Radio is today the wonder of the world. It has been so developed and simplified that it is very practical and useful. Radio messages from hundreds of stations are continually being sent out and radio receiving outfits have been so simplified that your own home can "listen in" on the radio programs sent out by the radiophone "Broadcasting Stations." Among the programs regularly sent out are excellent musical concerts, latest news items of the day, time signals by which all clocks in the country are regulated, market reports giving up-to-minute quotations on stocks, bonds, cattle, sheep, hogs, grain and other produce. Besides this valuable information many special programs are sent out regularly. These include grand opera in season, complete theater programs, speeches by famous orators, sermons by well known churchmen, stories for the children, reports of athletic events while they are in progress, and many other items of interest.

Many radiophone "Broadcasting Stations" are now in operation and many more are being erected daily. Even now one or more radiophone programs can be heard in any part of the country by the more sensitive receiving outfits. Soon there will be so many broadcasting stations that even the ordinary receiving sets will have the choice of listening to several and the better outfits can be "tuned" to listen to any one of a dozen or more stations.

Any station within range can be so "tuned in" that none of the others "interfere"—that is, none will be heard except the one wanted. You need not be an expert to do this. Any one, after reading the simple instructions sent with every set can set up a receiving station and receive messages without trouble.

It should be understood that it costs nothing to "listen in" on radio. Some of the programs are sent out by the big radio companies as an advertisement, others by schools, colleges, municipalities, newspapers and other agencies. These programs are a permanent feature in the country. In fact, they will be greatly extended so that every kind of interesting news will be sent out. Also, many different kinds of programs, music, news and stock reports will be sent out at the same time, so that you may listen to whatever interests you most. And your only cost is your receiving set.

We offer a number of outfits which incorporate the wonderful new developments that have made radio what it is today. When amplifiers are used a loud speaking horn can be connected in so that an audience of people can enjoy the program without the use of the ear receivers generally used.

In this catalog will be found radio outfits to suit every pocketbook. Of course the sensitiveness, or receiving range of the outfit is usually in proportion to the price. The cheaper outfits will receive fairly well for short distances, while the best outfits you can, under favorable conditions, hear radiophone transmitting stations a thousand miles or more distant.

However, it is not possible to state the distance messages can be heard under all conditions—the power of transmitting station, the geographical location, the season of the year, local atmospheric conditions, and even the time of day, all influence the range. A receiving set that under favorable conditions might easily "tune in" stations a thousand miles distant—might, under unfavorable conditions, only be able to receive stations a hundred miles away. However, with a good outfit you can always be assured of hearing something interesting.

In addition to radiophone messages radio-telegraph code messages from many parts of the country may be "picked up" almost any time. The range of transmitting and receiving sets is much greater on the radio-telegraph than on radiophone.

While radio is extremely simple, it can be made a very deep study, and a very interesting one. We suggest that you order and study some of the radio books we offer. You will enjoy building your own set—the books tell you how. We carry a very complete line of parts to build not only receiving sets but transmitting sets as well. Learn the code—it requires but little practice. You will then be able to read all kinds of messages, not only from land stations but from the ships at sea.

For fifty years Montgomery Ward & Co. have been serving their customers. Today we have more than five million. Before adding radio merchandise to our many other lines, we made certain of the quality of the goods we offer. Every type of machine in this catalog has been thoroughly tested.

Let Ward's be your radio headquarters. A copy of this catalog will be gladly sent to any of your friends who are interested in radio. Send us their names and addresses.

Montgomery Ward & Co.

Chicago  Ft. Worth  Kansas City  Portland, Ore.  St. Paul
In the descriptions of the outfits shown in this catalogue, we have tried to give an idea of how far messages can be received. However, a number of things influence the receiving range—the power of the transmitting station and local atmospheric conditions are the principal factors. Also, the range is much greater on clear winter nights than at any other time. The other extreme is a hot, stormy summer day. Where radio messages might carry a thousand miles in the first instance, they might only be effective for a hundred miles in the second. Radio always works better at night than in the daytime, and better in winter than summer. Local conditions also sometimes have an influence. For instance, some places are in a "shadow" or pocket for some stations, while they can hear others perfectly. As an example, it is usually difficult to send messages between Milwaukee and Chicago, while under the same conditions, either Milwaukee or Chicago may communicate perfectly with Detroit and Pittsburgh.

On the above map we show the location of the leading broadcasting stations (April 15, 1922). Others are in the course of construction and many more are contemplated.

It is expected that within a year or so, every spot in the country will be within range of several broadcasting stations.

Radio messages travel like waves in circles from the transmitting station. So that you can get an idea of the effectiveness of each station as concerns your particular receiving set, we have tried to show circular zones around each station, showing different distances.

The Radio Antenna or Aerial is a necessary part of a receiving outfit. The most effective aerial consists of a wire or a set of wires suspended in the open air above all surrounding objects. From the aerial wire a "lead in" wire goes to the instruments. Both the aerial wire and lead in wires must be very carefully insulated from any object that might conduct electric currents from it to the ground. Aerial insulators (see Page 23) for the aerial wires are used for this purpose and the lead in wire is usually supported on porcelain knobs.

Best results for receiving are usually obtained with a single wire aerial ranging from 75 to 125 feet in length. Such an aerial will also receive stronger from stations toward which it is pointed, other conditions being equal.

Any of the aerial wire we list (see Page 23) is satisfactory, but the seven strand cable, 63 J 5150, is the best.

If it is not possible to put up a single wire of the length mentioned, a shorter one can be used, and under some conditions single wire aerials as short as 35 feet give good results. Adding one, two or three wires stretched side by side, from 1 to 2 feet apart, improves short antennas somewhat.

Outdoor aerials are not absolutely necessary. Wires stretched indoors often give satisfactory results. In fact, a very compact type of indoor aerial known as the Loop Antenna (see Page 23), gives excellent results with the more sensitive receiving sets, even on fairly long distance reception.
Complete Westinghouse R.C. Radio Outfit

1. Air Cap Insulator
2. Lightning Arrester
3. Porcelain Switch
4. Wall Insulator
5. Grounding Switch
6. "B" Battery
7. "A" Storage Battery
8. Ground Clamp
9. Ground Rod
10. Porcelain Insulators

The best medium priced, long distance Radio Receiving Outfit, and at the same time the simplest one to operate, is the Westinghouse "R.C." This receiver is manufactured by the Westinghouse Electric and Manufacturing Company, whose reputation for high electrical appliances is well known. The "R.C." receiver will give results equal to any receiver on the market today; it has none of the complicated, intricate adjustments so often found in the better types of receivers which require trained radio operators to handle. The "R.C." receiver is so simple that a beginner may acquire perfect results with it.

Either a telephone receiver or a loud "speaker" may be connected to this outfit, and all of the people may be entertained. In fact, the messages may be so amplified with certain types of loud 'speakers' that they may be heard at a distance of 100 feet or more.

The Westinghouse "R.C." outfit, properly installed, has the longest range for radio-home broadcasting reception of any complete outfit offered today. It combines the Armstrong Regenerative circuit with audio detector and two-stage amplifier. Makes a very sensitive receiver that will regularly "bring in" distant stations.

Any persons using these outfits in Chicago during the past winter have heard the radio programs sent out from New York. Of course, other stations, such as those at Pittsburgh, Kansas City, and St. Paul, are heard as well. However, it must be remembered that the receiving range can be increased or decreased on any other radio-receiving outfit, the range varying according to atmospheric conditions, the season of the year, the weather, and the power of the transmitting station. It is possible that during a hot, stormy summer day a station at Chicago that had regularly heard New York in the winter time would temporarily be unable to cover a distance of 100 miles.

But, nevertheless, you will always be able to "pick something interesting from the air," and when conditions are right and you can hear a radio concert, you can step out into the streets, and listen to the music while you walk. Or you can sit down in your armchair, listen to the music while you eat your meal.

The Complete Outfit Consists of:

1. Instructions for installation and operation.
2. The Westinghouse "R.C." set—which is fully described on opposite page.
3. One Western Electric 200-ohm double headed with universal jack plug. (See Page 15 for complete description.)
4. One Radio Storage Battery, 6-volt, 90-ampere-hour capacity.
5. One Radiotron Detector Tube.
6. Two Radiotron Amplifier Tubes.
7. One combination 45-volt "B" battery with 22½-volt tap for the detector circuit.
8. A complete antenna equipment consisting of:
   - 160 feet stranded aerial wire cable.
   - 2 air-gap type, extra high grade aerial wire insulators.
   - 1 extra high grade wall insulator.
9. An all-frequency receiving switch.
10. A 22½-foot No. 4 insulated ground wire.
11. A lightning protector.
12. Shipping weight, complete outfit, 50 pounds.

Montgomery Ward & Co.

All merchandise in this catalogue shipped from Northern Illinois

$175.00
Westinghouse D.A. and R.A. Radio Instruments

These two instruments, combined in one cabinet, make up the R.C. set shown on opposite page. They are supplied separately so that either can be used with radio instruments of other makes if desired.

Type R.A. Short Wave Regenerative Tuner

This is the instrument that takes the incoming radio wave collected on the antenna wire and "tunes" it so that the balance of the apparatus used can change the wave so it may be heard in the head receivers. In order that this "tuning" can be easily done by anyone, the instrument is made as simple as possible, requires but one adjustment in order to tune to the desired signal. The wave length range is from 180 to 700 meters, which means that amateur broadcast and commercial messages may be tuned in. May be used either with a crystal or an audion detector, working alone or in conjunction with an amplifier.

TECHNICAL: This is a single circuit tuner and the oscillating circuit consists of a condenser of variable capacity and a variometer inductance connected in series. The rotating plates of the condenser and the rotating coils of the variometer are mounted on the same shaft (controlled by the large dial) and are so balanced that rotating the one shaft changes simultaneously the inductance and capacity of the antenna circuit, thereby keeping the efficiency of the oscillating circuit practically constant throughout the entire range of the receiver. A single plate variable vacuum condenser (controlled by lower left hand dial) is connected in parallel with the main condenser, and makes extremely fine tuning possible. Through the use of an adjustable shrink coil (controlled by lower right hand dial) the input may be used with a vacuum tube detector, which greatly increases the sensitivity and selectivity of the set. All connections are made at the back of the cabinet. Binding posts extend through the rear of the tuner and they are plainly marked by means of paired engraved insulating plugs. The capacity effect of the operator's body on tuning is eliminated by means of a metal shield mounted on the back of the front panel, which is connected to the ground circuit.

Panel—Mica or cupro-nickel. Cabinet—Height, 9 3/4 inches; depth, 8 3/4 inches; width, 6 1/4 inches. Solid mahogany, varnished and polished. Dial—polished black Mica with beveled edges. Markings filled in white. Condensers—Rotary plate type, air, diathermic. Wiring diagram showing all connections is furnished, together with complete instructions for installing and operating. Net weight, 6 pounds. Shipping weight, 10 pounds. $68.00

Load Coil for Use with Type R.C. Receiver or R.A. Tuner

The addition of this coil to either the R.C. or R.A. instruments increases the receiving range, making possible the reception of signals having wave lengths from 1600 to 5000 meters. It is readily attached to two binding posts at the rear of the cabinet. Shipping weight, 1 pound. $6.00

Westinghouse D.A. Detector and Two-Stage Amplifier

This instrument can be used in conjunction with any type of tuner—loose coupler, honeycomb coils or regenerative tuner. It is especially designed to work with the Westinghouse R.A. tuner and is the same size and shape, so that the two instruments can be placed side by side and present a very symmetrical appearance. It provides a vacuum tube detector and two stages of audio-frequency amplification. The results obtained with it are vastly superior to the results obtained by a crystal detector under the same conditions, the signals as given out by the second stage of amplification being at least one hundred times louder than one crystal detector. It is this type of instrument, used in connection with a regenerative tuner, such as the R.A. set listed above, that makes the satisfactory results obtained by modern radio possible. Two much disconcerted people have written us saying that they have heard radio telephone messages from distant stations. (See description on opposite page.)

The current is first passed to the detector tube, from whence it passes on to an amplification transformer, which steps up the current and delivers it to the first amplifying tube. The incoming messages at this point are already greatly increased, but are further amplified by passing through another amplification transformer, from whence the current is delivered to a second and third amplifiers, and the current when delivered from this tube has been stepped up so loud and clear that messages even from far distant stations can be distinctly heard, either in the telephone headphones or through the loud speaker. The control—stores controlling the detector tube, the other controlling the two amplifiers, give perfect control of the filament currents. Three telephone jacks mounted on the panel enable the signals to be heard either by the detector or first or second stage of amplification by inserting the plug in the corresponding jack. All binding posts are located at the rear of this instrument, and are so arranged that direct wiring connections can be made with the R.A. tuner. The cabinet is 9 3/4 inches high, 8 3/4 inches deep and 6 1/4 inches wide, solid mahogany, varnished and polished. Door in top, for ready inspection and removal of vacuum tubes. The instrument is completely shielded on all sides, entirely eliminating capacity effects from operator's body. A wiring diagram showing all connections is furnished, together with complete instructions for installation and operation.

Net weight, 10 pounds. Shipping weight, 13 pounds. No batteries, no tubes nor head phones included. $70.00

Montgomery Ward & Co.

All merchandise in this catalogue shipped from Northern Illinois
The Tuska Complete Radio Receiving Set

Including Regenerative Tuner, Detector and Two-Stage Amplifier 

Easily Handled—Equal in Results to the 

Best Radio Receiver

If you are looking for the best outfit that you can get at a reasonable price, this is the outfit you will want. We have selected for you a set that will give you the best value offered today, after a thorough investigation of all radio sets on the market. The receiving instrument has been very carefully designed by several of the leading radio engineers in the country, and the result is an instrument equal in results to the best radio receiver of its type on the market.

A special effort was made to keep the instrument as simple as possible and yet incorporate the best features of the more complicated sets. The result is an outfit that is easy to handle, yet makes use of the new wonderful radio developments, such as the Armstrong regenerative circuit and vacuum tube detectors and amplifiers. With this receiver, signals more than 100 times louder than those obtainable with any ordinary circuit and a single sound detector can be received. This means that the instrument will pick up and reproduce distinctively messages from distant transmitting stations. It also means that you can use the single or a series of telephone headsets; or, if you wish, you can connect to the instrument a loud speaker, so that an audience of any size can be entertained by the incoming radio program. While designed particularly for radio telephone reception, the outfit is equally effective for radio telegraph reception. In fact, the range on radio telegraphy is considerably greater than for radio telephone. As an example: During the tests conducted at Chicago during the last winter, the radio broadcast station at Pittsburgh was regularly brought in, Detroit and nearby towns being heard very readily. Of course, it must be remembered that no definite range can be set on any radio receiving outfit. The range depends entirely upon the season of the year, atmospheric conditions, geographical location and the power of the transmitting station. Also, the range is much greater at night than during the daytime. We do not claim that this or any other machine that we handle can regularly receive messages over the distance that Chicago is from Pittsburgh. In fact, we know that such a condition is not possible, and we merely cite the instance to show what may be done.

This outfit is especially intended for home entertainment or for use in clubs and halls, and the separate parts were selected with this in mind. The wavelength from 180 to 600 meters can be tuned in, which means that broadcasting, amateur and commercial ship and land stations can be heard.

Technical Description and Specifications: Receiving instrument consists of a single tuning circuit made up of a variable condenser in series with an antenna inductance. The coil is controlled by a switch on the receiver. Regeneration is obtained by a tickler coil on the detector plate circuit. Tubs one-piece knobs and dials are mounted on the receiver cabinet and are correctly aligned. The parfaitly engraved scale makes it possible to set condenser and tickler very accurately. Plainly marked binding posts for all connections. Paper mache tubes, socks. Highly efficient amplifying transformers. All impedances each controlled separately by finely graduated rheostats. Satin finish, antique mahogany finished cabinet, inside dimensions 6 x 6 x 17 inches.

The Outfit Complete Includes:

The tuner and detector two-stage amplifier, as described above: one detector; two amplifier tubes; 45-volt "B" battery with tape for detector circuit; 6-volt 40-ampere hour storage battery; high grade 2000-ohm resistor; complete antenna equipment, consisting of 100 feet of bare copper, galvanized wire; 20 feet insulated wire for connecting to the ground; a single pole double-pole throw switch, a lightning arrester; 4 porcelain insulating knobs with nuts, 2 serial wire insulators, 2 screw eyes, a porcelain wall tube and a ground clamp.

Shipping weight, 48 pounds.

$115.00

63 J 638—Complete Outfit

The equipment as listed above does not include a loud speaker. A complete line of loud speakers is listed on Page 20, and any of those shown will give very satisfactory results with this receiving outfit.

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All merchandise in this catalogue shipped from Northern Illinois
Acmefone Loud Speaking Radio Receiving Set

This receiver is fitted with a loud speaking device built right into the cabinet, which reproduces radio messages so that they can be distinctly heard all over any ordinary size room. This special feature makes this an excellent outfit to entertain small audiences in the home, club, church, hall, etc. Without any other attachments you can get music, lectures, news items, reports of sporting events, market reports, etc., from any transmitting station within the range of the instrument, which ordinarily is from 50 to 75 miles. However, we wish to make clear the fact that this instrument does not have as broad a range as some of the other types of instruments, such as the Westinghouse R. C. and combination R. A. and D. A. sets, or the Tucka instruments. While we consider that this instrument will work satisfactorily at a range of from 50 to 75 miles and even farther, it must be understood that no definite receiving range can be stated on any radio receiving set—as geographical location, atmospheric conditions, time of the year, the time of day and the power of the transmitting station entirely determine the receiving range. However, if you live nearby a transmitting station you will find this a very complete and satisfactory instrument. The control is so simple that a child can get excellent results.

Technical Description and Specifications:

To operate the Acmefone the three small knobs which control the “tubes” are turned clockwise until the tubes light up. After that all adjusting is done by means of the dial located beneath the loud speaker—opening. This dial is simply rotated back and forth until the message wanted is plainly heard. The volume of sound can be easily controlled so that the music, speech, etc., comes through the speaking horn loud enough to be distinctly heard by every one in the room.

The receiver has a single tuning circuit, with a variable condenser in series with an antenna inductance. This circuit is directly connected to the detector circuit, to which is added two stages of amplification. The best grade tube sockets are used, and the transformers are the Acme make, which are recognized as among the most efficient. The loud speaker is connected to the second stage of amplification and has for its working unit a Baldwin type C amplifying unit directly connected to a sounding horn, which is very carefully worked out to give clear, pure tones. Provision is made to mount the “B” battery inside of the cabinet, so that the external connections are those that lead to the serial, ground and storage battery. Genuine mahogany cabinet 18 by 12 by 12 inches. Solid finish, machine engraved forms panel. Jacks are provided in the detector, first and second amplifier circuits, so that any standard telephone headset can be plugged in either one of the three circuits; and when a receiver is in circuit the loud speaker is automatically disconnected.

The Complete Outfit Includes:

The Acmefone receiver as described, one detector tube, two amplifier tubes, two small size “B” batteries; one 6-volt 40-ampere hour “A” radio storage battery; one high grade 2000-ohm telephone headset with Universal plug, and 6 feet flexible connecting cord. Also a complete antenna equipment consisting of 190 feet of bare copper aerial wire, 36 feet insulated wire for connecting to the ground; a single pole double-throw switch, a lightning arrester, 4 porcelain insulating knobs with screws, 3 aerial wire insulators, 2 screws, 1 porcelain wall tube and a ground clamp.

Shipping weight, 45 pounds.

563 J 626—Complete outfit

$119.50

All merchandise in this catalogue shipped from Northern Illinois
Westinghouse Aeriola Sr. Receiving Set

This receiving set is one of the latest and most advanced developments in the radio field. It is so simple to operate that a child can get good results with it. Its special features enable it to receive messages distinctly from far distant stations as well as any of the more complicated sets of the same type and better than many of them. The special Armstrong circuit used multiplies many times the strength of the incoming signal. These sets used in Chicago during the last winter regularly received the radiophone concerts sent out from Detroit and often picked up Pittsburgh, beside many other nearby stations. It must be understood, however, that no definite receiving range can be given on any radio receiving set, as the local atmospheric conditions, geographical location, season of the year, size of tube and strength of the transmitting station entirely govern the range of a receiving outfit.

The whole complete outfit is so compact and light in weight that it can be easily carried around, and because of its simplicity it can be set up and put in operation in just a few minutes. The tuner, one single dry cell, a small "B" battery, one set of telephone head receivers and an antenna outfit make up the entire set, and the net weight is only 11 pounds.

This is a wonderful little outfit for home entertainment. It can be quickly set up in any room on a table, sideboard, etc. Make the connections and you can tune in to hear the radio programs, music, news items, market reports, stock reports, speeches, etc.

Because of its compactness and light weight you can easily move it about and give entertainments in your church, hall or your neighbor's house. In the summertime when you make auto trips you can take this outfit along. Tie the antenna wires to a couple of trees or from a tree to your car, connect the outfit and you are ready to "listen in." No matter where you may go you can pick something interesting from the air almost any time with this outfit.

SPECIFICATIONS: The tuner is of the single circuit type, the antenna circuit being tuned by a varicorder; taps being entirely eliminated. A special condenser with leads giving two different capacities is provided. One connection gives wave length range of 180 to 300 meters, the other 300 to 500 meters. Regeneration is by means of a combination tickler coil and variometer mounted beside the antenna circuit inductances and connected in the plate circuit. Filament control rheostat gives very fine control of filament circuit. A grid leak and phone stopping condenser are also provided. Binding posts for all connections. Size over all of the containing cabinet, 3 1/2 by 7 by 7 inches.

The complete outfit includes the tuner, as described above; one Aeriola receiver, requiring only one single dry cell for filament circuit; Brandies 1000-ohm telephone headset receivers; one, American 2 1/4 by 6 inch size dry cell; one signal corps size "B" battery; complete antenna equipment, consisting of 150 feet of bare copper aerial wire, 15 feet insulated wire for connecting to the ground, a single pole double-throw switch, a lightning arrester, 4 porcelain insulating knobs with screws, 2 aerial wire insulators, 2 screws, a porcelain wall tube, and a ground clamp.

Shipping weight, 10 pounds.

563 J 502—Complete outfit $69.00

Aerotron Detector Tube

The detector tube supplied with the above outfit will give many months of service if properly used. The operator must be very careful not to apply too much current to the filament circuit. The filament should be lighted only a dull orange red. Lighting beyond this point will burn it out very quickly. The current specifications for this tube are 1 volt filament, 1 1/2 volts plate. These tubes are of course very desirable for use in homemade receiving sets, but we cannot guarantee to fill orders except for those persons who have purchased Aeriola Sr. outfits from us, as the Westinghouse Electric Company are as yet only supplying tubes as replacements for their own outfit.

Shipping weight, 1 pound.

563 J 5198 $7.50

All merchandise in this catalogue shipped from Northern Illinois

Montgomery Ward
DeForest Radiohome Vacuum Tube Receiver

The tuner in this set is a really practical machine, using a vacuum tube detector. The set is high grade in every respect and has an effective range equal to that of many of the high priced outfits. The operation is very simple—after once being set only one adjustment is required. While especially designed for radiophone reception, it will receive radio telegraph signals equally well. The wave length range is 145 to 800 meters. Signals from any of the high power commercial stations working on the longer wave lengths can also be received. For this purpose standard honeycomb coast are mounted in connections provided, and with the proper selection of coils any wave length can be tuned in. The effective receiving range of this instrument is from 75 to 100 miles, and during tests conducted at Chicago the broadcasting station WJR at Detroit was heard regularly and often the Pittsburgh station was brought in clearly. It must be understood, however, that no receiving range can be guaranteed for this or any other radio receiver, as the range depends entirely upon the power of the transmitting station, geographical location, local atmospheric conditions, season of the year and time of the day.

SPECIFICATIONS: The receiving instrument has a single tuning circuit made up of an antenna inductance directly connected with a vacuum tube detector circuit. The antenna inductance is tuned for the incoming wave by means of two sliding contact levers controlled by two knobs on the panel board. Detector filament current is controlled by standard DeForest high grade rheostat. The vacuum tube socket is molded. Burring posts mounted on panel board for all connections. Grid leak and grid condenser in detector circuit. The complete instrument enclosed in a neat walnut finished case, size 7 by 81/2 by 9 inches.

The complete outfit includes: Receiver as described above; a 2000-ohm resistance high grade broadcast A. F. detector tube; one 1 volt, 40-microfarad hour storage battery; one "B" battery; complete antenna equipment, consisting of 150 feet bare copper aerial wire, 25 feet insulated wire for connecting to the ground, a single pole double-throw switch, a lighting arrester, 4 porcelain insulating knobs with screws, 2 aerial wire insulators, 2 screweyes, a porcelain wall tube and a ground clamp.

We recommend this outfit as being thoroughly satisfactory within its range, but of course it does not equal the results obtained when using the higher priced sets, which incorporate a regenerative tuner working in conjunction with a detector two-stage amplifier.

Shipping weight, complete outfit, 35 pounds. Complete instructions included. $62.50

Westinghouse Aeriola Jr.

Everybody Can Receive Wireless Messages With the Aeriola Jr.

The Westinghouse Company produced this outfit so that every American home can have a complete radio receiving set at a low cost. It has an effective receiving range of approximately 10 miles, and if you are located within that distance of a radio transmitting station you can receive messages clearly. It will receive either radio telephone or telegraph, and on radio telegraph its range is considerably more than 10 miles. Under favorable conditions it will receive telegraph messages from stations as far distant as 100 miles, and even more. The complete set can be easily installed, and it is so simple in operation that a child can get results with it. All the essential parts required to make an efficient tuner of this type are included.

Shipping weight, 8 pounds. $27.95

All merchandise in this catalogue shipped from Northern Illinois
De Forest Everyman
Low Priced, Short Range Receiving Set

The name "DeForest" is famous the world over, wherever radio is known. The "Everyman" is a product of the DeForest laboratories and is one of the best instruments of the crystal detector type on the market. It is priced so low that it is possible for every home to have a radio outfit and enjoy the radio programs sent out by any broadcasting station within its range.

The range of this instrument, like all crystal detector type receiving sets, is limited to about 10 miles. That is, if you are within that distance of any transmitting station you can receive the radiophone or radio telegraph messages sent out from that station. It will often happen, however, that you can pick up messages at a much greater distance than ten miles, and sets of this type have received code messages from stations as far as 40 miles distant, and even more. This set consists of a tuning coil controlled by two knobs on the panel, so that the incoming message can be easily tuned by anyone. The current passes from the tuning coil to a crystal detector, which changes the current in such a manner that sounds identical to those given into the transmitter in the transmitting station are reproduced in the receivers. Binding posts are mounted on the panel for all connections. The wavelength range of the set is from 150 to 800 meters, but a special connection is provided by means of which honeycomb coils can be added to the circuit, so that the set will respond to wavelengths up to 20,000 meters, enabling you to listen to the big commercial radio telegraph stations. The instrument is mounted in a handsome walnut finished cabinet, with carrying handle. A space is provided for honeycomb coils and receivers. Cabinet size is 10 by 5 by 7 inches; net weight, about 5 pounds. Shipping weight, 10 pounds. Complete set of instructions supplied.

63 J 655—Price, including a pair of 2000-ohm army type band covers, and a complete antenna outfit.............................$27.95

See page 5 for specifications and description of the antenna outfit.

THE "heart" of these outfits, and the part most mysterious in its action, is the "crystal detector"—from which the outfits are named. By means of this device, with the help of the "tuning coil", the incoming radio waves are changed in such a manner that speech, music, and other sounds, are reproduced in the telephone headsets exactly corresponding to the sounds given into the transmitter of the transmitting station. However, too much must not be expected of crystal detector receiving outfits. They will do what we claim for them, but it should be remembered that they are the original type of radio receivers and cannot nearly equal the wonderful results produced by the more modern equipment, such as a regenerative tuner working in conjunction with a vacuum tube detector and two stage amplifier.

If you want a radio receiving outfit that will produce the best possible results, we recommend the Westinghouse R.C.O. outfit, listed on page 2, or the Enka outfit, shown on page 4. Or if you want a real good set at the lowest possible cost, we recommend the outfit shown on the back cover. Any of these outfits will receive radio messages from far distant stations. Stations entirely beyond the range of a crystal detector receiver such as the one shown on this page.

Marvel Radio Receiving Set

Those people who live within 7 miles of a radio transmitting station of commercial power and wish to make only a limited investment in a radio set will find in this, the "Marvel", a practical outfit that will receive signals so that they can be plainly heard. It will receive radio telephons and radio telegraph equally well and its range of telegraph is somewhat greater than on telephone.

The construction of the outfit is very simple and with the material supplied it can be put into operating condition within a few moments. No batteries and no source of power are needed and there are no parts to break or wear out. The set includes a regenerative tuner, well tapped tuning coil and crystal detector, single telephone headset, with leather covered headband and flexible connecting cord; and complete antenna outfit consisting of 150 feet bare copper serial wire, 50 coil insulators, single pole double throw switch. Code sheet and instruction booklet are also included.

Shipping weight, 6 pounds.

63 J 659—Complete Outfit..............................$15.0

Montgomery Ward

All merchandise in this catalogue shipped from Northern Illinois
Tuska Expert Tuner—Type 220

Wavelength Range, 150 to 800 Meters

(Licensed Under Armstrong Patents)

A complete super-selective tuner, designed especially for those persons desiring the most selective and effective tuning system available. This set is what is known as the three-circuit tuner, and the circuit used is of the regenerative type. All wavelengths from 150 to 500 meters can be covered with maximum efficiency. There are two distinct circuits, one with a range of 150 to 385 meters, the other from 375 to 800 meters. Change from one circuit to the other may be instantly effected by means of the 12-point jack switch, the connections to which are so arranged that there are absolutely no dead end or capacity losses from the long wave inducances. The hook-up is so arranged that taps on the primary of the coupler are avoided, which makes for more satisfactory operation. A lead shield is provided on the back of the panel, so that capacity effects from the hands and body of the operator are entirely eliminated.

Specifications

Antenna condensers, 45 plate, capacity .001 m. f. d., fitted with molded knob and dial, diameter 3/8 inches. Secondary tuning condenser, 13 plate, capacity .000025, fitted with molded knob and dial, diameter 3/8 inches. High grade Tuska molded plate voltmeter for regeneration, fitted with molded knob and dial, diameter 3/4 inches. Coupling control. Long and short wave change jack switch. Satin finished formica panel, size 6 by 17 1/4 inches. Polished nickel finished binding posts with machine engraved markings. Polished mahogany finished cabinet, inside dimensions 6 by 3/4 by 17 1/4 inches. All apparatus is directly mounted onto the panel so that all working parts can be removed from the cabinet in one unit. Shipping weight, 18 pounds.

$75.00

Tuska Standard Receiver

Type 222

Wavelength Range, 150 to 800 Meters

(Licensed Under Armstrong Patents)

This is one of the finest radio instruments on the market. The circuit used is one of the most effective and the materials and workmanship are of the very best. It is a complete receiving set in itself, consisting of a tuner directly connected to a detector tube circuit. It is ready for operation upon the connection of aerial ground batteries, phone and tube. The standard receiver is comprised of an antenna, parallel tuned, secondary tuning condenser, plate voltmeter for regeneration, coupling control, long and short wave switch, grid condenser, rheostat, and tube socket. A type of circuit and controls provided make this instrument very selective; in other words, you can more nearly tune in the station that you desire to hear without interference from other stations. While this set is very selective, it is not difficult to handle, and is recommended to the beginner or semi-experienced operator who desires a high grade complete outfit for radiophone or C. W. and spark code reception.

Specifications

Cabinet—Size inside, 6 by 6 1/2 by 17 1/4 inches. Fine polished mahogany finish. Satin-finished formica panel, size 6 by 17 1/4 inches, with molded engraved markings. Variable condenser, 11 plate, capacity .000025, fitted with one-piece molded knob and dial, diameter 3/8 inches. Small capacity and variable tuning. Antenna inductive with green silk windings on molded tube. Five taps controlled by switch lever. Variometer—High grade Tuska molded type with one-piece knob and dial, diameter 3/8 inches. Loading coils wound with green silk windings on molded tubes. Changes from short to long waves by means of switch lever. Short wave range, 150 to 385 meters. Long wave range, 375 to 800 meters. High grade filament control rheostat, grid condenser, tube socket. All connections by means of nickel finished binding posts plainly marked. All apparatus mounted on the panel, so that when panel is removed from cabinet the entire working parts are removed, permitting easy access to every part. Shipping weight, 18 pounds.

$75.00

The Demand for Radio Apparatus Is Greater Than the Supply

The extremely heavy demand for radio materials is taxing manufacturers of radio apparatus beyond their capacity. Our highly efficient buying organization has been able to keep our stock practically complete, and your orders for our radio goods will be given prompt attention.

All merchandise in this catalogue shipped from Northern Illinois
Short Wave, Long Distance Regenerative Tuner

This instrument makes possible the reception of messages in which other types of apparatus will not respond. The range is from 180 to 600 meters and by the addition of external loaders, such as the inductance coils listed on Page 20, this range may be raised as desired. Properly handled, signals may be read from stations at extreme distances or through heavy static and interference. The antenna and closed circuits are inductively coupled and the induction is variable. Regeneration is obtained by tuning the grid and plate circuits to resonance with the incoming signal. Highest efficiency and amplification are obtained by reducing capacity and resistance in circuits to absolute minimum, and the best regenerative effect is secured by the use of properly designed variometers. These instruments are known as three-circuit tuners. They are not as simple to handle as some other types of tuners, but, properly handled, they give better results than any other type of tuner on short wave reception, such as radiophone broadcasting. Anyone can, with an hour's practice, handle these sets as effectively as an expert.

Specifications

The Inductive Coupler—consists of a primary, the inductance of which is varied by one 7-point switch and a rotating secondary, by means of which arrangement very fine tuning is possible. Two Variometers, with both grid and plate circuits. High grade Dials and Knobs—fitted to variometers and couplers, fine graduated scales in contrasting white enamel. Inductance Switch—smooth working positive contact. Panel-condensate cellon, satin finish, size 7½ by 14 inches. Fine machine engraved. Binding Posts—polished nickel finish. Cabinet—solid walnut polished finish, 5 inches deep. Shipping weight, 10 pounds.

$53.00

Figure 1
This diagram shows the circuit used in the above regenerative tuner. This circuit is generally considered as giving the best results of any of the regenerative circuits. The grid and plate are each tuned and are in one continuous circuit and not affected by the impedances of the receivers, as is the case in some other types of hookups.

Another type of Armstrong Regenerative Circuit. It is viewed from the circuit shown at right in that the receivers are placed in the same circuit with the grid and plate. This type gives effective results, but is not considered to be as good as that shown in Fig. 1.

Figure 2

Tuska Molded Variometer

The stator and rotor forms of this variometer are molded of a special composition which cannot warp or shrink and will retain its shape indefinately. The windings are molded into the stator form and wound upon the rotor form in such a way that they cannot come loose. Because of the materials used, this variometer produces maximum inductance with minimum distributed capacity. A very important point in the design is the clearance spacing between the rotor and stator. Many careful experiments were conducted to determine the proper spacing, with the result that the spacing used gives greatest possible efficiency. A very handsome appearing instrument in polished black finish. Winding post connection. Wavelength range: 180 to 600 meters; 4½ inches square by 1½ inches thick. Shaft threaded 9/32. This variometer mounted on the brackets listed below and used with the special log shank dial with knob, provides the best mechanical and electrical variometer obtainable. Shipping weight, 4 lbs. $6.25

63 J 6310
63 J 6314—Paged mounting brackets. Per pair $0.35
63 J 6315—Long shank dial with knob, 3-inch diameter $0.95
63 J 6316—Long shank 3½-inch diameter dial with knob $1.48

Montgomery Ward

All merchandise in this catalogue shipped from Northern Illinois
Detector and Two-Step Amplifier

This is a very compact, well arranged instrument, neat in appearance and very efficient in results. It can be used in connection with any type of tuner on the market, but most efficient results are obtained on the short wave reception used in conjunction with any first class three-circuit regenerative tuner. It is especially designed to work in conjunction with our regenerative tuner and matches it perfectly in appearance. Has one detector and two audio frequency amplifying circuits. Grid condenser in detector circuit. The amplification transformers used are the most efficient available and produce maximum amplification with any standard amplifier tubes. Standard tube sockets mounted on shelf. Provided with jacks so that either receiver headset or loud speaker can be connected in on any of the three circuits. One plug to fit jacks included. Satin finish bakelite panel; 3½ inches high, 8¼ inches wide. High grade solid mahogany cabinet, polished finish, with hinged top, making interior easily accessible. Binding posts polished nickel finish, plainly marked for all connections. Arranged to use separate "B" battery in detector and amplifier circuits. No tubes, batteries or phones included. Shipping weight, 10 pounds. $35.00

The illustration at the left shows the very simple arrangement of this set. The wiring circuit has been very carefully worked out so that howling, due to induction between wires, is entirely avoided. A mechanically and electrically well designed and well made set.

Variometers

A high grade variometer. The stator and rotor forms are made of kilndried wood and will not warp nor shrink. The winding ratios are properly calculated so that when using two of these variometers in conjunction with the loose coupler quoted at the right, very efficient results are obtained. These instruments, together with the proper binding posts, links, knobs, etc., can be made up into a very efficient set at a low price. Variometers can also be used separately for grid and plate tuning in any radio or audio frequency tuner. Designed for very low dielectric losses and maximum range of inductiveness. Rotor element contacts are made through a flexible cable, soldered firmly onto the rotor shaft and securely connected to the binding posts. Soldly built; ¾-inch shaft. Shipping weight, 4½ pounds. $4.45

Variometer Parts

Consists of a complete set of parts for making a first class variometer. Contains two stator forms, one rotor, and the necessary medicalities, bearings and screws to complete the instrument. No wire is included so that you can arrange the windings to suit your own ideas. A wooden form for the rotor windings is included. Coils are wound on form and then slipped into the rotor. Wood parts made of genuine solid mahogany. Shipping weight, 8½ pounds. $1.90

Vario cougar

A high grade loose coupler, designed especially for use in conjunction with the wood frame variometers, quoted at the left. The secondary is wound on a rotating element turned out of kiln-dried wood. Connectors are made through silver firmly soldered onto the rotor shaft and shaft support. The primary is wound on a bakelite tube and has seven tape windings. Can be connected to switch points and the inductance varied by means of a switch lever. Mounted on a wooden base; ¾-inch diameter shaft. Shipping weight, 2½ pounds. $3.80

Vario coupler Parts

Includes all necessary parts except wire, to make a high grade variocoupler. Secondary is wound on the wooden rotor, primary is wound on a formica tube and can be tapped at any point. Brass shafts, bearings and connecting screws finish ready to assemble. No wire included. Shipping weight, 1 pound. $1.38

It is not difficult to construct radio apparatus. On this and the following pages we show a complete line of radio parts. From the parts shown practically any type of radio apparatus can be constructed. The cost is much less than when the complete set is purchased, and the building up of the parts is very interesting and instructive.
Knocked Down Regenerative Tuner Set

Furnished complete with two variometers, variocoupler, switch lever and contact points, dials, connecting wire, binding posts and panel. The panel is 6 inches high and 17½ inches long. It is drilled with proper size holes correctly located and plainly marked, so that all parts can be easily assembled in the proper relative positions to make a solid high grade instrument.

The variometer and variocoupler are the Tesla mold type and are the best instruments of their kind. The dials are very neat, being molded in one piece with the knobs. Numerous wiring circuits can be used. Figure I shown on Page 10 is generally considered as giving the best results, and when this circuit is used the wavelength range is from 180 to 500 meters. Cabinet not included. Shipping weight, 10 pounds.

Cabinet to take above outfit. Made of solid genuine mahogany, polished piano finish. Inside dimensions: Six inches high, 6¾ inches deep, 17½ inches long. Hinged top. Shipping weight, 8 pounds.

563 J 678 $4.95

How to Make a Regenerative Tuner

Complete instructions with drawings on how to make a regenerative tuner with a range of 140 to 800 meters. The type of tuner described has a .001 MF variable condenser, a tapped inductance and a tickler coil. This type of set, because of simplicity of operation and good reception, is becoming very popular. Easy to build. All parts used are listed in this catalogue. Shipping weight, 4 ounces.

63 J 6340 $0.35

63 J 6340—Tickler coil, 6 turns, 20 gauge wire, 1/4 inch diameter, 1 inch long. Shipping weight, 6 ounces.

63 J 6343—Tickler tube, size 3 inch, diameter, 2 1/2 inch long. Shipping weight, 2 pounds.

63 J 6344—No. 23 green single silk covered wire for above set. Four ounces for...

How to Make Detectors and Amplifier Units

Complete instructions with drawings on how to make detector and amplifier units. These units are very similar in design to the units listed on Page 13. They are arranged so that they can be wired together to make a detector and two or three-stage amplifier. All materials required are listed in this catalogue. Shipping weight, 4 ounces.

63 J 6341 $0.35

160 to 1,000 Meter Armstrong Improved Regenerative Tuner. Using Variable Condensers

Designed for amateur relay stations, being especially efficient on wavelengths from 140 to 400 meters, and giving approximately a regenerative amplification of 100 through the entire wavelength range. Receiver is free from intercircuit effects when receiving O.W. signals. Replaces two-variometer tuner. Shipping weight, 4 pounds.

63 J 6332—Per set of four blueprints...

150 to 3,000 Meter Armstrong Single Circuit Regenerative Tuner

This design has three distinct advantages over any single circuit receiver now made. First: The ratio of inductance to capacity is variable and can be adjusted for maximum results. Second: Varimeters which are inefficient at their lower wavelength ranges are eliminated. Third: Combined inductive regeneration and tuned plate circuit employed for maximum regenerative amplification. Shipping weight, 2 pounds.

63 J 6334—Per set of two blueprints...

Blueprints of Receiving Sets

These blueprints show in detail how to construct various types of receiving instruments. They give complete complete construction details and all parts required and wiring diagrams of detectors and receivers in efficient operation over the entire wavelength range. This uniform efficiency is obtained by using a specially designed switch which permits the proper adjustment of the capacity inductance ratio for maximum grid vol, and eliminates losses in unused portions of the inductances. Regenerative is provided inductively on the lower wavelengths and conductively on longer wavelengths. Shipping weight, 3 pounds.

63 J 6330—Per set of three blueprints...

150 to 25,000 Meter Armstrong Regenerative Tuner

Designed for the experimenter who desires to cover the entire range of wavelengths now used by all classes of stations and still secure maximum efficiency over the entire wavelength range. This uniform efficiency is obtained by using a specially designed switch which permits the proper adjustment of the capacity inductance ratio for maximum grid voltage and eliminates losses in unused portions of the inductances. Regenerative is provided inductively on the lower wavelengths and conductively on longer wavelengths. Shipping weight, 3 pounds.

63 J 6332—Per set of four blueprints...

Detector and Three-Stage Audio Frequency Amplifier

Designed especially for use with the below 100 to 850 and 150 to 3,000 meter Armstrong Regenerative Tuners. This set may be used with any Armstrong Regenerative Tuner. It has many advantageous features. Provision is made to use a soft tube potential meter "B" battery adjustment. Plate tuning circuit, filament adjustment, microphone connection, and provision for operating the entire set through a single switch. This switch also automatically controls the filament circuits. The new Radio Corporation Amplifiers are used and insure maximum results. Shipping weight, 4 pounds.

63 J 6333—Per set of four blueprints...

160 to 850 Meter Armstrong Super-Autodyne Receiver

This receiver, the very latest development in short wave reception, is used extensively by commercial radio stations to handle ship's traffic. Used in connection with a single indoor loop antenna, it is possible to eliminate at least one-half of the total interference through the directive qualities of the loop. An additional advantage when using loop antennas is that maximum received energy is obtained from the desired station, and this is particularly true of the directive feature of the loop. With this circuit it is possible to use resistance coupled amplifiers in the first grid stage and finally two stages of audio frequency amplification.

In laboratory tests this circuit has been used with Armstrong stations 5000 miles away, and have heard, not only loud enough to read but readable in ten feet from the phones. On 6500 miles it is not unusual to hear a 2 K.W. ship station 1500 to 2000 miles distant. Shipping weight, 4 pounds.

63 J 6335—Per set of four blueprints...

20 to 850 Meter Armstrong Super-Autodyne Receiver

This receiver, the very latest development in short wave reception, is used extensively by commercial radio stations to handle ship's traffic. Used in connection with a single indoor loop antenna, it is possible to eliminate at least one-half of the total interference through the directive qualities of the loop. An additional advantage when using loop antennas is that maximum received energy is obtained from the desired station, and this is particularly true of the directive feature of the loop. With this circuit it is possible to use resistance coupled amplifiers in the first grid stage and finally two stages of audio frequency amplification.

In laboratory tests this circuit has been used with Armstrong stations 5000 miles away, and have heard, not only loud enough to read but readable in ten feet from the phones. On 6500 miles it is not unusual to hear a 2 K.W. ship station 1500 to 2000 miles distant. Shipping weight, 4 pounds.

63 J 6336—Per set of four blueprints...

Detector and Two-Stage Amplifier for Tuner 63 J 6336

The mechanical arrangement of this instrument is symmetrical to that of the above receiver and the electrical constants selected for best mutual response. Changes from detector to other stage of amplification is obtained through plug and pulls. Provision is made to use a "soft" condenser to any single circuit receiver tube, but only using one "A" and one "B" battery and the "A" battery potential applied to the detector tube is variable. Shipping weight, 2 pounds.

63 J 6338—Per set of three blueprints...

All merchandise in this catalogue shipped from Northern Illinois.
Paragon Detector Two-Stage Amplifier, Type DA2

We have selected this as being the highest grade instrument of its kind on the market. A most efficient hookup is used and the parts and workmanship are of the very best. Overall amplification with this amplifier is at a maximum. It is free from howling and tube noises. May be used in conjunction with any tuner on the market and built ready for direct connection with regenerative tuners. Grained finish formsica panel, size 61/2 by 101/4 inches. Perfect machine engraved lettering, white filled. All metal parts polished nickel finish. Case is of heavy quarter sawed oak in a fine dull, dark rubber finish. Top is hinged, allowing quick, easy access to the interior. Filament circuit of detector tube is provided with both controlling rheostat and a 390-ohm potentiometer, which permits very fine adjustment necessary in the modern critical tubes. Detector circuit is also provided with an adjustable grid leak. Rheostats and potentiometers are all controlled by dial indicators, which are supported in operation and appearance to the usual uninsulated knobs. Each circuit may be separately connected to the receiver, headset or loud speaker. A special stage controlling switch progressively light filament and transfers telephone connections. No jacks or plugs are used. The amplifying transformers used are the best available. All connections are made with heavy wire, neatly arranged and enclosed in insulating tubing. No tubes, batteries or phones included.

Detector Panel in Cabinet

This unit is so arranged that any type of detector circuit can be used. Satin finish condensate center panel, fuse finish cold adjusted top. Switching points for all connections. High grade filament control rheostat. Molded in standard tube socket to take any standard tube. Grid condenser in grid circuit. Shipping weight, 2 pounds. 63 J 6354. $7.95

Amplifier Unit in Cabinet

This instrument is arranged to work in conjunction with the above detector unit in cabinet. Binding posts provided for switching connections between detector and amplifier. High-grade filament control rheostat. Molded tube socket to take any standard tube. Very efficient amplifying transformer. Satin finish condensate center panel. Oak cabinet, finely finished. Produces results equal to the highest grade amplifier unit. Shipping weight, 4 pounds. 63 J 6356. $12.15

Detector Unit

This is a very efficient detector unit. Satin finish condensate, center panel, molded on wooden base, size 31/2 by 6 inches. Binding posts with insulating knobs for all connections. High grade filament control rheostat. Molded tube socket to take any standard tube. Grid leak condenser in grid circuit. The wiring is arranged so that any type of vacuum tube circuit can be used. Shipping weight, 2 pounds. 63 J 6380. $5.50

Build Your Own Radio Receiving and Transmitting Set

While we have endeavored to show in this catalogue many of the most popular types of receiving sets, there are, however, a great many of our customers who with very little study could build their own radio sets and we have, therefore, selected for them a complete line of parts for this purpose.

For a great many years even small boys have successfully operated a small circuit and transmit over long distances with the apparatus they have made.

Radio is an extremely fascinating subject to study and the more you study it the more fascinating it will become. We suggest that you order a few of the simple books described on Page 35. A study of these books will show you just how simple it is for you to build any part of a radio receiver or transmitter.

You will find in this catalogue a very complete list of parts which will enable you to build a set at low in price, or of a high a grade as you could possibly ask for. All these parts have been carefully selected by our own radio engineers, so that we know they are as near mechanically perfect as possible.

You will find instructions in our radio books that you can start with a very inexpensive set and get satisfactory results. Additions can be made to your original outfit and you can add to it so that you can finally have an extremely sensitive, high power set that will amaze everybody once they consider that you have made it yourself.
Attach a MAGNAVOX Loud Speaker

To Your Radio Receiving Set

Entertain your family and friends with radio concerts. Reproduce radio music, speeches, sermons, in any volume of sound you want and with a purity of tone that makes you think you are listening to the actual original instead of being miles away.

Simply substitute the Magnavox for the headset and an audience of one or a hundred may hear perfectly. The Magnavox equipment enables everything received by radio to be swelled to a volume of sound required for near concert without losing even the most delicate tone modulations or a single bit of the original clearness and distinctness. It makes a radio set practical for home entertainment, concerts and dances. In addition many business uses readily suggest themselves.

Easy to operate. Connections are simple and there are no adjustments to make. Best results are obtained with a set using one or two stages of amplification. No special circuits are required. Simply connect in place of phones and attach six volt current on horn circuit. Plate voltage on amplifier can be from 50 up to 300 volts, and 90 volts has been found to be a good average voltage. The higher the voltage, the louder the sound. Horn diameter, 14 inches. Black enamel finish. Shipping weight, 17 pounds. $45.00

Westinghouse Vocarola

Usually several people want to listen in on the radio set at one time. This instrument makes it unnecessary to have a separate headset for each person as it reproduces radio messages loud enough so that they usually can be distinctly heard for a distance of 15 or 20 feet or more. Consists of a metal amplifying horn to which is adapted a very sensitive loud reproducer. Produces pure, clear tones without metallic sound. Gives excellent results with any receiving set having one or two stages of amplification. Very compact. Furnished with six feet of hanging cord and plug to connect to amplifier jacks. Can be laid on table or hung on wall. No battery currents of any kind required. Shipping weight, 3 pounds. $30.00

Firth Vocaloud

Radio stations equipped with a Vocaloud in conjunction with suitable receiving apparatus, will reproduce radio telegraph and radiophone signals capable of being heard in many cases as much as 100 feet from the instrument. Best results are obtained when connected to sets having one or two stages of amplification. Consists of a Baldwin amplifying reproducer connected to a sound chamber of special design, which absorbs the sound to greatest volume without distortion. Produces rich, clear tones. Working parts are contained in a cabinet of solid mahogany with an extra high grade, polished finish. Shipping weight, 8 pounds. $63 J 692

Arkay Loud Speaker Radio Horn

With this horn you can make your own loud speaker by simply inserting one of the phones from your headset in the base. It is so designed as to reproduce signals, speeches and broadcasting music without distortion, giving a pure and natural tone. Carefully constructed of brass throughout. Black enameled finish. Any make of radio receiver can be used. Best results are obtained with receivers of a Baldwin type C amplifying type with two stages of amplification, although one stage often produces sounds of sufficient volume. Shipping weight, 4 pounds. $5.00

Rhamstine Adapt-O-Phone

This device may be used with your regular headset. Clamp both receivers to the base of the horn. The sounds from the two receivers enter the manifold and are amplified so that they emerge clear and loud from the horn. Gives very satisfactory results and a surprisingly large volume of sound. Satisfactory results can be obtained on either one or two stages of amplification. Height, 20 inches. Shipping weight, 4 pounds. $12.00

Vocarola Phonograph Attachment

This is a loud toned reproducer fitted with an attachment that permits it to be placed on a phonograph, in place of the regular reproducer. The phonograph sound chamber is utilized as the amplifying horn. Connects with the first or second stage of amplification on any good receiving set, radio messages can be intensified to a volume of sound about equal to that ordinarily given off by a phonograph. Shipping weight, 1 pound. $15.00

Baldwin Loud Speaker Unit

This device consists of a Baldwin type C amplifying type reproducer to which is fitted an adapter which may be inserted in the base of any sound amplifying chamber. With it you may make your own loud speaker; and with a properly designed sound chamber the result produced will be very satisfactory. This same unit constitutes the working part of many of the high grade loud speakers offered for sale today. Shipping weight, 1 pound. $36.00

Federal Pielophone Loud Speaker (Improved Model)

This is a complete loud speaking instrument and is offered at a very reasonable price. When used with two stages of amplification it will give sufficient sound intensity so that it may be distinctly heard for a distance of 15 feet or more. Consists of a speaker wound high resistance receiver mounted in the base to which is connected a heavy amplifying horn. Finished in black enamel. Worked with six feet of green silk connection cord. Base diameter, 5 inches. Height, 12% inches. Bowl diameter, 3% inches. Shipping weight, 4 pounds. $14.00

All merchandise in this catalogue shipped from Northern Illinois

Montgomery Ward
Our Special Head Phone Set

High Grade Supersensitive Radio Receivers

A high grade set of head phones offered at a very reasonable price. They are equal in sensitiveness and results to many phones selling at much higher prices. Light in weight and of substantial, durable construction. Every detail has been carefully worked out and only the best materials are used. The workmanship is the best, resulting in a neat appearing, fancy finished article. Army-Navy headband and transmitter are properly shaped to give most comfort. Covered with heavy webbing. Adjustment to fit to head is quick, simple and secure. No chance to pull the hair. Black polished, molded receiver cases. Six-foot connecting cord with enclosed terminals. Equally suitable for use on the highest grade sets or the inexpensive crystal sets.

We guarantee these sets to satisfy you. If they do not, return them and we will gladly refund the purchase price together with transportation charges. Shipping weight, 1½ pounds.

\[63 \text J 5160 \] — 2000 ohms total resistance. Per set. \$4.80

\[63 \text J 5161 \] — 3000 ohms total resistance. Per set. \$5.75

Brandes Matched Tone Headsets

These receivers have established themselves as being the best at the price on the market and equal to many selling higher prices. They are used throughout the world and are famous for their excellent workmanship, durability and extreme sensitiveness. The receivers of each set are very carefully selected, so that the tone values of the two receivers of each pair are exactly the same, resulting in the messages being heard much more distinctly. Improved style. Comfortable, easily adjusted. Army-Navy headband covered with webbing. Will not catch the hair. Fitted with 6-foot polaroid indicating connecting cord. Shipping weight, 1½ pounds.

\[63 \text J 5380 \] — Superior type; total resistance, 5000 ohms. Net weight, 14 ounces. \$7.60

Baldwin Amplifying Headsets

Type "C"

These are probably the most famous radio receivers. They are of entirely different construction than any other on the market. They are fitted with special mica diaphragms which are actuated by a very thin, light armature which is super-sensitive to the slightest variations of current passing through the electromagnets. This special type of construction enables signals to be heard which are not audible in the ordinary headset. Their high efficiency has caused them to be used by the U. S. Bureau of Standards, by the U. S. Navy and War Department, by many foreign governments and by various private operators all over the world. The shell containing the mechanism is of molded bakelite. Comfortable web covered headband with fine quick adjustment. Six-foot connecting cord fitted with universal plug to connect to any radio jack. Ship. weight, 2 pounds. \$12.00

\[63 \text J 5164 \] — Receiving Cord

Made of heavy mercerized cotton, six feet long. For use with any standard double receiver. Ship. weight, 3 ounces. \$7.00

Single Receiver Headset

A high grade, single receiver mounted on a leather covered spring headband. Resistance, 1000 ohms. These receivers are especially designed for radio use and are just the type where a low priced sensitive receiver is desired for use in connection with the inexpensive crystal receivers. Connected with connecting cord. Shipping weight, 1½ pounds. \$2.69

\[63 \text J 5383 \]

Western Electric Headsets

These receiver units are the most efficient commercial type on the market, being electrically the same as the Western Electric receivers recognized as standard de luxe by both the Military and Navy during the war. Their high efficiency is obtained by the scientific design of the standard receiver and winding. The magnets are of high grade magnetic steel. The coils are wound with Western Electric black enamelled copper wire, and the utmost care and precision in manufacture is observed. Case is of aluminum with molded bakelite finish.

The D. C. resistance of each unit is 1200 ohms. The headband is covered with heavy textile webbing, and may be adjusted to any desired position. The cord is high grade with black mercerized cotton covering, equipped with concealed tabs on the receiver end for universal jack plug on the apparatus end. Shipping weight, 1½ pounds. \$11.75

Brown Adjustable Phones

The Brown headset is known to be one of the most sensitive made. It is adjustable to any pitch or frequency by turning the adjustment screw on the back of the shell. This feature enables the operator to adjust both earpieces to the same tone, which results in the signals being more plainly heard. As it is desirable that the correct polarity may be maintained, the terminals of each earpiece and cord tips are marked. A very special feature of this set is the light weight, the weight of the complete set being only nine ounces, which is several ounces lighter than any other make on the market. The lightness in weight, combined with the comfort of the head frame and ability of the operator to wear them for hours without fatigue. Shipping weight, 1½ pounds. \$18.00

Receiving Condenser

Special type receiving condenser. The foil and insulation are wrapped around a fiber sheet. Connections are made by means of rivets in the ends of the condenser. Very compact. Equal to any other condenser. Capacity, .002 m. f. d. Ship. weight, 2 ounces. \$29.00

Fixed Receiving Condensers

A necessity on any receiving set. Used as "stopping" condensers or for shunting across telephones. Molded composition. Nickel-plated binding posts. Shipping weight, 8 ounces. \$8.06

Montgomery Ward & Co.

All merchandise in this catalogue shipped from Northern Illinois

15
Detector and Amplifier Vacuum Tubes

Vacuum Tube Detector Radiotron U. V. 200

Detector tubes are replacing the old style of crystal detectors and enable reception of messages which the crystal detector will not respond. This tube is made especially for amateur and experimental use. It incorporates all of the latest developments of vacuum tube manufacturing. Equally suitable for radiophone and telephone signals. These tubes are of the "soft" type and while especially designed as detectors, they will also give excellent results as audio-frequency amplifiers. They are remarkably free from tube noises and "singing." Fitted with standard 4-prong mounting to fit any standard tube socket. Operating plate voltage of 10V to 22V volts, filament voltage 5 to 40 volts. For best results we recommend a tapped "B" battery be used in the plate circuit to enable a voltage potential best suited to the individual tube, to be applied to the plate. We also recommend that a potentiometer be used in the filament circuit as a millimeter adjustment of the filament current is often necessary to get the best results.

A. P. Detector Tube (Electron Relay)

This detector tube has distinctive characteristics, because of which many persons prefer it. It is extremely critical in adjustment and therefore very sensitive to radiofrequency and telegraph signals when compared. Its' battery potential requirements vary from 18 to 20 volts, which means that a tapped "B" battery must be used. It has a copper grid and aluminum plate as in the old style vacuum tube valve. Fitted with standard size 4-prong base. Shipping weight, 1 pound.

Vacuum Tube Amplifier Oscillator Radiotron UV 201

Amplifying tubes, working in conjunction with amplification transformers, are used to increase the sensitivity of signals passed through the detector tube. One, two or three tubes and transformers can be used in a group, although the use of more than one will not improve the results. These tubes are of the high vacuum type and require no critical adjustment. They are very uniform and free from tube noises. Besides audio frequency amplification, these tubes can also be used as a detector and radio frequency amplifiers. The normal plate voltage is approximately 40 volts, although increasing amplification can be obtained at plate voltages ranging up to 100 volts. Fitted with standard 4-prong base. Shipping weight, 1 pound.

Graphite Potentiometer

Used for regulating filament current of detector tubes. Resistance can be varied accurately and readily. The graphite, molded in place, is of high purity and of the very best quality. Fitted with standard size 4-prong base. Shipping weight, 3 ounces.

Paragon Potentiometer

A potentiometer completely mounted and fitted with controlling lever and adjustment knob. Suitable for either panel or table mounting. Base, 21/2 inches in diameter. Base height, 31/2 inches. Molded of condensate. Adjustable to panel of any thickness, 1/8 inch to 1/2 inch. Permits very close adjustment of plate circuit current. Resistance 300 ohms. Shipping weight, 5 ounces.

Fixed Grid Condenser

The conductors are stamped from sheet copper and are very nearly pure graphite, molded into their respective forms of vacuum tube. Approximate capacity, .00025 mfd. which is the correct value for the new type detector tubes. Shipping weight, 2 ounces.

Variable Grid Leak

A grid leak is necessary in the operation of vacuum tube detectors and some forms of amplifiers to permit the negative charge on the grid to discharge. A variable grid leak is most desirable. The base of this grid leak is mounted from condensate and a penannular-type contact stud is included which provides the variable resistance or leak. The metal cap is brass, finished in black. Two studs are provided with washers and nuts for ship weight, 3 ounces.

Variable Grid Leak

A variable grid leak with six fixed values, varying in half megohm steps from 15 to 3 megohms. They are mounted on bakelite strips. Each step of resistance has a wire lead which can be attached to a switch point, thereby enabling the resistance to be conveniently varied by means of a switch lever. Shipping weight, 3 ounces.

Receiving Grid Leak

Different detection and amplification circuits require leaks of different values. These cartridge forms of grid leaks are supplied in resistance to meet the requirements of all circuits ordinarily used. The resistance values are fixed and the ratings are set for use in series or multiple. Various resistance can be obtained by means of grid leaks wired in series or multiple. Shipping weight, 2 ounces.

Grid Leak Mountings

Consists of two spring clips with screw connections mounted on a bakelite base. Grid leak cartridges can be readily inserted. Shipping weight, 2 ounces.

Special Grid Condenser

A well-made, rugged condenser made of foil, insulated by paraffine paper and wrapped on a fiber base. Eyelots at each end of base for easy connection. Shipping weight, 3 ounces.

Mounted Grid Leak Condenser

Pencil type grid leak condenser mounted between the two sheets of bakelite. Connections made through insulating binding posts. Can be fastened to panel or table. Shipping weight, 3 ounces. 58

All merchandise in this catalogue shipped from Northern Illinois Montgomery Ward
**Panel Mounting Rheostat**

Used to regulate filament current to detector or amplifier tube. Simple, small size, opens when key is turned. Capacity, 1½ amperes. Resistance, 6 ohms. Mounts on panel up to ¾ inch thick. Tape diameter, 2½ inches. Screws, 3/8 inch. 63 J 6401...

**Positive Circuit Panel Mounting Rheostat**

This rheostat insures a positive, even contact at all times. Construction is through two microswitch coils and slider conductor bearing directly on the coil, not dependent on friction bearings. Construction permits maximum current and overall diameter being only ⅛ inches. Baked base and knob. Resistance, 6 ohms. Capacity, 1½ amperes. Adjustable to panel up to ¼ inch. Shipping weight, 6 ounces. 63 J 6405...

**Graphite Disc Varnish Rheostat**

This style construction, made to conform to the standard size, permits maximum current and overall diameter being ⅛ inch. Baked base and knob. Resistance, 6 ohms. Capacity, 1½ amperes. Adjustable to panel up to ¼ inch. Shipping weight, 6 ounces. 63 J 6406...

**Klossner Varnish Rheostat**

A rheostat that permits of finest varnished control at any degree of resistance of a single control. This is necessary for best results with the modern critical tubes. A special feature is the cutoff switch arrangement which permits current to be cut on or off by a slight push in or out of the controlling knob, without disturbing the adjustment on the rheostat itself. Molded bakelite knob. Resistance, 12 ohms. Capacity, 3 amperes. Shipping weight, 4 ounces. 63 J 6407...

**Porcelain Base Rheostat**


**Molded V.T. Socket**

Made of molded condensate. Takes all standard base tubes. Strong and durable. Positive contact. Marked connections. For base mounting only. Base size, 2⅛ by ⅜ by ⅛ inches. 63 J 6415...

**Combination V.T. Socket**

Can be mounted directly on panel or fastened to base. Durable, rugged connections. Any connections plainly marked. Molded condensate base. Shipping weight, 6 ounces. 63 J 6417...

**Porcelain V.T. Socket**

Made entirely of geared porcelain. High dielectric strength. So rugged as to be practically indestructible. Positive contact. Easily mounted on panel or base. For amplifier, detector or power tubes. Shipping weight, 5½ ounces. 63 J 6419...

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**Audio Frequency Amplifying Transformer—Radio Corp. Model 712**

This transformer was designed especially to work with UV-200 and UV-201 tubes. Its characteristics and performance have been amplified with less disturbance and losses and all stages are protected by shorting out condenser and steel cover. Terminal posts are plated nickel and are well finished. Length 3⅛ inches. Height, 2⅛ inches. Base, 2 by 1⅛ inches. Winding ratio, 9 to 1. Shipping weight, 1½ pounds. 63 J 6425...

**All American Amplifying Transformers**

Designed with the maximum and internal resistance permitted to the requirements of Radio Corp. UV-200 and UV-201 tubes. Winding ratio of 16 to 1. Specially constructed to produce maximum amplification without distortion or hollowness. These transformers have been very satisfactorily tested so that they are standard equipment with many manufacturers of the higher grade instruments. Shipping weight, 1 pound. 63 J 6426...

**Thordarson Amplifying Transformer**

A transformer that permits of finest varnished control at any degree of resistance of a single control. Molded bakelite knob. Resistance, 12 ohms. Capacity, 3 amperes. Shipping weight, 4 ounces. 63 J 6427...

**National Amplifying Transformer**

Designed especially for use with Radio Corp. UV-200 and Cunningham C-501 tubes. Windings are wound on 3½ to 1. Primary and secondary windings are wound to give best efficiency and low distribution. Holiness is practically eliminated with binding post connections conveniently arranged. Shipping weight, 1 pound. 63 J 6428...

**Federal Amplifying Transformer**

The original amplification transformer. Its correct design and careful workmanship insures the best of results in any type of amplification circuit. It is especially compact. Winding ratio, 3 to 1. Audibility amplification is claimed to be 40 times on first step and 400 times on second step. Fully protected. Shipping weight, 1 pound. 63 J 6429...

**Radio Frequency Amplifying Transformer**

The development of Radio Frequency Amplification will be the next great step forward in the progress of radio. The transformer used will determine very largely the success obtained with all radio frequency hookups. The transformer we are here offering is the result of a long series of experiments conducted by very careful, thorough engineers. It is of the air core type, wound on a molded bakelite bobbin, the windings being wound in two sections. This transformer will give very satisfactory results on a wave length band from 150 to 500 meters. During tests conducted in Chicago using a hookup, utilizing one step of radio frequency amplification, a detector and two stages of audio frequency amplification, Amateur C.W. note stations could be heard with an ordinary wire antenna. We do not claim such results under all conditions, but have found this to be an example of what has been done, using this transformer in circuit with other standard apparatus. Also very low range of reception are obtainable with indoor antenna, which is ideal for outdoor use. Fully protected with conventional connections and with supports for mounting, shipping weight, 1 pound. 63 J 6639...

**Coto Coll Radio Frequency Amplifying Transformer**

Radio frequency amplification hookups are in vogue—those using Inductance transformers and those using amplifiers on the tapped-impedance type. The latter type is easier to be the best transformer. Please contact easily mounted on panel or base for amplifier, detector or power tubes. Shipping weight, 5½ ounces. 63 J 6409...

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**Montgomery Ward & Co.**

All merchandise in this catalogue shipped from Northern Illinois
Improved Model $17.50

Two-Slide Radio

Tuning Coil

Machine spaced enameled copper wire windings on non-shrinkable tube. Windings cannot come loose. Control is by means of two smooth working sliders. Mahogany finished end pieces. Range up to 1,000 meters on average antenna. Length, 8½ inches. Shipping weight, 4 pounds.

$3.25

Cardboard Tubes

These tubes are used for making tuning coils, loading coils, etc. They are made of specially prepared pulp and are treated so that they will hold their shape permanently. Shipping weight, each, 1 pound.

$18

See Page 22 for Magnet Wire

Slider Rods

Used for building up tuning coils. Made of solid brass, smooth polished finish. Size, A by ½ by 3½ inches long. The right length when using 63 J 6530 tube for the primary. Ship wt., 6 oz.

$15

Loose Coupler Slide Contact

63 J 6532—Slider for A-inch rod. Stiff spring insures positive contact when slide is moved either forward or back. Shipping weight, 3 ounces.

$21

Weatherproof Detector

Very rugged. Perfect, easy adjustment. Phosphor bronze contact spring can be set and adjusted in any position. A piece of tested galena set in wood is mounted inside dust and moistureproof enclosed glass cylinder. All metal parts nickel plated and polished. A very attractive and efficient piece of apparatus. Formica base, 2 by ½ by 3½ inches. Shipping weight, 1 pound.

$21.90

Wizard Detector Stand

This detector is a wonderful value for the money. Carefully made of highest grade materials. Uses any detector mineral. Adjustment can be made to any position. Sheet formica base, size 1½ by 2½ inches. Metal parts brass, nickel finish. Shipping weight, 4 ounces.

$89

All merchandise in this catalogue shipped from Northern Illinois
Variable Condensers

Variable condensers are very extensively used in different types of radio circuits. Every receiving station can make good use of one or two variable condensers, one of .0005 capacity and one of .001 capacity. Even with sets designed to be used without variable condensers better results are often obtained when one is placed in the antenna or closed circuit to balance the set.

Crosey Variable Condenser

This condenser works on an entirely new principle. Has two plates which are hinged and are opened and closed like a book, by means of a special cam arrangement. The plates are surfaced with gold. One copper sheet is covered with mica, so that when the two plates are clamped tightly together maximum capacity is obtained. Rated at .0005 mfd., but maximum capacity will average .0008. Excellent for receiving circuits and will withstand 1000 volts, making it usable for C.W. transmission. Especially adapted to panel mounting. Shipping weight, 1/2 pounds. $1.25

Murdock Variable Condensers

Murdock condensers have been on the market for many years. They have proven to be satisfactory on receiving circuits under many varying conditions. Both stationary and rotary plates are die-cast mounted, so that the spacing between the plates is absolutely uniform and accurate.

Enclosed Type


63 J 5177—Murdock No. 368. Diameter of plates and 11 rotary plates. Capacity, .006 mfd. Shipping weight, 1 3/4 pounds. $3.78

Panel Type

63 J 5179—Murdock No. 361. Has 23 plates, .0006 mfd. capacity. Ruggedly assembled for panel mounting. Complete with mounting screws, knop, pointer, engraved 180° scale and anti-slip handle. Has 3/4-inch die-cast shaft. $3.88

63 J 5181—Murdock No. 361. Same as above, except 42 plate size. Capacity, .001 mfd. Requires space 3 3/4 inches wide, 2 1/2 inches deep for mounting, 3 1/2 pounds. $4.10

Test Buzzers

Watch case buzzer. Operates on one dry cell. Nickel plated cover and base. One inch high; 3/4 inches diameter. Shipping weight, .05 ounces. $0.85

Century Buzzer

Used by the Army and Navy and commercial wireless stations. For adjusting crystal detector. Operates on one or two dry cells. Base is hard rubber with black enameled brass cover. Two thumbcrews provide for adjustment of the armature to regulate the tone to desired pitch. Genuine platinum contacts. Diameter of base, 2 inches. Ship. wt., 6 ounces. $1.65

Test Buzzer Push-Button

For use with test buzzer. Nickel rim with pearl center. Held firmly in 3/8-inch hole by small spring clips. Shipping weight, 4 ounces. 25c

Standard Galena Detector

Improved Model

A popular detector. 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 knob. Diameter 3 by 3 inches. Shipping weight, 1/2 pounds. $1.43

Variable Condenser

Table Mounting Type With Glass Case

A high grade variable condenser properly designed and carefully made. Both stationary and rotary plates stumped from sheet aluminum. Accurately machined spacers insure perfect centering of plate. Contact plates are formed with engraved scale. Regulating dial and pointer. Glass case protects mechanism. Shipping weight, 3 pounds. $3.95

63 J 6480—21-plate size. Capacity, .0005 mfd. $4.95

63 J 6481—43-plate size. Capacity, .001 mfd. $6.95

Variable Condenser

Panel Mounting Type

This is the same high grade condenser shown above. Can be mounted on any panel up to 3 1/2 inch in thickness. Composite, easily mounted. Shipping weight, 2 pounds.

63 J 6484—11-plate size. Capacity, .002 mfd. $2.95

63 J 6485—21-plate size. Capacity, .006 mfd. $3.40

63 J 6486—42-plate sizes. Capacity, .001 mfd. $4.30

Coto Variable Air Condenser

Panel Mounting Type

After looking over the market carefully, we do not hesitate in saying that these are the highest grade of condensers to be had today. Their mechanical construction is a step ahead of any other make and the glass and materials used are such that the greatest electrical efficiency is obtained. They are suitable for use in C.W. transmitting circuits as well as for reception purposes. Mechanically durable. Solid base aluminum bearing support. Bearing and shaft automatically taken up. Will stay put in any position. As many plates can be removed, capacity condenser is desired. Positive as necessary if a smaller electrical connections. Shipping weight, 2 pounds.

63 J 6493—Capacity, .001 mfd. $5.40

63 J 6490—23-plate size. Capacity, .0007 mfd. $5.40

63 J 6491—35-plate size. Capacity, .001 mfd. $6.00

Chelsea Variable Air Condensers

Mounted in Case

These variable air condensers are excellent examples of modern methods of mechanical and electrical construction. The two sets of plates, the stationary and movable, are each die-cast into one piece. Each plate is independently sandblasted for rate and spacing and alignment. The end plates are of genuine molded bakelite. Shaft is milled and separate. Includes a stainless steel bearing, insure efficient operation even for the most prolonged use. Labeled with hundreds. Has adjustable friction bearing, so that movable plate will remain in any position set. Shipping weights, 2 and 3 pounds.

63 J 6497—Capacity, .0005 mfd. $4.50

63 J 6498—Capacity, .001 mfd. $5.00

63 J 6499—Capacity, .002 mfd. $6.00

63 J 6500—Capacity, .003 mfd. $6.50

Chelsea Variable Air Condenser

Panel Mounting Style

These variable air condensers embody the same high grade features as those listed above but are suitable for mounting on any panel up to 3 1/2 inch thick. They are fitted with a counter-weight which is placed on the rotating shaft and exactly balances the rotating plate, so that the condenser will remain at any point it is placed. Shipping weights, 2 and 3 pounds. $3.95

63 J 6518—Capacity, .002 mfd. $2.15

63 J 6519—Capacity, .003 mfd. $2.35

Knocked Down Variable Condensers

A complete set of parts, furnished unassembled. Can be readily put together, and when assembled make a first class condenser. Intended for panel mounting. Complete with scales, pointer and knob. For 24 trips, top base, 3 1/4 lbs. 3 1/2 lbs. $1.95

63 J 5184—Capacity, .00025 mfd., 11 plates. $2.35

63 J 5185—Capacity, .0006 mfd., 21 plates. $2.15

63 J 5186—Capacity, .001 mfd., 41 plates. $3.15

Montgomery Ward & Co. All merchandise in this catalogue shipped from Northern Illinois 19
Honeycomb Inductance Coils

Honeycomb coils are used as receiving inductances, aerials, etc. Because of their compactness and wide range of adaptability and low price, every amateur should have a complete set. With them any style of straight, regenerative or radio frequency hookup may be made, and results obtained are superior because of the efficiency of the coils and the concentration of the inductances.

These coils are compact, and permit of easy manipulation. They cover the entire range of wavelengths without the dead-end losses that exist when a tapped coil is used, and have low frequency resistance and distributed capacity losses.

The construction of the coil is such that successive turns of conductor are wound on an angle to prevent the turns from touching, and a cellular structure, from which it derives its name. These cells and the angular disposition of the turns reduce the losses in the coil to a marked degree. With the proper number of turns, the entire range of wavelengths used in radio, by means of the tuning plugs and bracket listed below, these coils can be very conveniently attached to a panel or other support. The leads and brackets are of two types, the fixed and the universal. The fixed is used where the coil is stationary, and the universal where it is desirable to rotate the coil for changing the degree of coupling, as shown in the diagram. A number of turns and spread between primary and secondary coils, etc., are given, which allows a great variety of arrangement for the secondary. For instance, the secondary induction may be split up and a smaller coil used for coupling, and the secondaries laid by another coil to the proper value. The flexibility of these fixtures may be readily appreciated.

Characteristics and Prices, Honeycomb Wound Inductances

<table>
<thead>
<tr>
<th>Article</th>
<th>Unmounted Coils</th>
<th>Mounted Coils</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Price Each</td>
<td>Number</td>
</tr>
<tr>
<td>63 J 5470</td>
<td>$1.30</td>
<td>63 J 5485</td>
</tr>
<tr>
<td>63 J 5471</td>
<td>$1.32</td>
<td>63 J 5486</td>
</tr>
<tr>
<td>63 J 5472</td>
<td>$1.36</td>
<td>63 J 5487</td>
</tr>
<tr>
<td>63 J 5473</td>
<td>$1.40</td>
<td>63 J 5488</td>
</tr>
<tr>
<td>63 J 5474</td>
<td>$1.49</td>
<td>63 J 5489</td>
</tr>
<tr>
<td>63 J 5475</td>
<td>$1.50</td>
<td>63 J 5490</td>
</tr>
<tr>
<td>63 J 5476</td>
<td>$1.60</td>
<td>63 J 5491</td>
</tr>
<tr>
<td>63 J 5477</td>
<td>$1.70</td>
<td>63 J 5492</td>
</tr>
<tr>
<td>63 J 5478</td>
<td>$1.80</td>
<td>63 J 5493</td>
</tr>
<tr>
<td>63 J 5479</td>
<td>$2.00</td>
<td>63 J 5494</td>
</tr>
<tr>
<td>63 J 5480</td>
<td>$2.20</td>
<td>63 J 5495</td>
</tr>
<tr>
<td>63 J 5481</td>
<td>$2.50</td>
<td>63 J 5496</td>
</tr>
<tr>
<td>63 J 5482</td>
<td>$3.00</td>
<td>63 J 5500</td>
</tr>
</tbody>
</table>

Shipping weights, 6 ounces to 3 pounds each, according to size.

DeForest Geared Coils

A three-coil mounting for either table or panel use. The center receptacle is fixed. One of the outer receptacles is movable and may be rotated through any degree by means of a knob geared to the mounting. The knobs are so located that they are readily accessible without bringing the hand close enough to the coils to produce heat. The receptacles are connected by heavy Litz wire. All metal parts nickel plated.

<table>
<thead>
<tr>
<th>Article</th>
<th>Coils</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 J 5640</td>
<td>Mounted on pedestal and base of oak. Shipping weight, 4 pounds. $9.95</td>
</tr>
<tr>
<td>63 J 5641</td>
<td>Mounted on base only. Shipping weight, 3 pounds. 6.20</td>
</tr>
</tbody>
</table>

These diagrams show how honeycomb coils can be used in a regenerative circuit.

Honeycomb coils can be used effectively in many types of hookups.

Turner Spider Web Inductances

A new form of inductance. May be used on wave-lengths 660-400 meters. A wide range of values is obtainable by changing the number of turns, and the correct instructions accompany each set, and the proper compensation may be made by marking the diagram. The adjustable inductance may be used on any type of circuit. Shipping weight, 2 pounds.

 Molded Bakelite Coil Plug

Used to mount any standard honeycomb type coil. By using tape or other suitable material, which can be securely held to the plug by the brass plates at top and bottom, coil may be mounted firmly in place. Shipping weight, 4 ounces. 63 J 6543 Enh. $4.95

Fixed Panel Plug

Fitted with bracket to mount on panel or other support. Made of molded bakelite. Takes any standard coil plug. Shipping weight, 4 ounces. 63 J 6545 Each. 55c

Trunnion Panel Plug

May be swung to any position desired. Used in making two or three coil mounting with complete, with variable coupling. Capacity handle. Shipping weight, 6 ounces. 63 J 6547 Each. $1.18

All merchandise in this catalogue shipped from Northern Illinois.
Storage "A" Battery
A battery specially designed for radio purposes. The plates are extra heavy and will enable the battery to hold its charge for a long period of time and to withstand sulphation when left in a partially discharged condition. The case is made of fine natural colored, varnished baked enamel, with dovetailed corners. Rubber covered wire terminal leads with brass wire connections, and nickel-plated iron clamps, so that nickel connection wires will not be affected by acid fumes. Acid proof carrying handle makes it easy to move battery around. This is the most practical radio battery on the market and is the best you can get.

<table>
<thead>
<tr>
<th>Code</th>
<th>Size</th>
<th>Weight</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>563 J 492</td>
<td>6-volt 40-ampere size</td>
<td>40 lbs.</td>
<td>$9.95</td>
</tr>
<tr>
<td>563 J 494</td>
<td>6-volt 75-ampere size</td>
<td>75 lbs.</td>
<td>$13.25</td>
</tr>
</tbody>
</table>

Vacuum Tube Plate Circuit Battery

The Audion "B" Battery
Our "B" batteries are made of the finest materials by one of the best battery manufacturers. We guarantee them to equal in results any battery on the market. Fresh stock at all times. Very uniform and have extra long shelf life.

<table>
<thead>
<tr>
<th>Code</th>
<th>Size</th>
<th>Weight</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 J 6618</td>
<td>22-1/2 volt, battery</td>
<td>6.5 lbs.</td>
<td>$9.98</td>
</tr>
</tbody>
</table>

Tapped "B" Batteries

<table>
<thead>
<tr>
<th>Code</th>
<th>Size</th>
<th>Weight</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 J 6455</td>
<td>22-1/2 volt, Navy size battery</td>
<td>6.5 lbs.</td>
<td>$1.80</td>
</tr>
</tbody>
</table>

Hipwell "B" Battery
Refillable variable "B" battery. Guarded to be noiseless. Because of its renewable, refillable feature, full service of the entire battery is assured. Can be tapped at any point, as each cell is fitted.

<table>
<thead>
<tr>
<th>Code</th>
<th>Size</th>
<th>Weight</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 J 6459</td>
<td>22-1/2 volt, 15-cell small battery</td>
<td>1.5 lbs.</td>
<td>$1.70</td>
</tr>
</tbody>
</table>

4½-Volt "B" Battery Unit
These units may be used in making up "B" batteries. Five batteries connected in series to standard 20-cell standard 20-cell battery or 150 watts of alternating current will produce eighteen volts, etc. Should it happen that one cell of the series goes dead, it is only necessary to renew the block in which it is located and you again have a perfect working set of batteries. Cells are size as used in Navy type batteries. Shipping weight, each, 1 pound.

<table>
<thead>
<tr>
<th>Code</th>
<th>Size</th>
<th>Weight</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 J 6463-Each</td>
<td>4½ volt cell</td>
<td>3 oz.</td>
<td>$3.60</td>
</tr>
</tbody>
</table>

Standard Dry Cell

<table>
<thead>
<tr>
<th>Code</th>
<th>Size</th>
<th>Weight</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 J 2801</td>
<td>6-inch dry cell</td>
<td>3 lbs.</td>
<td>$3.95</td>
</tr>
</tbody>
</table>

Unit Dry Cell Battery
Consists of four regular size, 2½-inches by 6-inch, cell connected together and sealed in a metal container. This method of construction greatly prolongs the life of battery. Nickel-plated cell connections, so that nickel connection wires will not be affected by acid fumes. Acid proof carrying handle makes it easy to move battery around. This battery is made for carrying, can be used as an "A" battery. Tests 6 volts, 13/4 amperes. Shipping weight, 10 pounds.

<table>
<thead>
<tr>
<th>Code</th>
<th>Size</th>
<th>Weight</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>463 J 418</td>
<td>6-volt 40-ampere size</td>
<td>40 lbs.</td>
<td>$4.10</td>
</tr>
</tbody>
</table>

Charge Your Own Storage Battery with this Battery Charging Rectifier
This rectifier, when connected with 110-volt 60-cycle alternating current, will supply a direct current for charging any type of storage battery. Just connect the attaching wire to any standard, direct current rectifier, and the rectifier charges the battery without further attention at a cost of only a few cents. Suitable for charging radio or auto storage batteries. No chance to get connections wrong as charger automatically seeks its own polarity. Only one moving part which, with ordinary use, will last for years and can be easily replaced if desired. Very compact. Size over all, 7 by 3½ by 5¼ inches. Contain of a very efficient stepdown transformer mounted in steel frame. From transformer current passes through vibrating device which changes alternating to direct current. Micro ammeter registers charging rate. Prices include 10-foot connecting cord with plug, battery leads and two clips. Shipping weight, 10 pounds.

<table>
<thead>
<tr>
<th>Code</th>
<th>Size</th>
<th>Weight</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>563 J 6193</td>
<td>Charges 6-volt</td>
<td>10 lbs.</td>
<td>$13.95</td>
</tr>
<tr>
<td>563 J 6191</td>
<td>Charges 12-volt</td>
<td>10 lbs.</td>
<td>$13.95</td>
</tr>
</tbody>
</table>

4½-Volt 3-Cell Flashlight Battery
Standard flashlight battery, 1½-inches by 3¼-inches. Can be used to build up "B" batteries. By building up a standard 20-cell battery or standard 15-cell batteries, a considerable saving is effected, because when one set of cells burns out it can be readily replaced at very small cost. Each battery can also be tapped so as to give various voltages. Also 8 standard size flashlight pocket size. Shipping weight, for tube, 1 lb. 6 oz.

<table>
<thead>
<tr>
<th>Code</th>
<th>Size</th>
<th>Weight</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 J 2236</td>
<td>For 3-cell</td>
<td>6 oz.</td>
<td>$1.80</td>
</tr>
</tbody>
</table>

Standard Type Stepdown Transformer
Transform 110-volt 60-cycle alternating current down to lower voltage. Can be used for sealed into steel cases. Connection post for obtaining different voltages. Fitted with 7-ampere connection and 1½-inch hole. Sizes 2½-inches by 4½-inches by 1½-inches. Shipping weight, 8 pounds.

<table>
<thead>
<tr>
<th>Code</th>
<th>Size</th>
<th>Weight</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 J 1695</td>
<td>60-watt capacity produces from 2½ to 27½ volts in 24-volt battery</td>
<td>8 lbs.</td>
<td>$2.75</td>
</tr>
<tr>
<td>63 J 1697</td>
<td>100-watt capacity produces from 1½ to 24 volts in 20-volt battery</td>
<td>10 lbs.</td>
<td>$4.95</td>
</tr>
<tr>
<td>63 J 1699</td>
<td>150-watt capacity produces from 1½ to 24 volts in 20-volt battery</td>
<td>13 lbs.</td>
<td>$6.50</td>
</tr>
</tbody>
</table>

Miniature Base Lamps
Light from batteries. Shipping weight of three, 2 ounces. Shipping weight of three, 3 for...

<table>
<thead>
<tr>
<th>Code</th>
<th>Size</th>
<th>Weight</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 J 2307</td>
<td>3-volt. Lights on dry cell</td>
<td>3 oz.</td>
<td>$0.42</td>
</tr>
<tr>
<td>63 J 2313</td>
<td>6-volt. Lights on dry cell</td>
<td>3 oz.</td>
<td>$0.42</td>
</tr>
</tbody>
</table>

Porcelain Sockets for Miniature Base Lamps
Can be fastened to any support. Two screws for wire connection makes sockets listed above. Shipping weight, for three, 3 oz.

<table>
<thead>
<tr>
<th>Code</th>
<th>Size</th>
<th>Weight</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 J 2750</td>
<td>2 for...</td>
<td>3 oz.</td>
<td>$0.42</td>
</tr>
</tbody>
</table>

BATTERY CONNECTING CLIPS

For connecting lead wires to storage battery terminals. Jaws open wide to attach to any size terminals. Made of steel, heavily lead coated. Per set for all sizes, Length, 3½ inches, shipping weight of two, 8 oz.

<table>
<thead>
<tr>
<th>Code</th>
<th>Size</th>
<th>Weight</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 J 6137</td>
<td>2 for...</td>
<td>8 oz.</td>
<td>$0.35</td>
</tr>
</tbody>
</table>

Connecting Clips
Spring clip for attaching permanent wires to binding post, etc. Inquire a firm, perfect contact. Brass, lacquered, plated black nickel. Per set for all sizes, Length, 3½ inches, shipping weight of two, 8 oz.

<table>
<thead>
<tr>
<th>Code</th>
<th>Size</th>
<th>Weight</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 J 6472</td>
<td>2 for...</td>
<td>8 oz.</td>
<td>$0.35</td>
</tr>
</tbody>
</table>

Fahnestock Connectors
A very convenient method for connecting wires. Can be fastened to binding post, lead, or copper and securely attached to make a perfect electrical and mechanical connection. Made of steel, heavily lead coated. Per set for all sizes, Length, 3½ inches, shipping weight of two, 8 oz.

<table>
<thead>
<tr>
<th>Code</th>
<th>Size</th>
<th>Weight</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 J 6560</td>
<td>2 for...</td>
<td>8 oz.</td>
<td>$0.25</td>
</tr>
</tbody>
</table>

All merchandise in this catalogue shipped from Northern Illinois
Electricians' Pliers
A high grade hardened steel. Plier. Used a great deal on all electrical work. Hand made in any shop. Shipping weight, 6 oz. 
63 J 5802—6-Inch Sharp 
$1.23

Soldering Sets
63 J 5844—A complete outfit for doing ordinary soldering. Consists of large soldering copper, tin of solder, tin of rosin, 335 loungers, tin of solder, 2033 loungers. 
In wooden box. Suitable for electrical work and light house hold repairing. Shipping weight, 1/2 pounds. 
Set complete... $1.55

Electrical Soldering Irons
Do away with inconvenience of old type iron. Screw attachment plug into socket and turn on current. Iron heats to working temperature in two to three minutes. Copper soldering tips have special heat-resistant qualities. Tip screws into copper core. Easily removed and others substituted. Steel parts galvanized finish. Equipped with 6-foot cord and attaching plug. 
For Garage and General Heavy Work 
63 J 5874—This set especially suitable for general heavy work. Soldering tips particularly adapted for soldering terminal and burning in connections. Length, 16 inches. Diameter of tip shown in iron, 1/4 inch broaching diameter of tip shown. Shipping weight, 4 pounds. Complete with three tips, for use on 10 to 110-volt current. 
$14.50

For Use on 108 to 115-Volt City Current 
63 J 5879—For general small soldering around the house or manufacturing plant. Length, 16 inches. Diameter of tip, 1 inch. Uses 200 watts current. Shipping weight, 3 pounds. 
63 J 5872—For light soldering work for jewelers, telephone exchanges, etc. Especially suited to radio instrument construction and repairs. Length, 12 1/2 inches. Diameter of tip, 1/4 inch. Uses 75 watts current. Shipping weight, 2 pounds. 
$8.75

Wire Solder
63 J 5830—Resin core wire solder. Requires no flux. Indispensable for soldering electrical connections and extensively used on telephone and electric work. Shipping weight, 1/4 lb. 
63 J 5832—Plain Wire Solder. Very handy for all electrical soldering. 

Insulating Tape
For wrapping wires where insulation has been scraped off. Recommended for electrical work. Provides a smooth, continuous insulating covering. Very handy around the radio room for soldering or any other job where a smooth, continuous insulating covering is necessary. Made of cotton, rubber, and asphalt. Shipping weight, 3 pounds. 

Gasoline Blow Torch
Tank of polished brass. Special bronze burner. Improved air pump. Produces blast of gas sufficient for heating purposes. For 100 degrees (Fahrenheit). Easily regulated. Handy for electrination and plumbing work. Has removable soldering iron handle. Very handy around the radio room for soldering or any other job where a smooth, continuous insulating covering is necessary. Made of cotton, rubber, and asphalt. Shipping weight, 3 pounds. 

Radio Tap and Die Set
Standard sizes for radio instruments. Set includes one each, plug tap and round adjustable die of the following sizes: 5/4, 5/4, 5/4, 5/4, 5/4. Together with a 5/4 inch cold die of same length and 1/2 inch long wrench. Shipping weight, 2 lbs. 
64 J 7848—Set complete... $5.95

Magnet Wire
For building radio apparatus, repairing motors, other electrical apparatus, experimental work, etc. One piece only on a spool. Store in radio shops and 5 cent stores. Insulation on wire both perfect and uniform. Supplied only in weight spoons given. 

Double Cotton Covered Magnet Wire

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>$ .65</td>
<td>$ .95</td>
<td>14</td>
<td>18</td>
<td>$ .55</td>
<td>$ .85</td>
<td>18</td>
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<tr>
<td>$ .69</td>
<td>$ 1.03</td>
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<td>18</td>
<td>$ .55</td>
<td>$ .85</td>
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<tr>
<td>$ .74</td>
<td>$ 1.12</td>
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<td>$ .55</td>
<td>$ .85</td>
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<tr>
<td>$ .79</td>
<td>$ 1.21</td>
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<td>$ .55</td>
<td>$ .85</td>
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<td>$ 1.18</td>
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<td>$ .75</td>
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<tr>
<td>$ 1.46</td>
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<td>26</td>
<td>$ .85</td>
<td>$ 1.28</td>
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<td>$ 1.95</td>
<td>3.58</td>
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<td>26</td>
<td>$ .95</td>
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<tr>
<td>2.84</td>
<td>5.34</td>
<td>36</td>
<td>36</td>
<td>$ 1.20</td>
<td>$ 1.98</td>
<td>36</td>
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</table>

New Code Rubber Covered Wire, Single Braid
Solid copper conductor tinned with rubber compound over which is one cotton saturated braid. Shipping weight, per 100 feet, 3 and 4 pounds. Sold only in lengths listed. 
63 J 3015—Size 14. Price for 25 feet 

<table>
<thead>
<tr>
<th>Price</th>
<th>8-Oz. Price</th>
<th>1-Lb. Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>$ .29</td>
<td>$ .55</td>
<td>18</td>
</tr>
</tbody>
</table>

New Code Twisted Pair Cotton Lamp Cord
Two conductor, twisted New Code Lamp Cord. Conductor consists of five copper wires stranded twisted together. Covering is of fine quality yellow and green colored cotton. Shipping weight, per 100 feet, 5 and 6 pounds. Sold only in lengths listed. 
63 J 3175—Size 18. Price for 10 feet 

<table>
<thead>
<tr>
<th>Price</th>
<th>8-Oz. Price</th>
<th>1-Lb. Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>$ .80</td>
<td>$ 1.65</td>
<td>18</td>
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</tbody>
</table>

Porcelain Tubes
Unplated porcelain tubes, 5/8 inch ins. inside, 5/8 inch outside. Length given in inch. Inside head and base, 1/2 inch. Lasting weight, per dozen, 1 to 2 pounds. 
63 J 3902—Length, 3 inches. Per dozen... $20

Glazed Porcelain Cleats
Take No. 10 or smaller wires. Have 5/8 inch wire centers. Shipping weight, per dozen, 2 pounds. 
63 J 3920—2 wire per cleat. Per dozen... $55

Solid Porcelain Knobs
63 J 3927—New Code No. 5/4 solid porcelain knob, plain design, 5/8 inch. Shipping weight, per dozen, 14 1/2 pounds. Per dozen... $28

Porcelain Entrance Switch
63 J 4205—Two-pole switch. Shipping weight, per dozen, 1 3/4 pounds. Per dozen... $52

Radio Screwdriver Set
This set of screwdrivers with handles 11 1/2, 5 1/2, and 3 1/2 inch. Groove, 5/16 inch. Shipping weight, per dozen, 1 3/4 pounds. Per dozen... $35

Radio Drill Set
Set of six drills of proper sizes to drill holes to be tapped for standard radio screws. 5/32, 7/32, 9/32, 11/32, 13/32, 15/32 shipping weight, 10 pounds. 
63 J 1053—Set of six... $54

Hand Drill
Goodell-Pratt hand drill, style 3/4. One of the finest hand drills yet made. Best kind of radio instrument construction. Doub- le geared, two speeds, three jaw chuck. Designed for light work and can be used for a hand drill and easy to handle with a handle for driving. No drills included. 
63 J 1298—Shipping weight, 6 pounds... $4.10

All merchandise in this catalogue shipped from Northern Illinois.
Indoor Loop Antenna

This loop was designed to meet the requirements of those persons desiring to receive radio messages without the use of a receiving set. Simple circuits and instruments using a loop antenna for the reception of radio waves are many hundreds of miles distant. Specially adapted for receiving up to 750 meters during the day and up to 350 meters at night. Tuning can be obtained by using a variable condenser on the loop circuit. Interference can be practically eliminated. Can also be used for receiving distant stations several hundred miles distant. Supplied complete with all necessary parts and wiring. For long waves, ground wire, and using in- cluded. Height, 44 inches. Shipping weight, 5 lbs.
563 J 651 — Each $4.35

Antenna and Copper Wire

Supplied only in size coils listed.
63 J 6150 — Antenna Wire. Composed of seven strands No. 22 B. & S. gauge harddrawn copper wire. Shipping weight, per 100 feet, 6 pounds.
63 J 6151 — Bare copper wire No. 14 gauge. 100 feet, 0.65 pounds.
63 J 6152 — Bare copper wire No. 12 gauge. 100 feet, 0.95 pounds.

Copperweld Antenna Wire

The best wire for radio aerials. Much stronger than ordinary copper wire. Made with a steel core only which is welded on the surface of the copper. Size No. 14. Shipping weight, 2 pounds.
63 J 6124 — Per 100 feet. 1.50 pounds.

Porcelain Base Knife Switches

Porcelain base switches. Contacts and blades made of heavy copper. Satisfactory for any present or future aerial work, although we recommend the switches listed below. Can also be used on other parts of apparatus.
63 J 2684 — Single pole, single throw switch. Shipping weight, 8 ounces.
63 J 2686 — Single pole, double throw switch. Base size, 1 1/4 by 3 1/2 by 1/2 inch. Shipping weight, 20 ounces.
63 J 2687 — Double pole, single throw switch. Base size, 2 by 3 1/2 by 1/2 inch. Shipping weight, 12 ounces.
63 J 2689 — Double pole, double throw switch. Base size, 2 1/4 by 3 1/2 by 1/2 inch. Shipping weight, 14 ounces.

Ground Switches

A switch especially intended for use as a grounding switch. Underwriters' tests. Per 100. 100 cents.
63 J 5589 — Each $3.10

Antenna Wire Connector Block

If you have an antenna of more than one wire, you should connect the wires together with this connection block. Does away with soldering and loose connections. Made of solid brass. Easy to install. From equipment.
63 J 6604 — Each $2.55

Ground Rads

Iron ground rod. Length, 6 feet. Heavily galvanized. A ground rod is necessary with every radio antenna. Shipping weight, 4 pounds.
63 J 1051 — Each $4.35

Ground Clamp

If you ground your outfit on a waterpipe or steam pipe, you should use a ground clamp to insure a perfect connection to be applicable to any size pipe up to 1 1/2 inches in diameter.
63 J 6606 — Each $0.96

Insulators

We are here introducing a new line of insulators for radio purposes which have just been produced after careful and thorough testing. This material is used in the most satisfactory, moderately priced material for the purpose and has rubber as a base. Tough and durable. No noise is used. Has a high melting point (2600°F) and the dielectric strength is very high, 35,000 volts per inch, and the insulator is unaffected by any atmosphere conditions. A particular feature of these insulators is that, with the exception of the 1/4 inch size, they are molded of a non-conductive composition, which gives good service as an insulator. Have galvanized steel wire for attaching wire to the insulator.
63 J 6610 — Insulator for small aerial. Length over all, 4 inches. Flash over voltage, 35,000 volts. Shipping weight, 18 ounces.
63 J 6612 — Length, 4 inches. Tensile strength, 250 pounds. Shipping weight, 5 ounces.
63 J 6614 — Length over all, 4 1/2 inches. Tensile strength, 1000 pounds. Shipping weight, 14 pounds.

Air Gap Type Insulators

In this type insulator, all parts have been interposed between live parts, thus imposing particular strain on the air and preventing any possible leakage. This greatly builds up the electrical strength of the insulator and in thus preventing possible mechanical failure.
63 J 6620 — Length, 2 1/2 inches. Tensile strength, 750 pounds. Flash over voltage, 35,000 volts. Shipping weight, 1 1/2 pounds.
63 J 6622 — Length, 7 inches. Tensile strength, 2500 pounds. Flash over voltage, 40,000 volts. Shipping weight, 8 ounces.
63 J 6624 — Length, 9 inches. Tensile strength, 4000 pounds. Flash over voltage, 45,000 volts. Shipping weight, 4 1/2 pounds.

Post Type Insulators

Used for supporting wires or other live conductors. Threaded inserts in top and bottom side with machine screw and washer. May be readily fastened to any panel base or instrument. Base broad insures a stable mounting. Heights given are for insulators only and do not include screws.
63 J 6626 — Height, 1 1/4 inches. Diameter of base, 3/4 inch. Shipping weight, 1 1/4 ounces.
63 J 6628 — Height, 3 1/4 inches. Diameter of base, 3/4 inch. Insulator and top, 1 1/4 inches. Shipping weight, 1 1/4 pounds.
63 J 6630 — Height, 5 1/4 inches. Diameter of insulator at top, 1 1/4 inches. Shipping weight, 2 1/2 pounds.

Lead-in Bushings—Panel Insulators

63 J 6632 — Especially designed for panel work. Length, over all, 3/8 inch; under shoulder, 1 inch; above shoulder, 1 inch; Has 1/4 inch hole, 1 inch diameter, 1/4 inch diameter; Has 1/4 inch hole, 1 inch diameter, 1/4 inch diameter; Has 1/4 inch hole, 1 inch diameter, 1/4 inch diameter; Has 1/4 inch hole, 1 inch diameter, 1/4 inch diameter; Has 1/4 inch hole, 1 inch diameter, 1/4 inch diameter.

Window Sash Insulator. For bringing lead wire through window sash or wall. Length of insulator, 3 inches. Insulator and base, 3 inches. Shipping weight, 3 pounds.
63 J 6633 — With rod projecting from end to end and threaded projection, 3 inches, end, fitted with nuts.

Wall Insulators

Specially designed as a lead-in insulator for outside use. This insulator will not stand as close to walls. Can be adapted in any size from 1/8 inch to the 1 inch size. Can be used with 1 inch size as small as 3/16 inch thick. Length over all, 1 inch; under shoulder, 1 inch; above shoulder, 1 inch; Has a 1/4 inch hole, 1 inch diameter, 1/4 inch diameter.
63 J 6640 — Each $1.30

Wall Insulators

Especially designed as a lead-in insulator for framing in wire from the outside. Can be used with 1 inch size as small as 3/16 inch thick. Length over all, 2 1/4 inches; under shoulder, 1 1/4 inches; above shoulder, 1 1/4 inches. Has a 1/4 inch hole, 1 inch diameter, 1/4 inch diameter.
63 J 6642 — Each $3.40

Electrode Insulators

These insulators have been used for radio purposes for many years. They are molded of a non-conductive composition, which gives good service as an insulator. Have galvanized steel wire for attaching wire to the insulator.
63 J 6650 — Diameter of head, 5/8 inch. Length of rod, 5 inches. Shipping weight, 9 ounces.
63 J 6652 — Diameter of head, 7/8 inch. Length of rod, 5 inches. Shipping weight, 12 ounces.
63 J 6654 — Diameter of head, 1 inch. Length of rod, 5 inches. Shipping weight, 15 pounds.

Montgomery Ward & Co.

All merchandise in this catalogue shipped from Northern Illinois
Wood Cabinets
The tendency in the radio field today is to put appen-
dences in place of a solid wood finish, for appearance, but as a pro-
going a solid wood finish, for appearance, but as a pro-
cut durability. The cabinets we offer are
acrylic in design and are
of uniform style so that you
can use cabinets of different
sizes and have them all
match up. Panels are rai-
bred towards the front, Light
or dark, are hinged. The wood used is kiln-dried gum-
ning in size and thickness.

<table>
<thead>
<tr>
<th>Article</th>
<th>Width</th>
<th>Height</th>
<th>Depth</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>63 J 5665</td>
<td>1/4 inch</td>
<td>1/4</td>
<td>1/4 inch</td>
<td>$1.00</td>
</tr>
<tr>
<td>63 J 5677</td>
<td>1/2 inch</td>
<td>1/2</td>
<td>1/2 inch</td>
<td>$1.00</td>
</tr>
</tbody>
</table>

Marconi Knobs
A knob suitable for large panels. Two sizes, match
perfectly. Polished black finish. Has 3/4 inch hole at
bottom tapering up to 7/8 inch. Shipping weight, each,
3 ounces; per dozen, 1/4 pounds.

<table>
<thead>
<tr>
<th>Number</th>
<th>Diameter</th>
<th>Height</th>
<th>Weight</th>
<th>Price</th>
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<tr>
<td>63 J 5666</td>
<td>1/4 inch</td>
<td>1/4 inch</td>
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<td>$1.00</td>
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<tr>
<td>63 J 5677</td>
<td>1/2 inch</td>
<td>1/2 inch</td>
<td>1/2 inch</td>
<td>$1.00</td>
</tr>
</tbody>
</table>

New Government Style Knobs

<table>
<thead>
<tr>
<th>Number</th>
<th>Diameter</th>
<th>Height</th>
<th>Weight</th>
<th>Price</th>
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<tbody>
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<td>63 J 5671</td>
<td>1/4 inch</td>
<td>1/4 inch</td>
<td>1/4 inch</td>
<td>$1.00</td>
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</tbody>
</table>

New Government Style Knobs With Hole for Shaft

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<tr>
<th>Number</th>
<th>Diameter</th>
<th>Height</th>
<th>Weight</th>
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<td>1/4 inch</td>
<td>1/4 inch</td>
<td>1/4 inch</td>
<td>$1.00</td>
</tr>
</tbody>
</table>

New Style Radio Knob

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<th>Height</th>
<th>Weight</th>
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<td>1/8 inch</td>
<td>1/8 inch</td>
<td>1/8 inch</td>
<td>$1.00</td>
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</table>

Series Parallel Switch

<table>
<thead>
<tr>
<th>Number</th>
<th>Diameter</th>
<th>Height</th>
<th>Weight</th>
<th>Price</th>
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<td>1/4 inch</td>
<td>1/4 inch</td>
<td>1/4 inch</td>
<td>$1.00</td>
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</table>

Inductive Switch

<table>
<thead>
<tr>
<th>Number</th>
<th>Diameter</th>
<th>Height</th>
<th>Weight</th>
<th>Price</th>
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<tbody>
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<td>1/8 inch</td>
<td>1/8 inch</td>
<td>1/8 inch</td>
<td>$1.00</td>
</tr>
</tbody>
</table>

Hard Rubber Dial and Knob
Made in one piece polished black rubber.

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4 inch</td>
<td>$0.50</td>
</tr>
</tbody>
</table>

Molded Dial and Knob
Made of molded condensate. Beveled edges, radial lines and figures are engraved in the
diameter, 3 inches, Shipping weight, 3 ounces.

<table>
<thead>
<tr>
<th>Number</th>
<th>Diameter</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 J 5670</td>
<td>1/8 inch</td>
<td>$0.50</td>
</tr>
</tbody>
</table>

0.00 degree scale marked 0 to 100. 0.05 degree scale marked 0 to 100.
0.10 degree scale marked 0 to 100.
0.15 degree scale marked 0 to 100.
0.20 degree scale marked 0 to 100.
0.25 degree scale marked 0 to 100.
0.30 degree scale marked 0 to 100.
0.35 degree scale marked 0 to 100.
0.40 degree scale marked 0 to 100.
0.45 degree scale marked 0 to 100.
0.50 degree scale marked 0 to 100.
0.55 degree scale marked 0 to 100.
0.60 degree scale marked 0 to 100.
0.65 degree scale marked 0 to 100.
0.70 degree scale marked 0 to 100.
0.75 degree scale marked 0 to 100.
0.80 degree scale marked 0 to 100.
0.85 degree scale marked 0 to 100.
0.90 degree scale marked 0 to 100.
0.95 degree scale marked 0 to 100.
1.00 degree scale marked 0 to 100.
1.05 degree scale marked 0 to 100.
1.10 degree scale marked 0 to 100.
1.15 degree scale marked 0 to 100.
1.20 degree scale marked 0 to 100.
1.25 degree scale marked 0 to 100.
1.30 degree scale marked 0 to 100.
1.35 degree scale marked 0 to 100.
1.40 degree scale marked 0 to 100.
1.45 degree scale marked 0 to 100.
1.50 degree scale marked 0 to 100.
1.55 degree scale marked 0 to 100.
1.60 degree scale marked 0 to 100.
1.65 degree scale marked 0 to 100.
1.70 degree scale marked 0 to 100.
1.75 degree scale marked 0 to 100.
1.80 degree scale marked 0 to 100.
1.85 degree scale marked 0 to 100.
1.90 degree scale marked 0 to 100.
1.95 degree scale marked 0 to 100.
2.00 degree scale marked 0 to 100.

Our Special Inductive Switch

<table>
<thead>
<tr>
<th>Number</th>
<th>Diameter</th>
<th>Height</th>
<th>Weight</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>63 J 5671</td>
<td>1/4 inch</td>
<td>1/4 inch</td>
<td>1/4 inch</td>
<td>$1.00</td>
</tr>
</tbody>
</table>
Radio Jacks
Especially designed for radio work. Very compact, carefully constructed, and finely finished. May be mounted on panels up to 1/4 inch in thickness. Contacts are silver. Nickel plated polished frame. Shipping weight, each, 3 ounces.
63 J 5636—Open circuit, ... 6c. 63 J 5631—Closed circuit, ... 7c. 63 J 5622—2 circuit, each, 80c. 63 J 5640—Filtering element control, each, 9d. 63 J 5644—Spring. Filter element control, each, $1.19.

Radio Plugs

Universal Radio Plug
Fits any standard jack. Cord easy to connect. Ship. weight, 3 ounces. 63 J 6790—Each. $1.10

Pacent Twin Adapter
63 J 6791—Same style as Universal Radio Plug, except will take two sets of plug on one cord. $1.35

Firth Radio Plug

Pacent Multijack
63 J 6794—This simple device enables to connect up three headsets with any receiving set, or two sets of phones and a loud speaker. Can be fastened in place of screwdriver. All standard plugs will fit it. $1.42.

Anti-Capacity Switch
63 J 6796—Double throw switch handles 12V, 1500 watt非常好. Ports are switch key; 1/4 inch wide; 3 inch deep. Overall length, 5 inch. Mounted to arm of panel. Only the switch lever appears on the outside of the plate. Shipping weight, 5 ounces. Each. $2.58.

Machine Screws
Made of brass with slotted head, accurately cut threads. Sold only in units of quantities listed. Ship. wt., per dozen, 2 ounces, per gross, one pound.

Brass Nuts for Machine Screws
Nuts to fit above machine screws. Sold only in quantities listed. Ship. wt., per dozen, 2 ounces; per gross, 8 oz.

Tinned Copper Wire
Specially hard-drawn tinned copper wire, intended for connections in apparatus. 100-foot spools permits of making a neat, efficient job. Supplied in 24-inch lengths only. Shipping weight, for 3 pieces, 8 oz. 63 J 6863—Size 18, 3 dozen for 20c. Per dozen, 50c. 63 J 6864—Size 16, 3 dozen for 4c. Per gross, 6c.

Switch Points—Made of brass nickel plated. All have 9/16-inch screws or shanks threaded 9/16. Shipping weight, 3 ounces, each. 63 J 5646—1/4 by 1/4 head with machine screw and soldering lug. Per dozen, 3c. 63 J 5648—1/4 by 3/8 head. Fitted with two nuts. Per dozen, 38c. 63 J 5649—1/4 by 1/2 head. Fitted with copper lug. Per dozen, 35c.

Binding Posts
Metal parts of brass, polished nickel finish. All have 9/16-inch long screws with washers. Sizes given are from bottom of shoulder to top of knob and do not include screw. Ship. wt., per dozen, 15c.

Threaded Brass Rod
Supplied in 8-inch lengths. Clean, accurate threads. Sold only in length quoted. Shipping weight for 3 lengths, 8 ounces.

Solid Brass Rod
For shafts, etc. Supplied only in 8-inch lengths. Shipping weight for 3 lengths, 8 ounces.

Copper Lugs
Fit onto machine screws. Intended to be clamped and soldering to connect wire. Shipping weight, per dozen, 2 ounces; per gross, 6 ounces. 63 J 6892—To fit 1/8 screw. Per dozen, 11c. Per gross, 50c. 63 J 6893—To fit 5/32 screw. Per dozen, 12c. Per gross, 60c.

Switch Stop—63 J 5609—Made of brass, polished nickel finish. Will fit any panel up to 1/4 inch thick. Supplied with one lock nut. Shipping weight, 4 ounces. 4 for $1.82.

New Style Binding Post
A specially constructed binding post. Has a non-removable knurled knob. May be mounted onto any panel up to 9/16 inch thick. Made of brass polished nickel finish. Fitted with copper lug and locknut. Shipping weight, 8 ounces. 63 J 5610—Each. 12c. Dosen. $1.20

Sheet Micro-66 J 2589—Used as dielectric for condensers. Clear firm sheet. Shipping weight, per dozen, 3 to 8 ounces.

Varnish Cambric Tubing "Spaghetti"
Perfectly shaped tubing of high dielectric strength. Used to cover connecting wires, instruments, to assure proper insulation. Supplied in 4-foot lengths only. Color, yellow. Ship. wt., for 4 feet, 4 ounces. 63 J 6886—Size 3, takes size 12 wire and smaller. 4 feet for, 32c. 63 J 6887—Size 2, takes size 16 wire and smaller. 4 feet for, 40c. 63 J 6888—Size 1, takes size 25 wire and smaller. 4 feet for, 32c.

Iron Setscrews
Iron setscrews, 9/16 size. Shipping weight, per dozen, 2 ounces.

Tinfoil
63 J 5686—Used for making condensers. In sheets size, 9 by 9 inches. Approximately, 25 sheets to the pound. Per pound.

Radio Automatic Filament
Control Switch for Detector. 2 Stage Amplifier
Takes the place of three filament control jacks and plugs. Phons or loud speaker hooked up to this switch can be instantaneously put in circuit with either detector, first or second stage of amplification. Turns off filament current on one or both belts. Each mounted on panel. Furnished with knob and pointer, directions and prints of connections. A substantially made high grade article. Shipping weight, 1/4 pounds. 63 J 6788—Each. $5.90.
Spark Transmission Apparatus

Wireless Spark Coils
These coils are carefully constructed and operate successfully on either dry cells or storage batteries. A slight adjustment of the primary and secondary windings of the coil gives a pure, even tone. The necessary primary condenser is enclosed in the base and is of correct size for proper adjustment. Properly adjusted, the half-inch coil has a sending range of from 2 to 20 miles, the one-inch coil 5 to 10 miles. Amateurs will appreciate the efficiency of this model of spark coil.

Shipping weight, 6 and 8 pounds.

63 J 5126 - Half-inch coil ........................................ $4.85
63 J 5127 - One-inch coil ......................................... 6.95

Spark Coil Transmitting Condenser
Designed for use with spark coil sets, having a dielectric of five 5 by 7 photo plates. Price includes a finish. Permite sending weight, 3 pounds.

Shipping weight, 3 pounds.

63 J 5348 .......................................................... $1.48

Zinc Spark Gap
For use with spark coil transmitters. Base is molded composition. Metal parts are plated and polished. Can be used with cells up to 4 inches. Shipping weight, 2 pounds.

Shipping weight, 2 pounds.

63 J 5350 .......................................................... $1.10

Radiator Spark Gap

Shipping weight, 2 pounds.

63 J 5351 .......................................................... $2.30

Murdock Oscillation Transformer

Shipping weight, 8 pounds.

63 J 5155 .......................................................... $4.75

Wireless Practice Set
Anyone learning wireless telegraphy transmission must know the code. Send for a wireless practice set and see how easy it is to learn the code. Set consists of complete 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 sending posts on the set by means of a slip piece of wire and press the handle so the key and buzzing sound will be produced. In a very short time your ear will become accustomed to the various combinations of dots and dashes representing different letters and numbers. Practice until you can understand the signals at the speed sent by average stations. The most difficult part of wireless telegraphy. A very good way to learn the code quickly is to place two of these sets in separate rooms with an operator at each set, and practice sending signals back and forth. Chart included with each set.

Shipping size, 7 by 4 inches. Shipping weight, 3 pounds.

Shipping weight, 3 pounds.

63 J 1750 .......................................................... $1.79

Learner's Code Chart
Explains how to learn the code by the sound method, which is recognized as the correct way. With the aid of this chart you can learn the code faster and more thoroughly. A copyrighted system that gives fast sure results. Printed on durable celluloid in convenient pocket size. Shipping weight, 2 ounces.

Shipping weight, 2 ounces.

63 J 1751 .......................................................... 48¢

Professional Telegraph Set
Regulation instrument used by professional operators. Soldered and key mounted on polished oak base. The wide range of polished brass with aluminum lever and hard rubber covered magnets. Key polished, brush, steel lever, hard rubber scale and circuit board thoroughly and strongly built throughout. Shipping weight, 3 pounds.

Shipping weight, 3 pounds.

63 J 1732 - 4-ohm combination set .................... $3.78
63 J 1733 - 20-ohm combination set ................ $3.75

Amateur Telegraph Set
Full size key and sounder, mounted on polished oak base. A good instrument for beginners. Price includes up-to-date Operator's Manual containing Morse code; instructions for telegraphing, and other information. Shipping weight, 2.5 pounds.

Shipping weight, 2.5 pounds.

63 J 1715 - With 4-ohm sounder ......................... $2.65
63 J 1719 - With 20-ohm sounder ..................... 2.93

Pony Relay
A relay working in conjunction with each instrument to improve the efficiency of any telegraph system, when several instruments are connected on the same line. Also used on burglar and alarm systems. Finely finished. Made of high-grade materials. Shipping weight, 1 ounce.

Shipping weight, 1 ounce.

63 J 1745 .......................................................... $3.35

Sonders
Sonders same as used on our professional combination set. Shipping weight, 2 ounces.

Shipping weight, 2 ounces.

63 J 1735 - 4-ohm sounder .................................. $2.30
63 J 1737 - 20-ohm sounder .............................. 2.50

Electric Bell Ringing Transformer
Attach transformer to regular lighting wires. Makes electric bell, buzzer, annunciator or door opener. Registers on meter only when current is used. Produces three voltages—5, 6, and 14. Operates on alternating current of 100 to 150 volts. Lasts a lifetime. Working capacity, 25 watts. Transformer, without bell. Shipping weight, 2 pounds.

Shipping weight, 2 pounds.

63 J 5921 .......................................................... $1.15

Electric Bell

Shipping weight, 9 ounces.

63 J 5945 - ½-inch gong .................................... 48¢
63 J 5947 - 2-inch gong ................................... 53¢
63 J 5948 - 3-inch gong ................................... 71¢
63 J 5950 - ½-inch gong to operate direct from 30-32 volt current ........................................... 72¢

Insulated Bell Wire
63 J 5960 - Single conductor. Size 18. About 100 feet to the pound. Shipping weight, 1 pound.

Per pound .......................................................... $50


Per pound .......................................................... $55

Push Buttons
Nicely finished wood push button composition center. Positive spring contact. Shipping weight, 1 ounce.

Shipping weight, 1 ounce.

63 J 5936 - Each ................................................ 9¢
63 J 5937 - Dozen .............................................. 90¢

Insulated Staple
For fastening wires to wall. Insulated staple eliminates danger of short circuiting. Height, ¾ inch. Shipping weight, 3 ounces.

Shipping weight, 3 ounces.

63 J 5932 - Per 100 ............................................. 20¢
Spark Transmission Apparatus

On pages 26 and 27 are shown a complete line of spark transmission apparatus using either batteries or 110-volt 60-cycle A. C. as the source of power. Spark transmission was the original method used for sending code, and the apparatus used is very simple when compared to that used with the modern transmission methods. Suitable for instruction and experimental use for schools, colleges, etc.

Thordarson Type R Transformer

For use on 108 to 115-volt 60-cycle alternating current. Provided with adjustable magnetic leakage gap which controls primary input, giving a wide range of amperage and permitting easy adjustment. No impedance or choke coil necessary in primary circuit. This transformer has some wonderful long distance records and has given general satisfaction to amateurs for years. Works best when used with rotary spark gap producing about 80 sparks per second. Shipping weights, 35 and 35 pounds.

| Article Number | K.V.A. | Amperage | Volts | Price
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<tr>
<td>566 J 630</td>
<td>1</td>
<td>1½ to 1</td>
<td>r.p.m.</td>
<td>$18.95</td>
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<tr>
<td>566 J 632</td>
<td>1</td>
<td>2½ to 14</td>
<td>25,000</td>
<td>39.00</td>
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| Article Number | K.V.A. | Sec. Volts | Shipping Weight | Price
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<tbody>
<tr>
<td>566 J 633</td>
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<td>12 pounds</td>
<td>2500</td>
<td>$10.00</td>
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<tr>
<td>566 J 635</td>
<td>1</td>
<td>25 pounds</td>
<td>35 pounds</td>
<td>28.50</td>
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</table>

Thordarson Type RS Transformer

This type differs from the well known model shown above except in that it does not have the adjustable magnetic leakage gap. All other features of study, compact construction and correct electrical characteristics are the same. For use on 105 to 120-volt 60-cycle alternating current.

| Article Number | K.V.A. | Sec. Volts | Shipping Weight | Price
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<tbody>
<tr>
<td>566 J 5358</td>
<td>1</td>
<td>12 pounds</td>
<td>2500</td>
<td>$7.50</td>
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<tr>
<td>566 J 620</td>
<td>1</td>
<td>25 pounds</td>
<td>35 pounds</td>
<td>28.50</td>
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Universal Spark Gap Motor

A rugged high grade motor for spark gaps, running saw blade machines, fans, small lathes, buffer, emery wheels, etc. Running idle will make 6,000 r.p.m. Will make about 4,000 r.p.m. with electrode shown below. Will operate on 100-125 volt A.C. or D.C. current. Black enamel finish. Height, overall all, ½ inch. Width, 1 inch. Thickness, ½ inch. Will develop about ½ H.P. Supplied with 1-inch grooved pulley. Shipping weight, 8 pounds.

| Article Number | K.V.A. | Shipping Weight | Price
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<tbody>
<tr>
<td>63 J 5624</td>
<td>1</td>
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</tr>
<tr>
<td>63 J 5625</td>
<td>1</td>
<td>20 pounds</td>
<td>35 pounds</td>
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</table>

Spark Gap Electrodes

Saw tooth rotor, ½ inch diameter, of machine cast aluminum with bakelite center and brass bushing to fit 14-inch shaft. Two adjustable stationary electrodes. This set of electrodes together with universal motor listed above, mounted on a substantial base will make a high grade rotary spark gap. Shipping weight, ¾ pounds.

| Article Number | K.V.A. | Shipping Weight | Price
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<tr>
<td>63 J 5625</td>
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<td>$7.50</td>
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<tr>
<td>63 J 5514</td>
<td>1</td>
<td>25 pounds</td>
<td>35 pounds</td>
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</table>

Commercial Type Oscillation Transformer

Designed to give wave ranges both above and below 200 volts. Solid copper windings with mica separators allow circulation of oil to keep down heating. Flat aluminum sheet electrodes with rounded corners. Variable in ten steps of 0.005 MF each from 0.005 MF to 0.009 MF. Especially designed to prevent corona losses and brush discharge. Oil included. Shipping weight, 25 pounds.

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<tr>
<td>566 J 620</td>
<td>1</td>
<td>12 pounds</td>
<td>$7.50</td>
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<tr>
<td>566 J 640</td>
<td>1</td>
<td>25 pounds</td>
<td>35 pounds</td>
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</table>

Improved Model Rotary Spark Gap

Flat pure copper stationary electrodes and solid aluminum stationary electrodes avoid arcing. Width of break is adjustable. Strong breeze generated by rotary electrodes quickly quenches spark, thereby allowing transmission of wave of low decrement. All conducting metal is mounted on mica. Easily handles 40,000 volts without endangering motor windings. Constant steady speed. Shipping weight, 10 pounds.

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<tbody>
<tr>
<td>566 J 5141</td>
<td>1</td>
<td>12 pounds</td>
<td>$14.80</td>
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<tr>
<td>566 J 5142</td>
<td>1</td>
<td>25 pounds</td>
<td>35 pounds</td>
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Variable Transmitting Condenser Oil Immersed

An oil immersed variable condenser for use with all makes of transformers up to 1 K.W., 25,000 volts. Flanged fiber dielectric, corrugated aluminum separators allow circulation of oil to keep down heating. Flat aluminum sheet electrodes with rounded corners. Variable in ten steps of 0.003 MF each from 0.007 MF to 0.010 MF. Especially designed to prevent corona losses and brush discharge. Oil included. Shipping weight, 25 pounds.

| Article Number | K.V.A. | Shipping Weight | Price
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<tr>
<td>566 J 640</td>
<td>1</td>
<td>25 pounds</td>
<td>35 pounds</td>
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New Style Antenna Switch

A large, sturdy, well built "change over" switch suitable for use on sets up to 1 K.W. Mahogany finish base. Improved support, copper blades. Fitted with blade to disconnect receiver when sending. Extra large thumb lever. In this article shows you a considerable saving. Quick, easy operation. Shipping weight, 8 pounds.

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<tr>
<td>63 J 5514</td>
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<td>12 pounds</td>
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<tr>
<td>63 J 5515</td>
<td>1</td>
<td>25 pounds</td>
<td>35 pounds</td>
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Standard Wireless Key

One of the finest keys made for radio work, either spark or C.W. base lever and supports made of heavy brass in lacquered gold finish. Extra large durable hardened contact points. New style knob. Shipping weight, 1 pound.

| Article Number | K.V.A. | Shipping Weight | Price
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<tr>
<td>63 J 5352</td>
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<tr>
<td>63 J 5355</td>
<td>1</td>
<td>25 pounds</td>
<td>35 pounds</td>
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Double Action Wireless Key

Double action which makes for speed. Will improve your sending and lends individuality. Large weighted, heavy spring contact suitable for use up to 2 K.W. Motor base, heavy, high formica base. Metal parts nickel plated. Shipping weight, 1½ pounds.

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<td>63 J 5355</td>
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<td>25 pounds</td>
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Steal Lever Keys

Steel lever and switch bracket is heavy nickel plated and buffered. Black composition knob on switch and lever. Shipping weight, 1½ ounces.

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<td>63 J 1739</td>
<td>1</td>
<td>12 pounds</td>
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<td>63 J 1741</td>
<td>1</td>
<td>25 pounds</td>
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<tr>
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<td>$1.85</td>
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<tr>
<td>63 J 1741</td>
<td>1</td>
<td>25 pounds</td>
<td>35 pounds</td>
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Steel Lever Keys

Steel lever and switch bracket is heavy nickel plated and buffered. Black composition knob on switch and lever. Shipping weight, 1½ ounces.

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Montgomery Ward & Co.

All merchandise in this catalogue shipped from Northern Illinois.
Radio Hand Microphone
Portable Handset used when transmitting speech over radio telephone. Being especially designed for radio purposes, it has a properly balanced electrical component of correct resistance and capacitance carrying capacity for most efficient results. Fitted with 6-foot cord for connection to modulator for radio transmission. The operator to move about while transmitting. Exposed metal parts nickel plated and polished. Black corrugated handle. Hook for hanging up. Shipping weight, 2 pounds. $6.85

Panel Mount Radio Microphone Socket
Mounds firmly on a normal circuit, has unusual enamelled arm, polished nickel finish microphone. Same high-grade construction as above handset. Shipping weight, 2 pounds. $6.25

Kentonre Rectifier Tube
UV 216
Intended for use with 5-watt power tubes and is rated at 20 watts. Changes alternating current taken from household lighting circuit through a power transformer to direct current. This rectifier tube is then suitable for either plate or filament operation, making unnecessary a motor generator for high voltages. The output of this tube is 450 volts of maximum for these tubes when the load is such that the current is 300 milliamperes. E.C. input voltage, 550 volts (stepped up from 110-volt D.C.). D.C. output, 20 volts, 350 volts. Shipping weight, 1 pound. $7.50

A. P. 5-Watt transmitting Tube
This tube has been especially developed for amateur use as an undamped wave transmitter for either radio or telephone. Operating on 5000 volts and with plate potential of from 150 to 600 volts, which can be obtained either from batteries, generators, or any of the usual means of producing radio frequency. By connecting the grid and plate together, this tube may be used as a rectifier. Standard 4-prong base. Shipping weight, 1 pound. $7.50

5-Watt Transmitting Tube
Radiotron UV-202
This tube is especially intended for low power radio telephones and crystal sets. Two-watt tubes in parallel will put out about 1.5 amperes into the average amateur receiver tube as a modulator, and one tube as a transmitting tube. Radiophones that range from 20 miles to 40 miles is obtainable and four times that distance for C.W. telegraph when the two tubes are connected in parallel. Frequencies of 5000 volts, with plate potential of from 100 to 500 volts, which can be obtained either from batteries, generators, or any of the usual means of producing radio frequency. By connecting the grid and plate together, this tube may be used as a rectifier. Standard 4-prong base. Shipping weight, 1 pound. $7.50

Tuska Molded C.W. Inductance
A basic component for any C.W. system, and at an exceptionally low price. Exterior molded bakelite tubes 4 inches in diameter and 6 inches long. 48 tubes accorded in molded bakelite tube. Carrying capacity, 50 watts. Shipping weight, each 21.8 pounds. $8.00

Porcelain Transmitting Socket
The proper socket for transmitting tubes. Bases of porcelain, which is the ideal material for this purpose on account of its non-conductive capacity and its high insulating qualities. Shipping weight: 8 ounces.

Acme Inductor End
A rugged, flexible and efficient C.W. inductor. Consists of 30 turns of No. 14 C.W. wire wound on a bakelite bobbin and adjoined bakelite tube. Taps are brought out at each turn in the form of studs rigidly fastened to the wire and held in place by means of bakelite strips. Five insulated terminals for connecting wires are supplied. Makes a good radio-frequency contact. Five separate connections may be made on the inductor, each one spaced at a uniform distance one turn at a time while the tubes are excited. Shipping weight, 4 pounds. $8.00

Acme Grid Coils
A new type of Grid Coils. Consists of 25 turns of 5/8-inch wire wound on a 4-inch bakelite tube. Tapped at five points, making three variations possible: 0, 10 and 15 turns. Fit inside of Acme C.W. Inductance listed above. Shipping weight, 2 pounds. $2.00

C.W. Inductance With Sliders
Consists of 40 properly spaced turns of No. 10 bare copper wire, wound on a bakelite tube 4 inches in diameter. Positive, 110 pac polarity points; negative, 60 pac. Can be used as a variable in any cut by means of heavy phosphor brads. Moving on a solid 8-inch axis through the length of the inductance. Rigidly adapted to either plate or back panel mounting. Heavy terminals are provided for making external connections. Shipping weight, 2 pounds. $7.50

Radio Corporation Catalogue
This is a book listing with C.W. Corporation products which are described fully and completely. In addition, it contains a very comprehensive treatise on C.W. transmission and other information useful to the radio operator. A large number of transmitting and receiving circuits, wiring diagrams and a list of the apparatus required. Shipping weight, 6 ounces.

Aerial Change-Over Switch
A neat compact switch for stations doing transmitting and receiving. Enables you to change instantly from receiving to transmitting and vice versa. Throwing the switch to the sending position closes the transmitting circuit and the antenna circuit of the receiving side. Changing the switch to receiving position opens the receiving position of the astatic coils cut off, then the aerial is drained and finally the receiving circuit is closed. Formica base and terminal terminals. Aerial parts with nickel finish; 5 inches long, 3 inches wide, 4 inches high. Binding posts for all connections. Shipping weight, 2 pounds. $8.50

Transmitting Grid Leaks
Radio Corp. UP-1718
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 control the character of the antenna oscillations. Resistance element is embedded in a heat-resistant tube that will withstand sudden and severe temperature changes. Metal terminals for firm connections. Resistance, 5000 ohms with mid-tap at 2500 ohms. For use with 5-watt transmitting tubes. Sizes, 1/2 by 5 inches. Shipping weight, 1 pound. $1.10

Oscillation Transformer
Radio Corp. UL-1988
This transformer is designed especially for use in tube transmitting circuits. It is also adaptable for use as a low frequency transformer. This transformer consists of 25 turns of nickel plated copper stripped with nickel finish. Offers very little resistance to radio frequency currents, thereby assuring maximum radiation of low power C.W. transmitters. Exceptionally low inductance. Connections made on a wooden base which has four binding post connections, three of which have flexible conductors and clips for selecting pick-off points of the coil. The clips are attached to the coil, but when wing nut is tightened they will positively hold their positions and cannot be accidentally moved or detached. All metal parts nickel plated and polished. Shipping weight, 7 pounds. $11.00

Radio Ward/
Acme C.W. Power Transformers
Combine Plate and Filament
These transformers are used to step up 110-220 cycle A. C. to voltages used in C.W. transmission. High voltages are obtained by using these transformers when passed through the proper combination of rectifiers, choke coils and condensers applied to the plate as a direct current and is suitable for both radio telephony and telegraphy. Low voltages current is applied to the filament without rectification. Mounting type is securely mounted on standards and all connections are brought out to a formica panel with binding post connection plainly marked.

75-Watt Output Capacity
- Plate voltage, 275 volts; plate current, 100 milliamperes; filament voltage, 10 volts; filament current, 5 amperes. These transformers supply plate and filament voltages and current for two 5 tubes.
  563 J 7060—Mounted. Shipping weight, 10 pounds.
  563 J 7062—Unmounted, core and coils assembled. Shipping weight, 8 pounds.
  $15.00

200-Watt Output Capacity
- Plate voltage, 750 and 660 volts either side of center. Plate current, 300 milliamperes maximum; filament voltage, 10 volts for 25 amperes; current, 6 amperes for each winding. This transformer will supply plate and filament current and voltages for five 5 watts tubes; 200 volt side is used with electrolytic rectifier, 75 volt side is used with rectifying tube.
  563 J 7064—Mounted. Shipping weight, 12 pounds.
  563 J 7066—Unmounted with core and coils assembled. Shipping weight, 10 pounds.
  $20.00

Radio Corporation Power Transformers
UP-1368—Maximum Input 32 Watts
This transformer connected to alternating current 120 to 150 volts, will deliver proper voltages and currents for plate and filament of radio transmitting tubes. As many as four tubes can be handled and the current produced when passed through proper combination of rectifiers, choke coils and condensers is suitable for radio telephony in addition to C.W. or interrupted C.W. telegraphy. Plate winding consists of 125 volts or 1,100 volts, filament current, 7.5 volts. Shipping weight, 8 pounds.

563 J 7070—Mounted. Shipping weight, 12 pounds.
  $25.00

Thordarson Special Transformers
Designed to handle one 5 watt tube. Wiring diagrams are supplied with each transformer, which shows how some very remarkable results can be obtained on either C.W. telephony or telegraphy. For standard where a voltage of only 10 to 15 volts is required, this transformer is the other necessary accessories can be built into a very efficient set at a low cost. Plate voltage, 600 volts; filament voltage, 10 volts. Built shell type unmounted only.

563 J 7075—Mounted. Shipping weight, 10 pounds.
  $7.50

C.W. Plate Transformer
The ideal way for operating a C.W. set is to use a separate transformer for both plate and filament circuits. Not only is the secondary current easy to handle, but the key can be put in the primary after the transformer. Will supply the proper voltages and current for up to six 5 watt tubes, or one 30 watt tube, 250 watt capacity; also 500 milliamperes at 550 volts and 1,100 volts. Secondary current, 100 milliamperes at 1,000 volts and 400 milliamperes at 550 volts. The mounted type is supplied with cast standard and is fitted with a formica panel on which are binding post connections, all plainly marked. Unmounted type is supplied with core and coils assembled. Shipping weights, 10 and 14 pounds.

563 J 7072—Mounted. Shipping weight, 10 pounds.
  $20.00

563 J 7078—Unmounted. Shipping weight, 14 pounds.
  $16.00

C.W. Filament Heating Transformers
These transformers are used in conjunction with plate transformers described below to replace batteries for heating filaments. The A.C. current supplied being rectified to produce d.c. for use without rectification. 110 volt 60 cycle A.C. Primary; two secondary voltages of 8 and 12 volts are provided. The 8 volt winding is used on the secondary winding in order to connect the grid circuit to a point where potential control can be obtained. Provide with a rheostat in the primary for filament control. Also provided with condensers permanently connected across the secondaries. They do not alternate change from plus to minus. Shipping weight, 12 pounds.

563 J 7082—75 watt, mounted.
  $12.00

563 J 7083—75 watt, unmounted.
  9.00

563 J 7084—100 watt, mounted.
  15.00

563 J 7085—100 watt, unmounted.
  13.00

Acme Choke Coils
1½ Henries
Choke coils are used to smooth out the pulsations in the direct current supply to keep a constant potential current when modulating. Also prevent high frequency from bleeding up in the power supply. Best results are obtained with a coil in each side of the line. A tap is provided on the secondary winding for use with high frequency currents. Shipping weights, 75 watt, 12 pounds.

563 J 7010—150 MA capacity, single coil.
  $4.00

563 J 7011—100 MA capacity, double coil.
  6.00

563 J 7012—50 MA capacity, single coil.
  3.00

563 J 7013—50 MA capacity, double coil.
  8.00

Radio Corp. Filter Reactors
Mounted UP-1636—500 Milliamperes
These reactors are used to smooth out the high voltage current supplied by the plate circuit of a transmitting receiver. They are intended to be used with radio tubes or with other tubes. Best results are obtained with a coil in each side of the line. A tap is provided on the secondary winding for use with high frequency currents. Shipping weight, 20 pounds.

563 J 7105—Mounted.
  $11.50

Radio Corp. Plate Circuit Reactor UP-415
Radio telephone circuits using one or more tubes as oscillators and condensers, or more additional tubes as modulators, require a reactor in series to those tubes in order to maintain the D.C. supply voltage to the plate at constant value. Has an inductance of one henry and a resistance of 0.2 ohms. D.C. resistance, approximately 64 ohms. Shipping weight, 1/2 pound.

563 J 7110—Mounted.
  $5.75

Filter Condensers
Carefully made. Mounted in flat metal case, size 3/4 by 7/8 by 1 inch. Connecting leads at end of case. Shipping weight, 1 pound.

563 J 7115—5 volt.
  $1.35

Condensers for C.W. Transmitter Sets
563 J 7125—Farad type UC-1014. Capacity, 0.005 mfd.; voltage, 3000 volts.
  $8.50

563 J 7126—Farad type UC-1015. Capacity, 0.0005 mfd.; voltage, 3000 volts.
  $5.00

563 J 7127—Farad type UC-1016. Capacity, 0.0005 mfd.; voltage, 5000 volts.
  $3.50

All merchandise in this catalogue shipped from Northern Illinois
The Radio Dynamotor
To Operate From 32-Volt Direct Current

This combination dynamo and motor operates from 32-volt farm electric plant or motorboat power current. Connect the motor to the 32-volt currents and the generator produces 320 volts, 75 watts, which will take care of four tubes, two oscillators and two modulators. This generator with the other proper accessories can be built up into a transmitting set for a radio telephone range of 20 miles and upward. Shipping weight, 45 pounds.

$82.50
163 J 688.

6-Volt Radio Dynamotor
Will operate on a 6-volt storage battery. Just the machine for a portable set. Can be used on automobile, in motorboat, or on the street. Very rugged and durable. Delivers 320 volts, 15 watts. Will handle one 6-volt tube. Weight, 18 pounds. Shipping weight, 30 pounds.

$45.00
163 J 689.

Jewell Radio Meters

These meters are made by the Jewell Electrical Instrument Company. They are high quality instruments that have proved quite satisfactory for radio work. A very rugged case is built. Genuine sapphire bearings can be mounted flush on panel. Two sizes of instruments are supplied. We carry in stock and can have prompt shipment on order. We also sell meters of all calibrations more commonly used. We can also supply meters of any calibrations within approximately 10 days after receipt of order. All meters have black enamel finish with white faces and have handwound scales. Shipping weight, each, 1/4 to 3 pounds.

Radio Frequency Ammeter. Pattern 64
An antenna radio frequency ammeter is a necessity to properly control the operation of a C.W. tube set. These meters are of the thermo-coupled type, which makes a very high class instrument. Indicate current radiated very accurately even after long usage.


$11.25
63 J 7195. 0-0.5 amperes.
63 J 7181. 0-3 amperes.
63 J 7183. 0-10 amperes.
63 J 7190. 0-10 volts.
63 J 7191. 0-15 volts.

Alternating Current Voltmeters and Ammeters

$7.20
63 J 7170. 0-10 volts.
63 J 7171. 0-15 volts.
63 J 7175. 0-300 milliamperes.
63 J 7176. 0-500 milliamperes.

Direct Current Milliamperes Meters
Pattern 54. Flange diam., 3/4 inch; case diam., 3 in.

$6.95
63 J 7150. 0-10 milliamperes.
63 J 7152. 0-300 milliamperes.
63 J 7153. 0-500 milliamperes.

$5.40
63 J 7155. 0-10 milliamperes.
63 J 7156. 0-300 milliamperes.
63 J 7157. 0-500 milliamperes.

Filament Rheostat
Radio Corporation PR 35
Designed especially to regulate power tube filament current. Heat-resisting molded base, 2 3/4 inches diameter, with two concentric resistances which can be arranged to give four separate values of 2.5 ohms, 1.2 amp, 5 ohms, 2.5 amp, 10 ohms, 0.5 amp. Shipping weight, 1 pound.

$3.00
63 J 7197.

Motor Driven Chopper
Type PX-1638
For C.W. Tube Transmitters
Used for I.C.W. telegraphy. Can be driven by any motor to produce 1725 r.p.m. Gives positive interruption without adjustment. Not subject to any damped pitch by changing the driving motor speed. No modulating tubes required. Produces results much better than ordinary modulating chopper.

$7.25
63 J 7092 - Shipping weight, 3 pounds.
63 J 7093 - Adapting bushing for 1/4-inch shaft.
63 J 7094 - Adapting bushing for 3/8-inch shaft.
Paragon C. W. Radio Transmitter
Type 2-5-U
For Radio Telephony or Telegraphy Transmission

This is the simplest and most efficient small power set on the market. It is designed to use two 5-watt transmitting tubes of any standard make and will operate on one or both tubes. Can be switched instantly from telephone to telegraph transmission. With proper accessory equipment, we guarantee a range of 50 miles by voice. On tests made in Chicago, we have consistently worked 100 miles by voice. On numerous occasions we have been heard over 600 miles distant. The code range is considerably greater. The modulation is excellent and is obtained by the special Paragon method. With the average antenna, wavelengths lying between 180 and 325 meters are obtainable. Shorter wavelengths may be had by inserting a Variable Air Condenser in the antenna circuit. Longer wavelengths may be had by inserting an inductance in the antenna lead. The plate inductance control and the stabilizer grid control make it possible to adapt the transmitter to the average antenna and obtain perfect modulation immediately. The filament voltage of 110 volts will suffice, as sometimes require weeks of experimenting and then never reach the perfect modulation that one gets with the Paragon 2-5-U with a few minutes' adjustment. The filament current can be D.C. from battery, or stepped down A.C. plate current is best obtained from a motor generator. We recommend one of our 220 or 300-volt sets. Rectified A.C. can also be used with good results. All necessary accessories for rectifying A.C. are listed on the preceding three pages. Plate current can also be taken from "B" batteries. A battery voltage of from 100 volts up will suffice for working ranges of several miles. When using either D.C. generator supply or A.C. it is necessary to pass the current through a filter system in order that situations in current may be smoothed out. Where location is in isolated points such as on farms, ranches or small vessels, power may be supplied by storage batteries, filament being lim directly from the battery and the filament current may be used for driving a motor generator for the plate supply current.

Details
The Wave Change Switch gives choice of seven different wavelengths. On the average amateur station, this means seven wavelengths between 180 and 325 meters.

Magnavox Transmitter
Phonograph Tone Arm
Consists of a standard phonograph reproducer directly connected to a special Magnavox microphone, to which is connected two wires leading to transmitting set. Can be attached to any phonograph without wires, and with the regular arm and will play any type of disc record. Universal in use, by broadcasting stations for transmitting phonographic music. Simply connect two wires from Magnavox tone arm in place of microphone. Shipping weight, 4 pounds. $37.50

Magnavox
Bowl Shaped Transmitter
A special voice and sound collecting transmitter, developed for use during study and for broadcasting stations. It also delivers its microphones mounted on an adjustable stand, provides a high output of sound and delivers it to microphone mounted at sound level. Shipping weight, 5 pounds. $30.00

Modulation Transformer, Inductive Type
This transformer has a primary and secondary winding mounted on a laminated core. The inductivity of the radio is designed particularly for use with Radiotron UV-202 and Cunningham 302-5-1000. Takes microphone plug and delivers to microphone mounted at sound level. Shipping weight, 1½ pounds. $4.75

Magnetic Modulators for Radio Telephony
Radio Corporation UT-1643
and UT-1357
These modulators work on the same principles as those used in high powered transmitting stations. They connect to a radio telephone type power source, they give the full amount of adjustment or attenuation. Best results can be obtained even without previous experience. Simple in design and operation. Magnetic modulation is claimed to be the only non-distorting method of controlling the output of a single tube for radio telephony. It permits the parallel use of a number of tubes as oscillators and thus eliminates the use of special modulator tubes with their necessary additional accessories and critical adjustments.

Microphone Transformer
Radio Corporation UP-414
The characteristics of this transformer are such as that with a suitable microphone and a battery of four dry cells connected in series with the primary coil, a secondary voltage is obtained which will provide effective control of the radiated energy. Also provided with a side tone winding which may be connected to the telephone of the receiving set while transmitting, thus giving the operator the chance to check operation of his microphone. Shipping weight, 1½ pounds. $7.25

All merchandise in this catalogue shipped from Northern Illinois
It Is Easy to Order Radio Outfits and Supplies from this Catalogue

In this catalogue, we show a complete line of high grade radio outfits and supplies, from which you may choose the equipment best suited for use in your home. You may select a complete outfit ready for use, or if you prefer to construct your own outfit, this catalogue will enable you to order all of the necessary equipment. In either event, you may rest assured that your order will be filled to your complete satisfaction. For your convenience when ordering, we have enclosed with this catalogue, an order blank on which to write your order; however, you may use a plain piece of paper if you desire.

How to Order

The first thing you should do when ordering is to give us your correct address and shipping instructions so the merchandise will reach you promptly. Write your full name and address plainly. Give street and number (or R. F. D. and box), and post office. Also shipping point if it is different from post office. Each family should order under one name only, preferably the name of the head of the household.

Then go through this catalogue selecting the outfit or equipment you want, and give the following information:

1. Give article number of each item, quantity desired, name of article, and other information according to the outfit or equipment you order.
2. State the exact amount of money sent us with your order. Send remittance in the form of a post office money order, bank draft, or personal check. If currency, be sure to send by registered mail.
3. Shipping instructions: Be sure to give full shipping information. If you want your order shipped by parcel post, or prepaid express, send additional money to pay transportation charges. We will return any balance due you after we have paid shipping charges.

The 50th Year of Our Golden Rule Guarantee

Guarantee: It is our intention that every article in this book shall be truthfully described and be exactly as pictured. Therefore, we guarantee everything you buy from us to be satisfactory to you in every detail and to reach you in perfect condition.

You take no risk whatever in sending us your order, for unless you are completely satisfied with the goods and with your saving, you may send back anything you buy from us and we will promptly return your money and all transportation charges you have paid.

MONTGOMERY WARD & CO.

All merchandise in this catalogue shipped from Northern Illinois

Scale of Parcel Post Charges

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<thead>
<tr>
<th>Weight of Packages to Local Zone</th>
<th>1st and 2nd</th>
<th>3rd</th>
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<tr>
<td>Shipments to Our Customers from Chicago</td>
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<td>Over 150 Miles</td>
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<td>301 to 600 Miles</td>
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Note: Packages weighing more than fifty pounds cannot be shipped beyond the third zone.

No package having a combined length and girth of more than seven feet can be shipped by parcel post.
Newest Books on Radio Telephony and Telegraphy

Radio Book for Boys
By A. Hyatt Verrill
It gives a history of radio, describes its uses and construction, and instructions for operation. It is the first book the amateur can buy for himself in radio. 120 pages. Cloth bound. 5/6 by 8 inches. $1.85
Postage, 6¢ extra

Radio for Everybody
By A. Desbarbours
Easily understood and explained. Gives complete descriptions of various kinds of apparatus, and explains what is used to meet your needs and location. A complete guide in practical radio communication. 140 pages, 110 illustrations. Cloth bound. $1.37

Experimental Wireless Stations
By F. E. Edelman
The first and most complete book giving all of the recent radio improvements, some of which have never before been published. It only explains how to make apparatus, but how to make apparatus to hear all telegraphed and telephoned radio messages. Vacuum tube circuits, amplifiers, long distance sets, etc., are all explained and illustrated. Cloth bound. 5/6 by 7 3/4 inches. $1.38
Postage, 6¢ extra

Construction of New Type Transmittant Receivers
By M. B. Sleeper
In 27 chapters tells how to make a complete sender's outfit. The apparatus is so detailed that anyone can build it. Cloth bound. 5/6 by 7 3/4 inches. $2.43

Practical Wireless Telegraphy
By E. E. Buecher
Explains a complete transmission and reception of telegraphic node. Includes a set of test questions and a set of questions for radio operators. 140 pages. Illustrated. 6¢ by 9 1/4 inches. Cloth bound. $2.10
Postage, 6¢ extra

Wireless Telegraphy and Telegraph Receivers
By M. B. Sleeper
The man who wants the real thrill of accomplishment builds his own radio apparatus. Here is the first book to give this information in detail. Cloth bound. 5/6 by 7 3/4 inches. $2.00
Postage, 6¢ extra

Wireless Construction and Operation
By A. H. Royce
This book covers everything from the first foundation on up to the last details. It is practical and clear. Cloth bound. 5/6 by 9 inches. $1.65
Postage, 6¢ extra

Experimental Wireless
By E. E. Buecher
Detailed instructions for building and operating wireless telegraphy apparatus. A companion volume to the "Practical Wireless Telegraphy." 140 pages. Illustrated. 6¢ by 9 1/4 inches. Cloth bound. $2.20
Postage, 6¢ extra

Chicago Fort Worth Kansas City
Portland, Ore. Saint Paul
Our Special Complete Radio Receiving Outfit

An Outfit which Represents the Highest Development in Radio Receiving...

Simple to Operate—Best Results

Price Complete  $59.50

Our special complete receiving outfit is one of the very best on the market. It will equal in results any receiving outfit of its type, regardless of cost. Everything is complete—nothing extra to buy. You can take the materials we send you, put up the aerial wire, connect the instruments, which is easy to do, and in less than half an hour you can be receiving signals, radio music, lectures, stock reports, market reports, or any other radio program being sent out within your range.

While this outfit was especially designed for radio telephone receiving, it will give equally good results for radio telegraph reception, while making tests at Chicago the Detroit broadcasting station was regularly heard. Besides, Pittsburgh and other stations were often tuned in. It must be understood, however, that no range can be guaranteed for this or any other radio set, as atmospheric conditions, season of the year, time of day, geographic location, and the power of the transmitting station entirely control the effectiveness of radio equipment. Wavelength range—180 to 600 meters, which includes broadcasting stations, amateur and commercial ship and land stations.

Technical Description of Combined Tuner and Detector: This is a single circuit type regenerative tuner requiring only very simple adjustments. It is licensed under Armstrong patents. Tuning circuit is directly connected to the detector and consists of a high grade condenser, in series with an inductance having six taps and controlled by a switch lever. Regeneration is obtained by means of a tickler coil, mounted inside of the antenna inductance, which is wired into the plate circuit. Both condenser and tickler coil are controlled by dial mounted on panel, making tuning simple and rapid. Grid condenser in detector circuit. Tube socket of high grade molded composition. Finely graduated rheostat controls filament current. Panel is molded in one piece with engraved markings filled with contrasting while enamel. Fine mahogany finished cabinet with hinged top. Plainly marked binding posts for all connections.

THE COMPLETE OUTFIT INCLUDES:

Tuska Combined Tuner and Detector which is so simple in operation that a child can handle it.
Telephone Head Set—Our Special 2000-ohm Double Heat Set—reproduces messages loud and clear (see page 13 for complete description).
Radio Storage Battery—4.5 volt, 40-minute hour capacity (see page 21 for complete description)
One Detector Tube (see page 15).
One "B" Battery (see page 21).
Antenna Kit including 150 feet bare copper wire, 25 feet insulated wire, porcelain base double throw switch, lightning protector, ground clamp, 4 screw eyes and 25 feet of wire for connecting instruments. Shipping weight, complete outfit, 40 pounds.

563 J 639—Complete Outfit. .................................................. $59.50