A PICTORIAL ALBUM
of
WIRELESS AND RADIO
1905-1928

EXPERIMENTAL
RECEIVING &
BROADCAST
EQUIPMENT

Murdock One-Kilowatt
Spark Transmitter

PUBLISHED BY
FLOYD CLYMER
LOS ANGELES

- DOCUMENTARY
- HISTORICAL
- EDUCATIONAL

$3.00

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Covers All VW Commercial Vehicles

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In addition, the author, OCee Ritch veteran technical writer and competition driver, has included the speed secrets that make the hottest Porsches go. In a special section he details proven modifications for those interested in super performance. Covered are all Porsche models from 1100 to Super 90, plus the 1500-1600 Carreras; engine, chassis, suspension, etc. Photos of all models, with charts and drawings.

Written with authority, this handbook should be in every Porsche owner's glove compartment and in the hands of every Porsche enthusiast and tune-up expert. Valuable for prospective owners and collectors. Fully illustrated with hundreds of photos, charts and drawings, the handbook is far more valuable than its nominal purchase price indicates.

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Here is a newly revised "How-to-do-it" book about engine swapping. Covers late model OHV engines with step-by-step method of installing into older cars and compacts. Information on installing Cadillac into Ford, Chevrolet into Ford, Chrysler into Ford and Chevrolet into Studebaker and late Chevrolet into early Chevrolet and others. All electrical circuit changes. Information on adapters, engine weights, suspension and chassis data. A MUST book for the enthusiast who wants to change engines and other parts. Lot of photos.

Postpaid $2.00.

MODEL A FORD SERVICE MANUAL AND HANDBOOK

This is the most fantastic book ever published on the Model A Ford. It is a "monster" with 560 pages and over 300 photographs, charts, and drawings. Written in 1929 and 1930 near the end of Model A production by S.A.E. member, Victor Page, who was then considered the most outstanding authority on Model A Ford cars.

Among the 300 illustrations there are many cutaway views of engine, transmission, differential, carburetor, wheels, drop center rims, truck 2-speed auxiliary transmission, power take-off, and water cooling system. Data on refitting bearings and all about the electric system, including wiring diagrams, disc and single plate clutches, steering gear.

A "must" for every owner, restorer, collector, mechanic, enthusiast and historian.....Postpaid $5.00

BASIC AUTOMOTIVE HANDBOOK

How Your Car Operates From A to Z

Here is the ideal book for those who say "I don't know the first thing about a car," but who would like to have a working knowledge of its fundamentals. Written in easy-to-understand layman's language, the handbook covers every part and function of the car from the fuel tank to the exhaust pipe. And, it is carried out in a unique fashion which permits the reader to become as technically involved as he desires. Each factual explanation is followed by a discussion of theory and a deeper penetration of the subject, which can be skipped by those who are interested only in the "how" rather than the "why."

Profusely illustrated with hundreds of line drawings, cutaways and photographs, the BASIC AUTOMOTIVE HANDBOOK is an excellent manual for the teen-ager, students and the non-mechanically minded. The chapters on driver education and the practical aspects of owning a car alone are worth the price of the entire book to people in this category. Women will especially enjoy reading this book so that they may more clearly understand what makes their car "tick." It explains in every-day, simple and non-technical language the many things so many want to know. If there is someone in your family who is about to have a car for the first time, this handbook should be in his or her possession. Valuable also for libraries, driving schools and lecturers.....Postpaid $3.00.

FORD MODEL "A" ALBUM

This big unique book is actually a pictorial history of the fabulous model "A", including trucks. 150 splendid 4 x 7 photos illustrate all of the "A" models from various angles. Each photo has captioned details and comments by the outstanding model "A" authority, Leslie R. Henry. Included are interesting sales and promotion articles, technical articles and servicing data by experts, specifications, listing of motor numbers for each month, description and photos of prominent characteristics of each yearly model, and 24 pages illustrate and describe accessories of all kinds. There is also an interesting article on the Ford-built Lincoln. This most comprehensive volume has 144 large pages which will delight any "A" owner, collector or enthusiast.....Postpaid $3.00

RENAULT DAUPHINE OWNERS HANDBOOK

Here is a large complete owners handbook needed by every owner of the Renault Dauphine. Tells the owner how to perform service operations and keep his car in top condition. Written so the layman can understand it. In addition to the technical section the book includes Floyd Clymer's test report with many photos and comments on the car's features. Also Clymer's comments on manufacturing methods of Renault he saw on his visit to the factory in France.

This book also includes a free section by the famous Belgian racing driver, Paul Frere. There are also beautiful photographs of the Renault factory, including manufacturing methods and assembly line procedure.

Postpaid $3.00

Floyd Clymer Publications, 1268 S. Alvarado St., Los Angeles 6, Calif.

A PICTORIAL ALBUM

of

WIRELESS AND RADIO

1905-1928

by

Harold S. Greenwood

This book is dedicated to the Scientists, Mathematicians, Engineers, Experimenters and Amateurs who made present day radio possible.

Published by

FLOYD CLYMER

World's Largest Publisher of Books Relating to Automobiles, Motorcyles, Motor Racing, and Americana

1268 South Alvarado Street Los Angeles 6, California

ANNOUNCEMENT

One of the most fabulous eras in science was that period in which man took the giant step forward in communication by means independent of direct contact and the transmission of the human voice. Although we had developed a fair complex of land telegraph and telephone channels and had laid an undersea cable to Europe, the evolution of wireless permitted the long-dreamed-of communication with ships at sea and to any remote point of the globe. It was an era comparable to the present but even more exciting because nearly anyone could get into the act. The part played by the amateur experimenter cannot be overstated and the rapid growth of commercial broadcasting can only be traced to the avid manner in which mechanically-minded young people adopted the new hobby.

The equipment used by the pioneers, from the first crude detectors and transmitters to the rather complex super-heterodyne is, in itself, a fascinating study in evolution. To find a collection of that equipment, in restored and operating condition, as the property of an individual is almost beyond hope, but one man, the author of this book, Harold S. Greenwood (W6MEA) owns such a collection.

With radio as a hobby since his High School days (in the very early 'twenties) and with a quarter of a century as a radio parts supplier in his business career, Harold Greenwood can be ranked as an extremely knowledgeable and practical radio man. He was interested in the historical aspect of the art from his first experiences and made up his mind to keep certain milestone pieces of equipment. As a result, he possesses a unique assemblage of components, receivers, transmitters and experimental equipment unmatched (to our, or his, knowledge) anywhere in the world.

The brief, readable, history which accompanies the illustrations is not meant to be an exhaustive study. It gives the highlights and ecalls many of the names familiar to amateur and layman alike. All of the photos are of items in his collection and each is in operable condition. Uncounted man hours have gone into the restoration and preservation of this equipment and I feel that the reader of this book will get the thrill I did when I was taken back in time in a review of these wire, metal, glass and wood links with the beginnings of wireless communimation. The historical period ends with the superheterodyne circuit and the screen grid tube inasmuch as we are still developing that phase of electronic progress. And, we owe a debt of gratitude to Mr. Greenwood for preserving history for the present.

I hope you enjoy the book as much as I have in publishing it.

Floyd Clymer

Publisher.

CONTENTS

RADIO CHRONOLOGY

1832. SAMUEL MORSE, American, devised Morse Code, still in use.

1860. MICHAEL FARADAY, English, invented the spark induction coil, later improved by Ruhmkorff.

1865. JAMES MAXWELL, Scotch, found mathematically that light waves, electric waves and magnetic waves were similar in their behavior.

1883. THOMAS EDISON found that current would flow if a plate was put in a light bulb and connected in series with a battery, galvanometer and the bulb's filament; known as "Edison effect." Discovered about same time in England by Fleming.

1875. ALEXANDER GRAHAM BELL invented magnetic microphone.

1885. PREECE and HEAVISIDE found that by running two wires parallel, signals could be sent from one to the other without direct connection. HEAVISIDE also devised theory of "Heaviside layer" above Earth.

1877. DAVID HUGHES, English, invented carbon microphone.

1887. HEINRICH HERTZ, German, discovered "Hertzian" electromagnetic waves; proved Maxwell's theories. Found that electomagnetic waves traveled at speed of light and could be reflected. Hertz built an oscillator using a Ruhmkorff spark coil with spark gap for the transmitter; for a receiver he used a loom of wire with an adjustable resonating gap. When adjustments were made a fine spark appeared at the receiving gap.

1904. FLEMING patented his "Fleming valve," a diode giving no amplification; used as a detector by Marconi Company.

1905. Several men claimed to be first with radio telephony. "Singing arc" had been discovered by Elihu Thompson in 1892. Poulsen was first to use a copper and carbon electrode arc for continuous-undamped waves. Fessenden used an alternator or "wave mill" giving up to 20,000 sparks per second, later improved to give 100,000/sec. Lee DeForest using an arc made commercial broadcasts in 1907. He played phonograph recordings and had "commercials." Laughter and Ruhmer also used arcs for radio telephony. Frederick Collins also claimed to be "first" with the new media.

1908. Famous patent for Triode Audion tube granted to DeForest.

1914. Major Armstrong patented the regenerative circuit; later given to DeForest.

1915. First trans-Atlantic rediotelephone transmission. Much improved radio tubes available.

1917-19. Great strides in practical radio made due to war impetus.

1921-28. Birth of the broadcasting era in U.S., higher power stations, world-wide radiograms. Hundreds of new manufacturers making the new hetrodyne receiver. Scanning disc television experiments.

DR. LEE DeFOREST
THREE ELEMENT AUDION
1906

GUGLIELMO MARCONI
SENT FIRST WIRELESS
MESSAGE 1896

HEINRICH HERTZ
ELECTROMAGNETIC WAVES
1887

SIR OLIVER LODGE
METHODS OF TUNING

MAJOR ARMSTRONG
REGENERATION 1914

DR. J. A. FLEMING
FLEMING VALVE 1905

NIKOLA TESLA
AC MOTOR & TESLA COIL

R. A. FESSENDEN
ELECTROLYTIC DET. 1903

EDOUARD BRANLY
COHERER DET. 1890

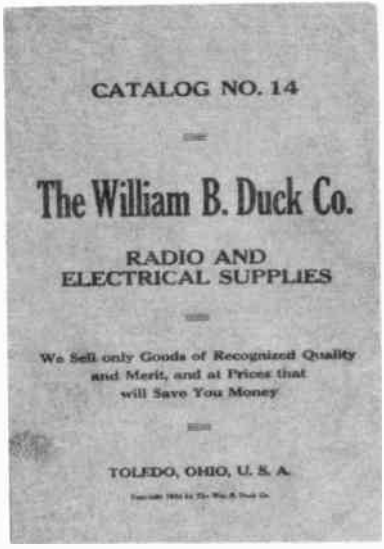
WHERE YOU COULD BUY IT

By 1906 wireless apparatus was on sale to the amateur and experimenter. The Electro Importing Co. of New York was formed by Hugo Gernsback and soon began making parts and sets for the amateur.

J. J. Duck, and later his brother Wm. Duck at Toledo, Ohio, put out a mail order radio parts catalog. Another mail order house was Manhattan Elect. Supply Co. F. D. Pitts of Boston put out a radio parts catalog containing testimonials. John First of New York sold the famous "Firso" line by mail.

In 1914 Merker-Flocker Electric Co. of Pittsburgh offered wireless gear for sale. Pacific Laboratories of San Francisco sold the Audiotron and Morehead tubes in 1916. National Radio Supply Co. of Washington, D.C. sold both amateur and commercial apparatus by mail order. An amusing advertisement of the period was that of the Electrical Supply Co., which read, "Be a detective and hear through the walls with our Skinderviken Button."

The DeForest Radio Tel. & Tel. Co. of New York issued catalogs after the war, selling their famous "unit parts" for the amateur.



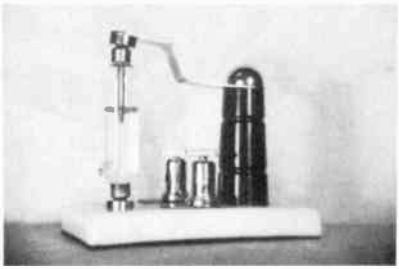
THE ELECTRO IMPORTING CO.

One of the real pioneers in bringing radio as a hobby to the public was Hugo Gernsback who, in 1904, founded the Electro Importing Company, known to all early day amateurs simply as the E. I. Co. He and Louis A. Coggeshall rented a location at 32 Park Place, New York City, in 1906 and began to offer a wireless set labeled the "Telmico" a name made up from letters of the company's designation. Gernsback also began publishing his first magazine MODERN ELECTRICS about this time. The E. I. catalog was the 'bible'.

Gernsback designed much of his first wireless apparatus himself including the Radioson Electrolytic Detector and a Leyden Jar Variable Transmitting Condenser in 1906 and the famous Gernsback Rotary Variable Condenser in 1911.

In 1909 he formed the Wireless Association of America which jumped to 3,200 members in only a year. In 1915 Gernsback began the formation of the Radio League of America and started publishing ELECTRICAL EXPERIMENTER. In addition to his work as a publisher and prime mover in organized amateur radio, Gernsback was a tireless worker for legislation favorable to the amateur and experimenter and most of the statutes relating to amateurs are along his proposals. Most of the startling predictions he has made editorially have come to pass and he can certainly be counted as a great force in the growth of modern radio and electronics.

Rotary Variable Condenser



Electrolytic Detector

DETECTORS

The first detector was a "coherer," simply a glass tube containing iron filings. A strong wireless signal passing through it caused the filings to cling together. But the top code speed was about 15 words per minute, too slow for commercial use; land telegraph lines were then doing 45 WPM.

In 1899 Lee DeForest read articles by Ashkinas and Neugschwender, who had found that a piece of tin foil on a glass plate, when cut into with a razor blade, would detect electric waves if a drop of alcohol and a battery was attached across the cup gap. DeForest developed this detector by using tin for the gap and perovide of lead paste as the electrolyte. This detector was self-restoring and could be used at any code speed.

About 1902 Pickard used two needles and a carbon block as a detector; Fessendesn patented the elcetrolytic detector about the same time. This was a carbon cup of diluted acid with a platinum wire immersed in it; this like the carborundum detector required a battery. In 1907 Pickard invented the crystal detector, an inexpensive, self-restoring device needing no battery.

Other types followed: the Barr mercury cup, the Perikon using two minerals, the Ferron and the famous Crystaloi using a hollow button filled with a sensitive mineral powder and many needle points; it only needed to be revolved to find a sensitive spot. When arc, alternator and tube transmitters came in, producing an undamped wave, the crystal detector would not receive them. So a buzzer circuit was inductively coupled through the antenna or a "tickker wheel" was used to break the signal into audio frequencies. A motor driven chopper wheel at the transmitter achieved the same purpose.

In the 1920s the crystal detector was made in many types: fixed for the reflex sets, and the common Galena with "cats whisker."

Three mineral detector.

R.C.A. chopper wheel.

BRANLEY COHERER AND DECOHERER
WITH KEY WIND TAPE PRINTER
ABOUT 1902 TO 1905

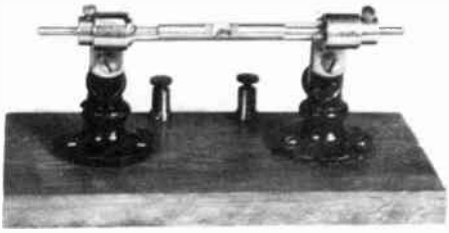
MARCONI TYPE D TUNER
AMERICAN MARCONI CO.
ALSO MADE BY UNITED WIRELESS.
1905

MARCONI CA 294
250 TO 3100 M.
1917

INSIDE VIEW
MARCONI 106D

MARCONI 106
MODIFIED TO 106D BY
GEN. ELEC. FOR RCA.
1915

WIRELESS DETECTORS



BRANLEY COHERER
ABOUT 1902

CRYSTALOI
WIRELESS DETECTOR
TYPE AA ABOUT 1914
$6.00

ELECTRO IMPORTING CO.
RADIOSON ELECTROLYTIC
DETECTOR, ABOUT 1914

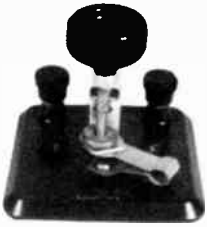
MURDOCK
SILICON DETECTOR
WITH CONDENSOR
1913 $4.50

J. J. DUCK FERRON DETECTOR
HOLLAND BLUE MARBLE BASE
1913 $4.00

WIRELESS DETECTORS

CLAPP-EASTHAM
FERRON DET.
HOLLAND MARBLE BASE
ABOUT 1914 $3.25

ELECTRO
GALENA DET.
F. I. CO., 1914

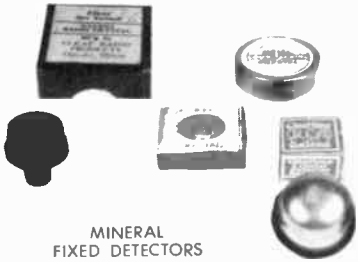


PEROXIDE OF LEAD
DRY ELECTROLYTIC
E. I. CO., 1913

THREE MINERAL DET.
JOHN A. FIRTH CO.

BABY DETECTOR
E. I. CO., 1915 $ .25

BALL SLIDERS
FOR SLIDE TUNERS
E. I. CO., 1910



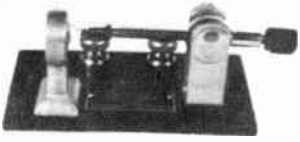
MINERAL
FIXED DETECTORS

WIRELESS DETECTORS

DEFOREST D-101
CRYSTAL DET.
$2.60

DEFOREST
CRYSTAL DET.

MURDOCK
324 DETECTOR
1919 $ .75



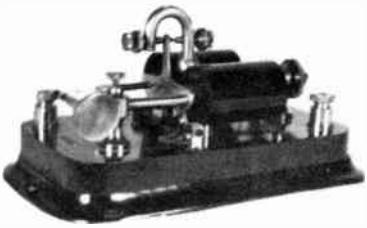
WIRELESS SPECIALTY
APPARATUS CO. 1919

WIRELESS SPECIALTY CO.
TRIPLE DETECTOR STAND
1917

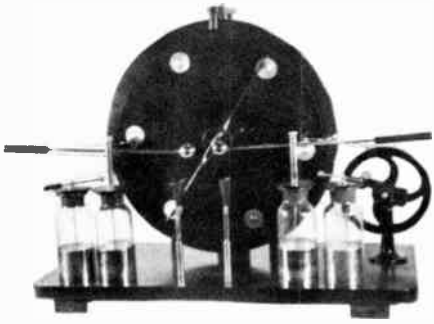
DETECTOR MINERAL
CATWHISKERS

PHONE CONDENSORS
MURDOCK A. J. MORGAN PARKIN
1912 TO 1915

ELECTRO IMPORTING CO.
E. I. CO.
PRECISION COHERER
1910



SENSITIVE RELAY
USED
WITH COHERER DET.
1910



WHIMSHURST
STATIC MACHINE
2 in. SPARK
CHICAGO APPRA. CO.
1910

LEYDEN JAR
CHICAGO LABS. &
SCALE CO.
1910

"CROWFOOT"
GRAVITY BATTERY
USED FOR TELEGRAPH
AND WIRELESS 1905

COLUMBIA BATTERY
1907

THE FLEMING VALVE

Thomas A. Edison laid the groundwork for thermonic detection of high frequency oscillations in 1883. Edison found that a black deposit formed on the inside of an electric light with use. These particles, he discovered, were part of the filament. He sealed a plate in one of his lamps and found that with it connected to the positive end of the filament, current would flow from the filament to the plate. Edison patented this as an "Electrical Indicator" and called the phenomenon, "The Edison Effect." Other pioneers became interested in the effect. Prof. Edwin J. Houston, Sir William Preece, Julius Elster and Hans Geitel of Germany all made experiments but it remained for Ambrose J. Fleming to perfect a new type of detecting device for receiving wireless oscillations.

Fleming, formerly with the Edison Co., had taken a new job with Marconi. He was hard of hearing and desired a visual indicator to use in place of audio detection. He thought of his work with Edison and decided to try one of the Edison Effect lamps. He set up the necessary circuits and found that a galvanometer gave a steady direct current reading. He then knew he had found a better rectifier for wireless oscillations.

Fleming, then, was not the inventor of, but actually the first to find an application for the Edison Effect phenomenon. On Nov. 7, 1905 he patented the "Fleming Oscillation Valve" or Glow Lamp, as he called it and it was the first thermonic wireless detector.

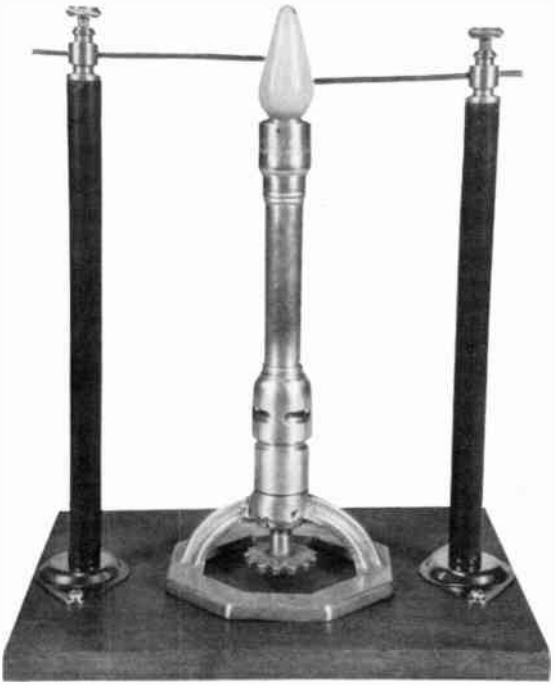
This valve was a diode and was made in many forms. It detected but did not have any intensifying qualities. By 1907 the Marconi Corporation was manufacturing Fleming valves for commercial use. They varied from approximately an inch to an inch and one quarter in diameter and from three and a half to four inches long. Both the Edison bayonet base and the Edison medium screw base were employed. No plate battery was used, merely a filament battery, and it was found that four volts was sufficient for wireless detection.

THE VACUUM TUBE

The vacuum tube was given its start in 1880 when Julius Elster and Hand Geitel of Germany found that adding a plate to an incandescent lamp gave a "valve" effect. Thomas Edison in 1883 found that a current would flow from a heated filament to a positively charged electrode within a lamp. John Fleming found that using the "Editon effect" rectification took place and could be used as a wireless detector.

In 1900 Dr. Lee DeForest while testing his new type detector (called a "Responder") noticed that his Welsback gas burner would dim when he operated his spark coil. In 1903 he used two platinum electrodes, one holding table salt, and detected signals by the change in the flame as current passed across the electrodes. This led DeForest to heating gas in a carbon filament lamp, and he had the H. W. McCandless Co. (makers of Xmas tree lights) make some two element tubes, which he patented. In 1906 DeForest applied for a three element tube patent, publicly announced a year later. In 1908, at the suggestion of the McCandless Co., the Audions were made spherical, and remained that way for some time. In 1909 they were made with a double grid and a double plate.

About 1910 DeForest made the RJ4 detector, sold as a unit with a DeForest Audion, the only way it could be bought. By 1915 the Audion tube was tubular and had a double filament. Next came Moreheads with Shaw bases, and Diodes with a control electrode on the outside, done to bypass the DeForest patent. During the war Western Electric made the famous VT-1 and VT-2. In 1919 General Electric made their advanced UV-200 and UV-201 for R.C.A. From this date many makes appeared on the market, including such "bootleg" names as Vaco-Bulbs.



Replica of DeForest gas flame detector.

DE FOREST TUBES

DE FOREST
SPHERICAL AUDION
SINGLE GRID & PLATE
1909

DE FOREST
SPHERICAL AUDION
DOUBLE GRID & PLATE
1909

DE FOREST AUDION
PATENTED 1908

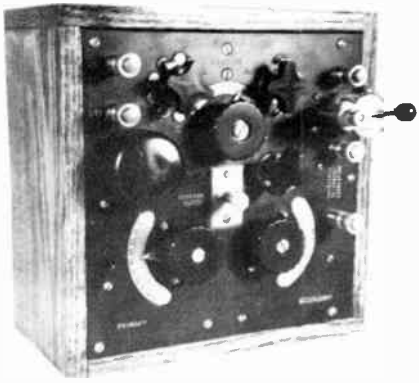
DE FOREST OSCILLION
SINGLE TUBE, 1917

DE FOREST TUBULAR AUDION
1915

LEE DEFOREST

DEFOREST GAS FLAME DETECTOR
FORERUNNER OF THE VACUUM TUBE
REPLICA 1904

DEFOREST AUDION DETECTOR
TYPE RJ4
1909 $18.00 COMPLETE



DEFOREST LONG WAVE
CRYSTAL RECEIVER
1917

AUDION CONTROL BOX
FOR DEFOREST AUDION
1910

EARLY TUBES

ELECTRON RELAY
PACIFIC LABS., 1916

WEAGRANT VALVE
EXTERNAL GRID
1912

MARCONI TUBE
MADE BY
H. J. ROUND
1911

AUDIOTRON
DOUBLE FILAMENT
1915

AUDIOTRON
WITH ADAPTER

FOREIGN TUBES

BRITISH "R" TUBE
1917

PHILLIPS TUBE

MULLARD BRITISH
PM-22

TELEFUNKEN
TYPE EVE-193

TELEFUNKEN
TYPE ER 58

TELEFUNKEN
TYPE EVN-194

MARCONI
OSRAM VALVE

MARCONI
P-410

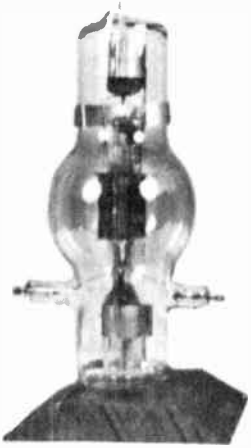
EARLY TUBES WITH SHAW BASES

A - P
TRANS. TUBE
1920

MOORHEAD
ELECTRON RELAY
1920

MOORHEAD
AMPLIFIER

MARCONI VT
1920



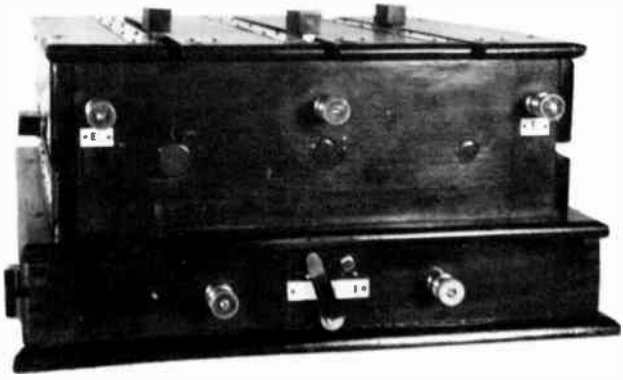
DE FOREST
TYPE H

MOORHEAD
1917

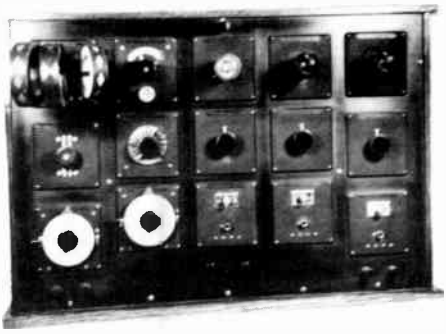
VT - 14

DE FOREST SYSTEM

Dr. DeForest, early in 1903, tried out an electrolytic detector which Reginald Aubrey Fessenden had patented. He found it superior to the chemical detector he had been using in the Responder. Fessenden's detector used a Wollaston wire (invented by the man of the same name) which was a platinum wire sealed in a glass rod and dipped into a dilute acid solution. DeForest had Clifford Babcock make what he called a "Spade Electrode", a piece of platinum leaf sealed into glass. In 1905 the courts ruled that this was in infringement on Fessenden's patent and prevented DeForest from using it. However, by this time, DeForest had a carborundum detector and was developing the audion detector. With the spade electrode this pioneer was employing a three-slide and a five-slide tuner. He called these the two-coil and three-coil "Syntonizers" and they made up the receiving equipment for the DeForest system.

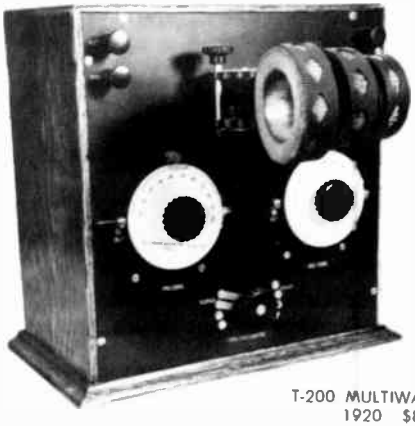


DEFOREST

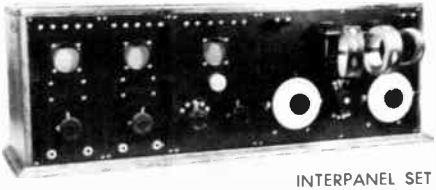


FIFTEEN PANEL UNIT SET
1919 $160.00

P-300
AUDION-ULTRAUDION
1919 $88.50

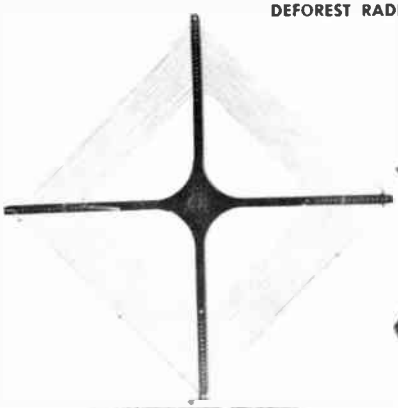


T-200 MULTIWAVE TUNER
1920 $87.50



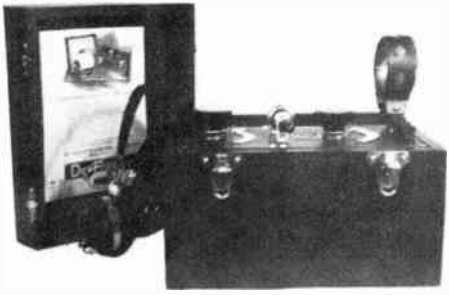
INTERPANEL SET
1921 $125.00

DEFOREST RADIO TEL. & TEL. CO.



DEFOREST F-5
RADIO PHONE
5 TUBE T. R. F.
1924 $75.00

RADIOPHONE TYPE D-10
PORTABLE REFLEX 4 TUBE
1923 $150.00



THE EVERYMAN CRYSTAL SET
1923 $31.50

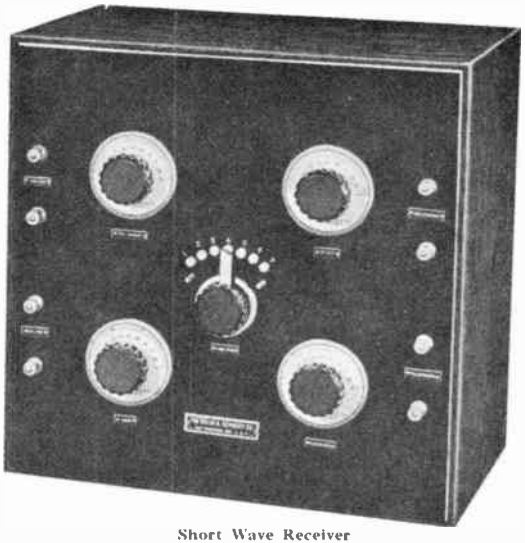
The Colin B. Kennedy Co.

Manfuacturers of

Radio Apparatus

Office and Salesrooms

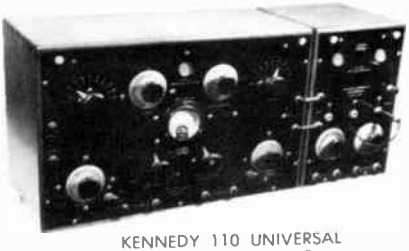
Rialto Building San Francisco, California



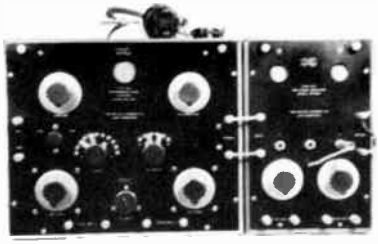
Short Wave Receiver

The 200 meter wave to which the amateur is limited by government regulations, does not permit of high efficiency at the transmitting end. It is possible to more than offset this, however, by the use of super sensitive receiving apparatus—a fact that is well demonstrated by the way amateurs consistently communicate over greater distances than do commercial stations although obviously the latter work under more favorable conditions.

COLIN B. KENNEDY RECEIVERS

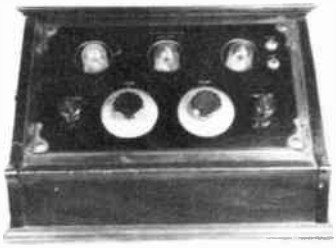


KENNEDY 110 UNIVERSAL
175-25,000 METERS
1922 S.P. $250.00

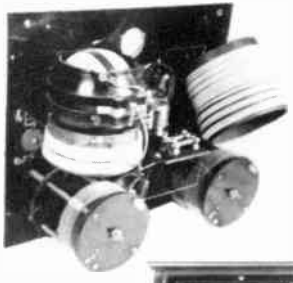


KENNEDY 220 INTERMEDIATE
175 TO 3100 METERS
1921 S.P. $210.00

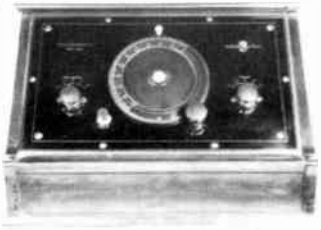
KENNEDY 281 & 521 AMP.
175 TO 620 METERS
1921 S.P. $135.00



KENNEDY MODEL V
1923 S.P. $86.50



BACK VIEW
MODEL 220



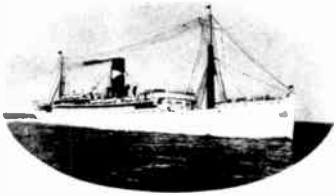
KENNEDY
MODEL 22
5 TUBE
1924

KENNEDY PORTABLE
1923 S.P. $75.00

RADIO TELEGRAPH *and* TELEPHONE EQUIPMENT

DESIGNED FOR

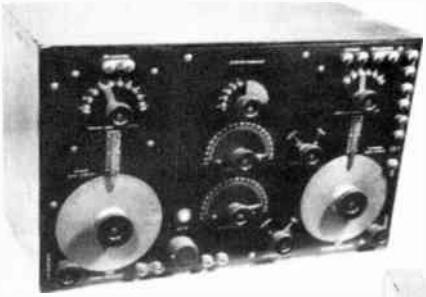
COMMERCIAL SHIP AND SHORE STATIONS
MILITARY INSTALLATIONS
PLEASURE YACHTS AND CRUISER AUXILIARIES
SCHOOLS AND COLLEGES
PRIVATELY-OWNED RESEARCH AND
EXPERIMENTAL STATIONS



United Fruit Company's Steamship *Pastores*

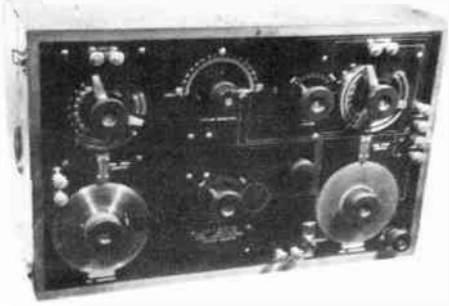
WIRELESS SPECIALTY APPARATUS COMPANY
ENGINEERS, DESIGNERS, AND MANUFACTURERS
BOSTON, MASS., U.S.A.

October, 1919

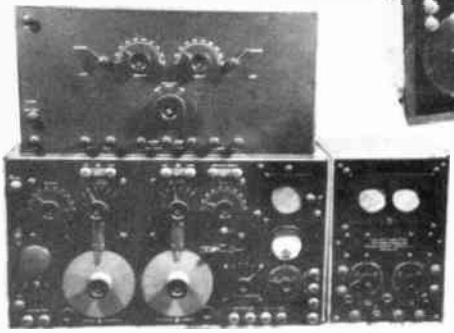


THE I-P TYPE RECEIVERS
WERE DESIGNED BL W. H.
PRIESS AND L. L. ISRAEL
WHEN THEY WERE WITH THE
U. S. NAVY.

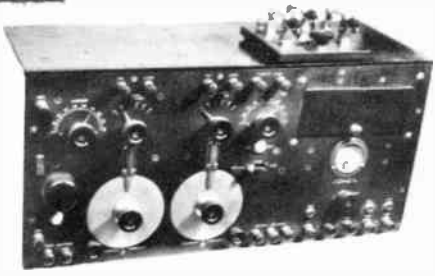
I-P-500
CRYSTAL DET. RECEIVER
1918 $425.00
150 TO 6,800 M.



NATIONAL ELEC. SUPPLY CO.
CN 239
CRYSTAL DET. RECEIVER
1917 $425.00



I-P-501
250 TO 8,000 M.
CRYSTAL DET. & AUDION
I-P-503 LONG WAVE
LOADING UNIT TYPE B AMP.
1910 $600.00



I-P-501A
250 TO 8,000 M.
CRYSTAL DET. & AUDION
TWO STEP AMPLIFIER
1920 $550.00

PARAGON

Reg. U. S. Pat. Off.

RADIO PRODUCTS

The amateur will tell you that the Paragon three-circuit receiver, because of its greatly superior selectivity and sensitivity, can pick and choose between broadcasting stations of about the same signal strength with less than one per cent differential.

This means that with a Paragon receiver you get what you want when you want it—complete messages and clear music from the station you tune in on, without interruption and jamming. Until you have listened in with a Paragon three-circuit receiver, you cannot guess the real pleasure and fascination of radio.

Long before broadcasting popularized radio with the general public, Paragon equipment was the choice of the experienced amateur. He will tell you today that if you want quality and satisfaction, Paragon Radio Products are the best and safest buy on the market.

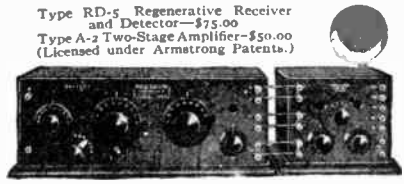
An illustrated Catalog of Paragon Radio Products is Yours For the Asking

DEALERS — The Adams - Morgan Company has an interesting proposition to make to reputable radio dealers who believe in quality merchandise. Details on request.

ADAMS-MORGAN COMPANY
6 Alvin Ave., Upper Montclair, N. J.

Also Manufacturers of PARAGON	
Radio Telephone Transmitters	Amplifier Transformers
V. T. Control Units	Control Dials
Rheostats	Amplifiers
Potentiometers	Receivers
V. T. Sockets	Switches
Detectors	Variometers

Type RD-5 Regenerative Receiver and Detector—$75.00
Type A-2 Two-Stage Amplifier—$50.00
(Licensed under Armstrong Patents.)



September, 1921

If you had a dozen ears

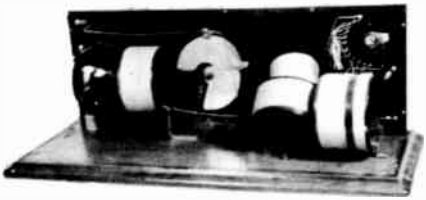
You would need them all to hear what you get nowadays with a single circuit receiver.

With several hundred powerful broadcasting stations, all operating on one narrow wave band, it takes real selectivity and sensitivity to get a satisfactory radio programme.

PARAGON RECEIVERS
ADAMS - MORGAN COMPANY

PARAGON RA TEN AMPLIFYING
SHORT WAVE RECEIVER
1921 S.P. $75.00

PARAGON DA 2
DETECTOR 2 STAGE AMP.
1921 S.P. $65.00



INSIDE VIEW RA 10

III A
3 TUBE REGEN.
1923 $175.00

PARAGON RA 10 DA 2

Wireless Telephone and Telegraph Receiving Sets

Simple enough for any one to operate
and of almost unbelievable efficiency

Manufactured in the Clapp-Eastham Shops
in the Clapp-Eastham Way

-1922.

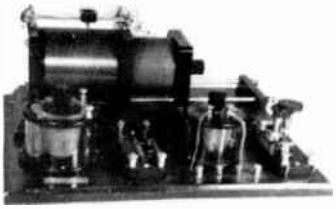
A SATISFIED AUDIENCE

"A LITTLE BETTER THAN THE BEST"

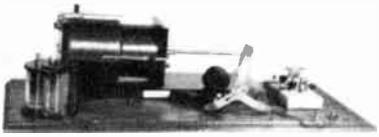
CLAPP-EASTHAM COMPANY

139 Main Street, Cambridge, Mass.

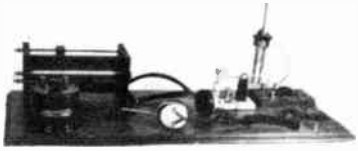
LONG WAVE RECEIVERS



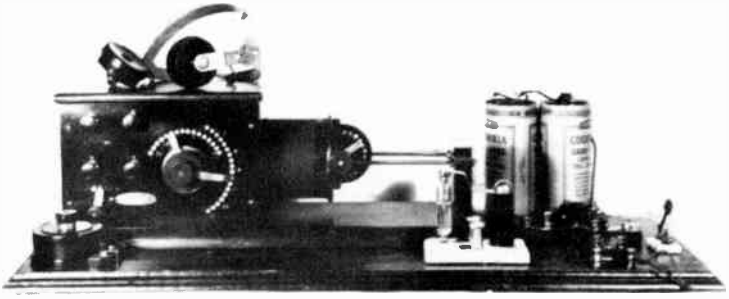
MURDOCK
LONG WAVE RECEIVER
LOADING INDUCTANCE
SILICON DETECTOR
1913 S.P. $50.00



CLAPP-EASTHAM
LONG WAVE RECEIVER
1914 FERRON DETECTOR



THREE SLIDE COIL
RADIOSON ELECTROLYTIC
DETECTOR. WITH
PLUNGER BATTERY.



LONG WAVE RECEIVER
NAVY COUPLER, CONNECTICUT TEL.
& TEL. VAR. COND. RADIOSON DET.
GRAPHITE POTENTIOMETER. PHONE
CONDENSOR. MURDOCK 55 PHONES.

REGENERATIVE ONE TUBE RECEIVERS AND AMPLIFIERS

AMARAD
REGENERATIVE RECEIVER
DETECTOR & 2 STEP AMPLIFIER
1921 $57.50
AMERICAN RADIO & RESEARCH

AMARAD
REGENERATIVE RECEIVER
VARIOCOUPLER & DETECTOR
1921 $30.00

CLAPP-EASTHAM ZRF
REGERATIVE TUNER
2 VARIOMETERS 1 VARIOCOUPLER
1919 $38.00

CLAPP-EASTHAM
REGENERATIVE RECEIVER
DET. 2 STEP AMP. 1921
$60.00 LESS TUBES

SLEEPER TYPE 3300
REGENERATIVE RECEIVER
1920 $35.00

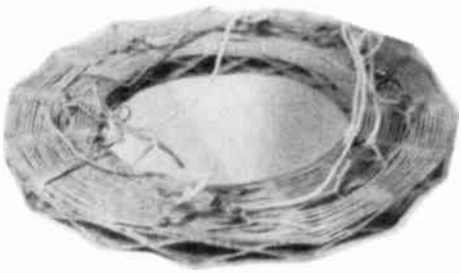
WIRELESS SHOP
REGENERATIVE RECEIVER
A. J. EDGCOMB LOS ANGELES

TUNING INDUCTANCES

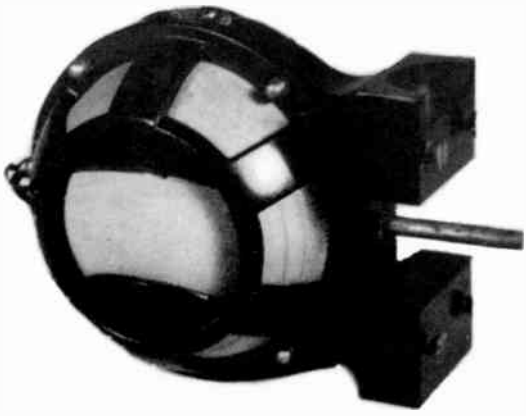
Syntony or tuning was used as early as 1900. Brass tubes, Leyden jars, coils and variable resistors were used to tune the transmitter and receiver. The coils were tapped every ten turns and switch points were used. Then the slide tuner appeared, using up to three sliders. But the slider would wear out the wire on the coil and deposit copper between the turns. The E. I. Co. corrected this in 1910 with a ball bearing slider. Litz wire came into use; this was many strands of small enameled wire wound into a cable.

The two-circuit or "loose coupler" next arrived, using a secondary winding sliding within the primary, and greatly increasing selectivity. By 1917 receivers were being made with a panel on which were found vario-couplers and variometers, making it possible to calibrate a dial.

The honeycomb coil was used by DeForest and others and produced the first all band receivers. By changing coils one could tune from 200 to 3100 meters without using the former loading coils. In the 1920s, with the coming of the tuned radio frequency receiver, many coils appeared on the market. Toroidal (doughnut) coils, spiderweb, figure-8, binocular and basket weave coils. The spider webs had a low loss as no coil form was used.

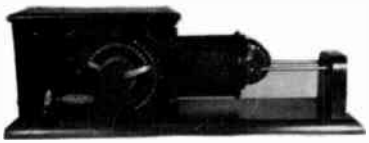


Reinartz coil.



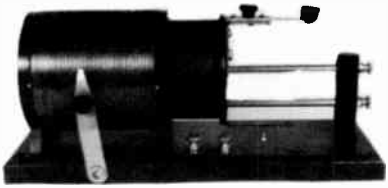
Grebe Vario-meter.

RECEIVING TYPE TRANSFORMERS
LOOSE COUPLERS

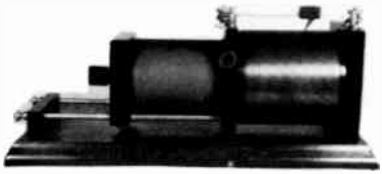


NAVY TYPE RECEIVING
TRANSFORMER 5A
WM. DUCK 1915 $19.50

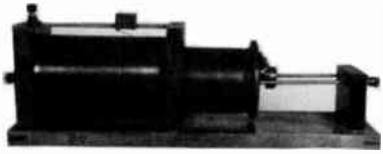
MURDOCK 337
1914 $12.00



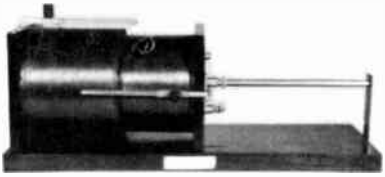
MURDOCK 335
1913 $13.50



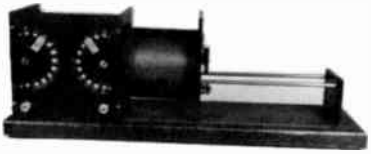
MURDOCK 334
1913 $25.00



ARLINGTON RECEIVING TRANSFORMER
WM. DUCK 1915 $9.00

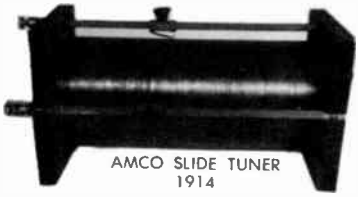


CLAPP-EASTHAM
1914

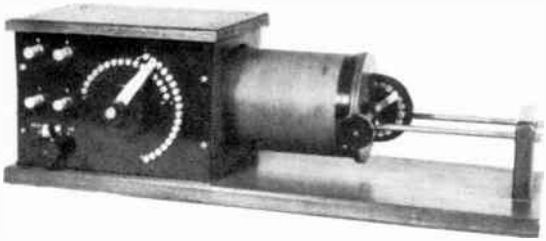


NAVY TYPE COUPLER

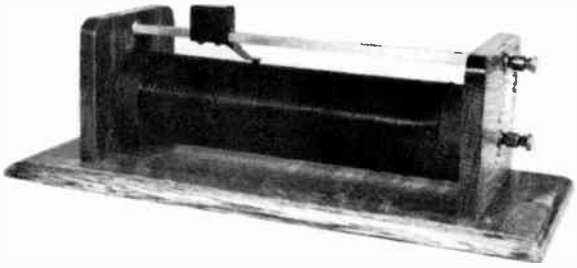
TRESCO LOADING COIL



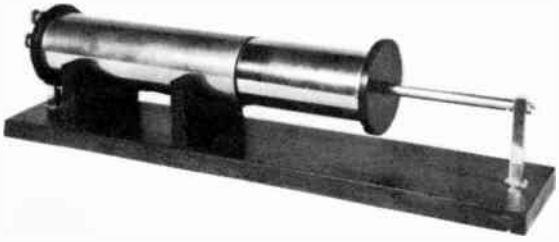
AMCO SLIDE TUNER
1914



WIRELESS SHOP
A. J. EDGCOMB
NAVY TYPE TUNER
1917 S.P. $24.00

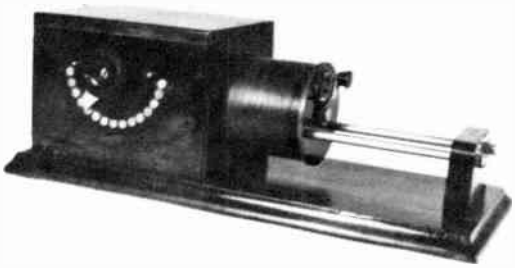


CLAPP EASTHAM
SLIDE COIL TUNER
1912

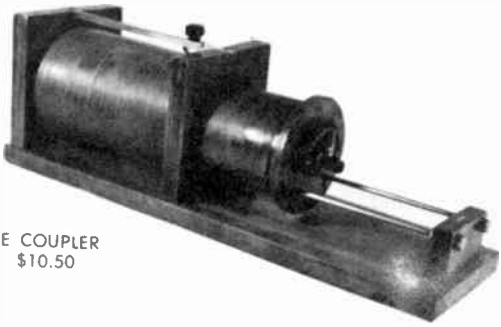


VARIABLE SLIDING CONDENSOR
ABOUT 1912

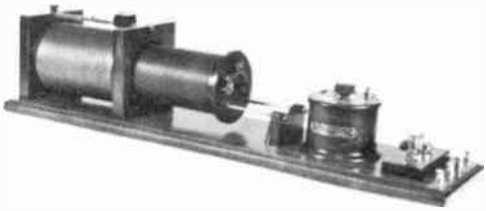
EARLY RECEIVING GEAR



LOOSE COUPLER
1921 S.P. $10.00



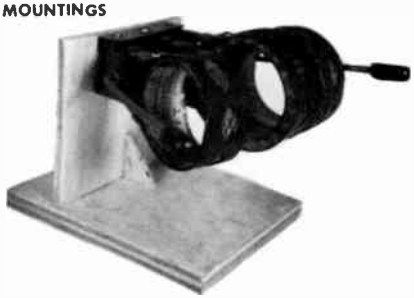
SIGNAL LOOSE COUPLER
1919 S.P. $10.50



THREE CIRCUIT LOOSE COUPLER RECEIVER
FOR CRYSTAL DETECTOR OR AUDION
1919

DUO-LATERAL HONEYCOMB
COILS & MOUNTINGS

DEFOREST
COILS & MOUNTING
$16.50



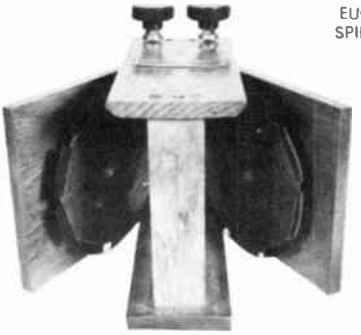
SIGNAL
MOUNTING
FEDERAL COILS
$15.00

REMLER
COILS & MOUNTING
$15.00

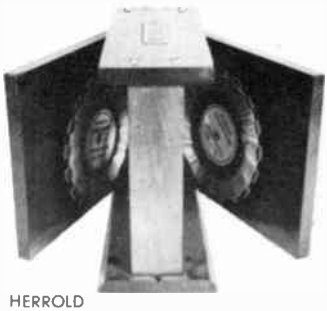
CROWN TWO
COIL MOUNTING
COTO COILS $10.00

BRANSTON
COILS & MOUNTING
$17.50

TUNING UNITS



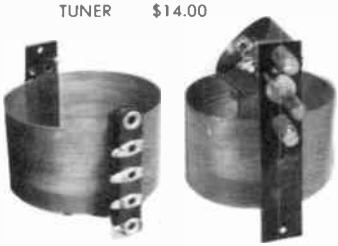
EUGENE TURNEY
SPIDERWEB COILS
$8.00



HERROLD
SPIDERWEB COILS
$8.00

ATWATER KENT
COUPLED CIRCUIT
TUNER $14.00

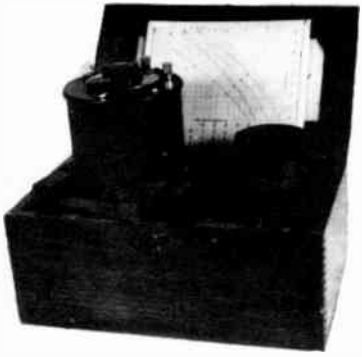
SIMPLEX
ADAMS MORGAN
VARIOCOUPLER 1920
$7.00



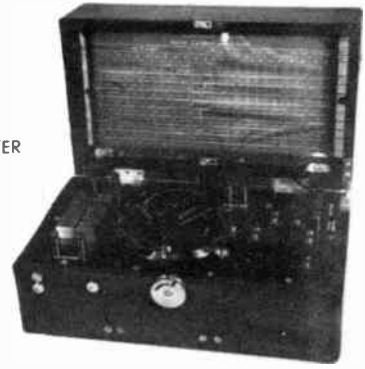
BROWNING DRAKE
COILS $3.50

MADISON MOORE
M5 R. F. TRANS.

DECREMENT AND WAVE METERS



GENERAL RADIO
WAVE METER
TYPE 358 $15.00



MARCONI DECREMENT METER
1909

GENERAL RADIO
WAVE METER
TYPE 274 $10.00

GENERAL RADIO
WAVE METER
TYPE 174
1922 $68.00

Kellogg Radio Accessories

THE Kellogg Switchboard and Supply Company have been manufacturing complete telephone exchange equipment, telephones, switchboards, apparatus and supplies for over twenty-five years. Our plant in Chicago is probably the largest factory of its kind in the world. Our floor space covers fourteen acres, and our manufacturing equipment is complete, up to date and of high efficiency.

The Kellogg Company is known throughout the telephone world, it may be said, but we include this brief explanatory statement in this bulletin which is addressed to the Radio trade.

The Kellogg Switchboard and Supply Company has been foremost in the production of standard, high efficiency telephone equipment. Its extensive laboratories and experienced engineering personnel guarantee Kellogg products to be of the utmost reliability.

In theory, design, and practice, Kellogg circuits and apparatus are conservative, yet known to be of the greatest dependability. Kellogg insulating products, such as receiver shells, transmitter mouthpieces, and the many forms of insulators necessary in the telephone field are in the front rank.

With such equipment and such experience it is reasonable that Kellogg radio apparatus should take first place in reliability and economy, as it has done. We are receiving the most satisfactory reports from the trade generally at the fine performance of the Kellogg head sets, and other Kellogg equipment. The engineer, the practical radio man, and the amateur, all acknowledge this superiority.

In extreme sensitiveness, accuracy, sound reproduction, and convenience in use, the Kellogg radio telephones are in a class by themselves.

For twenty-five years, our motto has been, "Use, is the Test."

June 1[illegible],

VARIOMETERS & VARIOCOUPLERS
1921 - 1922

KELLOGG
VARIOMETER $7.50

KELLOGG
VARIOCOUPLER
$8.00

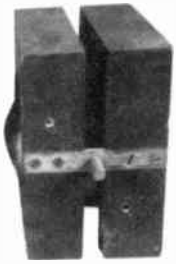
GREBE
VARIOMETER $7.50

PEARLCO
VARIOMETER $6.50

GILFILLAN
5 INCH VARIOMETER
$7.00

VARIOMETERS & VARIOCOUPLERS
1919 TO 1923

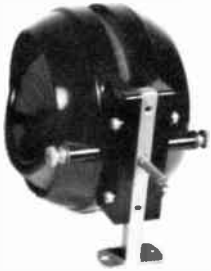
$6.00



RPM VARIOMETER
RADIO PROD. MFG.
CHICAGO $6.00

CHI-RAD
VARIOMETER
CHICAGO RADIO
APARATUS CO.
1919 $5.00

ATWATER KENT
VARIOCOUPLER
1922 $8.00



REMLER
VARIOMETER
$7.50

ATWATER KENT
VARIOMETER
1922 $7.00

VARIOMETERS · VARIOCOUPLERS

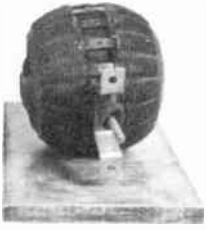
SHAMROCK
180 COUPLER
$3.50

GENERAL RADIO
VARIOCOUPLER
$3.50

GENERAL RADIO
VARIOMETER
$3.50

ATEC.
VARIOCOUPLER
$3.50 EACH

HILCO VARIOMETER
A. E. HILL CO.
ATLANTA, GA. $6.00



AMARAD VARIOMETER
AMERICAN RADIO & RESEARCH
MEDFORD, MASS. $3.75

SIMPLEX
SIMPLEX RADIO
PHIL., PENN. $3.50

GILFILLAN
SMALL VARIOMETER
MOULDED $4.50

TUNING UNITS

BRUNO
R. F. AMPLIFIER
REGEN. DETECTOR
$8.50

THREE CIRCUIT
TUNER $3.50

FIVE TUBE
RADIO FREQUENCY
RECEIVER KIT $12.00

SHORT WAVE
TELEVISION KIT
$12.00

OSCILATOR COIL
SUPERHET $4.50

RADIO FREQUENCY UNITS

$2.50

$3.50

$2.50

$8.00

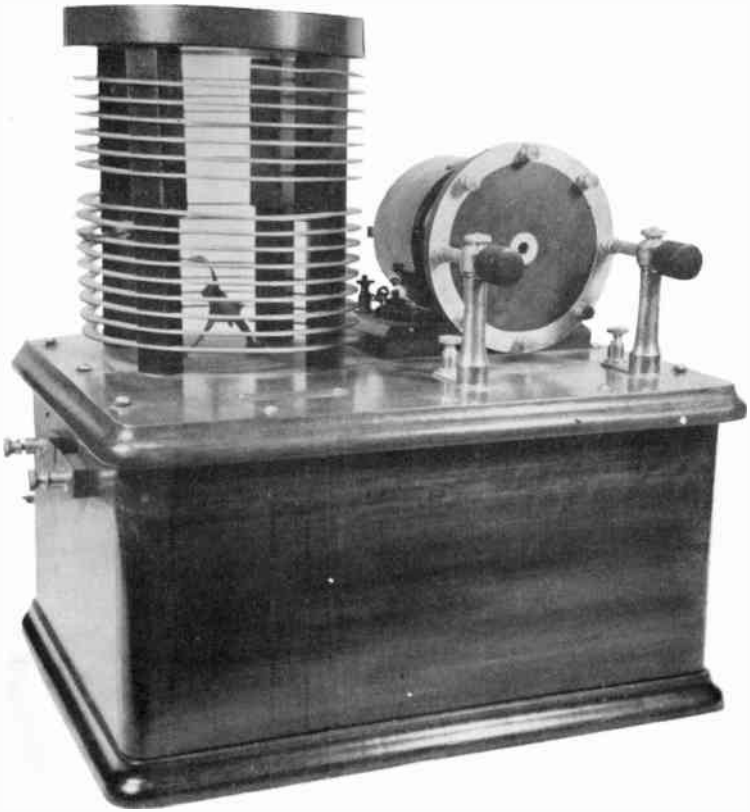
$4.00

SPARK TRANSMITTERS

Spark transmitters began with the Ruhmkorff spark induction coil. They were rated by the number of inches of spark they produced. The one inch coil would send eight miles and the four inch 32 miles. Spark transmitters up to 12 inch size were in use, the small ones ran on batteries and the large ones by generators. The spark transmitter consisted of a spark coil, or transformer, a spark gap, Leyden jar, a helix and a key-switch. Initially using a simple two-electrode spark gap, later models had a rotary motor-driven gap, and later still some used a quenched gap. The original Leyden jar condenser gave way to glass plates with tin foil between them, immersed in oil. Then came the mica condensor. Spark gap transmitting stations needed a hot wire ammeter to tune the antenna, a send-receive switch, a ground switch to earth the antenna.

Keys on small rigs were simple telegraph keys, but on KW transmitters ½ inch contacts were used as the key was in the primary circuit of the transformer. Some keys were enclosed to make them flame proof. Eventually the helix was made illegal and an oscillation transformer was used.

Antennas were usually a four-wire flat top or a five-wire cage for 200 meter; usually about 100 ft. long with a 35 foot rat tail and lead in. Commercial stations ran 100 KWs of power and operated as high as 3100 meters. The radio act of 1912 put the amateur on 200 meters with a maximum of one Kilowatt.



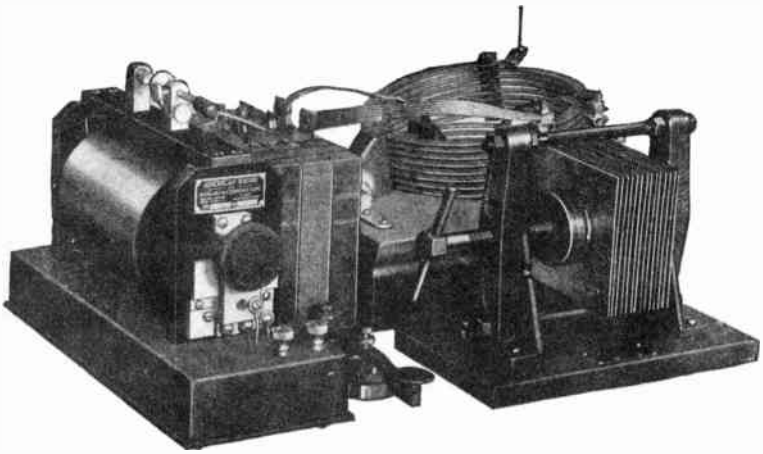
Murdock One Kilowatt spark transmitter.

AMERICAN RADIO AND RESEARCH CORPORATION

21 PARK ROW NEW YORK

Amrad Radio Products June 15, 1920

Low Power D. C. Transmitting Equipment

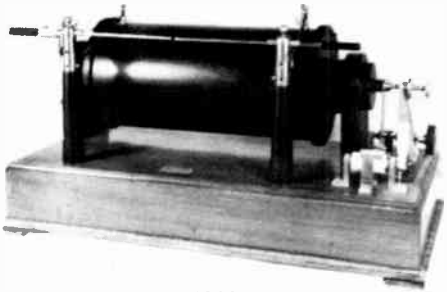


(Fig. 1)

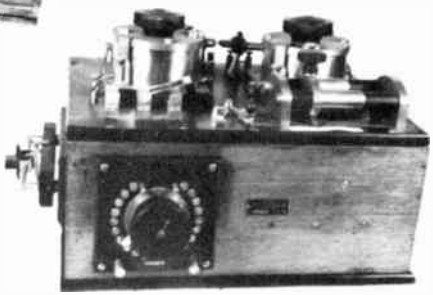
A Complete Transmitter Consisting of Amrad Induction Coil, Amrad Quenched Gap, Murdock Oscillation Transformer and Condensers and Bunnell Key. The Entire Assembly May be Mounted in a Cabinet Measuring 20"x13"x10"

An Old Handicap Conquered

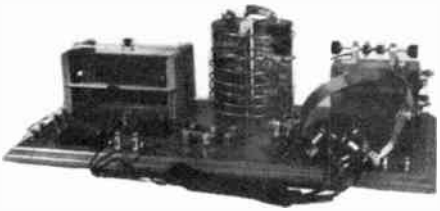
OWNERS of radio stations having no available supply of alternating current have heretofore been unable to obtain efficient and reliable transmitting equipment to operate with the power generated by batteries. With the advent of the Amrad Induction Coil and the special Amrad Quenched Gap the old handicap has been swept aside. These two instruments make the transmission of radio messages over distances of 25 miles and upwards an easily accomplished fact under ordinary conditions. Both instruments are of a design suitable for use with standard Oscillation Transformers and Condensers as illustrated above. The power supply may be obtained from either a 6 volt storage battery of the automobile type or from standard 32 volt farm lighting circuits.



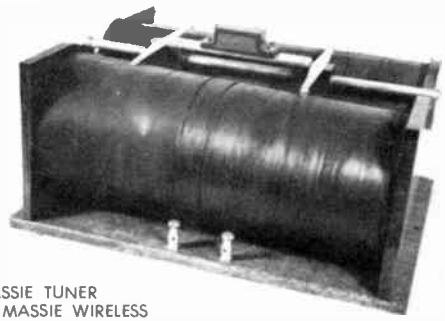
MARCONI
WIRELESS TELEGRAPH CO.
OF AMERICA.
TYPE 10-A
10 INCH SPARK INDUC-
TION COIL 1910



MARCONI
WIRELESS TELEGRAPH CO.
OF AMERICA.
TYPE 107-A
MODIFIED FLEMING VALVE
RECEIVER 1914



TRANSMITTER-RECEIVER
USING CARBON DETECTOR
1917

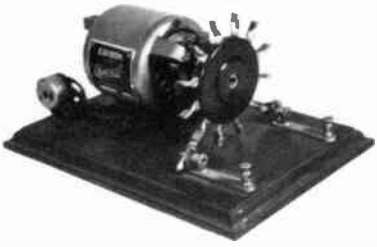


MASSIE TUNER
USED IN MASSIE WIRELESS
SYSTEM 1916

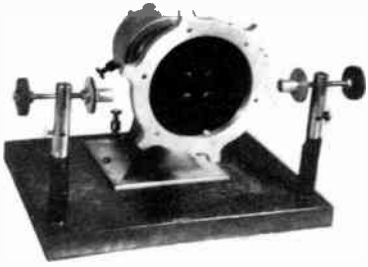
ROTARY SPARK

CLAPP-EASTHAM
ROTARY QUENCHED
1920

BENWOOD ROTORY SEMI
QUENCHED 1919

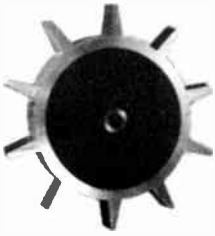


MURDOCK ROTORY GAP
1913 $20.00



B. F. CHAMBERS ROTORY GAP
1915 $15.00

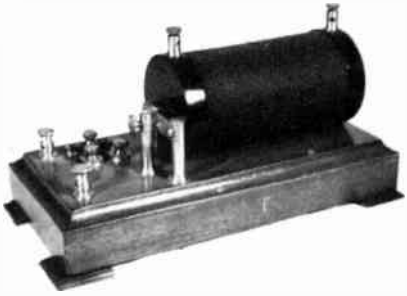
R. C. A.
1921 $7.50



BEENWOOD SPARK WHEEL
1919

SPARK COILS AND TRANSFORMERS

E. I. CO.
1" SPARK COIL
1914 $4.00



RUHMKORFF SPARK
INDUCTION COIL
ABOUT 1915

AMARAD TYPE C
SPARK INDUCTION COIL
ABOUT 1920 $35.75

E. I. CO.
½ KW SPARK TRANS.
1912 $6.00

HELIX AND OSCILLATION TRANSFORMERS

HELIX
1 KW ABOUT
1914

AMCO OSC. TRANS.
1 KW MADE FROM KIT
ABOUT 1914

MURDOCK #424
OSC. TRANS.
1914

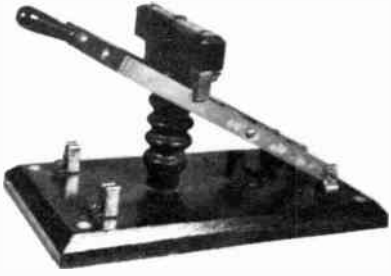
½ KW TRANSMITTING
TUNING COIL
ABOUT 1914

GENERAL RADIO
AUDIBILITY METER
1920

MURDOCK
KICK BACK PROTECTOR
#453 1914

EATON OSCILLATOR
1919 $15.00

CLARK TONE TESTER
1919

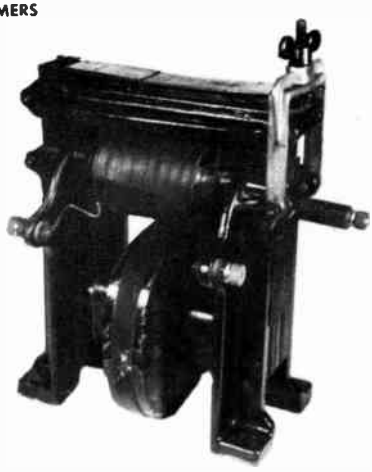


MESCO AERIAL SWITCH
1916

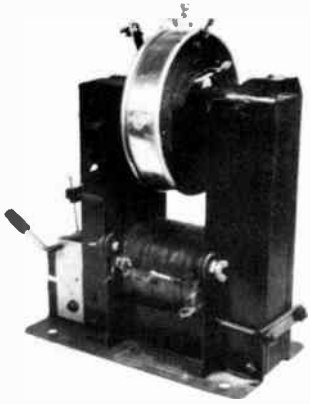
TRUMBULL GROUND SWITCH
100 AMP. 1915

SPARK TRANSFORMERS

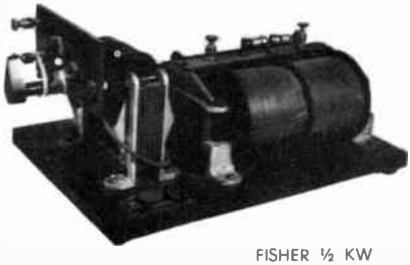
THORDARSON
¼ KW 1919
$15.00



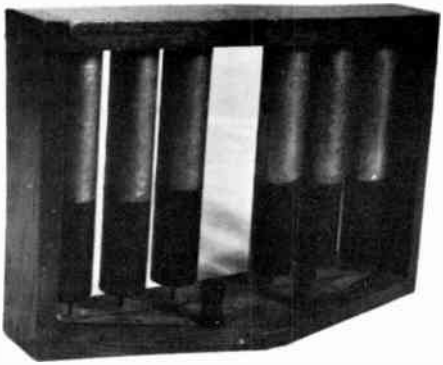
THORDARSON FLEXIBLE
1 KW 1915
$25.00



THORDARSON TYPE R
1 KW 1919
$25.00



FISHER ½ KW
WITH LINE
REACTOR



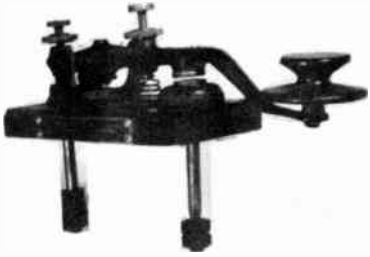
E. I. CO.
VAR. TRANS. COND.
LEYDEN JARS
1908 $2.50

MARCONI
.003 VAR. CONDENSOR
1906

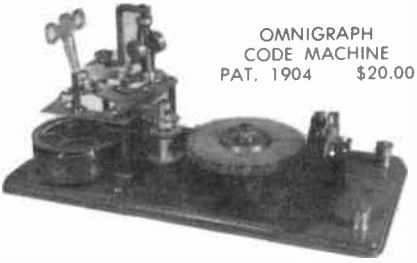
E. I. CO.
FIXED VAR. COND.
#10000
1912 $1.25

THORDARSON
OIL TRANS. COND.
1 KW. 1919 $32.50

GENERAL RADIO
FLAME PROOF KEY
1918



WIRELESS SPEC. APPARATUS
50 AMP KEY
ABOUT 1917



OMNIGRAPH
CODE MACHINE
PAT. 1904 $20.00

ELEC. IMPORT. CO.
GALVANOMETER
1916 30 CENTS

WESTON
GALVANOMETER

SIDE WINDER KEY

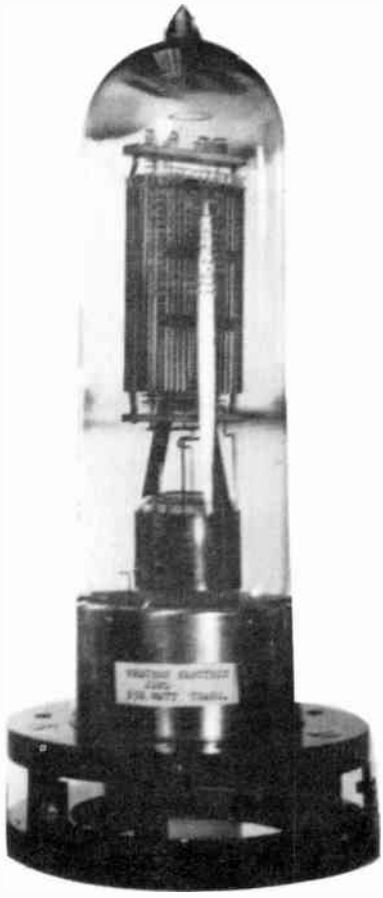
STD. WIRELESS KEY
1916

WIRELESS SPEC.
FLAME PROOF KEY

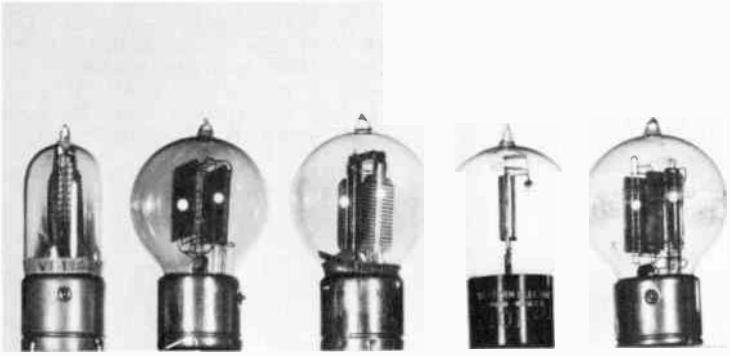
WESTERN ELECTRIC TUBES

Western Electric was one of the earliest tube manufacturers. In 1915 they worked on the transAtlantic telephone tests at Arlington, Virginia, using a bank of 550 tubes in parallel — which would be an accomplishment even today In 1917 they started work on the repeater bulbs for telephone use, using the ladder grid construction. In 1918 W.E. made the VT-1 and VT-2 tubes for the U.S. Signal Corps; the former was a general purpose detector-amplifier and the latter a five watt oscillator-modulator.

In 1919 Western Electric made 50 watt type-211 tubes, the famous N tube, and the 215A peanut tube used in Western Electric receivers. By 1920 they were making tubes for commercial stations, but still continuing the telephone tubes.



EARLY TUBES



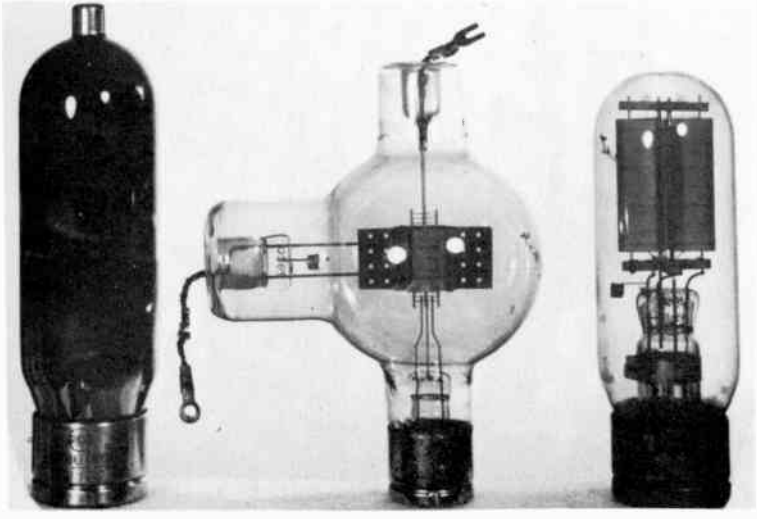
WESTERN ELECTRIC
VT1
DET. AMP. 1923

WESTERN ELECTRIC
VT2
DET. 1923 AMP.

WESTERN ELECTRIC
216A
SPEECH AMP.

WESTERN ELECTRIC
101 F
5 WATT TUBE

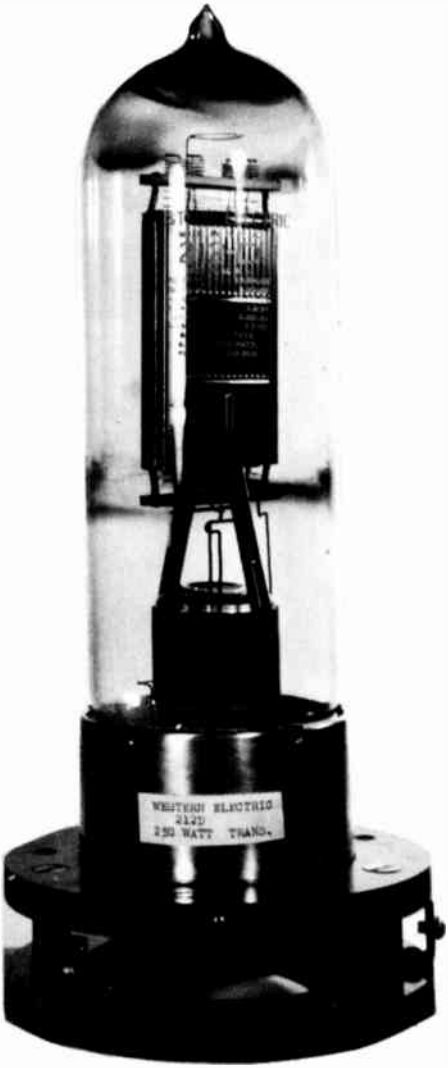
WESTERN ELECTRIC
205D
5 WATT MOUD.



RADIOTRON
UV 872
HALF WAVE RECT.

DE FOREST
552
100 WATT TRANS.

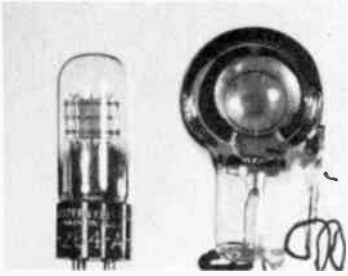
DE FOREST
503A
50 WATT TRANS.



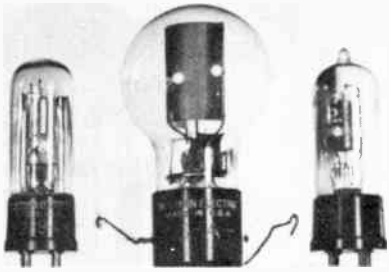
WESTERN ELECTRIC
212D
250 WATT TRANS

WESTERN ELECTRIC
215A
N TUBE

EARLY TUBES



WESTERN ELECTRIC
264 A
DETECTOR AMPLIFIER
1923

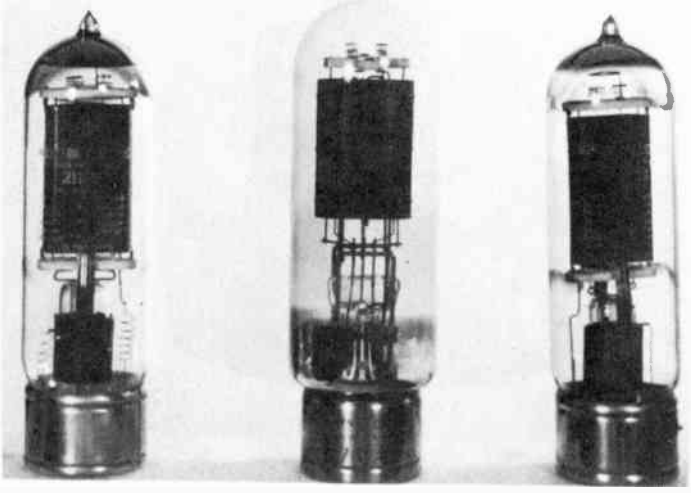


WESTERN ELECTRIC
239 A
DETECTOR AMPLIFIER
1923

WESTERN ELECTRIC
231 D

WESTERN ELECTRIC
1A
PHOTO CELL
EARLY TYPE

WESTERN ELECTRIC
PHOTO CELL



WESTERN ELECTRIC
211E
50 WATT TRANS.

WESTERN ELECTRIC
276A
50 WATT

WESTERN ELECTRIC
211D
50 WATT TRANS.

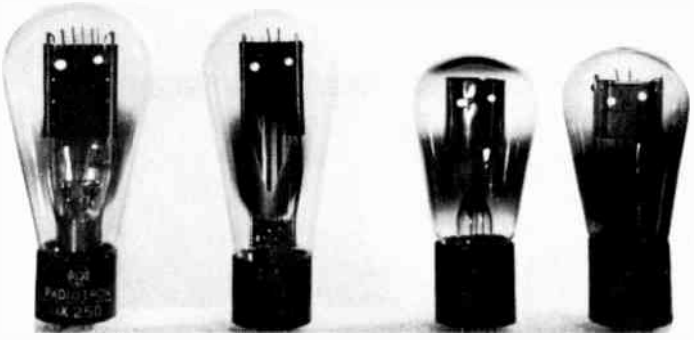
EARLY TUBES

WESTERN ELECTRIC
271A

WESTERN ELECTRIC
277A

RADIOTRON CA 10
15 WATT TRANS.

RADIOTRON UX 210
15 WATT TRANS.



RADIOTRON UX 250
CLASS A AMP.
MODULATOR

RADIOTRON UX 281
RECTIFIER

RADIOTRON UX 874
RECTIFIER

RECTRON UX 216B
RECTIFIER

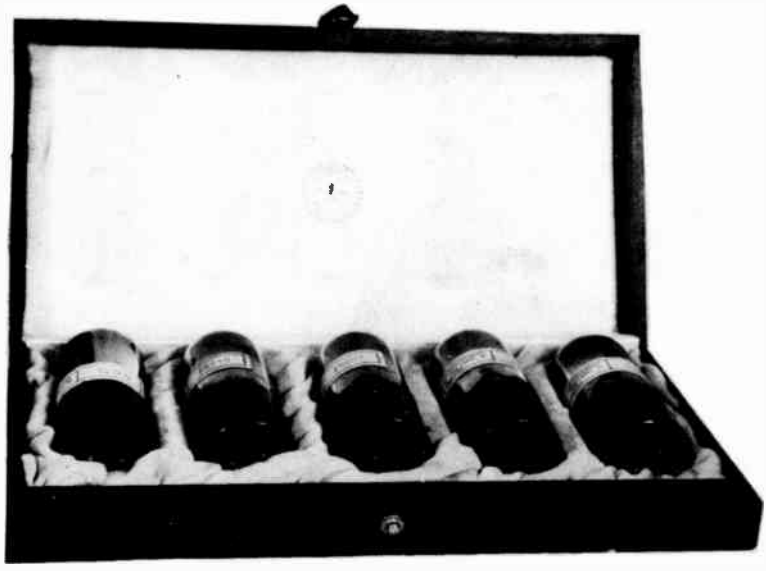
VACUUM TUBES

In 1919 radio was given a real boost when the Radio Corp. of America and Elmer Cunningham announced the 200 and 201 tube made by General Electric. The type 200 was a soft detector and the 201 was a hard detector-amplifier. Both were rated at five volts and one amp.

Radio stations with regular broadcasts were in full swing by 1921, and the receiver business was booming. A growing business was that of re-building tubes due to the tube shortage; charge was usually one to two dollars. Bootleg tubes were common and sold for about $5.00; some were very good. About this time G.E. brought out the Radiotron transmitting tubes UV-202 at five watts, UV-203 at 50 watts and the UV-204 at 250 watts. The same tubes were also sold under the Cunningham name .

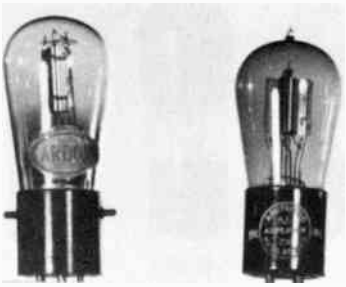
1923 saw a need for tubes that would operate on dry batteries. Westinghouse made the WD-11 and WD-12 for RCA (both 1.1 volts, .25 amp.), and G.E. made the type 199, rated at three volts, .6 amp. The next two years brought many special tubes: the DeForest DV series, the Connecticut T&T Co. double sodium vapor detector, the Electrad diode to be used in place of a crystal detector, and the Welsh peanut tube with the control element outside the tube.

1926 brought better tubes such as the 120 and 112 series. They were hard amplifiers, and with proper bias circuits improved tone quality. The Raytheon BH cold cathode rectifier for "B" battery eliminators appeared. Also the first tubes to use A.C. on the filaments: McCullough, Ardon and Kellog. The following year extremely practical A.C. tubes appeared: the 226 with a filament slow to cycle action and the 227 with a cathode unit. These made possible the era of all-electric sets. Screen grids became common in 1928.



Geo. E. Brighton's True Blue Tubes.

EARLY TUBES

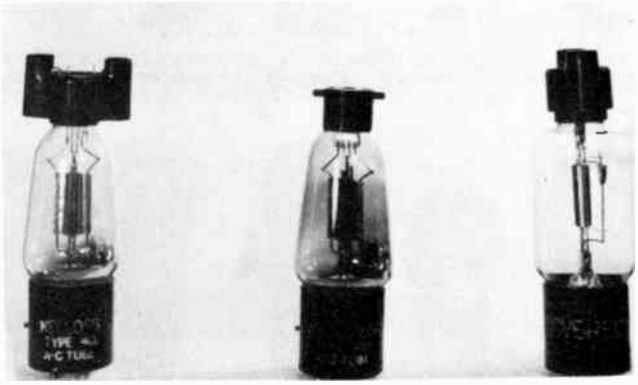


ARDON AC 373
MFG. CARDON CORP.

ARCTURUS 28
15 VOLTS AC

ATWATER KENT
AC RECTIFIER

MARATHON 608A
AC TUBE



KELLOGG 401
AC TUBE WITH
CAP

SOVEREIGN
AC TUBE WITH
CAP

McCULLOUGH 401
FIRST AC TUBE
PAT. BY McCULLOUGH

EARLY TUBES

STEWART WARNER
201A TYPE AMP.
5 VOLTS

QRS 201A TYPE
DET. AMP.
5 VOLTS

OK X 200-A
SOFT DETECTOR
5 VOLTS

SUPER AIRLINE
GX 201 A
MONTGOMERY WARD

MAGNAVOX TYPE A
AMPLIFIER

5 VOLTS
PERRYMAN H 201A
DET. AMP.
5 VOLTS

CONCERT MASTER
FIRST TYPE TUBE
SHIELDING

DAVEN MU 6
AMPLIFIER
6 VOLTS

SONATRON 201A
AMPLIFIER
5 VOLTS

SUPERTRON SX 201
AMPLIFIER
5 VOLTS

MAGNATRON DC 201A
DET. AMP.
CONNEWEY ELEC. LAB.

A. P. TWO IN ONE
TWO SEPARATE TUBES
ATLANTIC-PACIFIC

MARATHON MX 201A
DET. AMP.
5 VOLTS

PHILCO 112A
LAST
AUDIO STAGE

MUSSELMAN

The Golden Rule Tube

The Sodion does not oscillate.

No declaration as to sensitivity, signal strength—or quality of tone—can mean half so much to every broad-minded radio enthusiast as this simple statement of fact.

For there—in five words—you have the key to the solution of the problem of eliminating the whistles, the squeals and the howls that interfere so seriously with your enjoyment of radio today.

Don't misunderstand—

The Sodion does not protect YOUR reception against these noises from other sets.

But, because it does not oscillate—because it cannot reradiate—because it cannot whistle and howl—the Sodion DOES prevent your reception from interferring in any way with the reception of others.

This, we believe, is the practical way of eliminating one of the greatest faults in broadcast Radio reception.

In point of efficiency the Sodion Tube is far more sensitive and produces stronger signals than any detector now on the market. Its tone is fully equal to that of the finest crystal with the added advantage of great volume.

Descriptive Bulletin upon request.

CONNECTICUT TELEPHONE & ELECTRIC COMPANY
MERIDEN Radio Division **CONNECTICUT**

U.S. NAVY
CG-1787
DET. AMP. 1923

U.S. ARMY VT 24
SIGNAL CORP. 1923

WUNDERLICH
FIRST DIODE
TRIODE 1932

SODION S 14
CONNECTICUT
TEL & TEL CO.

SODION D 21
CONNECTICUT
TEL & TEL CO.

ELECTRAD
DIODE 1½ VOLT
1923 2.50

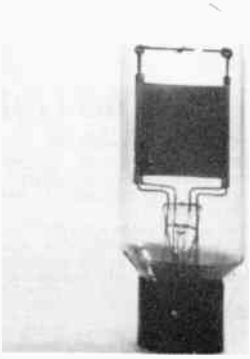
WELSH 501
EXTERNAL PLATE
1923 3.00

MEYERS RAC 3
DET. AMP.
1923 5.00

SODION S13
NON OSCILLATING
CONN. TEL & TEL 1923

DAVEN
TELEVISION NEON
LAMP 1929

SPEED
TRIPLE – TWIN
DIRECT COUPLED



ARCTURUS
TELEVISION NEON
LAMP 1929

EARLY TUBES

MAJESTIC
COLD CATHODE RECT.
1928

BOSCH SPECIAL
COLD CATHODE RECT.

EVERREADY
RAYTHEON
COLD CATHODE RECT.

COLD CATHODE RECT.
TYPE BR 1927

RAYTHEON
COLD CATHODE RECT.
TYPE B 1927

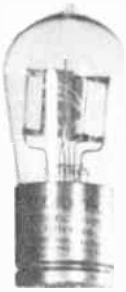
NATIONAL
RADIO TUBE CO.
RECTOBULB.

AMARAD
"S" TUBE
1923

SYLVANIA RECT.
TYPE 866

RADIOTRON UV 876
VOLTAGE REGULATOR

EARLY TUBES



RADIOTRON
U. V. 201
LIST PRICE $6.50

RADIOTRON

RADIOTRON
U. V. 200
PRICE $5.00

DECEMBER 1920

TYPE C-300
$5.00

Cunningham AudioTron Tubes
WITH STANDARD FOUR PRONG BASE

TYPE C-301
$6.50

EARLY TUBES

RADIOTRON UV 199
DET. AMP.
3.3 VOLTS

RADIOTRON UX 199
DET. AMP.
3.3 VOLTS

RADIOTRON UX 120
LAST STAGE AUDIO
3.3 VOLTS

RADIOTRON WD 11
DETECTOR
1.1 VOLTS

RADIOTRON WX 12
DETECTOR
1.1 VOLTS

RADIOTRON UX 112
LAST
AUDIO STAGE

RADIOTRON UX 112A
LAST
AUDIO STAGE

RADIOTRON UV-877
PROTECTIVE
TUBE

RADIOTRON UX 171
LAST
AUDIO STAGE

RADIOTRON UX 171A
LAST
AUD STAGE

RADIOTRON UX 200
SOFT DETECTOR
5 VOLTS

RADIOTRON UX 200A
SOFT DETECTOR
5 VOLTS

RADIOTRON UV 201A
DET. AMP.
5 VOLTS

RADIOTRON UX 201A
DET. AMP.
5 VOLTS

EARLY TUBES

CUNNINGHAM C 301A
AMPLIFIER
1923

RADIOTRON UV 201A
AMPLIFIER
1923

RADIOTRON WD 12
DETECTOR
1923

CUNNINGHAM C 12
DETECTOR
1923

RADIOTRON WD 11
DETECTOR
1923

WESTINGHOUSE WD 11
AERIOLA
DETECTOR 1923

WESTINGHOUSE WR 21
AERIOLA DET.
1923

VACOBUB 201
DETECTOR

CUNNINGHAM C 199
DETECTOR
1923

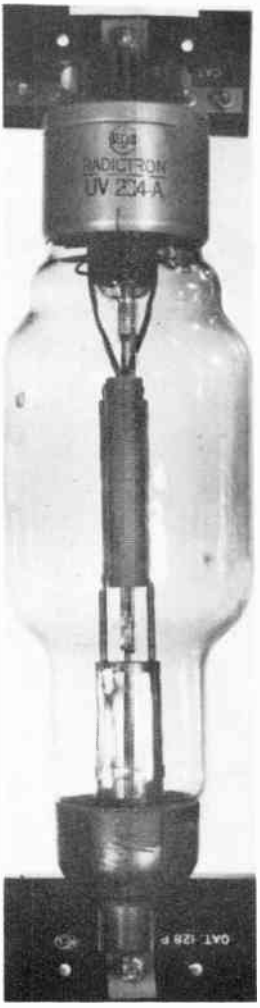
RADIOTRON UV 199
DETECTOR
1923

KR Q201A
DETECTOR
AMPLIFIER

PANAMA 0201A
DET. AMP.
5 VOLTS

RADIOTRON UV-204A

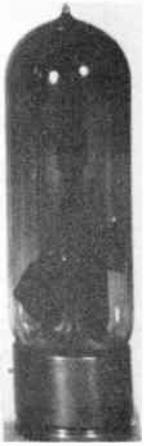
KENOTRON RECTIFIER
UV-216



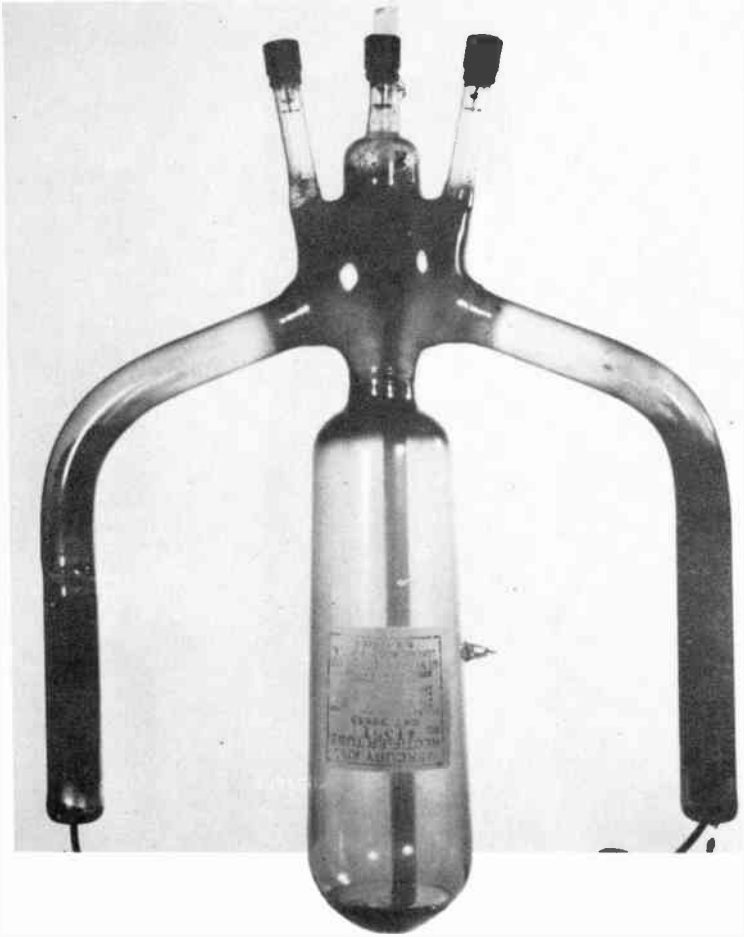
250-WATT

RADIOTRON UV-203
50 WATT TRANSFORMER
$30.00

RADIOTRON UV-202
5-WATT TRANSMITTER
$8.00



KENOTRON RECTIFIER
UV-217



MERCURY ARC
RECTIFIER
GENERAL ELECTRIC
3,000 VOLTS 1918

DE FOREST TUBES

DE FOREST
DO1A

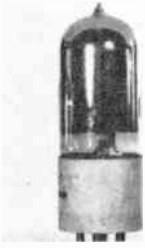
DE FOREST
DV 1

DE FOREST
DV 2

DE FOREST
DV 3

DE FOREST
DV 3

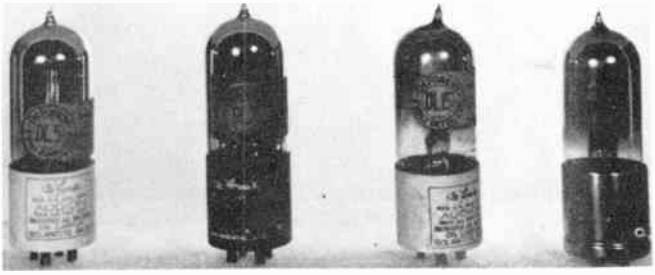
DE FOREST
DV 3



DE FOREST
DV 4

DE FOREST
DV 5

DE FOREST
DL 4



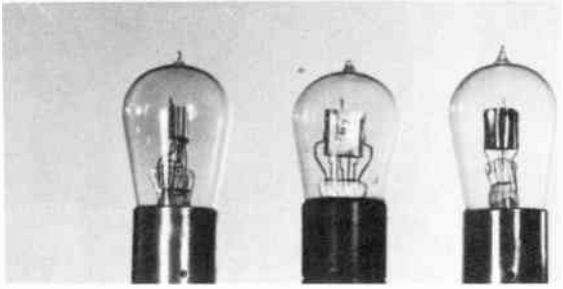
DE FOREST
DL 5

DE FOREST
DL 7

DE FOREST
DL 15

DE FOREST
AMP.

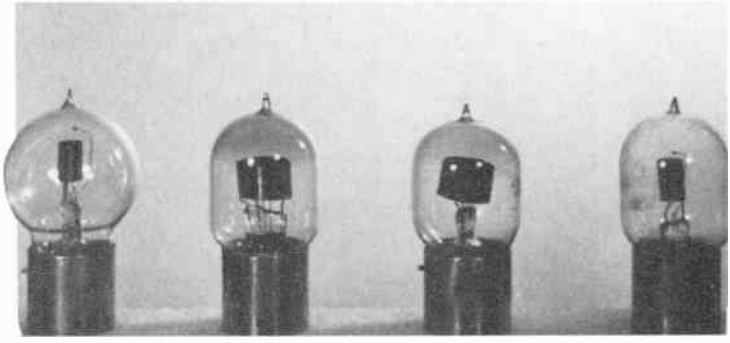
DE FOREST TUBES



VT 14
AUDION

DE FOREST
AUDION DET.
1920

TBI
EXPERIMENTAL
DIODE



MOOREHEAD
ELECTRON RELAY
1920

MOOREHEAD
ROUND TYPE AMP.
1920

DE FOREST AUDION
1920

ATLANTIC - PACIFIC
A - P 1920
ELECTRON RELAY

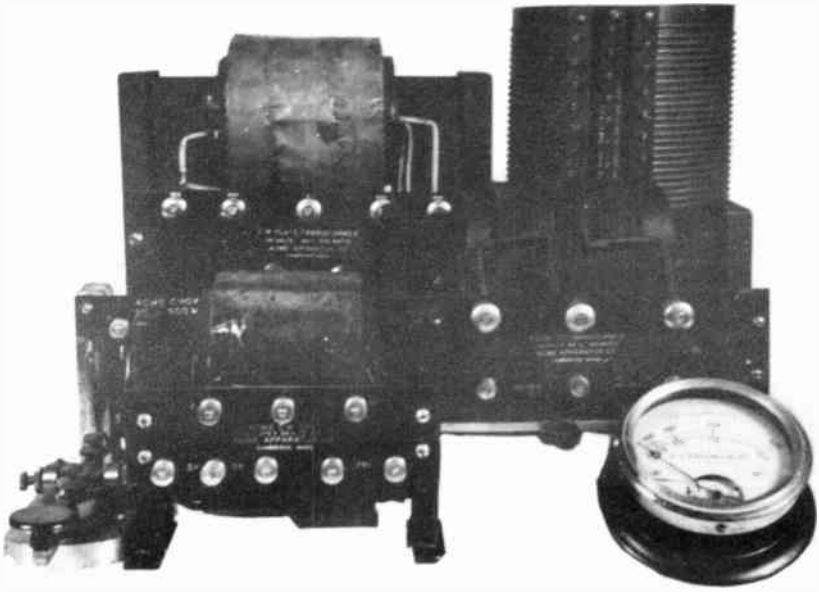
C.W. TRANSMITTERS

Immediately following W.W.I. amateur operators continued to use spark transmitters, but in 1921 G.E. made the Radiotron and Cunningham transmitting tubes, making Continuous Wave transmitters with tubes fairly common. RCA sold parts made by G.E. and also by Wireless Specialty Co. to build a complete C.W. or radiotelephone station. The Acme Apparatus Co. also made C.W. parts and transformers.

The early radiotelephone stations used Heising and grid modulation, and also modulated their antenna. Transmitters were self-excited oscillators of tubes in parallel. The tank coil used was a large tapped coil, tuning being accomplished by changing taps. It was soon found that using tubes the station could be tuned down to 175 meters with good output.

The M.O.P.A. transmitter followed, using a master oscillator with a power amplifier following; these were better than the parallel tube oscillator and the self-rectifying circuits.

Parts and tubes at this time were very expensive. The UV-204 250 watt tube cost $110.00. A 10 watt radiotelephone kit cost $150.00; a 100 watt kit cost $250.00 Thus many amateurs of the time wound their own transformers and coils. But the tube transmitters were clearly best, eliminating the interference of the spark transmitter, and giving about three times the range with the same antenna power while having much greater selectivity. By 1922 there were about 25,000 amatur radio transmitters in use, and about eight times that many receivers.



PIONEERS

What ACME has to offer besides apparatus

The Acme Apparatus Company are pioneer transformer and radio engineers and manufacturers and is composed of men who have associated themselves with radio and transformers for fifteen years, both as engineers and workmen skilled in art of construction.

Before the days of broadcasting Acme Apparatus was used by those amateurs who have now become the instructor of novice. They recommend it because of its tried efficiency, sturdy service and the way the company stands back of it.

As the rapid and continued growth of the Acme Apparatus Company has been due to the amateur and broadcast listener, we feel that our debt can partly be paid in service to prospective and actual purchasers of our product.

With this end in view, we maintain an Engineering Department continually at work to find out how to get the best results, how to improve the product and how to amplify more without distortion. This department welcomes your correspondence and questions, and freely and gladly gives advice obtained from actual experience.

OUR GUARANTEE

The only time a guarantee means anything is when an attempt is made to use it.

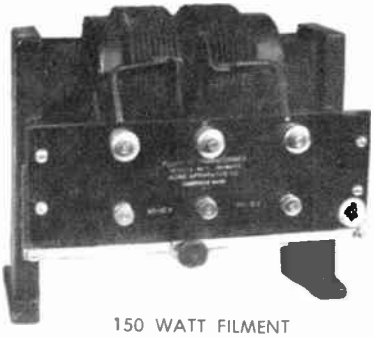
As always, Acme Apparatus is guaranteed against defects in material and workmanship and furthermore, we always try to make adjustments to the satisfaction of the customer.

ACME APPARATUS COMPANY

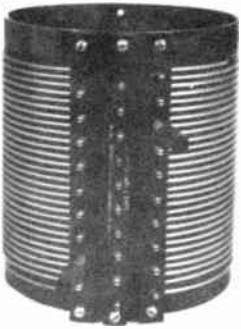
CAMBRIDGE, MASS.

Transformer and Radio Engineers and Manufacturers

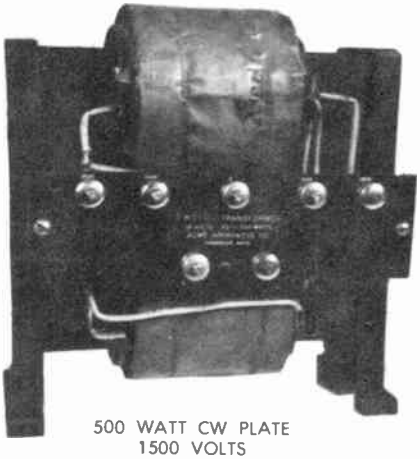
ACME 100 WATT C. W. TRANSFORMERS, 1922



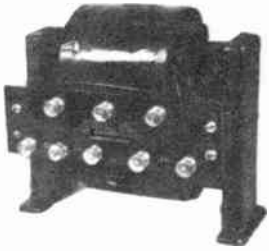
150 WATT FILMENT
10 VOLTS
$16.00



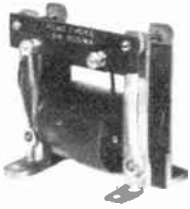
ACME
C W INDUCTANCE
$8.00



500 WATT CW PLATE
1500 VOLTS
$25.00



75 WATT FILAMENT
5 VOLTS $12.00



500 MIL. R.F. CHOKE
$6.00

JEWEL PANEL
MOUNT

WESTON PANEL
MOUNT

FISHER PANEL
MOUNT

JEWEL HIGH FREQUENCY METER
1919 $12.00

HUSTON BROS. CHICAGO.
TABLE MIL. METER
PAT. 1899

VOLT MIL. AND
HIGH FREQUENCY METERS

VARIABLE TUNING CONDENSERS

About 1905 both receivers and transmitters were being tuned with some type of variable condensers. Some of the early types were just a series of fixed condensers with switch taps, some were brass plates that slid in and out like a drawer. Marconi built a condenser with rotor and stator plates much like those in use today. Crosley used a "book" condenser. Murdock was famous for its variable condensers and made some with Bakelite cases that could be filled with oil to increase the capacity.

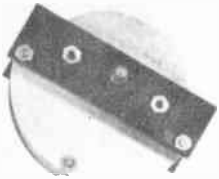
When broadcast stations began to crowd the band a condenser spread the stations at the high end was needed. Some makers elongated the plates, others cut away part of the plate to make them elliptical. Then came the low-loss era; Bakelite end plates were left off or replaced with metal ones. C. J. Fitch used triangular plates which operated like a clamshell. Remler used square plates that operated the same way. Both these gave a straight line frequency condenser which spread the stations and gave a high maximum and low minimum capacity.

Soon simpler tuning was needed and one and two dial receivers appeared in which the condensers were ganged with metal belts, chains, universal joints and levers. Ten gang condenser units were known. There were also compression types, but losses were very high.

Marconi, 1906.

E. I. Co., No. 1000.

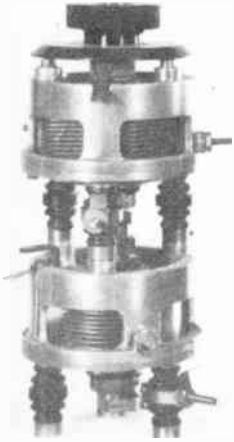
EARLY TUNING CONDENSERS

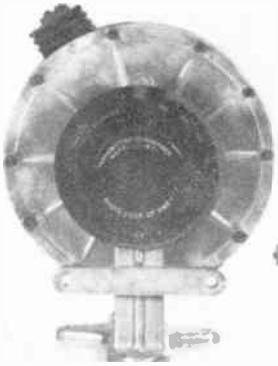


WIRELESS SHOP
A. J. EDGCOMB
LOS ANGELES $5.00

PITTSFIELD
VERNIER 43 PLATE
$4.50

RADIO TELE. SHOP
43 PLATE .001
SAN FRANCISCO $5.00





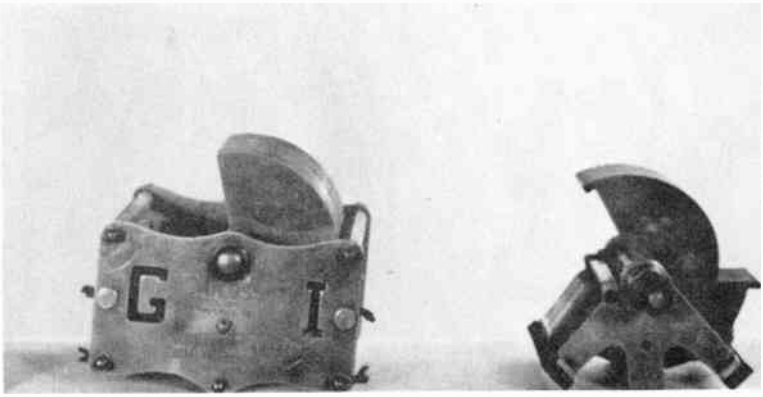
RCA
UC 1819 .005
MERCURY $8.75

RCA
UC 1820 .0006
$7.50

EARLY TUNING CONDENSERS

KARAS
ORTHOMETERIC
23 PLATE $7.00

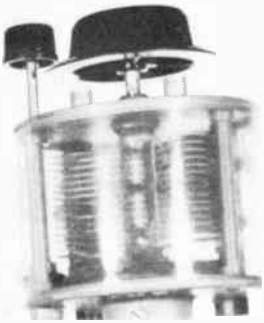
MAR-CO
23 PLATE .0005
$6.50



G. I. LOW LOSS
43 PLATE .001
GENERAL INST. $7.00

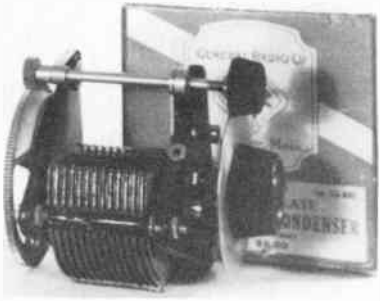
H & H
LOW LOSS 23 PLATE
$5.00

Camfield Type 888



Acme A-600

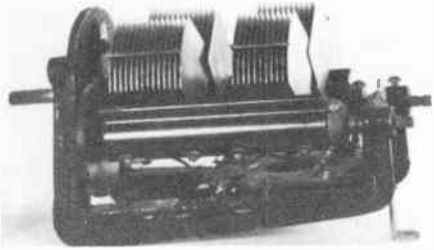
Chelsea 1919



General Radio Vernier

Preferred 23 Plate

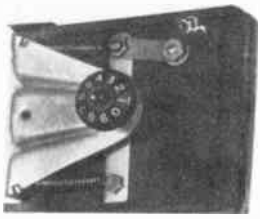
Thorardson 43 Plate



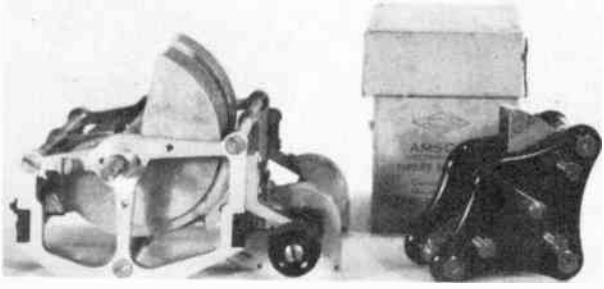
Remler Dual 23 Plate

Remler 23 Plate Low Loss

EARLY TUNING CONDENSERS



CROSLEY

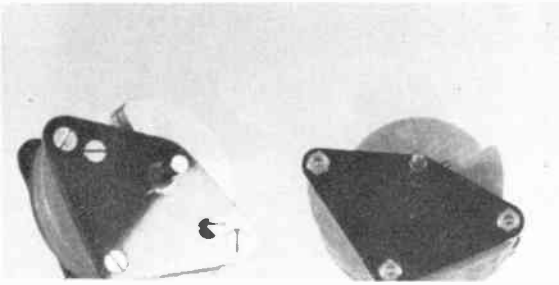


BREMER-TULLY
.00035 DUAL
$7.50

AMSCO
11 PLATE $3.00

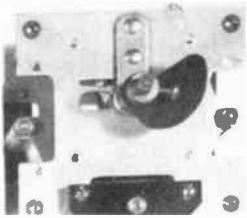
NATIONAL
MIDGET
$2.00

EARLY TUNING CONDENSERS

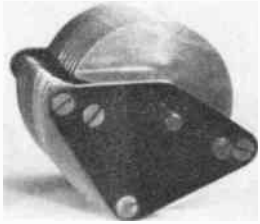


NORCO
.0015 $4.00

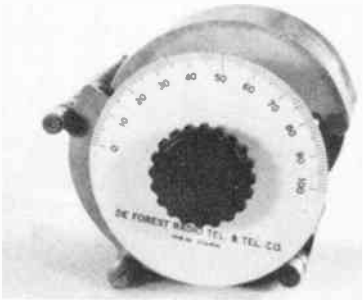
KOEHLER
23 PLATE .0005
$4.50



NATIONAL
TYPE DX $4.00



SIGNAL
.001 43 PLATE
$4.50



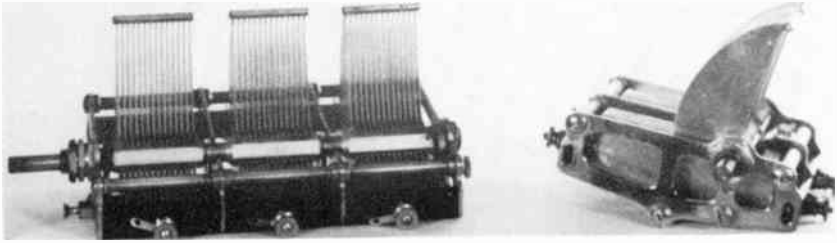
DEFOREST CV 1503
.0015 $14.25

EARLY TUNING CONDENSERS

CHELTON
VERNIER COND.
$1.95

PILOT
VERNIER COND.
$1.95

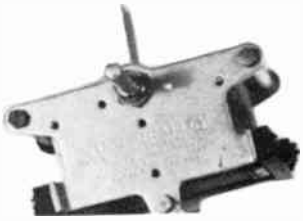
HAMMARLUND STAR
VERNIER COND.
$1.50



DEJUR
TRIPLE .0005
$8.50

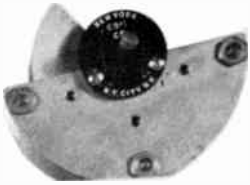
DEJUR
DUAL .0005
$6.00

EARLY TUNING CONDENSERS

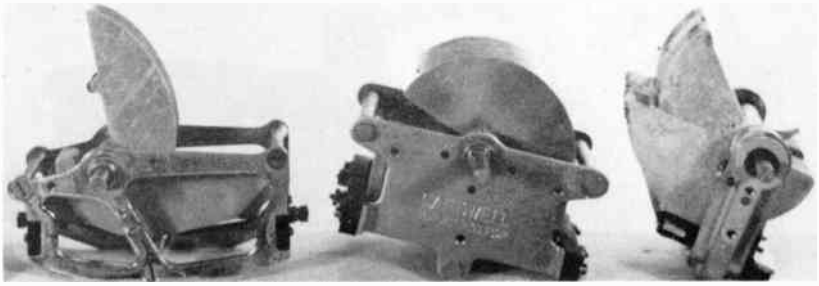


KING
17 PLATE $5.00

CROFOOT
.0005 $6.00
PREMIER ELEC.



COTO-COIL
23 P .0005
$3.50



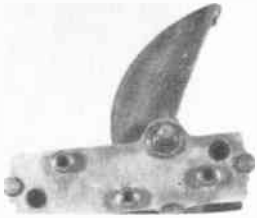
CARDWELL
43 PLATE .001
$6.00

DRIVER-TULLY
.00035 $5.00

HAMMARLUND DUAL
23 PLATE .0005
$6.00

EARLY TUNING CONDENSERS

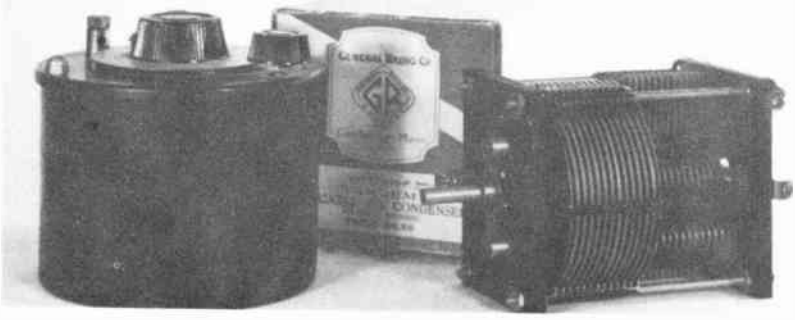
HAMMARLUND
23 PLATE .0005
$6.00



AMSCO
S.L.F. $6.50
ADAMS-MORGAN CO.

PILOT
.00035 $5.00

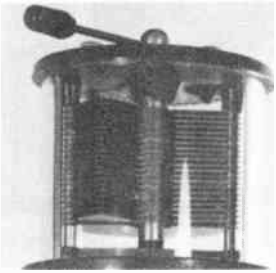
GENERAL RADIO
334 VERNIER
$5.00



GENERAL RADIO

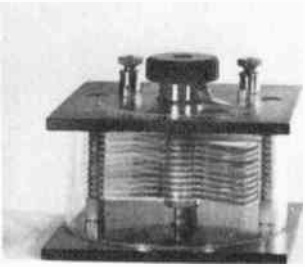
GENERAL RADIO
248F TANDEM
$6.50

EARLY TUNING CONDENSERS



BLITZEN
CLAPP-EASTHAM .001
43 PLATE 1914 $5.00

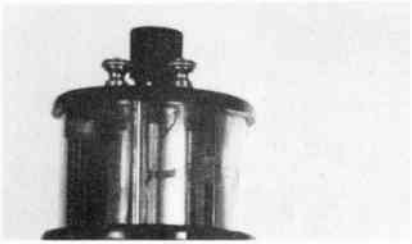
MURDOCK 368
23 PLATE .0005
1914 $4.50



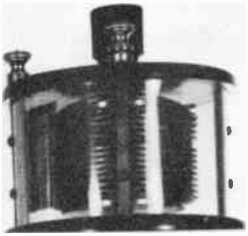
TEWNO #53
21 PLATES .0005
1916 $4.75

CONNECTICUT
COMPRESSION TYPE
1910 .001 $6.50

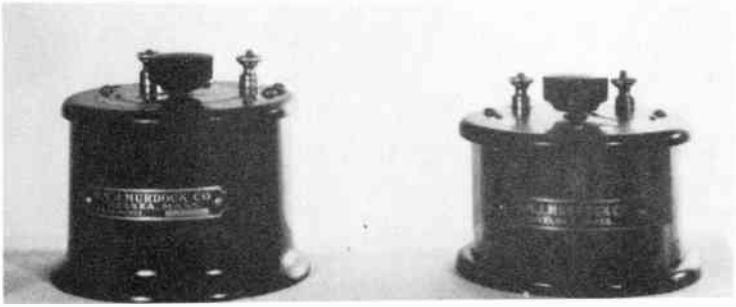
EARLY TUNING CONDENSERS



MURDOCK 360
7 PLATE .0005
1913 $5.00



MURDOCK 361
TAPPED DISC. O TO .001
1913 $8.50



MURDOCK 367
43 PLATE .001
1914 $4.50

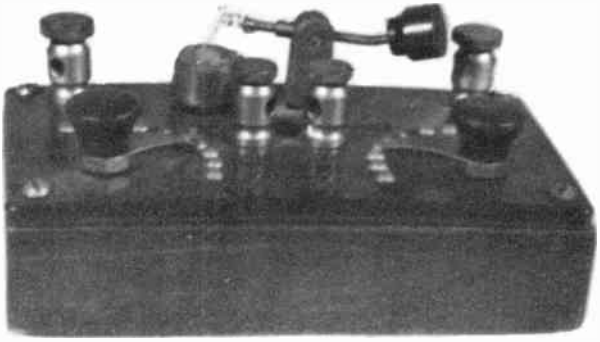
MURDOCK 366
43 PLATE .001
1914 $4.50

CRYSTAL RADIO DETECTORS

Before the radio tube came into use there were several detectors available. In 1907 Pickard invented the mineral or crystal detector. In 1921 with many broadcast stations coming on the air and the Quaker Oats box already in use everyone could then have a radio. Nearly every man and boy living near a broadcast station made a crystal set, or bought one ready made. Factory made crystal sets cost from $10.00 to $35.00 complete.

The two circut sets with spiderweb coils, or other low loss coils, and a good galena detector received stations up to 1500 miles away. A Quaker Oats box set would do fine if you had a neighbor near by with a good regenerative receiver that radiated the station he was listening to. As more broadcast stations came on the air more selectivity was needed, and was often secured by separating the primary and secondary circuits by about five inches; this cut down the volume and good headphones were then needed.

The crystal set required a good outside aerial and a good ground connection. The two most common crystals used were galena and silicon. Galena was most sensitive but took longer to find a good sensitive spot with the "cats' whisker." The silicon was louder and it was easy to find a good spot. Crystal detectors were priced from 50c to $4.00 for a good one. They were sold in fancy boxes, marked with guarantees as to volume, distance and clarity. Fixed detectors were available, and while they required no adjustments they were not as sensitive as the cat's whisker type. Crystal detectors are still being made and sold today.

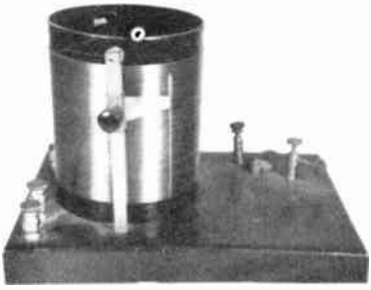


Baby Grand, one of the smallest Crystal sets made; 2 in. x 4 in.

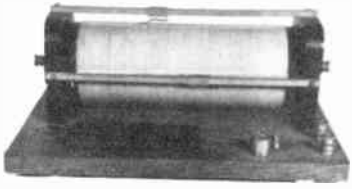
CRYSTAL RECEVING SETS

AIRPHONE GOLD GRAIN
DETECTOR RECEIVER
6.00

COMMERCE RADIOPHONE
1919



REMLER CRYSTAL SET
1921 $5.00



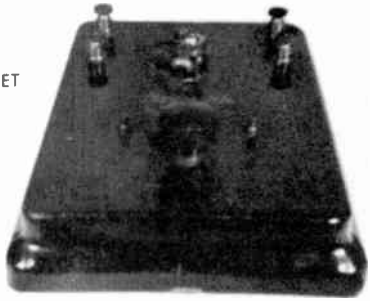
SIMPLEX CRYSTAL SET
ADAMS MORGAN
1914 $2.49

VICTOR
CRYSTAL SET

TWO CIRCUIT
CRYSTAL SET

CRYSTAL RECEIVING SETS

PANDORA CRYSTAL SET
1922 $2.50



BROWNIE CRYSTAL SET
BROWNIE CO. SAN FRANCISCO

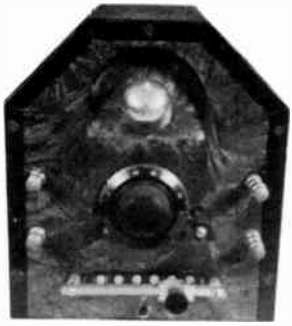
AMPLIFIER FOR CRYSTAL SET
CARBON MIKE DIRECT COUPLED
TO A RECEIVER. OPERATES A
LOUDSPEAKER WITHOUT TUBES.

ECLIPSE CRYSTAL SET
ECLIPSE MFG. LOS ANGELES

RAD-SCO CRYSTAL RECEIVING SET
RADIO SUPPLY CO.

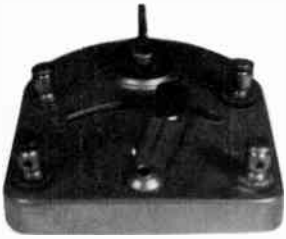
C. D. T. CRYSTAL SET
TANNER CO. LOS ANGELSE

CRYSTAL RECEIVING SETS



PHILMORE CRYSTAL SET

MIRACLE CRYSTAL SET
UNCLE AL'S RADIO SHOP
OAKLAND, CALIF.



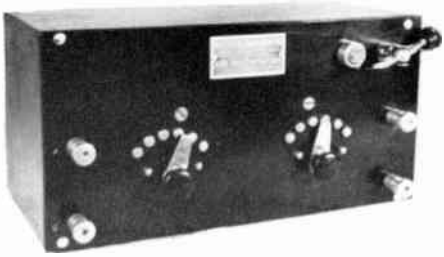
WORLD CRYSTAL SET

BABY GRAND CRYSTAL SET
ONE OF SMALLEST MADE

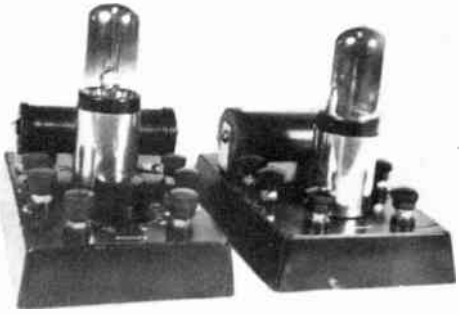
A. C. GILBERT
CRYSTAL SET
1922 $10.00

GREG-SOR CRYSTAL RADIO
STERLING MFG.
BERKELEY, CALIF.

MEEPON CRYSTAL SET
1923

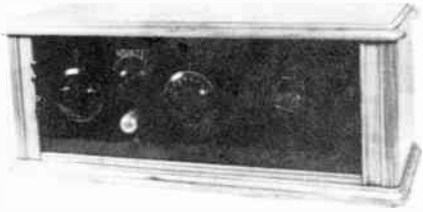


NATIONAL RADIOPHONE
CRYSTAL DET. RECEIVER
1922



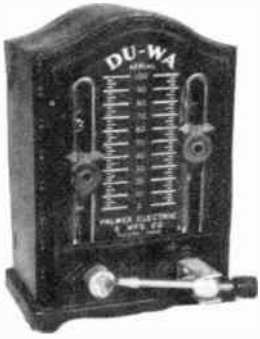
NATIONAL MONODYNE
1 TUBE RECEIVER &
1 STAGE OF AUDIO
1923 S.P. $18.00

AEREX CRYSTAL SET
KING OF THE AIR
1922



UNCLE AL'S CRYSTAL SET
ONE STAGE OF AUDIO

STANDARDYNE THREE TUBE SET
USING MULTIVALVE TUBE
THREE TUBES IN ONE 1925

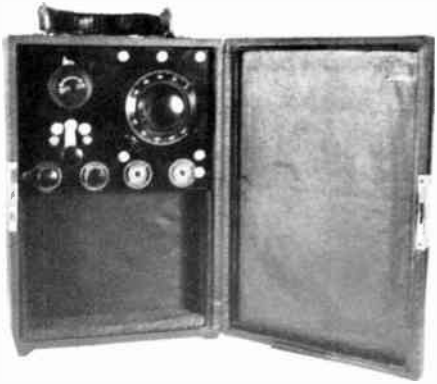


DUAL-WAVE CRYSTAL
DETECTOR RECEIVER
1924

EISEMANN
VARIO-COUPLER
SWITCH POINTS INSIDE

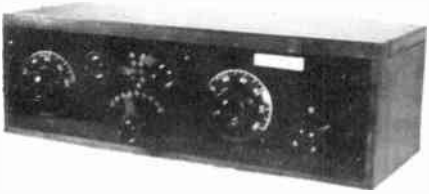
HOWE CRYSTAL RECEIVER
1925

CRYSTAL DETECTOR
RECEIVER



KODEL PORTABLE
"THE CAMERA RADIO"
IN A CAMERA CASE
1924 S.P. $16.00

AERIOLA X
NOT MADE BY
WESTINGHOUSE
1924



FAMOUS J. L. REINARTZ
RECEIVER
ONE OF THE BEST FOR CW.
1921

MULTIPHONE CRYSTAL SET 1924

BETTA-PHONE
CRYSTAL SET
1924

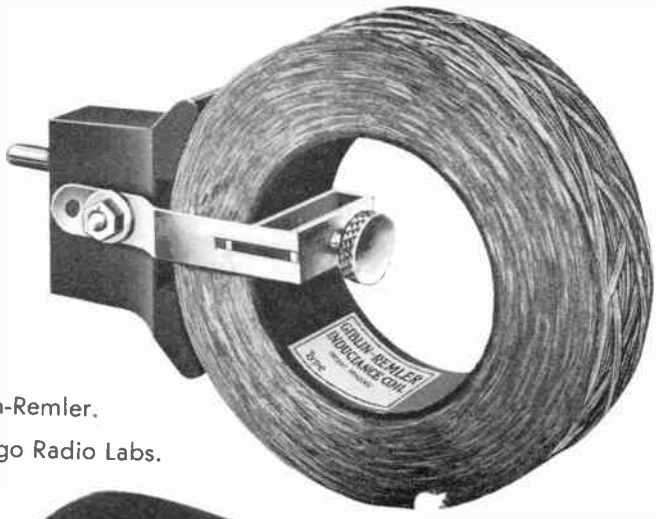
APPARATUS OF THE EARLY 1920s

After W.W.I many electric companies began manufacturing transmitting apparatus and receivers for amateur and home use. The old Marconi Co. was taken over by the Radio Corp. of America. General Electric made receivers and parts for RCA; also the Radiotron tubes. Westinghouse made receivers and the WD-11 and WD-12 tubes for RCA. The Wireless Specialty Apparatus Co. made a few receivers for RCA, the Faradon mica condensors, the Eaton oscillator and the Clark tone tester.

The Federal Tel. & Tel. Co. made receivers using the Federal radio frequency transformer and the 226W audio transformers. The Colin B. Kennedy Co. made receivers for both amateur and home use. A. H. Grebe Co. made a line of receivers for the amateur; also home receivers, and were one of the first to make a 10 meter receiver. The Adams-Morgan Co. continued to make the AMCO line and the Paragon receiver. They were one of the first to build a receiver using the Armstrong regenerative circuit.

C. D. Tuska, a radio pioneer and first Editor of QST Magazine, built regenerative amateur and home receivers. Chicago Radio Laboratories, owned by R. H. G. Matthews (9ZN) built wireless gear, later becoming the Zenith Radio Corp. American Radio Research made many parts, including the AMARAD "S" tube and the Mershon electrolytic condenser.

Remler — Elmer Cunningham was distributor for the Cunningham tubes and the Giblin-Remler duo-laterial honeycomb coils.



Giblin-Remler.

Chicago Radio Labs.

MERSHON
ELEC. CONDENSORS
1922 TO 1925

R. C. A. CHOKE
MADE BY G. E.
1921

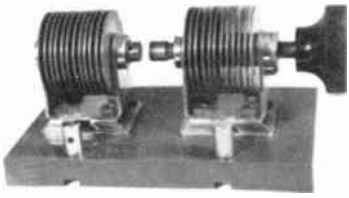
GENERAL RADIO
.003 VAR. COND.
1920

WIRELESS SPEC. CO.
.003 IP-301 VAR.
CONDENSOR 1919

R. C. A. FARADONS
MADE BY WIRELESS
SPEC. APPAR. CO.
1921

WIRELESS SPEC. CO.
MICA TRANS. COND.
1917 $25.00

DUBILIER MICA
TRANS. COND.
1917 $25.00



FISHER
1 KW. SPARK GAP,
AIR COOLED, 1919

MURDOCK #440
SPARK GAP
1919 90 CENTS

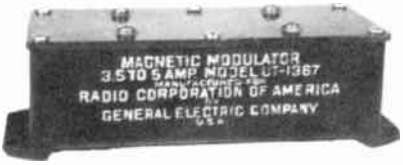
KNAPP
GENERATOR
1916

MESCO
SPARK GAP
1915

ELECTROSE INSULATORS
1912 TO 1920

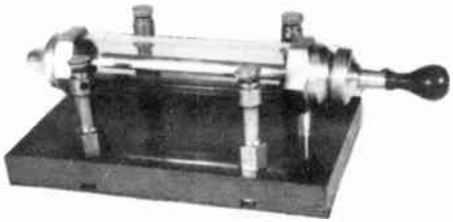
U. S. ARMY
SPARK TRANSMITTER
FIRST TYPE USED IN
AIRPLANES 1918

SODIUM DETECTOR
1919



RCA
MAGNETIC MODULATOR
USED IN ANT. CIRCUIT
1922

HANDMADE EXP. TUBE
1916



ENCLOSED SPARK GAP
1919

DEFOREST WAVE
METER 1923

CRYSTAL DETECTORS IN THE 1920's

KENNEDY

KOLSTER

CARBORUNDUM
WITH BATTERY

FRESHMAN

PACENT

FIXED DETECTORS

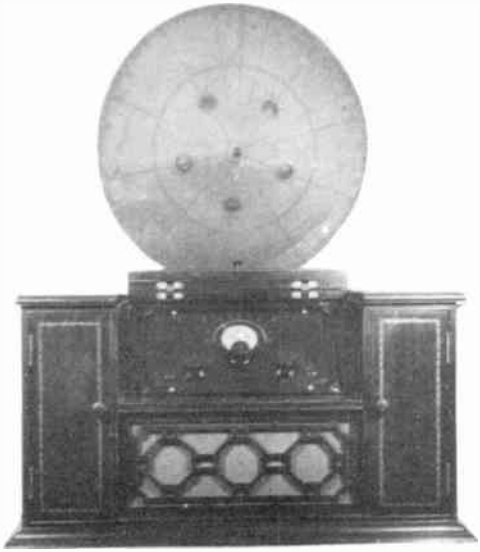
FADA

BROADCAST RECEIVERS

Up to about 1921 only amateurs, experimenters and commercial firms were using receivers, with the exception of a few watchmakers who received the Navy time signals from Arlington, Va. The latter dated back to 1913. The earliest receivers available for home use by the layman were the one tube regenerative or "blooper" type. The "bloop" came when the detector was in oscillation and the station was being tuned. The radiation from such sets was naturally bad, and the one tube reflex became popular in kit form; it didn't radiate signals and would operate a loud speaker. Next came untuned R.F. transformers giving some gain without radiation. Then the tuned R.F. outfits, usually five tube sets that when properly designed didn't radiate. The Hazeltine Neutrodyne was the first really stable receiver.

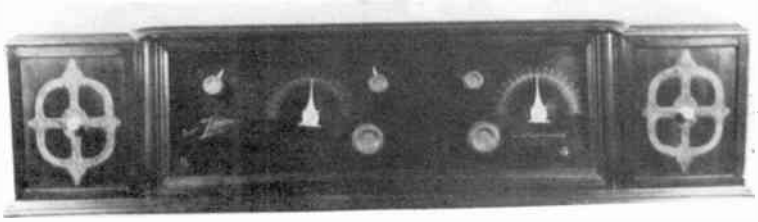
Radio kits were common in 1923, with everyone building a home receiver. Popular magazines carried circuit diagrams of new types of receivers. Among reflex sets, Acme, Erla, Harkness and Grimes were good sets. Popular sets using other circuits were Reinhartz, Cockaday and Pilot Super Wasp. The Browning-Drake and the Hammerlund Roberts were also fine receivers. Many manufacturers sold their regular sets in kit form; Bremer-Tully, Freed-Eisemann, Fada, Workright and DeForest were available this way.

Superhetrodyne kits were on the market by 1924. Lincoln, Branston and Remler Sampson were available in six to ten tube circuits. A complete "10" cost about $250.00 to build.



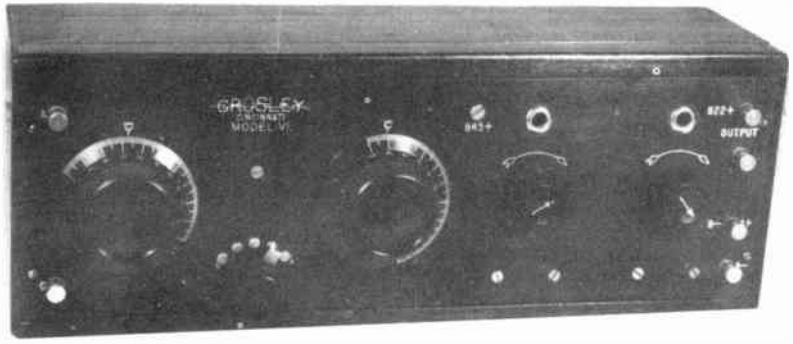
Falck Reflex.

Zenith Super VII.



CROSLEY

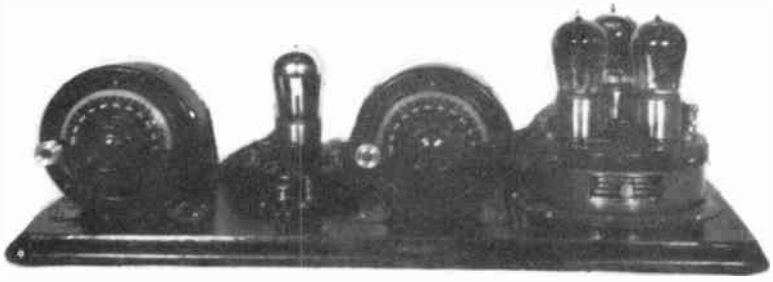
Crosley radio receivers were built by Powell Crosley Jr's. company. He had been radio amateur No. 8CR and later owned the WLW radio station at Cincinnatti, most powerful in the world at that time. Millions of Crosley receivers (called the "Model T" of radios) were sold, giving good results at a low price. They used a "book" condenser. Crosley was one of the first with good regenerative receivers; it had low loss spider-web coils. Harko and Ace were other Crosley Corp. trade names.



Crosley VI one stage R.F. Regenerative Detector.

ATWATER KENT

Atwater Kent started building receiving sets in about 1922, beginning with the famous "breadboard" model. He was making and selling variometers and varicouplers before that. The A-K sets performed well, being made with the best of parts. Atwater Kent continued to build receiving sets into the 1930s, quitting as the low cost, low quality sets took over the market.



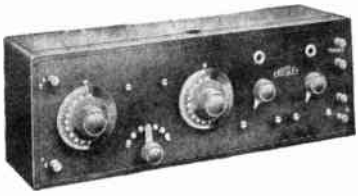
Atwater Kent Model 9.

For DISTANCE HERE *is a* RECORD

The remarkable results achieved with Crosley Radio Instruments are equaled only by their exceptionally low cost. A man in Sebring, Fla. listening in with a Crosley Model X—price only $55 for this 4 tube set—writes: "We are receiving from all standard stations north, east and west—from Winnipeg, Can., New York City, Seattle, Wash., and one night received three selections and two announcements from KDYX at Honolulu."

CROSLEY RADIO APPARATUS *Better Costs-Less*

Making distance records everywhere

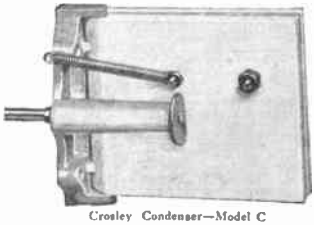


Crosley Receiver Model X

The most complete receiving set on the market. A 4 tube set consisting of one stage of tuned radio frequency, detector, and two stages of audio frequency amplification. It was on this instrument that Sebring, Fla. heard Honolulu. Price, without batteries, tubes and phones $55.00.

V-T Socket
40c

Socket Adapter with bushings and screws 70c. Without, 60c. Makes it possible to use 1⅛ volt tubes in Crosley Sets.



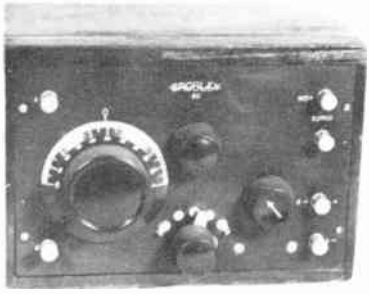
Crosley Condenser—Model C

CROSLEY MANUFACTURING CO.

ALFRED STREET CINCINNATI, OHIO

CROSLEY RECEIVERS

CROSLEY PUP
1923 $10.00



CROSLEY MODEL 50

1923 $14.50

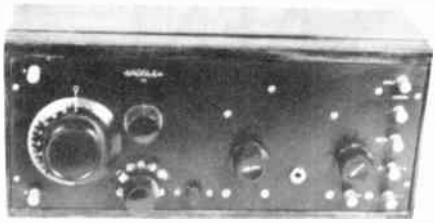
CROSLEY MODEL 51
51A 2 STAGE AMP.
1923 $47.50

INSIDE VIEW
CROSLEY 52

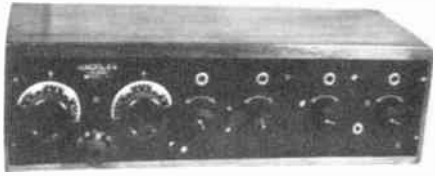
CROSLEY MODEL 51
PORTABLE
1923 $28.50

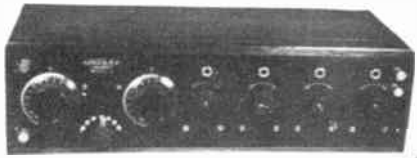
Crosley 1- 5, Radio

CROSLEY RECEIVERS



CROSLEY MODEL 52
THREE TUBE REGEN.
1923 $30.00

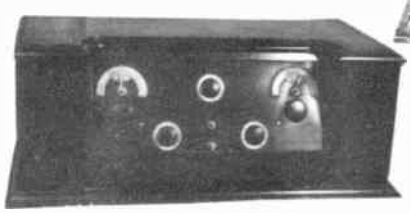




CROSLEY MODEL XJ
FOUR TUBE RECEIVER
1922 $55.00
Crosley 1 1, Rider

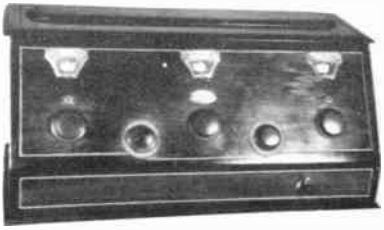
CROSLEY MODEL X
FOUR TUBE REGEN.
1922 $60.00

CROSLEY TRIRDYN
SPECIAL
1023 $75.00



CROSLEY TRIRDYN 3 tube
NEUPORT 1925 shielded RF A+1
$100.00

Crosley 1 16 Ride



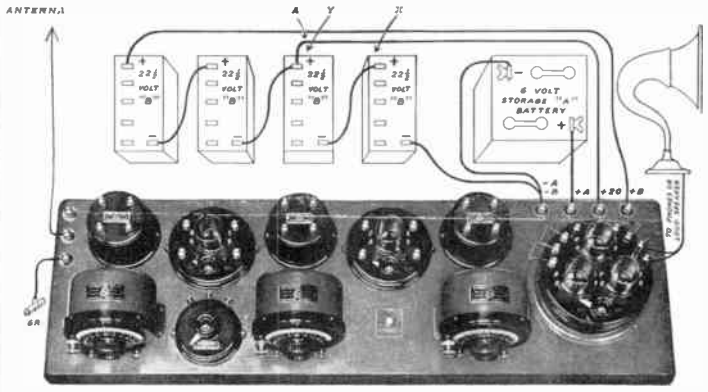
CROSLEY MODEL 5-38
1925 $38.00
5 Tube

ATWATER KENT

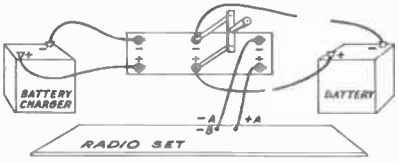
Instructions for Installation

of

Model 10 Receiving Set



Connections shown above are for five ¼ ampere tubes with 45 volts on the plate circuit of the detector tube. When a one ampere 5 volt tube is used as a detector, decrease its plate voltage to 22½ volts by disconnecting wire A from point Y and connecting it to point X.

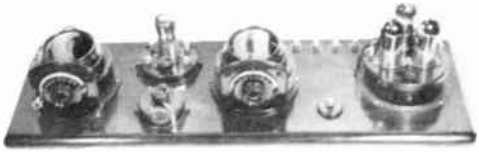


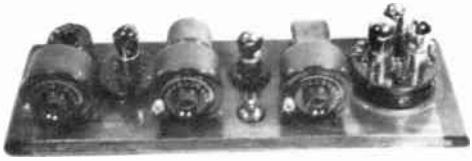
If Battery Charger is used, a switch is recommended and should be connected, as shown in diagram.

ATWATER KENT RECEIVERS

A-K p 1-1, Rider

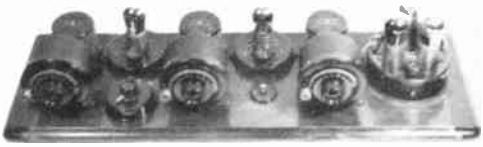
ATWATER KENT
MODEL 9
1921 $65.00





ATWATER KENT
TUNED R.F. REGEN. DET.
1922 $70.00

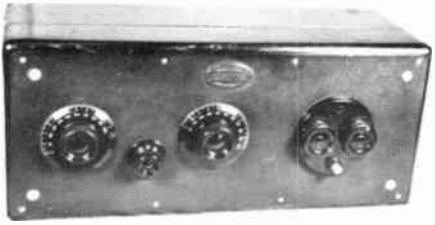
ATWATER KENT
MODEL 10
1922 $80.00



ATWATER KENT
MODEL 10B
1923 $80.00

ATWATER KENT
MODEL 12
1923 $100.00

ATWATER KENT RECEIVERS



ATWATER KENT
MODEL 19
4 TUBE T.R.F.
1924 $60.00

A-K p. 1-2, Radio

ATWATER KENT
MODEL 20
5 TUBE T.R.F.
1924 $80.00

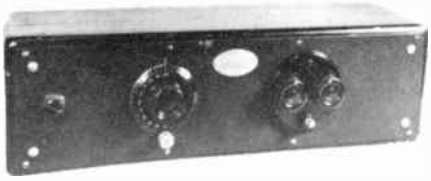
ATWATER KENT
MODEL 30
6 TUBE T.R.F.
1924 $85.00
inturned ant.

A K p. 1-3, Radio

ATWATER KENT
MODEL 32
6 TUBE T.R.F.
1925 $95.00
inturned ant.

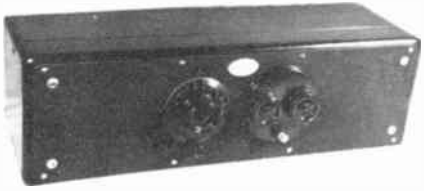
ATWATER KENT
INSIDE VIEW
MODEL 20

ATWATER KENT RECEIVERS

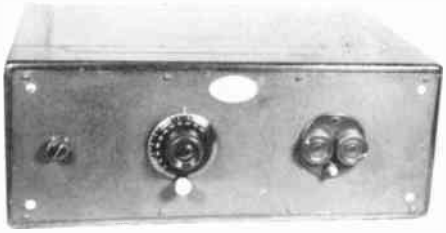


ATWATER KENT
MODEL 33
6 TUBE T.R.F.
1924 $98.00
tuned ant. A V p 15, Rad

ATWATER KENT
MODEL 35
1926 $75.00
untuned ant.
A V p 14, Rad



ATWATER KENT
MODEL 48
6 TUBE T.R.F.
1925 $80.00
untuned ant A V p 14, Rad



ATWATER KENT
MODEL 50
7 TUBE T.R.F.
1927 $125.00
3 tuned and tuned
4 untuned RF, det., 2 AF

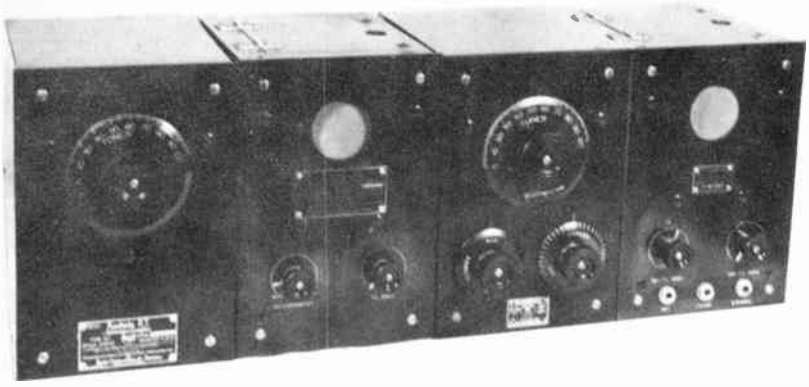
RADIO CORPORATION OF AMERICA

The Radio Corporation of America was and is one of the largest and oldest manufacturers of radio sets. After the first World War the Alexanderson Co. offered for sale its patents on the Alternator. The British Marconi Co. were making arrangements to secure these, but the U.S. government intervened in the interests of maintaining our nation's lead in the radio field. So R.C.A. was formed on October 17, 1919 with Ed J. Nally as President and Owen D. Young as Chairman. A month later, on November 20th, the Marconi Co. was taken over by RCA.

They became the largest distributor of radio receiving sets in the world, selling the entire output of the General Electric Co. and Westinghouse. RCA took over the Marconi Institute, founded in 1913, and renamed it the Radio Institute of America; it offered technical radio courses and commercial radio operator's courses to thousands of students.

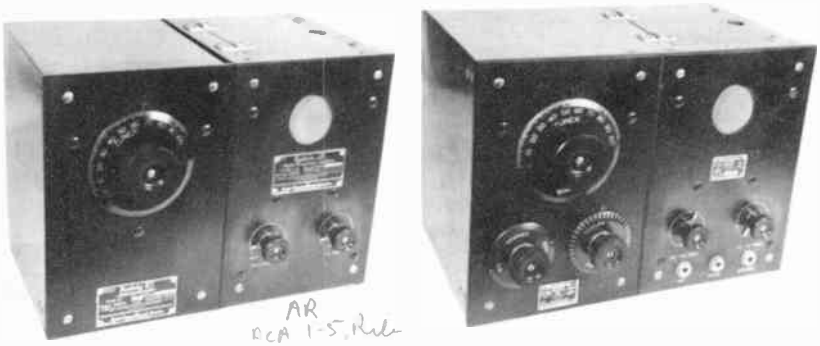
RCA World Wide Direless in 1920 sold transmitting and receiving commercial sets made by G.E. and Westinghouse, and also some made by Wireless Specialty Apparatus Co. RCA sold ship-to-ship and ship-to-shore stations complete. Portable mule pack sets, military tractor sets, spark transmitters from one to 20 KW, tube transmitters and interfleet radio telephones were all distributed by RCA at this time.

RCA Communications Inc. kept two 100 R.F. alternators in daily use to handle radiograms to 43 foreign nations. Radiograms were also handled by Western Union Telegraph Co. In 1926 RCA purchased radio station WEAF in New York for one million dollars and founded the National Broadcasting Co.; M. H. Aylesworth was president. There were more than five million home radio receivers in use at this date.



Completing Sets at the Westinghouse Electric and Manufacturing Company's Radio Works, Springfield, Massachusetts

Section of Radio Assembling Room at Immense Plant of General Electric Company, Schenectady, N. Y.



AR
RCA 1-5, Rider

RADIOLA SIX TUBE RECEIVER WITH RE-ANT. TUNER. AR-THREE STAGE R.F. AMP. RA-REGEN. RECEIVER. DA-DET. TWO STEP AMP. MADE BY WESTINGHOUSE 1922 S.P. $225.00.

RADIOLA SENIOR TYPE RF REGEN. USES 199 TUBE MADE BY WESTINGHOUSE 1923 S.P. $65.00

RCA 1-5 Rider

AERIOLA JR. MODEL RE CRYSTAL SET 1922 SP $25.00 MADE BY WESTINGHOUSE

RADIOLA SPECIAL
ONE TUBE REGEN.
170 TO 500 M.
1923 $30.00
WIRELESS SPEC. CO.

RADIOLA
CONCERT RECEIVER
CRYSTAL SET
170 TO 2650 M.
WIRELESS SPEC. CO.
1922 S.P. $40.00

AERIOLA SR. RECEIVER
REGENERATIVE USES WD11
MADE BY WESTINGHOUSE
1922 S.P. $65.00

RCA 1-5
Radio

AERIOLA AMPLIFIER
2 STEP WD 11 TUBES
MADE BY WESTINGHOUSE

RCA 1-6
Radio

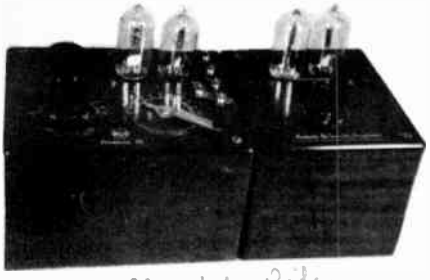
RADIO CORPORATION OF AMERICA

RADIOLA I
TYPE ER-753-A
MADE BY GENERAL ELEC.
1922 S.P. $25.00

RADIOLA II AR-800
2 TUBE REGENERATIVE
PORTABLE RECEIVER
USED TWO 199 TUBES
1923 S.P. $60.00
MADE BY GEN. ELEC.
RCA 1-6 Rider

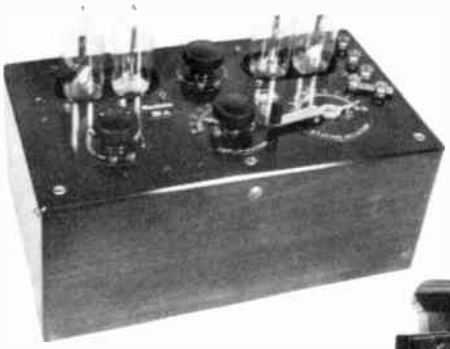
RADIOLA TYPE RS
MADE BY
WESTINGHOUSE
1923

RADIOLA III AR-805
WITH BALANCED AMPLIFIER
REGEN. DET. ONE STEP
AUDIO. ONE STEP PUSH
PULL AUDIO. 1923
S.P. $65.00

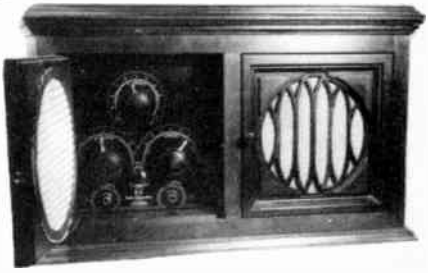


RCA p 1-6 Rider

RCA 1-5
Rider

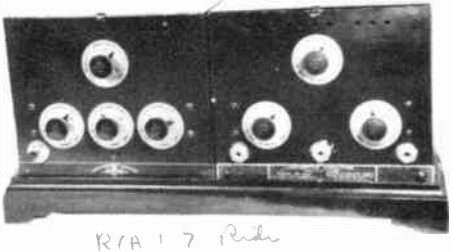


RADIOLA IIIA AR 806
REGEN. DET. ONE STEP
AUDIO. ONE STEP PUSH
PULL AUDIO. 1924
S.P. $65.00
RCA 17 Rider



RADIOLA IV AR-880
THREE TUBE RECEIVER
REGEN. DET. 2 STAGE
AUDIO. 1922
MADE BY GEN. ELEC.
RCA 17 Rider

RADIOLA V AR-885
AR-1300 CRYSTAL DET.
RECEIVER
AA-1400 TUBE DET.
TWO STEP AUDIO
1922 MADE BY GEN. ELEC.
$250.00 COMPLETE
RCA 17 Rider



RADIOLA VI AR-895
AA-1520 3 STAGE R.F.
AA-1400 3 STEP AUDIO
TUNES 200 TO 5000 M.
1922 MADE BY GEN. ELEC.
RCA 17 Rider

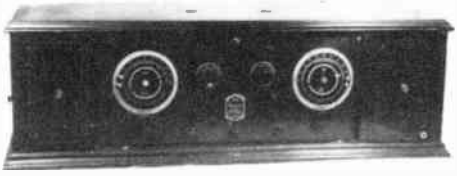
RADIOLA VIIB & IX
2 CIRCUIT TUNER
5 TUBE DET. AMP.
AR-907
1923 S.P. $245.00

RCA 1-8

35 x 11½ x 11" AR-812

2 RADIOLA ~~VIII~~
6 TUBE SUPER.
PORTABLE
1925 S.P. $286.00

RCA 19



$220.00

RADIOLA X
REGENOFLEX
4 WD 11 TUBES
1925 S.P. $245.00

RADIOLA 16 AR-924
6 TUBE RECEIVER
UX 201As
1927

RCA 1-15
Rider

RADIOLA 17 AR-927
ONE OF THE FIRST
AC RECEIVERS
1928

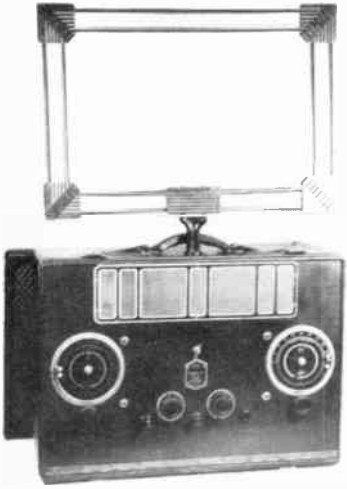
RCA 1 15
Rider

RADIOLA GRAND
4 WD 11 TUBES
REGEN. RECEIVER
1922 S.P. $150.00

RCA 1 5
Rider

RADIOLA 20 AR-918
5 TUBE T. R. F.
1925 S.P. $180.00

RCA 1-17
Rider



RADIOLA 24 AR-804
6 TUBE SUPER
USING 199 TUBES
PORTABLE
1925 S.P. $160.00

RADIOLA 25 AR-919
6 TUBE SUPER
USING 199 TUBES
LOOP RECEIVER
1925 SP $165.00

RADIOLA 26
6 TUBE SUPER
PORTABLE
HOME BATTERY BOX
WITH ANT. TUNER
1925 S.P. $225.00

RADIO CORPORATION OF AMERICA

Westinghouse Regenerative-Vacuum Tube Receiver Combination No. 4

RC	Short Wave Regenerative Receiver, 170-700 meters, less tubes	$132.50
CB	Load Coil	6.00
UV-200	One Radiotron Detector	5.00
UV-201	Two Radiotron Amplifiers	13.00
6HR-9	Storage Battery, 6 volts, 100 A. H.	24.00
UD-790	Brandes Telephones	8.00
UD-824	Telephone Plug	1.75
	Two "B" Batteries	6.00
AD	Receiving Antenna Equipment	7.50
LV	Vocarola (Loud Speaker)	30.00
285168	Rectigon Battery Charger, 5 amperes	28.00
	Total	$261.75

DECEMBER, 1919

Federal's

(There's Much in a Name)

Telephone & Telegraph Co.

MANUFACTURERS

TELEPHONE, TELEGRAPH AND RADIO APPARATUS AND ACCESSORIES

FACTORY AND HOME OFFICE

Buffalo, New York, U. S. A.

RADIO TELEGRAPH AND TELEPHONE APPARATUS

Home of Federal Radio Apparatus

BRANCH SALES OFFICES:

NEW YORK CITY
2158 Woolworth Bldg.

SAN FRANCISCO
603 Mission St.

CHICAGO
504 Plymouth Bldg.

BOSTON
99 Bedford St.

BRIDGEBURG,
ONTARIO

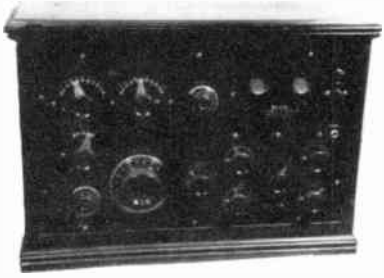
PHILADELPHIA
1008 Drexel Bldg.

FEDERAL JR.
CRYSTAL RECEIVING SET
1921 S.P. $25.00

INSIDE VIEW
FEDERAL 57 RECEIVER

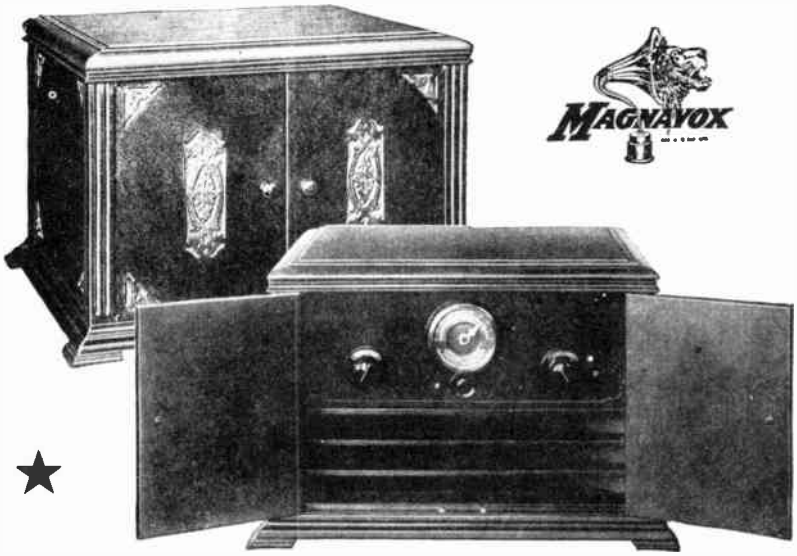
FEDERAL 57 RECEIVER
SINGLE TUNED RECEIVER
1 STAGE R.F. DET. 2 STAGE
AUDIO 1922 S.P. $98.00

FEDERAL 58 DX RECEIVER
DOUBLE TUNED RECEIVER
1 STAGE R.F. DET 2 STAGE
AUDIO. 1922 S.P. $116.00



FEDERAL 60 RECEIVER
DOUBLE TUNED RECEIVER
2 STAGE R.F. DET. 2 STAGE
AUDIO 1923 S.P. $135.00

FEDERAL 61 RECEIVER
3 STAGE R.F. DET. 2 STAGE
AUDIO 1923 $145.00



TRF-50
(as illustrated)

A 5-tube tuned radio frequency receiver with built-in Magnavox Reproducer unit which consumes no battery. Cabinet measures: height, 14¾ in.; length, 20½ in.; depth, 18¾ in.

Without tubes or batteries . . $150.00

TRF-5

This is identical with the above but encased in smaller cabinet without built-in Reproducer. Cabinet measures: height, 9⅝ in.; length, 20½ in.; depth, 14¾ in.

Without tubes, batteries or reproducer $125.00

MAGNAVOX

New Broadcast Receivers combining supreme efficiency, convenience and beauty

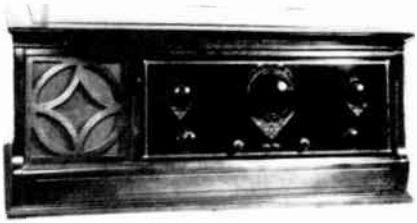
HERE at last is the perfected instrument permitting you to enjoy *simultaneously* the most desirable elements of broadcast reception.

Three decisive advantages go with the Magnavox: unequalled simplicity of control, reproduction of exceptional clearness—handsomely carved period cabinets.

Magnavox Radio Receivers, Vacuum Tubes, Reproducers, Power Amplifiers, and Combination Sets are sold by reliable dealers everywhere

THE MAGNAVOX CO., OAKLAND, CALIF.
New York: 350 W. 31st Street *San Francisco:* 274 Brannan Street
Canadian Distributors: Perkins Electric Limited, Toronto, Montreal, Winnipeg

DAY-FAN
5 TUBE T.R.F.
1924 S.P. $125.00



DAY-FAN
6 TUBE T.R.F.
WITH SPEAKER
1924 S.P. $150.00

MAGNAVOX
TRF-5
TELOS VARIO-
TRANSFORMERS
1924 S.P. $150.00

RADIODYNE
6 TUBE T.R.F.
USING 199 TUBES
1924 S.P. $150.00
WESTERN COIL CO.

THOROLA
5 TUBE T.R.F.
1924 $85.00

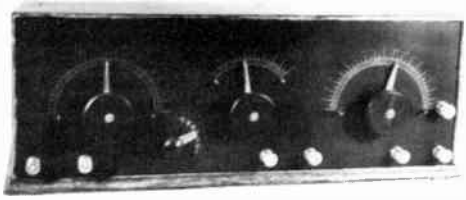
PREMIER RADIO MODEL 7A
5 TUBE REFLEX
3 STAGES OF R.F. CRYSTAL
DETECTOR 3 STAGES AUDIO
1924 $250.00

PILOT SUPER WASP
SHORT WAVE RECEIVER
PLUG IN COILS 1928

ELECTROLA
5 TUBE T.R.F.
1923 $90.00

EARLY RECEIVING SETS

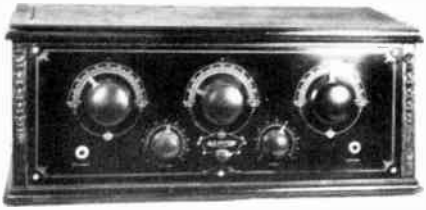
PARAGON RA-6
ADAMS MORGAN
FIRST RECEIVER TO USE
ARMSTRONG REGENERATIVE
CIRCUIT. 1916 $35.00



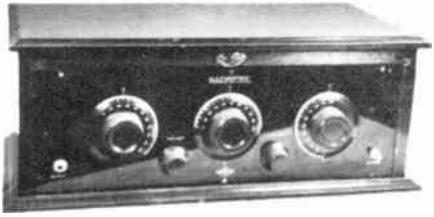
GARROD TYPE RAF.
4 TUBE NEUTRODYNE
1923 S.P. $135.00

MURDOCK
5 TUBE NEUTRODYNE
1923 S.P. $100.00

MARCONIPHONE
MADE IN ENGLAND
1923



A-C DAYTON XL 5
5 TUBE T.R.F.
1924 $95.00



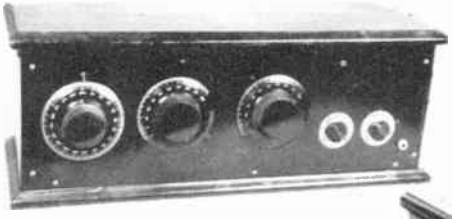
MAGNUTROL
5 TUBE T.R.F.
MAGNUS CO.
1924 $90.00

RADIO SERVICE LABS. R212
5 TUBE NEUTRODYNE
1924 $120.00

PACIFIC CLARATONE
5 TUBE T.R.F.
1925 $75.00

KOLSTER
6 TUBE T.R.F.
GANGED TUNING
1926 S.P. $150.00
FEDERAL-BRANDES

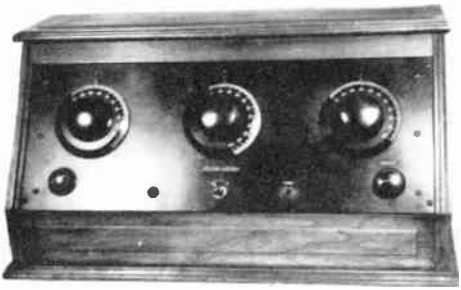
KING
5 TUBE NEUTRODYNE
ONE DIAL TUNING
1926 $125.00



THREE CIRCUIT REGEN.
4 TUBES
1923 KIT 30.00

MOHAWK
5 TUBE T.R.F.
1924 S.P. $125.00

MELCO
4 TUBE ACMEDYNE
AMSCO PROD. INC.
1924 $125.00



STEWART WARNER
MODEL 305
5 TUBE T.R.F.
1924 $120.00

STEWART WARNER
MODEL 300
5 TUBE T.R.F.
1925 $75.00

SLEEPER SERENADER
5 TUBE T.R.F.
1925 $190.00

REGENERATIVE RECEIVERS 1924

ECHOPHONE MODEL 4
RADIO SHOP
LONG BEACH, CALIF.

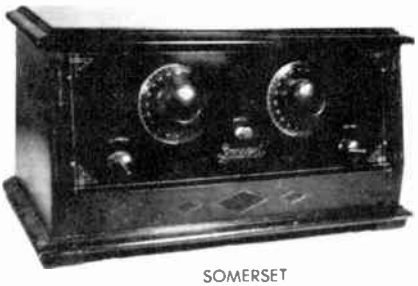
ECHOPHONE MODEL A
RADIO SHOP
SUNNYVALE, CALIF.

ECHOPHONE MODEL J
SUNNYVALE, CALIF.
RADIO SHOP

ONE TUBE REGEN. RECEIVER

SIGNAL
SINGLE CIRCUIT REGEN.
ONE TUBE $25.00

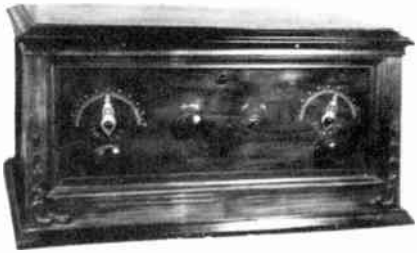
KEMPER PORTABLE
K-52
1925 $90.00



SOMERSET
5 TUBE T.R.F.
1924 $85.00

PARMAK 5 TUBE T R.F.
1924 $85.00

TRAV-LER PORTABLE
5 TUBE
1925 $75.00



HALES CALIFORNIAN
5 TUBE T.R.F.
1925 $80.00

KODEL Model C-11 Four Tube Receiver, with battery compartment and loud speaker. Price, $32.50. (Without battery cabinet, loud speaker, or accessories.) Battery cabinet can be furnished with any KODEL set at slightly additional cost.

Model S-1 KODEL crystal set. Selective, selective low priced. Price, $5.00

Model P-11 One Tube Portable—the Camera of Radio. Price, $16.00 without accessories. Tube, batteries, head phones, antenna, and ground wire all self contained. Weight 4¾ lbs. complete.

Model P-12 Two Tube Portable. (Model P-11 with additional tube added, which increases distance and volume many times) $22.50.

KODEL—An astonishing new receiver that will make radio history

KODEL is the name of a circuit discovered by an independent experimenter. So wonderful is the KODEL circuit that it picks up stations 1,000 miles away, using only one tube, and *no antenna*, when conditions are right. Add tubes and you increase distance and volume until you succeed in covering 3,000 miles on the loud speaker. All this with only a single dial to turn!

If you travel—KODEL Portable. If you cannot erect an antenna—KODEL. If you want distance and quality—KODEL. If you want simplicity—KODEL. If your pocketbook is limited—KODEL. Even if you want results regardless of cost—KODEL.

See the KODEL line at your dealer's. If he cannot supply you, send us his name and address with check or money order and we will ship direct to you. Money returned if any KODEL set does not more than satisfy you.

ALL KODEL sets use the unique KODEL circuit and may be operated from either storage or dry batteries at will, and without an outdoor antenna if desired.

FREE. Write for instructive KODEL Catalogue, entitled "Radio for Every Purpose and any Purse." FREE!

DEALERS: the KODEL is a sensation wherever introduced. Write for terms.

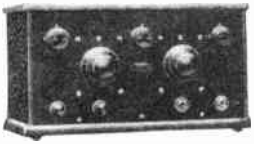
Kodel Manufacturing Company

Under same Management that made the Homcharger famous.

128 West Third Street Cincinnati, Ohio

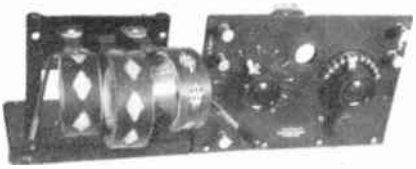
Model C-11 One Tube Receiver—The biggest value in a one tube radio set to-day. Price, $10.00.

Model C-12 Two Tube Receiver—$18.00. A great distance getter; puts local stations on the horn; single dial tuning.



Model C-13 Three Tube Receiver—$28.00. Gives five tube volume with only three tubes, due to reflex amplification.

RADIO FOR EVERY PURPOSE AND ANY PURSE—$5. TO $32.50

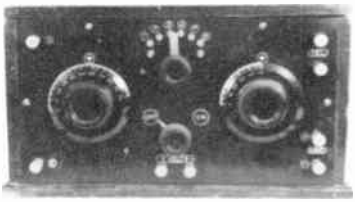


REMLER RECEIVER
TYPE 400 COIL MOUNTING
TYPE 300 DET. CONTROL
PANEL. 1921 $22.00

KODEL C 11
ONE OF THE LITTLEST
ONE TUBE SETS MADE
1924 S.P. $10.00

C. D. TUSKA 225
THREE TUBE REGEN.
1922 $90.00

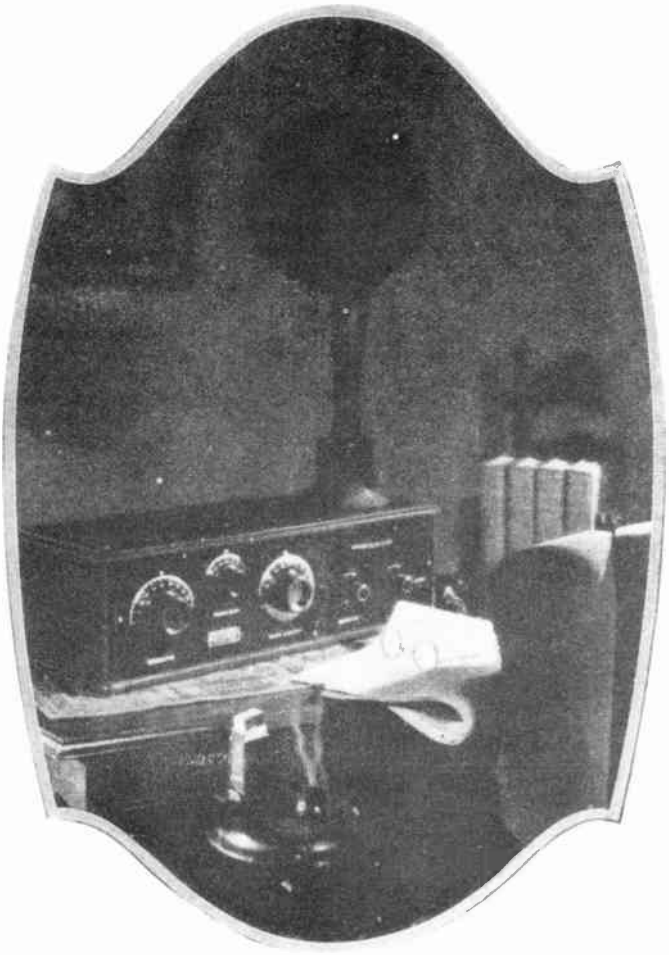
C. D. TUSKA 228
SUPERDYNE
1924 $120.00



C. D. TUSKA 224
ONE TUBE REGEN.
1922 $75.00

KELLOGG
ONE TUBE REGEN.
1922

TUSKA



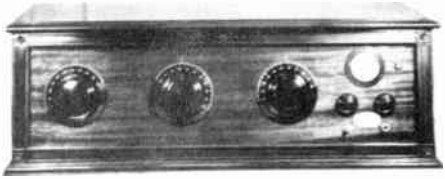
Michigan hears Honolulu

"On Saturday night my Tuska and I picked up Station KGU, Honolulu Advertiser, and listened to them for an hour through my loud speaker. It was wonderful!

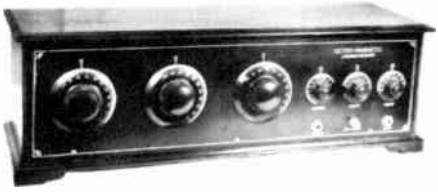
THE C. D. TUSKA CO.
Hartford, Conn.

BOSCH AMBOROLA
6 TUBE NEUTRODYNE
1924 $160.00
AMER. BOSCH CO.

SPLITDORF
5 TUBE T.R.F.
1924 $125.00

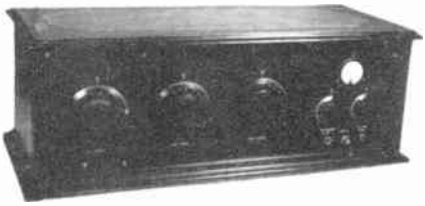


GAROD V
6 TUBE NEUTRODYNE
1923 $195.00
GAROD RADIO CORP.



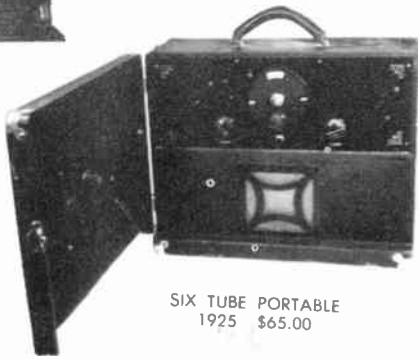
HETRO-MAGNETIC
TYPE 5H
5 TUBE T.R.F.
1923 $140.00
SIDBENEL RADIO EQUIP.

GILFILLAN GN-3
NEUTRODYNE
1923 $75.00



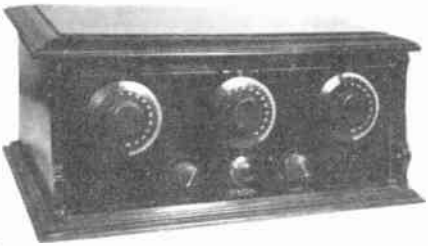
GILFILLAN GN-2
5 TUBE NEUTRODYNE
1924 $135.00

GILFILLAN MODEL 10
5 TUBE NEUTRODYNE
1925 $125.00

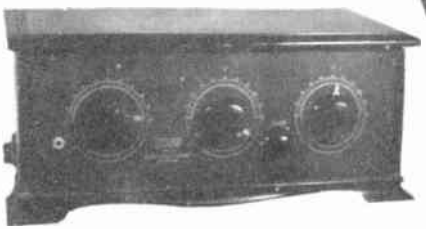


SIX TUBE PORTABLE
1925 $65.00

WARE 3 TUBE NEUTRODYNE
1923 $72.00
TYPE T

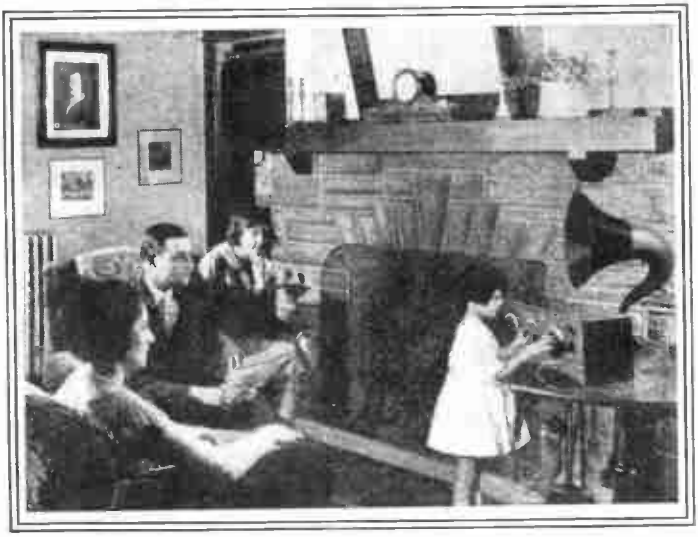


FADA 175A
5 TUBE NEUTRODYNE
1923 $160.00
F. A. D. ANDRE CO.



MUSIC MASTER
TYPE 60
1924 $95.00

FRESHMAN MASTERPIECE
1923 $75.00
CHAS. FRESHMAN CO.



The Neutrodyne principle as applied to the FADA "One Sixty" has produced a radio receiver that is simplicity itself. Once the notations have been made of the dial settings of any stations, *anyone* can reset the dials in the given positions and listen to that station at will.

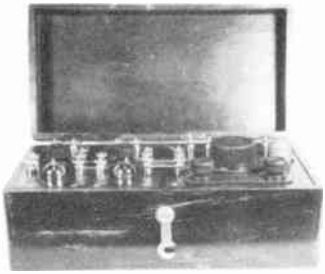
The pleasing design of the cabinet and its beautiful finish make it an ornament to any home. Its efficiency makes it a delight to all who listen. It is a receiver that you will be proud to own. See the FADA "One Sixty" at your dealer's. Price, exclusive of tubes, batteries and phones, $120.

F. A. D. ANDREA, INC., 1581 Jerome Ave., New York

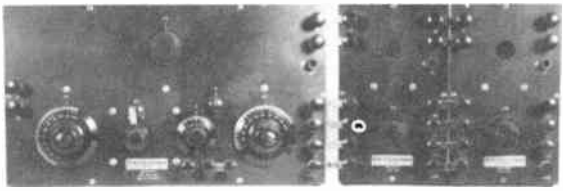
FADA *Radio*

F.A.D. ANDREA INC. LICENSED BY INDEPENDENT RADIO MANUFACTURERS INC. NEUTRODYNE

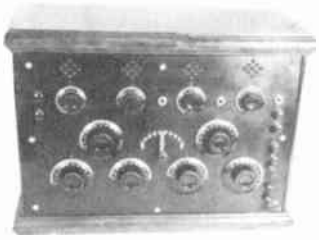
ZN-ITH 3R
LONG DISTANCE RECEIVER
CHICAGO RADIO LABS.
1923 S.P. $160.00 N L



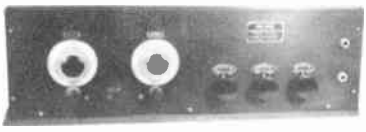
CONNECTICUT TEL. & ELEC.
SODION NON-REGEN. DET.
2 STAGE AUDIO



FIVE TUBE RECEIVER
2 STAGE FIXED TUNED R.F.
REGEN. DET. 2 STAGE AUDIO
USING W. E. 215 AS
NORTHERN ELEC. CANADA



REZODON
PAUL G. NIEHOFF CO.
FIVE TUBE REGEN.
1921



MU-RAD MA 13
2 STAGE UNTUNED R.F.
DET. 2 STAGE AUDIO.
1922 S.P. $125.00

FREED-EISMANN RADIO BROADCAST RECEIVERS

FREED-EISMANN
FE-15
5 TUBE T.R.F.
1924 $90.00

FREED-EISMANN
5 TUBE NEUTRODYNE
1923 $150.00

FREED-EISMANN
NR-7
6 TUBE NEUTRODYNE
1924 $150.00

INSIDE VIEW
NR 5

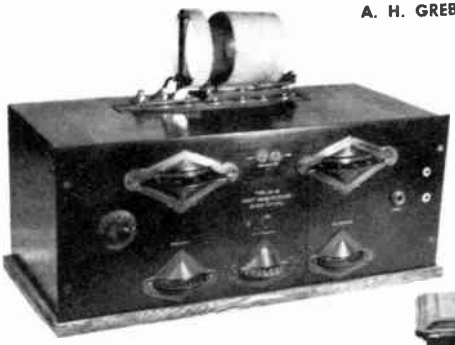
Freed-Eisemann

BROADCAST RADIO RECEIVERS

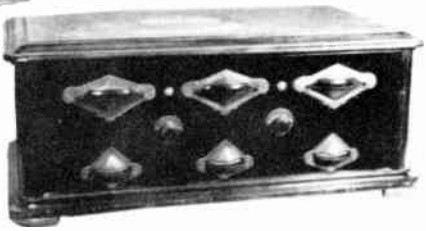
MANUFACTURED BY

Freed-Eisemann Radio Corporation
Sperry Building
Manhattan Bridge Plaza
Brooklyn, N.Y.

A. H. GREBE CO. RECEIVERS



GREBE CR-18
100 TO 200 METERS
ONE OF THE FIRST
10 METER RECEIVERS



GREBE SYNCROPHASE MU-1
5 TUBE T.R.F.
1925 $125.00

GREBE RORK
2-STEP AMP.
$55.00

GREBE RORB
DET. 2 STEP AMP.
$75.00

A. H. GREBE CO. RECEIVERS

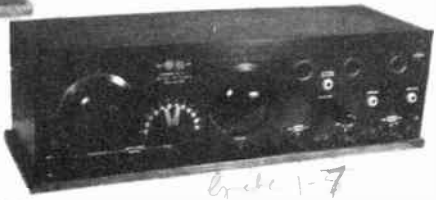
INSIDE VIEW CR-3

GREBE CR-3
150 TO 680 M.
1920 $60.00

GREBE CR-6
THREE TUBE REGEN.
170 TO 680 M.
1919 $180.00

GREBE CR-5
ONE TUBE REGEN.
150 TO 3,000 M.
1921 $80.00

GREBE CR-9
THREE TUBE REGEN.
150 TO 3,000 M.
1921 $110.00



GREBE CR-8
ONE TUBE REGEN.
150 TO 1,000 M.
1921 $80.00

A. H. GREBE & CO., INC.

Manufacturing GREBE RADIO Apparatus

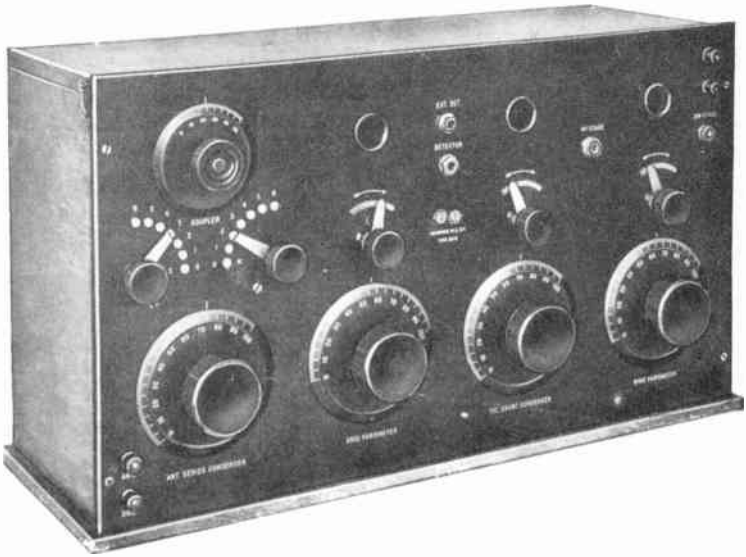
RICHMOND HILL NEW YORK CITY

TRADE MARK

FEBRUARY, 1920

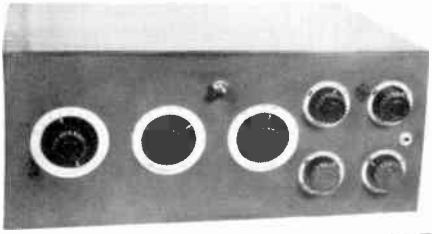
SHORT-WAVE REGENERATIVE RECEIVER AND TWO-STAGE AMPLIFIER TYPE CR-6

Wave-length range: 170 to 680 meters



FOR the radio amateur and experimenter who is satisfied only when he knows that he posesses the very last word in radio receiving apparatus, there is but one answer: the short-wave regenerative receiver and two-stage amplifier, known as Type CR-6. This is one of the most popular receiving sets now in use, because of its remarkable completeness, efficiency, and ease of operation.

The electrical design of the CR-6 embodies the most suitable arrangement for high efficiency and smoothness of operating control, for the wave-lengths covered. The antenna circuit consists of an adjustable inductance in series with a variable capacity, giving a very wide range of settings. The secondary circuit comprises a coupling coil and a variometer, a combination



CUTTING & WASHINGTON
11A 3 TUBE REGEN.
1922 $85.00

DAVID GRIMES
INVERSE DUPLEV REFLEX
TYPE 4DL 4 TUBE
SAME AS 6 TUBE SET
1924 $160.00

ERLA
5 TUBE T.R.F.
1924 $75.00

ARBORPHONE
5 TUBE T.R.F.
1923 $90.00
MACHINE SPEC. CO.

WURLITZER 5D
5 TUBE T.R.F.
1924 $85.00

EARLY RECEIVING SETS

REFLEX RECEIVERS

ERLA
REFLEX

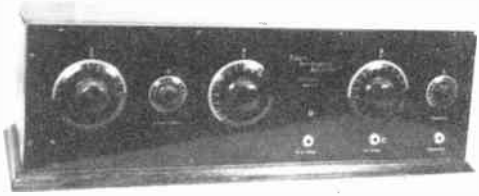
ACME
REFLEX

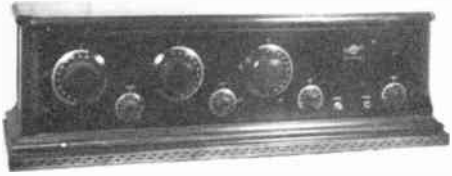
NATIONAL
BROWNING-DRAKE
RECEIVER

HARKNESS
REFLEX

STROMBERG-CARLSON
5 TUBE NEUTRODYNE
1924 SP $150.00

EAGLE NEUTRODYNE
BALANCED RECEIVER
1923 $135.00





HOWARD
6 TUBE NEUTRODYNE

FIVE TUBE
NEUTRODYNE KIT
1924 $80.00

SUPERHETRODYNE SETS

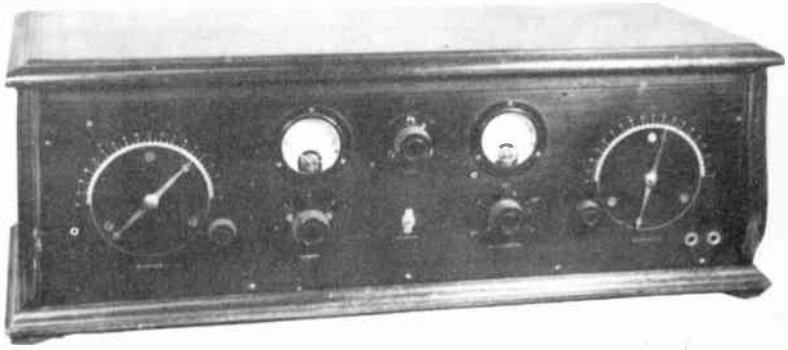
In 1921 Major Armstrong invented the superhetrodyne circuit; the hetrodyne principal was not new, having been used in undamped wave wireless telegraphy. This was the ultimate in a receiver, for it gave better selectivity and had a low noise ratio. The front end of the superhetrodyne used a loop antenna, an oscillator and a frequency changer or mixer. The intermediate frequencies were fixed at from 45 to 60 KC. A second detector and transformer-coupled audio stage followed. Initial problems with the "super" sets were bad radiation and two-spot tuning.....

Whe RCA brought out their first superhetrodyne sets in 1924 they used a revised circuit devised by Armstrong and Hauck which employed a second harmonic from the oscillator and cut down radiation. J. H. Pressley developed a circuit, the Autodyne, which combined the oscillator and mixer in one tube. This cricuit used a tuned front end and increased the gain while at the same time prevented radiation.

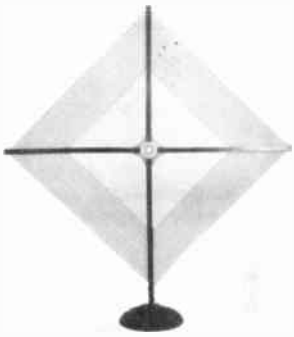
The DeForest Utradon circuit and the super-regenerative circuit were actually transmitters, and a loop was used to prevent radiation.

LOOP ANTENNAS

The loop antenna was first used for direction finding, and is still thus employed. In the early broadcast era the loop was used where an elaborate antenna could not be erected, and to prevent radiation and cut out strong local stations. For home receivers loops were made from about 12 to 24 inches square; they were often made to fold for storage purposes. Eventually loops became smaller and were placed within the sets, as they are today.

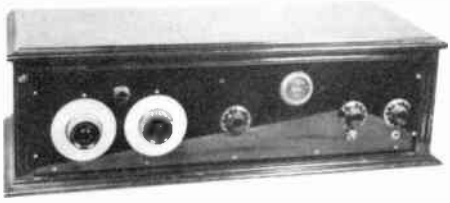


Norden-Hauck 10 tube Navy Super.



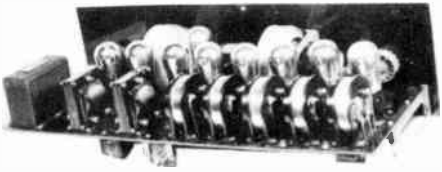
WESTERN ELECTRIC
4B SUPER
1923

NORDEN-HAUCK
10 TUBE SUPER
1925 S.P. $250.00



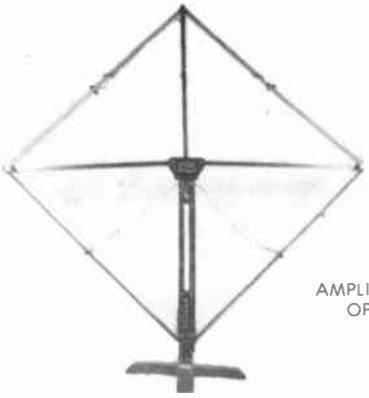
REMLER
9 TUBE SUPER
45 KC. IFs
1925 KIT $90.00

MAGNAFORMER
9 TUBE SUPER
RADIART LABS.
1926 $200.00

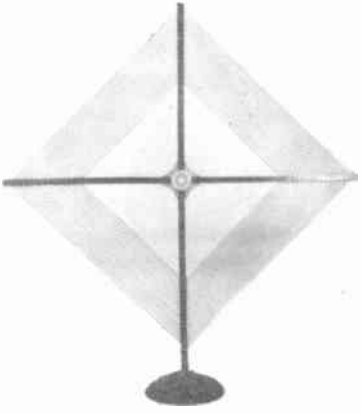


INSIDE VIEW
MAGNAFORMER SUPER

LOOP ANTENNAS 1920s



AMPLIFEX WITH COMPASS
OPEN AND CLOSED
$12.00



LINCOLN LOOP
OPEN & CLOSED
$8.00

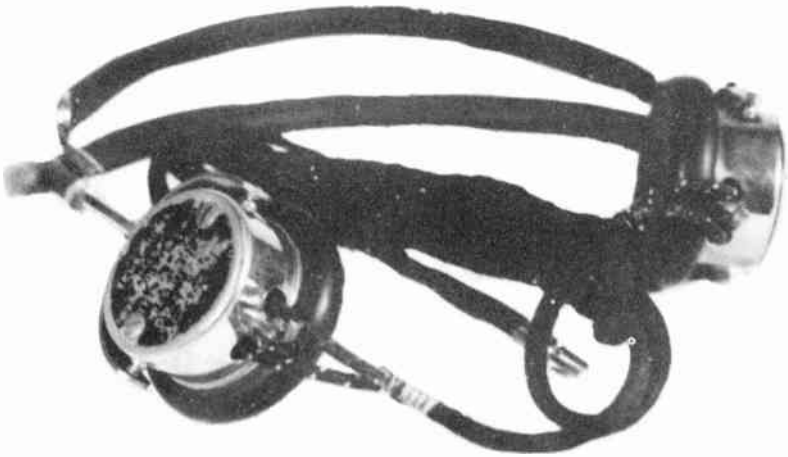
DUO-SPIRAL
$10.00

HEADSETS

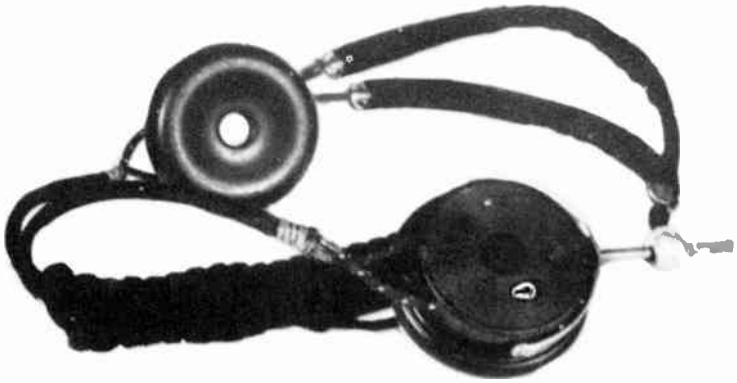
Low Ohm telephone receivers were the first used with radio receivers. The coherer was usually used with a tape printer. With the coming of self-restoring detectors it was found that receivers with higher Ohm-ratings were needed. Early 1,000 Ohm receivers usually appeared as a single unit, soon followed by double headsets. Some of the early makes were: Holtzer-Cabot, Brownies, Mesco, Brandies, Baldwin and Western Electric.

Murdock "55" receivers were sold by the thousands at $5.00; they were a good reliable unit. Brandies were popular at $10.00. Baldwin headsets were made with mica diaphrams and gave more volume than others; the makers claimed they were equal to an extra stage of audio amplification, and sold for $16.50.

During the 1920s other common makes were: Kellogg, Frost, Kennedy, Stromberg-Carlson, Federal and Red Head.

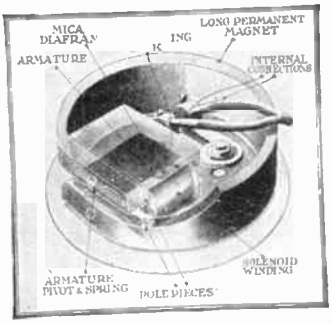


Holtzer-Cabot.



Mesco.

This illustration shows the amplifying mechanism in a Baldwin unit. Note that four pole pieces of single solenoid act on the armature, which in turn connects with the super-sensitive mica diaphragm.



Type "C" Navy standard	$16.50
Type "E" Super-sensitive	20.00
Type "F" light weight	21.00
Units for loud speakers	
Type "C"	$8.50
Type "E"	10.00

1922

Equal to two stages of radio amplification

THE experience of leading radio operators—who have found Baldy Phones "equal to two stages of radio amplification"—clearly indicates the outstanding advantages of using good phones. From a standpoint of radio efficiency, you will get "more value per dollar" from your investment in Baldwin Amplifying Phones than from any other item of your equipment.

Here are the actual (un-asked-for) letters from experienced radio men, telling of their results with Baldys. They're worth careful reading!

"Have used a pair of Type 'C' Baldys for some time, in naval communication and commercial service. Consider them the most sensitive telephone on the market." (Name on request.)

"I faithfully believe the use of Baldwin Phones will improve any receiving set at least 50%." (Name on request.)

"Have found your Baldwin Telephones equal to one and two stages of radio amplification." (Name on request.)

"In our station it is a common occurence to place the receivers (Baldys) on the table and copy in daylight the long undampt wave stations with but one V.T." (Name on request.)

"Equal to one and two stages of radio amplification": Of course Baldys cost more—but where can you get better value? Where else can you buy amplification equal to the super-sensitive Baldwin mechanism for so little?

And the more limited your investment in radio must be, that much more important becomes the use of a super-sensitive and selective Baldwin head set!

The best radio dealer in your town undoubtedly has a supply of booklets explaining the superior construction of Baldwin Phones, Eldredge Meters, and other Firth Specialties. If he does lack a supply, write, mentioning his name and address, direct to

JOHN FIRTH & CO. Inc., 18 Broadway, New York

Distributors for

Baldwin Phones
Eldredge Meters
Kolster Decremeter
U. S. Bureau of Standards Wavemeter
Brownie Adjustable Phones

Dealers: Write for advance information on new popular-priced loud speaker

BALDY FOR LAND SEA AND IN THE AIR PHONES

WIRELESS HEADSETS

BALDWIN RECEIVERS
PATENTED MAY 1910
FIBER DIAPHRAGMS
TYPE C $16.50

BALDWIN RECEIVERS
ALUMINUM DIAPHRAGMS
TYPE G $20.00

MURDOCK 55
1913 $4.50

WESTERN ELECTRICS
2200 OHMS 1919
$20.00

BALDWIN RECEIVERS
MICA DIAPHRAGMS
TYPE C $16.50

MURDOCK 56

THE PRICES ARE REMARKABLY LOW
THE QUALITY IS UNUSUALLY HIGH

MURDOCK No. 55

2000 OHM COMPLETE DOUBLE SET $4.50

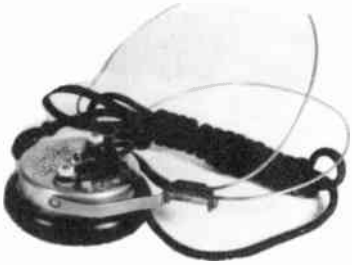
3000 OHM COMPLETE DOUBLE SET $5.50

REAL RADIO RECEIVERS

capable of record reception of signals when used with sensitive detecting apparatus. From the time of their introduction seven years ago to the present, they have earned a deserved reputation for unusual sensitiveness and long-lived dependability. The thousands of sets now in everyday service all over the world are evidences of the esteem which they have won. The unprecedented present demand for "MURDOCK 55'S" is conclusive proof that their wonderful value *cannot be duplicated* anywhere.

RADIO & WIRELESS HEADSETS

KENNEDY
$6.00



EISEMANN
$3.50

FROST
$5.00

BRANDES SUPERIOR
ABOUT 1916 $7.00

WATCH CASE RECEIVER
75 OHMS ABOUT 1914
$.60

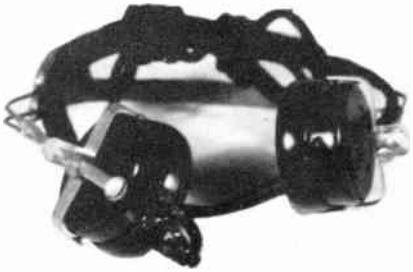
SAMPSON WATCH CASE
RECEIVER
HAND MADE PHONE TIPS
ABOUT 1912

HEAD PHONES

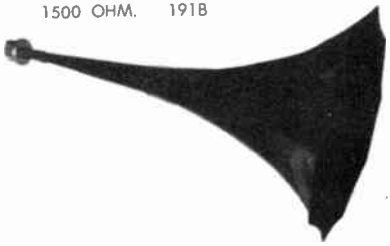
MESCO HEADSET
MANHATTAN ELEC. SUPPLY
SP $6.50 1916

KILBOURNE & CLARK
HEAD SET
1919

WESTERN ELECTRIC
HEAD SET
1500 OHM. 191B



KELLOGG HEADSET 2400 OHM
SP $12.00 1921



DEFOREST LOUD SPEAKER
1922

AMPLIFIERS AND TRANSFORMERS

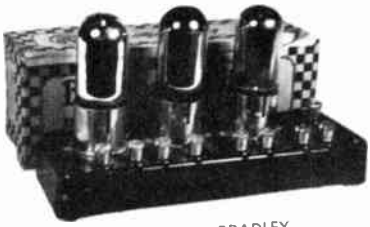
By 1921 one-tube and crystal sets were thought to be not loud enough for the whole family. Crystal sets could be amplified without tubes by use of an amplifier consising of a receiver directly coupled to a carbon mike, the output of which would operate a loudspeaker.

The audio, or tube amplifier, developed by W. H. Priess and L. L. Israel of Wireless Specialties Co. in 1917 was in use after the war. In 1919 the Federal Tel. & Tel. Co. put on the market the famous 226W transformer, the first to be offered to the amateur and experimenter. Before this time two tube amplifiers were available in complete form at about $65.00 with tubes. By 1924 there were many transformers on the market with step-up ratios of 1:2 to 1:12, all claiming to be the best. By this date the technique of biasing the amplifier tube was in use, this not only saving the "B" battery but improving the quality.

The cheapest way to build an amplifier was to use the simple Loftin-White circuit, which with proper bias worked well. Two stages of transformer-coupled audio were all that could be used unless they were cascaded by using 45 V. on the first stage and 90 V. on the second and 135 V. on the third and biasing each stage correctly. The resistance-coupled amplifier next came on the market and was a decided improvement.

Radio frequency transformers came in use about 1922; both air and iron core were made, and tuned from 200 to 600 meters. Iron core I.F. transformers came in ranges from 45 KC to 75 KC and were used for long wave R.F. and I.F. in superhetrodyne sets. The radio frequency transformer made posible the use of a loop antenna and stopped radiation from a regenerative receiver.

AMPLIFIERS USED IN THE 1920s

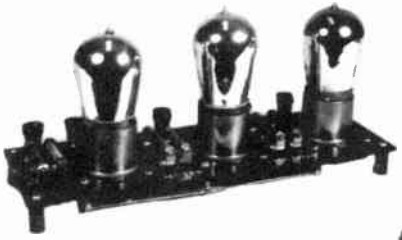


ALLEN BRADLEY
3 STAGE RES. COUP.
WITH TUBES $26.00

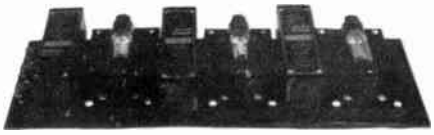
SONOTRON AUDIO AMP.
3 STAGE RES. COUP.
WITH TUBES $21.00

DAVEN AUDIO AMP.
RES. COUPLED
WITH TUBES $24.00

SAMPSON

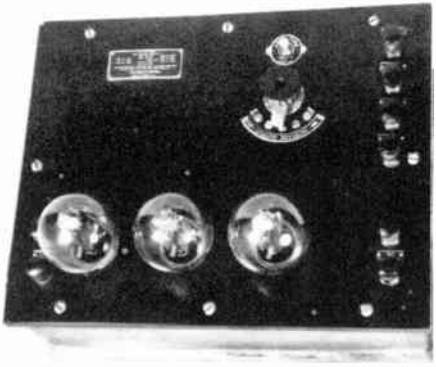


MUTER
RES. COUP. AUDIO
AMPLIFIER
WITH TUBES $21.00



RADIO INST. CO.
R.F. AMPLIFIER
USING MEYERS TUBES

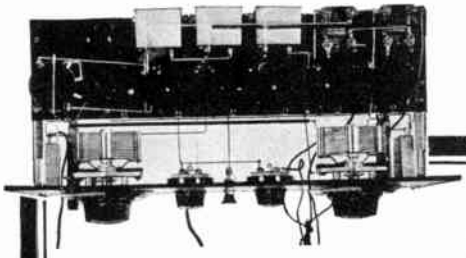
MAGNAVOX
2 STAGE AUDIO
AMPLIFIER



WESTERN ELECTRIC
7-A AMPLIFIER WITH
216-A TUBES

WESTERN ELECTRIC
25B AUDIO
AMPLIFIER

SUPER SM PARTS



The set at the left is a model of the Super-Autodyne, built by a radio fan and using the famous Silver-Marshall Straight-line wavelength condensers, Intermediate transformers and 101B coupling unit.

Recommended for Super-Autodyne!

The "Super-Autodyne" receiver described in this issue of the Citizens' Radio Call Book has been tested and approved by leading authorities everywhere. It has been endorsed by such prominent publications as "Radio Broadcast," "Radio Age," "Radio Engineering," "On the Air," "Radio," "Christian Science Monitor," and others.

In every instance the remarkable results attained by fans who have built this unique six-tube receiver have been attributed to the use of Silver-Marshall parts, including the new silver-plated Straight-line-wavelength condensers, the bakelite cased intermediate transformers, and the S-M Coupling Unit. Such wholehearted approval can be merited only by actual performance.

SILVER—MARSHALL, Inc.

110C So. Wabash Ave. Chicago, Ill.

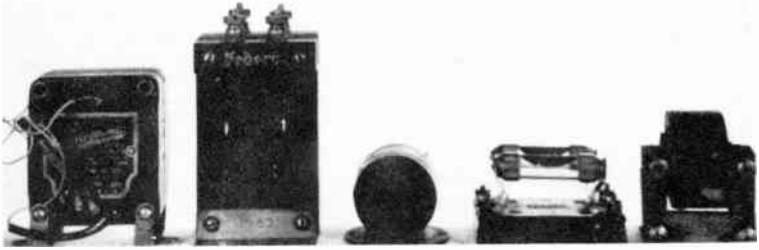
EARLY TRANSFORMERS

BRITISH INTERVALVE
AMPLIFING TRANSFORMER
1919

FEDERAL 226 W
3 TO 1
1918 $7.00

DEFOREST
TYPE A200
1919 $7.50

DEFOREST
3 TO 1
$6.00



NA-ALD
TRU-PHONIC
$5.00

FEDERAL TEL. & TEL.

FEDERAL 65

HEDGE HOG
3 TO 1
$3.00

DAVEN
RESISTOR COUPLED
AMPLIFIER UNIT
$3.00

PACENT TYPE 25
4 TO 1
$4.50

EARLY TRANSFORMERS

ACME
LONG WAVE 30 KC
INTERMEDIATE TRANS. $5.00

ATWATER KENT LR.
RADIO FREQ.
150 TO 500 METERS
$5.00

RECEPTRAD
INTERMEDIATE FREQ.
25,000 METERS
$5.00

RCA UV 1714
LONG WAVE 200 TO 5000
METERS
MADE BY GENERAL ELEC. $6.00

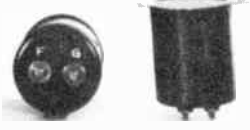
REMLER 600
INTERMEDIATE FREQ.
100 TO 15 KC
$6.00

REMLER 610
INTERMEDIATE FREQ.
40 TO 50 KC
$6.00

SILVER MARSHALL
TYPE 211
LONG WAVE 50 TO 70 KC
AIR CORE $6.00

ERLA
REFLEX 1
200 TO 700
METERS $5.00

ERLA
SELECTOFORMER
200 TO 700
METERS



ERLA
REFLEX 2
200 TO 700
METERS $5.00

ERLA
REFLEX 1
TUBE SOCKET MOUNTING
200 TO 700 M $5.00

EARLY TRANSFORMERS

RAULAND
ALL AMERICAN LONG WAVE
IRON CORE 30 TO 75 KC
$6.00

GENERAL RADIO
TYPE 271
LONG WAVE 30 KC
$5.00

ARMY SALES
LONG WAVE IRON CORE

DX 1 C3
RADIO FREQUENCY
170 TO 450 METERS
RADIO INST. CO. $6.00

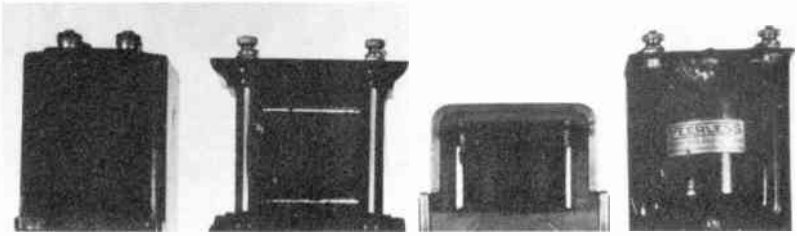
FEDERAL NO. 30
RADIO FREQUENCY
275 TO 600 METERS
1921 $6.00

DUBILIER DURATRAN
RADIO FREQUENCY
225 TO 550 METERS

ACME R2
200 TO 700
METERS
RADIO FREQUENCY
$5.00

MURAD T11
RADIO FREQUENCY
150 TO 500
METERS $5.00

EARLY TRANSFORMERS

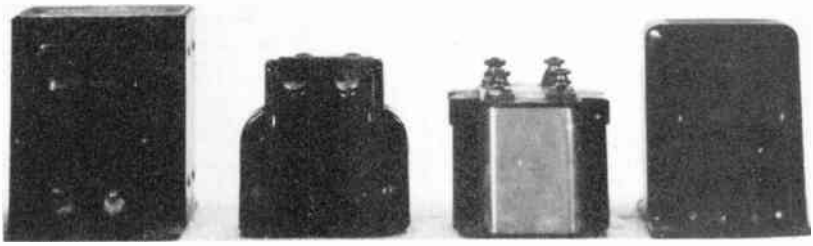


FADA
3 TO 1
$6.00

SPLITDORF
3½ TO 1
$6.00

CHELSEA
3½ TO 1
$6.50

PEERLESS
4½ TO 1
$6.00



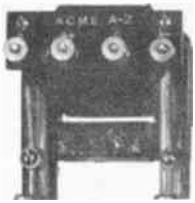
RAULAND 21
ALL AMERICAN
5 TO 1
$4.75

SAMPSON
3 TO 1
$5.00

JEFFERSON CONCERT
3 TO 1
$7.00

THORDARSON
6 TO 1
$4.50

EARLY TRANSFORMERS

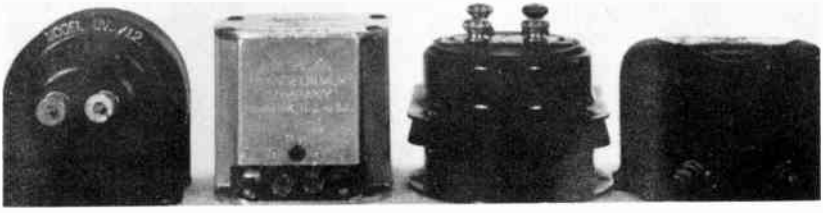


ACME A2
4.25-1 RATIO
1922 S.P. $5.00

ACME A 5
12 RATIOS
2½-1 11.5-1
$7.00

GENERAL RADIO
TYPE 231 A
$6.00

GENERAL RADIO
TYPE 361
$7.00



RADIO CORPORATION
UV 712
MADE BY G. E. $6.50

ATWATER KENT
3 TO 1
$6.50

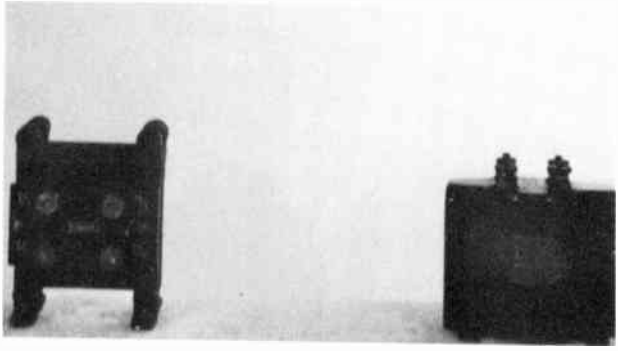
AMERTRAN 41
5 TO 1
$4.75

PRECISE 450
3½ TO 1
$6.50

EARLY TRANSFORMERS

STROMBERG CARLSON
SPEAKER FILTER
#10A

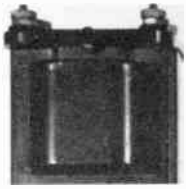
STROMBERG CARLSON
3½ TO 1
$4.50



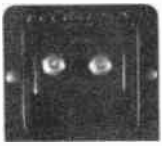
DONGAR
2 TO 1
$4.50

ERLA
3½ TO 1
$5.00

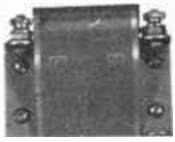
EARLY TRANSFORMERS



KELLOGG
3 TO 1
$5.00

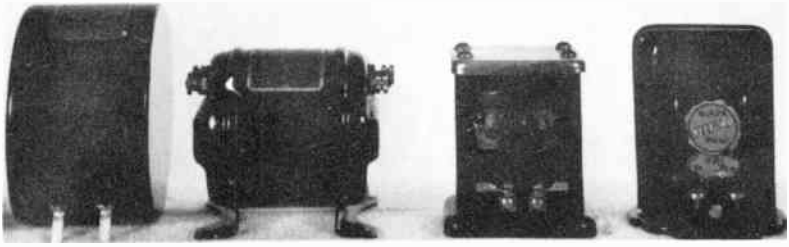


JEFFERSON STAR
6 TO 1
$3.75



CHASLYN 41
4 TO 1
$6.00

REPUBLIC
2 TO 1
$5.00



KARAS
TYPE 26
$6.00

KARAS HARMONIC
$7.00

STERLING
3 TO 1
$5.00

KELFORD
3 TO 1
$5.00

EARLY TRANSFORMERS

JEFFERSON #150
LONG WAVE
$5.00

BRANSTON R 91
INTERMEDIATE FREQ.
$6.00

RAULAND R 10
ALL AMERICAN
150 TO 550 METERS
$4.50

SANGAMO TYPE 60
LONG WAVE IRON CORE
$5.00

SAMPSON HW-R1
INTERMEDIATE FREQ.
5000 METERS $6.00

FORD
RADIO FREQUENCY
180 TO 575 METERS
MOORE & MARMADUKE

LOUDSPEAKERS

By 1921 the broadcasting stations were increasing in number and the radio receiver was entering the home everywhere; kits and parts were easily available. One tube sets and crystal sets were most common, and to allow the whole family to hear the headset was often put in a wooden bowl or cardboard box to increase the volume. The first loudspeakers were horns with arms to accept the standard headset receiver.

Magnavox brought out a speaker with a six volt field which gave much better volume, and units appeared that enabled the homeowner to use his phonograph horn as a loudspeaker. Broadcast stations were then transmitting signals that were heard as 200 to 2500 cycles/sec audio, so speakers did not need to be elaborate; when broadcast quality became better so did the loudspeakers. They were commonly made of pulp, hard rubber and wood. By 1924 wooden box and cone speakers were in use.

Western Electric came out with their cone speakers in three sizes: 18", 24" and a 36" that hung on the wall. Prices ran from $35.00 up to $60.00. The Baldwin unit was used in many of the speakers; the same firm made a unit designed to attach to the sounding bard of a piano. Baldwin also made their own horn speaker.

Magnetic speakers soon appeared, and were able to handle more audio and take higher plate voltages. 1926 brought the RCA 104 dynamic with voice coil; these were tops in their day.

LOUD SPEAKERS

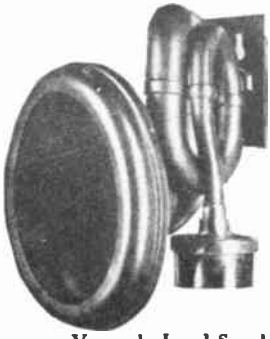
ATWATER KENT
TYPE-H
1924 $22.50

ARKAY
MADE FROM AUTO HORN
1921 $5.00

BRANDES TABLE TALKER
1924 $15.00

UTAH
1924 $18.00

THOROLA JR.
1924 $25.00



Vocarola Loud Speaker
1922 30.00

MANHATTAN
1924 $15.00

LOUD SPEAKERS

TRUTONE
1922 $15.00

MADERA
CLEAR-TONE
1923 $17.50

WESTERN ELECTRIC
1921 $30.00

SADLER
1922 $8.00

FEDERAL PLEIOPHONE
1921 $14.00

DICTOGRAPH
1921

WESTERN ELECTRIC
SHAWPHONE
1922 $10.00

What matters bad weather when Radio entertains?

RADIO'S "every-hour-every-where" broadcast schedule is the most stupendous organization of the means of entertainment the world has ever witnessed.

The Magnavox Co., Oakland, California
New York: 370 Seventh Avenue

MAGNAVOX
Radio
The Reproducer Supreme

MAGNAVOX LOUD SPEAKERS

MAGNAVOX R-3
1924 S.P. $35.00

MAGNAVOX TELEMEGAFONE
PUBLIC ADDRESS SET
1920 S.P. $150.00

MAGNAVOX TELEMEGAFONE
TS-2 1921 18" BELL
$93.00

MAGNAVOX 1923
14" BELL $45.00

MAGNAVOX M-4
1924 $25.00

LOUD SPEAKERS

BALDWIN
1924 $30.00

ROLA
1923 $25.00

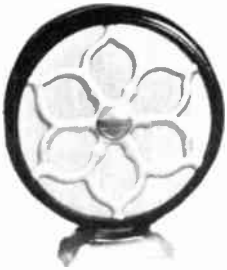
DICTOGRAPH
1922 $20.00

THOMPSON
1924 $35.00

CHANSON REPRODUCER
1925 $25.00

LOUD SPEAKERS

ATWATER KENT
1926 $20.00



ATWATER KENT
1927 $25.00

CROSLEY DYNACONE
1927 $22.50

THOROLA
1927 $25.00

OVENSHIRE
1925 $32.50

THOROLA
1927 $30.00

WESTERN ELECTRIC
24" 1927

STROMBERG-CARLSON
24" FLOOR MODEL
1927 $65.00

RADIO CORPORATION OF AMERICA
LOUD SPEAKERS

RADIOLA 103
1927 $35.00

RADIOLA 100
1925 $35.00

RADIOLA UZ-1320
1923 $36.50

RADIOLA 100A
1926 $30.00

RADIOLA UZ-1325
1923 $25.00

LOUD SPEAKERS

ACME DOUBLE CONE
1926 $35.00

MAGNAVOX CM-4

LOUD SPEAKER UNITS' PHONOGRAPH ATTACHMENTS 1922 TO 1926

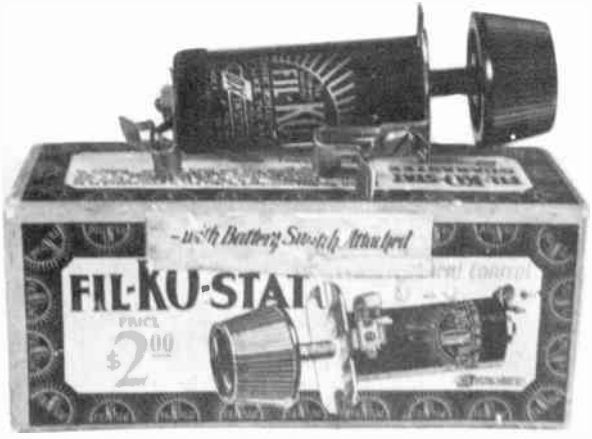
RHEOSTATS AND POTENTIOMETERS

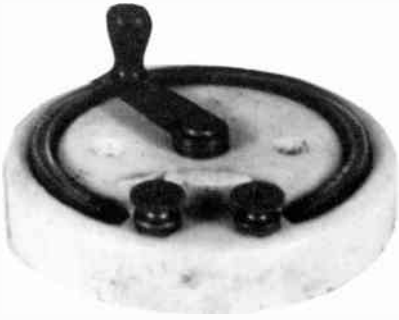
Potetniometers came into use in the earliest wireless days. They were used with electrolytic detectors and carborundum and other mineral detectors. They came back in use again during the 1920s as "loosers" or a means of preventing regeneration in R.F. amplifiers, also as bias controls in the reflex sets.

In 1908 rheostats were used to control filament voltage; they had naturally been in use for many years in other fields. Most common early radio rheostat was a coil of resistance wire mounted on a porcelain base, and they were sometimes mounted on the outside of the set's panel. By 1917 rheostats were made in a variety of ohm-ratings as required by the tubes used.

Regenerative detectors using soft tubes needed a fine adjustment on the filament; rheostats for the purpose were made with double shafts, the center control knob operating on just one turn of resistance wire. The smoothest, which would vary the emf by a fraction of a volt, were made of carbon discs or powder; resistance was secured by compressing the carbon. The Bradleystat was made for small transmitting tubes.

When it was found that the filament voltage on amplifier tubes was not too critical fixed resistors were used; some were just small wire-wound ones to be put on the tube socket, others were made to fit in a holder like a fuse. They came in different values for different tubes, some incorporating a fuse to protect the filament from burning out.





RHEOSTATS AND POTENTIOMTERS

STERLING
50 OHM RHEO.

BRADLEYSTAT
GRAPHITE CONTROL

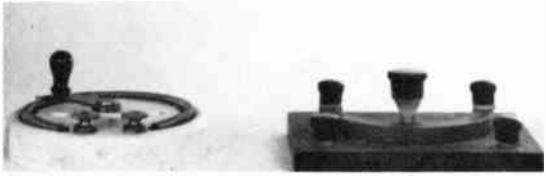
FEDERAL 18
RHEOSTAT

YAXLEY PONT.
40 OHM

DE JUR
20 OHM RHEO.

HOWARD RHEO
WITH VERNIER

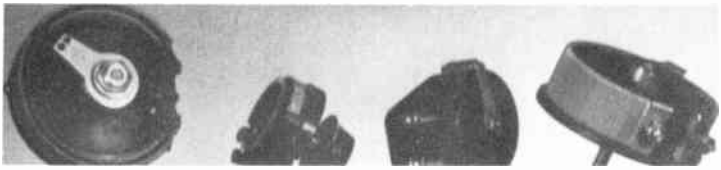
FILKOSTAT
SMOOTH CONTROL



RHEOSTAT
PARKEN 1914

POTENTIOMETER
GRAPHITE
ABOUT 1914

RHEOSTATS AND POTENTIOMETERS



WIRELESS SHOP LOS ANGELES POWER RHEO.

ELECTRAD POTENTIOMETER

VERNIER CONTROL NO. 24

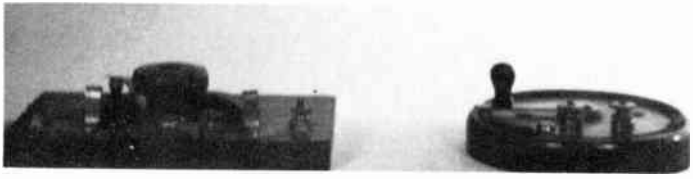
GENERAL RADIO #216 RHEO.

CLAROSTAT UNI. CONTROL

AMSCO POTENTIOMETER

FRAMINGHAM 300 OHM POTENTIOMETER

CANTER JR. RHEO.



POTENTIOMETER GRAPHITE ABOUT 1916

BUNNELL RHEO. ABOUT 1916

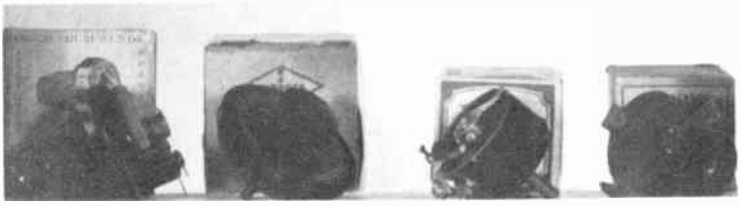
RHEOSTATS AND POTENTIOMETERS

FROST
GEM RHEO.
6 OHM

YAXLEY 6 OHM
RHEOSTAT

DeFOREST
20 OH RHEO.

FADA
120A RHEO.



AMSCO
POTEN. RHEOSTAT
ADAMS MORGAN

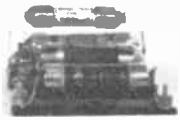
MURDOCE
MODEL 560
RHEOSTAT

GENERAL RADIO
301 POTEN.
200 OHM

JENKINS
VERNIER RHEO.

RCA 536
POTENTIOMETER

RCA 539
POWER RHEO.



MICROPHONES

Telephones were used as microphones in the early days, but the single button carbon unit was not good enough for music and singing. The simple carbon mike operated by variations of pressure on the carbon granules, varying the current. A double-button carbon mike was designed that still gave a carbon "hiss" and had to be mounted on springs to prevent vibration, but this did produce a somewhat better response.

The condenser microphone was then developed, operating on the principal that varying the space in a small condenser altered the voltage pressure. Condenser mikes used gold plated backs with Dural diaphrams; nitrogen gas was sealed in the unit. These had a low output and were subject to heat and cold; they required a preamplifier. There were many circuit problems, but frequency response was excellent, 40 to 10,000 CPS. They were made by Western Electric, Remler, American and others.

Velocity or ribbon microphones were developed, and proved to be unaffected by temperature changes and hum from R.F. fields. They required a preamplifier and an output transformer to match the amplifier input, but had good frequency response. They were bad for close-up talking. They operated on the principal that a moving conductor in a magnetic field induces a current in the conductor.

Crystal mikes appeared in two types: the grill and diaphragm. They functioned on the piezoelectric properties of Rochelle salts; i.e., when a dielectric material in a condenser changes its density the capacity change generates an A.C. voltage. Crystal mikes have excellent response, second only to the diaphragm type. They did not need a preamplifier, and up to 100 feet of mike cable could be used. Only drawback was high temperatures that destroyed the crystals.

Universal "Baby" microphone.

MICROPHONES USED IN THE 1920s

AMERICAN
CONDENSER MIKE
WITH PRE-AMP.
$100.00

WESTERN ELECTRIC
SINGLE BUTTON
WITH STAND

UNIVERSAL
SINGLE BUTTON
WITH STAND

MAGNAVOX
LOUD SPEAKING
TRANSMITTER

WESTERN ELECTRIC
DOUBLE BUTTON
WITH CASE

AMERICAN
DOUBLE BUTTON

UNIVERSAL
BABY MIKE

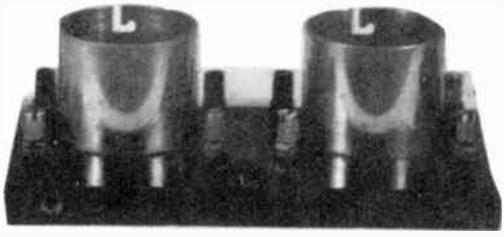
WESTERN ELECTRIC
HAND MICROPHONE

SOCKETS AND ADAPTORS

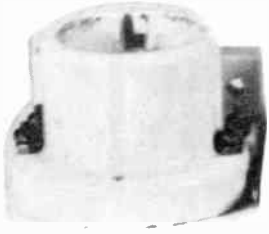
Tube sockets were used from about 1910; first types were the screw base and the Ediswan. Then came the candelabra for the early DeForest tubes. Western Electric made a cast brass socket for their first tubes. Then came molded and porcelain sockets with metal barrels. The hard detector tubes and the 199 tubes were very microphonic so a vibration proof socket was made for them.

The WD-11 tube required a special socket so that it could not be plugged into any other socket; it had a one volt filament. Transmitting sockets were much heavier and well insulated. The Radiotron 204 used a special socket as did the W.E.-212D; another special socket allowed the use of either the VT-2 or 216A tubes.

Adaptors became necessary as more tubes came on the market; the most common were used to change from storage battery to dry cell tubes. For a number of years an endless variety of adaptors appeared on the market.



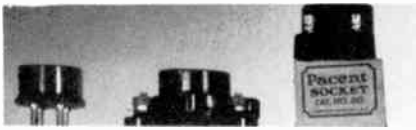
Two gang Fada.



Silver contact, General Instrument Co.

Candelabra socket, DeForest audion tube.

SOCKETS AND ADAPTERS



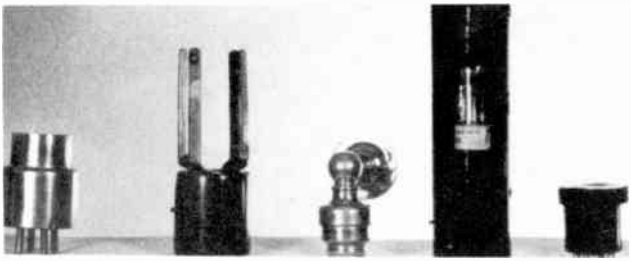
PILOT SHOCK ABSORBER 01A $1.00

BENJAMIN SHOCK ABSORBER 01A $1.00

PAGENT 199 NO. 80 $.75

FRONT 01A $.50

BENJAMIN SHOCK ABSORBER 199 $1.00



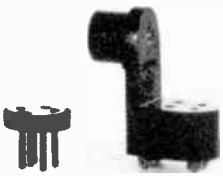
DEFOREST ADAPTOR FOR DV3A TO 01A

RADIOTRON ADAPTER TO STD. SOCKET 1917

DEFOREST SOCKET FOR ROUND AUDION 1913

MEYERS TUBE ADAPTOR FOR 01A SOCKET

WD 11 ADAPTOR TO 01A 1923



PILOT 01A SOCKET

NA-ALD UX TYPE TO UV

NA-ALD UX TO WD11

RCA UR 556 UX TYPE TO UV

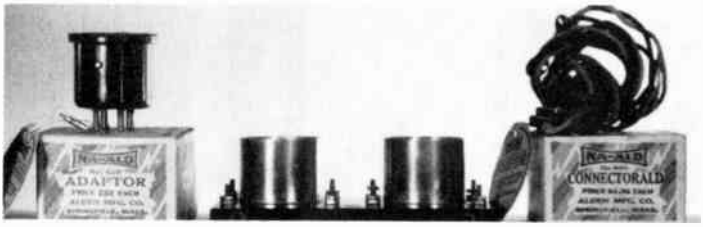
SOCKETS AND ADAPTERS

MIRRA
METAL SHELL
$1.25

CROSLEY
PANEL MOUNT
$.60

CROSLEY
CERAMIC PANEL MOUNT
$1.00

SE-AR-DE
PANEL MOUNT
$1.00



NA-ALD
199 TO 01A
$.75

FADA
TWO GANG
$1.75

NA-ALD
199 TO 120
POWER TUBE $1.25

KELLOGG
01A TYPE
$1.00

BELL
199 $.75

PACENT
199 TO 01A
$.60

ADAPTER
WESTERN ELECTRIC 216A
TO UX01A TYPE

LYNCH
MODEL RF
TWO TUBE $1.50

SOCKETS AND ADAPTERS

BIRNBACH
TRANSMITTING

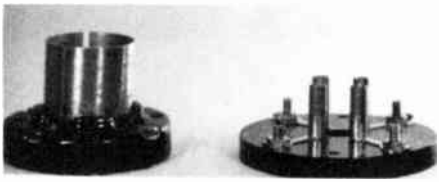
50 WATT
TRANS FOR 203

GENERAL ELECTRIC
50 WATT

FLEWELLING
5 WATT
$1.00

RADIO ELEC. LAB.
250 WATT 204
$2.00

GENERAL INSTR.
CORP.
SILVER CONTACTS

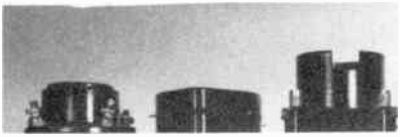


RCA UR 542
5 WATT TRANS.
$1.00

R. E. L.
50 WATT TRANS.
$2.00

E. T. L.
50 WATT TRANS.
MADE IN LOS ANGELES

SOCKETS AND ADAPTERS



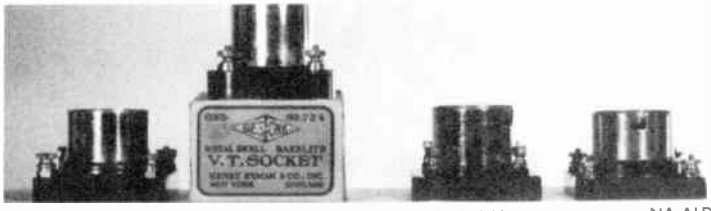
NA-ALD
199 TYPE
$.60

SHOCK PROOF
TYPE 131A
$1.00

BREMER-TULLY
SELF LOCKING
01A TYPE $1.00

ERLA
METAL SHELL
199 $1.00

KELFORD
01A TYPE ABSORBER
$1.00



ERLA
METAL SHELL
01A TYPE $1.25

BESTFORM
METAL SHELL
$1.25

GILFILLAN
METAL SHELL
01A TYPE $1.25

NA-ALD
METAL SHELL
01A TYPE $1.25

PILOT
SHOCK ABSORBER

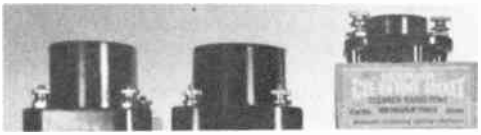
GENERAL RADIO
TYPE 349
$.75

ATWATER KENT
WD 11 SOCKET
$1.25

SILVER MARSHALL
01A TYPE 511
$.60

SILVER MARSHALL
01A TYPE

SOCKETS AND ADAPTERS



MAZDA RADIO
SPC. CONTACTS
$1.00

DEFOREST
STD. BASE AUDION
$1.00

BENZAMIN
TYPE 8646
$1.00

COLIN B. KENNEDY
SPC.MOUNTING
1920 $1.00

FEDERAL
01A TYPE
$1.25

PARAGON 01A
ADAMS MORGAN
1919 $1.25

GENERAL RADIO
TYPE 156
$.75

KK
01A TYPE
$.75

PILOT
01A TYPE
$.75

WESTERN ELECTRIC
FOR 215 A "N"
1919 $1.00

EBY
01A TYPE
$.70

REMLER
TYPE 399
199 $1.00

REMLER
TYPE 50
01A $.75

BATTERIES–BATTERY ELIMINATORS–CHARGERS

Among interesting early batteries used in wireless were liquid cells. The Lalande cell used caustic soda for the electrolyte with plates of cupric oxide and zinc. The michromate, or punger, battery used an acid solution and two carbon plates with a zinc plate that was plunged into the solution to put the cells into use.

When the storage battery entered the home the problem of its proper care was not understood. The batteries spilled acid, ate holes in the rug, the terminals corroded and reception became noisy, the fumes gave the home a bad odor. Storage batteries were expensive and needed frequent recharging; battery charging stations in many cities would pick up a battery and recharge it for a dollar or leave a rental battery for 25c a day.

The "B" dry batteries were also expensive, a 90 volt set costing $10.00 and lasting about three months; a five tube set usually cost about $5.00 a month for upkeep. When "C" batteries appeared the "B" battery's life was more than doubled and the "C" lasted a year. Wet "B" batteries became available at some cost, but cut the cost of receiver operation. The Edison wet cells were best as they used a potash solution and were easy to recharge.

Those who could spend up to $125.00 for an "A" and "B" eliminator had the problem solved; all that was needed was a little water and care. The "A" eliminator was a wet storage battery with a trickle charger that operated when the battery wasn't in use. The dry "B" eliminator used a Raytheon cold cathode rectifier and produced 22½, 45 and 135 volts with no attention needed.

"A" and "B" wet cells.

EDISON B BATTERIES & CHARGER
1924 $42.00

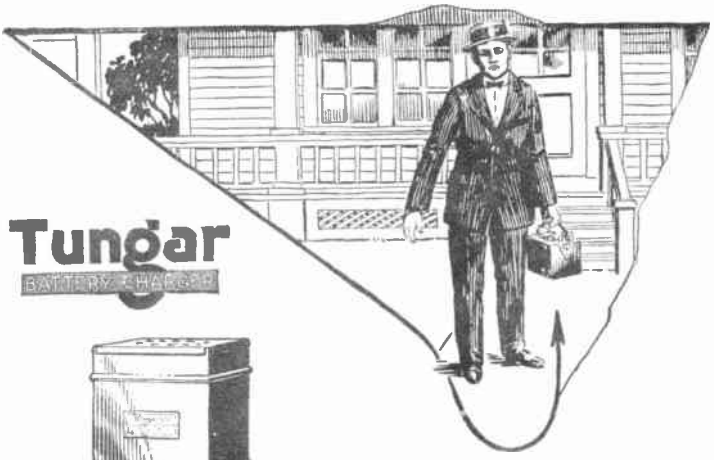
BICHROMATE BATTERY
PLUNGER TYPE
ABOUT 1900

B & C BATTERIES
1920s

WET B AND A
BAT. CELLS
1920s

HYDROMETER

BATTERY CONDITION
TESTER



Tungar Battery Charger—keeps your battery at home. Also, with simple attachment, charges "B" storage batteries.

This is the way "B" Storage Batteries are charged with Tungar and attachment.

March, 1923

No Need of Doing This

Is yours a tube set?

Yes? Then you have a storage battery which frequently requires recharging.

Do you carry it to a charging station, wait three or four days, pay from 75 cents to a couple of dollars and then lug it home again? You don't need to.

A Tungar Battery Charger enables you to recharge your storage batteries for either radio or automobile use right at home—easily, quickly and at little expense. It operates from any a-c. lighting circuit.

Any one can operate a Tungar. Once started, it requires no attention; nor is there the slightest danger of injuring the battery.

The initial cost is low; the operating cost is little. Send for our new booklet on Tungar for radio, if your dealer cannot supply you. Address Merchandise Dept., General Electric Company, Bridgeport, Conn.

General Electric Company

General Office Schenectady, N.Y.

Sales Offices in all large cities

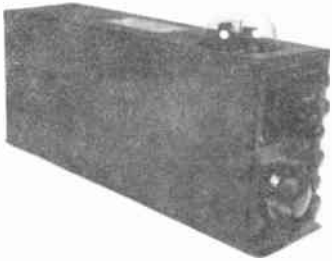
35A-79C

"A" AND "B" ELIMNIATORS
BATTERY CHARGERS

ATWATER KENT
"A" AND "B"
ELIMINATOR

MARATHON
"B"
ELIMINATOR

YAXLEY AUTOMATIC
CHARGER CONTROL

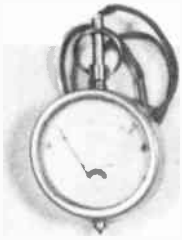


SILVER MARSHALL
"B" ELIMINATOR

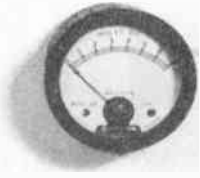
TODD "B" BATTERY
CHARGER

TWIN-BULB
BATTERY CHARGER

WATCH CASE BATTERY METERS
1915 TO 1920



METERS
1920 TO 1925

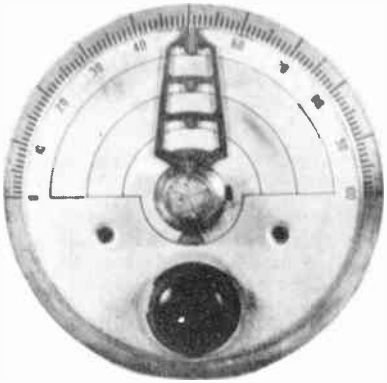


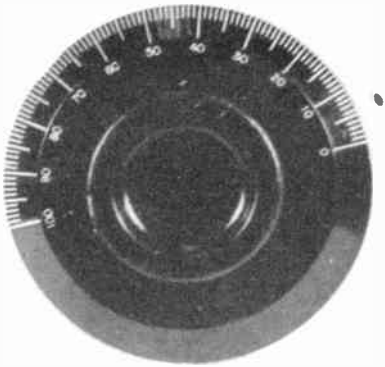
DIALS

About 1915, with the Armstrong circuit in use, radio receiver manufacturers began to change from single pieces of equipment hooked together on a board to sets built in a cabinet. Good variable condsensers were on the market, which brought a need for dials.

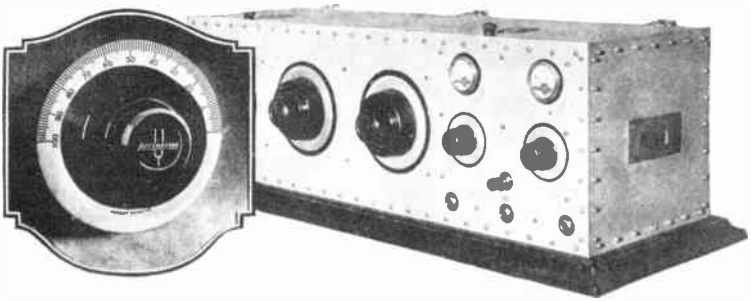
Early ones were made of hard rubber, Bakelite and metal and were usually graduated from 0 to 100. Dials made logging stations easy, and naturally facilitated tuning. As the number of stations increased finer tuning was necessary, so vernier dials were produced. Some used gears; others friction drive. Some variable condensers used a double knob, with the center knob tuning a single plate for fine tuning.

By 1925, with the three-dial set the most common, ganging the condensers was standard to make tuning easier. This brought about dials placed behind the panel, as they still are today.





Geared 80-1 Ratio



Preferred by Radio Experts

Commercial operators, men who know tuning efficiency, use Accuratune Micrometer Controls.

L. M. Cockaday, Arthur Lynch, R. E. Lacault, technical editors of the three leading radio publications, use and recommend Accuratunes for best tuning results to their thousands of readers.

Accuratunes are actual Micrometer Controls, geared 80 to 1 ratio for infinite tuning precision. More efficient than built-in verniers or any other tuning device. An absolute necessity on Super-Heterodynes and other Receivers requiring unusually close tuning.

Pioneer Manufacturers of quality vernier devices

Radio Ltd., Montreal, Canadian Representatives

Accuratune Micrometer Controls give you greater distance, greater selectivity, greater volume. Well worth their price of $3.50.

At your dealers, otherwise send purchase price and you will be supplied postpaid. *1923*

★ **ACCURATUNE**

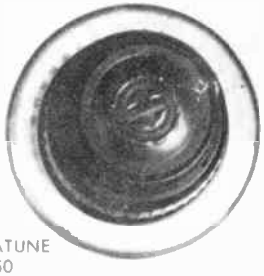
80-1

MICROMETER CONTROLS

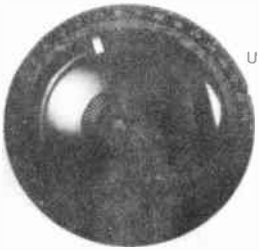
MYDAR RADIO CO., 9-D CAMPBELL ST., NEWARK, N. J

DIALS

GISCHOW
$3.50

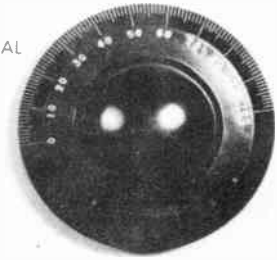


ACCURATUNE
$3.50



UNIVERNER
$3.00

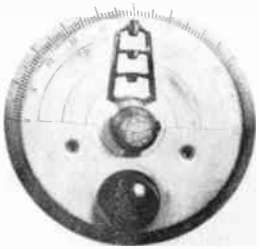
NATIONAL
$1.75



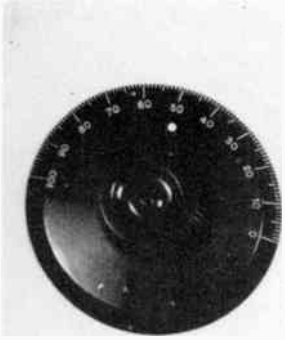
MARCO
$.75

APEX
$1.50

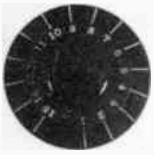
REL
$1.50



DIALS

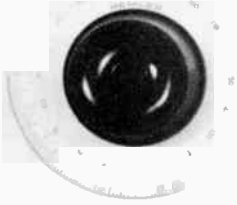


RADION
AMER. HARD
RUBBER CO. $1.25

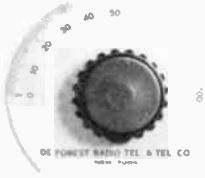


GILFILLAN BROS.
$.60

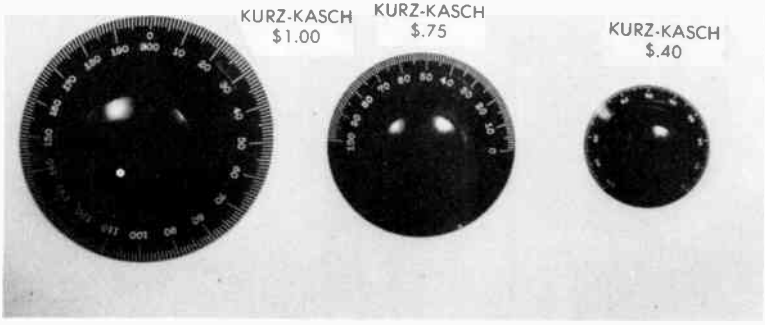
ATWATER KENT
$1.00



REMLER
$1.00



DEFOREST
$1.25



KURZ-KASCH
$1.00

KURZ-KASCH
$.75

KURZ-KASCH
$.40

DIALS

BUTLER
$1.50

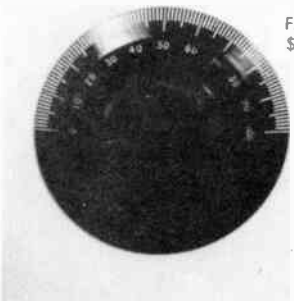
ATWATER KENT
$1.00

VISCO.
$.50

GEN. RADIO
$1.50

KING
$.90

GILFILLAN BROS.
2.50



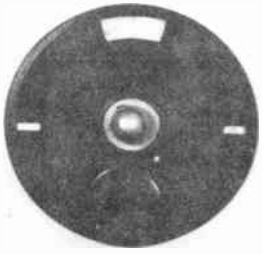
FADA
$1.00

ALLEN DIAL
VERNIER $1.50

DIALS

KURZ-KASCH
VERNIER
$2.00

NATIONAL
VERNIER
$2 50



MARCO
$1 25

ACCURATUNE
VERNIER
$2 00

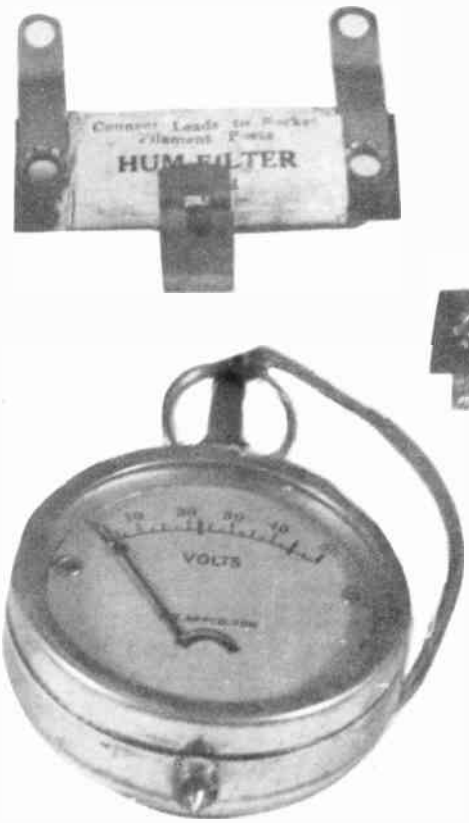
PILOT
$1.50

PARTS KITS AND SERVICING

In 1905 the E. I. Company put transmitter and receiver parts on the open market. When receivers became fairly common in homes across the country many parts were offered to improve the set. Antenna eliminators designed to plug into the A.C. outlet, howl eliminators (metal caps for the tubes), variable grid leaks and condensers, phone plugs, vernier dial tuners to eliminate hand capacity effect, wave traps and lightning arrestors were all offered the home set owner.

An item that sold by the thousands was the "hum eliminator" which made possible the use of A.C. on D.C. filaments; it was a center-tapped 20 ohm resistor to hook across the filaments, with the center tap grounded. Phone jacks incorporating a switch to shut off the radio's stage not in use were sold. Vivration proof sockets were offered as replacements for the original. Many varieties of outdoor antenna kits were offered at about $5.00.

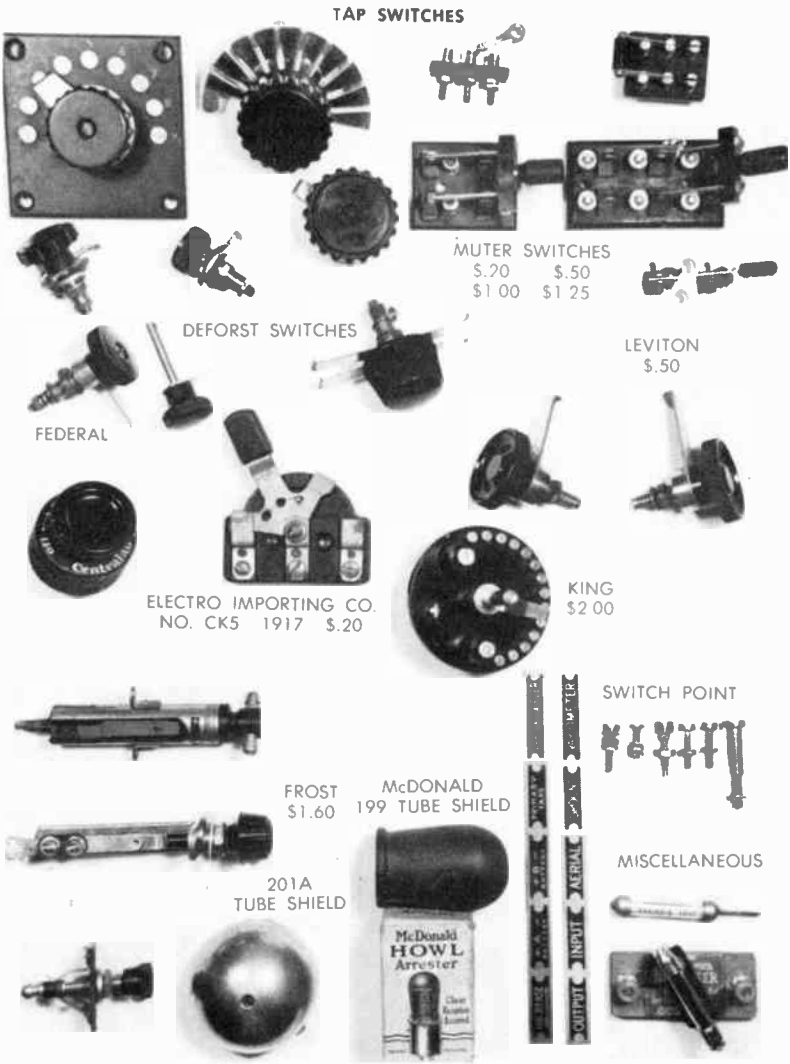
When superheterodyne sets and "A" and "B" battery eliminators entered the home the occasional services of a trained repairman were needed. Storekeepers who sold the sets commonly did this up to about 1924. Among devices developed to serve the need were fast tube rejuvinators to bring back filament emission, tube testers and more accurate measuring meters. When A.C. sets came on the market in about 1928 the many receiver kits disappeared, and the role of the modern serviceman began.



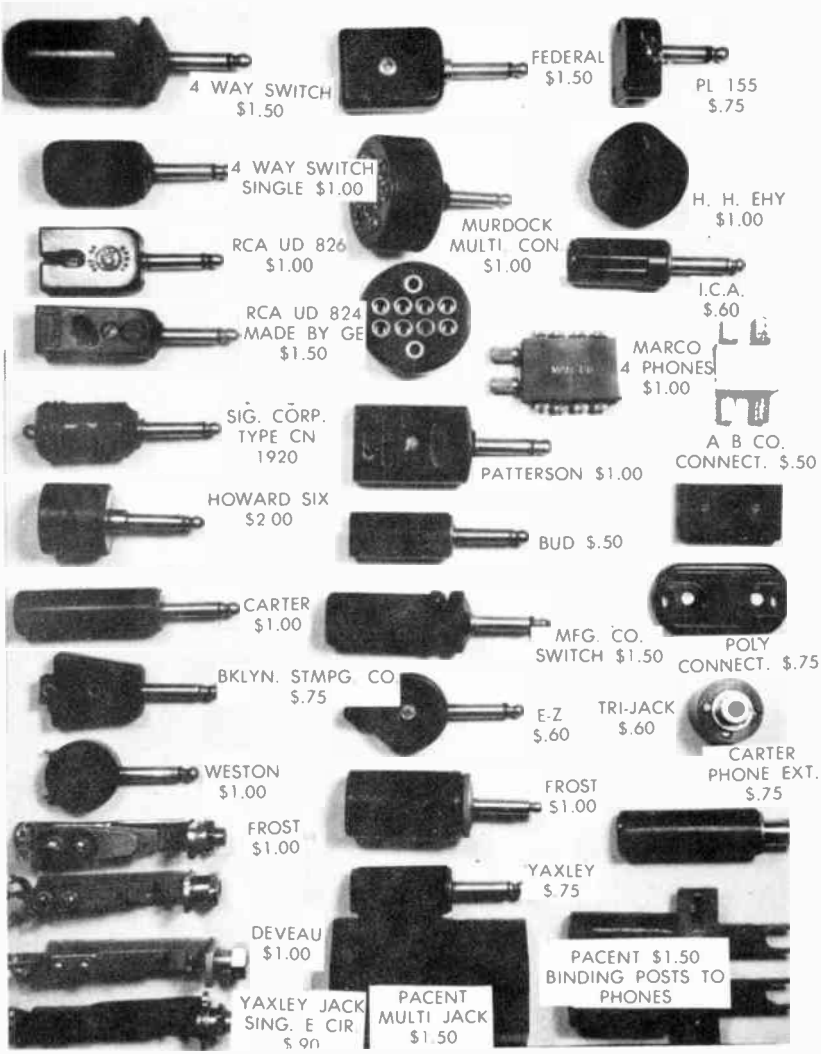
Hum eliminators.

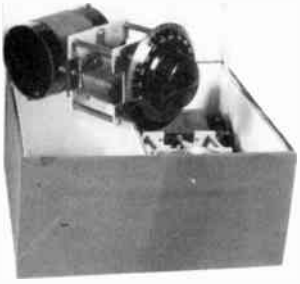
Watchcase voltmeter.

GRID LEAKS AND RESISTORS
FIXED CONDENSERS
1916 TO 1925


TAP SWITCHES
MUTER SWITCHES
$.20 $.50
$1 00 $1 25
DEFORST SWITCHES
LEVITON
$.50
FEDERAL
ELECTRO IMPORTING CO.
NO. CK5 1917 $.20
KING
$2 00
SWITCH POINT
FROST
$1.60
McDONALD
199 TUBE SHIELD
201A
TUBE SHIELD
MISCELLANEOUS
McDonald
HOWL
Arrester
MUTER
OUTPUT
INPUT
AERIAL


RADIO FREQUENCY CHOKES
NEUTRALIZING CONDENSORS
AERIAL ELIMINATORS
NU-TONE
LINE REGULATORS
MARVEL
NOISE ELIMINATOR
LIGHTNING ARRESTERS
ELECTRAD


4 WAY SWITCH $1.50
FEDERAL $1.50
PL 155 $.75
4 WAY SWITCH SINGLE $1.00
MURDOCK MULTI CON $1.00
H. H. EHY $1.00
RCA UD 826 $1.00
I.C.A. $.60
RCA UD 824 MADE BY GE $1.50
MARCO 4 PHONES $1.00
SIG. CORP. TYPE CN 1920
PATTERSON $1.00
A B CO. CONNECT. $.50
HOWARD SIX $2.00
BUD $.50
CARTER $1.00
MFG. CO. SWITCH $1.50
POLY CONNECT. $.75
BKLYN. STMPG. CO. $.75
E-Z $.60
TRI-JACK $.60
CARTER PHONE EXT. $.75
WESTON $1.00
FROST $1.00
FROST $1.00
YAXLEY $.75
DEVEAU $1.00
PACENT $1.50 BINDING POSTS TO PHONES
YAXLEY JACK SING. E CIR $.90
PACENT MULTI JACK $1.50



NATIONAL
BROWNING DRAKE KIT
1 STAGE R.F. REGEN.
DET. 2 STAGE AUDIO
1925 S.P. $22.00

BRANSTON
SUPER KIT
1924 S.P. $36.50

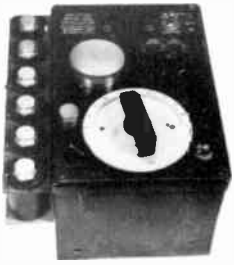
BREMER-TULLY
6 TUBE KIT
1925 S.P. $38.00

SAMSON
SUPER KIT
1925 S.P. $30.00

TEST EQUIPMENT USED IN THE 1920s

SYLVANIA TUBE TESTER

HICKOCK TUBE TESTER



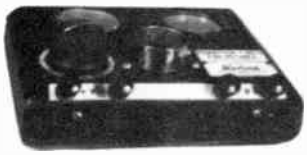
WESTON MODEL 802
TEST OSCILLATOR

ELECTRON 5 INCH
ELECTRON OSCILLOGRAPH
GENERAL RADIO

VAN HORNE TUBE TESTER

BURTON TUBE TESTER

TUBE AND SET TESTERS USED IN THE 1920s



STERLING TUBE TESTER
$25.00

STERLING
TUBE REACTIVATOR
$5.00

HEMCO
TUBE VITALIZER
$5.00

JEFFERSON TUBE
REJUVINATOR
$5.00

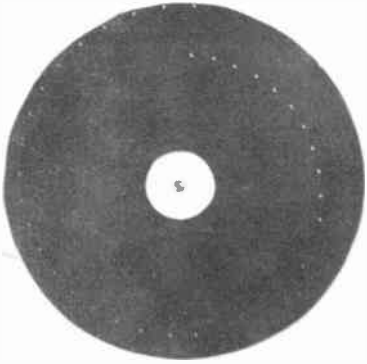
PEERLESS
KONDENSOR TEST KIT
$10.00

STERLING TUBE AND SET
TESTER $35.00

SCANNING-DISC TELEVISION

The principle of television was discovered in 1884 by Paul Nipkow who developed the Nipkow Scanning Disc. By 1928 scanning-disc TV was out of the laboratory. By 1932, Don Lee's W6XAO, at 7th and Bixel in Los Angeles and W2XF operated by RCA and broadcasting from Al Smith's Empire State Building were on the air with programming. By 1937 both Los Angeles and New York residents could receive transmissions on cathode ray tube reproducers. RCA, Gilfillan and others had console sets on the market. Meissner and Farnsworth were marketing kits. The DuMont Company, a pioneer in developing the VonArdenne C.R. tube had a 9" tube made by the Corning Glass Co. In 1940 RCA offered the 1" Iconoscope for amateur radio TV transmitters. Television started into full swing in 1946 with 3", 5", 7" and 10" receivers available to the public.

COMPLETE SCANNING DISC TELEVISION KIT — 1928



36-aperture scanning disc

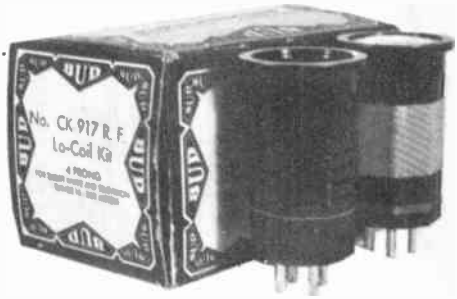
Daven television Lamp — 1½ sq. in picture

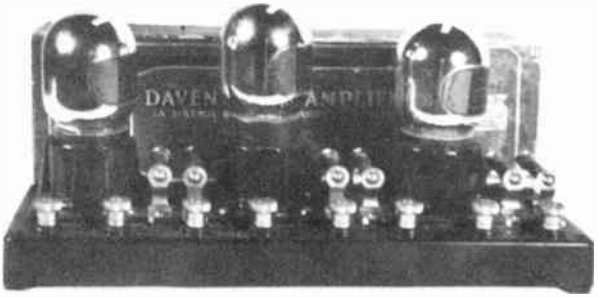
1700 rmp motor for disc

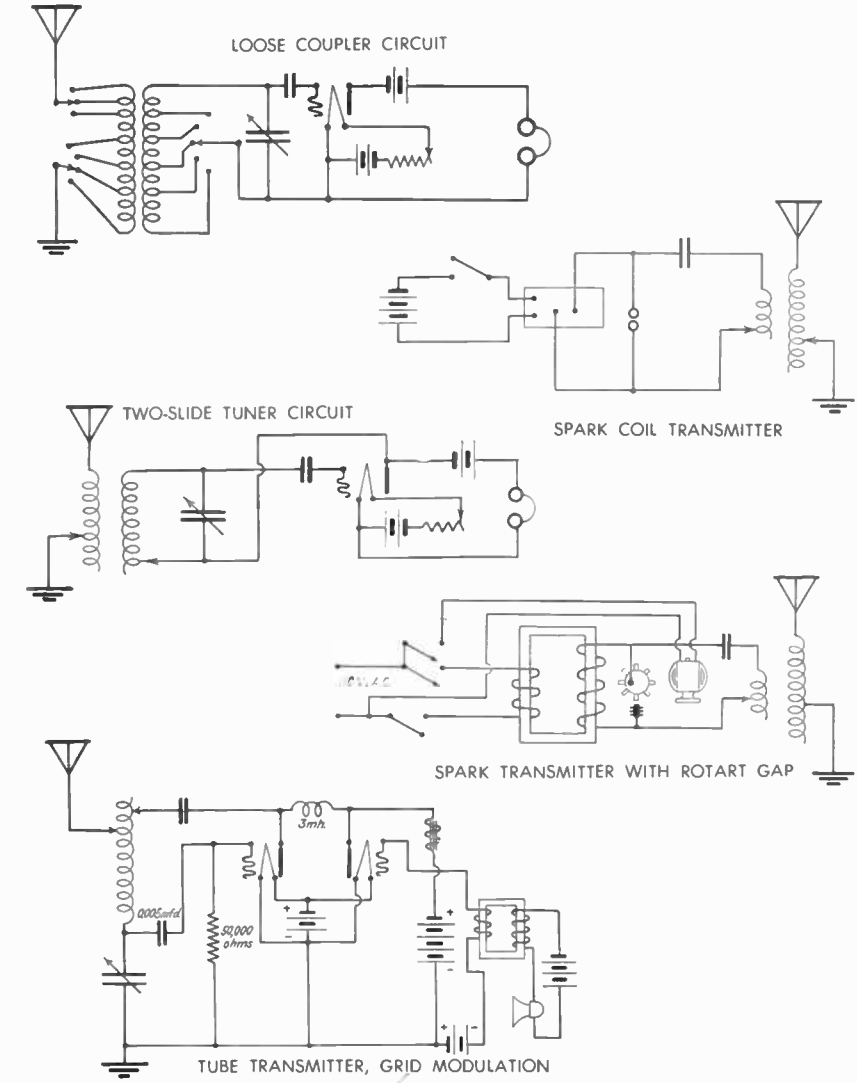
Synchronizer control

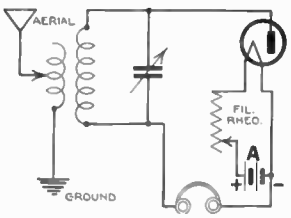
Daven resistance coupled television amplifier

Television coil kit for receiver

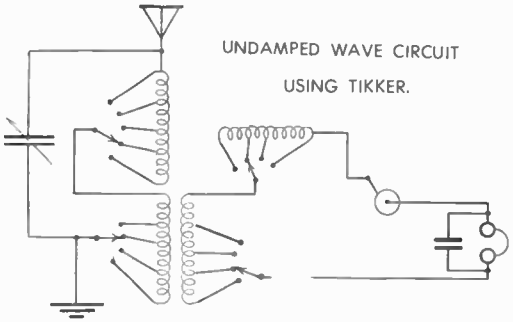





LOOSE COUPLER CIRCUIT
TWO-SLIDE TUNER CIRCUIT
SPARK COIL TRANSMITTER
SPARK TRANSMITTER WITH ROTART GAP
3mh.
.0005mfd.
50,000 ohms
TUBE TRANSMITTER, GRID MODULATION

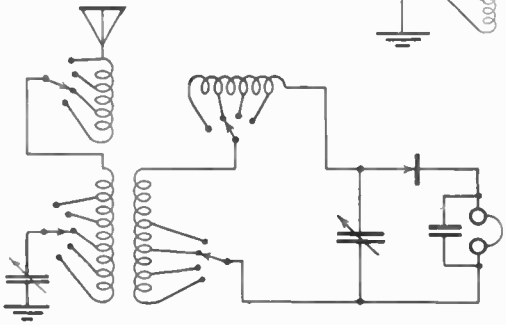


FLEMING VALVE CIRCUIT

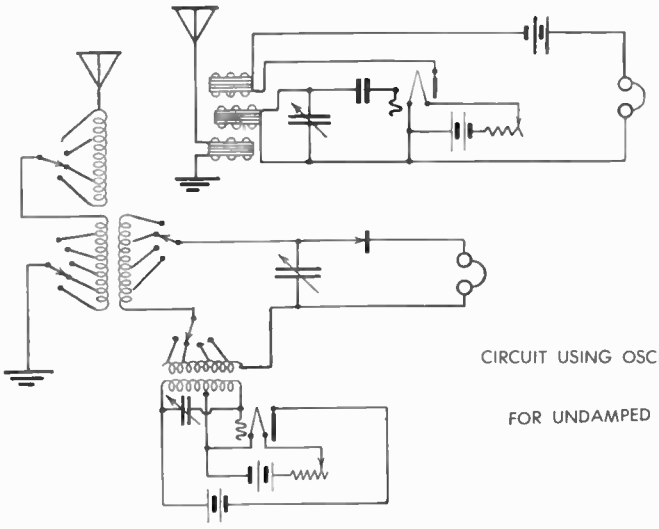


UNDAMPED WAVE CIRCUIT

USING TIKKER.



LONG WAVE CIRCUIT



HONEYCOMB COIL

RECEIVER

CIRCUIT USING OSCILLATOR TUBE

FOR UNDAMPED WAVES

RADIO TELEPHONE BROADCASTING PROGRAM

New York City District

SUN., FEB. 12th, TO SUN., FEB.19th, 1922

This program can be heard by any one with suitable radio receiving apparatus within a radius of several hundred miles of New York. The service is absolutely free. Tune instruments for 360-meter waves.

Sunday

3 P. M.—Radio-Chapel services, "The Spirit of Lincoln in a Radio-Unified World", by Rev. Edgar Swan Wiers, D.D., assisted by the quartette—Mrs. Wm. M. Rockwell, Mrs. M. S. Powell, Fred P. Taylor and George Roubaud; F. F. Huxham, organist—from the Unitarian Church, Montclair, N. J.

4 P. M.—"Abraham Lincoln", an address by Rev. Robert Scott Inglis, of Newark, N. J.

4.30 P. M.—"My Country 'Tis of Thee", "Star Spangled Banner"; also several popular selections, including "Ty Tee", "All That I Need Is You"; played by Paul Whiteman's Orchestra, from the Palais Royal, New York. Arranged through the courtesy of Leo Feist, Inc.

7.00 P. M.—Sacred Music played by the Aeolian Orchestrelle.

8.00 P. M.—"Listen to Me", "Sweet Lady", "Hawaiian Blues", and several other selections from Carleton's Tangerine, by members of the Tangerine Company, accompanied by the Casino Theatre Orchestra. Arranged through the courtesy of Leo Feist, Inc.

Monday

2.30 P. M.—Ray Miller's Record Orchestra, assisted by Cliff "Ukelele Ike" Edwards.

8.15 P. M.—Miss Ethel Grow, contralto, who appeared in English Opera and Concert, and in Oratorio in England, under the direction of Sir Henry Wood.

8.45 P. M.—Gustav O. Hornberger, cellist of the Kaltenborn String Quartette, who appeared in concert with the leading orchestras of Europe as solo cellist under Von Bulow, Rubinstein, Weingartner and Richard Strauss. Mr. Hornberger will play a programme of selections by Goltermann, Chopin, and Moskowski.

Tuesday

7 P.M.—"Man-in-the-Moon" stories for children.

7.45 P. M.—"Tuberculosis, Influenza and Common Colds", a preventive lecture by Dr. Charles J. Hatfield, Managing Director of the National Tuberculosis Association.

8.00 P M.—An address on radio by Paul F. Godley.

8.20 P. M.—A second recital to the radio-phone audience by Mme. Gretchen Hood, Prima Donna Soprano, Theatre De La Monnair, Brussels; also of the San Carlo Opera Company, and prominent concert singer. Her program includes "Segerbella" from Carmen, Bizet, and a group of ballads. Courtesy of Aeolian Company.

8.45 P. M.—"The Gelida Manina" from the Opera Boheme, Buccini, etc., by Charles Harrison, Tenor Soloist, Fifth Avenue Brick Presbyterian Church, for four years; studied with Frederick Bristol.

9.20 P. M.—Songs and readings by Mr. and Mrs. E. E. Holle, of Newark, N. J.

Wednesday

8.15 P. M.—Descriptive recital with music, of Verdi's opera, "Il Trovatore."

Thursday

7.45 P. M.—"Modern Health Problems", an address by Dr. Royal S. Copeland, Commissioner of Health, New York City.

8.00 P. M.—"What is a Rotary Club and What Are its Relations to the Public" by Allan Smith, Ex-President of the Newark Rotary Club. Also a rotary song by Andrew Krenrich.

8.20 P. M.—Classical music.

9.20 P. M.—A program of songs by Janet Bush-Hecht, contralto soloist, First Congregational Church, Montclair, N. J., and a prize winner in a Newark Music Festival Contest. The program includes "In Flanders Fields", "Would You," "Bubbles", and "Joyous Youth", composition, of Mabelanna Corby, who will be the accompanist for these and other selections. Courtesy, Aeolian Company.

Friday

7.00—"Man-in-the-Moon" stories for children.

8.15 P. M.—"Party Night," when several well-known artists of vaudeville and the musical comedy stage will entertain with songs and monologues.

Saturday

7.00 P. M.—Irv Pages Cornell Orchestra, Cornell University, composed of the following: Irv Page, banjo; Geo. Cox, banjo; Lyman Breese, banjo; Sam Bird, traps and drums; Jack Wallace, saxaphone; and Paul Miller, cornet, banjo and violin.

7.45 P. M.—"Fashion Talks to Women", Marjorie Wells, N. Y. World.

8.00 P. M.— The "Daily Dozen" exercises address, by Walter Camp, foremost authority in, American athletics.

8.20 P. M.—Dance Music by the Fernwood Dance Orchestra of Newark, N. J.

9.20 P. M.—Popular and character songs by Aileen Stanley, soprano, well-known in vaudeville circles.

9.45 P. M.—"Hello Prosperity", "Don't Leave Me Mammy", etc., by Max Hitrig, dramatic tenor, known from Coast to Coast.

Duo Art Piano Recital.

Sunday

3 P. M.—Radio-Chapel Services, Rev. Clarence H. Wilson, D.D., Glen Ridge Congregational Church.

4 P. M.—"Boys of the World", an address by C. R. Scott, State Secretary of Boys' Work, Y. M. C. A., Newark, N. J. Music by quartette including Miss May Korb, soprano soloist, South Park Presbyterian Church; Miss Marian Adams, contralto soloist, Church of the Redeemer; Bruce Campbell, tenor, and Louis Burke, baritone, Clinton Avenue Reform Church.

6 P. M.—Program of classical music by Mrs. Robt. Baldwin, violinist and Mrs. Ernest H. Harder, pianist.

7.45 P. M.—Sacred Music recital by the Aeolian Orchestrelle.

8.00 P. M.—Ed Wynn and the entire company of "The Perfect Fool", now playing at Geo. M. Cohan's Theatre, New York. For the first time in the history of radio an attempt will be made to broadcast an entire theatrical performance. Arranged by the N. Y. Globe.

OTHER FEATURES

Musical Program weekdays, every hour from 11 a.m. to 6 p. m. on the hour.

"FASHION TALKS TO WOMEN", Marjorie Wells, N. Y. World Saturday 7.45 P. M.

WEATHER FORECAST (Official) - Daily, 11:00 A. M., 12.00, M 5:00 and 10.01 P M. sharp.

SHIPPING NEWS weekdays 2.45P. M.(excepting Sat.) by Marine Engineering and Shipping Age.

BABSON'S Statistical Service, Monday, 6 P. M.

OFFICAL ARLINGTON TIME 9.58 P. M.

AGRICULTURAL REPORTS, Official, daily 12.00 M., and 6.00P.M

"MAN-IN-THE-MOON" stories by Miss Josephine Lawrence (@NewarkSunday Call).

(Program will be announced daily by radio phone 7.45 P. M.)

Radio Jazz:

Irresistible foxtrot. One of the prize winners of RADIO NEWS Broadcast contest! Young feet dance—old feet tap time, to the fascinating melody of this real smashing hit.

Radio March:

Another Prize Winner of RADIO NEWS Broadcast contest. Here, music lovers, is a wonderful number! Is there anything so appealing as the stirring strains of a military march?

Listen In:

Featured in RADIO NEWS Broadcast contest, has caught the fancy of all America! Its rare swing hypnotizes—and its tuneful melody makes it simply irresistible.

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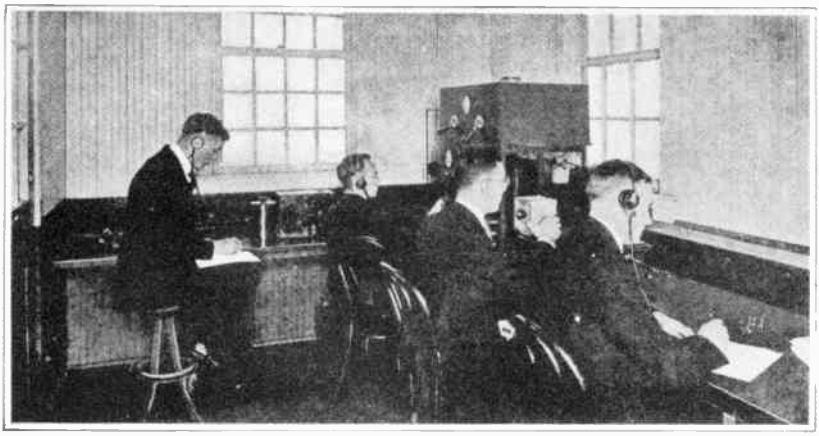
THE CONSRAD COMPANY, INC.

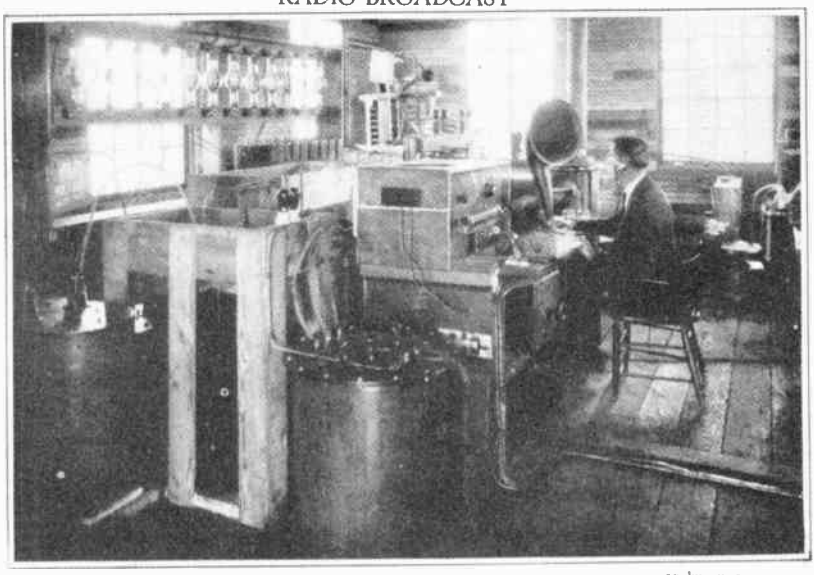
233 Fulton Street, New York City



Still another radio-phone broadcasting station, showing the announcer and the receiving operators. This is KDKA of East Pittsburgh, Pa., the forerunner of all other radio-phone broadcasting stations in the United States.

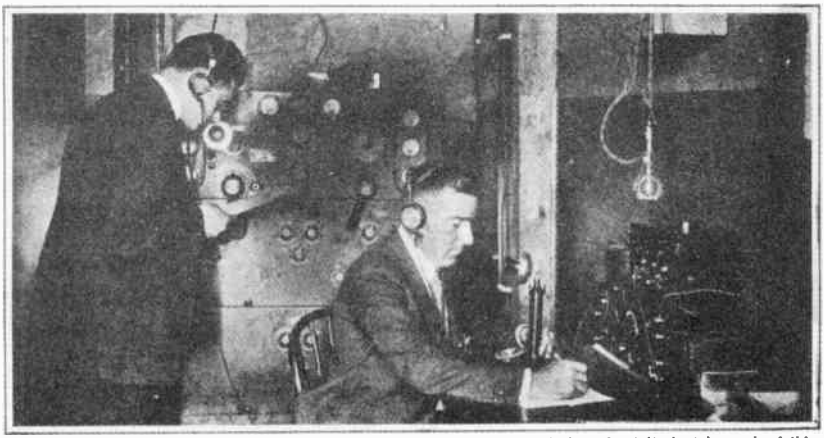
The present form of radio-phone broadcasting dates back to the latter part of 1920, when the Westinghouse Electric and Manufacturing Company inaugurated the first radio-phone concert through its Pittsburgh station, KDKA

The "announcer" of a radio-phone broadcasting station, and the receiving operator. The announcer speaks into the microphone transmitter which he holds in his hand. Alongside of him is the radio-phone transmitting apparatus, with the vacuum tubes for generating and modulating the radio waves. This is WJZ, the Newark radiophone.



A CORNER OF THE EXPERIMENTAL LABORATORY AT WGY

50 kw. was employed The station was heard in England and on the Continent



Broadcasting the results of a boxing contest round by round. The radio-telephone is at its best in work of this kind, and special efforts are being made to report all athletic events of surpassing interest in this manner. This photograph was made at the time of the Dempsey-Carpentier fight.

WELCOME
To the Convention

March, 1923

The Radio Corporation welcomes amateur wireless men to the First National Convention and Radio Show.

To do its share in making this event interesting, instructive and profitable, the Radio Corporation cordially invites amateurs, advanced experimenters, dealers and jobbers to visit

SPECIAL BOOTH "B"
IN CHARGE OF
MR. GEORGE W. HAYES

It will be a pleasure for Mr. Hayes to explain the features of R. C. Continuous Wave and other apparatus for amateur and experimental use.

Be sure to arrange to have your name placed on the first list to receive the Corporation's new Catalog and Instruction Book on C. W. Operation, now ready.

A Few Leading C. W. Units:

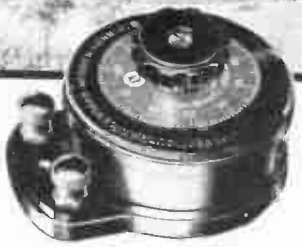
Radiotrons for Transmission
Kenotrons for Rectification
Sockets for Vacuum Tubes
Filament-Plate Voltage Power Transformers
Filament Rheostats
Transmitting Grid Leaks
Special Mica Condensers
Filter Reactors
Antenna Ammeters
Rotary Grid Choppers
Magnetic Modulators
Microphone Transformers
Oscillation Transformers

These products of quality are manufactured expressly for the Radio Corporation of America by the

GENERAL ELECTRIC COMPANY

Radio Corporation of America

CONNECTICUT RADIO



J-107 $6.50
Portable Type Variable Condenser

J-108 $5.50
Panel Type

What determines signal strength in Variable Condensers

Strength of signals, when you use a Variable Condenser, depends upon *low* "effective resistance." In most ordinary commercial types this resistance lies between two and fifteen ohms.

Compare this with the CONNECTICUT Variable Condenser, about two-tenths of an ohm. This low comparative resistance not only permits, but insures, strength of signals.

There are other advantages—compactness, fine adjustments, stable in any position, sensitiveness—any one of which should make the CONNECTICUT type your choice of variable condensers. Every well-informed amateur should know about this condenser. We will gladly send you a booklet describing it.

CONNECTICUT TELEPHONE & ELECTRIC COMPANY
Meriden Connecticut

CATALOGS OF EARLY U. S. CARS

CATALOG OF 1909 CARS

This book of 144 pages has specifications and photos of all cars manufactured in 1909 by manufacturers who were members of the National Automobile Chamber of Commerce. The specifications are complete with beautiful photos illustrating the respective makes. This book is a reproduction of the original one published by the National Automobile Chamber of Commerce and referred to as the NACC Handbook. Original copies are today considered collectors' items and have considerable value, but the information in this reprint is identical.
Postpaid $3.00

CATALOG OF 1912 CARS

This book of 208 pages has specifications and photos of 194 vehicles including passenger cars, commercial vehicles and fire apparatus. Prices are listed on 442 different models of passenger cars. Included are such names as Autocar, Brush, Cartercar, Corbin, Elmore, Franklin, Garford, Haynes, Jackson, Knox, Lozier, Pullman, Reliance, Reo, Stevens-Duryea, Stoddard-Dayton, Thomas, Warren, and White. These 1912 models are beautifully illustrated and they include some real gems.
Postpaid $2.50

CATALOG OF 1914 CARS

This book of 208 pages has specifications and photos of all cars manufactured in 1914 by manufacturers who were members of the National Automobile Chamber of Commerce. The specifications are complete with beautiful photos illustrating the respective makes. This book is a reproduction of the original one published by the National Automobile Chamber of Commerce and referred to as the NACC Handbook. Original copies are today considered collectors' items and have considerable value, but the information in this reprint is identical.
Postpaid $3.00

CATALOG OF 1918 CARS

This 224 page book has photos and specifications of 200 vehicles including fire apparatus and electric cars and trucks. There is an amazing total of 85 different makes of passenger cars alone. Of the 112 makes of cars and trucks combined, only a dozen have survived. Included are such names as Allen, Apperson, Brockway, Chalmers, Cole, Davis, Dort, Elgin, Emmite, Fiat, Grant, Hackett Inter-State, Jackson, Kelly-Springfield, Kline Kar, Lexington, Liberty, Maxwell, Mercer, Nash, Overland, Paige, Regal, Scripps-Booth, Vim and Westcott.
Postpaid $2.50

CATALOG OF 1921 CARS

This book of 240 pages has specifications and photos of all cars manufactured in 1921 by manufacturers who were members of the National Automobile Chamber of Commerce. The specifications are complete with beautiful photos illustrating the respective makes. This book is a reproduction of the original one published by the National Automobile Chamber of Commerce and referred to as the NACC Handbook. Original copies are today considered collectors' items and have considerable value, but the information in this reprint is identical.
Postpaid $3.00

CATALOG OF 1924 CARS

This book of 232 pages has specifications and photos of all cars manufactured in 1924 by manufacturers who were members of the National Automobile Chamber of Commerce. The specifications are complete with beautiful photos illustrating the respective makes. This book is a reproduction of the original one published by the National Automobile Chamber of Commerce and referred to as the NACC Handbook. Original copies are today considered collectors' items and have considerable value, but the information in this reprint is identical.
Postpaid $3.00

CATALOG OF 1927 CARS

This book has photos and specifications of 80 passenger cars of 44 different makes. Included are such names as Auburn, Briscoe, Case, Diana, Essex, Flint, Gardner, Hupmobile, Jordan, Kissel, Locomobile, Marmon, Oakland, Peerless, Rickenbacker, Star and Willys-Knight. Other features include the formula used to determine the N.A.C.C. horsepower rating of motors of various sizes—a 48 page directory of automobile terms—a 24 page section of views from various automobile plants showing up-to-date mass production methods at that time.
Postpaid $2.50

CATALOG OF 1929 CARS

This book of 188 pages has photos and specifications of 148 vehicles including passenger cars and buses, taxicabs and trucks. A few of the makes are Atterbury, Corbitt, Cunningham, Durant, Elcar, Federal, Graham-Paige, Kleiber, Larrabee, Moon, Pierce-Arrow, Roamer, Stutz, Stearns-Knight, Velie and Whippet. A six page table lists alphabetically the prices of all models of passenger cars—an amazing total of 580 different models and body styles. Another section gives some interesting facts and figures relating to the automobile industry.
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CLYMER'S CATALOG OF 1956 U. S. CARS

Newest of Floyd Clymer's well-known series of U. S. automobile catalogs, this book includes many improvements over previous issues, with special articles, both descriptive and technical, on the various new cars, and a pleasing new format, 8½ x 11 size.
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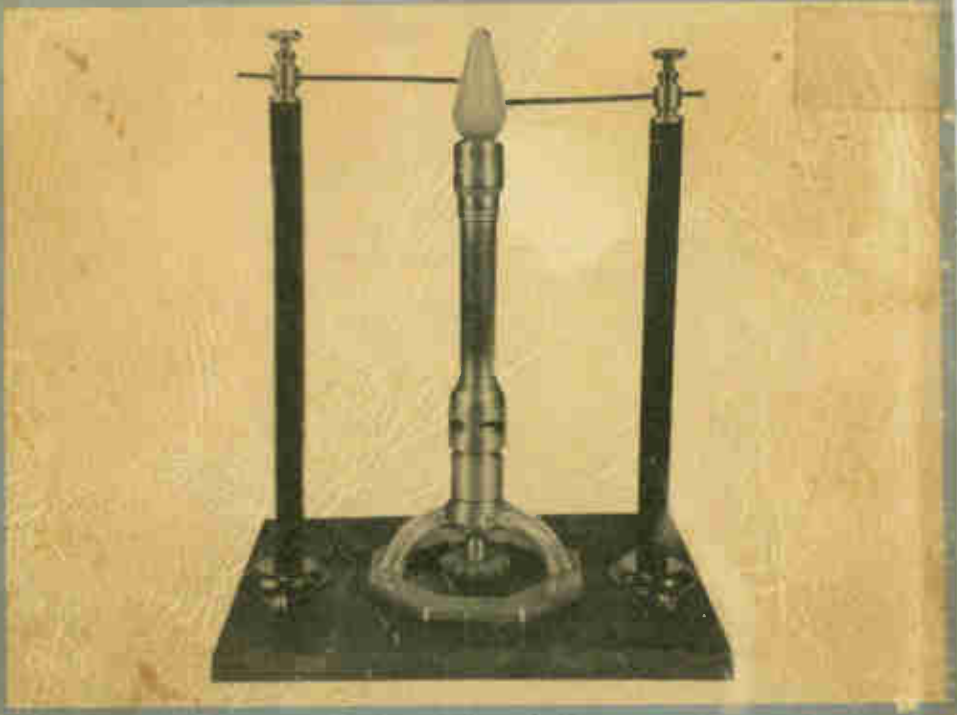
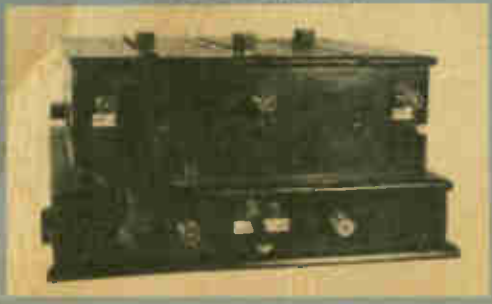


De Forest Flame Audion

De Forest Responder



De Forest Synchronizer

Western Electric VT-1

Illustrated with more than 1,000 photos of operating equipment