

RADIO Engineering

The Technical Magazine of the Radio
Trade ~ Edited by M. B. SLEEPER



DECEMBER 1925

20c

VOL. V NO. 12

**EVEREADY HOUR
EVERY TUESDAY AT 9 P. M.**

Eveready Standard Time

For real radio enjoyment, tune in the "Eveready Group," broadcast through stations—

| | |
|-----------------------|-------------------------|
| WEAF New York | WCAC Pittsburgh |
| WAB Providence | WSA Cincinnati |
| WEEI Boston | WWJ Detroit |
| WTAR Worcester | WDCB Minneapolis |
| WAB Buffalo | WDC St. Paul |
| BSB St. Louis | WDC Des Moines |

For radio economy

EVEREADY Radio Batteries are noted for their long service and economical operation. They are made in different sizes and types so that every radio user can enjoy the economy and convenience to be had by fitting exactly the right Eveready to his receiver. Five of the dry-cell types of Eveready Radio Batteries are here illustrated and described to make it easy for you to decide just which will give the longest and most economical service on your set. A dealer near you sells Evereadys.

Manufactured and guaranteed by
NATIONAL CARBON CO., INC.
New York San Francisco

Canadian National Carbon Co., Limited
Toronto, Ontario

EVEREADY Radio Batteries

-they last longer

No. 364
Portable
27½-volt
Vertical
Price
\$1.75



Eveready Columbia Ignitor "A" Battery, the proven dry cell for all radio dry-cell tubes 12½ volts

No. 770
22½-volt
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Vertical
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\$1.00



No. 771
8½-volt
"C"
Battery
Price
40 cents

No. 486
45-volt
Layzell
Extra-Large
Vertical
Price
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No matter what set you buy, be sure the dealer puts in genuine Radiotrons:

| | |
|----------|--------|
| 1V-100 | \$2.50 |
| 1X-100 | \$2.50 |
| 1X-120 | \$2.50 |
| 1V-201-A | \$2.50 |
| 1X-201-A | \$2.50 |
| 1V-200 | \$2.50 |
| 1X-200 | \$2.50 |
| WD-11 | \$2.50 |
| WD-12 | \$2.50 |
| WX-12 | \$2.50 |
| 1X-112 | \$6.50 |
| 1X-210 | \$9.00 |

Rectrons:

| | |
|----------|--------|
| 1X-213 | \$7.00 |
| 1X-216-B | \$7.50 |

A "1X" or "WX" tube is the same as the corresponding "1V" or "WD" tube, except in the design of the base.

For every Christmas Radio Set use only genuine RCA Radiotrons

READ all the claims of all the makers of radio sets—and then remember this when you buy—that getting what is claimed for a set depends upon the quality of the *vacuum tube* put into it. You cannot get clearness—you cannot get distance—you cannot get volume—unless the *tubes* get it. That is why it is so important to look at the base of every tube, to be sure it is a *genuine* RCA Radiotron.

**A great gift
for any fan.— at \$2.50**

A radio fan will appreciate a "spare" Radiotron, just as an autoist appreciates a spare tire. But the Radiotron—a genuine RCA Radiotron—costs only \$2.50. If you note what make of set a man owns, any dealer can tell you which *type* of Radiotron he uses, and you can give him exactly what he would choose for himself.

**for owners of Super-Heterodynes
— the new power tube**

Every owner of a Radiola Super-Heterodyne can bring his set right up-to-date with the latest improvement, if you give him the new dry battery power Radiotron UX-120, and the adapter. The adapter costs but \$1.50. And this new tube means great volume with better tone than ever!

RADIO CORPORATION OF AMERICA
CHICAGO NEW YORK SAN FRANCISCO



Radiotron
1V-201-A,
standard high-vac-
uum tube for most
dry battery sets.

RCA-Radiotron

MADE BY THE MAKERS OF RADIOLAS

RADIO ENGINEERING

Edited by M. B. SLEEPER

Fifth Year

Vol. V, No. 12

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AMERTRAN

THE ORIGINAL

DE LUXE



AMERTRAN

Types AF-7 and AF-8

AmerTran audio transformers Types AF-7 and AF-8 have been considered for years among the leaders in audio amplification. Their gain, efficiency, and reliability have been demonstrated in a considerable variety of uses.

Type AF-7 \$1.25 AF-8 \$1.50



The

AMERTRAN Power Transformer

Types PF-40, 50, F-40 coils 117 volt

Type PF-40 is intended for use on the standard 110 volt, 60 cycle house lighting circuit. It has three separate well-insulated secondary windings. These are enclosed in a strong metal case provided with mounting holes. The secondary leads are shielded with flexible wire, but long enough to reach the terminals on the outside of the metal covering. This transformer is well suited for supplying B.C. power for tube sockets, and is designed with the usual margin of safety.

\$11.00 each



The New AMERCHOICE

Type 419

Type 419 is a specially designed impedance or choke coil of general utility, designed primarily for use in filter circuits. At the same time it is well adapted for bypassing direct current from the load circuit in a just as efficient and more economical than an equal impedance. When used with a 1000 ohm grid leak resistor, it can give quality music from the best output transformer. DC impedance is guaranteed by our accurate test, built in the case. \$2.00 each

A New Standard of Excellence in Audio Amplification

THIS new audio transformer has been developed for those who are satisfied only with the utmost in quality. It possesses an unusually straight line frequency characteristic extending the range below the lowest note now being broadcast, and actually shows a gain of about three octaves below that previously obtained.



The AmerTran De Luxe is a transformer of moderate size and weight, enclosed in a strong metal case with mounting holes at both top and bottom so that it may be inverted, affording simplified connections. While the AmerTran De Luxe will improve any set, appreciation of its uniform amplifying qualities can best be realized when operated in conjunction with straight line frequency loudspeakers, such as the best cone and disc types, and with a tube in the last stage capable of handling the output.

The AmerTran De Luxe is made in two types, one for the first stage and one for the second stage, and plainly marked as such. The chief difference between these two types is that the first stage transformer has approximately 50% greater primary inductance than the second stage transformer, thus more nearly corresponding to the operating impedances of the tubes out of which they work. For this reason it is advisable to purchase and operate these transformers by the pair!

PRICE, EITHER TYPE, \$10.00

Write for descriptive booklet on AMERTRAN Audio Products

American Transformer Company

178 Emmet Street, Newark, N. J.

"Transformer builders for over twenty-four years"

SOLD ONLY AT
AUTHORIZED AMERTRAN DEALERS



MICARTA Enhances Beauty

A RADIO set is a conspicuous piece of furniture. It must present a pleasing appearance to be acceptable in homes of refinement. Make the enclosing case of your radio set harmonize with the attractive appointments of a well-furnished home.

The satin-like lustre of the Micarta Radio Panel enhances the beauty of the design and of the cabinet handi-craft. Micarta panels may be had in mahogany, walnut or ebony. This variety of finish permits individuality of style and close color harmony.

Some of the largest and most successful manufacturers of wireless equipment use Micarta Radio Panels as a finishing touch of beauty. They are aware that appearance is an important factor in the sale of a product placed in the home.

Tune in

On one of the Westinghouse Broadcasting Stations tonight:

- KDKA**—East Pittsburgh, Pa.
- WBZ**—Chicago, Ill.
- KYW**—Springfield, Mass.
- KFKX**—Hastings, Neb.

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pennsylvania
Sales Offices in All Principal Cities of
the United States and Foreign Countries

Westinghouse

2431741



Howard Fixed Condensers

Of the many exceptional features embodied in Howard Fixed Condensers, the most unique is the method of assembly. A cap nut is used for this purpose instead of a rivet as is the usual custom. This is especially advantageous as it provides for accurate adjustment insuring the "fixed" rated capacity to be just as represented.

Only the best India Ruby Mica is used to separate the copper and brass conductors. Howard Fixed Condensers are all hand made, each tested on a capacity bridge and guaranteed to be noiseless and accurate. They are furnished in capacities of .00025, .0005, .001 and .002 M. F.

Get them at your dealers or write us.

Capacities Guaranteed As Stated



451-469 E. OHIO STREET

Put Them on Your Sales Force

JIM McILHENNY, star salesman for Elliott-Lewis R.C.A. distributors in Philadelphia, called on Kleffman in Altoona, Pa., his mind all made up to take a real order for super-heterodynes. The minute he broached the subject, Kleffman called to the back of the store, "George, do we want any of these R.C.A. super-hets?" "No," came the answer. "We're doing well enough with neutrodynes and tuned R. F." George is Kleffman's technical man. Probably Jim McIlhenny just put him down as a wise guy. Salesmen aren't expected to say much more for the technical men in dealers' and jobbers' organizations when they spoil sales that way.

The truth of the matter is that they are pretty wise. They are held responsible for passing on the technical merits of new products, and of selling them and keeping them sold. It's only natural for them to play safe and say, "No."

But these men, if you have sold them, from their point of view, are the best assistants your salesmen can have. They will work for you if you sell them on the "technical safety factor" of your products and your organization.

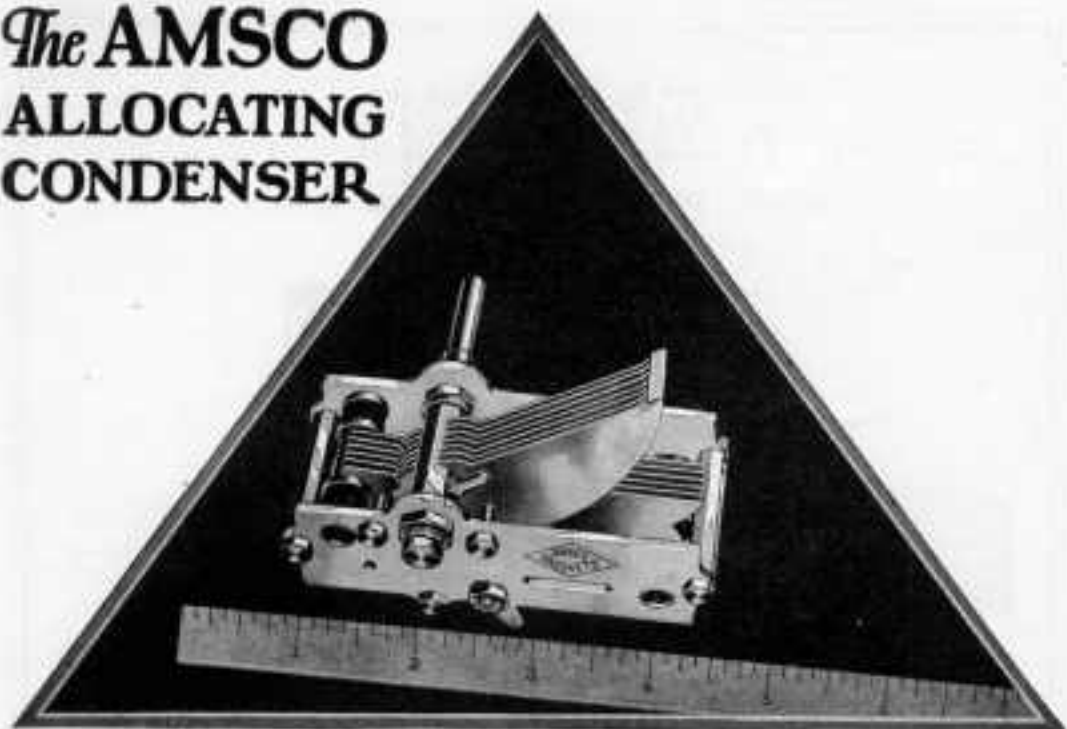
Radio Engineering, as a part of its 25,000 circulation, has over 9,000 paid subscribers who are employed as technical men in dealer, jobber, and manufacturing organizations. **Radio Engineering** is the only magazine in which you can talk to them directly and personally.

Radio Engineering readers absolutely control the buying power of the Radio Industry

This is the fifth of a series of six advertisements published to show readers and distributors, the exact status of Radio Engineering as a publication—its circulation, range of influence, editorial policy, class of readers, position as an advertising medium, and why it has been accepted as the leading technical magazine of the Radio Industry.

5

The AMSCO ALLOCATING CONDENSER



IT SAVES SPACE!

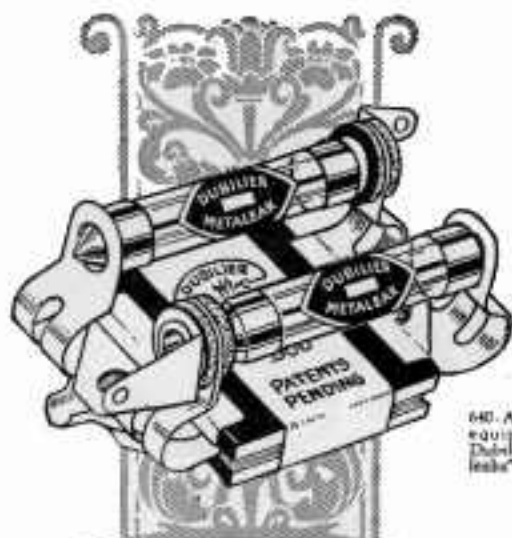
This straight line frequency condenser is a space-saver in the radio cabinet It can usually be substituted for the old type condensers in existing sets Once installed, it revolutionizes your ideas about tuning Those AmSCO half-a-heart-shaped plates add Kilocycles at the rate of ten to each dial division — giving "a station for every degree" All wavelengths—high or low on the scale—tune in with equal ease AmSCO allocation of the stations is uniform and correct to within a fraction of 1% Insist on AmSCO Allocating Condensers Made in six space-saving models, three Single and three Siamese, at reasonable prices

AmSCO Products, Inc., Dept. B
Broome & Lafayette Sts., N. Y.



OTHER AMSCO PARTS

Write for our booklet, "The Heart of the Hook-up" for full details and prices of the entire AmSCO line. AmSCO for Excellence.



640-A Micadon
equipped with
Dubilier "Meta-
leaks".

The New Resistance Coupled Amplification Unit

Dubilier has now perfected a new resistance coupled amplification unit.

It consists of the well-known 640 Micadon arranged with special clips for holding the new Dubilier metalized filament resistance units.

Together they form a device which is compact, easy to install, low in price—and thoroughly efficient.

Send 10c for 32-page booklet A-1, "Applications of Dubilier Condensers in Radio Circuits".

Address 4377 Bronx Blvd., New York

Dubilier

CONDENSER AND RADIO CORPORATION



A. Atwater Kent, who is providing a new type of radio entertainment to about 75 per cent of our population

An Opportunity to Sell Entertainment

The Atwater Kent concerts, broadcast each Sunday night from WEAF and its associated stations have given dealers a chance to sell radio on a real entertainment basis

MR. A. ATWATER KENT, in arranging for a full season of weekly concerts by world-famous artists who have never before entertained the radio audiences has made a tremendously important contribution to the permanent future of radio.

When the whole radio industry, and particularly the radio dealers, realize that this business can be made as permanent an institution as music itself, they will understand that there is no reason to fear a loss of public interest in communities within the range of the stations tied in with WEAF, from which the Atwater Kent programs are being transmitted.

As a result of the research and devel-

opment work done by the A. T. & T. Company, these stations transmit music more perfectly than it can be received on almost any set. It is now possible to hear the best artists in the country at no more expense than the cost of a radio set, the transmission is brought to the public with perfect quality, so that the dealer has only the problem of selecting receiving sets which will approach the perfection of the broadcasting equipment. Dealers who are guided in their judgment by the entertainment value of radio sets rather than by an extra five per cent in discounts can sell Anna Case, or Reinold Werrenrath to their customers instead of just plain radio outfits.

It is a very fortunate thing for the

public that Mr. Kent decided to broadcast through the A. T. & T. chain of stations, making the programs available to practically the entire country, rather than to operate a single broadcasting station to cover a comparatively small territory, as so many concerns have done.

Many dealers have capitalized the tremendous improvement in the quality of radio entertainment by selling sets this year to people who previously maintained that there was not enough broadcasting worth listening to to justify the purchase of a radio set, while to others; they have sold new outfits, capable of reproduction

in keeping with the quality of the programs, to replace old sets which did not do justice to the performers.

In addition, the movement to do away with regenerative sets of a type which radiate strongly enough to cause local interference has gained much strength.

The greatest stress put upon entertainment value, which calls for less complicated tuning as well as more accurate reproduction, probably accounts for the universal demand for straight line frequency condensers in order that the controls can be manipulated with greater facility.

The New Browning-Drake Units

In addition to improving the Browning-Drake tuning units, the National Company has added to its line a set of chokes for impedance amplification

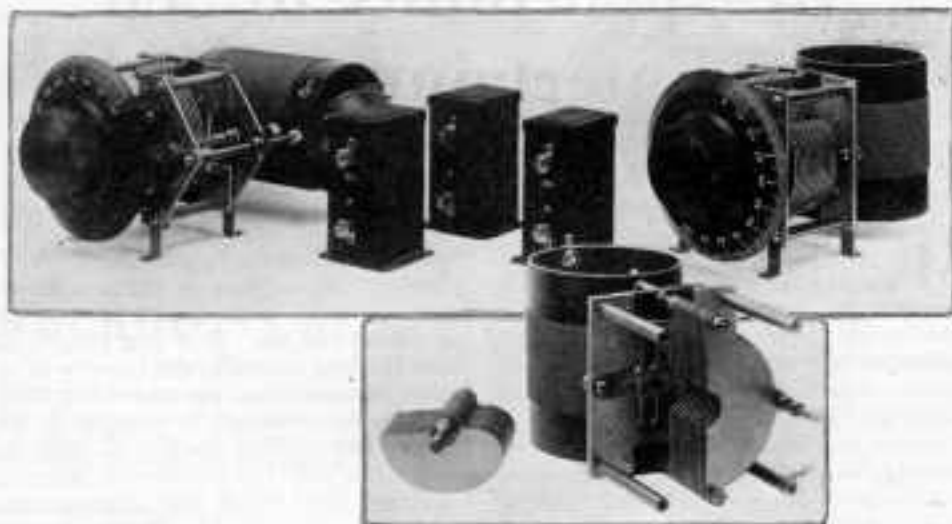


Fig. 1. Detail views of the new Browning-Drake units and the impedance coils.

THE National Company has done an unusual job, as a parts manufacturer, in the development of the Browning-Drake tuning units and in the sale of these items. Straight through the summer the demand for Browning-Drake coils held up and has increased greatly

this fall. Many of them have been used for the familiar Browning-Drake circuit, altho experimenters have devised many special hookups in which one or both of the tuning units are used.

This fall, the design of the condensers has been changed to give straight line

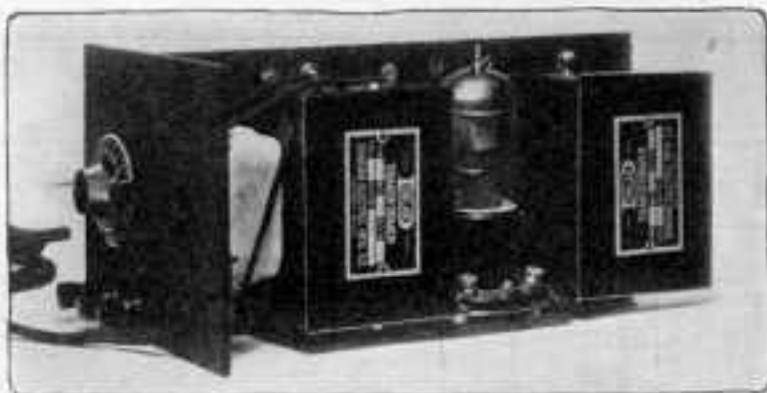


Fig. 1. This design, made up on two Celoron panels, is both compact and convenient.

Raytheon-Dongan Eliminator

Describing a design which radio dealers can follow out in merchandising Dongan transformers and chokes and the Raytheon tube—By *R. L. Osborne**

EACH season has brought new demands for special devices. This fall, the B battery eliminator is specially favored, and radio dealers have had their technical men at work to get up designs which their customers can follow, having purchased the parts.

Of the variety of types that have been built, there are a number of features which will recommend the combination shown in the accompanying photographs. It has been made up with the Dongan type 509 transformer and two type 514 chokes. In addition, there are two fixed condensers of 0.1 mfd., one of 0.5 mfd., two of 2.0 mfd., and two of 4.0 mfd. All the condensers were obtained from the Potter Manufacturing Company, of Chicago. The circuit employed is that recommended by the Raytheon Manufacturing Company, manufacturers of the Raytheon tube.

In the matter of convenience, this design is particularly good, for the parts could not be compressed into a smaller amount of space. Some cabinets will accommodate the complete eliminator in the compartment made for batteries, while there is ample space in any of the console cabinets. The tube is quite well protected from injury. The wiring has been carefully laid out so as to prevent

the slightest possibility of short circuits. The little panel at the front, measuring 6 ins. in width and 5 ins. high carries a Royalty variable resistance of 1,500 to 100,000 ohms, a very neat toggle switch for switching from high to low power, and three Eby binding posts marked GND., B DET+ and B AMP+. All the other parts are fastened to the rear panel which is 10 ins. long by 5 ins. high. It is fastened to the front panel by four angle brackets, two on each side at the top, and two on each side at the bottom. In the picture showing the under side, you will see a 10,000-ohm Electrad resistance, and the small bakelite plate, $2\frac{3}{8}$ ins. wide by $2\frac{1}{2}$ ins. long, which supports the Naal standard base socket. This panel is also fastened in place with a pair of angle brackets.

This rectifier unit, with a Raytheon tube, operates 10 or 12 201-A type tubes at full capacity, and without any hum. The latter is important, for some eliminators do not hum on a light load, but make a most objectionable noise the minute a heavy load is put on. The rectifier tube is an outgrowth of the old S tube. It operates on the same gas conduction principles. There is no filament to burn out or to become exhausted by constant use. The tubes should last for several years.

* Chief Engineer, Dongan Electric Mfg. Co.

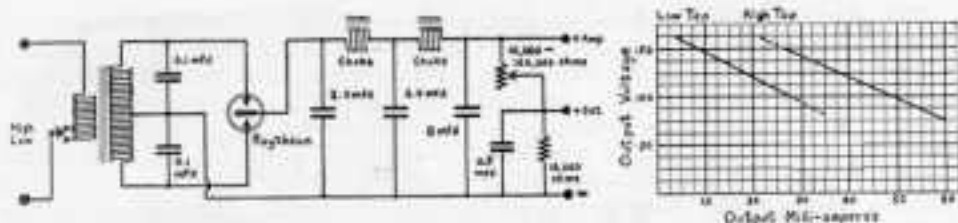


Fig. 4.—Wiring diagram of the Raytheon-Dongan eliminator, and a curve showing the voltage against current drain. The upper curve was taken with the switch on the tap of the transformer primary wind, giving a higher secondary voltage, and the lower curve with the full primary, at which adjustment the secondary voltage was reduced.

Moreover, the tube provides full-wave rectification, for both halves of the alternating current cycle are used. This makes the unit more economical in current consumption than the half-wave type, and makes less work for the filter circuits to do. The voltage characteristic is unusually constant. This is indicated in Fig. 4.

You will note that there are two curves. The upper one is the curve for the unit when the transformer primary tap is connected by the toggle switch. Throwing the switch to the other side connects the full primary winding, reducing the secondary voltage by reducing the primary-secondary turn ratio.

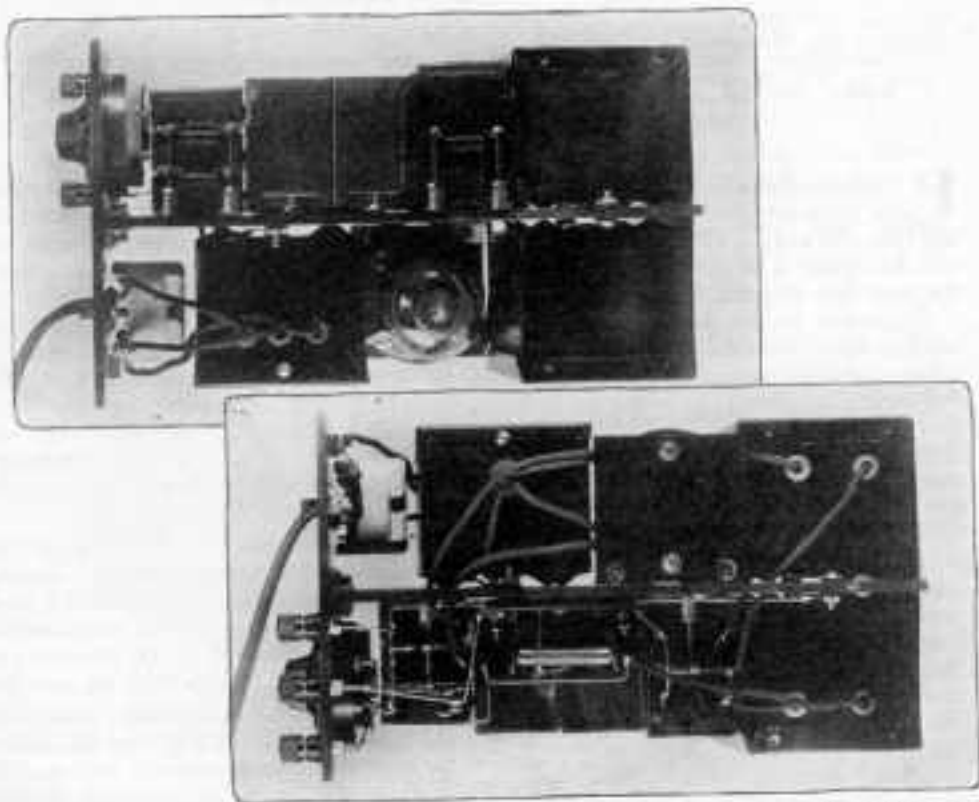


Fig. 2. Above, looking down on the top of the unit. Fig. 3. Below, the under side of the eliminator, showing the resistance mounting and the connections.

The filter circuit in Fig. 4 was designed by Prof. F. S. Dellenbaugh, Jr., of Massachusetts Institute of Technology. He is one of the foremost authorities on filter design in this country. So carefully has the filter circuit been worked out that, under all ordinary loads, it is impossible to hear the slightest hum either with headphones or the loud speaker.

In operating a device of this kind, it should be borne in mind that more care in handling the equipment and wiring it is called for than when a 6-volt battery circuit is used. There is nothing danger-

ous about the unit provided ordinary care is observed. One special fact should be borne in mind. When the unit is turned off, the lamp socket switch should be turned off first, and then the tubes. Try the set with first the tap and then the full primary coil, so that you can get the correct voltage. Also, adjust the variable resistance, as this controls the voltage. The fixed resistance of 10,000 ohms, from the detector post to B—, is designed to give 22 volts. The curve shows the approximate voltage from the amplifier post to B—.

How an Engineer Would Sell Loud Speakers

Salesmen shouldn't be engineers, but successful salesmen do make use of their knowledge of engineering principles — By *A. W. Harris**

IT must be conceded by everyone who is in close touch with radio engineering that the era of Better Radio Reception has made a marked advance during the past few months.

Engineers in the laboratories of the leading radio manufacturers, of this and other countries, have concentrated on the refinement of detail, in order to reduce that bug-bear of good reception—distortion. In the Engineers' Clubs and meetings, the layman listening in to the general conversation would often hear such expressions as peak frequencies, width of frequency band, etc., and he would soon discover that everyone was seeking to get a flat curve with a wide frequency range. The net result of all this patient investigation and improvement in design has been to nearly double the musical range of the better receiving sets.

Music consists of vibration mathematically arranged to produce harmony.

Middle C on the piano is 250 vibrations per second and its octaves are multiples thereof. To reproduce music from the highest notes down to the deep bass tones in all its beauty, and speech with its over-tones, requires vibration, varying from about 80 to 6000 per seconds, to be accurately reproduced, first by the receiving set and then by the loud speaker. Many of the receiving sets offered by the leading set manufacturers this year are able to accomplish this with a large degree of success.

Now comes the problem of the Loud Speaker and acoustic engineer. During the past few months he has had the same bee in his bonnet. He has been searching for and dreaming of the flat curve as high above zero and as wide as possible.

There are two components that make the loud speaker, the unit and the acoustic section. It is possible to have a good unit ruined by a bad acoustic section, or a good acoustic section spoiled by a poor unit. There are many types of

* Chief Engineer, Amplion Corp. of America.

loud speaker units on the market today. There are poor units which are nothing more than slightly enlarged telephones to which are attached horns of indifferent design. These speakers will often only reproduce about two octaves in the musical scale. There are Units which give good tone quality and volume, and include a wide frequency range, but are so fragile in their construction, having several delicate moving parts, that they soon lose their tone and volume. Then there are the really good "Units built to last." These Units are sturdy in construction and as carefully designed as a Rolls-Royce car. They are an engineering job, embodying strong permanent magnets of the highest grade magnet steel, coils scientifically constructed and tested, laminated pole pieces and diaphragms made of a special alloy and mounted so as to cover the widest range of vibrations possible.

There are horns or acoustic sections which will not pass more than three octaves on the musical scale. They are so badly designed and the impedance is so great, that base notes below 300 vibrations per second are lost and hence a good unit is spoiled.

A good acoustic horn is a transmission system capable of passing into the atmosphere vibrations up to 5000 per second and as low as 100. There is a definite relation between its length, rate of taper and size of opening for a predetermined low limit of tone. Any bends required to enable it to be fitted into a small space in a cabinet must be carefully designed so as not to interfere with the correct degree of taper called for by theory.

In other words, just as the best set manufacturers have, by careful investigation and great outlay of time and money, succeeded in increasing the efficiency of their sets, so the loud speaker manufacturers of standing have backed them up by making loud speakers capable of conveying to the public the best that the radio set can reproduce, in the form of true music and speech.

It will easily be understood, therefore, that if you place an engineer in a general Radio Store filled with a miscellaneous collection of different type loud speakers and ask him to sell them to the general

public, he will approach the proposition at an entirely different angle from the ordinary salesman. When he looks at the various assortment of speakers, good, bad and indifferent, he calls to mind his laboratory experience and experiments of the past months. He is naturally anxious that the increased efficiency of the receiving sets shall not be cramped and curtailed by a badly designed speaker. He is determined that his customer shall get the full benefit of the deep bass notes and the high treble notes in the musical scale.

He will first find out what set his prospective customer is using. He will familiarize himself with the characteristics of the various sets. He will know the sets which favor the low notes and are deep toned and therefore require or balance better with a higher pitch speaker and others which are high in pitch and more suited to a low, deep mellow speaker. When a lady customer wants to buy a speaker because it is artistic, and he knows it is badly designed, he will not necessarily talk of high and low vibrations, but he will demonstrate it to her and point out how, for instance, in reproducing Rachmoninoff Prelude it cuts off all the rich deep and stirring base notes and turns the great masterpiece into a parody. He will then switch on a good speaker and she will at once notice the difference. She will not know that those wonderful bass notes are in the region of 100 vibrations a second. She will not know that the laboratories of the factory which made that speaker, spent time and brains and money to enable the speaker to reproduce those notes.

She will not know that Liszt's Third Rhapsody has notes running up to 5000 vibrations, but she will be thrilled by their beauty and the engineer would point out these facts to her.

Then he would like to show her an oscillator test, using an oscillator giving cycles from 50 to 5000 and explain to her how obstructions in an acoustic system set up resonance at various frequencies so that the speaker, though giving volume, lacks quality. In fact there are so many things he would want to explain that I do not think an engineer is the right person to sell loud speakers!

PDQ RADIO SERVICE

Phone Market 7195

Replacement

Ant., Gnd.
Battery A, B, C.
Tubes 1, 2, 3, 4, 5, 6, 7, 8.
Loud Speaker
Grid Leak
Special

Repair

Ant., Gnd.
Battery A, B, C.
Eliminator
Loud Speaker
Connections
Inside Wiring
Special

Date _____ Charges _____ By _____

The service record used by the PDQ Radio Service

Record Builds Confidence

A service record, left with the customer, protects him and helps the installation and maintenance men

THE little card reproduced here was worked out after eighteen months of experience in handling radio maintenance and repair work and the men who did it. We started out to give quick, snappy, and satisfactory service at charges reasonable enough that people wouldn't feel that their sets cost too much to keep up.

We paid our men enough to attract those really expert in radio work, but I must admit we had troubles. The first thing we noticed were that our men either added a little personal profit for their sales, which they didn't turn in, of course, or else they felt they ought to make the most of each job by doing things which weren't necessary. Both these things might have been all right for installation men from a department store, but they wouldn't do for the kind of a business we were trying to build up.

After trying this thing and that, we settled on the service ticket, a form card to be left in the set at every call. Putting the charges on the ticket made it a receipt to the customer and gave the service man the feeling that the next man would see the record of his work and the amount he charged. It also put a

curb on the "mystery work" by requiring the man to record exactly the things he had done.

In addition, we capitalized the use of these cards by pointing out in our small local advertising that, by furnishing the service tickets, we provided a detailed record of renewals and faults. This wasn't so popular with dealers in our city who sold second grade sets which the owners called on us to service, because, on the strength of the ticket records, faults were brought out so obviously that those dealers had to take the sets back, but it gave the owners real confidence in us.

Also, locating trouble on a second or third call was made much easier by the records of work which had been done before. On the second call the new card was clipped to the first with an ordinary paper fastener.

This service ticket is a small thing, but it has helped us in handling our men, and I think it is largely responsible for the good will we have built up. We can give PDQ service, and we do it so reasonably that we get practically all that work which is done in our city.

RADIO ENGINEERING

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F. A. SKELTON, Managing Editor

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Vol. V DECEMBER, 1925 No. 12

EDITORIAL

IT IS natural to say it's much easier for the editor of a magazine to talk about running a jobber's or dealer's business than to get out and do it, but few jobbers or dealers realize what a clearing house for ideas, expressions of opinion, and advance plans is the office of a technical radio publication.

Now, regardless of how I would do things, if I were a jobber or dealer, very often I can see handwriting on the wall which says that things must be done, whether in one way or another.

Right now, with the whole industry in a blue haze over the disappointingly small amount of business done up to the end of October, the handwriting has come again. The words are clear and distinct. They are familiar words, but this winter they have a new significance—Quality and Service.

The public is thru with radio as we used to know it. The public has had all it will absorb of radio sets that aren't house broken. Music or nothing is the answer to dealers and manufacturers who have sold and built sets which do nothing more than demonstrate that more or less intelligible speech and music can be transmitted thru the air.

Nor is the public willing to turn radio engineer. Time was when sets had to have hinged covers, because looking at the works was a part of the thrill of having a set. But no more. There was lots of comment when R. C. A. put out the super-heterodyne with the works in a box filled with pitch. No one got excited this fall when sets were completely enclosed, even to covers over the tubes.

The public is running true to form. It buys amusement. It isn't amusing any more to get out and get under. Fortunately for radio, however, the charm of music never wears off. I said music. That's the only kind of a set that has a place in our homes. Why, another year and those rattling, ear-splitting radio sets will be as scarce as a phonograph with morning glory horns.—And, by the way, if we had realized that sooner, the Victor Talking Machine Company wouldn't have felt it worth while to develop the Orthophonic phonograph. Instead, they capitalized the big failing of radio—quality. They have already a service organization which puts to shame the service provided by radio manufacturers.

No radio business this fall? Don't let yourself believe that for a minute. There's more than ever, but not so many are getting it. Companies that are building house broken radio sets, or parts manufacturers who are tying in their products with successful construction designs are exceeding all records. But not every dealer is getting this merchandise. The fact that a manufacturer is working on a franchise plan doesn't prove that his product is up to this season's standards, and concerns who have the real goods to sell know that they will be only as satisfactory as the sales and service facilities provided by the dealer.

If you can't get these goods to sell, or if you don't know that only these goods are selling, don't blame the industry or the public. The fault is yours.

M. B. SLEEPER,
Editor.

Working Data on the Unipower A

The complete story of the 4-volt and 6-volt Unipower devices made by the Gould Storage Battery Company.

Through the successes and failures of various A battery devices, the Gould Storage Battery Company has been conducting a most thorough investigation into the question of A power derived from 110 volts A.C. The conclusion reached by their engineers is that the most satisfactory method is to combine in one unit a storage battery and charger. The charger is of the lead-tantalum-acid type, using the same container, same type of cell, same electrolyte and negative electrode as the battery cells.

There is no deterioration in the use of the rectifier other than that existing in the normal life of a storage battery. It requires only the addition of water put in the same time water is put in the battery cells. This design makes it possible to cut off the charge when the electrolyte is evaporated to a point below the lead point. This makes it impossible to injure the battery plates because of failure to put in water. The rate of evaporation in both the battery and rectifier cells is the same as in any of the ordinary types.

The following data and the information given on the page opposite will be found of tremendous assistance to those who are called upon to install and service the Unipower devices.

The AC-4 type is a 4-volt unit capable of operating up to eight 199 tubes or their equivalent. It works on 110 to 125 volts, 60 cycles, altho types can be obtained for 25 or 50 cycles. The capacity of the battery unit is 18 ampere hours. AC-4 weighs 14 lbs. 6 oz., or, when packed, 22 lbs.

The wiring diagrams show a resistance in the charging circuit, which can be short circuited by a push-pull switch. When the resistance is in the circuit, a trickle charge of 0.1 to 0.13 ampere flows into the battery. With the resistance short circuited, the charging rate is increased to 0.4 or 0.5 ampere. The current con-

sumed at trickle charge is 6 watts or 15 watts at the high rate.

The AC-6 operates up to eight 201-A type tubes, and works from the same supply lines. The capacity is 40 ampere hours. AC-6 weighs 39 lbs., or 48 lbs. packed. The trickle charge is 0.35 to 0.45 ampere or 1.3 to 1.5 amperes at the high rate, consuming 12 to 15 watts or 40 to 45 watts respectively for the two adjustments.

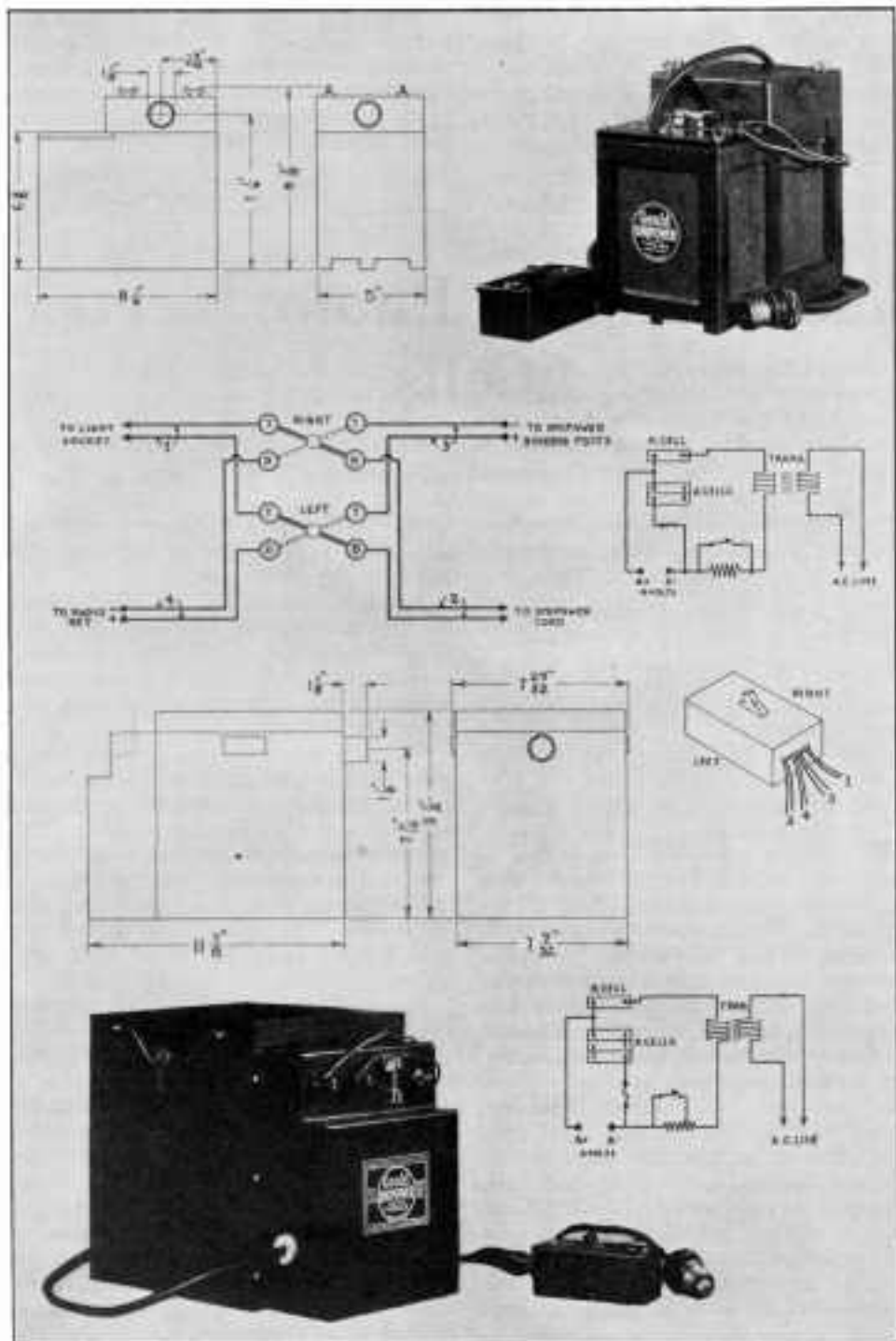
The electrolyte in all cells is of the standard specific gravity, 1.250 when fully charged. Normally water must be added to the AC-4 once in three months or once in two months to the AC-6.*

With each unit a Master control switch is supplied, shown in the illustration opposite. The connector for the AC supply should be put into a lamp socket, and the cord to the set connected to the A+ and A- battery terminals. In one position of the switch, the line is connected to the Unipower transformer primary and connections between the Unipower of the radio set are broken, allowing the battery to charge. With the switch in the other direction, the supply line is disconnected, and the Unipower put on to the set. It is, therefore, unnecessary to turn the tubes off at the radio set itself. If the control switch is used for that purpose, the battery is always on charge when not in use. If the set has been run considerably, the switch on the Unipower should be put on the full charge setting, or with only normal operation on the trickle charger.

For those who have a Unipower B supply also, a special cord can be provided to control the B battery.

The special virtue of this device is that the human factor, as far as possible, has

* Interesting data on the theory and principles of lead-tantalum-acid rectifier is given in Technology paper 365, published by the Bureau of Standards, Government Printing Office, Washington, D. C., and a complete explanation of the trickle charge is given in Storage Batteries, by Viral.



Details of the AC-4 and AC-6 Gold Unipower devices.

been eliminated. It is not possible to repeatedly discharge the battery completely before it is recharged, a practice which greatly reduces the life of a battery, there is no fluctuation in A supply voltage, and it is just as noiseless as a plain storage battery with a separate charger.

A vent from the battery is furnished so that any gases can escape through a hole in the side of a cabinet, altho experience in this respect does not indicate that the metal parts of the set are damaged, even over a considerable period of time, by exhaust gases.

Selenium and Photo Electric Cells

Chapter IV. The Purpose of Annealing Selenium and the Methods Employed—By Samuel Wein

THE literature is replete with reference on annealing selenium, a process employed to enhance its light-sensitive characteristics. Various temperatures and processing has been advocated from time to time.

However, the essentials for selenium cell construction, as has been pointed out, consists essentially in spreading the selenium into thin films over a large active surface, and by annealing and processing this phase of the operation.

That the resistance of selenium cells varies with the annealing temperature is evident, as shown by Dieterich²⁶ who verified the observations of Ries²⁷ in regard to the variation of resistance with annealing. Thus, Ries records two cells that were annealed at different temperatures, and shows that the higher the temperatures to which the cell was heated the lower was its ultimate resistance. The method employed by Ries differs from that used by Dieterich, however, in that he subjected the individual cells to a series of temperature changes, alternately heating and cooling each cell, measuring its resistance and sensitiveness while it was at room temperature. In these experiments each cell was subjected to a high temperature only once, but the results were the same as those obtained by Ries.

The influence of annealing on the resistance of the cells can be clearly

seen. The higher the temperature of annealing and the longer the time, the lower is the resistance.

It was further found that if cells were annealed for a short time only, and at a high temperature, and the annealing carried on to completion at a lower temperature, the resistance of the cells was materially reduced.

The resistance of the freshly made cells was, in general, low, but increased gradually, and this reached a constant value in a few weeks after making. This gradual, permanent-increase is no doubt due to the contraction of the selenium and its consequent tearing away from the electrodes. The resistance of the various cells ranged from 12,000 to 92,000,000 ohms.

Ruhmer²⁴ has shown that he was able to prepare two types of selenium cells, these he calls "hard" and "soft" cells, their difference in behavior being due to the allotropic forms of crystalline selenium. A soft cell is coarse grained, whereas a hard cell is fine grained, and can be obtained by annealing at a somewhat lower temperature. This gives a relatively smaller change in resistance to weak illumination than the other type. The soft cells are very sensitive for low light intensities, but their resistance change when exposed to strong illumination is small compared to that of the hard cells.

The single crystals of selenium made by Brown³⁸ have an extraordinarily high sensitivity as compared with a selenium cell, but they also have the characteristic slow recovery after exposure to light. From published data, it appears that a single crystal of selenium, 1 mm. in area, is 100 times as sensitive as the best selenium cell.

Many experimenters are inclined to believe that addition agents to the selenium increase the sensitivity to light considerably. This phase of selenium cell construction has not, unfortunately, been investigated to any great extent. Several investigators undertook to find out the extent of these increasing sensitiveness by these additional agents. The results gotten are contradictory and not dependable.

Moss³⁹ showed that mercury combines at ordinary temperature with selenium, producing a superficial film of comparatively low resistance. This effect is produced with vitreous as well as with the granular or metallic form of selenium.

Tisdale⁴⁰ corroborated the findings of Moss, in this case using bismuth and arsenic.

Coblentz⁴¹ forms molybdenum selenide by precipitation from ammonium molybdate on hydrogen selenide. This compound showed no marked actino-electric effect.

A German worker⁴² subjects amorphous selenium to the action of a quinoline solution. The mixture is heated to 200° C., and then allowed to cool very slowly for two or three days. Highly sensitive selenium cells it is claimed are made from the use of such selenium compounds.

WARNING. The red fumes from selenium, when subjected to elevated temperatures, are exceedingly poisonous, they corrode the skin, and have a tendency to affect the nails, coloring them reddish-brown and producing pain, which lasts for hours. They also affect the nasal channel, and with delicate matured individuals, it brings forth bleeding. Great care must be exercised when experimenting with selenium on this account.

³⁸ Dieterich. *Phys. Rev.* vol. 4, (2) page 470, 1914.

³⁹ Ries. *Das Elektrische Verh. des Krist. Selens*, etc. 1902.

⁴⁰ Ruhmer. *Elektrotech. Zeit.* vol. 25, page 1021, 1904.

⁴¹ Brown. *Phys. Rev.* vol. 4, (2) page 85, 1914.

⁴² Moss. *Proc. Roy. Soc. Lond.* vol. 25, page 22, 1875.

Nature. vol. 77, page 198, 1908.

⁴⁰ Tisdale. *Phys. Rev.* vol. 12 (2), page 334, 1918.

⁴¹ Coblentz. *Bur. Stand. Sci. Pap. No. 462*, page 596, 1922.

⁴² German. *Chem. Abst.* page 2586, 1920. German Pat. No. 304, 261.

Wavelength, Capacity, and Inductance Tables

On the following pages is a table showing the wavelength of circuits containing combinations of capacity and inductance from 0.00001 mfd. and 0.02 millihenry to 0.0020 mfd. and 200 millihenries.

To determine the wavelength of any circuit, select the column headed by the correct value of inductance, and run down to the figures opposite the given capacity. The number thus located is the wavelength of that combination of inductance and capacity.

A very small error is, of course, introduced by the distributed capacity in the

coil and the associate circuit, but the percentage of error should be very small in well designed sets.

The values of inductance are given in millihenries. To change to centimeters, multiply the inductance expressed in millihenries by 1,000,000. In other words, 1,000,000 cms. = 1.0 mh. Therefore, for example, 0.02 mh. = 20,000 cms., or 1.3 mh. = 1,300,000 cms.

To change microfarads to micro-microfarads, multiply the capacity in microfarads by 1,000,000. In other words, 0.0002 mfd. = 200 mmfd.

| C | 0.02 | 0.025 | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 | 0.10 | 0.12 | 0.14 | 0.16 | 0.18 | 0.20 |
|---------|------|-------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|
| 0.00001 | 27 | 30 | 33 | 38 | 42 | 46 | 50 | 53 | 57 | 60 | 65 | 71 | 75 | 80 | 84 |
| 0.00002 | 38 | 42 | 46 | 53 | 60 | 65 | 71 | 75 | 80 | 84 | 92 | 100 | 107 | 113 | 119 |
| 0.00003 | 46 | 52 | 57 | 65 | 73 | 80 | 86 | 92 | 98 | 103 | 113 | 122 | 131 | 139 | 146 |
| 0.00004 | 53 | 60 | 65 | 75 | 84 | 92 | 100 | 107 | 113 | 119 | 131 | 141 | 151 | 160 | 169 |
| 0.00005 | 60 | 67 | 73 | 84 | 94 | 103 | 112 | 119 | 126 | 133 | 146 | 158 | 169 | 179 | 189 |
| 0.00006 | 65 | 73 | 80 | 92 | 103 | 113 | 122 | 131 | 139 | 140 | 160 | 173 | 185 | 196 | 207 |
| 0.00007 | 71 | 79 | 86 | 100 | 112 | 122 | 132 | 141 | 150 | 158 | 173 | 187 | 200 | 212 | 223 |
| 0.00008 | 75 | 84 | 92 | 107 | 119 | 131 | 141 | 151 | 160 | 169 | 185 | 200 | 213 | 226 | 238 |
| 0.00009 | 80 | 89 | 98 | 113 | 126 | 139 | 150 | 160 | 170 | 179 | 196 | 212 | 226 | 240 | 253 |
| 0.00010 | 84 | 94 | 103 | 119 | 133 | 146 | 158 | 169 | 179 | 189 | 207 | 223 | 238 | 253 | 267 |
| 0.00012 | 92 | 103 | 113 | 131 | 146 | 160 | 173 | 185 | 196 | 207 | 226 | 244 | 261 | 277 | 292 |
| 0.00014 | 100 | 112 | 122 | 141 | 158 | 173 | 187 | 200 | 212 | 223 | 244 | 264 | 282 | 299 | 315 |
| 0.00016 | 107 | 119 | 131 | 151 | 169 | 185 | 200 | 213 | 226 | 238 | 261 | 282 | 302 | 320 | 337 |
| 0.00018 | 113 | 126 | 139 | 160 | 179 | 196 | 212 | 226 | 240 | 253 | 277 | 299 | 320 | 339 | 358 |
| 0.00020 | 119 | 133 | 146 | 169 | 189 | 207 | 223 | 238 | 253 | 267 | 292 | 315 | 337 | 358 | 377 |
| 0.00025 | 133 | 149 | 163 | 188 | 211 | 231 | 249 | 267 | 283 | 298 | 326 | 353 | 377 | 400 | 421 |
| 0.00030 | 146 | 163 | 179 | 206 | 231 | 253 | 273 | 292 | 310 | 326 | 358 | 386 | 413 | 438 | 462 |
| 0.00040 | 169 | 188 | 206 | 238 | 267 | 292 | 315 | 337 | 358 | 377 | 413 | 446 | 477 | 506 | 533 |
| 0.00050 | 188 | 211 | 231 | 267 | 298 | 326 | 353 | 377 | 400 | 421 | 462 | 499 | 533 | 565 | 596 |
| 0.00060 | 206 | 231 | 253 | 292 | 326 | 358 | 386 | 413 | 438 | 462 | 506 | 546 | 584 | 619 | 653 |
| 0.00070 | 223 | 249 | 273 | 315 | 353 | 386 | 417 | 446 | 473 | 499 | 546 | 590 | 631 | 669 | 705 |
| 0.00080 | 238 | 267 | 292 | 337 | 377 | 413 | 446 | 477 | 506 | 533 | 584 | 631 | 674 | 715 | 754 |
| 0.00090 | 253 | 283 | 310 | 358 | 400 | 438 | 473 | 506 | 536 | 565 | 619 | 669 | 715 | 759 | 800 |
| 0.00100 | 267 | 298 | 326 | 377 | 421 | 462 | 499 | 533 | 565 | 596 | 653 | 705 | 754 | 800 | 843 |
| 0.00110 | 280 | 313 | 342 | 395 | 442 | 484 | 523 | 559 | 593 | 625 | 685 | 740 | 791 | 839 | 884 |
| 0.00120 | 292 | 326 | 356 | 413 | 462 | 506 | 546 | 584 | 619 | 653 | 715 | 772 | 826 | 876 | 923 |
| 0.00130 | 304 | 340 | 372 | 430 | 481 | 526 | 569 | 611 | 645 | 680 | 744 | 804 | 850 | 912 | 961 |
| 0.00140 | 315 | 353 | 386 | 446 | 499 | 546 | 590 | 631 | 669 | 705 | 772 | 834 | 892 | 946 | 997 |
| 0.00150 | 326 | 365 | 400 | 462 | 516 | 565 | 611 | 653 | 690 | 730 | 800 | 864 | 923 | 979 | 1,032 |
| 0.00160 | 337 | 377 | 413 | 477 | 533 | 584 | 631 | 674 | 715 | 754 | 826 | 892 | 954 | 1,011 | 1,062 |
| 0.00170 | 348 | 389 | 426 | 491 | 550 | 602 | 650 | 695 | 737 | 777 | 851 | 920 | 983 | 1,042 | 1,099 |
| 0.00180 | 358 | 400 | 438 | 506 | 565 | 619 | 669 | 715 | 759 | 800 | 876 | 946 | 1,011 | 1,073 | 1,131 |
| 0.00190 | 367 | 411 | 450 | 520 | 581 | 637 | 687 | 735 | 780 | 822 | 900 | 972 | 1,041 | 1,102 | 1,162 |
| 0.00200 | 377 | 421 | 462 | 533 | 596 | 653 | 705 | 754 | 800 | 843 | 923 | 997 | 1,069 | 1,131 | 1,192 |

| C | 0.25 | 0.30 | 0.40 | 0.50 | 0.60 | 0.7 | 0.8 | 0.9 | 1.0 | 1.2 | 1.4 | 1.6 | 1.8 | 2.0 |
|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.00001 | 94 | 103 | 119 | 133 | 146 | 158 | 169 | 179 | 189 | 207 | 223 | 238 | 253 | 267 |
| 0.00002 | 133 | 146 | 160 | 180 | 207 | 223 | 238 | 253 | 267 | 292 | 315 | 337 | 358 | 377 |
| 0.00003 | 163 | 179 | 207 | 231 | 253 | 273 | 292 | 310 | 326 | 358 | 386 | 413 | 438 | 462 |
| 0.00004 | 189 | 207 | 238 | 267 | 292 | 315 | 337 | 358 | 377 | 413 | 446 | 477 | 506 | 533 |
| 0.00005 | 211 | 231 | 267 | 298 | 326 | 353 | 377 | 400 | 421 | 462 | 499 | 533 | 565 | 596 |
| 0.00006 | 231 | 253 | 292 | 326 | 358 | 386 | 413 | 438 | 462 | 506 | 546 | 584 | 619 | 653 |
| 0.00007 | 249 | 273 | 315 | 353 | 386 | 417 | 446 | 473 | 499 | 546 | 590 | 631 | 669 | 705 |
| 0.00008 | 267 | 292 | 337 | 377 | 413 | 446 | 477 | 506 | 533 | 584 | 631 | 674 | 715 | 754 |
| 0.00009 | 283 | 310 | 358 | 400 | 438 | 473 | 506 | 536 | 565 | 619 | 669 | 715 | 759 | 800 |
| 0.00010 | 298 | 326 | 377 | 421 | 462 | 499 | 533 | 565 | 596 | 653 | 705 | 754 | 800 | 843 |
| 0.00012 | 326 | 358 | 413 | 462 | 506 | 546 | 584 | 619 | 653 | 715 | 772 | 826 | 876 | 923 |
| 0.00014 | 353 | 387 | 446 | 499 | 546 | 590 | 631 | 669 | 705 | 772 | 834 | 892 | 946 | 997 |
| 0.00016 | 377 | 413 | 477 | 533 | 584 | 631 | 674 | 715 | 754 | 826 | 892 | 954 | 1,011 | 1,066 |
| 0.00018 | 400 | 438 | 506 | 565 | 619 | 669 | 715 | 759 | 800 | 876 | 946 | 1,011 | 1,073 | 1,131 |
| 0.00020 | 421 | 462 | 533 | 596 | 653 | 705 | 754 | 800 | 843 | 923 | 997 | 1,066 | 1,131 | 1,192 |
| 0.00025 | 471 | 516 | 596 | 666 | 730 | 789 | 843 | 894 | 942 | 1,032 | 1,115 | 1,192 | 1,264 | 1,333 |
| 0.00030 | 516 | 566 | 653 | 730 | 800 | 864 | 923 | 979 | 1,032 | 1,131 | 1,221 | 1,306 | 1,385 | 1,460 |
| 0.00040 | 596 | 653 | 754 | 843 | 923 | 997 | 1,066 | 1,131 | 1,192 | 1,306 | 1,410 | 1,506 | 1,596 | 1,666 |
| 0.00050 | 666 | 730 | 848 | 942 | 1,032 | 1,115 | 1,192 | 1,264 | 1,333 | 1,460 | 1,577 | 1,686 | 1,788 | 1,885 |
| 0.00060 | 730 | 800 | 923 | 1,032 | 1,131 | 1,221 | 1,306 | 1,385 | 1,460 | 1,599 | 1,727 | 1,846 | 1,959 | 2,065 |
| 0.00070 | 789 | 864 | 997 | 1,115 | 1,221 | 1,320 | 1,410 | 1,496 | 1,577 | 1,727 | 1,866 | 1,995 | 2,116 | 2,230 |
| 0.00080 | 843 | 923 | 1,066 | 1,192 | 1,306 | 1,410 | 1,509 | 1,599 | 1,686 | 1,846 | 1,995 | 2,133 | 2,262 | 2,384 |
| 0.00090 | 894 | 979 | 1,131 | 1,264 | 1,385 | 1,496 | 1,599 | 1,686 | 1,768 | 1,932 | 2,116 | 2,262 | 2,399 | 2,529 |
| 0.00100 | 942 | 1,032 | 1,192 | 1,333 | 1,460 | 1,577 | 1,686 | 1,768 | 1,855 | 2,065 | 2,230 | 2,384 | 2,529 | 2,665 |
| 0.00110 | 985 | 1,083 | 1,250 | 1,398 | 1,531 | 1,654 | 1,768 | 1,875 | 1,977 | 2,165 | 2,339 | 2,500 | 2,652 | 2,795 |
| 0.00120 | 1,032 | 1,131 | 1,306 | 1,460 | 1,599 | 1,727 | 1,846 | 1,959 | 2,065 | 2,262 | 2,443 | 2,612 | 2,770 | 2,920 |
| 0.00130 | 1,075 | 1,177 | 1,359 | 1,520 | 1,665 | 1,798 | 1,922 | 2,039 | 2,149 | 2,354 | 2,543 | 2,718 | 2,883 | 3,039 |
| 0.00140 | 1,115 | 1,221 | 1,410 | 1,577 | 1,727 | 1,866 | 1,985 | 2,116 | 2,230 | 2,443 | 2,639 | 2,821 | 2,992 | 3,154 |
| 0.00150 | 1,154 | 1,264 | 1,460 | 1,632 | 1,788 | 1,932 | 2,065 | 2,190 | 2,308 | 2,529 | 2,732 | 2,920 | 3,097 | 3,264 |
| 0.00160 | 1,192 | 1,306 | 1,509 | 1,686 | 1,846 | 1,995 | 2,133 | 2,262 | 2,384 | 2,612 | 2,821 | 3,016 | 3,199 | 3,372 |
| 0.00170 | 1,229 | 1,346 | 1,554 | 1,737 | 1,904 | 2,056 | 2,198 | 2,332 | 2,457 | 2,692 | 2,908 | 3,108 | 3,297 | 3,475 |
| 0.00180 | 1,264 | 1,385 | 1,599 | 1,788 | 1,959 | 2,116 | 2,262 | 2,399 | 2,529 | 2,770 | 2,992 | 3,199 | 3,392 | 3,576 |
| 0.00190 | 1,299 | 1,423 | 1,643 | 1,837 | 2,012 | 2,174 | 2,324 | 2,465 | 2,598 | 2,846 | 3,074 | 3,286 | 3,485 | 3,674 |
| 0.00200 | 1,333 | 1,460 | 1,686 | 1,885 | 2,065 | 2,230 | 2,384 | 2,529 | 2,665 | 2,920 | 3,154 | 3,372 | 3,575 | 3,770 |

| C | 2.5 | 3.0 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 | 12.0 | 14.0 | 16.0 | 18.0 | 20.0 | 25.0 |
|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|
| 0.00001 | 298 | 326 | 377 | 421 | 462 | 499 | 533 | 565 | 596 | 653 | 705 | 754 | 800 | 843 | 942 |
| 0.00002 | 421 | 462 | 533 | 596 | 653 | 705 | 754 | 800 | 843 | 923 | 997 | 1,066 | 1,131 | 1,192 | 1,333 |
| 0.00003 | 516 | 566 | 653 | 730 | 800 | 864 | 923 | 979 | 1,032 | 1,131 | 1,221 | 1,306 | 1,385 | 1,460 | 1,632 |
| 0.00004 | 596 | 653 | 754 | 843 | 923 | 997 | 1,066 | 1,131 | 1,192 | 1,306 | 1,410 | 1,509 | 1,599 | 1,686 | 1,885 |
| 0.00005 | 663 | 730 | 843 | 942 | 1,032 | 1,115 | 1,192 | 1,264 | 1,333 | 1,490 | 1,577 | 1,656 | 1,738 | 1,815 | 2,108 |
| 0.00006 | 730 | 800 | 923 | 1,032 | 1,131 | 1,221 | 1,306 | 1,385 | 1,460 | 1,599 | 1,727 | 1,846 | 1,959 | 2,065 | 2,398 |
| 0.00007 | 789 | 864 | 997 | 1,115 | 1,221 | 1,320 | 1,410 | 1,495 | 1,577 | 1,727 | 1,866 | 1,995 | 2,116 | 2,230 | 2,613 |
| 0.00008 | 843 | 923 | 1,066 | 1,192 | 1,306 | 1,410 | 1,509 | 1,599 | 1,686 | 1,846 | 1,995 | 2,134 | 2,262 | 2,381 | 2,865 |
| 0.00009 | 894 | 979 | 1,131 | 1,264 | 1,385 | 1,495 | 1,599 | 1,698 | 1,788 | 1,969 | 2,116 | 2,262 | 2,399 | 2,529 | 3,013 |
| 0.00010 | 942 | 1,032 | 1,192 | 1,333 | 1,460 | 1,577 | 1,686 | 1,788 | 1,885 | 2,065 | 2,230 | 2,384 | 2,529 | 2,665 | 3,150 |
| 0.00012 | 1,032 | 1,131 | 1,306 | 1,460 | 1,599 | 1,727 | 1,846 | 1,959 | 2,065 | 2,262 | 2,443 | 2,612 | 2,770 | 2,920 | 3,264 |
| 0.00014 | 1,115 | 1,221 | 1,410 | 1,577 | 1,727 | 1,846 | 1,985 | 2,116 | 2,230 | 2,443 | 2,639 | 2,821 | 2,992 | 3,164 | 3,526 |
| 0.00016 | 1,192 | 1,306 | 1,509 | 1,686 | 1,846 | 1,985 | 2,133 | 2,262 | 2,384 | 2,612 | 2,821 | 3,016 | 3,199 | 3,372 | 3,770 |
| 0.00018 | 1,264 | 1,385 | 1,599 | 1,788 | 1,959 | 2,116 | 2,262 | 2,399 | 2,529 | 2,770 | 2,992 | 3,199 | 3,392 | 3,576 | 3,995 |
| 0.00020 | 1,333 | 1,460 | 1,686 | 1,885 | 2,065 | 2,230 | 2,384 | 2,529 | 2,665 | 2,920 | 3,154 | 3,372 | 3,576 | 3,770 | 4,214 |
| 0.00025 | 1,490 | 1,632 | 1,885 | 2,108 | 2,308 | 2,493 | 2,665 | 2,827 | 2,980 | 3,264 | 3,526 | 3,770 | 3,998 | 4,214 | 4,713 |
| 0.00030 | 1,632 | 1,788 | 2,065 | 2,308 | 2,529 | 2,732 | 2,920 | 3,097 | 3,264 | 3,576 | 3,863 | 4,129 | 4,379 | 4,617 | 5,161 |
| 0.00040 | 1,885 | 2,065 | 2,384 | 2,665 | 2,920 | 3,154 | 3,372 | 3,576 | 3,770 | 4,129 | 4,400 | 4,768 | 5,057 | 5,331 | 5,960 |
| 0.00060 | 2,108 | 2,380 | 2,665 | 2,980 | 3,264 | 3,526 | 3,770 | 3,998 | 4,214 | 4,617 | 4,987 | 5,331 | 5,654 | 5,960 | 6,663 |
| 0.00080 | 2,308 | 2,529 | 2,920 | 3,264 | 3,576 | 3,863 | 4,129 | 4,379 | 4,617 | 5,057 | 5,462 | 5,840 | 6,192 | 6,529 | 7,299 |
| 0.00070 | 2,493 | 2,732 | 3,154 | 3,526 | 3,863 | 4,172 | 4,460 | 4,731 | 4,987 | 5,462 | 5,900 | 6,306 | 6,693 | 7,052 | 7,885 |
| 0.00080 | 2,665 | 2,920 | 3,372 | 3,770 | 4,129 | 4,460 | 4,768 | 5,057 | 5,331 | 5,840 | 6,306 | 6,741 | 7,152 | 7,539 | 8,429 |
| 0.00090 | 2,827 | 3,097 | 3,576 | 4,000 | 4,379 | 4,731 | 5,057 | 5,364 | 5,654 | 6,192 | 6,693 | 7,152 | 7,587 | 7,996 | 8,940 |
| 0.00100 | 2,980 | 3,264 | 3,770 | 4,214 | 4,617 | 4,987 | 5,331 | 5,654 | 5,960 | 6,529 | 7,052 | 7,539 | 7,996 | 8,429 | 9,423 |
| 0.00110 | 3,125 | 3,424 | 3,953 | 4,420 | 4,842 | 5,230 | 5,591 | 5,930 | 6,251 | 6,848 | 7,396 | 7,909 | 8,386 | 8,810 | 9,890 |
| 0.00120 | 3,264 | 3,576 | 4,129 | 4,617 | 5,037 | 5,462 | 5,840 | 6,192 | 6,529 | 7,152 | 7,724 | 8,261 | 8,761 | 9,233 | 10,320 |
| 0.00130 | 3,398 | 3,722 | 4,298 | 4,805 | 5,264 | 5,685 | 6,109 | 6,449 | 6,796 | 7,444 | 8,040 | 8,594 | 9,119 | 9,611 | 10,730 |
| 0.00140 | 3,526 | 3,863 | 4,460 | 4,987 | 5,462 | 5,900 | 6,306 | 6,693 | 7,032 | 7,724 | 8,344 | 8,922 | 9,459 | 9,973 | 11,150 |
| 0.00150 | 3,650 | 3,988 | 4,617 | 5,161 | 5,654 | 6,109 | 6,529 | 6,902 | 7,299 | 7,996 | 8,637 | 9,233 | 9,794 | 10,320 | 11,540 |
| 0.00160 | 3,770 | 4,129 | 4,768 | 5,331 | 5,840 | 6,306 | 6,741 | 7,152 | 7,539 | 8,261 | 8,922 | 9,536 | 10,110 | 10,660 | 11,920 |
| 0.00170 | 3,885 | 4,256 | 4,915 | 5,495 | 6,020 | 6,502 | 6,949 | 7,373 | 7,771 | 8,511 | 9,196 | 9,828 | 10,420 | 10,990 | 12,290 |
| 0.00180 | 3,998 | 4,379 | 5,057 | 5,654 | 6,192 | 6,693 | 7,152 | 7,587 | 7,996 | 8,761 | 9,459 | 10,110 | 10,730 | 11,310 | 12,640 |
| 0.00190 | 4,108 | 4,500 | 5,196 | 5,809 | 6,365 | 6,872 | 7,384 | 7,796 | 8,215 | 9,000 | 9,721 | 10,410 | 11,020 | 11,620 | 12,960 |
| 0.00200 | 4,214 | 4,617 | 5,331 | 5,960 | 6,529 | 7,052 | 7,539 | 7,996 | 8,429 | 9,230 | 9,973 | 10,660 | 11,310 | 11,920 | 13,330 |

| C, | 30.0 | 40.0 | 50.0 | 60.0 | 70.0 | 80.0 | 90 | 100 | 120 | 140 | 160 | 180 | 200 |
|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0.00001 | 1.032 | 1.192 | 1.333 | 1.450 | 1.577 | 1.686 | 1.788 | 1.885 | 2.065 | 2.230 | 2.384 | 2.529 | 2.665 |
| 0.00002 | 1.460 | 1.686 | 1.885 | 2.065 | 2.230 | 2.384 | 2.529 | 2.665 | 2.920 | 3.154 | 3.372 | 3.576 | 3.770 |
| 0.00003 | 1.788 | 2.065 | 2.308 | 2.529 | 2.732 | 2.920 | 3.097 | 3.264 | 3.576 | 3.863 | 4.129 | 4.379 | 4.617 |
| 0.00004 | 2.065 | 2.384 | 2.665 | 2.920 | 3.154 | 3.372 | 3.576 | 3.770 | 4.129 | 4.400 | 4.768 | 5.037 | 5.331 |
| 0.00005 | 2.308 | 2.665 | 2.980 | 3.264 | 3.526 | 3.770 | 3.998 | 4.214 | 4.617 | 4.987 | 5.331 | 5.654 | 5.960 |
| 0.00006 | 2.529 | 2.920 | 3.264 | 3.578 | 3.862 | 4.129 | 4.379 | 4.617 | 5.057 | 5.462 | 5.840 | 6.192 | 6.529 |
| 0.00007 | 2.732 | 3.154 | 3.526 | 3.863 | 4.172 | 4.460 | 4.731 | 4.987 | 5.462 | 5.900 | 6.306 | 6.693 | 7.052 |
| 0.00008 | 2.920 | 3.372 | 3.770 | 4.129 | 4.460 | 4.768 | 5.057 | 5.331 | 5.840 | 6.306 | 6.741 | 7.152 | 7.539 |
| 0.00009 | 3.097 | 3.576 | 4.000 | 4.379 | 4.731 | 5.057 | 5.364 | 5.654 | 6.192 | 6.693 | 7.152 | 7.587 | 7.996 |
| 0.00010 | 3.264 | 3.770 | 4.214 | 4.617 | 4.987 | 5.331 | 5.654 | 5.960 | 6.529 | 7.052 | 7.539 | 7.996 | 8.429 |
| 0.00012 | 3.576 | 4.129 | 4.617 | 5.057 | 5.462 | 5.840 | 6.192 | 6.529 | 7.152 | 7.724 | 8.261 | 8.761 | 9.233 |
| 0.00014 | 3.863 | 4.460 | 4.987 | 5.462 | 5.900 | 6.306 | 6.693 | 7.052 | 7.724 | 8.344 | 8.922 | 9.459 | 9.973 |
| 0.00016 | 4.129 | 4.768 | 5.331 | 5.840 | 6.306 | 6.741 | 7.152 | 7.539 | 8.261 | 8.922 | 9.536 | 10.110 | 10.660 |
| 0.00018 | 4.379 | 4.987 | 5.654 | 6.192 | 6.693 | 7.152 | 7.587 | 7.996 | 8.761 | 9.459 | 10.110 | 10.730 | 11.310 |
| 0.00020 | 4.617 | 5.331 | 5.960 | 6.529 | 7.052 | 7.539 | 7.996 | 8.429 | 9.230 | 9.973 | 10.660 | 11.310 | 11.920 |
| 0.00025 | 5.161 | 5.960 | 6.653 | 7.299 | 7.885 | 8.429 | 8.940 | 9.423 | 10.320 | 11.150 | 11.920 | 12.640 | 13.330 |
| 0.00030 | 5.659 | 6.529 | 7.260 | 7.906 | 8.637 | 9.233 | 9.794 | 10.320 | 11.310 | 12.210 | 13.060 | 13.850 | 14.600 |
| 0.00040 | 6.529 | 7.539 | 8.429 | 9.233 | 9.973 | 10.660 | 11.310 | 11.920 | 13.060 | 14.100 | 15.060 | 15.960 | 16.800 |
| 0.00050 | 7.299 | 8.429 | 9.423 | 10.320 | 11.150 | 11.920 | 12.640 | 13.330 | 14.600 | 15.770 | 16.800 | 17.880 | 18.850 |
| 0.00060 | 7.996 | 9.233 | 10.320 | 11.310 | 12.210 | 13.060 | 13.850 | 14.600 | 15.960 | 17.270 | 18.460 | 19.590 | 20.650 |
| 0.00070 | 8.637 | 9.973 | 11.150 | 12.210 | 13.200 | 14.100 | 14.960 | 15.770 | 17.270 | 18.660 | 19.950 | 21.160 | 22.300 |
| 0.00080 | 9.233 | 10.660 | 11.920 | 13.060 | 14.100 | 15.060 | 15.960 | 16.800 | 18.460 | 19.950 | 21.330 | 22.620 | 23.840 |
| 0.00090 | 9.794 | 11.310 | 12.640 | 13.850 | 14.960 | 15.960 | 16.960 | 17.880 | 19.950 | 21.160 | 22.620 | 23.940 | 25.200 |
| 0.00100 | 10.320 | 11.920 | 13.330 | 14.600 | 15.770 | 16.800 | 17.880 | 18.850 | 20.650 | 22.300 | 23.840 | 25.200 | 26.550 |
| 0.00010 | 10.830 | 12.500 | 13.980 | 15.310 | 16.540 | 17.680 | 18.760 | 19.770 | 21.650 | 23.390 | 25.000 | 26.520 | 27.950 |
| 0.00120 | 11.310 | 13.060 | 14.600 | 15.960 | 17.270 | 18.460 | 19.590 | 20.650 | 22.620 | 24.430 | 26.120 | 27.700 | 29.200 |
| 0.00130 | 11.770 | 13.560 | 15.200 | 16.650 | 17.980 | 19.230 | 20.390 | 21.490 | 23.540 | 25.430 | 27.120 | 28.830 | 30.390 |
| 0.00140 | 12.210 | 14.100 | 15.770 | 17.270 | 18.660 | 19.950 | 21.160 | 22.300 | 24.430 | 26.390 | 28.210 | 29.920 | 31.540 |
| 0.00150 | 12.640 | 14.600 | 16.320 | 17.880 | 19.320 | 20.650 | 21.900 | 23.080 | 25.200 | 27.320 | 29.200 | 30.970 | 32.640 |
| 0.00160 | 13.060 | 15.090 | 16.860 | 18.460 | 19.950 | 21.330 | 22.620 | 23.840 | 26.120 | 28.210 | 30.160 | 31.980 | 33.720 |
| 0.00180 | 13.460 | 15.540 | 17.370 | 19.040 | 20.560 | 21.960 | 23.230 | 24.570 | 26.920 | 29.080 | 31.080 | 32.860 | 34.750 |
| 0.00180 | 13.850 | 15.960 | 17.880 | 19.500 | 21.160 | 22.620 | 23.990 | 25.290 | 27.700 | 29.920 | 31.990 | 33.720 | 35.760 |
| 0.00190 | 14.230 | 16.430 | 18.370 | 20.120 | 21.740 | 23.240 | 24.650 | 25.980 | 28.400 | 30.740 | 32.860 | 34.850 | 36.740 |
| 0.00200 | 14.600 | 16.970 | 18.850 | 20.650 | 22.300 | 23.840 | 25.290 | 26.650 | 29.200 | 31.540 | 33.720 | 35.760 | 37.770 |

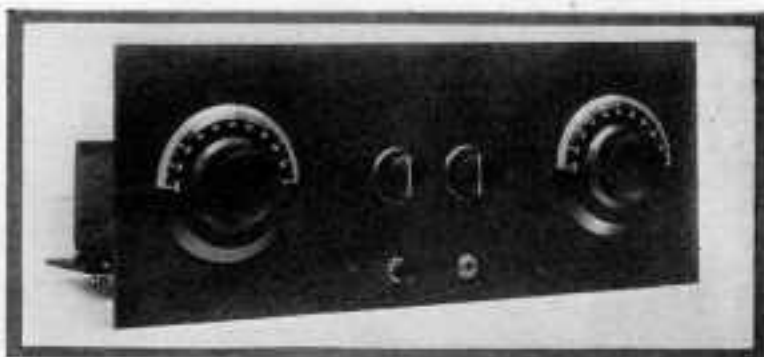


Fig. 1. The New Yorker has been made to appeal in appearance to the experienced designer as well satisfy in results the experienced B. C. L.

The New Yorker

An outfit built to meet the special requirements of B. C. L.'s in the larger cities where there is much local interference. Dry cells can be used with the three UX-199's and one UX-120 tube.

FOLLOWING the publication of the RX-1 data in the New York Telegram, there appeared an article in the same paper describing a set built to overcome the faults encountered in operating the RX-1 in metropolitan districts.

Reports which have been sent in as a result of our requests for data as to the operation of the RX-1 indicate that, in practically every case, the only complaint with the RX-1 concerned broad tuning, and that could be overcome by shortening the antenna, or using an indoor antenna for local reception and an outdoor antenna for DX after the locals had shut down.

It did not seem to us that the set described in the Telegram as overcoming the assumed difficulties with the RX-1 was in any way an improvement except that it used plain regeneration to sharpen the tuning.

It was demonstrated in the October issue of RADIO ENGINEERING that regeneration, while sharpening the tuning, necessarily introduced considerable distortion, to say nothing of the increased disadvantage of radiation from regeneration in congested areas.

Knowing the RX-1 better than anyone else, and having a complete file of suggestions for special ideas to be incorporated in a different set, we developed

what we have called The New Yorker.

The New Yorker, however, is by no means an improved RX-1. It is simply a set which gives a variable degree of sharpness, quality of tone equal to the average receiver, and operates on dry cells for the A battery. The tuning is sharper than the RX-1, the receiving range about the same, and the quality satisfactory for most requirements. Certainly it is as good or better than ordinary regenerative receivers.

In short, it is a safe design to sell a man who wants tuning which will cope with the most difficult conditions, and who requires dry-cell operation. In addition, the T. C. circuit is employed to provide a degree of neutralization which very nearly eliminates radiation.

The outfit is built up around the Samson T. C. kit, consisting of a double-rotor coupler, antenna coupler, neutralizing condenser, and R. F. choke. The use of these instruments is illustrated in Fig. 5, the picture wiring diagram. The set has all the modern improvements. Silver-Marshall S. L. F. condensers are employed, and the new Pacent Isolantite sockets. Provision is made for the use of a UX-120 tube in the last stage, the filament of which is controlled by a 120 Amperite. Binding posts for the C battery are mounted directly behind the last



Fig. 2. Top, showing the clever arrangement by which the parts on the front and tube panels are made to fit in with each other. Contrast this with the very amateurish designs you have seen, and you will realize the thought and skill put into the development of this set, built in the Darien Laboratory.

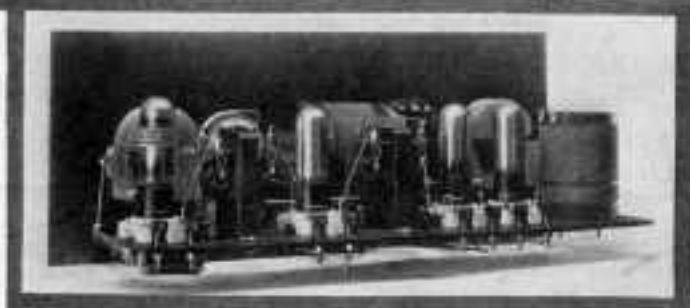


Fig. 3. The rear view shows the tubes in place, three UX-159's and a UX-120 for the last A. F. stage. This tube requires a 22-volt C battery, which can be a small size 22-volt B battery. Fig. 4, the under side, where you can see how the Lastites are used both as terminals and lock nuts. More complete details will be found in the data-prints which have been made up for set builders.



socket. Both A. F. transformers are the Amertran 1 to $3\frac{1}{2}$ ratio type.

The photographs show the new Pacent porcelain-base rheostat of 20 ohms used in an unusual way. On the front panel is a Carter Imp switch. When the switch is thrown to the left, the first three tubes are connected to the tap on the rheostat which cuts in enough resistance to bring the voltage on the filament down to 2.75. With the switch at the right, the filament circuit is connected to the variable contact arm of the rheostat. This is adjusted to a point where the voltage on the tubes is 3, giving full volume. While this method does not represent any particular improvement, it is a simple way to

cut down the volume without the use of another jack.

As the photographs show, all the terminals are fitted with Lastites, and the wiring is done with Wirit. Terminals on the sockets, when they go up to the transformers, are made with Lastites above the bases. Where it was more convenient to connect underneath, the screws were put down through the contact springs, socket base, and tube panel, held underneath by Lastites which serve as terminals, nuts, and lock nuts. That is a particular advantage of the Lastite, for once a wire is soldered to it, it cannot very well turn loose.

Another feature of this set is the con-

pact design and the comparatively small amount of panel material required. The front panel, of Celoron, measures 7 by 18 by 3/16-in., and the tube panel, of the same material, is 17 by 3 1/2 by 3/16-in.

Figs. 2 and 4 show the arrangement of the neutralizing condenser, and Fig. 4 shows the mounting of the R. F. choke and fixed condenser. Since it is not possible to leave a UX tube in the socket

would not change the note at all, but it is not possible to accomplish this in practice.

The statement was made in the first part of this article that the selectivity could be adjusted. That is an important factor in congested districts because, as a rule, there is enough volume so that the signal strength can be cut down, in order to sharpen the tuning, without any sacrifice in the required volume. In this set

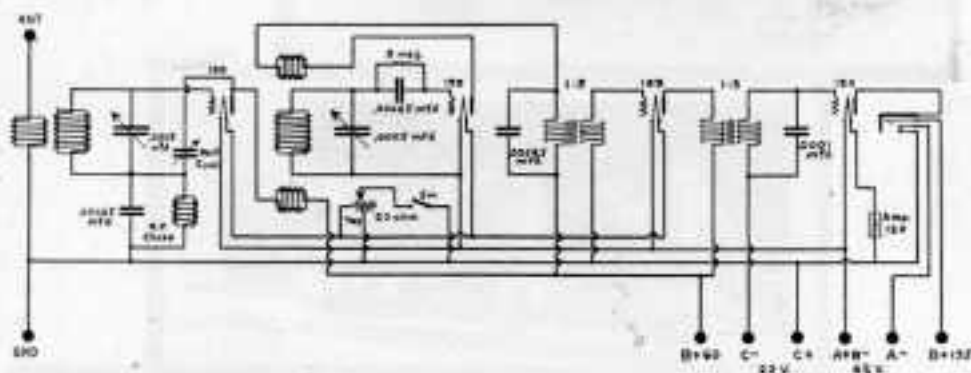


Fig. 5. Schematic wiring diagram of the New Yorker. Extreme selectivity is obtained by loose coupling between the coil in the plate circuit of the first tube and the grid coil.

with one of the filament terminals open, as can be done with UV-201A tubes, a method of neutralizing somewhat different from that previously employed was used in adjusting this set.

The tickler coupling was increased until the set oscillated and caused beat notes with an incoming station. Then the control knob on the neutralizing condenser was adjusted until the variation of the left hand condenser made the least difference in the frequency of the beat note. This was done at a fairly low wave length. If the set were perfectly neutralized, the detector could be put into oscillation to make beats with an incoming signal and the left hand or R. F. condenser

the tuning is not made sharper by bringing the regeneration just under the oscillating point. It is controlled by loosening the coupling between the primary of the R. F. transformer. That makes the tuning just as sharp as it can be made by regeneration, but does not make the circuit so unstable that it is liable to spill into oscillation from strong signals or, on that account, destroy the quality.

In addition, the New Yorker can be installed in apartment houses where there are many antennas without making the owner unpopular with his neighbors as a result of regenerative squeals set up by the ordinary oscillating receiver.

Picture Wiring Diagrams and Instruction for The New Yorker

For the benefit of those who want the picture wiring diagrams and step-by-step instructions, as well as the list of parts used in the New Yorker, this information has been included in the blue prints. The blue prints for the New Yorker

consist of two sheets, 18 by 26 ins. The data above is given on them, in addition to the full-size, one-piece panel patterns.

The arrangement has been made in accordance with suggestions from the readers of RADIO ENGINEERING.



New N. & K. loud speaker and feather-weight phone. The insert shows the diaphragm adjustment, designed to prevent excessive lightening.

A COMMUNICATION just received from Mr. Bulevre, advertising manager for the Daven Radio Corporation, states that the Daven Company is in full production on the Mu-20 tube for resistance coupled amplifiers and the Mu-6 power tube. Mr. Bulevre says that production has been increased as rapidly as possible since last July, the only difficulty being to get enough tubes to fill orders. This will straighten out those who are under the impression that, for one reason or another, these tubes have been discontinued.

With the advent of the UX-120 tube, for use in sets previously equipped with 199's throughout, there has been considerable demand for an adapter which will permit the connection of a UX-120 tube in the last socket of the R. C. A. super-heterodyne sets. An answer to this problem has been given by the Alden Manufacturing Company, of Springfield, Massachusetts. This adapter plugs into the socket and, with the separate set of contacts, holds the 120 tube horizontally. Leads are brought out from the adapter to allow for the addition of a 22½-volt C battery and an extra 45-volt B battery. This is absolutely essential to get the full efficiency of the UX-120 tube. Production on these adapters is now in full swing. Alden is also making adapters to allow the use of UX-120 and UX-199 tubes in the regular UV-201-A sockets, and another adapter to permit the use of large or small-base UX tubes in WD-11 sockets.

From the Federal Telephone Manufacturing Company, Buffalo, New York, comes the announcement that Lester E. Noble, for several years connected with the Company, has been made Vice President and General Manager. Mr. A. C. Stearns, Jr., a recent acquisition

from the Globe Electric Company of Milwaukee, has been made Advertising Manager.

Many of the technical men in dealer and jobber organizations, have aspired to membership in the Institute of Radio Engineers, but have not made application because they were under the impression that they were not eligible as Associate Members. While the Membership Committee passes on the individual qualifications of applicants, these men generally possess the necessary qualifications.

Since the first of the year, over 700 men have joined the Institute, many of whom are connected with merchandising and distributing organizations.

The Institute has recently published a very interesting booklet describing the various activities and giving also the qualifications for membership. The annual dues for an associate member are five dollars. This includes the bi-monthly Proceedings, in which various papers presented at the meetings are published. A copy of this booklet will be sent upon request to those writing to the Institute of Radio Engineers, 37 West 39th Street, New York City.

The Victor Talking Machine Company's line of Orthophonic victrolas is now on display, as well as the new clock-type loud speaker. In addition to developments in the phonograph part of the machine there are very interesting features in the radio set which is combined with it. One of the combination instruments has a five-tube R.F. receiver, Radiola No. 20. This works on an outside antenna or loop, with dry cells to supply the filament current.

Another type has the Radiola No. 25 six-tube super-heterodyne with the loop built on a door of the cabinet. This set, also working from dry cells, uses UX-199's and a UX-120, with a

special protector tube to prevent injury to the tubes in case of short circuits. Still another model has the Radiola No. 28, the new eight-tube super. These combination phonographs and radio sets are so built that the same sound passage is used for the phonograph or radio set.

Amsco Products, Inc., of New York City, is supplying dealers with a set of three very



attractive ads for local newspaper use. One shows the S.L.F. condenser, another the vernier dial, and the third the condenser, socket, and rheostat. These items are very popular now and many dealers have taken advantage of this opportunity to keep sales moving by displaying these ads in their local newspapers.

Walter A. Heppner, well known for his work with the United States Army Signal Corps at Camp Alfred Vail, in New Jersey, has re-

Polyment automatic phone plug, rheostat, potentiometer, and cord extension connection. These are being sold both to the manufacturers and the retail trade.



cently joined the R. E. Thompson Manufacturing Company, to take charge of their laboratory force as chief assistant to Dr. L. F. Fuller, Vice President and Chief Engineer.

"12 New Patent Radio Essentials" is the title of a new booklet recently published by the Patent Electric Company of New York City. This booklet describes the Patent S.L.F. condenser, the new A.F. transformer, vernier tuning control, Isolantite and Pyrex sockets, the battery switch, porcelain and bakelite-base rheostats, a wide variety of jacks and jack switches, logging scale, a knob and dial to match the control on the bakelite rheostat, and several other items of special interest to set builders.

The Daven Radio Corporation, Newark, New Jersey, is now distributing a booklet which dealers' salesmen will find exceedingly useful in selling parts for resistance coupled amplifiers. This booklet also gives some useful data on the Mu-6 and Mu-20 tubes as well as on the Daven ballast-resistors and the leakcondenser.

The latter is a new device, designed to fit the regular gridleak mounting. It contains a gridleak and a special type of grid condenser which, by virtue of its construction, cannot vary in capacity.

The special Hammarlund S.L.F. condenser, used in the Hammarlund-Roberts construction kit, can now be obtained separately. This condenser has been very carefully designed to pre-

Polyment resistance coupling units, equipped with atopping condensers, and the by-pass condenser mounting. These make up a three-stage kit.

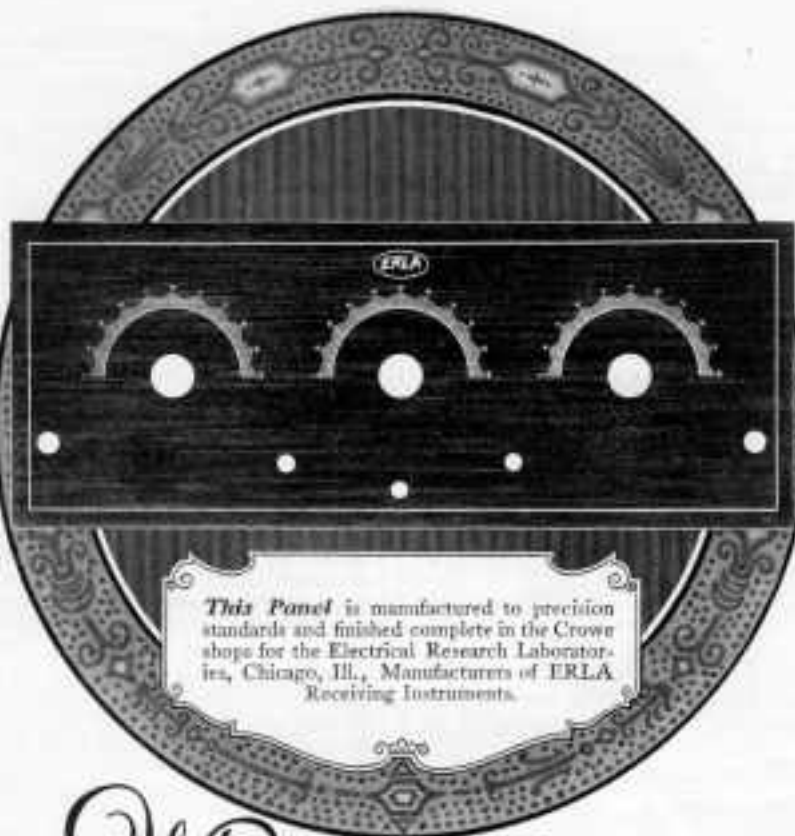
vent the development of mechanical faults which might be found in other S.L.F. types. It is interesting to note that only one small piece of insulation is used on the condenser. This is of Isolantite. Each condenser is provided with a shield plate, to be mounted in front of the rotor, if the circuit in which it is used causes any hand capacity effects.

Everybody will be much relieved to hear that an agreement has been made between the

United States, British, and Canadian authorities to prohibit the transmission of telegraph messages on 300 to 450 meters when ships are within 250 miles of the coast of the United States, Canada, or the British Isles.

The Operadio Company of Chicago is probably the oldest exclusive manufacturer of loop receivers. Year after year they have developed the Operadio outfit, always a self-contained portable set carrying the batteries within the cabinet. The newest model is a single-control set using six 199 tubes. The tuning is done with an S.L.F. condenser, covering a range from a little below 200 meters to 600 meters. A meter, mounted on the front panel, shows either A or B voltage. This development is the result of the combined efforts of Mr. J. M. Stone, President, W. B. Ricketts, Vice President and Sales Manager, and H. H. Shotwell, Chief Engineer. The Company has been under the management of these three men since it was first organized.

It is not too early to remind the jobbers and



What means

From now on—this mark is inconspicuously placed on Crowe-made etched metal panels.

It means that the manufacturer of the set has taken great pains to obtain the best, most satisfactory panel. It also means that he has enjoyed, through his choice of Crowe craftsmanship, a definite saving of money; money

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dealers that they should take advantage of the sales opportunity afforded by the International Test Week, of January 24th to 30th, 1926. At that time over seventeen countries will take part in the International Programs, and American stations will attempt to reach the listeners abroad.

That will be the time for set owners to overhaul their outfits, to improve their antennas, and to buy new tubes and batteries, if not new



Potter high-capacity condensers, designed particularly for eliminators.

outfits altogether. Newspapers all over the country will publish news about the tests and advance programs which can be capitalized by the local dealers.

Radio salesmen who have been in the game a long time will remember the Myers tubes, originally made in the United States and later in Canada, and will be pleased to hear that the Myers Radio Corporation has recently been organized in Cleveland, Ohio, for the purpose of manufacturing the newest type Myers tubes, equipped with the double-end contacts, and also other types with regular bases. The latter tubes will be regarded with much interest, while the former will be welcomed as old friends by those who have had such splendid results with the double-end tubes, particularly in R.F. and super-heterodyne amplifiers.

The Polymet Manufacturing Corporation, New York City, is putting some real effort behind the new Poly line. This includes a resistance coupled amplifier kit of 2, 3, or 4

stages, selling for three, four, and five dollars, respectively. By-pass and stopping condensers are furnished with the kits, so that they do not have to be purchased separately. In addition, there are the 35c and 50c plugs, 200 and 400-ohm potentiometers, at \$1.00 and \$1.25, rheostats ranging from 6 to 30 ohms, as well as a line of fixed condensers and gridleaks in all the standard values. Another useful item is the extension connector. Fitted with a 25-ft. cord, the loud speaker is plugged in at one end of the connector, and the cord run to the receiving set, so that the loud speaker can be located about 30-ft. from the set, if necessary.

Having become firmly established in the American market, the Amplion Corporation of America, the United States associate of Alfred Graham & Company, London, England, the originators of the Amplion, have recently extended their operations in the United States by establishing a factory at 437 Eleventh Avenue, corner of 36th Street. The trade should welcome this development of the Amplion business because the Amplion Corporation can now be considered as an American industry and not as a branch of an English factory.

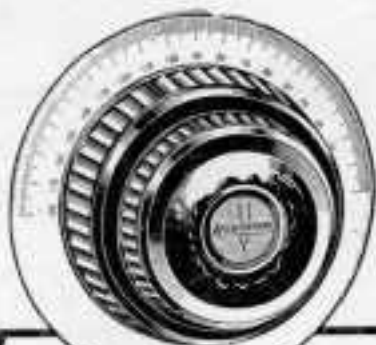
It is the intention of this company to specialize, for this coming season, on a new model unit for manufacturers of console sets and cabinet type loud speakers.

It should be clearly understood, however, that four or five of the essential internal parts of the Amplion mechanism will be continued to be brought from Alfred Graham & Company, London, England, in order that the quality of the Amplion, which is dependent upon these particular parts, will in no way be affected by American manufacture.

When the new manufacturers' units are distributed to those with whom the company now has contracts, it will be found that this product of the American company is certainly equal to, if not better than, the Amplion units that have in the past been imported from England.



WD-11 adapter, UX socket, and the UX-120 adapter for superheterodynes. These items are being produced by the Alden Mfg. Company.



Pat.
April
21, 1925

Other
U. S. and
Foreign
Patents
Pending

The last word in tuning devices

When a micrometer control is so delicately geared that it brings in the most elusive stations within the scope of your set with deadly accuracy, and with ease, it fully deserves to be referred to as "the last word in tuning devices." Such is the Accuratune.

Volume and clarity are matters of course to a set equipped with Accuratune, because, geared on an 80-to-1 ratio for either coarse or infinitely fine tuning, it functions with precision and accuracy, with little or no effort on your part.

Easily substituted for ordinary dials without alteration of your set.

MYDAR RADIO CO.

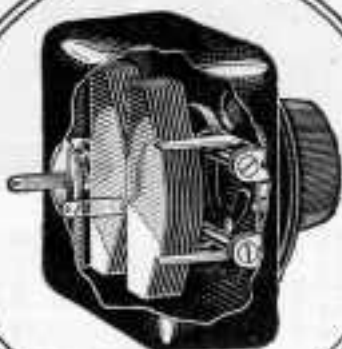
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(Min. 10.5 micro at
400 meters) - \$4.30

Type C-20 Max. 100
micromicrofarads
(Min. 11.8 micro at
400 meters) - \$3.00

Size of shaft $3\frac{1}{2} \times 2\frac{1}{2}$ "
extending $1\frac{1}{2}$ " back
from panel.

**ALL-AMERICAN
TOROID COILS**

Type T-1 Antenna

Coilider - \$4.50

Type T-2 R. F. Trans-

former - \$3.50

Set of 3 coils complete - \$10.50

The R. F. Transformer has a small primary, closely coupled to the secondary, rotatably adjusted. The coils have taps for long and short-circuits. All bases are of bakelite.



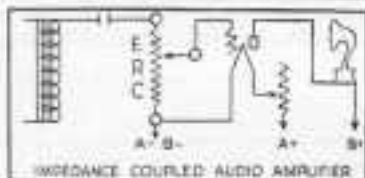
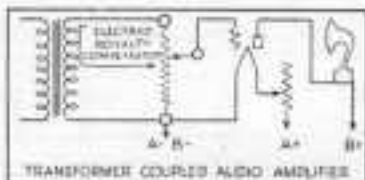
ALL-AMERICAN RADIO CORP., CHICAGO

Pioneers in the Industry

ABSOLUTE CONTROL OF Tone and Volume WITH THE Electrad Royalty COMPENSATOR



A wire wound, non-inductive high resistance potentiometer of unquestionable merit. Its mechanical construction is far superior to any similar device on the market. Can be attached to or used in the construction of any type of audio amplifier. The slight cost will be repaid many times by the remarkable results obtained.



The above diagrams clearly indicate the application of the "Electrad" Royalty Compensator to two popular types of audio circuits. There are three terminals provided as in the usual potentiometer—the center one being connected to grid of the last tube.

Type E—500,000 ohm Compensator—\$2.00

"Electrad" Royalty High Resistances are also made in the following standard ranges:

Type A (Variable Grid Leak), 1-15 to 7 megohms \$1.50

Type B (Variable Resistance), 1,500 to 500,000 ohms 1.50

Type C (Variable Resistance), 500 to 50,000 ohms 1.00

Type D (B Eliminator det. control), 10,000 to 500,000 ohms 2.00

On Sale at all good radio stores with other Guaranteed Electrad Radio Essentials.

ELECTRAD

INC.

428 Broadway, New York City.

COMPENSATED MULTIPLE VARIABLE CONDENSER



One Dial Control

Here is the multiple condenser that made possible the New York Journal's sensational one-knob set.

United Scientific Compensated Multiple Variable Condenser

It was found to be the only real and practical one-dial control unit on the market.

With this remarkable unit, New York fans are getting distance, razor-sharp selectivity, volume, tone—in fact, all-around real radio satisfaction, with only one dial.

This multiple is a straight line, low loss product and it can be built into any Tuned Radio Frequency circuit. Each condenser unit is evenly matched and balanced and the entire job is electrically and mechanically perfect.

Capacity, .00035 mfd. per unit.

Write for Full Particulars and Discounts

Branch Sales Offices

Chicago, Ill. Omaha, Nebraska
55 W. Jackson Blvd. 425 Manhattan Bldg.
Minneapolis, Minn. Boston, Mass.
1036 Second Av., So. 53 State St.

San Francisco, Cal.
Pacific Building

80 FOURTH AVE. NEW YORK CITY



| Manufacturer | Movement | Vernier | Material | | | Type | Maximum capacity, m.m.l. | Method of assembly | Shaft | Overall size behind joint |
|---|--------------|---------|--------------|----------|-----------|----------|--------------------------|--------------------|-----------|---------------------------|
| | | | Tussaloiding | Flange | End plate | | | | | |
| Allen D. Cardwell Mfg. Corp., Brooklyn, N. Y. | Rotary | None | Hard rub. | Aluminum | Brass | SLF | 900, 480 | Stator-staked | 3/4 x 7/8 | 4 x 4 x 0.5 |
| | | | | | | SLC | Double 67 | ..... | ..... | 4 x 4 x 4 |
| | | | | | | SLC | Double 95, 142 | ..... | ..... | 4 x 4 x 5 |
| | | | | | | | Double 250, 300 | ..... | ..... | 4 x 4 x 5 |
| | | | | | | | Double 330 | ..... | ..... | 4 x 4 x 5 |
| | | | | | | | Double 500 | ..... | ..... | 4 x 4 x 6 |
| | | | | | | | Triple 85 | ..... | ..... | 4 x 4 x 5 |
| | | | | | | | Triple 142 | ..... | ..... | 4 x 4 x 5 |
| | | | | | | | Triple 250, 300 | ..... | ..... | 4 x 4 x 6 |
| | | | | | | | Triple 350, 500 | ..... | ..... | 4 x 4 x 7 |
| | | | | | | Mod. SLW | Double 40 | ..... | ..... | 4 x 4 x 4 |
| | | | | | | | 185, 98, 121, 215 | ..... | ..... | 4 x 4 x 5 |
| | | | | | | | Double 305, 350 | ..... | ..... | 4 x 4 x 6 |
| | | | | | | | Double 425 | ..... | ..... | 4 x 4 x 6 |
| | | | | | | | Triple 65, 85 | ..... | ..... | 4 x 4 x 5 |
| | | | | | | | Triple 131 | ..... | ..... | 4 x 4 x 5 1/2 |
| | | | | | | SLF | Double 200 | ..... | ..... | 4 x 4 x 5 |
| | | | | | | | Double 280, 330 | ..... | ..... | 4 x 4 x 5 |
| | | | | | | | Double 450, 480 | ..... | ..... | 4 x 4 x 5 |
| | | | | | | Mod. SLF | 500 | Washer | 3/4 x 5/8 | 4 x 3 1/2 x 3 1/2 |
| Crest Radio Corp., Chicago | | | Bakelite | Aluminum | Brass | Mod. SLW | 250 | ..... | 3/4 x 5/8 | 3 x 2 1/2 x 2 1/2 |
| Cruver Mfg. Co., Chicago | | | Hard rub. | Aluminum | Aluminum | SLW | 350 | ..... | 3/4 x 5/8 | 3 x 2 1/2 x 2 1/2 |
| | | | | | | | 500 | ..... | ..... | 3 x 2 1/2 x 2 1/2 |
| | | | | | | | 1000 | ..... | ..... | 3 x 2 1/2 x 2 1/2 |
| | | | | | | | 250 | Staked | 3/4 x 1/2 | 3 1/2 x 3 1/2 x 1 1/2 |
| | | | | | | | 330 | ..... | ..... | 3 1/2 x 3 1/2 x 2 1/2 |
| | | | | | | | 600 | ..... | ..... | 3 1/2 x 3 1/2 x 2 1/2 |
| | | | | | | Mod. SLF | 300 | ..... | ..... | 3 1/2 x 3 1/2 x 2 1/2 |
| | | | | | | SLC | 115 | ..... | ..... | 3 1/2 x 3 1/2 x 1 1/2 |
| | | | | | | | 275 | ..... | ..... | 4 1/2 x 3 1/2 x 1 1/2 |
| | | | | | | | 375 | ..... | ..... | 4 1/2 x 3 1/2 x 2 1/2 |
| | | | | | | | 500 | ..... | ..... | 4 1/2 x 3 1/2 x 2 1/2 |
| | | | | | | | 1070 | ..... | ..... | 4 1/2 x 3 1/2 x 4 |
| | | | | | | Mod. SLW | 275 | ..... | ..... | 3 1/2 x 3 1/2 x 2 1/2 |
| | | | | | | SLF | 250, 350, 500 | ..... | ..... | 3 x 3 x 3 |
| | | | | | | | Also 500, 600 | ..... | ..... | 4 x 3 1/2 x 3 1/2 |
| | | | | | | SLC | 500 | Washer | 3/4 x 5/8 | 2 1/2 x 2 1/2 x 2 1/2 |
| | | | | | | | 330 | ..... | ..... | 3 1/2 x 3 1/2 x 2 1/2 |
| | | | | | | | 500 | ..... | ..... | 3 1/2 x 3 1/2 x 2 1/2 |
| Furnell Mfg. Corp., Newark, N. J. | 360° sliding | ..... | Pyralis | Aluminum | None | ..... | ..... | ..... | ..... | ..... |
| J. W. Jones Radio Mfg. Co., Inc., New York | Rotary | None | Bakelite | Aluminum | Brass | SLC | ..... | ..... | ..... | ..... |
| ..... | 180° slid. | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

QUAM CONDENSERS

with the Pyrex end plate are the choice of radio engineers and experts—not only for their own receivers, but for testing work in their laboratory experiments.



BECAUSE—

They are skillfully designed to get the best results out of a circuit and are not merely thrown together to sell at a competitive price.

Frame and plates are of brass, soldered in place.

The rotor is grounded to eliminate body capacity.

2 to 1 Helical cut gears give sharp tuning without a semblance of backlash.

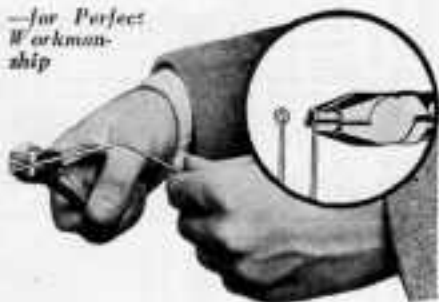
Pyrex end plate with $1\frac{1}{4}$ " leakage paths assure lowest possible loss. (As a matter of fact the Quam shows less resistance than the laboratory standard). Straight line frequency and straight line wavelength. \$5, \$6.50 & \$7 for .00025, .00035 and .0005 mufds. capacity. With 4" bakelite 360 degree dial, add \$1 to above prices.

Let us send you samples. Quam Audio Frequency transformers \$5.

QUAM Radio Corporation

1925 S. Western Ave.
Chicago

—for Perfect
Workman-
ship



Range

COMBINATION RADIO PLIERS

(Patent applied for)

MADE for the man that takes pride in his set, Range Pliers form perfect "loops" to fit both 6/32 and 8/32 screws. The pins, of chilled steel, cannot be damaged or broken.

Range Pliers cut sharp and clean. They bend angles without scratching your wire or bus bar. They'll do any job that ordinary pliers can do, and do it better. With them, you can wire any set in half the time, making perfect contacts without the mess and bother of soldering. They're guaranteed for one year. Price, \$3.50. Use the FREE TRIAL Coupon—today!

RANGE CORPORATION

86 Church St., New York, N. Y.

Range Corp., 86 Church St., New York, N. Y.
Send me a pair, postpaid—on 1-day FREE TRIAL.
I enclose \$3.50. If not entirely satisfied I'll return
the Pliers and you are to refund my money.

(Name)

(Address)

..... E

| Manufacturer | Movement | Vernier | Material | | | Type | Maximum capacity, m.o.l. | Method of assembly | Shaft | Overall size behind panel | |
|---|----------|--------------|-------------|-----------|-----------|----------------------------|---------------------------|--------------------|-----------|----------------------------|----------------------------|
| | | | Insulating | Plate | End plate | | | | | | |
| Karns Electric Co., Chicago | Rotary | None | Hard rub. | Brass | Brass | SLF | 100 | Staked | 3/4 x 7/8 | 6 1/2 x 4 1/2 x 2 1/2 | |
| | | | " | " | " | " | 200 | " | " | " | 6 1/2 x 4 1/2 x 2 1/2 |
| | | | " | " | " | " | 370 | " | " | " | 6 1/2 x 4 1/2 x 2 |
| National Co., Inc., Cambridge, Mass. | Dial 5:1 | None | Hard rub. | Duralumin | Duralumin | SLC, SLW | 200, 350 | Washer | 3/4 x 5/8 | 2 1/2 x 2 x 2 1/2 to 4 1/2 | |
| | | | " | " | " | " | 500 and 1000 | " | " | " | 4 x 2 1/2 x 2 1/2 to 4 1/2 |
| | | | " | " | " | " | " | " | " | " | " |
| Facet Elec. Co., New York | " | None | Isolaclitic | Brass | Brass | SLF | 500 | Soldered | 3/4 x 3/4 | 2 1/2 x 4 1/2 x 1 1/2 | |
| | | | " | " | " | " | 500 | " | " | " | 2 1/2 x 4 1/2 x 2 |
| | | | " | " | " | " | 500 | " | " | " | " |
| Phenix Radio Corp., New York | " | None | Bakelite | Brass | Brass | SLW | 500 | Die cast | 3/4 x 5/8 | 3 x 2 1/2 x 3 1/4 | |
| | | | " | " | " | " | 500 | " | " | " | 3 x 2 1/2 x 3 1/4 |
| | | | " | " | " | " | 500 | " | " | " | " |
| Precision Mfg. Corp., Rochester, N. Y. | " | None | Hard rub. | Aluminum | Aluminum | Mod. SLF | 100, 500, 90, 100 | Soldered | 3/4 x 3/4 | 2 x 2 1/2 x 2 | |
| | | | " | " | " | " | 200 | " | " | " | 3 x 2 1/2 x 2 |
| | | | " | " | " | " | 350 | " | " | " | 3 x 2 1/2 x 2 1/2 |
| Premier Electric Co., Chicago | " | None | Hard rub. | " | Brass | SLW | 350 | " | " | 3 x 2 1/2 x 2 1/2 | |
| | | | " | " | " | " | 500 | " | " | " | 3 x 2 1/2 x 2 1/2 |
| | | | " | " | " | " | 500 | " | " | " | 3 x 2 1/2 x 2 1/2 |
| Quinn Radio Corp., Chicago | " | Gear 2:1 | Pyrex | " | Pyrex | Mod. SLF | 750 | " | " | 3 x 2 1/2 x 4 | |
| | | | " | " | " | " | 750 | " | " | " | 3 x 2 1/2 x 4 |
| | | | " | " | " | " | 250 | " | " | " | 3 1/2 x 2 1/2 x 2 1/2 |
| Hathburn Mfg. Co., Inc., Jamestown, N. Y. | " | None | Bakelite | Aluminum | Bakelite | SLW | 500 | Die cast | 3/4 x 5/8 | 3 1/2 x 3 1/2 x 3 1/2 | |
| | | | " | " | " | " | 150, 200, 250 | " | " | " | 3 1/2 x 3 1/2 x 3 1/2 |
| | | | " | " | " | " | 300, 350 | " | " | " | 3 1/2 x 3 1/2 x 3 1/2 |
| Enclosed types. | " | None | " | " | " | 500 | " | " | " | 3 1/2 x 3 1/2 x 2 1/2 | |
| | | | " | " | " | " | 100, 200, 250 | " | " | " | 3 1/2 x 3 1/2 x 2 1/2 |
| | | | " | " | " | " | 300, 350 | " | " | " | 3 1/2 x 3 1/2 x 2 1/2 |
| Silver-Marshall, Inc., Chicago | " | None | Hard rub. | Aluminum | Aluminum | SLW, SLF | 250, 300, and 500 | Washer | 3/4 x 5/8 | 3 1/2 x 3 1/2 x 3 1/2 | |
| | | | " | " | " | " | 500 | " | " | " | 3 1/2 x 3 1/2 x 3 1/2 |
| | | | " | " | " | " | 500 | " | " | " | 3 1/2 x 3 1/2 x 3 1/2 |
| Stollman Elec'l Co., Newark, N. J. | Friction | None | Bakelite | Aluminum | Aluminum | SLC | 350 | Staked | 3/4 x 5/8 | 3 1/2 x 3 1/2 x 2 | |
| | | | " | " | " | " | 500 | " | " | " | 3 1/2 x 3 1/2 x 2 |
| | | | " | " | " | " | 500 | " | " | " | 3 1/2 x 3 1/2 x 2 |
| E. S. Labov, Inc., New York | " | None | Hard rub. | " | " | SLF | 350 | " | " | 3 1/2 x 3 1/2 x 2 1/2 | |
| | | | " | " | " | " | 500 | " | " | " | 3 1/2 x 3 1/2 x 2 1/2 |
| | | | " | " | " | " | 500 | " | " | " | 3 1/2 x 3 1/2 x 2 1/2 |
| E. S. Tool Co., Newark, N. J. | " | Vernier type | Hard rub. | " | " | Mod. SLF | 250 | Pat. case joints | " | 2 1/2 x 2 1/2 x 2 | |
| | | | " | " | " | " | 300 | " | " | " | 2 1/2 x 2 1/2 x 2 1/2 |
| | | | " | " | " | " | 350 | " | " | " | 2 1/2 x 2 1/2 x 2 1/2 |
| " | " | None | " | " | " | 250 | " | " | " | 2 1/2 x 2 1/2 x 2 | |
| | | | " | " | " | " | 300 | " | " | " | 2 1/2 x 2 1/2 x 2 1/2 |
| | | | " | " | " | " | 350 | " | " | " | 2 1/2 x 2 1/2 x 2 1/2 |
| " | " | None | " | " | " | 500 | " | " | " | 2 1/2 x 2 1/2 x 2 1/2 | |
| | | | " | " | " | " | 500 | " | " | " | 2 1/2 x 2 1/2 x 2 1/2 |
| | | | " | " | " | " | 500 | " | " | " | 2 1/2 x 2 1/2 x 2 1/2 |
| " | " | None | " | " | " | Desable 250, 300, 350, 500 | " | " | " | 3 1/2 x 2 1/2 x 2 1/2 | |
| | | | " | " | " | " | 300, 500 | " | " | " | 3 1/2 x 2 1/2 x 2 1/2 |
| | | | " | " | " | " | Triple 250, 300, 350, 500 | " | " | " | 3 1/2 x 2 1/2 x 2 1/2 |

Better Tone!

-- with dry cells and UX120
than with storage batteries

Note: The UX120 is a new three volt dry battery power tube. Used for audio frequency amplification, this tube will produce better quality and greater loud speaker volume than regular storage battery tubes.

Any set owner can easily install a UX120 tube in his set in a few minutes by using the new Na-Aid Number 120 Connectoraid. It is a simple, efficient means of introducing the necessary additional "B" and "C" voltage required for this tube into the plate and grid circuit without rewiring the set. As easy to use as an adapter.

Just slip the Connectoraid onto the UX120 tube and put the tube in the socket. Connect the batteries and well, that's all there is to it--except to enjoy a quality and volume you would not have believed possible. No need to fuss with charging batteries. The simplicity, economy and freedom from attention characteristic of dry cells is now combined with the real volume and quality previously obtainable only with storage battery tubes.

The No. 120 Connectoraid is suitable for all sockets--metal neck as well as insulated. For sale at radio, electrical and hardware stores. Price, \$1.25.

No-Aid Adapters



Na-Aid Adapter 419-X

With this adapter the Na-Aid de Luxe Socket will take the new UX120 small base tube. Price, 419-X, 35 cents.

Na-Aid 420 Connectoraid

No. 420, equipped with cables, enables owners of Radiola Super-Hot to get the great increase in volume and clarity the new UX-120 tube develops. Price, 420, \$1.75.



Na-Aid Adapter 421-X

No. 421-X makes possible the shift from WD-11 to UX tubes. Especially designed to enable owners of Radiolas III, and III-A to enjoy the improved operation the new tubes provide. Price, 75c.

All Na-Aid products are for sale at radio, electrical and hardware stores everywhere. Send for complete data on adapters for new tubes.

ALDEN MANUFACTURING COMPANY

Also makers of the Famous Na-Aid Sockets and Dials

Dept. N 2

Springfield, Mass.



RAYTHEON

The tube that has perfected the
B-battery eliminator



Perfected, because of the application of new and fundamentally sound principles to the rectifier. B-eliminators or parts, specially designed for use with RAYTHEON tubes are made by them and other well-known manufacturers, and are now on sale at your dealer's:

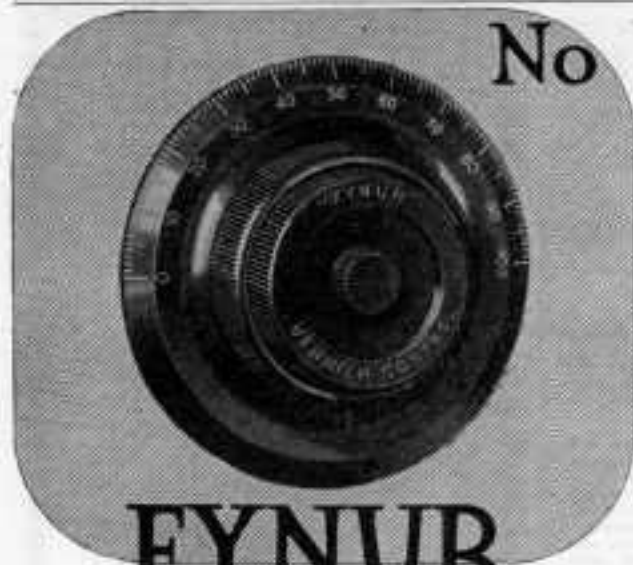
Acme Apparatus Co., Cambridge, Mass.
All-American Radio Corp., Chicago, Ill.
Dongan Electric Mfg. Co., Detroit, Mich.
General Radio Co., Cambridge, Mass.
Jefferson Electric Mfg. Co., Chicago, Ill.
Mayall Radio Mfg. Co., New York, N. Y.
Thordarson Electric Mfg. Co., Chicago, Ill.
Tobis Deutschmann Co., Boston, Mass.

RAYTHEON

Long Life \$6 Economy
No Filament 6 Reserve Power

RAYTHEON MANUFACTURING CO.
CAMBRIDGE, MASS.

Wholly AMERICAN APPLIANCE COMPANY



No Backlash in this New Dial

FYNUR VERNIER CONTROL

And that's only one of the Fynur's many mechanical superiorities. The dual control permits of a quick, general setting as well as infinitely fine vernier adjustment.

It's beautifully made—and so simple in construction that a child could take it apart and re-assemble it.

It operates by traction (not gears) so there can be no possible backlash or lost motion.

The Fynur is a quality dial for those who want the best. If not obtainable in your vicinity, we will gladly mail the desired quantity on receipt of price, \$3.50 each.

AUGUST GOERTZ &
CO., INC.

270-286 MORRIS AVE.,
NEWARK, N. J.



"A new 5-Tube Set with all the power and none of the grief of the Super" — so wrote Henry M. Neely, Editor of Radio in the Home, Philadelphia.

Get This Book

Write today for this big fascinating 32-page booklet which tells how you can build the truly amazing new QUADRAFORMER receiver. Based on a new radio principle, five tubes give remarkable results.

Enclose 10c and you'll have it by return mail

Gearhart-Schlueter Radio Corp'n
715 Younman Avenue, Fresno, California



EBY CUSHION SOCKETS

*Provide a positive contact
on a shock-absorbing base*

You can maintain a positive contact at all times, regardless of the size of the tube prongs or the amount of solder on the prong tip, with this new socket.

By an ingenious shock-absorbing feature EBY Cushion Sockets eliminate microphonic noises and are a guarantee against tube damage.

These sockets give the advantages of interchangeability and other desirable features of the new U. X. Tubes.

Don't take a chance on twenty loose connections in a five tube set. Ask your jobber about EBY Cushion Sockets today or write for complete information.

H. H. EBY MFG. COMPANY,
4710 Stanton Ave., Philadelphia, Pa.
Makers of EBY Quality Binding Posts

For Long Distance with Big Volume and Keen Musical Quality



-Install a pair of **KARAS** Harmonik Transformers in your radio set

KARAS Harmonik Transformers deliver perfect music with loads of volume from stations one to two thousand miles away. Distant reception worth listening to!

With Karas Harmoniks in your set, you can truly enjoy radio broadcast music from near or from far. You can get it in all the volume desired without crowding your receiver to the distorting point. You can sit back in your easy chair and listen with keenest pleasure.

"Fishing" for distant stations becomes a matter of finding programs you want to hear—not straining to catch only the bare announcement, and compiling a list of call letters.

There's power and to spare in Karas Harmoniks. Power that brings the biggest volume without distortion. You hear big, full, round, sonorous tones because you get the complete musical tone. All the vital harmonics and rich overtones are there in all their naturalness. Low notes, middle notes and high notes all are amplified to the same degree—a rare achievement for audio frequency transformers.

The true characteristics of all musical tones are recreated in your speaker. Piano music pours forth with the rich beauty of the concert hall. The pure, liquid tones of a violin played a thousand miles away cannot be detected from those of a violin played in the same room. The inflections of the human voice are all retained—the very breathing of the microphone—the soft elusive sounds of S and Z.

If this is the kind of reception you want—whether distant or local, you want true Karas Harmoniks in your set. It's the only way you can get it over the radio. Don't wait to build a new set. Take the old transformers out of your present set and install a pair of Karas Harmoniks. The master you do, the music you will enjoy the highest quality of radio reception.

KARAS ELECTRIC CO., 4162 N. Rockwell St., Chicago
For over 30 years makers of PRECISION Electrical Apparatus

\$7⁰⁰ Each
at your
Dealer's

**30 Day
Money Back
Guarantee**

—wherever you buy. If your dealer is out, order direct on this coupon. Send no money. Just pay the postman.

Karas Electric Co.
4162 N. Rockwell St., Chicago, Ill.

Please send me _____ pair(s) of Karas Harmonik Audio Frequency Transformers. I will pay the postman \$7 apiece, plus postage, on delivery. It is understood that I am privileged to return the transformers any time within 30 days if they do not prove entirely satisfactory to me, and my money will be refunded at once.

Name _____

Address _____

If you send cash with order we'll send Transformers postpaid.



Oh boy
KESTER
Rosin Core
Radio SOLDER

Sure to Sift and Simple
 APPROVED BY RADIO ENGINEERS
 A GENUINE SOLDER
 CHICAGO SOLDER COMPANY

4224 Weymouth Ave., Chicago, U.S.A.

Wholesale and Foreign Export Sales
 American & Foreign Distributors
 100 BROADWAY, NEW YORK, N.Y.

B-K Mast Fittings
 are easily attached anywhere



These Fittings with $\frac{1}{4}$ " pipe makes up a rigid and durable antenna installation.

—Price per set, \$1.50—

ROBERT H. KIMES

907A Schwind Bldg., Dayton, Ohio

Write for Literature



TRIDOT THREE STAGE RESISTANCE COUPLED AMPLIFIER, entirely assembled with 6 resistors and 3 .005 mica condensers. BETTER THAN TRANSFORMERS. LIST PRICE.....\$6.75 per complete Kit

Each kit of 3 Resistor-Couplers packed in attractive carton.

SCORES

of RADIO MANUFACTURERS have adopted TRIDOT grid leaks as standard equipment for the receiving sets which they manufacture. TRIDOT grid leaks are impregnated, guaranteed accurate, and permanently noiseless.

Large scale production means decreased costs. These economies are passed on to users of TRIDOT products.

Correspondence is invited from reliable manufacturers and jobbers.



*Your Own Name or Trade Mark
 on Any Item*

TRIDOT

(Registered Trade Mark)

TRIDOT ELECTRIC CO., INC.

16 HUDSON ST., NEW YORK CITY

SM**SILVER
SIX****"SIX" FEATURES**

- 1 **SELECTIVITY** The "Six" may be adjusted to cut the sidebands on any broadcasting station.
- 2 **SENSITIVITY** The "Six" will go below the average, favorable noise level from its small antenna or loop.
- 3 **RANGE** Possesses an unlimited range. Will cover present American and Foreign Stations as well as all future wavelengths.
- 4 **S. I. F. Feature** In the "Six" means real ability to select and separate short wave stations.
- 5 **QUALITY** Almost perfect due to use of three stages of resistance coupled audio amplification.
- 6 **VOLUME** In excess of all practical requirements.

Designed by McMurdo Silver, Assoc. I. R. R.
Complete description sent upon request.

Silver-Marshall

Inc.

108 S. Wabash Ave., Chicago

**C-10 Super
Heterodyne****DETAILED CONSTRUCTION
BLUE PRINTS**

The most sensitive and selective Super-Heterodyne set ever designed. It combines tuned radio frequency amplification with an improved Super-Het circuit, using 10 tubes. Full-size construction blue prints for this famous model can now be obtained from the Radio Engineering Blue Print Department.

Price: Five Dollars Per Set

Note: These prints give all data, parts lists, and other information necessary to build the C-10 model.

M. B. SLEEPER, Inc.

A-52 Vanderbilt Ave., New York City

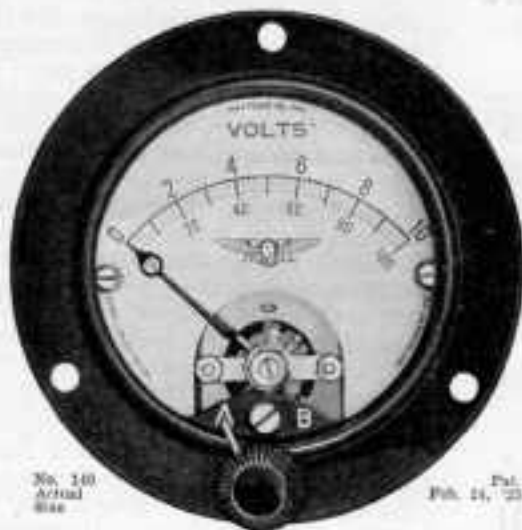
**From Herbert Hoover's Address to
the 4th Conference**

UP to the present time, we have had a policy of absolute freedom and untrammelled operation, a field open to all who wished to broadcast for whatever purpose desired. I am convinced that policy was sound. It resulted in a wonderfully extensive development which could have been obtained in no other way. We have today 578 stations, and as no more than four of them are under the same management, no one can say there is not plenty of competition. Today every solitary channel in the ether is occupied by at least one broadcasting station and many of them by several. Of the 578 stations, 197 are using at least 500 watts of power, and there are now pending before the Department of Commerce over 175 applications for new licenses.

Higher power has greatly strengthened the service to listeners, but it has aggravated the problem of providing lanes through the traffic, for geographical separation must be greater. Heretofore, it has been possible to duplicate channels geographically to a large extent among those using 500 watts, but with the increase of power, this system becomes more and more difficult, for the borderland of interference is wider spread. We must face the actualities frankly. We can no longer deal on the basis that there is room for everybody on the radio highways. There are more vehicles on the roads than can get by, and if they continue to jam in, all will be stopped.

It is a simple physical fact that we have no more channels. It is not possible to furnish them under the present state of technical development. It takes no argument to demonstrate that 89 wave lengths, and no more are available, cannot be made to serve innumerable stations.

One alternative, which would only partly solve the problem, would be to increase the number of stations by further dividing the time of the present stations down to one or two days a week or one or two hours a day. From the listener's viewpoint, and that is the only one to be considered, he would get a much degenerated service if we were to do that.



No. 140
Actual
Size

Pat.
Feb. 24, '23

Read

—filament and "B" Battery voltage with one instrument. (Switch self contained.)

Just what engineers, manufacturers and set owners have been looking for—A high resistance double reading voltmeter in a two inch case.

Just say that you are a radio engineer and we will send you a bunch of radio instrument literature.

Jewell Electrical Instrument Co.

1650 Walnut St., Chicago

"20 Years Making Good Instruments"

DURHAM

Variable Leaks

Make Good Tubes Better



Standard Type

For any set. Snap in place of present fixed leaks. Adjustable in line with tube makers instructions.

75c



New Panel Mount

Accurate control of detector or audio at your finger tips brings better results.

\$1

There's a DURHAM for every need
No. 100—1,000 to 100,000 ohms (audio).
No. 101—0.1 to 5 megohms (for UV-200 and W2-12).
No. 201A—0 to 10 megohms (for UV-199 or 201A tubes).

DURHAM & CO., Inc.
1930 Market St., Philadelphia



"BUFFALO"

(TYPE) ONE HOLE MOUNT RHEOSTAT

Guard over contact slider eliminates all strains and prevents slider from breaking, bending, or twisting, assuring permanent contact. Break in resistance wire towards all end point on resistance unit, gives contact slider a continuous smooth running surface without dropping off the wire as contact sliders do on all other Rheostats.

The Buffalo type Rheostat is recommended to manufacturers as the best Rheostat manufactured for commercial use.

Made under DeJur exclusive patents.

DeJur Products Co

199 Lafayette St., New York

The B-T "Euphonic" Sets New Standards of Radio Reception



2.2 to 1, Price: \$5.00

4.7 to 1, Price: 5.75

A great improvement in iron distribution and more turns by 50 per cent than in the average "good" transformer.

B-T research has proved the value of these features to better sound reproduction.

A leading technical laboratory says of B-T Euphonics, "The best we ever tested."

We are confident no other method of amplification will give equal results.

Send for Literature describing B-T "Euphonics."

Coming—

The Silent Socket

Watch for the appearance of B-T Silent Sockets. Put one on your detector and you won't recognize it as the same set.

This new B-T device eliminates microphonic noises,—and is the first thing we have found that is effective.

Price, including a B-T Universal Socket, \$1.25.

Pioneers of "Better Tuning"

BREMER-TULLY MFG. CO.

532 S. Canal St., Chicago, Ill.

Why set manufacturers should use Radion Panels

Appearance. Radion Panels have a high-polished, satin-like finish that enhances the attractiveness of any set. They come in two colors, standard black and Mahoganite; the Mahoganite panels with their beautiful coloring and graining give an effect that is especially distinctive. Radion takes engraving beautifully.

Efficiency. Built to order exclusively for radio purposes, Radion meets the most exacting tests for high insulating qualities. Surface leakage and dielectric absorption have been proved to be exceptionally low. This is an aid in getting distance and volume.

Convenience. Another feature that recommends Radio Panels to the manufacturer is the ease with which they can be cut, sawed and drilled. Edges are smooth and even; holes are trim and clean-cut. Radion does not chip as do other panel materials.

We invite manufacturers' inquiries

WE ARE always glad to co-operate with manufacturers in meeting their requirements. We invite them to send us samples or specifications of panels and other insulated parts of radio instruments or radio sets. Radion is used on the leading makes of condensers.

AMERICAN HARD RUBBER COMPANY
Dept. M N 8, 11 Mercer St., New York City

RADION
The Supreme Insulation

Hear Europe with the Universal Plio-6



35 Meters to 3400 Meters

No Batteries

are required even to operate the powerful receiver pictured above, if you use the new laboratory type

Model A Power Unit

A new broadcast receiver representing the highest type of efficiency obtainable in point of extreme range, tremendous audibility and remarkable selectivity.

Maximum Efficiency—Inexpensive

Facts or Completely Constructed

Write for information today

NORDEN-HAUCK, Inc.

Engineers

1617 Chestnut Street, Philadelphia, Pa.

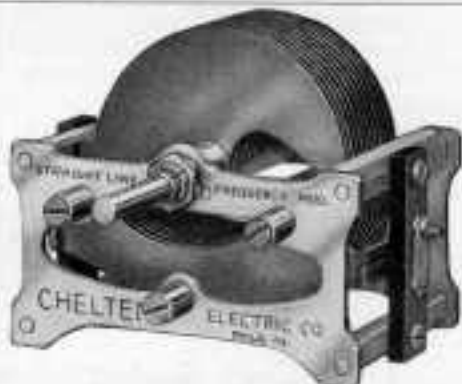
HARD RUBBER PUNCHED GOODS CO.

148-150 Mulberry St., Newark, N. J.

Manufacturers of

BINDING STRIP PANELS
BLOCKS AND STRIPS
BUSHINGS
CONDENSER END PLATES
DISCS
PANELS
PICTURE FRAME BACKS
AND EASELS
PHONE JACK INSULA-
TIONS
ROD
STRIP INSULATIONS FOR
CONDENSERS
TRANSFORMER INSULA-
TIONS
TUBING
WASHERS AND OTHER
ELECTRICAL INSULA-
TIONS.

If it's made from Sheet, Rod or Tube we make it



THE CHELTEN Straight Line Frequency Condenser

(Modified)

A real Condenser scientifically designed from practical operating standpoint. Dependable in every way.

Spreads low wave stations. Provides uniform separation over tuning range. Standard frame-welded brass plates.

Send for our booklet "Straight Line Frequency Tuning," an authoritative study on this vital subject. It's free.

CHELTEN ELECTRIC CO.,
4859-65 Stenton Avenue, Philadelphia



"One-direction" speakers make "reserved seats" necessary, if you would hear clearly. Shaded portion indicates where the broadcasting has force and clearness.



The "all-direction" N & K Model S Speaker sends the tone all over the room.

No "Reserved Seats" Needed

THE new N & K Model S Imported Loudspeaker is always pointed in *your direction*, no matter whereabouts in the room you are. It took N & K, pioneers in acoustics, to bring this revolution in speaker construction.

9½ inches high on a 6½ inch base. Made of burtex, a scientific material which eliminates false tone vibrations. Contains the famous N & K diaphragm unit, adjustable to every local broadcasting condition and variation in receiver construction. Tone clear, natural and lifelike. Volume equal to that of speakers costing several times as much money. Yet it sells for—

only **\$12.50** In Canada \$15

The popular price makes it a very profitable piece of merchandise for the dealer. Its all-direction feature and its excellent tone helps greatly in the demonstration and sale of complete sets. If your jobber is not yet supplied, get in touch with us.

N & K Imported Phones
4000 ohms. List \$8.50
N & K Imported Phonograph
Unit. List \$7.50
N & K Imported Loudspeaker
Model W. List \$22.50

The New Imported LOUDSPEAKER

MODEL S

NEUFELDT & KUHNKE DIVISION

Dept. K, 12, Th. Goldschmidt Corporation, 15 William St., New York City

AMPLION

The World's Standard
Loud Speaker

Alphonse Guzman & Co.
London, England,
Paris, France



Its clear
tone comes from 30 years of
loud speaker experience

Dealers, Jobbers & Retailers—wide advertising on a
greatly extended credit basis. The Amplion pro-
perties are attractive ones. Write for full particu-
lars concerning this internationally popular series
of the originators and oldest makers of
loud speakers.

The Amplion Corporation of America
Suite W, 280 Madison Ave., New York City
Incorporated in Canada, Ltd., Toronto

To-day
-in every
good set!



Every Tube

Full of Life!

What a wonderful difference AMPERITE makes! Every tube is so brimful of snap, so eager to deliver 100% value. Individual tube regulation to meet each tube's individual needs is the answer. And only AMPERITE can fill that requirement. Permits the use of any type or combination of tubes. Specified in all popular construction sets. Price \$1.10. There is an AMPERITE for every tube.

Write for free book-lets

Radiant Company

Dept. R. E.-16, 58 Franklin St., N. Y. City

AMPERITE

The "SELF-ADJUSTING" Rheostat

RADIO DEALERS

These Dealers are making
money by selling "How to
Build Long Distance Radio
Sets"

CHARLEY IZENSTARK has sold 200
copies of How to Build Long Distance
Radio Sets since this M. B. Sleeper book
was brought out on Sept. 25th.

COAST RADIO SUPPLY CO. has sold
500 copies.

E. P. MILL has sold 200 copies.

OLIVER C. SCHROEDER CO. has sold
200 copies.

These names have been picked at random
from our order files. They have not only
made a 100% profit on these books but
a much bigger profit from the sale of
parts to build the sets described.

"HOW TO BUILD LONG DISTANCE RADIO SETS"

is a 48 page book, printed on the finest
paper, 6½ by 9½ ins., fully illustrated
with detailed photographs, picture wiring
diagrams, and circuits.

The designs shown include the famous
Browning-Drake Five, Silver-Marshall
Super-Autodyne, Browning-Drake 199
Set, and the Samsen T. C. All these sets
use standard parts which you have in
stock.

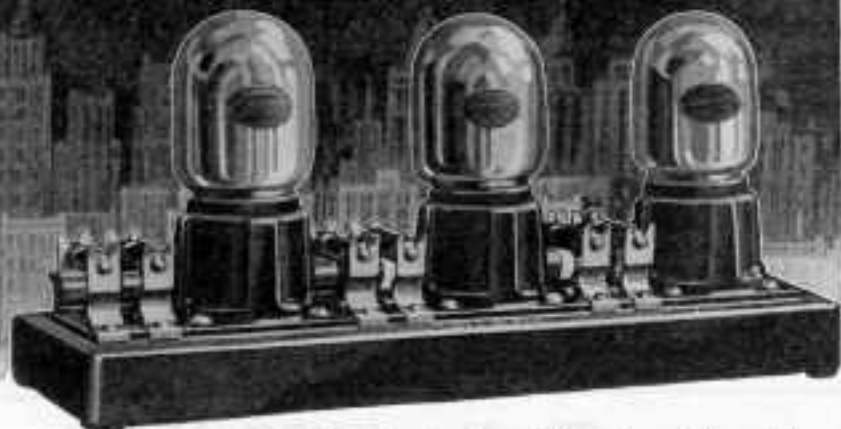
The price of this book is 25c less 50%.
Sell these books to keep parts moving.

SEND IN A TRIAL ORDER
FOR TWENTY-FOUR COPIES

M. B. Sleeper, Inc.

Technical Publisher
A-52 Vanderbilt Ave.,
New York

Daven Tubes



Resistance Coupled Amplification For All

THE Daven Super-Amplifier is for set owners who want more volume or for set builders or manufacturers who want resistance coupled amplification without the labor of assembly.

All the plate resistors, grid leaks and fixed condensers of the proper value, as well as all necessary binding posts, are supplied. There is nothing to do but connect with the tuner and the batteries.

Thousands have changed over their amplifiers to the resistance coupled system and testify to the wonderful improvement in richness and sweetness of tone and hearty, generous volume. The Daven Super-Amplifier makes even the best set a little better.

A ONE-PURPOSE TUBE

The new Daven Tube MU-20, 6 volt, $\frac{1}{2}$ ampere, increases the amplification of The Daven Super fifty percent, without distortion. The tone remains sweet and true. Daven Power Tube Type MU-6 is recommended for the last or output stage in any set.

Any Daven dealer will show you how to hook up the Daven Super-Amplifier.
DAVEN PRODUCTS ARE SOLD ONLY BY GOOD DEALERS

"The Sign of Merit"
DAVEN RADIO CORPORATION
Resistor Specialists

Newark

Eng. U. Pat. OR.

New Jersey



Resistor Manual

The Handbook of Resistance Coupled Amplification at less than dealer's price. Direct by mail, postpaid 30c.

CLIP THIS COUPON

8-13-33

DAVEN RADIO CORPORATION
126-140 Nassau Street
Newark, New Jersey

Please send me the following on Resistance Coupled Amplification:

Check one:

- Resistor Manual. 35c is enclosed.
 Complete catalogue (free).

Name

Address

Please do not send your letter back or card, as this coupon and we will have our nearest distributor communicate with you.

THE BIG LITTLE THINGS OF RADIO

NEW CARTER ITEMS

Original — Exclusive

"IMP" Pilot Switch



\$1.50

A red Pilot light shows when your "A" battery is "On"—no chance for going away and leaving your tubes burning. Single hole mounting, quarter turn switch—compact. Simple. Carter quality.

"Dialite"



\$1.75

Eliminate shadows and permit exact readings for logging your dials. Quarter turn snap switch combined with the light. Permits light to be turned off if desired when set is operating.

"Flat" Plug



\$0.75

Fits snugly against panel. Harmonizes with your Knobs and Dials and adds to the appearance of your set. Carlsburg down. Unightly tips uncracked. When set is closed, plug can be left in.

These and other new and original Carter products can be seen at your dealers. Ask him about them.

Works on 6 or 4½
Valve Battery
Draw negligible.



REGISTERED

The New KURZ-KASCH Aristocrat E-Z-TOON Group Control (EASY TUNE)

Makes possible the tuning of two or more units with but one master control and in addition provides for Vernier adjustment of each unit.

Moving the master dial slowly usually gives indication of any station. As soon as the station has been located the tuning can be perfected by rotating the correcting Vernier on each unit.



Front View

The group control is simple to install. Everything complete—no additional parts to buy. It being unnecessary to drill the panel.

The parts consist of a small gear to fit over the shaft of each unit and a gear rack held in place by a small spring. This gives positive and simultaneous movement of each unit.



Kit Closed

The non-back lash, smooth adjustment of the Aristocrat E-Z-TOON dial has been maintained in each unit.

Complete with instructions in attractive Kit \$7.50

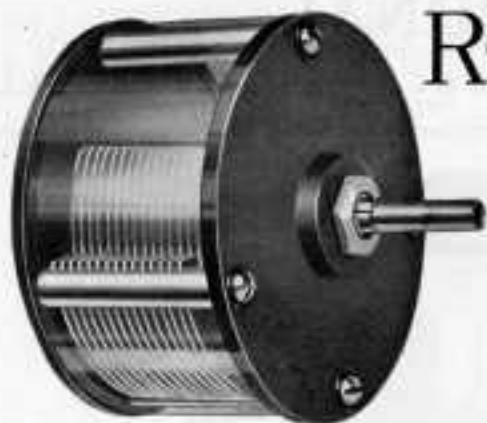
Write for illustrated folder giving complete information on this and other Kurz-Kasch Products

The Kurz-Kasch Company
Largest Exclusive Molders of Babolite
Dayton, Ohio.



Kit Open

RATHBUN RADIO APPARATUS



A Real Good Condenser

Among the superlatives and extravagant claims broadcast on radio apparatus—Rathbun Condensers stand out as real good condensers—at a fair price.



The end plates are of special Rathbun-steel with an accuracy of 1/32nd of an inch. Flat, dampness and age do not cause the plate to warp or change its perfect electrical constants.

Note that there is a spring chuck at the rear bearing plate. Always close the clamp with a joint bearing which wears down evenly.



The plates are held by slots in the tube. These cutwaters are established by an intricate, expensive die casting process.



It may be seen that an unusually large area of contact is allowed on both top and side. The spring chuck bearing eliminates play, and it is so accurate that the front bearing alone keeps the Rathbun plates in perfect alignment.

Rathbun Condensers are guaranteed electrically and mechanically perfect. They are as well made, as skill, the best materials, and the honest desire to give full value can make them. In actual results you will find them *always* satisfactory.

Buy Rathbuns—try them on your set. The single hole mounting and pyralin dust bands are real features. And bear this in mind—if you can get better results in distance, tuning or volume from any other condenser your money will be immediately refunded.

Rathbun Manufacturing Co.
INC.
Jamestown, New York

NATIONAL VARIABLE, *Velvet Vernier* DIAL

*Positive
Control*

*Easily
Mounted*

Gearless



*Variable
Ratio*

*Velvet
Smoothness*

Ornamental

TYPE B
Patents Pending

This dial embodies a modified application of our "Velvet Vernier" mechanism designed to facilitate mounting on the $\frac{1}{4}$ " shaft of any standard type of variable condenser, without the use of tools other than a screw-driver. It will replace plain dials on any receiver where sharper tuning is desired.

Of special importance is a new and novel device which enables the user to adjust at will the reduction to any ratio from 6-1 to 88-1. This feature aids greatly in the separation of stations operating on the lower wave lengths. This new dial is moulded from black bakelite in a highly ornamental design with perfectly uniform graduations.

PRICE LIST

| Catalog Symbol | Specifications | Price, Nickel Finish | Gold Finish |
|----------------|--------------------------------|----------------------|-------------|
| V. B. C. | Clockwise 0-200 (360°) | \$2.50 | \$3.00 |
| V. B. C. C. | Counter-Clockwise 200-0 (360°) | 2.50 | 3.00 |

NATIONAL CO., Inc.

Established 1914

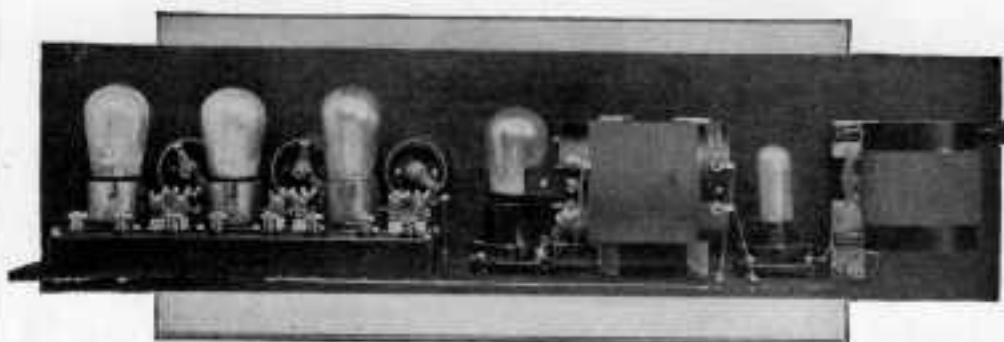
110 Brookline Street

Cambridge, Mass.

A very interesting and efficient audio amplifying unit made by the National Co. will be described in this space in the January issue.

BROWNING-DRAKE FIVE

New Type S.L.W. Tuning Units



Parts Listed Below, All Panels Drilled and Engraved, \$59.90

PARTS LIST, TYPE 1000, BROWNING-DRAKE RECEIVER

| Type No. | Name | Price | Type No. | Name | Price |
|----------|---|--------|----------|---|-------|
| 8035 | 1-Benjamin UV-201A Socket | \$1.00 | S | 1-Metro Keesek Switch | 0.75 |
| 8040 | 1-Benjamin UV-120 Socket | 1.00 | B-D | 1-Complete National Kit | 32.00 |
| TJ | 2-Tylocks | 2.50 | B.P. | 1-0.001 mfd. New York Coil | |
| SA | 1-Daven Super-Amplifier | 15.00 | | Fixed condenser | .40 |
| G | 1-3 Menzohm Eagle Grid-leak | .50 | | 1-0.0025 mfd. New York Coil gridleak condenser | .45 |
| P | 1-Black Celoron Panel, 7 x 28 x 2/16 in. | 4.50 | 38 | 2-Pkgs. of 53 soldering flux | .90 |
| P | 1-Black Celoron Panel, 3 1/2 x 5 3/8 x 2/16 in. | 1.97 | 105 | 1-Angle bracket | .10 |
| 601 | 1-0001 Meadon | .33 | 14 | 10-Coil mounting pillars | .60 |
| K | 3-Ensign Binding Posts, plain top | .45 | 62 | 1-Pkg. of 10 1/2-in. 6-32 F. H. nicked screws | .12 |
| | 1-ohm Rheostat | 1.50 | 43 | 2-Pkgs. 5/8-inch 6-32 R. H. nicked screws | .20 |
| | 1-20-ohm Rheostat | 1.50 | 6 | 1-Pkg. of 18 3/8-in. 6-32 R.H. nicked screws | .14 |
| | 1-30-ohm Rheostat | 1.50 | 143 | 1-Pkg. of 18 1 1/2-in. 6-32 R. H. nicked screws | .18 |
| W | 1-100 ft. spool of Wire | .50 | 49 | 2-Pkg. of 10 6-32 nicked nuts | .24 |
| MR | 2-Lengths No. 7 special varnished tubing | .30 | | | |

If you do not want to buy the complete Browning-Drake parts you can get any individual parts from DURRANT at the prices given above.

RX-1 Construction Kits, Delivery for Christmas

If you want to hear the Christmas Carols with a fidelity of reproduction which will bring the spirit of Christmas to every member of your family, if you want real Christmas music unspoiled by distortion, unmarred by faulty tuning, put in an order immediately for an RX-1. It will be shipped immediately, allowing you time to get it working before the holiday.

Complete, illustrated instructions are furnished, with picture wiring diagrams and step-by-step assembly instructions. All parts required, including Celoron panels drilled and engraved, postpaid.....\$32.50

(Add \$1.00 for shipping west of the Rocky Mountains)

D-21 Sodium Tubes for use with RX-1.....\$5.00

DURRANT RADIO, Ltd.

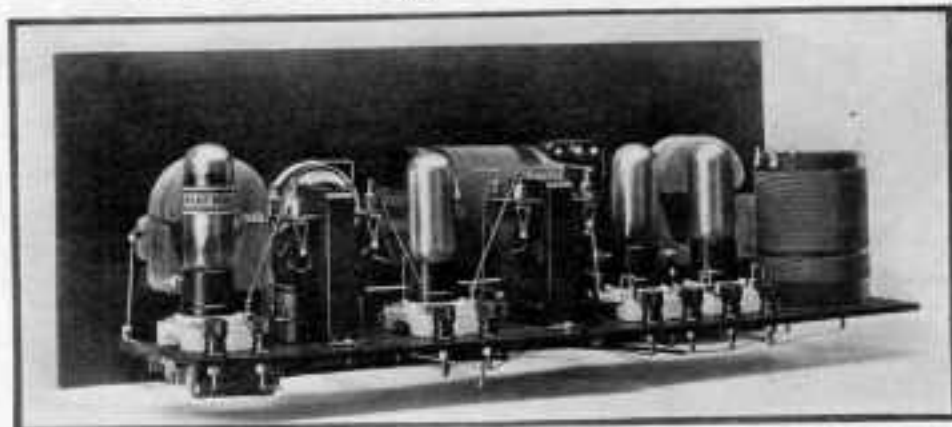
SUPPLIERS TO RADIO SET BUILDERS AND EXPERIMENTERS

T-52 Vanderbilt Avenue

New York City

THE NEW YORKER

S. L. F. Tuning, Variable Selectivity



Parts Listed Below, All Parts Drilled and Engraved, \$49.50

PARTS LIST THE NEW YORKER

| No. | Item | No. | Item |
|-----|---|-----|--|
| 28 | 1 7 by 18 by 1/10-in. Panel drilled and engraved..... | 32 | 2 0.0025 fixed condensers..... |
| 28A | 1 8 1/2 by 17 by 3/16-in. Panel drilled and engraved..... | 45 | 1 .001 fixed condenser..... |
| 30 | 1 Antenna coil..... | 12 | 1 Eagle 3.0 megohm gridleak..... |
| 31 | 1 Double rotor coupler..... | 15 | 8 Ely engraved, (2 plain) binding posts..... |
| 32 | 1 R. F. choke coil..... | 16 | 1 20-ft. coil wire..... |
| 33 | 1 Neutralizing condenser..... | 18 | 1 Length varnished tubing..... |
| 34 | 2 silver-Marshall S. L. F. condensers, No. 310..... | 30 | 10 Washers..... |
| 14 | 2 1-in. clockwise dials..... | 41 | 1 Carter No. 163 jack..... |
| 25 | 2 Amertus AF-7, 113 transformers..... | 42 | 1 Carter Imp switch..... |
| 26 | 4 No. 22 Patent bakelite sockets..... | 43 | 4 Terminal panel supports..... |
| 37 | 1 20C Patent rheostat 20 ohms..... | 10 | 4 Angle brackets..... |
| 58 | 1 UX-328 Amperite..... | 21 | 12 1/2-in. 6-32 F.H. bequeered screws..... |
| 11 | 1 New York Coil gridleak condenser, 0.00025..... | 44 | 4 1-in. 6-32 F.H. bequeered screws..... |
| | | 22 | 20 1/4-in. 6-32 R.H. nickelled screws..... |
| | | 24 | 24 3/4-in. 6-32 R.H. nickelled screws..... |
| | | 25 | 30 6-32 .011 nickelled nuts..... |
| | | 30 | 30 Soldering lugs..... |

Choose the Set Which Meets Your Conditions

The three sets shown on these pages have been designed to meet specific conditions, and each design has been selected because we found it the safest and surest way to meet the requirements of customers.

The RX-1 is the choice of those who put quality of tone above all other factors. It has a long range, too. The Browning-Drako Five is a real DX set, very sharp in tuning, giving tremendous volume. The New Yorker, a drycell set, is sharpest of all in tuning, also brings in extreme distance, and is the best for those in the city, where interference is bad, or in the country, where DX is necessary.

ORDER FROM DURRANT FOR PRE-XMAS DELIVERY

DURRANT RADIO, Ltd.

SUPPLIERS TO RADIO SET BUILDERS AND EXPERIMENTERS
T-52 Vanderbilt Avenue New York City



Mohawk

Manufactured by Mohawk Corporation
of Illinois, Independently Organized in 1924

Radios - Kits - Parts

5 Tubes—Just One Dial to Tune

Mohawk No. 143 Kit includes Mohawk Three-tube balanced condenser, Mohawk Selecting Dial, three standard Motorola vacuum tube frequency Transformers. With this kit you can construct any five-tube, three dial tuned radio frequency receiver into a one-dial set. Price \$22.00 complete.



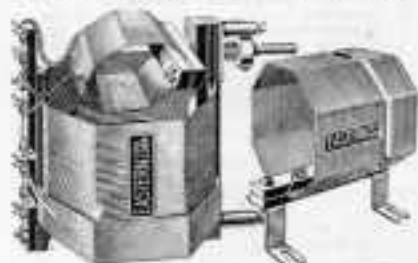
Mohawk Three-tube Balanced Condenser—*"The Heart of the Mohawk Radio."* Price \$12.

All the parts of the famous one dial Mohawk Radios can now be bought separately. You can easily assemble the complete Mohawk or install any parts of this remarkable set in the radio you are building or re-building. Only with the Mohawk three-tube balanced condenser can you get Mohawk performance and the unmatched simplicity of the Mohawk one dial control. This condenser is exclusive to Mohawk.

The separate parts come conveniently packed with full instructions for their use and installation. Mohawk Radios, Parts and Kits are sold by leading dealers.

Manufacturers
Mohawk Corporation of Illinois Inc.
Independently Organized in 1924
Chicago, Ill.

Sales Department
The Eiko Company
1333 So. Michigan Ave.
Chicago, Ill.



EASTERN KNOCKOUT COILS

Type R

Designed in strict accordance with Radio Broadcast specifications for the "Aristocrat" and for all Roberts Knockout Circuits, reflexed or unreflexed.

Per set, \$8.50

Eastern Coils are all in the efficient low loss pieble bottle form of winding, designed by M. B. Sleeper, guaranteed incomparable for the M. B. Sleeper RX-1, (\$6.00 per set). BROWN-ING-DRAKE (Type B-D, \$8.00 per set). THREE CIRCUIT SET, (Type 3-C Coupler, \$8.00), and for other leading circuits. Circular on request.

At your dealers or direct, postpaid.
EASTERN COIL CORPORATION
22 Warren St., Dept. R.E. New York



Quality—the Key to Permanent and Profitable Patronage

APEX VERNIER DIALS

RADIO purchases are now conducted on a progressive basis. Buyers are constantly searching for improved equipment. Quality receives the greatest consideration. Desires of particular operators insure development of profitable trade. APEX Vernier Dials stand for the greatest attainable value in dial construction and actual delivery of satisfactory service. They simplify undesirable elements and present outstanding improvements in desirable features. Make tuning positive—bring in a greater number of distant stations—simplify logging—and greatly enhance the beauty of any set. Ratio 10 to 1. Adaptable to any 1/2 inch shaft. Check size and counter clockwise.

| | |
|--------------------|----------------------------------|
| ROYAL BRASS FINISH | 3 1/2 inch—\$1.75 Net |
| 4 inch—\$1.50 Net | SILVER FINISH |
| 4 inch—\$1.75 Net | 3 1/2 inch—\$1.50 Net |
| 4 inch—\$1.75 Net | DE LUXE GOLD PLATED (14K) FINISH |
| 4 inch—\$2.50 Net | 3 1/2 inch—\$1.50 Net |

For particulars relative to specially attractive proposition to dealers, write

APEX ELECTRIC MFG. CO.,
Dept. 1178 1410 W. 59th Street, Chicago

SENSATION OF SEASON
B-ELIMINATORS
 Using new RAYTHEON Tubes

with

DONGAN



Transformers

- No. 309 Full Wave For Raytheon Tubes
 No. 337 Full Wave For R. C. A. UX 215 Tubes
 No. 337 Full Wave For Cunningham CX 313 Tubes
 No. 534 Half Wave For R. C. A. UX 216 B Tubes
 No. 534 Half Wave For Cunningham CX 316 B Tubes
List \$7.00

Operating a radio set is now a source of keen delight to every member of the family. Consistent performance every night is assured with the new B-Eliminators using the remarkable new Tubes and Dungan Transformers and Chokes. And anyone can build this B-Eliminator at a small cost.

Indorsed by leading radio engineers and well-known magazine editors, every radio lover can now possess the simplicity and 100 per cent reception possible with the new Tube B-Eliminators.



Chokes

- No. 314 20 henry
 No. 306 10 henry
 No. 337 10 henry

List \$5.00

Full instructions and description mailed on request. Ask your dealer or send check or money order to factory. Sold under guarantee.

FOR SET MANUFACTURERS

**Type S
 Audio Transformers**

| Ratios | |
|---------|-------------|
| 2-1 | \$4.00 List |
| 1 1/2-1 | \$5.00 List |
| 6-1 | \$2.75 List |

Dongan is the standard maker of transformers and chokes for the leading manufacturers of B-Eliminators. Engineering data and quotations furnished on request.



More than 42 of the country's leading sets use Dongan Audio Transformers. Any type you require. Your requirements can be handled promptly in our big plant. Prices on request.

DONGAN ELECTRIC MANUFACTURING CO.
 2995 Franklin Street, Detroit, Mich.

Transformers of Merit for 15 Years

The winding trail to true amplification



is taken by many electrical engineers

Radio Engineers, University Professors, Electrical Dealers, and many employees of public service corporations who know show a marked preference for Samson Helical Wound Transformers in their own sets because of the advantages only obtainable with helical winding—an exclusive Samson feature.

Samson Helical Wound Transformers

Only a few turns (these extremely low voltages) separate adjoining parts of wire on adjacent helical layers. This gives minimum leakage effect and makes paper insulation unnecessary. Greater efficiency through less resistance results as well as a minimum of distributed capacity effect which is the cause of distortion in transformers not having this helical winding.

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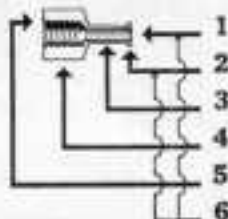
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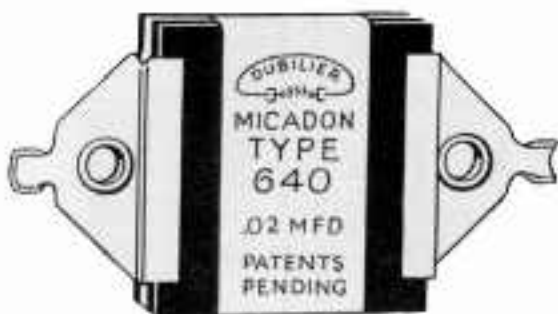
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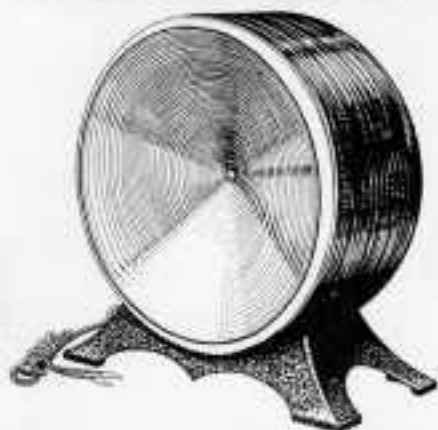
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