage Extra
Article Number	Each	Article Number	Each		
63 R 6670	\$ .55	63 R 6680	\$ .80	6 by 7	6¢
63 R 6671	.83	63 R 6681	1.10	6 by 10 1/2	6¢
63 R 6672	1.10	63 R 6682	1.38	6 by 14	8¢
63 R 6673	1.38	63 R 6683	1.66	6 by 16	8¢
63 R 6674	1.66	63 R 6684	1.94	7 by 9	6¢
63 R 6675	1.94	63 R 6685	2.22	7 by 10	6¢
63 R 6676	2.22	63 R 6686	2.50	7 by 12	8¢
63 R 6677	2.50	63 R 6687	2.78	7 by 14	8¢
63 R 6678	2.78	63 R 6688	3.06	7 by 16	8¢
63 R 6679	3.06	63 R 6689	3.34	7 by 18	8¢
63 R 6680	3.34	63 R 6690	3.62	7 by 24	10¢
63 R 6681	3.62	63 R 6691	3.90	7 by 26	10¢
63 R 6682	3.90	63 R 6692	4.18	7 by 33	12¢
63 R 6683	4.18	63 R 6693	4.46	9 by 16	18¢
63 R 6684	4.46	63 R 6694	4.74	11 by 16 1/2	10¢

## Fine Quality Hard Rubber Panels

One of the easiest Panels to drill. Cuts clean with little effort. Takes engraving nicely. Made of rubber base composition with glossy black finish. Has high insulation properties and is moisture proof. Sold only in one thickness, 3/16 inch. Every panel perfectly true and flawless, with clean, square cut sides, and packed in scratch proof container. Our prices are very low, due to large purchases.

**39¢**

Size 6 by 7

Although low in price this is a strictly quality Panel and is finished with a highly polished surface.

Article Number	Size	Each	Postage Extra
63 R 6710	6 by 7 in.	\$ .39	5¢
63 R 6711	6 by 10 1/2 in.	.57	10¢
63 R 6712	6 by 14 in.	.78	12¢
63 R 6713	6 by 16 in.	.90	12¢
63 R 6714	7 by 9 in.	.57	10¢
63 R 6709	7 by 10 in.	.64	10¢
63 R 6799	7 by 12 in.	.76	12¢
63 R 6730	7 by 14 in.	.89	12¢
63 R 6739	7 by 16 in.	1.02	12¢
63 R 6715	7 by 18 in.	1.14	14¢

## Base Boards for All Cabinets 18¢ by 6 1/2 Inches



Correct sizes for all cabinets listed in this catalogue. Cut from clear grain, non-warping 3/4-inch wood, nicely finished and shellacked.

Article No.	Size, Inches	Each	Article No.	Size, Inches	Each
63 R 6954	6 1/2 by 6 1/2	18¢	63 R 6961	6 1/2 by 11 1/2	21¢
63 R 6955	6 1/2 by 10	19¢	63 R 6962	6 1/2 by 17 1/2	23¢
63 R 6956	6 1/2 by 13 1/2	24¢	63 R 6963	6 1/2 by 25 1/2	32¢
63 R 6957	6 1/2 by 15 1/2	24¢	63 R 6964	9 1/2 by 13 1/2	26¢
63 R 6958	6 1/2 by 20 1/2	27¢	63 R 6965	9 1/2 by 15 1/2	27¢
63 R 6959	6 1/2 by 8 1/2	21¢	63 R 6966	9 1/2 by 16	28¢

Postage, each, 8¢ extra

## Panel Engravings and Binding Post Markers

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

- 63 R 5629—Per set.....12¢

Postage, per set, 1¢ 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 home made radio set look like a commercially made set. With the various dials and binding posts marked it will be much easier for you to operate your set. Complete set consists of 31 transfers—every title needed on any set. Black lettering on gold background. Complete sets only.

- 63 R 6802—Per set.....9¢

Postage, per set, 2¢ 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 misplaced means a whole new panel. Center fits over 1/2- and 3/4-inch shafts. Arms adjustable to locate screw holes.



- 63 R 5552.....14¢

Postage, 2¢ extra



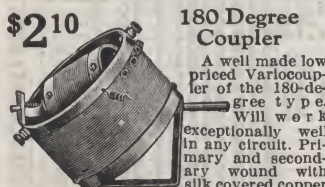
# Variocouplers and Variometers



**Bakelite Variocoupler**  
**\$1.68**

A well made properly designed Coupler that gives excellent results in any single circuit or three-circuit hook-up. Can be mounted on panel or shelf. Windings are of green silk covered wire on genuine bakelite tubes. Primary has set of coarse and fine taps for accurate tuning. Gives 180 degree coupling. Shaft, 1/4 inch diameter. Covers all broadcasting wave lengths.

**63 R 6313.....\$1.68**  
Postage, 8¢ extra



A well made low priced Variocoupler of the 180-degree type. Will work exceptionally well in any circuit. Primary and secondary wound with silk covered copper wire on genuine bakelite forms. Primary tapped for fine and coarse tuning. Arranged for table or panel mounting. Wave length range, 150 to 600 meters. Has 3/8-inch shaft.

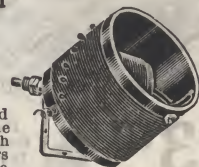
**63 R 6309.....\$2.10**  
Postage, 8¢ extra

**Genuine Bakelite**  
**1/4-inch Shaft**  
**Panel or Table Mounting**  
**Ward's Special Bakelite Variometer**

This fine molded bakelite Variometer is priced very low. It is sold under an advertised brand at a much higher price than we ask. Windings are of large size silk covered wire, and are designed for reception of all broadcasting wave lengths. The stator winding is divided into two parts and connections are brought out to binding posts—a feature found only on highest priced variometers. This permits the use of this variometer in the new circuits featuring split stator windings. Windings are held on fine molded bakelite rotor and stator forms so they can not become loose. Shaft is 1/4 inch in diameter. Arranged for either panel or table mounting.

**63 R 6304—Variometer.....\$3.65**  
**63 R 6294—Variocoupler to match above variometer 3.95**  
Postage, 12¢ extra

**Low Priced Variocoupler**  
**90¢**



May be used in either single circuit set or with two variometers to match, in a three-circuit tuner. Wound with silk covered wire on a strong non-warping fiber compound form. Arranged for panel mounting. Requires only one hole. Has 1/4-inch shaft. For panel or shaft mounting. Used for all broadcasting wave lengths.

**63 R 5998.....90¢**  
Postage, 8¢ extra

**Good Low Priced Variometer**  
**88¢**



When used in pairs with a variocoupler in the standard three-circuit hook up or any standard circuit this variometer gives very satisfactory results. Wound with silk covered wire on a strong, non-shrinking fiber form. For panel mounting. Shaft, 1/4 inch. Works as well as many higher priced couplers.

**63 R 5997.....88¢**  
Postage, 8¢ extra

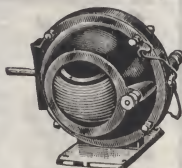


**WoodForm Variometer**

An especially well built Variometer with stator and rotor forms of kiln dried wood. Will not shrink or warp. Windings are properly designed for use on all broadcasting wave lengths. Shaft is 3/8 inch in 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.

**63 R 5641.....\$1.95**  
Postage, 10¢ extra



**Raven Bakelite Variometer**

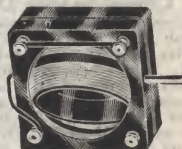
Small compact size. High quality molded bakelite Variometer of approved design. Silk covered winding with connections brought out to nickel plated binding posts. Positive shaft connections. Covers all broadcasting wave lengths and has polished metal base for panel or table mounting. Shaft, 1/4 inch.

will work well in any circuit. Has polished metal base for panel or table mounting. Shaft, 1/4 inch.  
**63 R 6312.....\$3.95**  
Postage, 8¢ extra

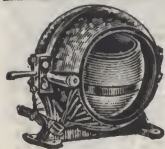
**Molded Variometer**

Stator and rotor forms of this Variometer are of molded composition. Will not warp or shrink. Windings stay firmly in place. For all broadcasting wave lengths. For panel or table mounting. Has 1/4-inch shaft. Convenient connecting posts. Positive connections. Well constructed and dependable. A quality instrument at a low price.

**63 R 6310.....\$2.48**  
Postage, 12¢ extra

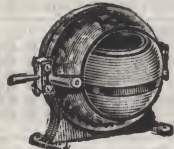


## Molded Bakelite Variometers and Couplers



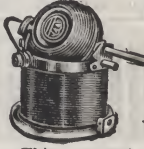
High grade molded mahogany finish bakelite Variocoupler wound with green silk covered wire. For table or panel mounting. Taps for coarse or fine tuning. Covers all broadcasting wave lengths. Shaft diameter, 1/4 inch. Gives exceptionally fine results as a single circuit tuner or as a three-circuit tuner with two of the variometers shown at the right.

**63 R 6163...\$4.28**  
Postage, 8¢ extra



Solid bakelite variometer to match variocoupler shown at left. Primary and secondary wound with green silk covered wire on mahogany bakelite forms. Convenient binding post connections. Table or panel mounting. Shaft, 1/4 inch.

**63 R 6164...\$4.10**  
Postage, 8¢ extra



**Kilbourne and Clarke Midget Variocoupler and Variometer**

This compact Variocoupler is designed for highest efficiency and will save space in a radio set. The primary is wound on a molded bakelite tube and the secondary on a bakelite ball. Nickel plated binding posts and 1/4-inch shaft. Tapped primary.

**63 R 6198...\$5.36**  
Postage, 8¢ extra



Variometer that occupies a minimum of space with rotor and stator molded of genuine bakelite. Wound to cover all broadcasting wave lengths. The rotor shaft has metal bearings and pigtail connections. Knurled nickel plated binding posts. 1/4-inch shaft.

**63 R 6199...\$4.96**  
Postage, 10¢ extra



Variocoupler to match Variometer 63 R 6168 shown at the right. Finely finished with the silk windings on genuine bakelite forms. Tapped primary. Panel or table mounting. Shaft, 1/4 inch. Covers all broadcasting wave lengths.

**63 R 6167...\$5.25**  
Postage, 12¢ extra



A well designed and constructed Variometer with silk covered windings on genuine molded bakelite forms. May be used in all circuits. Rotor connections are made through spring contacts to the nickel plated binding posts. Covers all broadcasting wave lengths. Designed for table or panel mounting. Shaft, 1/4 inch. Matches Variocoupler 63 R 6167.

**63 R 6168...\$5.25**  
Postage, 12¢ extra



**Hilco Variocoupler and Variometer**

Matches Variocoupler 63 R 6318. Stator and rotor windings are self supporting and wound in honeycomb form. Very efficient. For use in single circuit, two and three circuits and reflex sets. Very selective. Covers all broadcasting wave lengths. Has 12 taps. Shaft diameter, 1/4 inch. Noiseless spring contacts. Panel mounting only.

**63 R 6317.....\$5.20**  
Postage, 8¢ extra



Primary and secondary windings in honeycomb form. Matches coupler 63 R 6318 at the left. For use in three-circuit sets or any circuit requiring a high grade variometer. Covers all broadcasting wave lengths. Binding post connections. Shaft, 1/4 inch. Panel mounting. Our low price saves you considerable on this high grade instrument.

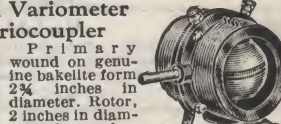
**63 R 6319.....\$4.48**  
Postage, 8¢ extra



**Coto Coil Variometer and Variocoupler**

A very compact Variometer only 2 3/4 inches in diameter with primary honeycomb wound on genuine bakelite forms. Designed for use with Coupler 63 R 6161. Binding post connections; 1/4-inch shaft. Panel or table mounting. The small size of this instrument makes it suitable for sets where space is limited.

**63 R 6162.....\$3.95**  
Postage, 6¢ extra



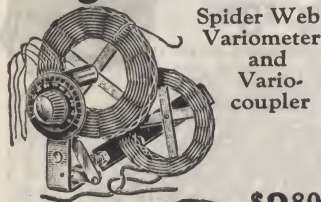
Primary wound on genuine bakelite form 2 3/4 inches in diameter. Rotor, 2 inches in diameter. Stator has taps for fine tuning. For panel or table mounting. Covers all broadcasting wave lengths. Diameter of shaft, 1/4 inch. For use in portable and other sets where space is limited.

**63 R 6161.....\$4.15**  
Postage, 6¢ extra



# Tuning Units and Inductances

\$3.95



Spider Web Variometer and Variocoupler

\$3.80

The remarkable efficiency, sharp tuning and responsiveness to distant signals of this Coupler are due to the superior design and complete absence of absorbing materials in the magnetic field. Primary has 4 taps. For panel or table mounting. Geared secondary coupling gives great selectivity. Covers all broadcasting wave lengths. Dial and knob included. Shaft, 1/4 inch.

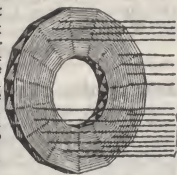
The Variometer used in the Hagerman Universal circuit. Gives excellent results in any circuit using variometers. Geared secondary gives sharp tuning. Table or panel mounting. Dial and knob included. Shaft, 1/4 inch.

63 R 6170.....\$3.80  
Postage, 8¢ extra

## Coil for Reinartz Circuit

Spiderweb coil with silk covered wire with 10 primary, 4 secondary and 4 tapper taps. Leads are brought out for connection to the switch points so the coil is easy to install and connect. Will receive all wave lengths from 200 to 600 meters.

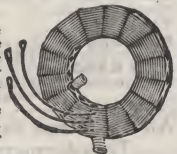
63 R 5501.....98¢  
Postage, 6¢ extra



## Ultraudion Coil

This Coil is used in the Ultraudion Circuit on Page 31, and produces fine results. Wound in self-supporting, spiderweb form doing away with the losses occurring through the use of wood, metal or fiber. May also be used as a loading coil for receiving higher wave lengths. Wound with silk covered wire. Very efficient on waves of 200 to 650 meters. Tapped at four places for accurate tuning.

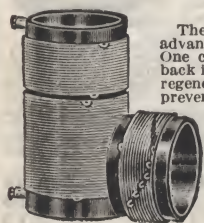
63 R 5467.....78¢  
Postage, 6¢ extra



## Wave Trap Coil

Loose coupled coil arranged for use with a variable condenser as a wave trap. When used with an ordinary receiving set, permits very selective tuning. For use on all broadcasting waves. Complete with full instructions showing how to make and use the wave trap on your radio.

63 R 6229.....90¢  
Postage, 4¢ extra



**Coil for the Cockaday Circuit**  
The circuit employing the Cockaday unit has many advantages over similar types of regenerative circuits. One coil is in reality an absorption coil to prevent feedback into the antenna. The feedback action that creates 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 bank wound "D" coil, primary and secondary coupling and stabilizer coil. Wound on non-warping forms. Length of "D" coil, 2 inches; 7 taps. Length of primary and secondary 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.....\$1.65  
Postage, 10¢ extra



\$2.95

## Ward's De Luxe Variocoupler

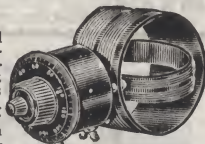
A well made, high grade Coupler at an unusually low price. Designed to meet the needs of the average set and has proved very efficient under rigid tests. It is handsomely finished and first class in every particular. When used with a 23-plate variable condenser in series with the antenna, the wave length 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 a fiber composition tube. Arranged for panel mounting. Shaft diameter, 1/4 inch. Designed by our engineers and built especially for Ward's. Thousands of these couplers have been used in single circuit regenerative sets throughout the country with unusually satisfactory results.

63 R 6300.....\$2.95  
Postage, 12¢ extra

## Tuning Unit

Consists of a special tuning inductance complete with variable condenser. Special short circuited rotor makes circuit very selective. Includes diagram for special Ultra-audion hook-up. Panel mounting. Complete with dial and two knobs. Center knob controls secondary. A very high grade tuning unit at an extremely low price.

63 R 6160.....\$3.89  
Postage, 6¢ extra



## What Our Customers Say

"I received my Radio apparatus all O. K. That Coupler is certainly a fine one. This morning about 6:00 o'clock I heard 6XG Oakland, California, on one tube using this coupler. How is that for distance?"

W. F. Burgess,  
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 Christman,  
Ephratah, N. Y.

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

Robert F. Stiles,  
Walkerton, Ind.

All Letters Printed by Permission

## 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 a splendid purchase for the experimenter who does not wish to spend a great deal of money on his outfit at one time.

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 3/4-inch black composition dial.

63 R 6158.....\$6.78  
Postage, 10¢ extra

## Single Circuit Tuner

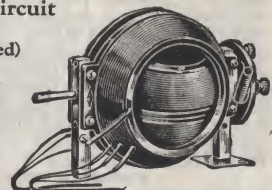
A variocoupler specially designed for use in single circuit tuners. Produces excellent results. Has taps for coarse and fine tuning. Coils wound on bakelite forms with green silk covered wire. Designed for maximum efficiency. Table or panel mounting. Binding post connections. Shaft, 1/4 inch. Metal parts nicked. A high grade instrument. You save at this low price.



63 R 6156.....\$3.95  
Postage, 8¢ extra

## Coupled Circuit Tuner (Unmounted)

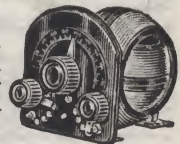
Takes the place of a variometer and variocoupler in a coupled circuit receiving set. Produces excellent results when used with a good vacuum tube detector and two-stage amplifier. Only one adjustment. Rotor and stator forms of genuine bakelite. Windings are silk covered copper wire. Shaft, 1/4 inch. Diagram of connections included.



63 R 6173.....\$6.75  
Postage, 12¢ extra

## Coupled Circuit Tuner (Mounted)

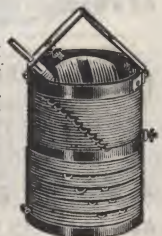
Same as Coupled Circuit Tuner 63 R 6173 shown above, except that this is mounted on genuine molded bakelite panel attractively engraved and fitted with knob, pointer and inductance switches.



63 R 6174.....\$10.25  
Postage, 14¢ extra

## All Meter Variocoupler

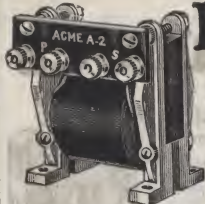
Many people desire a set that will receive more than the usual broadcasting stations. To those who are interested in this broader field we offer the All-Meter Variocoupler. It will receive amateur stations on 200 meters, all broadcasting wave lengths, ship and commercial stations on 700 to 1440 meters, and will also enable you to tune in the government stations that send out time signals on 1500 to 2500 meters. This is a first quality instrument offered to you at a great saving. Wound with silk covered wire. Primary, "bank wound." Taps are brought out for connections to switch points. Should be used with a variable condenser in series with the antenna. Shaft, 1/4-inch diameter.



63 R 6320.....\$4.75  
Postage, 12¢ extra



# Popular Audio Frequency Transformers



## \$4.38 Acme Transformer

The Acme Audio Transformer needs no introduction to radio experimenters. It is the best of its kind and is one of the best to be had. Gives high amplification without distortion. Wound to meet the usual radio requirements and suitable for either first, second or third stages of Audio frequency. Especially desirable where loud speaking devices are used. Easily mounted. Marked binding post connections on bakelite panel. Guaranteed not to short or open circuit when properly used. Ratio, 4 1/2 to 1.

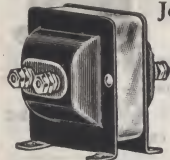
63 R 6473.....\$4.38  
Postage, 6¢ extra



## Amertran Transformer

Comparatively new in the radio field but already adopted by many companies building high priced sets Amertran Transformers give high amplification and true tone quality. Windings are designed to cover the usual radio requirements, and the Amertran functions well with any of the present day vacuum tubes. Shell type design with carefully selected steel core. Connections are brought out to marked binding posts mounted on insulating terminal board. May be mounted on panel or on base of cabinet.

63 R 6574—Ratio, 5 to 1.....\$6.65  
63 R 6596—Ratio, 3 1/2 to 1.....6.65  
Postage, 6¢ extra

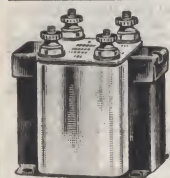


## Jefferson Transformer

Another Big Saving Only \$2.30

A recent addition to the well known line of Jefferson Transformers. During tests in our radio laboratory this transformer proved to be one of the most satisfactory audio frequency transformers we have seen. It is of the shell core type with windings properly designed for amplification of voice and music as well as radio telegraph signals. Mounted in a metal enclosure with nickel and black enamel finish. This metal case acts as a shield and prevents leakage from one transformer to another in a multi-stage amplifier. Binding posts are provided for easy connection. We recommend this transformer to the radio experimenter as being thoroughly satisfactory and a fine value at our low price.

63 R 6588—Ratio, 3 to 1.....\$2.30  
63 R 6908—Ratio, 6 to 1.....2.48  
Postage, 6¢ extra

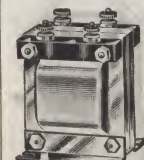


## Thordarson Amplifying Transformer

Long before radio became popular the Thordarson transformers for all purposes were standard everywhere. To meet the requirements of radio receiving stations Thordarson has produced a line of transformers employing unusual construction features that serve to produce superior results with any standard tubes.

Windings are of carefully insulated, enamel wire, greatly reducing the possibility of burning out. An extra large core of this type is used. Primary and secondary are wound in proper ratio to give most efficient coupling with low distributed capacity. Metal enclosing shell shields the winding and howling is eliminated. Binding post connections conveniently arranged.

63 R 6563—6 to 1 ratio.....\$3.95  
63 R 6564—3 1/2 to 1 ratio.....3.58  
63 R 6222—2 to 1 ratio.....4.19  
Postage, each, 6¢ extra



## Shell Type Audio Frequency Transformer

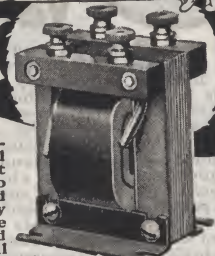
Well designed and carefully made closed core type. Very compact and a good value. Gives good amplification without howling. Enclosed in metal shielding shell. Binding posts plainly marked. Can be used for table or panel mounting.

63 R 7018—6 to 1 ratio.....\$2.30  
63 R 7017—3 1/2 to 1 ratio.....2.39  
Postage, 6¢ extra

NOTE: The tone quality of the audio frequency amplifier often 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.

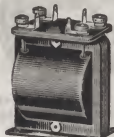
## Ward's Special Audio TRANSFORMERS

\$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 windings are carefully insulated and wound on a shell type core of special steel. Binding posts mounted on hard rubber terminal board and plainly marked. This transformer will produce results equal to transformers sold at much higher prices.

63 R 6264—6 to 1 ratio.....\$2.25  
63 R 6265—3 1/2 to 1 ratio.....1.95  
Postage, 6¢ extra



## Sampson Audio Transformer

In the Sampson Audio Frequency Transformers the helical type of windings is used for both the primary and secondary coils. This type has met with very much enthusiasm because of the reduction in capacity effect. No paper insulation between layers is necessary in this type of winding which means the least possible resistance with the very best efficiency.

There is a minimum current leakage, and the transformer will give, almost always, a clearer reception with less howling. A quality instrument selling at a comparatively low price. This transformer is one of the best audio frequency transformers on the market.

63 R 6232—Ratio, 6 to 1.....\$4.25  
63 R 6233—Ratio, 3 to 1.....4.25  
Postage, 6¢ extra

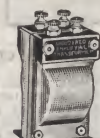


## Kellogg Transformer

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 shell type core is built up of small plates of silicon steel, the most approved construction in high grade transformers.

The coils are enclosed in brass shields so they may be mounted in any desired position without losses. Connection wires extend through the Bakelite top, which affords perfect insulation, and are soldered in plain sight so they can be inspected easily. Secure better results from your radio set by installing Kellogg audio transformers which amplify without distortion.

63 R 6247—Ratio, 4 1/2 to 1.....\$3.89  
63 R 6249—Ratio, 3 to 1.....3.89  
Postage, 6¢ extra



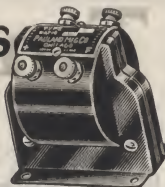
## K. C. Transformer

This make of Transformer is characterized by the skilled workmanship in their construction, as well as the high grade of material used. Quiet operation, freedom from distortion, natural, round tones and low transformer losses are results secured by the use of these transformers.

The construction requires more than a score of assembling operations, and each one of these operations is tested so the instrument is actually proved in each process of manufacture. It is shielded so it may be mounted in any position without loss, and is finished in black enamel. It may be used with excellent results with all tubes commonly in use in receiving sets.

63 R 6210—Ratio, 6 to 1.....\$4.10  
63 R 6211—Ratio, 3 to 1.....4.10  
Postage, 6¢ extra

## All American Transformer Now \$3.95 Only

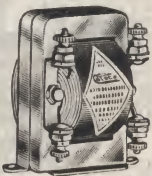


Radio enthusiasts over the country are using All-American Audio Frequency Transformers with splendid results. They produce maximum amplification without loss of quality. Windings are shielded in a metal case. Three different types are made for use respectively in the first, second and third stage of the amplifier. The first type with a ratio of 10 to 1 is used in single stage amplifiers; 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 3 to 1 is used as the last transformer in a two stage audio frequency amplifier.

63 R 6582—Type 1; 10 to 1 ratio.....\$3.95  
63 R 6583—Type 2; 5 to 1 ratio.....3.95  
63 R 6584—Type 3; 3 to 1 ratio.....3.75  
Postage, each, 6¢ extra

## Coto Coil Transformer

## Now \$3.95 Only



Certain features make this Transformer highly desirable for use in audio frequency amplifying circuits. Windings are properly designed for maximum amplification without howling. Shell type core gives great efficiency. Losses through leakage are reduced to a minimum. Resonance is secured at all frequencies used in broadcasting which means true tone quality. Very 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. Connections are brought out to binding posts which are plainly marked. May be mounted on the radio panel or on the table. Our price gives you a substantial saving.

63 R 6578.....\$3.95  
Postage, 6¢ extra

## Erla Audio Transformer

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



63 R 6594—Ratio, 6 to 1 for 1st stage of amplifier.. \$3.98  
63 R 6590—Ratio, 3 1/2 to 1 for 2nd stage.....3.98  
Postage, 6¢ extra

## All American Power Transformers

To be used in pairs in push-pull (power) Amplifiers. Give unusual volume without distortion. When used with the ordinary 3-tube set loud speaker 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.



63 R 6551—Per pair.....\$9.95  
Postage, per pair, 10¢ extra

## Hegehog Audio Transformer

A compact Audio Frequency Transformer that will give excellent results in 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 clearness because of the efficient design and style of windings.



The Hegehog is only 3 inches long, 1 1/4 inches wide and 1 1/4 inches high. The windings are fully shielded and transformer may be mounted in any position. You make a saving when buying this transformer at Ward's low price.

63 R 6251—Ratio, 10 to 1.....\$3.95  
63 R 6253—Ratio, 5 to 1.....3.19  
63 R 6255—Ratio, 3 to 1.....3.19  
Postage, 4¢ extra



# Radio Frequency Transformers



The Well Known Acme

## Radio Frequency Transformer

Especially suited to reflex circuits. Acme Transformers are among the best known and most popular radio frequency transformers. Designed by the Acme engineers, who have been building radio transformers for years. These transformers are of the iron core type. Windings are mounted in a bakelite case with all binding posts plainly 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.

63 R 6475—Type R1 for amateur waves of 100 to 350 meters.....\$4.38

63 R 6476—Type R2 for first stage amplifier..... 4.38

63 R 6477—Type R3 for second stage amplifier..... 4.38

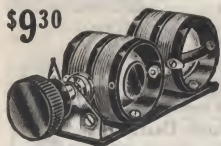
63 R 6458—Type R4 for third stage amplifier..... 4.38  
Postage, each, 6¢ extra

## 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 case of insulating material. Neat and compact. Nickel plated feet 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. A bargain at Ward's low price.

63 R 6571—For first stage amplifier... \$3.38  
63 R 6572—For second stage amplifier 3.38  
Postage, each, 6¢ extra



## Kilbourne & 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 broadcasting wave lengths. Has insulated shaft. Pig tail connections. Each stage of amplification adjustable. Made of bakelite. For panel or table mounting.

63 R 6183—Two stage.....\$9.30

63 R 6184—Single stage..... 4.65  
Postage, 10¢ extra

Radio Frequency Transformers are constructed very much like audio frequency transformers but are designed especially for the purpose of amplifying or increasing the strength of the signals before they reach the detector. Audio Frequency Transformers increase the volume after it has been detected and made audible. Many signals too weak to be plainly audible on the detector alone are sufficiently increased by radio frequency so as to be made audible. Radio frequency transformers must be calibrated to a very exacting wave length range, and this construction also helps clear the signals by filtering out some forms of interference.

## Radio Frequency Amplifying Transformer \$4.95

An Amplifying Transformer made by the Radio Corporation of America. Type UV-1714 for one or more stages of amplification. Has the windings in two sections: one for waves 200 to 500 meters and the other for those 500 to 5000 meters. Change is made by moving contact arm on binding posts. Winding enclosed in composition case.

63 R 6478..... \$4.95  
Postage, 6¢ extra



## Dubilier Radio Frequency Transformer



A famous product of the Dubilier Co., makers of the widely known Dubilier condensers. Designed for use on the usual broadcasting wave lengths. Gives excellent service in any standard radio frequency circuit. Mounted in a neat bakelite case with plainly marked binding posts.

63 R 6573.....\$3.48  
Postage, 6¢ extra

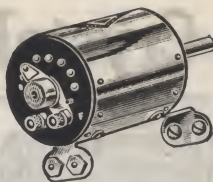
## The Erla Selectoformer Replaces the Variocoupler in Many Circuits

The Erla Selectoformer was especially designed to take the place of a variocoupler in any circuit except the single circuit regenerative and one-tube reflex. Covers all wave lengths. Mounted in a case with binding posts plainly marked. A superior instrument of the usual Erla quality.

63 R 6601.....\$4.20  
Postage, 6¢ extra



## Coto Coil Radio Frequency Amplifying Coil



## Brings in Long Distance Stations

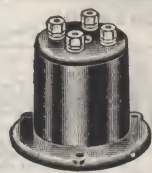
This Transformer is of the tapped type so that maximum efficiency is obtained on all amateur and broadcasting wave lengths. Change is made by a switch arm mounted on the end of the case. This is one of the most efficient radio transformers obtainable. It will bring in the long distance stations that can not be heard by ordinary methods. Suitable for use in one or more stages and as many as three can be mounted on one shaft.

63 R 6637.....\$5.50

Extension Shafts  
63 R 6648—8 inches for 2 transformers. 1.0¢  
63 R 6649—10 inches for 3 transformers. 1.5¢  
Postage: Transformers, 6¢ extra; shafts, 2¢

## 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 usual trouble due to capacity effects in the circuits and changes in the load. Mounted in a bakelite case with binding posts marked for easy connection. Built for panel or shelf mounting. This transformer is highly recommended, and the price is lower because of quantity production and efficient engineering. Only high grade materials are used in the production of this transformer.



63 R 6546—For use with 201A and 301A tubes....\$1.79

63 R 6547—For use with UV-199, C-299, C-11 and C-12 tubes.....\$1.79  
Postage, each, 6¢ extra

## Erla Reflex Transformer Gives Excellent Results

Especially well suited to reflex circuits where the utmost transformer efficiency is necessary. The circuits using the Erla Reflex transformers are easily 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 long experiment and have proved capable of remarkable results. Erla Reflex circuits and instructions furnished with each transformer.

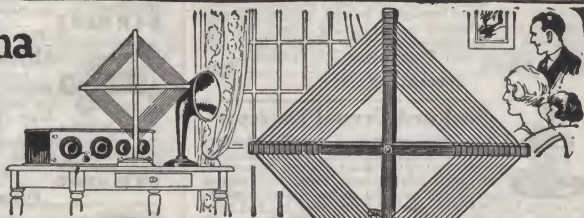


63 R 6562—For first stage reflex.....\$3.95

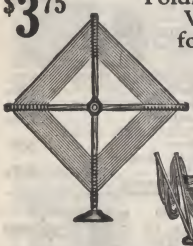
63 R 6591—For second stage reflex... 3.95  
Postage, each, 6¢ extra

# 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. It necessarily the energy gathered by a loop antenna is smaller than on an outside antenna, therefore a loop should be used only with an extremely sensitive multiple tube receiver, such as reflex, radio frequency, super heterodyne and other sets employing much amplification. An advantage gained is that the loop is directional—that is, it brings in signals from a given station louder when pointed directly toward that station. It also cuts out much interference and has the advantage of portability. Loop reception should not be attempted except with super sensitive amplifying sets.



## Folding Loop Antenna Very Desirable for Portable Sets

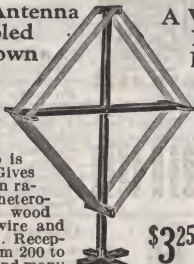


Folding type Loop recommended for use with portable sets. Can be folded and put in to small tubular case 13 inches long by 3 inches in diameter. Covers all broadcasting waves. Loop, when extended is 31 1/2 inches high by 28 1/2 inches wide. Easy to set up and operate. Designed for high selectivity. Wood parts are mahogany finished. Complete with case.

63 R 655.....\$3.75

Postage, 14¢ extra

## Box Type Loop Antenna Easily Assembled and Taken Down

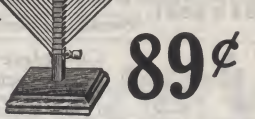


Very convenient and practical. Can be assembled and taken down easily. Complete wood frame and stand with wire and binding post connections. Size of loop is two feet on each side. Gives good results with modern radio frequency and super-heterodyne circuits. Complete wood frame and stand with wire and binding post connections. Reception over distances of from 200 to 1500 miles is common, and many longer distances have been reported. Shipped taken apart.

563 R 650.....\$3.25

Postage, 16¢ extra

## A Very Satisfactory Loop Antenna Priced at Less Than a Dollar



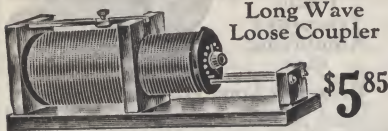
This Loop was designed to meet the requirements of those who desire a high grade loop aerial at a price within the reach of anyone. Supersensitive instruments using radio frequency amplification and a loop antenna for aerial will, under favorable conditions, receive stations several hundred miles distant. Specially adapted for receiving up to 600 meters wave length. Very sharp tuning can be obtained. Interference can be practically eliminated. Can also be used for direction finding. Comes taken apart, complete with all necessary parts and wire. Directions for assembling and using included. Height, 28 inches.

563 R 654.....89¢

Postage, 14¢ extra



# Crystal Detectors - Tuning Coils and Parts



Long Wave Loose Coupler

\$5.85

A low priced receiving set using a Loose Coupler and a crystal detector. Has a range of 10 to 30 miles for broadcasting stations, and a greater range for commercial land and ship stations. The outfit requires an antenna of 75 to 150 feet, a head set, a variable condenser and a fixed condenser.

This loose coupler will tune to all waves up to 4000 meters. Very effective on short broadcasting waves of 200 to 600 meters. Primary controlled by sliders, ten point switch on secondary mounted on formica panel. Silk covered wire windings. Mahogany finished woodwork. Base about 18 by 6 inches.

63 R 601.....\$5.85  
Postage, 32¢ extra

## Tip-Top Crystal



Tip Top Crystals are ideal for crystal sets and reflex sets using crystal for detector. They are sensitive over almost entire surface, easy to adjust and hold adjustment well. Mounted in metal to fit any standard detector cups.

63 R 5559.....24¢  
Postage, 2¢ extra

## Culina Crystal



Extra sensitive. Suitable for use in any crystal set and especially fine in reflex sets. Stand high voltage without burning out. Do not require frequent resetting. Mounted in metal. Fit any standard detector cups. Hold adjustment well.

63 R 5560.....24¢  
Postage, 2¢ extra

## 82¢ Weatherproof Detector Stand



Phosphor bronze contact spring can be firmly set in any position. Crystal is held securely inside dustproof and moistureproof-glass cylinder. All metal parts nickel plated and polished. Polished formica base, about 2 by 2 3/4 inch. Nickel plated brass binding parts. Convenient screw holes. Crystal not included.

63 R 5303.....82¢  
Postage, 6¢ extra

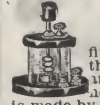
## Standard Galena Detector Stand



Permits vertical or horizontal adjustment. Tested piece of galena is mounted in cup which can be rotated. Crystal contact of phosphor bronze wire coiled and pointed and soldered on flat spring. Very fine adjustment obtainable with screw. Molded base and adjustment knobs. Base, about 3 by 3 inches.

63 R 5305.....59¢  
Postage, 6¢ extra

## Enclosed Crystal Detector



Cat whisker type Crystal Detector, fitted with a glass case, which protects the crystal from dust. Easy to adjust and holds adjustment well. Crystal is held firmly in cup in base and contact is made by fine wire spring controlled by rod projecting through composition top. Binding posts and screw holes in base. Crystal not included.

63 R 6531.....74¢  
Postage, 6¢ extra

## Complete Set Crystal Detector Parts



Complete set of metal parts to make up a high grade crystal detector. Can be mounted on front panel or top of set. Made of brass, nickel finish. Crystal cup takes regular mounted crystals. Base or crystal not included.

63 R 6534—Per set.....29¢  
Postage, per set, 2¢ extra

## Erla Fixed Crystal



Mounted in convenient dustproof case with screw holes for mounting. Especially suitable for use in Erla reflex and all other reflex or plain detector crystal circuits. No adjustment necessary. Very sensitive.

63 R 6595.....89¢  
Postage, 2¢ extra

## 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 electrical 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



Requires only one hole 7/16 inch in diameter in panel. Used to control current or make and break circuits. Fits panel up to 1/4 inch.

63 R 5645.....27¢  
Postage, 3¢ extra

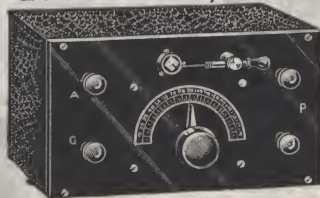
## Push-Pull Switch



Used to control current to tubes or various other uses. Built to last for years. A neat and compact switch that can be mounted behind panel so only the nickel plated button shows. Single hole mounting; size of hole, 7/16 inch.

63 R 5614.....45¢  
Postage, 3¢ 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 imitation leather covered case, 9 by 5 inches. Binding posts are provided on the hard rubber panel 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. Head sets or antenna not included.

63 R 6293.....\$3.95  
Postage, 14¢ 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 spot. Enclosed in hard rubber tubing with nickel plated ends. Has brass screws for mounting on panel. Detector complete with instructions for care and installation.

63 R 5562.....\$1.15  
Postage, 5¢ extra

## Mounted Crystal



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

63 R 5320—Supersensitive Galena Coll. 19¢  
63 R 5322—Supersensitive Silicon Coll. 19¢  
Postage, 2¢ extra

## Broadcast Tested Crystals

Each Crystal is carefully tested on signals from broadcasting stations.

63 R 5325—Galena unmounted.....	5¢
63 R 5326—Galena mounted.....	6¢
63 R 5327—Silicon unmounted.....	7¢
63 R 5330—Radiolite mounted.....	8¢

Postage, 2¢ extra

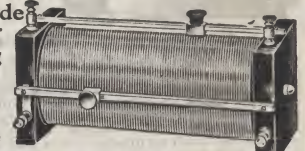
## Grewol Fixed Crystal



Recommended for use in reflex and other circuits. Very sensitive. Gives louder signals than most crystals. Can be adjusted if necessary. Holds adjustment. Dustproof glass case. For panel mounting.

63 R 6597.....\$1.10  
Postage, 2¢ extra

## Two-Slide Radio Tuning Cell



\$2.45

Machine spaced bare copper wire windings on non-shrinkable tube. Windings can not come loose. Controlled by means of two smooth working sliders. Mahogany finished end pieces. Range up to 1000 meters on average antenna. Length, about 8 1/4 in.

63 R 5104.....\$2.45  
Postage, 12¢ extra

## Cardboard Tubes

Used for making tuning coils, loading coils and for other radio purposes. They are made of paper from specially prepared wood pulp and are treated so that they will hold their shape permanently with ordinary care. Easily cut to any length desired. All sizes 1 foot long.

63 R 6565—Diameter, 3 inches.....12¢  
63 R 6566—Diameter, 3 1/2 inches.....14¢  
63 R 6567—Diameter, 4 inches.....16¢  
Postage, 2¢ extra

## Bakelite Tubing



Grade XX Bakelite-Directo or Formica Tubing. Use these tubes for winding all your coils. Very strong, will not warp or bend. All sizes 3 inches long.

63 R 6870—Inside diameter, 2 1/2 inches...30¢  
63 R 6871—Inside diameter, 3 inches...37¢  
63 R 6872—Inside diameter, 3 1/2 inches...40¢  
63 R 6873—Inside diameter, 4 inches...45¢  
Postage, 2¢ extra

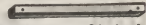
## Slide Contactors



Wiping contact, spring type Slider for 3/16-inch rod. Positive contact at every point on the coil. Slides freely.

63 R 6532—2 contactors.....18¢  
Postage, 2 contactors, 2¢ extra

## Slide Rods



Used in building tuning coils. Made of 3/16-inch square brass rod; smooth polished finish. Screw holes in each end.

63 R 6575—8 inches long. 2 rods.....12¢  
63 R 6576—10 inches long. 2 rods.....14¢  
63 R 6577—12 inches long. 2 rods.....16¢  
Postage, 2 rods, 2¢ extra

## Test Buzzer Push Button



For use with test buzzer, or as circuit closer in any battery circuit. Mounts flush with panel. Nickel rim with pearl center. Held in 3/16-inch hole by small spring clips.

63 R 5137.....22¢  
Postage, 2¢ extra

## Test Buzzer



This watch case Buzzer operates on one dry cell. Useful for many purposes where an alarm signal is wanted. Also used for inducing high frequency currents in the antenna lead in order to find sensitive spots on crystal. Nickel plated cover and base. Height, 1 1/2 inches; diameter, 2 3/4 inches.

63 R 5345.....69¢  
Postage, 4¢ extra

## Potentiometer Switch



For cutting the potentiometer out of the battery circuit and leaving the circuit still in operation.

63 R 5646.....43¢  
Postage, 2¢ extra

## Porcelain Base Knife Switch



Porcelain base provides extra good insulation. Broad head screws on copper lugs provide an easy means of making connection.

63 R 2684—Single pole, single throw switch. Base size, 1 1/2 by 3 1/4 inches.....18¢  
63 R 2686—Single pole, double throw switch. Base size, 1 1/2 by 3 1/4 inches.....25¢  
63 R 2687—Double pole, single throw. Base size, 2 by 2 1/2 inches.....30¢  
63 R 2689—Double pole, double throw. Base size, 2 1/2 by 4 inches.....45¢  
Postage, 2¢ extra

## Anti-Capacity Switch



Double throw, four pole, 12 spring standard Switch Key; 1 1/2 inches wide; 7/8 inch deep. Entire length, 3 1/2 inches. For mounting behind panel with only the lever projecting at front.

63 R 6796.....\$2.58  
Postage, 6¢ extra



# Latest Improved Radio Accessories Priced Low

## Inductance Switch and Dial



Takes the place of switch points on the panel of your set. Arranged so only the dial and knob are visible on the front side of the panel. The rest of the mechanism is mounted on the rear. Twelve switch points are provided, any number of which may be used. Black composition tapered knob with calibrated dial, 2 1/4 inches diameter, with markings from 1 to 12 which indicate exact position of lever on switch points. Requires but one hole and single hole mounting. Switch points have split soldering shanks to take wire leads from inductance. Fits hole 6704.

**63 R 6704**.....\$1.19  
Postage, 6¢ extra

## Back Mounted Switch



This Switch is easily mounted by drilling one hole through the panel and tightening the lock nut. Numerals on knob indicate exact position of switch lever. Connections are made to the switch points mounted on the insulating block behind the panel. The switch has ten switch points complete with lugs to which connections may be soldered.

**63 R 5660**.....89¢  
Postage, 6¢ extra

## Back Mounted Switch



A well built inexpensive back mounting Switch. Has 10 switch points to which connections may be soldered. Single hole mounting.

**63 R 5647**.....42¢  
Postage, 2¢ extra

## Switch Knob and Lever



A neat and attractive Switch Knob and Lever suitable for inductance variations of any tapped tuning device. Beautiful black composition fluted knob. Nickel plated spring lever makes wiping contact with switch points insuring clean contact. Adjustable to any panel up to 3/8 inch. Positive contact connection on bushing.

**63 R 5617**.....13¢  
Postage, 1¢ extra

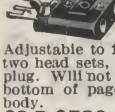
## Frost Jac-Box



With this you can attach four head sets equipped with plugs, to any radio set; or three head sets and a loud speaker may be used. Consists of four jacks mounted in mahogany finished box with bakelite front and back panel. Size, 5 inches long; 2 1/2 inches wide and 1 1/4 inches high. Twelve-inch flexible cord and attaching plug included.

**63 R 6793**.....\$1.95  
Postage, 6¢ extra

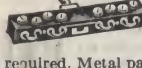
## Pacnet Duc-Jack



For connecting head set or loud speaker to set that has binding post connections instead of jacks. Adjustable to fit any of three sizes of two head sets, or one head set and loud speaker plug. Will not take two 63 R 6785 Plugs (shown at bottom of page) because of the size of the plug body.

**63 R 6786**.....79¢  
Postage, 4¢ extra

## Frost Four-Way Plug



Use this 4-way Plug on your set and let the whole family listen in. Takes 4 pairs of head set tips. No extra plugs required. Metal parts of brass.

**63 R 6797**.....\$1.68  
Postage, 4¢ extra

## Three-Plug Adapter



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

**63 R 6794**.....89¢  
Postage, 4¢ extra

## Two-Cord Plug



With this new style plug you can use two head sets without having a number of unsightly troublesome connections. This is 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.

**63 R 6792**.....39¢  
Postage, 3¢ extra

## 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 lugs tinned. Formica insulation. Exposed nickel parts highly polished.

**63 R 6928**—Frost No. 133 open circuit Jack for one-tube sets or last stage of amplifier. One-spring type.....48¢

**63 R 6929**—Frost No. 134 closed circuit Jack with series connection. Two-spring type.....57¢

**63 R 6937**—Frost No. 131 two-circuit Jack for detector-amplifier. Four-spring type.....61¢

**63 R 6938**—Frost No. 135 single circuit Jack for filament control. Four-spring type. Closes one circuit.....67¢

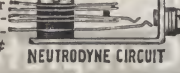
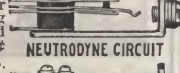
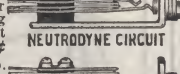
**63 R 6940**—Frost No. 136 two-circuit Jack for filament control. Opens two circuits and closes one.....71¢

**63 R 6941**—Frost No. 141 open circuit Jack for filament control. Four-spring type. Closes one circuit.....71¢

**63 R 6943**—Frost No. 126 double circuit Jack for filament control. Six-spring type. Opens one circuit.....71¢

**63 R 6939**—Frost No. 130 two-circuit Jack for filament control. O-spring type. Closes one circuit and opens one.....71¢

**63 R 6942**—Frost No. 125 closed circuit Jack for filament control. Five-spring type. Opens one circuit and closes one.....71¢  
Postage, each, 3¢ extra



## Radio Jacks

A series of Jacks especially designed for radio use. May be mounted on any panel up to 1/4 inch, by drilling one hole. The contacts are silver, assuring positive connection. Springs are of heavy construction and will not weaken in service. All visible parts nickel plated and polished. Equal in quality to any jack on the market.

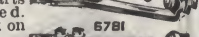
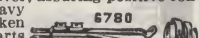
**63 R 6780**—Open circuit Jack for single tube sets or last stage of amplifier.....29¢

**63 R 6781**—Closed circuit Jack for series connection.....35¢

**63 R 6782**—Two-circuit Jack for detector amplifier circuits.....46¢

**63 R 6783**—Single circuit Jack with extra contacts to turn filament on and off.....42¢

**63 R 6784**—Two-circuit Jack with extra contacts to turn filament on and off.....59¢



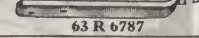
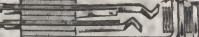
## Special Jacks

Well made with strong springs. Silver contacts.

**63 R 6787**—Double Circuit.....25¢

**63 R 6815**—Single Circuit.....22¢

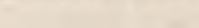
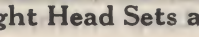
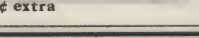
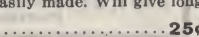
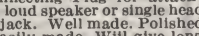
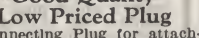
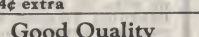
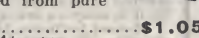
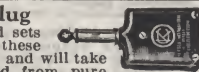
Postage, each, 3¢ extra



## Series Automatic Plug

Add any number of head sets by using one or more of these plugs. Plug into each other and will take all standard plugs. Molded from pure bakelite.

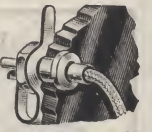
**63 R 6196**.....\$1.05  
Postage, 4¢ extra



## Cord Tip Jacks

Does away with jacks and plugs for head set connections. Fits any standard panel up to 3/8 inch. Mounted in panel by drilling one hole. Holds tightly cord tip or size 12 (or smaller) wire. Nickel plated and polished.

**63 R 6826**—Per pair.....21¢  
Postage, per pair, 2¢ extra



## Marked Binding Posts

A set of 8 binding posts for use in making your own set. Made of high quality molded composition with polished top engraved and filled with white enamel. Complete with Machine screw and polished metal bar. Fit all panels. Complete set marked as follows: Ant, Gnd, A+, A-, B+, B-, Tel, and Tel.

**63 R 5577**—Per set.....39¢  
Postage, per set, 3¢ extra



## Switch Stops

Handy Switch Lever Stops that prevent the switch lever from jumping off the switch taps. May be mounted on any panel up to 3/8 inch thick. Highly polished nickel plated finish with nut on threaded shank. Will add to the appearance of any set.

**63 R 5611**—Per dozen.....15¢  
Postage, per dozen, 2¢ extra



## Switch Posts

Made of brass, with 3/8-inch shank threaded 6-32, and each fitted with two hexagonal nuts. Head, 3/8 inch diameter by 1/8 inch high. Finish. Priced very low.

**63 R 5652**—Per dozen.....9¢  
Postage, per dozen, 2¢ extra



## Double Binding Posts

Made of nickel plated brass. Size 3/8 inch in diameter by 3/8 inch high. Fits panel of any thickness.

**63 R 5606**—Each.....9¢ Per doz. 90¢  
Postage, each, 1¢ extra; per dozen, 6¢



## Eby Binding Posts

Fine quality Binding Posts of well known make in both composition and brass combinations.

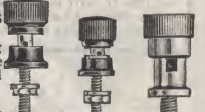
**63 R 5573**—Commander "H". A large size binding post with 63R5573 63 R 5571 63R5568 top and body of polished black molded composition. Height, 3/8 inch, open; diameter, 3/8 inch. Fitted with 3/8 inch long with nut. Will accommodate standard telephone cord tip and size 14 wire or smaller.....19¢

**63 R 5575**—Ensign "H". Medium size binding post with top and body of polished black molded composition. Height, open, 1/2 inch; diameter, 1/2 inch. Will accommodate standard telephone tip and size 0 wire or smaller. Fitted with 3/8 inch long 3/8 screw, nut and washer.....17¢

**63 R 5568**—Captain. Large heavy binding post made of brass; hand buffed, polished nickel finish. Top has knurled finger hold band. Size of body, 1 1/2 inch high; 1/2 inch diameter. Fitted with 1/2 inch screw and nut. Slot for No. 6 wire or smaller.....34¢

**63 R 5569**—Sergeant. Medium size binding post made of brass; hand buffed, polished nickel finish. Top has knurled finger hold band. Size opened, 3/8 inch high; 1/2 inch diameter. Fitted with 3/8 inch screw and nut. Will take size 10 wire or smaller.....16¢

**63 R 5571**—Buddie. A neat, small binding post. Same style of construction as the two described above. Made of brass; hand buffed, polished nickel finish. Height, 3/8 inch; diameter, 3/8 inch. Will accommodate standard telephone cord tip and size 12 wire or smaller. Can be mounted on any panel not over 1/4 inch thick. Fitted with one locknut.....11¢



## Binding Posts

Metal parts brass, polished nickel finish. Has 3/2 screws, 3/8 inch long. Sizes given from top of knob to bottom of shoulder.

No. 1—**63 R 5636**—Length, 3/8 inch. Each.....5¢ Per dozen.....40¢

No. 2—**63 R 5602**—Length, 1/2 inch. Each.....4¢ Per dozen.....32¢

No. 3—**63 R 5603**—Length, 5/8 inch. Each.....4¢ Per dozen.....32¢

No. 4—**63 R 5638**—Length, 1/4 inch. Each.....8¢ Per dozen.....69¢

No. 5—**63 G 5644**—Length, 1/8 inch. Each.....6¢ Per dozen.....40¢

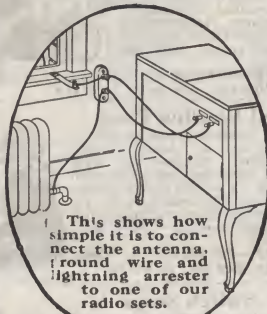
With insulated knob. Postage, each, 1¢ extra; per dozen, 6¢





# An Efficient Antenna Is Easy to Build

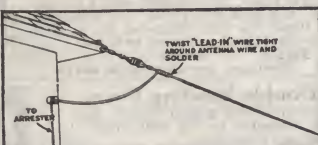
## A Good Ground Is Essential



This shows how simple it is to connect the antenna, ground wire and lightning arrester to one of our radio sets.

An efficient and convenient ground is a water pipe, or a radiator. If these are not available drive an iron rod or pipe several feet into the ground and solder or clamp the ground connection onto the pipe. The earth should be kept moist around the pipe. If a water pipe is used, make the connection with a metal clamp such as 63 R 6606 shown on this page. Run an insulated wire from the ground clamp to the set, or to the wire that connects the set and the lightning arrester. The illustration above shows how the connections should be made.

with a metal clamp such as 63 R 6606 shown on this page. Run an insulated wire from the ground clamp to the set, or to the wire that connects the set and the lightning arrester. The illustration above shows how the connections should be made.



Twist "lead-in" wire tight around antenna wire and solder.

where it enters the house, bring it directly from the antenna to the porcelain knob located within two or three feet of the window through which it will enter the house. For running the wire into the house, several handy lead-in connectors are listed below.

Make the lead-in as short as possible. In carrying it down to the point



### New Style Lead-In

This new style Lead-in Insulator does away with boring holes through the window sash. May be bent into any shape to fit ledge. Is thin enough so that window may be closed down tightly and will not leave cracks for the wind and rain to come through. Insulated to prevent grounding on wet sills. Fitted with positive connection on the ends. Requires no soldering and can be installed in a few minutes without special tools.

63 R 6263 ..... 15¢  
Postage, 3¢ extra



### Lead-In Connection

Strong, cast brass, T shaped Lead-in Connector Block. Used to connect lead-in wire with antenna. Soldered connections are eliminated. Size, 2 inches wide by 2 inches high.

63 R 6266 ..... 29¢  
Postage, 4¢ extra



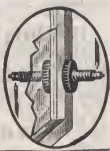
### Leading-In Insulator

Makes a Firm, Tight Connection

Requires 3/4-inch hole. Can be used for bringing lead through a partition or wall. Made of molded hard rubber compound—one of the best insulating materials.

63 R 6644—  
For 2 1/2-inch walls or smaller 42¢  
Postage, 4¢ extra

63 R 6645  
For 3/2-inch walls or smaller 69¢  
Postage, 6¢ extra



### Ribbon Aerial

Solid copper Ribbon. Easy to put up. Snap at each end fastens to insulator. Sold in three lengths—75, 100 and 150 feet.

63 R 5172—75 ft. \$1.19  
63 R 5173—100 ft. \$1.59  
63 R 5174—150 ft. 2.38  
Postage, 9¢ extra

## Location and Construction of the Antenna

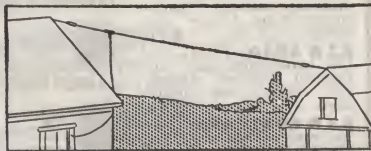
A necessary part of every radio set is the Aerial or Antenna, which is a single wire or a combination of wires for the purpose of gathering the electrical impulses sent out by broadcasting stations. The most efficient antenna is the outdoor type, which should be placed as high as possible and located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

It may be erected on the roof of your home, or it may be suspended between the house and barn, between the house and a tree, or between two trees or buildings. The surroundings 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.

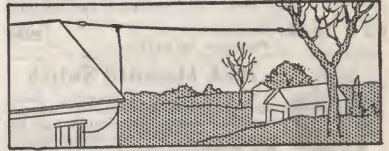
A single wire, 75 to 125 feet long and 35

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 contact, either solder the lead-in connection to the aerial or use Connector 63 R 6266, shown 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 50 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 diagrams below.

Although a radio antenna is less likely to attract 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.



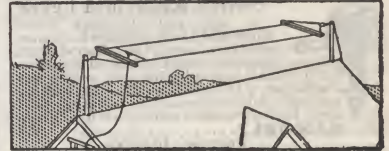
From House to Barn



From House to Tree

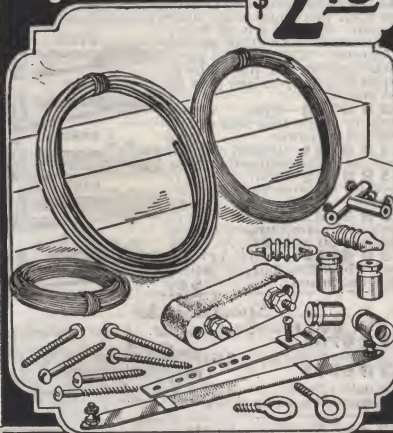


From House to Wind Mill



Two or Four Wires 40 to 75 Feet

## Complete Antenna Equipment \$2.75



To get the best results you need a reliable, efficient Antenna, whether you use a receiving set with several vacuum tubes or a simple crystal set. With this complete outfit it is easy to erect a high grade antenna.

The set includes 150 feet of copper antenna wire, 25 feet of insulated ground wire, lightning arrester, 4 knobs with screws, 2 antenna insulators, 2 screw eyes, special lead-in which does not require any hole in window sill, 25 feet of flexible connecting wire, ground clamp, clamp to connect antenna to lead-in wire without soldering, and complete instructions.

563 R 5145—Complete outfit ..... \$2.75  
Postage, 20¢ extra

### 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 1 1/2 inches.

63 R 6627—Length, 3 1/2 inches ..... 11¢  
63 R 6629—Length, 5 inches ..... 14¢  
Postage, 3¢ and 4¢ extra

### Porcelain Strain Insulator

A well made, glazed finish porcelain insulator, strong and durable. Heavy ribs. Holes at each end for attaching wires. Satisfactory for the ordinary receiving aerial. Size, about 2 1/4 inches long by about 1 inch in diameter.

63 R 6643—Each ..... 5¢  
Per dozen ..... 42¢  
Postage, each, 1¢ extra; dozen, 8¢ extra

### Porcelain Strain Insulator

Extra strong. Especially desirable for long aeriels 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 1 1/2 inch.

63 R 6619 ..... 6¢  
Postage, 2¢ extra

### Fahnestock Aerial Connector

For connecting lead-in wire to antenna without splicing or soldering the wires. Saves time and saves trouble.

63 R 5612 ..... 9¢  
Postage, 1¢ extra

### Ground Clamp

If you ground your radio set on a water or steam pipe, use a Ground Clamp for perfect connection. Adjustable to any size up to 1 1/2 inches in diameter. Made of copper.

63 R 6606 ..... 6¢  
Postage, 1¢ extra



# Buy Good Parts at These Low Prices



## Rubber Covered Wire

Insulated copper wire, covered with rubber compound around which is woven a black cotton weatherproofed braid. Sold only in lengths as listed.

- 63 R 3015**—Size 14. 25 feet..... \$ .29  
100 feet..... \$1.10 500 feet..... 3.75  
Postage, 100 feet, 10¢ extra  
**63 R 3036**—Size 4 for ground lead.  
10 feet..... \$ .71  
25 feet..... \$1.67 100 feet..... 6.20  
Postage, 100 feet, 30¢ extra



## Cotton Lamp Cord

Double conductor new code Lamp Cord. Conductor consists of fine copper wire strands twisted 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 Number	Size	10 Feet	25 Feet	100 Feet	250 Feet
63 R 3175	18	27¢	\$ .55	\$1.79	\$4.25
63 R 3180	16	33¢	.89	3.60	5.90
63 R 3185	14	45¢	1.05	3.85	8.90

Postage, 100 feet, 16¢ extra

## Tinned Copper Wire

Special drawn tinned Copper Bus Wire, for connections in apparatus. Stiff enough to permit making a neat, efficient job.

- 63 R 7054**—Size, 14 square. 10 feet..... 12¢  
**63 R 7055**—Size, 14 round. 10 feet..... 11¢  
Postage, 10 feet, 1¢ extra

## Pigtail Connecting Wire

Use this flexible braided Copper Pigtail Wire for making connections to your variable condensers, variometers and switches and avoid high frequency resistance losses. Prevents noises caused by loose or imperfect connections due to sliding contacts. Sold in 10-foot lengths only.

- 63 R 6904**—Per length..... 12¢  
Postage, per length, 1¢ extra

## Magnet Wire

For building radio apparatus, repairing motors or other electrical apparatus or experimental work. One piece only on a spool. Wire is standard B and S gauge. Insulation and wire both perfect and uniform. Sold in spools of given weights only.

State gauge wanted.

Gauge	Enamelled 63 R-1400 8-Oz. Spool	Double Cotton Covering 63 R 1350 8-Ounce Spool	Double Green Silk Covering 63 R 1300 8-Ounce Spool
14	25¢	\$ .35	.....
16	28¢	.43	.....
18	32¢	.51	.....
20	36¢	.59	\$ .92
22	36¢	.67	1.07
24	39¢	.69	1.14
26	47¢	.69	1.59
28	48¢	.69	.....
30	57¢	1.00	.....
32	67¢	1.00	.....
36	94¢	2.00	.....

Postage, per spool, 6¢ extra

## Varnished Cambric Tubing

(Spaghetti)

Perfectly formed Varnished Cambric "Spaghetti" Tubing that is an excellent non-conductor. With this tubing your set will be more efficient and will have a much neater appearance. Prevents short circuits and protects your tubes. Yellow color only. Sold in lengths varying from 33 to 36 inches.

- 63 R 6896**—Size 3. Takes 12 wire and smaller. Per length..... 15¢  
**63 R 6897**—Size 2. Takes 17 wire and smaller. Per length..... 15¢  
Postage, per length, 2¢ extra

## Grade 2 Tubing (Spaghetti)

Not quite as efficient as Varnished Cambric Tubing but sold at a much lower price. Entirely satisfactory for use on most sets. Size 3. Takes No. 12 wire or smaller. About 3 foot lengths.

- 63 R 6899**—3 feet..... 8¢  
Postage, 3 feet, 1¢ extra

## Colored Spaghetti Wire

No. 14 Tinned Wire, spaghetti covered. With these different colored wires you can put each circuit in a separate color, and make tracing easy.

- 63 R 6983**—Black. 2½-foot length..... 12¢  
**63 R 6984**—Yellow. 2½-foot length..... 12¢  
**63 R 6985**—Red. 2½-foot length..... 12¢  
**63 R 6986**—Green. 2½-foot length..... 12¢  
Postage, 2½ feet, 1¢ extra

## Copper Antenna Wire

**63 R 5150**—Aerial Cable made of stranded hard drawing copper wire. High tensile strength. Large surface area giving low resistance. Supplied only in lengths listed. 100 ft. 49¢ 150 ft. 73¢ 200 ft. 96¢ 500 ft. \$2.35.

- 63 R 5151**—Bare copper wire No. 14 gauge. 100 feet..... 42¢ 500 feet..... \$1.70  
**63 R 5152**—Bare copper wire, No. 12 gauge. 100 feet..... 62¢ 500 feet..... \$2.65  
Postage, per 100 feet, 10¢ extra

## Copper Clad Antenna Wire

Made with a steel core coated with a layer of pure copper. Very strong. Size No 14

- 63 R 5154**—100-foot coil..... 44¢  
Postage, per coil, 8¢ extra

## 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; conducting parts imbedded in molded composition.

- 63 R 2694**..... 29¢  
Postage, 2¢ extra

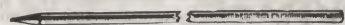
## Antenna Wire Connector Block



If you have an antenna of more than one wire, you should connect the wires together with this Connector block. Does away with soldering and loose connections. Made of solid brass.

- 63 R 6604**..... 19¢  
Postage, 3¢ extra

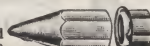
## Iron Ground Rod



Length, 6 feet. Heavily galvanized. Handy for use with any radio outfit. Perfect ground contact where water pipe ground is not possible. Shipping weight, 4 pounds. Not mailable.

- 163 R 1081**..... 43¢

## Pipe Cap and Point



Two fittings to be attached to any ¾-inch galvanized iron pipe. With these fittings pipe can easily be driven into the ground to insure good ground connection. Screw connection on cap for fastening ground wire.

- 63 R 6244**—Per set..... 76¢  
Postage, per set, 8¢ extra

## Socket Antenna Plug

Screws into any light socket and takes the place of aerial for short distance reception. Very convenient and satisfactory. A well made device at a low price. Not suitable for long distance reception.

- 63 R 6599**..... 39¢  
Postage, 4¢ extra

## Light Socket Antenna



Screws into any light socket. For short distance reception takes the place of regular antenna. Ideal when travelling. No possible danger of shock or fire. Gives clear reception with little static interference. Molded composition construction.

- 63 R 6598**..... 95¢  
Postage, 6¢ extra

## Ducon Electric Light Socket Antenna



Screw this device into any electric light socket and you can use it to replace the usual outdoor aerial. It is best for receiving from nearby stations and is not recommended for long distance reception. Simple to install; gives excellent results; absolutely safe. No possibility of shock. Splendid for people in apartment buildings.

- 63 R 6605**..... \$1.19  
Postage, 6¢ extra

## Porcelain Bracket Insulator

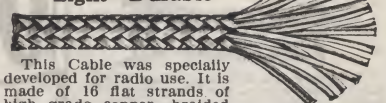


For attaching lead-in or ground wire to posts or side of building. Screw mounting. Heavy porcelain insulator and galvanized screw. Size, insulator 1½ inches diam.

- 63 R 6891**..... 17¢  
Postage, 3¢ extra

## Braided Antenna Cable

Light—Durable



This Cable was specially developed for radio use. It is made of 16 flat strands of high grade copper, braided into a hollow cable about ½ inch in circumference. This makes about twice the circumference of the ordinary antenna wire. Especially desirable for use on indoor and loop antennas.

- 63 R 6246**—100-foot coil..... \$2.10  
Postage, per coil, 10¢ extra



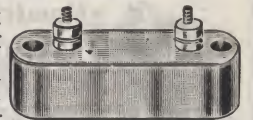
## Ground Switch

Aerial grounding 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. Size, 3 by 1½ inches; sizes are approximate.

- 63 R 5359**..... \$1.79  
Postage, 14¢ extra

## Lightning Arrester

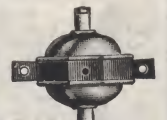
This device is an automatic protection to your apparatus during electrical storms when the ground switch is not thrown. It is easily mounted and requires no attention whatever. The Arrester has no effect upon radio signals but grounds any heavy current induced by an electrical storm. Mounted on porcelain base.



- 63 R 6641**..... 69¢  
Postage, 8¢ extra

## Porcelain Enclosed Lightning Arrester

Uses safety gap principle. Points are set close together inside a porcelain weather-proof cover. Very dependable and reliable. Convenient screw post connections. Can be suspended from lead-in wire or fastened to any support. For outdoor use.



- 63 R 6611**..... \$1.19  
Postage, 8¢ extra

## Porcelain Tubes

Unglazed Porcelain Tubes, ¾ inch inside, ¾ inch outside. Length given is from under head to end.

- 63 R 3902**—Length, 3 inches. Per dozen.. 12¢  
**63 R 3906**—Length, 6 inches. Per dozen.. 22¢  
**63 R 3908**—Length, 8 inches. Per dozen.. 43¢  
Postage, per dozen, 2¢ extra

## Glazed

## Porcelain Cleats

Take No. 10 or smaller insulated wires. Also make very satisfactory antenna insulators. Have wire centers 2½ inches apart. Holds two wires.



- 63 R 3920**—Per dozen pairs..... 32¢  
Postage, per dozen pairs, 3¢ extra

## Solid Porcelain Knobs

Porcelain Knobs should be used to support lead-in wire wherever it touches house. Made of high quality solid porcelain. New code No. 5½ Height, 1¼ inches. Diameter, 1¼ inches. Hole, ¼ inch. Groove, ⅜ inch. Sold by dozen only.



- 63 R 3927**—Per dozen..... 23¢  
Postage, per dozen pairs, 2¢ extra

## Pipe Mast Fittings

Pipe Fittings for antenna masts. Sold only in sets of three, consisting of roof fittings, adjustable to fit flat or gable roofs; pulley fitting with holes for fastening guy wires; guy wire fitting with set screw to prevent slipping. No pipe included. Made of cast iron and heavily japanned. ½ inch roof fitting has only two feet.

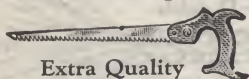


- 63 R 6416**—Fits 1-inch pipe. Per set..... \$2.48  
Postage, per set, 40¢ extra  
**63 R 6418**—Fits ½-inch pipe. Per set..... 89¢  
Postage, per set, 30¢ extra



# Good, Handy Tools for Radio Building

## Lakeside Compass Saw



Extra Quality

Compass saw with steel blade. Thin back, hand hammered, filed and set. Beech handle. Brass screws. Radio workers find many uses for this saw. Shipping weight, 1 pound. State size wanted.

Length..... 12 inches 14 inches  
84 R 71..... 48¢ 55¢



39¢

Nickel Plated Hack Saw

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 blade is in position. Complete, with 8-inch blade. An excellent saw for cutting bakelite or hard rubber panels. Shipping weight, 1 pound.

84 R 116..... 39¢

## Genuine Miller's Falls Bench Drill

**\$9.95**

**A Practical Drill for Radio Work**

**Priced Low**

Genuine Miller's Falls two-speed Bench Drill with hand feed, 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. Radio cabinet makers find this drill essential for their work.

Frame, strong cast iron, designed for maximum strength. Speeds, Two ratios 1/2 to 1, and 4 to 1, instantly changed by turning knurled sleeve. Gears and Pinions. Cut from solid blanks and fitted to run smoothly. Crank. Adjustable radius 3 to 6 inches. Chuck, 3-jawed with protected springs, holds straight shank drills from 0 to 1/2 inch. Feed. Hand screw. Table. Circular, slotted, 6 inches in diameter. Adjustable vertically and horizontally. Maximum distance from chuck to table, 9 inches. Height over all, 24 inches. Finish. Black enamel with red gears, polished chuck and table. Shipping weight, 28 pounds.

184 R 6661..... \$9.95

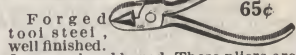
## Klein's Pattern Pliers



High quality forged steel. Lap joint, beveled head. Nicely finished and correctly tempered. Has large opening for cutting insulated wire. A strong convenient tool for radio or electrical use, especially for work where heavier wires are used. Ship. weights: 16 to 20 oz. State length.

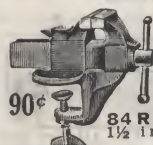
Lengths..... 6 inches 8 inches  
84 R 2180... 78¢ 95¢

## Diagonal Side Cutting Pliers



Forged tool steel, well finished. Jaws are hand honed. These pliers are highly recommended for use by radio owners. Also suitable for jewelers, electricians and motorists. Ship. wts., 6 to 10 oz. State length.

Length..... 5 inches 6 inches  
84 R 2186... 65¢ 80¢



## Handy Bench Vise

Extra quality vise finely fitted and finished. For holding panels while drilling and many other uses. Shipping weights: 4 and 4 1/2 pounds.

90¢  
84 R 6846—Factory No. 741. Jaws 1 1/2 inches. Will open 1 1/2 inches. 90¢  
84 R 6847—Factory No. 743. Jaws 2 inches. Will open 2 1/2 inches..... \$1.48

## Coil Winder



Wind your own radio coils with this Coil Winder and save money. For winding single layer or bank wound coils. Has 4-inch face plate with four adjustable fingers for holding any size tube. Strong clamp for fastening to edge of table. Spring holds handle steady when not winding.

63 R 5628..... \$1.89  
Postage, 6¢ extra



## Screw Driver Set

You can do quicker, neater work

when you have the right size screw driver. Four different size screw drivers, combined in one handy tool. They are made entirely of metal and the handle of the largest holds the other three screw drivers. There is a size to fit every screw used in radio work—the blades are 1/8, 1/4, 3/8 and 1/2-inch. A dustproof metal cap fits over the large blade, so every blade is protected when not in use.

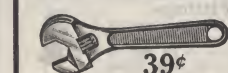
63 R 1805—Set of 4..... 45¢  
Postage, per set, 4¢ extra



## Radio Wrench Set

The most troublesome nuts are tightened in a few seconds with these Radio Wrenches. Each wrench is made with a hollow stem one inch deep, so it will go down over projecting screws. The hexagon socket always secures a firm grip on the nut, and the high grade chromized handle is well formed for comfortable use. The set includes three wrenches to fit 1/4, 3/8 and 1/2-inch nuts—the sizes most used in radio sets.

63 R 5585—Set of 3..... 79¢  
Postage, per set, 6¢ extra



## Crescent Pattern Forged Steel Adjustable Wrench

39¢

Excellent for radio work, also for general all around use by the autoist or machinist. Made of high grade forged steel. Angle head, thin jaws. Fits hexagon and square nuts. Adjusted by a knurled screw in frame. Length..... 6 in. 8 in. 10 in. 12 in. Opens..... 3/4 in. 1 in. 1 1/4 in. 1 3/4 in. Shipping weights: 1/2 lb. 3/4 lb. 1 1/4 lbs. 2 1/4 lbs.  
84 R 7458.. 39¢ 54¢ 70¢ 90¢



## Hand Drill

For Radio and Electrical Work

\$1.65

Three jawed chuck holds drills up to 1/4-inch. An excellent Drill for radio and electrical work. Polished wood handles. Black enameled malleable iron frame. Cut gear and pinion. Length without drills, 12 inches. Handle has magazine for holding extra drills. You will find this handy drill an unusual value at our low price. Shipping weight, 3 pounds.

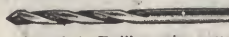
84 R 1287..... \$1.65



## Set of Eleven Twist Drills

Set of eleven straight shank Cleveland twist drills. In small roll, keeping sizes separate. Sizes from 1/16 to 1/4. Will fit above hand drill.

84 R 1057—Shipping weight, 3 ounces... 89¢



## Radio Drills

Set of six Drills—wire gauge number 10, 15, 20, 28, 32, 41—to drill holes to be tapped for standard radio screws 4/36, 6/32, 8/32, 10/32, 12/24, 14/20. Will fit above hand drill.

84 R 1053—Per set..... 55¢  
Postage, per set, 6¢ extra



## Lakeside Automatic Punch Drill

Lakeside Automatic Punch Drill. Pushing handle down rapidly revolves the drill, and a spring automatically pushes the handle back. Case made of brass, nickel plated. Length, 10 inches. Complete with eight drill points, assorted from 1/16 to 1/4 in. numbered magazine handle. Shipping weight, 1 lb.

84 R 1314—Lakeside Automatic Hand Drill, Complete with 8 Drills..... \$1.65  
84 R 1310—Eight extra drill points for 84 R 1314. Ship. wt., 8 ounces..... 48¢

## Wire Solder

Half and half tin and lead. Diameter, 1/4 inch.  
84 G 5192—Per pound..... 43¢

## Gasoline or Kerosene Blow Torch

A good quality Blow Torch. Complete with soldering copper holder. Shipping weights, 3 and 4 pounds.  
84 R 5220—Height, 7 inches. Capacity, 1 pint..... \$3.85  
84 R 5221—Height, 9 inches. Capacity, 1 quart..... \$4.25

## Long Chain Nose Pliers

Drop forged steel, highly tempered. Lap joint and side cutter. Strong oval jaws, neatly polished. Convenient for radio use as they will reach the difficult places. Ship. wt., 6 oz.

84 R 2165..... 75¢

## Greenfield Button Die



Screw Plate \$5.95

These round adjustable die Screw Plates are especially suited for threading wire rods or small screws and radio work. Each set is furnished with stock, 6 1/2 inches long, adjustable tap wrench; 1 3/8-inch round adjustable dies and necessary taps.

84 R 7287—No. D6. Machine screw size. Cuts six sizes: 4-36, 6-32, 8-32, 10-24, 12-24, 14-20. Ship. wt., per set, 1 1/2 lbs. Per set..... \$5.95  
84 R 7288—No. D10. Machine screw size. Cuts ten sizes: 2-56, 3-48, 4-36, 5-36, 6-32, 8-32, 10-24, 10-32, 12-24, 14-20. Shipping weight, per set, 2 pounds. Per set..... \$8.25  
84 R 7289—No. DD6. Fractional sizes. Cuts six sizes: 7/8-48, 1/2-40, 3/4-32, 5/8-24, 3/4-24, 1/4-20. Ship. weight, per set, 1 1/2 pounds. Per set..... \$5.95

## Polishing Head

For round belt. Height, 6 inches. Has 9-inch spindle. Diameter between flanges, 3/4 inch. One end has taper screw; other end will hold emery wheels up to 6 by 1/2-inch; buffers and small saws. Has 3-jawed chuck for drilling up to 3/8-inch. A very high quality machine; attractively priced. For polishing cloths see 84 R 6742, listed below. Shipping weight, 4 lbs.

84 R 6702..... \$2.10

## Cloth Buffing Wheels

Unbleached muslin. Eighteen-ply. Shipping weights, 3 to 9 ounces. State size wanted.

Diameter, in... 4 6 8 10 12  
84 R 6742.. 9¢ 19¢ 30¢ 45¢ 60¢

## Radio Soldering Set

A Soldering set of suitable size for radio work. Consists of forged soldering copper with wood handle, prepared solder wire, sal ammoniac to clean copper, can of non-corrosive soldering paste, emery paper and stick of rosin. Directions for radio soldering included.

84 R 5217—Shipping wt., 1 1/4 lbs... 78¢



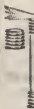
# Supplies for the Radio Workshop

## Automatic Blow Torch



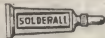
With this Blow torch you can make neat, clean soldered wire connections easily and quickly without the use of a soldering iron. The flame can be directed to the exact spot to be soldered and the heat confined to a very small space. Metal parts of brass, polished nickel finish; 5/2 inches long, 2 inches wide; cylinders, 7/8-inch diameter. Will operate twenty minutes on one filling of alcohol.  
**63 R 5876**—Per tube, 4¢ extra ..... \$1.19  
 Postage, 4¢ extra

## Alcohol Blow Torch



Gives hot sootless flame. Fill cylinder with denatured alcohol, light wick and torch is ready for immediate use. By blowing through the rubber tube a pointed, 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, 7/8 inch. Brass cylinder fine polished nickel finish.  
**63 R 5878** ..... 39¢  
 Postage, 4¢ extra

## Makes a Soldered Joint with Heat of a Match



A paste combination of soldering metal and soldering flux. Makes a good electrical and mechanical connection.  
**63 R 5822**—Per tube, ..... 19¢  
 Postage, per tube, 2¢ extra

## Resin Core Solder



The only safe, non-corrosive Core Solder for radio use. Generally preferred for radio work.  
**63 R 5833**—4 ounces, ..... 29¢  
**63 R 5834**—1 ounce, ..... 12¢  
 Postage, 3¢ extra

## Radio Insulating Cement



Use this compound to prevent the wire on your coils from loosening. Dries quickly and produces a hard film. Free from capacity effects. Convenient and easy to apply.  
**63 R 6762**—2-ounce bottle, ..... 20¢  
 Postage, per bottle, 2¢ extra

## Radio Shellac Compound

If you paint the wood 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 6763**—2-ounce bottle, ..... 20¢  
 Postage, per bottle, 2¢ extra

## Bezels at a Saving



To be inserted in holes in the panel of your set. Adds greatly to the appearance. Polished nickel rim. Nickelized screen.  
**63 R 6856**—Diameter, 1 1/2 inches, ..... 15¢  
**63 R 6857**—Diam. 3/4 inch; for portable sets 15¢  
 Gold Bezels. Same as above, except gold finish.  
**63 R 6868**—Diameter, 1 1/2 inches, ..... 25¢  
**63 R 6869**—Diameter, 3/4 inch, ..... 25¢  
 Postage, 2¢ extra

## Bezel Cutter



Cuts clean true bezel holes through rubber or bakelite panels up to 1/2 inch thick.  
 Cutter of one piece of tool steel, hardened and tempered.  
**63 R 55586**—Cuts 3/4-inch hole, ..... 63¢  
**63 R 55587**—Cuts 1/2-inch hole, ..... 79¢  
**63 R 55588**—Cuts 1 1/2-inch hole, ..... 79¢  
 Postage, 3¢ extra

## Tinfoil



You can make fixed condensers for your radio set by using this Tinfoil and the mica shown below. Also has many other uses about set such as for shielding. In sheets, size 6 1/2 by 5 1/2 inches. Approximately 25 sheets to the pound.  
**63 R 5680**—Per pound, ..... 29¢  
 Postage, per pound, 3¢ extra

## Sheet Mica



Used as non-conducting insulator for fixed condensers. Clear, firm sheets. Always convenient to have a supply in your radio tool kit.

Article Number	Size, Inches	Dozen Sheets	Postage Extra
806 R 25669	2 by 3	\$ .21	2¢
806 R 25670	2 by 4	.50	2¢
806 R 25671	3 by 5	.94	6¢
806 R 25672	5 by 7	3.00	6¢

## For Better Radio Connections Use An Electric Soldering Iron



Everyone 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 faster joints you can make and how much faster you can work with this electric soldering iron.

It is full size and well made with durable heating element. The solid copper tips are the most convenient sizes and shapes for radio work and for use around the house. For use on 105 to 120-volt alternating or direct current (any city lighting current). Complete with about 5-foot flexible cord and attaching plug.  
**63 R 5850**—Small size, with 3/8-inch copper tips, ..... 98¢  
 Postage, 10¢ extra

## Iron Set Screws



A handy accessory that every radio owner should have. Size, 6-32. For fastening dials to shafts.

**63 R 6887**—1/4 inch long, Per dozen, ..... 10¢  
**63 R 6888**—3/8 inch long, Per dozen, ..... 11¢  
**63 R 6889**—1/2 inch long, Per dozen, ..... 12¢  
**63 R 6890**—1 inch long, Per dozen, ..... 13¢  
 Postage, per dozen, 1¢ extra

## Do Faster, Neater Work With An Electric Drill

**\$17.95**

Cuts Fast Clean and True  
 For Home or Shop Use

Small and compact enough to be handy on all jobs, but sturdy enough to withstand the hardest kind of drill work. For use wherever there is need of drilling holes up to 1/4 inch. Self tightening, three-jaw chuck. Snap switch built into pistol grip makes current control easy and positive. Series wound, universal motor operated from any alternating or direct 110-volt current. Actual weight only five pounds. Ship. weight, 8 pounds.  
**63 R 5820** ..... \$17.95  
**63 R 5821**—Set of attachments for above drill consisting of 2-inch emery wheel, steel wire brush, about 3 1/2 inches in diameter, cotton buffer, chuck adapter, stand and clamp for fastening drill to work bench and open end wrench. Shipping weight, 4 pounds, ..... \$4.35

## Fahnestock Connector



May be fastened to binding posts or wire. Connecting wire instantly attached to make a good electrical connection by pushing down spring clip. L. gth., 1 inch.  
**63 R 5607**—Per dozen, ..... 17¢  
 Postage, per dozen, 3¢ extra

## Double Fahnestock



A device for making connections between two or more wires. Wires are held firmly in spring grip, but may be instantly removed. About 2 inches in length.  
**63 R 5608**—Per dozen, ..... 39¢  
 Postage, per dozen, 4¢ extra

## Upright Fahnestock



Machine screw in base to mount on panel or baseboard. By removing screw they may be fastened to binding posts of dry cells to secure tight connections. Lgth., 3/4 in.  
**63 R 5622**—Per dozen, ..... 26¢  
 Postage, per dozen, 4¢ extra

## Copper Lugs



Prevent leakage of current and secure better results from your set by using these Lugs at connections. Fit on machine screws.

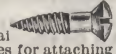
Article Number	Fit Screws	Per Dozen	Per Gross
<b>63 R 6892</b>	6-32	7¢	65¢
<b>63 R 6893</b>	8-32	8¢	67¢
<b>63 R 6894</b>	10-32	9¢	69¢

Postage, per dozen, 1¢ extra; gross, 6¢ extra

## Screw Assortment

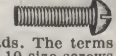
A complete assortment of wood screws, machine screws, washers, and nuts for the man who owns a radio set. Very handy. You can readily get the nut or washer you need when making a change in connecting or rewiring your set. A handy assortment to have about the house at all times.  
**63 R 5639** ..... 37¢  
 Postage, 4¢ extra

## Oval Head Screws



About four dozen nickel plated, oval head wood screws in convenient sizes for attaching panels to baseboards or cabinets.  
**63 R 5579** ..... 19¢  
 Postage, 4¢ extra

## Machine Screws



Brass, with accurately cut threads. The terms 6-32, 8-32 and 10-32 mean 6, 8 and 10 size screws with 32 threads to the inch. Sold only in lots of a dozen. Diameters are as follows: 6, 7/8 inch; 8, 7/8 inch and 10, 3/16 inch.

Length	6-32 Roundhead		8-32 Roundhead	
	Article Number	Per Doz.	Article Number	Per Doz.
3/8 inch	<b>63 R 6841</b>	12¢	<b>63 R 6846</b>	12¢
1/2 inch	<b>63 R 6842</b>	12¢	<b>63 R 6847</b>	12¢
5/8 inch	<b>63 R 6843</b>	12¢	<b>63 R 6848</b>	12¢
3/4 inch	<b>63 R 6844</b>	16¢	<b>63 R 6849</b>	16¢
1 inch	<b>63 R 6845</b>	16¢	<b>63 R 6850</b>	16¢

Length	6-32 Flathead		8-32 Flathead	
	Article Number	Per Doz.	Article Number	Per Doz.
3/8 inch	<b>63 R 6990</b>	12¢	<b>63 R 6995</b>	12¢
1/2 inch	<b>63 R 6991</b>	12¢	<b>63 R 6996</b>	12¢
5/8 inch	<b>63 R 6992</b>	12¢	<b>63 R 6997</b>	12¢
3/4 inch	<b>63 R 6993</b>	16¢	<b>63 R 6998</b>	16¢
1 inch	<b>63 R 6994</b>	16¢	<b>63 R 6999</b>	16¢

Postage, per dozen, 1¢ extra

**Brass Nuts.** Size 3 Doz. Gross  
**63 R 6860** 6-32 20¢ 60¢  
**63 R 6861** 8-32 24¢ 72¢  
**63 R 6862** 10-32 28¢ 80¢  
 Postage, 3 dozen, 2¢ extra; gross, 6¢

**Brass Washers.** Size 3 Doz. Gross  
**63 R 6865** 6 18¢ 48¢  
**63 R 6866** 8 22¢ 66¢  
**63 R 6867** 10 22¢ 66¢  
 Postage, 3 dozen, 2¢ extra; gross, 6¢

## Threaded Brass Rod

A high quality, cut with clean, accurate threads. Sold only in three 8-inch lengths.  
**63 R 6875**—Size 6-32. Three lengths, ..... 17¢  
**63 R 6876**—Size 8-32. Three lengths, ..... 23¢  
**63 R 6877**—Size 10-32. Three lengths, ..... 29¢  
 Postage, 3 lengths, 4¢ extra

## Solid Brass Rod (Round)

To be used for shafts in variometers, variocouplers, etc. You will find a few lengths of the various sizes of brass rod very handy around your station. Sold only in three 8-inch lengths.  
**63 R 6880**—Size 6. Three lengths, ..... 15¢  
**63 R 6881**—Size 8. Three lengths, ..... 16¢  
**63 R 6882**—1/8 inch. Three lengths, ..... 17¢  
**63 R 6883**—1/4 inch. Three lengths, ..... 17¢  
**63 R 6884**—3/8 inch. Three lengths, ..... 39¢  
 Postage, 3 lengths, 4¢ extra



# How to Build the Set You Want



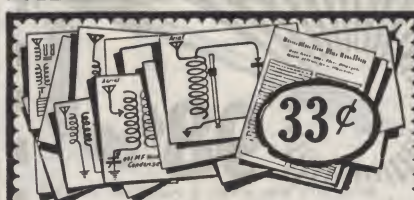
## 33¢ How to Make a Neurodyne

The Neurodyne is one of the most successful of the new radio circuits. It is extremely selective and brings in distant stations remarkably well. A special method of tuning the radio frequency amplifier is used which prevents the tubes from oscillating. As a result the voice and music are clear and distinct. Stations always come in at the same dial setting. This set of instructions explains the construction of a 5-tube neurodyne and tells you how to build it.

63 R 6360..... 33¢  
Postage, 4¢ extra

## Build Your Own Radio Set

More advanced amateurs who prefer to select their own parts and build their own sets complete, will find our Radio Instruction Plans very helpful. These are up-to-date and are not too technical. With these plans of approved circuits you can very readily design sets to meet your particular fancy or needs, and make a considerable saving on the cost.



## 24 Radiophone Diagrams

Consists of twenty-four Blueprint Diagrams, 8 1/2 by 11 1/2 inches, and one 4-page Direction Pamphlet containing illustrated Symbol Key Chart, directions on How to Read Diagrams. The following are included:

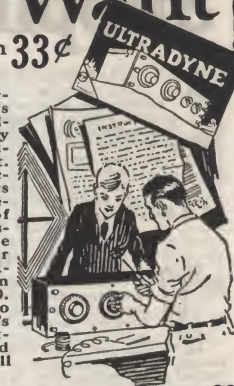
- 1—Single Slide Tuner with Crystal Detector.
- 2—Double Slide Tuner with Crystal Detector.
- 3—Loose Coupler with Crystal Detector.
- 4—Regenerative Set using two-slide Tuner.
- 5—Plain Audion Detector Circuit.
- 6—Feedback Circuit with a Loose Coupler.
- 7—Armstrong Feedback Circuit.
- 8—Standard Short Wave Regenerative Set.
- 9—Honeycomb Coil Receiver for all Waves.
- 10—Short Wave Set with two-step Amplifier.
- 11—Combination Circuit for both Long and Short Waves.
- 12—Detector and two-stage Amplifier.
- 13—Single Circuit Regenerative Tuner.
- 14—Circuit for elimination of induction.
- 15—Loop Aerial Receiver.
- 16—Radio and Audio Frequency Amplifier.
- 17—C. W. Transmitter for low power.
- 18—5-watt Radiophone Transmitter.
- 19—10-watt Phone and C. W. Transmitter.
- 20—High power C. W. Transmitter.

Also Cockaday, Reflex, Reinartz and Neurodyne circuits.

63 R 6348—20 diagrams..... 33¢  
Postage, 20 diagrams, 4¢ extra

## How to Make an Ultradyne 33¢

Complete instructions and blueprints for building the Ultradyne, a recently developed 6-tube superperthydyne circuit. Has proved satisfactory because of its ease of operation, selectivity, clarity of tone and long distance reception. The parts needed for building the ultradyne are shown in this book on Page 30. When you order radio supplies from Ward's you are sure of getting reliable tested parts that meet all requirements.



63 R 6324..... 33¢  
Postage, 4¢ extra



## The Radio Constructor

Pamphlet giving hookup diagrams, notes and instructions on how to build a number of popular sets. Included with each pamphlet is a list of parts necessary to the construction of that particular set. Everything is thoroughly explained and made clear so that the plans are easy to follow. Anyone should get good results from the information given.

### Description of Contents

- One-Tube Reflex Amplifier.
  - Reinartz Tuner with Spider Web Coil.
  - Two-Stage Radio Frequency Amplifier.
  - Short Wave Regenerative Tuner and Amplifier in Separate Units.
  - Long Distance Receiver.
  - Honeycomb Receiver (and Amplifier).
  - Regenerative Set with two-stage Amplifier for W D 11 Tubes.
  - Full size panel layouts for each of above circuits.
- 63 R 6140..... 45¢  
Postage, 4¢ extra

## Popular Radio Circuits

Gives plans for full size panel layout, connections and complete instructions.

- 63 R 6142—One-tube Reflex..... 9¢
  - 63 R 6143—One-tube single circuit Receiver..... 9¢
  - 63 R 6144—One-tube Reinartz Receiving Set using spider web coil..... 9¢
  - 63 R 6146—Radio and audio frequency Amplifier (three-stage radio, detector and two-stage audio)..... 9¢
  - 63 R 6147—Short wave one-tube Regenerative Set using two variocouplers..... 9¢
  - 63 R 6148—Three-tube honeycomb coil Circuit and Amplifier..... 9¢
- Postage, 1¢ extra



## Detector and Amplifier Plans

Complete instructions and drawings for building a Detector and Amplifier Units. Shows how to make complete detector and two or three-stage amplifiers. You can add this amplifier to any one-tube set so you may use loud speaker. All the materials required are listed in this catalogue at money saving prices.

63 R 6341..... 33¢  
Postage, 4¢ extra

## How to Make a Regenerative Tuner

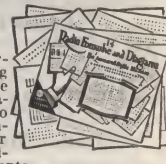
Complete instructions with drawings on how to make a single circuit Regenerative Tuner for reception of wave lengths up to 800 meters. May be used with either crystal or vacuum tube detector. The type of tuner described has a 43-plate variable condenser, a tapped inductance and a tickler coil. This type of set, because of simplicity of operation and good reception, is very popular. Easy to build. All parts used are listed in this catalogue.



63 R 6340..... 33¢  
Postage, 4¢ extra

## Radio Formulas and Diagrams

This packet contains fourteen charts and diagrams giving much technical radio knowledge covering schematic wiring diagrams, measurements and radio tables. Not intended for beginners, but especially valuable for experienced radio men, engineers, experimenters and students.



63 R 6150..... 33¢  
Postage, 4¢ extra



## How to Make a Reinartz Set

The Reinartz is one of the most popular radio circuits today because of its general satisfactory results and ease of tuning. These instructions include a complete explanation of the construction of the Reinartz receiver with blueprint of connections, size and layout of panel and cabinet. Complete list of parts needed, all of which are shown in this catalogue at money saving prices. A thorough instruction that can readily be understood. A simple compact single tube set that may be easily built in the home as only a few tools are required.

63 R 6328..... 33¢  
Postage, 4¢ extra

## How to Make a Cockaday Set

Contains instructions, diagrams, blueprints and list of materials to make this widely known Cockaday four-circuit one-tube Receiving Set. This set may be built at a comparatively low cost and the circuit used is not only extremely efficient but the wiring of the various parts is very simple. Some remarkable results have been obtained with sets using this circuit. Gives extra loud signals, remarkable selectivity and brings in the distant stations.



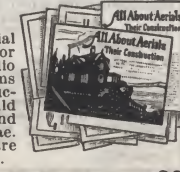
63 R 6151..... 33¢  
Postage, 4¢ extra

## Parts Made Specially for Set 63 R 6340

- 63 W 6342—Primary Inductance Tube for use with above set. Diameter, 4 1/2 inches; length, 5 1/2 inches 18¢  
Postage, 4¢ extra
- 63 R 6343—Tickler Tube. Diameter, 3 inches; length, 2 1/2 inches..... 15¢  
Postage, 3¢ extra
- 63 R 6344—No. 23 Wire, green silk covered, for above set. 4 ounces..... 60¢  
Postage, 2¢ extra
- 63 R 6335—Brass Bearings with nuts to mount rotor shaft on inductance tube. Per pair..... 9¢  
Postage, per pair, 2¢ extra

## All About Aerials

A properly constructed aerial is of greatest importance for good results from your radio set. This set of twelve diagrams together with complete instructions shows you how to build any of the most practical and efficient types of aerials. Among these diagrams you are sure to find the one you need.



63 R 6149..... 33¢  
Postage, 4¢ extra

## How to Make an Autoplex

Complete set of plans, instructions and blueprints for building the one-tube Autoplex Receiving Set. This circuit has been in use for some time and gives very satisfactory results. Instructions also include a list of parts necessary for constructing this circuit. All parts required for building this set are listed in this catalogue.



63 R 6331..... 33¢  
Postage, 4¢ extra



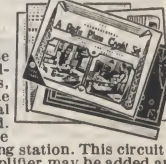
## How to Make a Reflex Set

Complete instructions on how to build a one-tube Reflex Receiver, a circuit in which the radio current is "reflected" through the vacuum tube a second time. In this way the same tube acts both as a radio and audio frequency amplifier. A crystal is used for a detector giving this set a clear natural tone. A one-tube reflex set is equal to many two-tube sets in both volume and distance. Complete with blueprints of connections, layout of panel and cabinet. Instructions give list of parts needed, all of which may be ordered from this catalogue. Also gives information on two and three-tube reflex sets.

63 R 6329..... 33¢  
Postage, 4¢ extra

## How to Build a Crystal Set

Especially designed for those persons without technical knowledge of radio. The instructions, diagrams, photographs and blueprints tell how to build a Crystal Set and what parts are needed. Crystal sets are only for use within 30 miles of a broadcasting station. This circuit is designed so a vacuum tube amplifier may be added and a loud speaker used to receive local stations. Standard materials are used throughout.



63 R 6152..... 33¢  
Postage, 4¢ extra



# Learn More About Radio

65¢



148 Pages Many Helpful Illustrations

## The Home Radio

How to Make and Use It

Revised Edition Including 1924 Developments By A. Hyatt Verrill

Intended particularly for the use of amateurs and experimenters who wish to know how to make, use and adjust wireless telephone instruments. All technical terms have been avoided in the writing of this book, and the directions and explanations are plain and simple, and the illustrations clear.

Many suggestions are offered for those who already have receiving sets and desire to improve them, or install more efficient sets. Explains the principles of wireless telephony, how to make the different parts, and gives information on the building of many different types of receiving sets, and also for the setting up of two very simple sending sets. Cloth bound. Size, 4 1/2 by 6 7/8 inches; 148 pages; illustrated.

57 R 3567.....65¢

Postage, 4¢ extra

\$1.35

Get This Good Book



## Radio for the Amateur

Simple—Thorough—Practical By A. H. Packer and R. R. Haugh

If you have a radio set or intend 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 circuits and tells the results they give. Cloth bound. Size, 5 1/4 by 7 3/4 inches; 207 pages; 71 good, helpful illustrations that you will appreciate.

57 R 3590.....\$1.35

Postage, 6¢ extra



85¢

## Radio Simplified

What It Is—How to Build and Operate the Apparatus

New Revised and Enlarged Edition By Kendall and Koehler

Building a radio set is easy and great fun if you let Radio Simplified be your guide. This popular and up-to-date Book gives all the principles and new developments of radio—tells you what equipment to buy; how to put it together and how to make it work, and the directions are so simply and clearly written that the beginner will really enjoy working from them. And, if you are already operating a radio set, but wish to improve it, you will find this book very helpful.

The first chapter gives a very interesting explanation of what radio is and how it works. A large amount of space has been devoted to the proper erection of aerials to give the best results. The latest and most efficient hookups are given; loose couplers, vario-couplers, variometers and all apparatus used in radio are thoroughly described so that you can construct any kind of a set from the smallest to the largest.

Other chapters include: Essentials of a Receiving Station; description, development and uses of the Vacuum Tube; Amplifiers, Loud Speakers and Loop Aerials; the Spark Sending Set; the Vacuum Tube Transmitter, and Learning the Code and Government Regulations for Amateurs. Cloth bound. Size, 5 by 7 1/2 inches; 302 pages; 106 illustrations.

57 R 3594.....85¢

Postage, 6¢ extra

\$2.72



## The Book of Radio

By Charles W. Taussig. A popular and instructive Book for both amateurs and professionals. Gives a complete, simple explanation of radio reception and transmission, and fully discusses the uses, public and private, to which radio is being put. Cloth bound. Size, 5 3/4 by 8 3/4 inches; 447 pages; 186 illustrations.

57 R 3595.....\$2.72

Postage, 8¢ extra

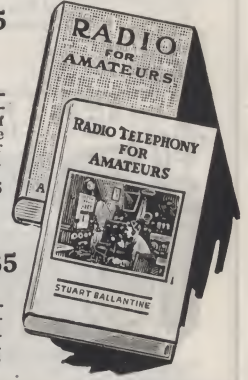
## Radio for Amateurs

By A. Hyatt Verrill. A splendid guide in helping amateur radio operators understand radio telegraphy and telephony. Catches the functions of the parts, shows how various instruments are constructed and gives simple instructions for making and installing sets. Cloth bound. Size, 5 1/4 by 7 3/4 inches; 228 pages; illustrated.

57 R 3566.....\$1.85

Postage, 8¢ extra

\$1.85



## Henley's 222 Radio Circuit Designs

By Anderson, Mills and Lewis. A new Book of practical, up-to-date receiving and transmitting circuits with complete electrical design. Simple enough for the beginner, yet so thorough and comprehensive that the more advanced experimenter will appreciate it. Paper bound. Size, 5 1/4 by 7 3/4 inches; 271 pages; 284 illustrations.

57 R 3574.....73¢

Postage, 4¢ extra

## Radio Telephony for Amateurs

By Stuart Ballantine. A highly recommended Book covering the principles of radio telephony; the audio; antenna construction and operation of the transmitter; sources of power; receiving apparatus; underwriters' specifications governing installation of receiving antennae, and radio clubs. Cloth bound. Size, 5 1/4 by 7 3/4 inches; 296 pages; 153 illustrations.

57 R 3598.....\$1.85

Postage, 6¢ extra



35¢

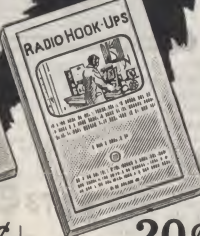
## 35 Easy Lessons in Radio

By C. R. Smith

A systematic, interesting course in the elementary principles of radio, written in simple language. Describes magnetism, electric currents, the aerial, spark gaps, detectors, coils, loose couplers, transformers, condensers and all of the other essentials of radio. Paper bound. Size, 4 3/4 by 7 1/2 in.; 117 pages; 66 illustrations.

57 R 3559.....35¢

Postage, 4¢ extra



20¢

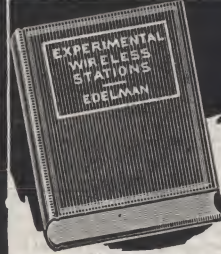
## Radio Hookups

By M. B. Sleeper

A valuable Book for the radio experimenter who wishes to build his own receiving apparatus. Gives wiring diagrams and explanations of many different wireless circuits for the reception of radio communication, starting with simple crystal detector set and working up to the more complicated receiving sets. Paper bound. Size, 5 1/4 by 7 3/4 inches; 67 pages; 86 diagrams.

57 R 3564.....20¢

Postage, 2¢ extra



\$2.43

## Experimental Wireless Stations

By Philip E. Edelman

A remarkably fine Book for those who have a fair knowledge of the principles of electricity and mathematics. Not only tells how to make apparatus to hear all telephoned and telegraphed radio messages, but also how to make simple equipment for transmission over reasonably long distances. Cloth bound. Size, 5 1/4 by 7 3/4 in.; 392 pages; 167 illustrations.

57 R 4028.....\$2.43

Postage, 8¢ extra



\$1.30

## Radio for Everybody

Latest Enlarged Edition By A. C. Lescarboura, Managing Editor Scientific American.

Includes all latest improvements in radio equipment and circuits. Complete, easy instructions for building or improving your receiving set, with principles simply explained, wiring diagrams and detailed specifications. Cloth bound. Size, 5 1/4 by 7 3/4 in.; 354 pages; well illustrated.

57 R 3568.....\$1.30

Postage, 6¢ extra



65¢

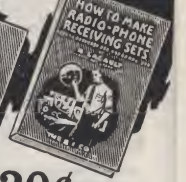
## How to Pass U.S. Government Wireless License Examinations

By E. E. Bucher. A Book intended to help those desiring to take the examination for a government license certificate by giving explanations of the principles of radio.

Three hundred sixteen actual government examination questions answered. Paper bound. Size, 6 3/4 by 9 3/4 inches; 125 pages; well illustrated.

57 R 3589.....65¢

Postage, 4¢ extra



20¢

## How to Make Radio-Phone Receiving Set

By R. I. Sault.

Written for beginners and laymen whose knowledge of electricity and wireless is limited. Complete, simple instructions for successfully building and operating a receiving set are given. Tells how to make the aerial, lightning switch, two-slide tuning coil, detector, loose coupler, variable condenser and everything needed for a receiving set. Paper bound. Size, 5 1/4 by 7 1/2 inches; 47 pages; well illustrated.

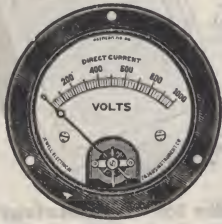
57 R 3596.....20¢

Postage, 2¢ extra



# Fine Quality Transmitting Accessories

The Transmitting Equipment shown on this page is intended for use by amateurs and by schools and colleges for experimental purposes. The quality is the best and fully up to the high standard you have a right to expect from Ward's.



All meters are fine quality precision instruments made by the Jewel Electrical Instrument Co. and have genuine sapphire bearings. 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 enameled flanges with white faces and accurate scales, marked by very plain figures. The other equipment and accessories are of equal high quality, and our prices will give you a substantial saving.

## Direct Current Ammeters

<b>Pattern 54</b>	
Flange diameter, 3 3/4 inches; case diameter, 3 inches.	
63 R 7140—0-1 1/2 amperes.....	\$6.95
63 R 7141—0-5 amperes.....	6.95
<b>Pattern 33</b>	
Flange diameter, 3 3/4 inches; case diameter, 2 1/2 inches.	
63 R 7145—0-1 1/2 amperes.....	\$5.40
63 R 7146—0-5 amperes.....	5.19
Postage, 10¢ extra	

## Direct Current Milliammeter Meters

<b>Pattern 54</b>	
Flange diameter, 3 3/4 inches; case diameter, 3 inches.	
63 R 7150—0-10 milliamperes.....	\$6.95
63 R 7151—0-30 milliamperes.....	6.95
63 R 7152—0-500 milliamperes.....	6.95
<b>Pattern 33</b>	
Flange diameter, 3 3/4 inches; case diameter, 2 1/2 inches.	
63 R 7155—0-10 milliamperes.....	\$5.25
63 R 7156—0-30 milliamperes.....	5.40
63 R 7157—0-300 milliamperes.....	5.40
63 R 7158—0-500 milliamperes.....	5.40
Postage, 10¢ extra	

## Direct Current Voltmeters

<b>Pattern 54</b>	
Flange diameter, 3 3/4 inches; case diameter, 3 inches.	
63 R 7160—0-10 volts.....	\$6.95
63 R 7161—0-15 volts.....	6.95
63 R 7162—0-30 volts.....	6.95
63 R 7163—0-50 volts.....	6.95
63 R 7164—0-125 volts.....	\$7.10
63 R 7165—0-500 volts.....	17.95
63 R 7166—0-1000 volts.....	19.95
Postage, 10¢ extra	

## Direct Current Voltmeters

<b>Pattern 43</b>	
Flange diameter, 3 3/4 inches; case diameter, 2 1/2 inches.	
63 R 7170—0-10 volts.....	\$5.40
63 R 7171—0-15 volts.....	5.40
63 R 7172—0-30 volts.....	5.40
63 R 7173—0-50 volts.....	5.30
63 R 7174—0-125 volts.....	\$6.95
63 R 7175—0-500 volts.....	13.20
63 R 7176—0-1000 volts.....	20.50
Postage, 10¢ extra	

## 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-coupled type. An adjusting-screw permits any correction for shift of the needle due to room temperature. This type of instrument is equally accurate on direct or alternating current circuits of any frequency.

Flange diameter, 3 3/4 inches; case diameter, 3 inches.	
63 R 7180—0-1 1/2 amperes.....	\$11.25
63 R 7181—0-3 amperes.....	11.25
63 R 7182—0-5 amperes.....	11.25
63 R 7183—0-10 amperes.....	11.25
Postage, 10¢ extra	

## Alternating Current Voltmeters and Ammeters

<b>Pattern 74</b>	
Very accurate, steady readings. Flange diameter, 3 3/4 inches; case diameter, 3 3/4 inches.	
63 R 7186—0-5 amperes.....	\$7.20
63 R 7187—0-10 volts.....	7.20
63 R 7191—0-15 volts.....	7.20
Postage, 10¢ extra	



\$5.85

## Radio Phone

Portable Hand Microphone especially designed for radio purposes. It is fitted with 6-foot cord for connection in circuit. Exposed metal parts nickel plated. Black corrugated handle. Hook for hanging up.

63 R 7011.....\$5.85  
Postage, 8¢ extra



## C. W. Coil

A rugged, flexible and efficient C. W. Inductance. Taps are brought out at each turn in the form of studs rigidly 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.

63 R 7037.....\$7.48  
Postage, 12¢ extra

## Acme Grid Coils

For use in circuits which require a Grid Coil. Consists of 25 turns of wire wound on a 4-inch composition tube. Tapped at fifteenth turn, making three variations possible—10, 15 and 25 turns. Fits inside of the C. W. Inductance Coil shown above.

63 R 7050.....\$1.86  
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 600 degrees Fahrenheit. Can be mounted on panels up to 3/4 inch thick.

63 R 7197.....\$8.9¢  
Postage, 6¢ extra



## Transmitting Grid Leak

Necessary in tube transmitting circuits. Shunted across grid condensers of oscillating tubes, they limit the potential accumulated on the grid of the tube, and thus govern the output to the antenna and also the character of the antenna oscillations. Resistance element contained in a heat resisting tube that will withstand sudden and extreme changes in temperature. Metal terminals for firm connections. Resistance, 5000 ohms with center tap at 2500 ohms. For use with 5-watt transmitting tubes. Size, 1/2 by 5 inches.

63 R 7024.....\$1.10  
Postage, 6¢ extra

## Thordarson Special Transformer

Designed to handle one 5-watt tube. Wiring diagrams are supplied with each Transformer, which show how some very remarkable results can be obtained on either C. W. telephony or telegraphy. For stations where a range of only 50 to 100 miles is required, this transformer with other necessary accessories can be built into a very efficient set at a low cost. Plate voltage, 650 volts; filament voltage, 10 volts. Built shell type, unmounted only; with windings of the so-called pancake construction, the coils being so arranged as to give the best operation.



63 R 7075.....\$6.90  
Postage, 14¢ extra

## Standard Radio Key

A heavy type of Radio Key designed for larger capacity radio work. The arm, base, and supporting posts are made of heavy cast brass. The whole key is of rugged construction, so it will stand up well under rough usage. The contact points are extra 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.

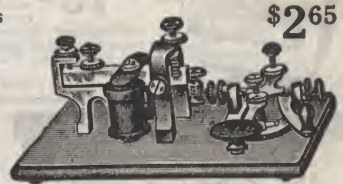
63 R 5352.....\$2.48  
Postage, 6¢ extra



## 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 20-ohm set can 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 in circuit with another set. Price includes manual of Morse code and instructions for telegraphing.

63 R 7215—With 4-ohm sounder.....\$2.65  
63 R 7219—With 20-ohm sounder.....2.98  
Postage, 9¢ extra



\$2.65

## Steel Lever Keys

Railroad type Key with steel lever. Switch strap and lever heavily nickel plated. Heavy cast brass base of skeleton type on the bottom of which is mounted screw legs to go through desk or table. Can be had without legs.

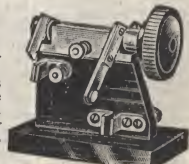
63 R 1739—Key with screw legs to go through table or desk.....\$1.73  
63 R 1741—Key without legs to fasten on top of desk.....1.89  
Postage, 6¢ extra



## 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 of the transmitting side. Changing the switch to the receiving position shuts off the power, drains the aerial, 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, 5 inches, 3 inches wide, 4 1/2 inches high.

63 R 7052.....\$5.25  
Postage, 8¢ extra



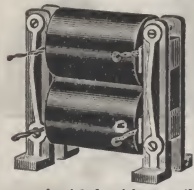


# Standard Transmission Apparatus

## 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 and a casual inspection of the prices will indicate the savings made possible by dealing with Ward's. We invite you to make us your headquarters for transmission apparatus.

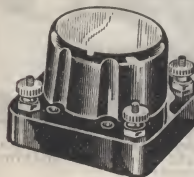


## Acme Choke Coils 1½ Henries

The Acme Choke Coil is used to smooth out the pulsations in the direct current supply to keep a constant potential current when modulating or for pure C.W. These coils have a soft iron core wound with many turns of fine copper wire. This prevents the high frequency waves from passing through and allows those of low frequency to go through. Also they will prevent high frequency from backing up in the power supply. Best results are obtained with a coil in each side of the line. The double coil is used for this purpose. Size, 3 inches high, 2¾ inches wide, and 2¼ inches deep.

63 R 7101—150MA capacity, single coil.....\$3.70  
63 R 7102—150MA capacity, double coil.....5.68  
63 R 7103—500MA capacity, single coil.....5.68  
63 R 7104—500MA capacity, double coil.....7.65

Postage, 10¢ extra



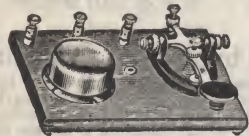
## Porcelain Transmitting Socket

A porcelain Socket designed especially for use with a 5-watt tube for the transmitting station. This socket has the new type sure grip contacts, and loss 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 part at a low price.

63 R 7023.....39¢

Postage, 4¢ extra

## Beginners' Wireless Practice Set



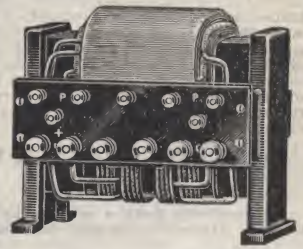
Anyone learning wireless telegraph transmission must know the code. Send for this Wireless Practice Set and see how easy it is to learn the code. Set consists of a key and buzzer mounted on a polished wood base. Buzzer reproduces accurately the high pitched sounds of wireless code stations. Connect a 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 numerals. Practice until you can understand the signals at 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 4¾ inches wide.

63 R 1750.....\$1.90

Postage, 10¢ extra

## Acme C. W. Power Transformer Combined Plate and Filament

These Transformers are used to step up 110-volt, 60-cycle alternating current voltages used in C. W. transmission. High voltage current obtained from these transformers when passed through the proper combination of rectifiers, choke coils and condensers is applied to the plate as direct current and is suitable for both radio telephony and telegraphy. Low voltage current is applied to the filament without rectification. These transformers may be obtained in two forms: Mounted, ready for connecting into the set; and unmounted with the core and coils assembled. The mounted type is securely mounted on standards and all connections are brought out to a formica panel with binding post connections.



### 75-Watt Output Capacity

Plate voltage, 375 volts; plate current, 100 milliamperes; filament voltage, 10 volts; filament current, 5 amperes. These transformers will supply plate and filament voltages and current for two 5-watt tubes.

563 R 7060—Mounted.....\$13.70

Postage, 24¢ extra

563 R 7062—Unmounted, core and coils assembled.....11.20

Postage, 20¢ extra

### 200-Watt Output Capacity

Plate voltage, 750 and 550 volts either side of the center tap; plate current 250 milliamperes maximum; filament voltage, 10 volts for each winding; filament current, 5 amperes for each winding. This transformer will supply plate and filament voltage, and current for four 5-watt tubes; 750-volt side is used with electrolytic rectifier; 550-volt side used with rectifying tube. This high quality transformer is an unusual bargain at these low prices.

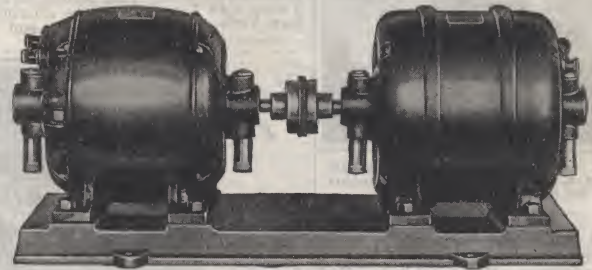
563 R 7064—Mounted.....\$18.50

Postage, 28¢ extra

563 R 7066—Unmounted, core and coils assembled.....15.10

Postage, 24¢ extra

## 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. Write for special information.

Shipped from factory in Chicago. Allow 15 days for shipment to be made.

Article Number	Voltage Output	Watts Output	Will Handle Tubes	Shipping Weight	Each
263 R 696	300	15	One 5-Watt	20 pounds	\$29.50
263 R 697	350	40	Two 5-Watt	41 pounds	48.00
263 R 698	500	150	Six 5-Watt	100 pounds	75.00
263 R 699	1000	250	Two 50-Watt	105 pounds	95.00

## The Radio Dynamotor 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 Dynamotor operates from any 32-volt farm electric plant, or on a motor boat power plant, or from any source of 32 volts direct current 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 modulators. With the proper accessories this generator can be built up into a transmitting set having a radio-telephone range of 200 miles and upward. The very low price of the combination puts it within the reach of those who would like to operate a small transmitting station without the usual exceedingly high cost and at the same time have a piece of equipment of high quality. Shipping weight, 45 pounds.

Shipped from factory in Chicago. Allow 15 days for shipment to be made.

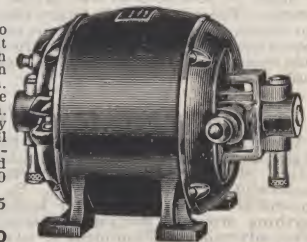
263 R 688.....\$60.00

### To Operate from a 6-Volt Battery

This Dynamotor is very similar in construction to the one listed at the left except it will operate on a 6-volt storage battery. The efficient design and the high grade material used cuts down the current consumption so this machine is exceedingly economical in operation. The proper machine for the portable set. Can also be 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 watts, which will handle one 5-watt tube very nicely. With proper accessories, a transmitting set using this dynamotor should have a range of 150 miles and up. Shipping weight, 30 pounds.

Shipped from factory in Chicago. Allow 15 days for shipment to be made.

263 R 689.....\$35.00





# Last Minute Specials



Tuned Radio Frequency Coil

**98¢**

A new and improved design in Tuned Radio Frequency Transformers. Consists of diamond wound loose 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. Long leads for easy connection to the set. To be used in tuned and balanced radio frequency circuits.  
**63 R 6050—Each.....98¢**  
 Postage, 4¢ extra



Radio Map of U. S. and List of Broadcasting Stations

A broadcast map of the United States with distance computing gauge, list of broadcasting stations, time divisions and radio districts.

**63 R 6051.....33¢**  
 Postage, 2¢ extra

Harkness Reflex Coils **\$1.85**

For the Harkness Reflex set, we recommend these coils. Sold only in sets of two consisting of one antenna coupling coil and one radio frequency coil. Antenna coupling coil is tapped at tenth turn for use with long or short antenna. Primary and secondary wound on genuine formica tubes. Soldering lugs for connections.



**63 R 6052—Set of 2.....\$1.85**  
 Postage, per set, 8¢ extra

New Style Loud Speaker

Special Low Price **\$7.95**

A special purchase makes it possible for you to save considerable on the price of a good Loud Speaker. The latest design and style in loud speaker construction. It is very attractively shaped and does not look out of place in the finest



home. The horn is molded from a special non-resonant material free from mechanical vibrations and harsh tones.

The unit used is specially designed for loud speaker use and gives plenty of volume with a clearness and sweetness of tone that is surprising. The small view at the right shows the horn construction of this speaker. Beautifully finished in a dull black and stands about 13 inches high. Complete with connecting cord with tips for binding post or plug connection.



Interior Construction of Loud Speaker

**563 R 758.....\$7.95**  
 Postage, 22¢ extra



**39¢** New Style Safety Battery Switch

When plug is removed, set can not be operated. Consists of a well made Battery Switch with removable contact plug. When plug is in all the way set is turned off, when plug is out half way, set will operate and when plug is removed, tubes will not light. Fits all panels. Requires only one hole for mounting on panel.

**63 R 6053.....39¢**  
 Postage, 3¢ extra



How to Build the Harkness Reflex Set Complete instructions and full size panel and baseboard layout for constructing the Harkness Reflex Set. The Harkness is easy to assemble and will give surprising tone quality and volume.

Coils for use in this set are listed above.  
**63 R 6063.....33¢**  
 Postage, 2¢ extra



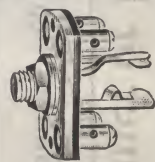
**34¢** Improved Radio Plug

A new and improved design in Radio Plugs. Requires no screw driver and has no cap to remove. No springs or levers to press, in top of plug and insert holes can not pull out. Plug is well made with metal parts of brass and frame of polished molded composition. Very neat in appearance. At this low price no radio owner can afford to be without one or more of these handy, new style plugs.

**63 R 6073.....34¢**  
 Postage, 4¢ extra

Solderless Radio Jacks

Single and Double Circuit **29¢** Single Circuit



A Jack that requires no solder. It is now possible for the experimenter to assemble a radio set without soldering jack connections, overcoming what has long been a source of trouble in the construction of home built radio receivers. Jacks are well made of brass, with strong contact springs. Highly polished nickel plated finish. Mount on any panel up to 3/16 inch thick. Made only in open and double circuit type.

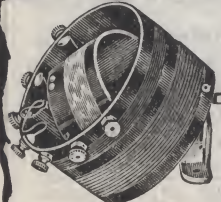
**63 R 6074—**  
 Open circuit jack.....29¢  
**63 R 6075—**  
 Double circuit jack.....45¢  
 Postage, each, 3¢ extra

Three Circuit Tuner

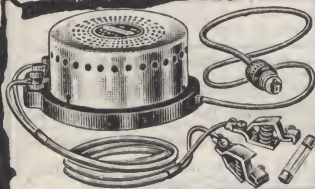
Sensitive and selective; used as a three Circuit Tuner. Consists of 3 tap primary, secondary and tickler coils. Wound on formica tubes with fixed coupling between primary and secondary. Tickler coupling 150 degrees. For panel or baseboard mounting. Brass binding posts. Has 1/4-inch shaft.

**63 R 6064.....\$2.95**  
 Postage, 8¢ extra

Simply thread phone cord through large hole in top of plug and insert tips in holes. Cord can not pull out. Plug is well made with metal parts of brass and frame of polished molded composition. Very neat in appearance. At this low price no radio owner can afford to be without one or more of these handy, new style plugs.



**\$2.95**



Storage "B" Battery Charger **\$7.95**

A vibrating "B" Battery Charger at a great saving. Specially designed for charging storage "B" batteries. Charges 24 or 48-volt batteries at a rate of about 250 milliamperes. Practically silent in operation and current consumption is very low. Indicator shows if battery is charging properly. Has long rubber covered battery connecting leads with lead covered clips attached. Complete with extra fuse and plug for attaching to 110-volt, 60-cycle alternating current. This is a special low price offer. Not for "A" Batteries.

**63 R 6076.....\$7.95**  
 Postage, 18¢ extra

**27¢** Open Circuit Jack



Easy Solder 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 as is usually the case. Jacks are strongly constructed and of neat appearance. Heavy springs insure positive contact. Mount on any panel up to 3/16 inch thick.

**63 R 6077—**  
 Open circuit jack, one spring.....27¢  
**63 R 6086—**  
 Closed circuit jack, two springs.....29¢  
**63 R 6087—**  
 Double circuit jack, four springs.....31¢  
**63 R 6088—**Open circuit filament control jack. Four springs, closes one circuit.....38¢  
**63 R 6089—**Closed circuit filament control jack. Five springs, opens one circuit and closes one.....42¢  
 Postage, each, 3¢ extra

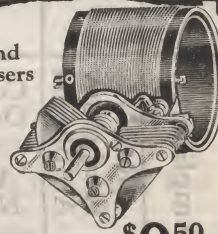
Battery Connecting Leads Flexible Connecting Cable Has 5 connectors for positive and negative of "A" and "B" batteries and for detector tap of "B" battery. Leads are colored. Will reach from set to floor.



**63 R 6090.....49¢**  
 Postage, 6¢ extra

Set of 3 Tuned Radio Frequency Transformers and Two Low Capacity Condensers

A set of three tuned Radio Frequency Transformers and two Low Capacity Condensers to be used in any of the popular balanced radio frequency circuits. Inductance coils wound on genuine formica tubing with green silk covered wire. Coils are mounted on high grade low loss variable condensers which have metal end plates and large insulating bushings. Rigid connections. Low capacity condensers are mounted on bakelite strip and fitted with soldering lugs. Sold only in sets of three transformers and two condensers.



**\$9.50**

**63 R 6091—Set of 5 parts.....\$9.50**  
 Postage, per set, 18¢ extra

Set of 5 Parts



Storage Battery Connecting Leads Flexible connecting wire with lugs and lead covered clips.  
**63 R 6092—Length, 10 feet.....69¢**  
 Postage, 4¢ extra

Rubber Head Set Cushions

Soft rubber Head Set Cushions for comfort and silence. Excludes all external noises. Fit all head sets. Sold only in pairs.  
**63 R 6093—Per pair.....42¢**  
 Postage, per pair, 4¢ extra

**42¢** A Pair





# This List May Remind You of Several Items You Need

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## 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 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 miles and 300 miles, your amount will be somewhere between the two amounts shown for the two distances, and so on.

### 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.

Estimated Total Freight Charges on Radio Sets			
Ship. Wt.	150 Miles	300 Miles	500 Miles
100 pounds.....	\$ .65	\$ .85	\$ 1.16
150 pounds.....	.98	1.30	1.74
200 pounds.....	1.30	1.70	2.32
250 pounds.....	1.63	2.13	2.90

Estimated Total Express Charges			
	150 Miles	300 Miles	500 Miles
20 pounds.....	\$ .59	\$ 1.12	\$ .87
40 pounds.....	.84	1.70	1.40
60 pounds.....	1.19	2.17	1.87
100 pounds.....	1.59	2.22	2.93

### 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.

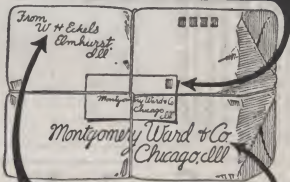
When you wish your order shipped by freight and there is a freight agent at your station, you need not send money for transportation charges. We will ship the goods and you pay the freight charges to the agent when you receive them. If there is no freight agent at your station, however, you should send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

1. To return by parcel post, pack securely in heavy paper and tie with a strong cord. Address the package to us and write your name and address on it. Write a letter telling why goods are returned and what we are to do. Enclose this letter in an addressed envelope. Seal the envelope and paste it on the package under the string, as shown in the picture. Do not seal the package. Place a two-cent stamp on the envelope and sufficient postage on the package.
2. To return goods by express or freight, be sure that your name and address are on the package or crate. Enclose the agent's receipt in your letter and mail it to us.
3. If the merchandise was shipped to you direct from one of our factories, be sure to write us for shipping instructions before returning.

### Attach Addressed Letter



Your Name & Address

Address Package To Us



# Radio Cabinets

Shown In Color  
On Opposite Page  
Described Below

## Radio Cabinet Desk

**A** A Tudor design Radio Cabinet Desk that will harmonize with any other furniture in your living room. Built by 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 on your set. The large compartment below has sufficient space to hold any radio set including the neurodyne.

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 taken apart ready to set up. Shipping weight, 50 pounds.

163 R 6906.....\$14.95

## Radio Cabinet With Built-in Loud Speaker



**B** 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 batteries 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 loud speaker horn and unit are built into 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 of beautifully grained Mahogany Veneer finished in a rich dull rubbed brown. 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 other accessories. Sound chamber and compartments are all protected by doors. Shipping weight, about 70 pounds.

163 R 6667.....\$29.95

## Radio Desk

**C** 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 his 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 all batteries, battery charger and phones. In planning and building the desk no detail has been overlooked to make it a convenient radio desk 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 red mahogany shade. Height, 33 inches; length, 40 inches. Shipping weight, 60 pounds. Not available.

163 R 6840.....\$18.95

## Console Style Cabinet

**D** Attractive Mahogany finished console model Radio Cabinet, as beautifully finished as any piece of high grade furniture. Any set can be built into top compartment. Takes 7 by 33-inch panel or smaller panel can be used by blocking the ends. Large enough for super heterodyne set. Top closes down and completely protects set from dust or tampering. Front leaf opens flat and acts as an arm rest or writing space when set is in operation. When closed it can be locked.

Bottom is divided into two compartments with attractively paneled doors. Left side is large enough to hold "A" battery. Right side has shelf for "B" batteries and head set. Size, over all, 36 inches wide by 39 inches high and 12 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

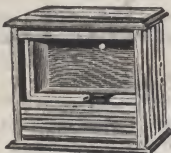
## A Beautiful Radio Cabinet

A handsome combination Cabinet in which you can build your radio set and also enclose the "B" batteries. Beautifully finished in dark imitation mahogany. Access to set is through removable rear panel. A shelf is provided at the level of panel bottom which leaves space below for dry cells and "B" batteries.

563 R 6830—Cabinet for use with panel, 7 by 12 inches.....\$4.70  
Postage, 32¢ extra

563 R 6831—Cabinet for use with panel, 7 by 18 inches.....\$5.80

563 R 6832—Cabinet for use with panel, 7 by 21 inches.....\$6.90  
Postage, 40¢ extra



## Knocked Down Radio Cabinet

Save money on a good Radio Cabinet. These cabinets can be put together in a few minutes by any one. Made of good quality wood selected for strength and even grain. Sanded smooth but not stained or varnished. A screw driver is the only tool necessary. When finished these cabinets make an attractive setting for your radio set.



Article No.	Panel Size	Depth	Each	Postage
63 R 6910	7 by 9 in.	7 in.	\$1.19	16¢ extra
63 R 6911	7 by 12 in.	7 in.	1.59	26¢ extra
63 R 6912	7 by 18 in.	7 in.	2.62	32¢ extra
63 R 6913	7 by 21 in.	7 in.	2.15	38¢ extra

## Standard Cabinet

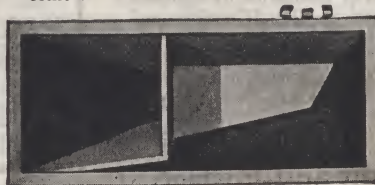
These standard Cabinets are recommended for those who build their own radio set. In sizes that take all the standard panels now in use. Finished in a dark imitation mahogany, hand rubbed to a beautiful finish. Very attractive in appearance. Will match up well with the furnishings of almost any room in the house. Matches especially well with the radio desk listed at the right.



Article Number	For Panel Inches	Depth	Each	Postage
63 R 6650	6 by 7	7 in.	\$2.05	16¢
63 R 6651	6 by 10½	7 in.	2.30	18¢
63 R 6652	6 by 14	7 in.	2.75	22¢
63 R 6653	6 by 16	7 in.	3.05	22¢
63 R 6654	7 by 9	7 in.	1.65	16¢
63 R 6655	7 by 10	7 in.	1.70	18¢
63 R 6656	7 by 12	7 in.	1.70	18¢
63 R 6657	7 by 14	7 in.	1.75	22¢
63 R 6658	7 by 16	7 in.	1.85	22¢
63 R 6659	7 by 18	7 in.	1.90	22¢
63 R 6660	7 by 21	7 in.	2.15	24¢
63 R 6661	7 by 24	7 in.	2.35	26¢
63 R 6662	7 by 26	7 in.	2.55	28¢
63 R 6663	9 by 16	10 in.	2.75	28¢
63 R 6664	11 by 16½	10 in.	4.25	34¢

## Radio Cabinet With Built-in Horn

**E** After you have completed your radio set, put it in one of these handsome Cabinets. It will give your set that appearance of being the work of a master workman. You will have a set your friends will admire and you will be proud to show it to them when they come to "listen in."



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 hand rubbed Adam brown mahogany. Lower 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 entire cabinet. A clip suitable for attaching a loud speaker unit such as the Baldwin is included. No unit included.

563 R 6669—  
Takes panel, 7 by 21 in....\$11.95

563 R 6621—  
Takes panel, 7 by 24 in.... 12.95

563 R 6623—  
Takes panel, 7 by 26 in.... 13.83  
Postage, 54¢ extra

## New Design Cabinet

**F** A combined Loud Speaker and Cabinet for less than you would expect to pay for a good loud speaker alone. Makes your radio set doubly attractive and useful. Solid Oak finished Silver Gray. Does not mar easily nor show finger marks. The loud talker gives excellent volume and full resonant tone quality. Opening is protected by an attractive grill covered with fine mesh silk cloth. Room back of loud speaker for "B" batteries. Panel size, 11 by 16½ inches. Size over all, 12½ by 14 by 25 inches. Sold with or without loud speaker.

563 R 6705—With speaker..\$29.42

563 R 6804—  
Without speaker..... 15.65  
Postage, 64¢ extra

## Radio Table

**G** 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. It is securely built, well braced and will easily hold the heaviest radio set.

Substantially constructed of hardwood and finished in Mahogany, hand rubbed to a rich dull finish. This beautiful table will match up well in appearance and finish to the best furniture in your home. Small drawer furnishes a handy place for your prints and tools. Size of top, 16 by 30 inches. Height, 38 inches. Shipping weight, 40 pounds.

563 R 6905.....\$6.95  
Postage, 64¢ extra

See Index and  
How to Order Instructions  
on Page 65



# 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 matter 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 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 refined entertainment, useful instruction and up-to-date information. "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 with which the air is filled. These dependable market reports and weather forecasts are given daily at frequent intervals from 86 of the most powerful radio stations in the country. These stations 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 possible 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 10 to 35 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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