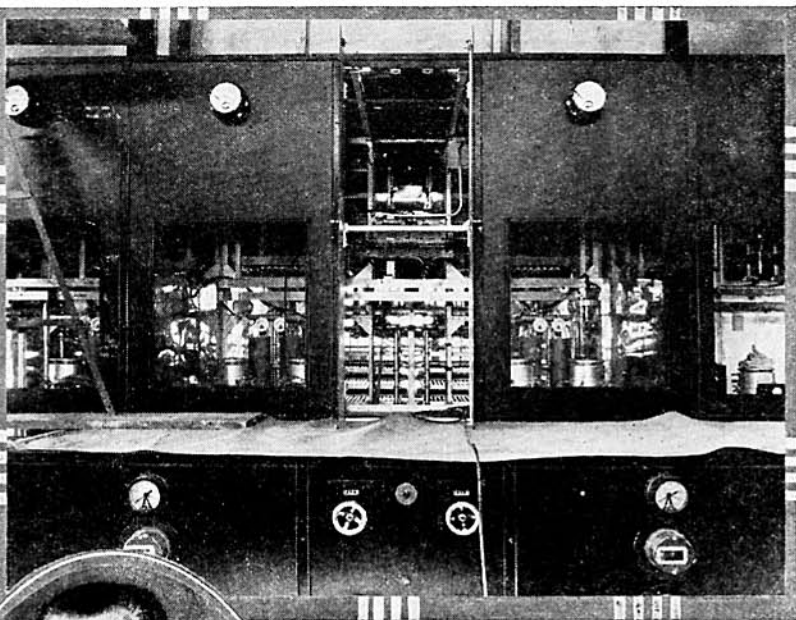
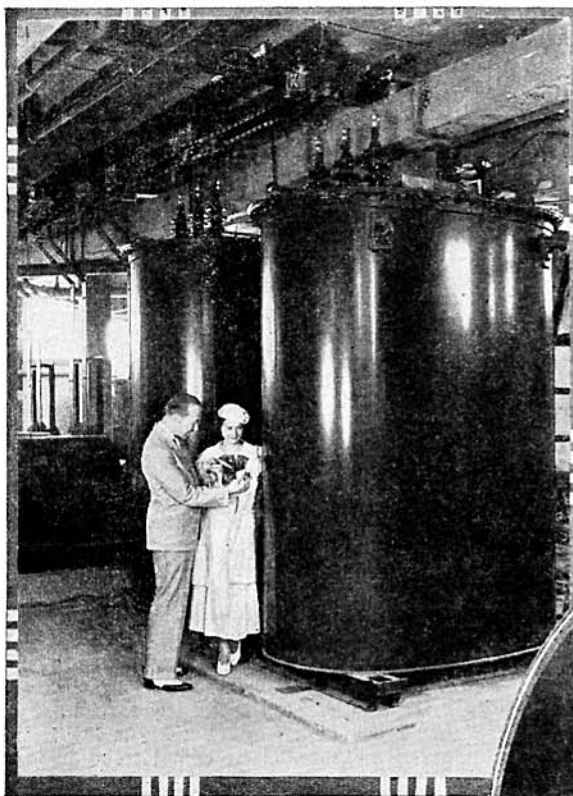


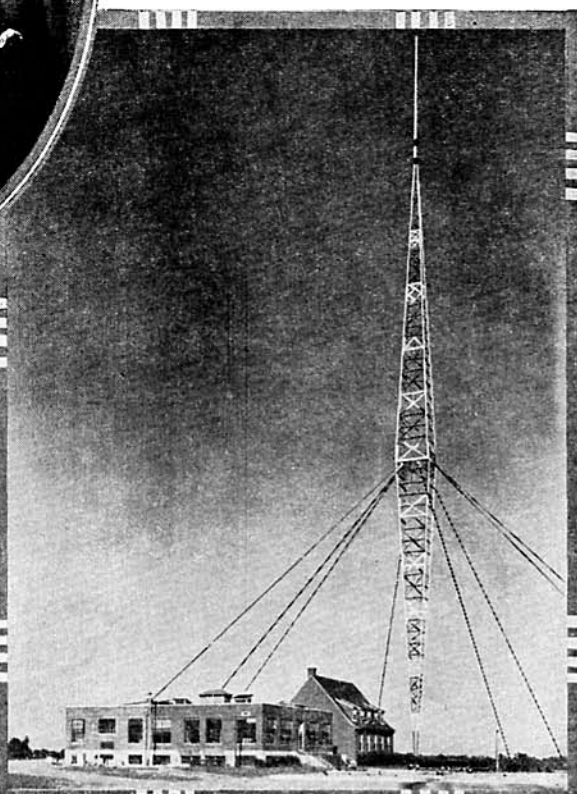
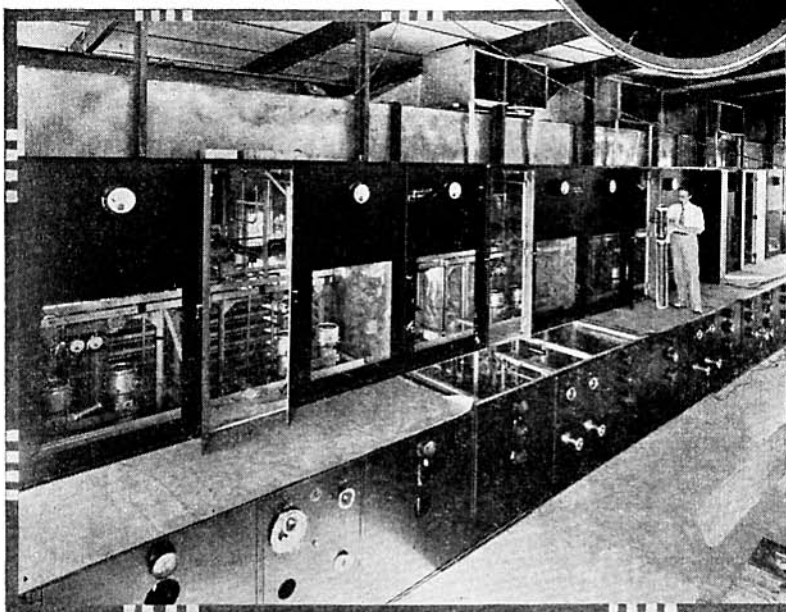
WLW ON THE AIR WITH 500 KW.

A NEW EXPERIMENT IN SUPER-POWER BROADCASTING



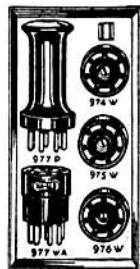
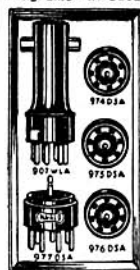
weighing 22.5 tons! (Compare this to the usual, 1/2-lb. unit held by Mr. Schaeffer!) In the upper-right photo is shown one of the three 180 kw. R.F. amplifiers used in this gigantic station. In the lower-left illustration is shown a section of the main control panel which is 54 ft. in length. In the lower-right photo is a view of the transmitter building and the 830 ft. vertical half-wave antenna. Powell Crosley, Jr., president and founder of Crosley Radio Corp., operators of WLW, WSAI and W8XAL, is shown in the central view.

(Continued on page 503)



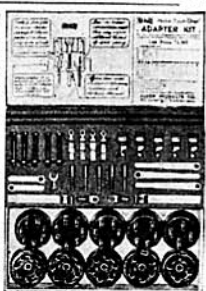
SERVICEMEN

Why be handicapped with an ancient analyzer when in two hours you can easily modernize it with one of these kits and a pair of composite sockets! Directions and diagrams included with all outfits



8-Wire Braid-Covered Analyzer Cable...List 10c. ft.
456 4-5-6 Contact Composite Socket.....List 50c ea.
477 7-7 Contact Composite Socket.....List 50c ea.

It's here at last!—The "Make - Your - Own" Adapter Kit. All the parts for making any required adapter, including all ten types of socket top-sections and small sized base-sections complete with over two dozen assorted extension, soldering, connection, phone-tip and control-grid terminals, connectors, clips and lead wires. 900 "Make - Your - Own" Adapter Kit complete. List\$2.50 Bought separately each 4, 5, 6, 7 and small 7 top or base section lists at 25c each.



HERE'S HOW TO MODERNIZE YOUR CHECKER



List \$6 950XYLA Checks over 120 new tubes including small 7's in your present tube checker. If checker has no fl. voltage switch, adapter 954SGL, list \$1.25 is also required. Servicemen's discount 35% on orders listing at \$10 or more, 40%.



List \$6 950TR Checks ALL 10 to 30 volt filament tubes in the 24 tube checker socket with 2½ volt. Has filament voltage selector switch and internal transformer.

HERE'S THE DATA YOU WANT Send two 3c stamps for new 16 page Booklet showing illustrated tube socket connections of 268 different tubes, data and diagrams on rewiring any obsolete set analyzer or tube checker and information on using the new tubes in place of old types. Includes catalog pages on all kinds of sockets, speaker plugs, connectors, wound and unwound coil forms, coil winding data, S-W receiver references, etc.

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We carry the complete line. Call or write for descriptive bulletin.



45D VESEY STREET New York, N. Y.

WLW ON THE AIR WITH 500 KW.

(Continued from page 457)

Crosley's "5 Year Plan"

In commenting on the new station, Joseph A. Chambers, technical supervisor of the station, says:

"The Crosley Radio Corporation has always pioneered in radio broadcasting; its WLW having been the first station in each successive increase in power and the first to put many new ideas into practice.

"We have been working toward this world's largest 0.5-megawatt transmitter for the past five years and our own technical staff worked up complete plans for such a unit, even though many people told us it could not be done. About a year ago we submitted our plans and predictions to the Federal Radio Commission. They became very much interested and decided to allow us to construct such a transmitter.

"Then came a series of meetings with many of the country's best radio engineers. Since it was an experimental transmitter of entirely new design, it rapidly developed into an engineers' picnic. It was decided to incorporate as many new and radical ideas as possible and for this reason it was necessary to design many new pieces of equipment. I am sure it is going to be the last word in broadcast transmitter design and will incorporate many features never before attempted.

"Briefly, the new equipment is an R.F. amplifier capable of 2,000,000 W. (2 megawatts) peak output; an A.F. amplifier of sufficient size to modulate the R.F. amplifier; and the necessary power supply and control circuits.

The R.F. Amplifier

"The R.F. amplifier contains twelve type 862, 100 kw. tubes. These are divided into three units of four tubes each, in each of which the tubes are operated in parallel push-push combinations. Each unit has its own grid-tank and plate-tank circuits. This arrangement, along with unusual mechanical design, results in a very stable amplifier. Each unit is individually neutralized, with the tubes operating as class C amplifiers. The final A.F. stage or modulator contains eight 100 kw. tubes. These are divided into two units of four tubes each. They are also operated in parallel push-push as class B amplifiers. The output A.F. transformer is divided into two sections; there is one section for each of the modulator units. The secondaries of the two sections are connected in series and the output modulates the plate voltage of the final R.F. amplifier. Direct current is blocked out of the modulation transformer secondaries and a 500 mf. audio coupling condenser is used. This amplifier is capable of delivering over 400 kw. of undistorted power output.

The Power Supply

"Filament and bias power is supplied by motor-generators; 4,300 A. at 33 V. for the filaments, is delivered by three 1,500 A. generators connected in parallel. They are driven by three 75 h.p., 2,300 V. motors. These motor-generators can be controlled individually or as a unit. Normally, they are controlled as a unit from the console on the transmitter floor, and a single control adjusts the voltage from all three generators. Naturally, the generators are of special design to have minimum ripple and other desirable characteristics.

The main plate supply rectifier will deliver 100 A. at 12,000 V. This is the normal voltage applied to all the tubes. At 100 per cent modulation, the peak voltage applied to the R.F. stages will be 24,000 V. A three-phase full-wave rectifier circuit is used, employing 6 special, type 870 hot-cathode mercury-vapor rectifier tubes.

A system of oil-immersed switches controlled from the control console on the transmitter floor permits the rectifier transformer primaries to be connected either in Delta or Y formation. This permits two voltages, namely 8,000 and 12,000 V. as normal operating voltages. Automatic step starting is also afforded whereby the voltage is applied gradually.

Make Quicker, More Accurate Tests



with this
NEW
No. 1167

TRIPLET Instrument



DEVELOPED by some of the industry's outstanding engineers, the new Triplett No. 1167 instrument is arousing widespread interest. While simply designed and easily operated, its extreme accuracy and completeness satisfy the most exacting requirements of the professional service man.

With this new instrument, you can quickly and accurately measure voltages, current, resistances and continuities without removing the chassis from the cabinet . . . using the cable and plug to make the connections between the set socket and the tester.

The 1167 unit incorporates a direct-reading Ohmmeter, Output Meter, AC-DC Voltmeter and a Milliammeter. All readings are controlled by a selector switch. The single meter has 1000 ohms per volt resistance. Voltage readings range from 0 to 750—Milliampere readings from 0 to 150—Ohmmeter readings from 0 to 3,000,000.

Four sockets take care of all tubes now in use. These sockets can be easily and economically replaced whenever other sockets with added connections are required. It is no longer necessary to carry additional cables, plus, etc.

YOUR JOBBER CAN SUPPLY YOU

. . . at the dealer's net price of \$25.00

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THE TRIPLET ELECTRICAL INSTRUMENT CO., 35 Main St., Bluffton, Ohio.

Gentlemen:

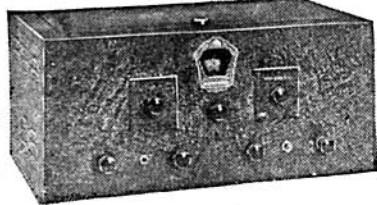
Send me catalog on Triplett Instrument No. 1167, and your complete line of radio servicing instruments.

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Street Address

City..... State.....

Just Hear Those "Foreigners" Roll in on the 1934 POSTAL "All-Wave" INTERNATIONAL



The INTERNATIONAL "All-Wave" 9-Tube Superheterodyne Receiver.

Here's the short-wave receiver made famous by Captain Horace L. Hall—it's the set on which he has pulled in those hard to get foreign stations, on the loudspeaker, with clarity and plenty of volume. It's the set that every DX fan should use in tuning foreign broadcasts to make them sound like locals; it's the set you must test in your home to enjoy the difference between just a regular short-wave set and the Postal "All-Wave" INTERNATIONAL.

IT'S THE NEW SHORT WAVE SENSATION

This custom-built, professional, all-wave receiver is for amateurs, short-wave fans or professional DXers. It employs a tuned R.F. preselector, with new triple draw coils and instantaneous 180 degrees band spread. It also features a C.W. beat oscillator, electron coupled oscillator phone jack 3 watt output, and antenna trimmer. No extraneous harmonics or drifts.

The INTERNATIONAL is sold direct from our laboratory with a money back guarantee, for those who want an instrument of precision and quality and at a new low price for a genuine professional custom-built receiver. Send 3c stamp for schematic diagram and circular that illustrates and describes the POSTAL INTERNATIONAL and the special offer to Radio-Craft Readers.

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TRY-MO RADIO CO., Inc.
85 CORTLAND ST. Dept. C-2 NEW YORK CITY

"Probably the outstanding feature of the entire installation is that high-level modulation is used and that class B A.F. amplifiers deliver the required audio power.

"This has various advantages, particularly in that it permits more economical use of power. All R.F. stages are operated in class C, which as you know is the most stable and efficient R.F. amplifier."

Class B A.F. Amplifier

"The A.F. amplifiers, consuming large amounts of power, are operated in class B, which is the most efficient A.F. amplifier. Fortunately, the 100 kw. tube is excellent as a class B audio amplifier and high quality A.F. amplification is obtained. The largest single problem was the design and construction of the tremendous A.F. transformers used as modulation transformers.

"Some interesting problems resulted from this high-power class B amplification. Power is drawn by the modulators in "gobs" at syllabic frequencies; in other words, very low power between words and high power at peaks of modulation. This means that in order that the voltage may remain constant under the highly variable load, the entire power supply system must have very low reactance. A 260 mf. filter condenser is used in the main rectifier filter. The rectifier transformers are special, having low reactance values. Special lines to our transmitter have been installed to meet our load conditions.

"In view of the fact that all the power equipment is of the low-reactance type, this reactance cannot be counted upon for any protection in case of short-circuits or rectifier-tube flashbacks. Almost unlimited power would be fed into any fault. To supply the necessary protection under these conditions and also to meet various other control requirements, a special, high-speed circuit breaker was developed as rectifier primary control. This breaker is rated at 100,000 A. interrupting capacity and is so fixed that the time from the energizing of the trip coil until the arc is extinguished is only 1/12-second. It closes just as fast and the transmitter control circuits are so arranged that under certain conditions this breaker may open three times under short-circuit conditions in less than a second.

Introducing the "Concentric" Transmission Line

"The output of the R.F. amplifier is transmitted to the antenna proper by a 'concentric' type of transmission line. This type of transmission line has not before been used for broadcasting and its use, particularly at 500 kw., involved quite a few problems. The transmission line was designed after the tower had been completed and measured, and was designed to match the tower impedance without the necessity of any coupling system whatsoever. This eliminated quite a bit of equipment with corresponding losses and harmonic radiation. The particular advantage of the concentric type transmission line is the reduction of harmonic radiation, which represents quite a problem with 500,000 W. power.

A 136 Ton "Tower-Antenna"

"The tower itself is quite an engineering accomplishment. It stands 820 ft. above the surface of the ground and its foundation extends 70 ft. beneath the ground. After work had been started on the foundation, it was found that beginning at 30 ft. and going down, the soil was soft blue clay. It was necessary for us to change the design of the foundation and we drove 24 wood piles as the main bearing.

"The steel itself weighs 136 tons. This weight, combined with the down-pull of the eight guy wires makes a total load on the base insulator of about 450 tons. The base insulator is made up of two apparently fragile porcelain cones so connected in the middle that swaying of the tower will not put any twisting forces in the porcelain. As long as most of the load is direct compression this insulator will stand up to about 1,500 tons.

"This insulator and the guy wire insulators were necessary to insulate the tower from ground. The reason for this is that the tower itself is used as the antenna. The signals actually radiate from the tower structure (RADIO-CRAFT, November 1931, page 269). Fifty-six insulators were used in the

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Auditorium Speakers

CONE SIZE 13½ INCHES

MODEL D-7 D. C. Dynamic



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Especially Suited for THEATRE,
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Handling Amplifiers Delivering
20 Watts 2500 Ohm field

Push-Pull 247 Output Transformer
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95 Westinghouse

Power Generator

MANUFACTURED
FOR U. S.
GOVERNMENT
\$75.00 VALUE



Manufactured by Westinghouse for the U. S. Signal Corps, the sturdy construction of this instrument recommends it to the technician.

Built-in commutator takes off the generated D.C. Three leads extend through the casing to permit a 4½ V. flashlight-type battery to be switched into circuit for starting, and to control the A.C. output of the generator. Rotated at its normal speed of 4,500 r.p.m., the output is 200 W., at 115 to 125 V. (on open circuit), 900 cycles.

The rotor turns in ball bearings. Shaft length (driving end), 2 ins.; diameter 9/16-in.; the end is threaded for a distance of ¾-in. Case dimensions exclusive of the shaft, 4½ x 6¼ in. in diameter. Guaranteed new and perfect. Worth \$75.00, but while they last, only \$4.95, plus shipping charges. Shipping weight 13 lbs.

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ACCEPTED—MONEY REFUNDED IF NOT
SATISFIED.

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Enclosed you will find my remittance of \$....., for which please send me by Express Collect:

- () Jensen 13½" Auditorium Speaker, \$9.95 each
- () Power Generator, \$4.95 each

Name

Address

City..... State.....

RC-234

guy wires to insulate the tower from ground and to break up the guy wires so that they could not distort the pattern. All eight guy wires fasten to the tower near the center at which point the tower is 35 ft. across.

"By actual measurement the use of this antenna with the previous 50 kw. transmitter resulted in an average improvement of 40 per cent in signal strength and in most cases eliminated "distortion" fading as well as moving the primary fading zone out about 50 per cent.

Summary of Features

"To summarize some of the outstanding features of the transmitter I want to point out:

(1) The normal carrier delivered to the antenna is 0.5-megawatt (500,000 watts).

(2) 100 per cent modulation of this 0.5-megawatt is obtained.

(3) This means that 2 megawatts of power is radiated at peaks of modulation.

(4) An average of 1,800 kva. of power is required.

(5) The frequency characteristic of the entire transmitter is flat (within 2 db.) from 30 to 10,000 cycles.

(6) The total A.F. harmonics do not exceed 10 per cent up to 95 per cent modulation.

(7) The R.F. harmonic radiation is so low that at any point the harmonics will not be greater than 1/100 of one per cent of the fundamental.

(8) Rectifier filaments which require 30 minutes to heat up are turned on by a time clock; spare tubes are kept hot at all times.

(9) The starting control system will start the entire transmitter automatically in proper sequence and with proper time delays, if desired; or individual control of any part of the sequence may be obtained by switches on the control console.

(10) In case of momentary failures such as arc-overs or tube flash which can be cleared by removal of power, the transmitter is automatically re-started in about 1/5-second.

(11) In cases of failure requiring attention the unit containing the failure is automatically isolated and the transmitter automatically re-started in about one second and continues operating at slightly reduced power. All dangerous voltages are removed from the isolated unit allowing engineers to get in and make repairs, and the unit can then be automatically reconnected in a fraction of a second.

(12) There are over 50 tons of A.F. transformers in the transmitter. The modulation transformers themselves weigh almost fifty tons and contain 1,400 gallons of oil. Of course, they are by far the largest in the world.

(13) A 550 mf. A.F. coupling condenser is used in the modulator.

(14) A 260 mf. filter condenser is used in the main plate supply.

(15) Air at the rate of 22,500 cubic ft. per minute is circulated for cooling various parts of the transmitter.

(16) For tube cooling, 500 gallons of distilled water and 700 gallons of city water are circulated each minute. A 75 x 75 ft. spray pond is used for cooling the city water so that it may be used over. This, in turn, is used for cooling the distilled water by means of a heat exchanger. On a hot summer day the makeup water required to make up for evaporation alone is 28,000 gallons a day.

(17) Class B A.F. amplification capable of delivering over 500 kw. of A.F. power is used for high-level modulation.

(18) A special concentric type transmission line is used to transmit the R.F. power from the transmitter to the antenna.

(19) A 0.58-wave vertical radiator, 836 ft. high is used as an antenna.

What Will Happen When Super-Power WLW Goes on the Air?

"As to the results of the 0.5-megawatt transmitter we can make the following predictions based on our previous studies.

"Considering power increase alone and ignoring for the moment the increased efficiency of the vertical radiator which has already been realized on the 50 kw. WLW transmitter, the signal strength of 500 kw. WLW will be 3 1/4 times as strong as previously. There-



The two Loudspeakers each 17 3/4 in. x 13 1/4 in. x 3 3/4 in. supplied with the PG-62-B equipment.

22 in. x 15 1/4 in. x 11 1/8 in. (closed) PG-62-B Carrying Case (open) containing Two Loudspeakers and Cables.



22 in. x 15 1/4 in. x 9 in. (closed) PG-62-B Amplifier Carrying Case, opened.



Velocity Microphone and Stand



Centralized Sound Section



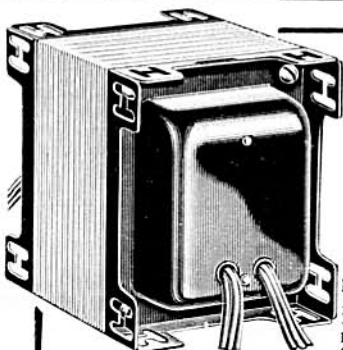
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RCA VICTOR Portable Public Address System Type PG-62-B

Type PG-62-B complete portable public address system, including the famous *Velocity Microphone*, a high grade Class B 20 watt amplifier and two modern dynamic loudspeakers with extension cords—all self-contained in two carrying cases. Operates on 110 volts AC, and is designed to reinforce speech and music. Provision for electrical phonograph input. Type PG-63 is a less expensive model, employing one loudspeaker and carbon type microphone, and is self-contained in one carrying case.

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Portable electric phonograph units of single and double turn-table types available for either of the above equipments.



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| No. 1881 | |
|---------------------------------|-------------------------|
| 7-26..... | 1.5V—7.35 Amp. |
| or 7-24, 27, | |
| 35, 55, 56, | |
| 57, 58, 2A6, 2A7, 90..... | 2.5V—11.5 " |
| or 9-C184, C185..... | 3.0V—11.7 " |
| 2-45, 46, 47, 59, 2A3, 2A5..... | 2.5V—3.0 " |
| or 2-C184, C185..... | 3.0V—2.6 " |
| 2-210, 250, C585, C586..... | 7.5V—2.5 " |
| 2-281, C281 in parallel..... | 7.5V—2.5 " |
| or 2-281, C281 in series..... | 15.0V—1.25 " |
| High Voltage..... | 1490 v. c.t. at 150 M A |

"MULTI-TAP" UNIVERSAL POWER TRANSFORMER (Patent Applied For) FIFTH UNIT

Renews original performance in case of transformer trouble in 149 models, makes of high powered radios, other than the 1377 models which can be handled by the 4 MULTI-TAP power units in the Service Engineers Emergency Stock. With these 5 units you can give immediate service on over 95% of radio power unit troubles.

FREE for the Asking!

General Bulletin No. 3 listing 1526 models of radios in which one of the 5 Multi-tap universals can be used for replacing power transformer in trouble to restore original performance. Bulletin shows electrical characteristics, mounting dimensions, price, etc., of each unit, for 110 V., 60 cy., 220 V., 60 cy., and 110 V., 25-40 cy.

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Send me without charge General Bulletin No. 3 and address of nearest distributor where I can get Multi-tap Universal power units.

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A microphone which plugs into the light socket and which reproduces speech and music in your own radio from any place in building without wires. Clear, powerful, instantaneous reception at your disposal—anytime, anywhere. Details on request.

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244 WEST 23rd ST. NEW YORK, N. Y.
We repair any make microphone—
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Complete Kit of Parts to Build the 5 Meter

TRANSCIVER

This low price is for parts used in the construction of the \$15.95 "Transceiver" only. Microphones, Phones, Tubes, Batteries and Battery Box can be furnished at correspondingly low prices.

BLAN, The Radio Man, Inc.

177C Greenwich St. New York, N. Y.

fore, wherever WLW has been well received, the increase of $3\frac{1}{4}$ times will not be particularly noticeable as there will be no reference level and the receiver volume control will need to be reduced only slightly. However, where the WLW signal was comparable to noise or static levels, the increase will permit satisfactory reception in spite of the noises. Although the signal strength at any given point is only increased 325 per cent, the area covered by a signal down to any predetermined value will be increased 1000 per cent, with a corresponding increase in our potential audience.

"Mr. Crosley has continually endeavored to provide radio programs particularly to the great number of people in small towns and rural communities which do not have a high-quality broadcast station close to them. With this in mind, we plan all of our efforts toward serving the greatest number of people and particularly those not served by local stations. In other words, we are placing a definite value on our secondary coverage. Very few stations are doing this and this fact is our justification for the increased power which we are now trying to get.

"To those who may be alarmed about local blanketing may I point out that the increased signal over the previous value is the same as the increase when we went to 50 kw. from 5 kw. There was considerable alarm at that time over the blanketing and as everyone found, it was not at all serious. In the meantime, receiver selectivity has been greatly improved and we expect even fewer complaints when we go from 50 kw. to 500 kw. than when we went from 5 kw. to 50 k. Another point to mention is that the signal strength over most of Cincinnati with 500 kw. will be in general less than the signal strength of WKRC now located in Walnut Hills! This, of course, is due to the difference in distance."

(The tendency toward higher and higher power in broadcasting transmitters is clearly shown by this new WLW—we wonder how high the power will be increased before the apex is reached?—Associate Editor)

RADIO SHORT-CUTS

(Continued from page 468)

the stator and rotor plates in the same relative horizontal and vertical positions, when mounting.

This 2-gang midget (trimmer) condenser, C, Fig. 3A, can be mounted on the side of the big (ganged) tuning condenser, or directly behind the panel. Use a very small graduated dial (or, even a small knob with pointer arrow will answer the purpose).

Using a good oscillator, realign the R.F. and detector at 1,400 kc. by slightly decreasing the trimmer condensers (that is, the ones that were originally built-in at the factory).

IMPROVING THE "OLD" RADIOLAMP

F. T. Olivera

IN your May, 1933 issue of RADIO-CRAFT you have shown the construction of the so-called "Radiolamp," the design of which surely is novel.

However, by connecting an S.P.D.T. switch in place of the set switch, as shown in Fig. 4, the switch in the lamp socket may be used as the master switch both for the radio and lamp. This permits the lamp to be used alone when desired.

A.F. OSCILLATOR

Donald Slattery

I HAVE a circuit (Fig. 5) for an A.F. oscillator that gives a sine wave output. It is excellent for use on bridges in determining ionization constant, inductances, capacities, etc.

It is an excellent use for old audio transformers. The poorer the transformer, the better the results. By using high-grade transformers I have succeeded in producing waves as slow as one cycle every two seconds. The output is fairly large.

BOOK REVIEW

AIRCRAFT RADIO, by Myron F. Eddy.

Published by The Ronald Press Co., New York, N. Y. First edition, 6 x 8 $\frac{1}{2}$ ins., 284 pages, 68 illustrations, cloth covers. Price, \$4.50.

This is the first book on this subject that we have had the pleasure of reading; it is an excellent volume, well prepared and covering the subject in a complete and concise manner. Lieutenant Eddy, the author of the book, has spent years teaching radio in the naval aviation ground schools and later at commercial aviation schools.

The volume starts with a very useful introduction to the fundamentals of electricity, including the elementary principles of matter; electrons; currents; circuits and conductors. The vacuum tube and its use in radio receiving and transmitting circuits is explained fully and simply.

Following this is a detailed description of various types of radio telegraph and telephone transmitters used for aircraft work. Radio receivers and their associated equipment are given plenty of consideration, both in the long-wave and short-wave aspects.

One of the most promising functions of radio in aviation is the part it plays in navigation; that is, the use of radio beacons, radio markers, aural and visual range beacons, the deviator and other similar instruments. Lieutenant Eddy's description of these units and their applications shows a clear and comprehensive understanding of their design, purpose and application.

Anyone who has installed radio sets in automobiles has a vague inkling of the difficulties normally encountered in successfully installing radio equipment in airplanes. Chapter 8 in this book explains these difficulties and also includes a detailed description of the methods of overcoming them.

The final chapters of the book cover the government regulations pertaining to aircraft radio and a glossary of terms and symbols used in radio work.

Another Big Boom In Radio . . .

PUBLIC ADDRESS INSTALLATION

It's a Money-Making Field



Here is a new edition to the RADIO-CRAFT Library Series—it's a book which shows radio men how to really make extra money in a fast-growing field, allied to radio. In public address work unlimited opportunities arise—it's practically a rejuvenation in radio. Know the facts about public address equipment and get your share of business. Get a copy of **PUBLIC ADDRESS INSTALLATION AND SERVICING**, by J. T. Bernsley—it covers modern methods of servicing and installing public address equipment.

A BRIEF SUMMARY OF THE CONTENTS

AUDIO AMPLIFIER FUNDAMENTALS—
Introduction; Discussion on types of amplification—transformer coupling, resistance coupling, impedance coupling, push-pull and miscellaneous; New Terms and Theory—Class A amplification, Class B amplification, Voltage amplifier; Power amplification; Pre-amplifier, Carbon microphone, Condenser microphone, Ribbon or velocity microphone; Power Supply Requirements—For Class A, For Class B.

PUBLIC ADDRESS AMPLIFIERS—
Standard Installation— $\frac{1}{2}$ watt amplifier, 7 watt amplifier, 10 watt amplifier, 15 watt amplifier, 20 watt amplifier, 30 watt amplifier, 40 watt amplifier, 50 watt amplifier; Special Installation—Portable— $\frac{1}{2}$ volt operated amplifier; Mobile-use amplifier, 25 watt (Radio-Craft), AC-DC and 6 volt amplifier, Pre-amplifier (1 stage, 2 stage, 3 stage).

INSTALLATION INSTRUCTION—
Analyzing Requirements; Best methods for installing—indoor, outdoor; Methods for minimizing "howl" or audio oscillation present after installing; Speaker installation (horn type, baffie type); General Instructions and Hints.

ACOUSTICS—
How to survey and analyze an auditorium for reverberation time—with formulas, and correct method for treatment; chart with absorption coefficients of standard treating material.

SERVICING—FORMULAS—
Amplifiers; Power Supply devices; Speakers; Microphones (carbon, condenser, ribbon or velocity); Formulae—decibel, meaning and use, calculation overall audio gain, distortion in amplifier; Conclusion.

64 PAGES — 6 x 9 INCHES — OVER 50 ILLUSTRATIONS

This book may be bought in combination with other books in the RADIO-CRAFT Library Series—see page 509 for complete details of the other books.

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