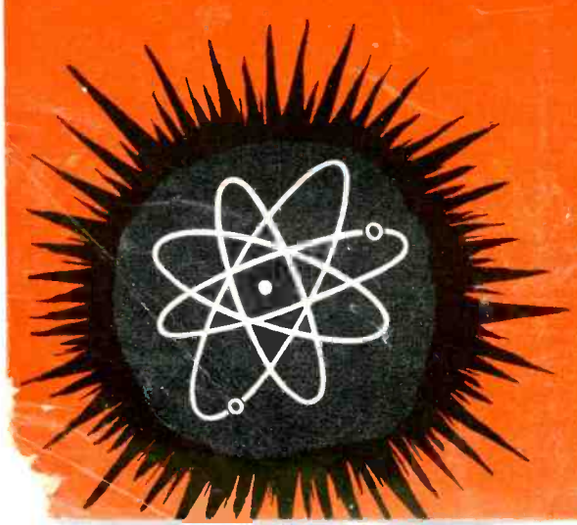
radio service dealer

FEBRUARY, 1947



IN THIS ISSUE:

SIMPLE METHODS OF IMPEDANCE MEASUREMENTS

SERVICING RECORD CHANGERS

HOW TO BLOCK THAT INTERFERENCE

PROFIT MARGINS FOR DEALERS

When the Encyclopedia recommends a WIRE-WOUND control, remember...

Mallory is the Line That Gives You **ALL** Needed Values

A PROPER servicing job on old type radios often calls for a tapered wire-wound control. The Mallory Radio Service Encyclopedia will tell you just what's needed. And you'll *find* what you need in the Mallory Catalog—and at your Mallory Distributor's.

Fact is, Mallory is the manufacturer who has always made a *complete* line of wire-wound controls. There are thirty-three types covering every resistance value and taper . . . many with the exclusive Mallory adjustable bias feature . . . *all* equipped with the universal channel shaft and insert that fits all types of knobs.

Make it a Mallory wire-wound control, and you can't go wrong.

You Expect More—and Get More—from Mallory

Insist on MALLORY—the Complete Control Line

Mallory is the manufacturer that offers:

- 33 Correctly Tapered Wire-Wound Controls
- 31 Values in Single Tapped Controls
- 10 Values in Double Tapped Controls
- 12 Clutch Type Controls
- 10 Universal Dual Controls
- 92 Popular Special Controls

P.R. MALLORY & CO. Inc.

MALLORY

VIBRATORS . . . VIBRAPACKS* . . . CAPACITORS . . . VOLUME CONTROLS . . . SWITCHES . . . RESISTORS . . . FILTERS . . . RECTIFIERS . . . POWER SUPPLIES.

*Reg. U. S. Pat. Off.

APPROVED PRECISION PRODUCTS

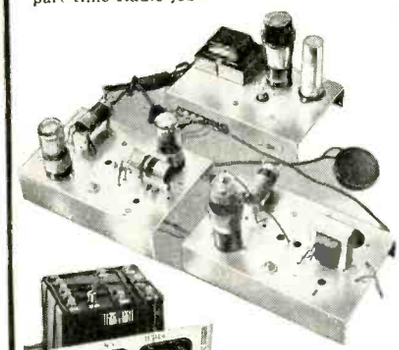
P. R. MALLORY & CO., Inc., INDIANAPOLIS 6, INDIANA

I WILL TRAIN YOU TO START
A SPARE TIME OR FULL TIME
RADIO SERVICE BUSINESS WITHOUT CAPITAL

J. E. SMITH, PRESIDENT
National Radio Institute
33rd Year of Training Men for success in Radio

You Build These and Many Other Radio Circuits with Big Kits of Parts I Supply

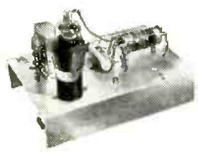
By the time you've conducted 60 sets of Experiments with Radio Parts I supply, made hundreds of measurements and adjustments, you'll have valuable PRACTICAL Radio experience for a good full or part-time Radio job!



You build MEASURING INSTRUMENT above early in Course, useful for Radio work to pick up EXTRA spare time money. It is a vacuum tube multimeter, measures A.C., D.C., R.F. volts, D.C. currents, resistance, receiver output.

You build the SUPERHETERODYNE CIRCUIT above containing a preselector oscillator-mixer-first detector, i.f. stage, diode-detector-a.v.c. stage and audio stage. It will bring in local and distant stations. Get the thrill of learning at home evenings in spare time while you put the set through fascinating tests!

Building the A. M. SIGNAL GENERATOR at right will give you valuable experience. Provides amplitude-modulated signals for test and experimental purposes.



APPROVED for training under G.I. BILL

The men at the right are just a few of many I have trained, at home in their spare time to be Radio Technicians. They are now operating their own successful spare-time or full-time Radio businesses. Hundreds of other men I trained hold good jobs in practically every branch of Radio. Doesn't this PROVE my "50-50 method" of home training can give you BOTH a thorough knowledge of Radio principles and the PRACTICAL experience you need to help you make more money in the fast-growing Radio industry?

Let me send you facts about opportunities in the busy Radio field. See how knowing Radio can give you security, a prosperous future . . . lead to jobs coming in Television, Electronics. Send coupon NOW for FREE Sample Lesson and 64-page, illustrated book. Read how NRI trains you at home in spare time. Read how you practice building, testing, repairing Radios with BIG KITS of Radio parts I send you.

Many Beginners Soon Make Extra Money in Spare Time While Learning

The day you enroll I start sending EXTRA MONEY JOB SHEETS. You LEARN Radio principles from my easy-to-understand, illustrated lessons—PRACTICE what you learn by building, testing and experimenting with parts I send—USE your knowledge to make EXTRA money fixing neighbors' Radios in spare time while still learning! From here it's a short step to your own *full-time* Radio Shop or a good Radio job!

Future for Trained Men is Bright in Radio, Television, Electronics

It's probably easier to get started in Radio now than ever before, because the Radio Repair Business is booming. Trained Radio Technicians also find profitable opportunities in Police, Aviation, Marine Radio, Broadcasting, Radio Manufacturing, Public Address work. Think of even *greater* opportunities as Television, FM, and many new, war-developed Electronic devices become available to the public! Soon, there will be more Radio equipment to install, operate, maintain and repair than ever before in all history! Get the facts on all these opportunities. Send for FREE books now!

Find Out What NRI Can Do For You

Mail Coupon for Sample Lesson, "Getting Acquainted with Receiver Servicing," and my FREE 64-page book. It's packed with facts about Radio's opportunities for you. Read the details about my Course. Read letters from men I trained, telling what they are doing, earning. See how quickly, easily you can get started. No obligation! Just MAIL COUPON NOW in an envelope or paste it on a penny postal.

J. E. SMITH, President, Dept. 7BJ5, National Radio Institute, *Pioneer Home Study Radio School*, Washington 9, D. C.

I Trained These Men — SPARE TIME RADIO BUSINESS

"I have a spare time Radio and Electrical business of my own which has been very profitable, due to the efficient training I received from your Course. Last year I averaged over $50 a month."—FRED H. GRIFFIE, Route 3, Newville, Pa.

"I am doing radio work in my spare time, and find it a profitable hobby. My extra earnings run about $10 a week. I certainly am glad I took your N.R.I. Course."—FERDINAND ZURBEL, Chaseley, North Dakota.

"About six months after I enrolled I started making extra money in radio. I am a farmer and just work on radios evenings and stormy days. That brought me a profit of $600 in the last year."—BENNIE L. ARENDS, RFD 2, Alexander, Iowa.

I Trained These Men — FULL TIME RADIO BUSINESS

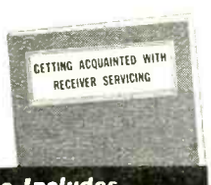
"Not long ago I was working 16 hours a day in a filling station at $10 a week. Now I have my own radio business and average over $60 a week. The N.R.I. course is fine."—ALBERT C. CHRISTENSEN, 116 - 10th Avenue, Sidney, Neb.

"Previous to enrolling for your radio training I made $12 per week in a hardware store. Now I operate my own repair shop, and often clear $35 to $45 a week."—FREDERICK BELL, 76 Golf Ave., St. Johns, Newfoundland.

"Am making over $50 a week profit from my own shop. Have another like to hire N.R.I. graduate working for me. I know radio."—NORMAN MILLER, Hebron, Neb.

SAMPLE LESSON FREE

I will send you a FREE Lesson, "Getting Acquainted with Receiver Servicing," to show you how practical it is to train for Radio at home in spare time. It's a valuable lesson. Study it—keep it—use it—without obligation! Tells how Superheterodyne Circuits work, gives hints on Receiver Servicing, Locating Defects, Repair of Loudspeaker, I. F. Transformer, Gang Tuning, Condenser, etc. 31 illustrations.



My Radio Course Includes
TELEVISION • ELECTRONICS
FREQUENCY MODULATION

GOOD FOR BOTH 64 PAGE BOOK SAMPLE LESSON FREE

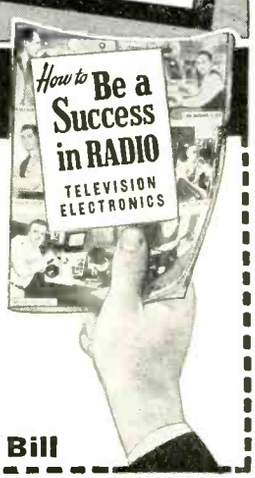
J. E. SMITH, President, Dept. 7BJ5
National Radio Institute, Washington 9, D. C.

Without obligating me, mail your Sample Lesson and 64-page book, FREE. I am particularly interested in the branch of Radio checked below. (No salesman will call. Please write plainly.)

( ) My own Radio Service Business
( ) Spare Time Radio Servicing
( ) Service Technician for Radio Stores or Factory
( ) Aviation Radio
( ) Operating Broadcasting Station
( ) Industrial Electronics
( ) Public Address Systems
( ) Ship, Harbor, Gov't., Military Radio

(If you have not decided which branch you prefer—mail coupon for facts to help you decide.)

Name..... Age.....
Address .....
City ..... Zone..... State.....



Approved for Training Under GI Bill

STANDARD OF COMPARISON

RADIART

"...ELEVEN YEARS OF TROUBLE-FREE PERFORMANCE"

A typical RADIART VIBRATOR TESTIMONIAL

A typical example of the testimonials to Radiart performance which come in to us regularly from Radiart users everywhere is contained in a recent letter from a Mid-Western service man, Mr. W. E. Hopper, of North Vernon, Indiana.

Back in 1935, Mr. Hopper purchased and installed a Radiart Vibrator, type 3315. On October 14, 1946, eleven years later, Mr. Hopper wrote in to order a new Radiart to replace the original which had finally worn out ***AFTER ELEVEN YEARS OF TROUBLE-FREE PERFORMANCE!***

This amazing record is only one of the many in our files attesting to the superiority of Radiart products. Designed to exacting specifications, of the highest quality materials, Radiart Vibrators, Vipowers and Aerials are as perfect as modern manufacturing methods can make them.

Ask to see these quality lines at your jobbers today or write for new illustrated Vibrator Guide and Catalog.

THORDARSON . . . MEISSNER . . . RADIART PRODUCTS
LISTED AND RECOMMENDED BY PHOTO-FACT FOLDERS

ELECTRONIC DISTRIBUTOR AND INDUSTRIAL SALES DEPARTMENT

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4237-39 N. LINCOLN AVE., CHICAGO 18, ILL. U. S. A. CABLE ADDRESS — HARSCHEEL

radio service dealer

Member Audit Bureau of Circulations

Covers all phases of radio, phonograph, sound and electrical appliance merchandising and servicing

VOLUME 8 **Number 2**

February, 1947

CONTENTS

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In & Around the Trade

Being a condensed digest of production, distribution and merchandising activities in the radio and appliance trade.

Initial trade showings of Stewart Warner television sets and of 1947 FM sets, at American Furniture Mart in Chicago, last month. Demonstrating television reception of the console set are Frank A. Hiter, senior vice president of the company (left) and Floyd Masters, radio division manager, Chicago (third from left). Distributors looking on are Harry Ellis, Philadelphia (second from left) and Wendell Kinney of Kinney Bros., Los Angeles, Calif. (right). FM sets include a console and two table models. A new AM set being shown is the post war "Air Pal," a midget AC-DC described as "smaller than a cradle telephone."

MORE FM SETS

Prospects for an adequate supply of FM radio receivers to provide the nucleus of a satisfactory FM listener audience in 1947 are foreseen. Mushrooming production of FM sets in late 1946 indicated an output of between 3,000,000 and 4,500,000 FM receivers for 1947.

Up to April, 1946, fewer than 2,000 FM sets had been made by the entire radio industry. Then the step-up was rapid through June when 17,000 FM receivers were turned out. This figure increased to 22,000 in October and 28,000 in November. Total figures for December are estimated to be between 40,000 and 46,000 receivers manufactured by the industry.

These figures show that FM receiver production had nearly doubled in a period of two months' time, indicating a decided trend toward the expected large FM production in 1947.

While the total FM output in 1946 was less than 1.5 per cent. of the total number of home radios marketed, this ratio will change sharply in 1947. *Well-informed radio manufacturing executives have estimated variously that between* 20 *and* 30 *per cent. of this year's receivers will contain FM. By the end of* 1947, *the industry will be turning out FM receivers at the rate of* 5,000,000 *a year.*

From an address by Dr. Ray M. Manson, president of Stromberg-Carlson Co., before the first general session of the Frequency Modulation Association in Washington, D. C.

Stromberg-Carlson, had produced through December 13, one-sixth of the total output of FM receivers last year. All new floor models and all straight table models retailing at more than $60 in 1947 will contain facilities for AM-FM reception.

While the prospects for a sufficient number of FM receivers to start off all the new FM broadcasting stations with a sizeable audience are not bright for this year it must be recognized that in many cases temporary low transmitter power will be a decided handicap and will require intelligent treatment.

Here is a case where cooperation between the FM broadcaster and the local radio dealer will pay big dividends in promoting as well as providing correct installation of new FM receivers to obtain good operation in the initial restricted service area of the FM station, expanding into the larger service area when the transmitter power is increased to the permanently assigned value."

Air King Distributors

Washington Distributors, 115-117 Madison Street, were appointed exclusive distributors in Oregon, Washington, Idaho, Montana, and Alaska, for the Air King Radio, product of the Air King Corporation, a division of the Hytron Radio and Electronics Corporation of Brooklyn, New York.

New Olson Catalog

A new 48-page catalog has just been published by Olson Radio Warehouse, Inc., 73 East Mill Street, Akron, Ohio. This new book has been made to a special size, so that the radio serviceman can conveniently carry it in his pocket.

An outstanding feature is uniform column width. The two and a half pages listing available tubes are uniformly set up with easy-to-read rock-bottom prices. Every column of listings on the other pages are evenly set, and at a glance the full description, picture and price of the part can be noted. A new catalog will be published every thirty to sixty days, so that the customers will always know what items are in stock and the exact price. Scattered throughout the book will be found an abundance of Olson big bargains.

All radio servicemen are urged to write for the catalog at once. The first edition is limited because of the paper shortage.

(*See page* 6)

SYLVANIA NEWS
RADIO SERVICE EDITION

FEB. *Prepared by* SYLVANIA ELECTRIC PRODUCTS INC., Emporium, Pa. 1947

A PERFECT COMBINATION FOR A COMPLETE SERVICING JOB: SYLVANIA TUBES PLUS SYLVANIA TESTING EQUIPMENT

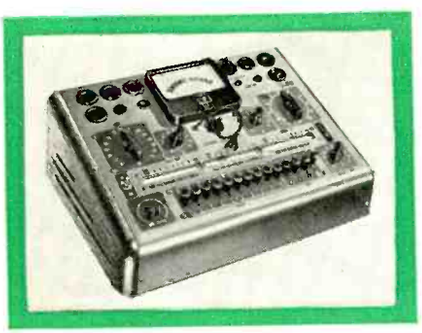
Now, in addition to selling the best in tubes, radio servicemen can simplify their testing and trouble-shooting job with the latest and finest in testing equipment.

The same high standard of manufacture that has always distinguished Sylvania Radio Tubes has been incorporated into these accurate, new instruments. This Sylvania high-quality combination — tubes plus testing units — means that you will be able to give methodical, dependable service easily and economically. Remember to take advantage of this combination now.

COUNTER TUBE TESTER

Here's the last word in counter testers — made by the men who have tested tubes by the million. Not only does it test every type of radio tube in common use today, but provision has been made to permit quick adaptation to new tube types.

The Sylvania Counter Tester Model 139 is *styled* as carefully as it is engineered. Its smart two-tone green panel, with its white dial markings, is in harmony with the surroundings of the most progressive radio store. Compact, Portable Tube Tester Model 140 also available.



POLY (MULTI-PURPOSE) METER

The Sylvania Poly (MULTI-PURPOSE) Meter Model 134 provides, in a single compact instrument, the means of making a multitude of electrical measurements and tests. Electrical values measured include audio, A.C. and R.F. voltages (up to 300 mc); D.C. voltages from 0.1 to 1,000; direct currents from 0.1 milliampere to 10 amperes; resistances from ½ ohm to 1,000 megohms.

Instrument is compactly built, attractively styled, includes all essential accessories.

OSCILLOSCOPE, TYPE 131

This instrument is especially useful in rapid receiver alignment and trouble-shooting. Controls are easily accessible. Hood shades face of 3-inch cathode ray tube permitting use of instrument in well-lighted room. The cathode ray tube is shock-mounted and shielded against stray fields.

Cabinet is steel construction, ventilated with louvers, and finished in attractive pearl-gray baked enamel. Easily carried; weighs only 18 pounds. Eight-foot power cord provided for quick installation.

SEE YOUR SYLVANIA DISTRIBUTOR, or write to Radio Tube Division, Emporium, Pa.

SYLVANIA ELECTRIC

MAKERS OF RADIO TUBES; CATHODE RAY TUBES; ELECTRONIC DEVICES; FLUORESCENT LAMPS, FIXTURES, WIRING DEVICES; ELECTRIC LIGHT BULBS

Ben French to Photofacts

Howard W. Sams & Co., Inc. announces the appointment of Mr. B. V. K. French as Director of Field Relations. Mr. French began his active radio career in 1923 when he joined the Federal Telephone and Telegraph Co., of Buffalo, as a development engineer. Two years later he became a member of the radio engineering staff of the American Bosch Company, where he played an important role in the development of the first all-wave sets, auto radios and personal type receivers produced by that firm.

In 1933, Mr. French joined the staff of the RCA License Division Laboratory in New York City. During 1935 and 1936 he was Chief Engineer for the Case Electric Co. of Marion, Indiana. Early in 1937 he entered the engineering department of the P. R. Mallory Co., of Indianapolis, where he was responsible for the introduction of push button station selection and wave band switching, and where he supervised the electrical design of the original push button radio switch. As head of the field engineering department at Mallory, Mr. French was an active member of the various components standardization committees of the Radio Manufacturers Association.

During the early part of the war, Mr. French served on the Joint Army-Navy Standardization Board. Late in 1944 he became supervisor of the Mallory Research Laboratory established in New York City for the further development of the Type R-M Mercury Dry Battery which was extensively used by the armed forces. Mr. French is a senior member of the Institute of Radio Engineers and has served as Chairman of the Connecticut and Indianapolis sections.

Don't Waste Time Figuring How to Take It Apart

PHOTOFACT* FOLDERS give you complete disassembly instructions

Do you lose valuable time discovering how to take out chassis, speakers and record changers from some of the new combinations? Are you familiar in all cases with *the proper sequence of removal?* Whenever the procedure is complicated, PHOTOFACT FOLDERS give you complete disassembly instructions—enable you to do an efficient job without damaging panels, dials, grilles or any other parts of the set. Better still, you're sure of getting them back together again in the quickest possible time.

That's not all PHOTOFACT FOLDERS do. They make it easy to diagnose trouble, locate defective parts, decide on adequate replacements and *get them in a hurry.* They do this by means of exclusive numbered photographs, full-page easy-to-read schematics, complete parts listings, record changer analyses and many other helps that assist you in making *up to twice as many repairs a day.*

PHOTOFACT FOLDERS are the result of actually examining and testing the instruments covered. They are based on *original research*—not on "canned" or copied information. They cover *all* the latest radios, phonographs, record changers, recorders, communications systems and power amplifiers. Sent to you in sets of 30 to 50 folders, they cost only $1.50 a set. This includes membership in the Howard W. Sams Institute. Actually they cost you nothing for they pay for themselves over and over again in time saved.

Over 25,000 radio service engineers use and depend on them! Give servicing worries the go-by! Spend less time, do better work—and more of it—by seeing your distributor or by using the convenient coupon.

PUBLICATION DATES
Set No. 13 . . . February 10
Set No. 14 . . . February 25

Cut this out and MAIL OR TAKE IT TO YOUR DISTRIBUTOR. If you do not know his name and address, send it directly to Howard W. Sams & Co., Inc., 2924 East Washington Street, Indianapolis 6, Indiana, and we will see that your nearest distributor gets it. In Canada, write to A. C. SIMMONDS & SONS, 301 King Street East, Toronto, Ontario. Canadian Price, $1.75.

- ☐ Send Set No. 14 (Feb. 25)
- ☐ Send Set No. 13 (Feb. 10)
- ☐ Send Set No. 12 (Jan. 25)
- ☐ Send Set No. 11 (Jan. 10)

☐ Send me Volume 1 (including Sets Nos. 1 to 10) with De Luxe Binder, $18.39. Individual Sets Nos. 1 to 10, $1.50 each.

☐ Send me a De Luxe Binder (at $3.39)

My (check) (money order) (cash) for ..... is enclosed. (If you send cash, be sure to use registered mail.)

PLEASE PRINT

*Name*_____

*Address*_____

*City*_____ *Zone*____ *State*_____

*Company Name*_____

*My Distributor's Name*_____

*City*_____

*Trade Mark Reg.

HOWARD W. SAMS & CO., INC. RADIO PHOTOFACT SERVICE

In Canada—write to A. C. SIMMONDS & SONS, 301 King Street East, Toronto, Ontario

with the publisher . . .

Dollars and Sense

DURING January executives and industrialists around the country managed to get themselves quoted in various periodicals on what they predicted would be the 1947 sales volume for their particular lines of business. Munitions manufacturers excepted, all forecast that 1947 sales would break all known records. Many prefaced their prediction with an "if" . . . "if" being: "IF" the supply of materials is not cut down because of strikes or shipping difficulties.

We are now well started into 1947. Labor, management and government seem to have mellowed toward each other to such an extent that one can almost feel complacent about production schedules in the months ahead.

All through 1946 manufacturers increased their production runs and finally managed, by year-end, to provide their dealers with display models. Final reliable figures are not available yet, but it is quite probable that when they are they will show that in 1946 over 14 million radios were bought by the public; one and a half-million washers; two million vacuum cleaners and two million refrigerators; six million electric irons and a half-million electric ranges. Mind you, these figures represent what the public probably bought, and not what manufacturers made. In some cases over 60% of what a manufacturer produced was shipped for display.

The servicing profession, because of improved management and sounder business practices achieved a new all-time high during 1946 in both dollar volume and percentage of profit. A fairly substantial percentage of firms who are primarily engaged in selling at retail reverted to their pre-war trend of not operating their own service department, preferring instead to "farm out" on a fee or percentage basis all their installation and service work to a nearby servicing organization that does not sell anything at retail.

Many parts jobbers that did service work at retail during the war have finally gone back to wholesaling exclusively again now that the pressure of shortages is removed, and they leave the service field to servicers who are entitled to non-competition from their suppliers. From every angle the servicing picture is brighter than ever before. During 1947 it is expected that several hundred thousand video and possibly two and a half-million FM receivers will be made and sold. Each such set will require technically competent installation for which a fee will be paid by the buyer resulting in a substantial profit to the installer. And adding to the service-dealer's bright prospects is the fact that replacement tubes and parts are again more easy to obtain. This circumstance allows technicians to put more sets back into operation, and continuing the circle, enhances the prospects of more and more potential service work. only a small percentage of the new autos now being delivered have radios already installed and this opens a profitable field for service-dealers and installers. Then, to wind up this squib, let's not overlook the tremendous potentials of the sound field; selling, renting, installing and servicing all types of PA and sound distribution systems. The last phase of radio trends, the servicing of electronic apparatus, is fast shaping up. More will be said about this in subsequent issues.

Citizen Transceivers

THE F.C.C. has recently issued new suggestions in regard to radio's very interesting post-war possibility, Citizens Radio. It is proposed by the commission that the band be divided into three parts: 460-462 MC for fixed stations having .02% frequency tolerance; 468-470 MC for stations with .02% tolerance and 462-468 MC for all classes of stations. Excessive interference in heavily populated areas would thus be surmounted and yet there would not be too many handicaps against building low priced apparatus. Of course the more expensive and critical receivers will be crystal controlled. But by and large, now that production of home receivers is well under way, the factory boys will be finding it possible to get their plans for Citizen Radios whipped into shape,

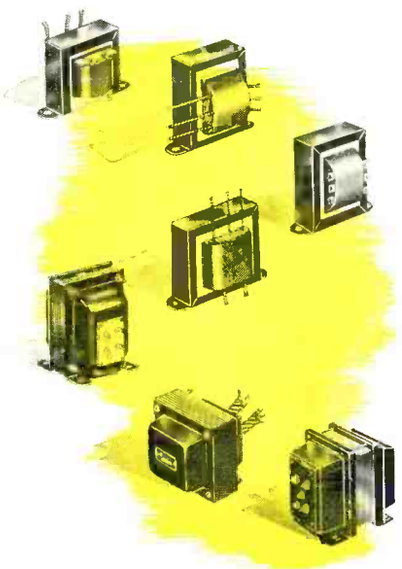
Price Trends

SINCE OPA passed out of the picture what we've claimed since cessation of hostilities has been borne out. We expressed it is our opinion that the general public could and would control price levels if given an opportunity to do so. Food and consumer durable goods prices are substantially lower today without OPA than they were during OPA's bungling postwar era. Free enterprise allows manufacturers to fight for their share of business and eventually this reflects in lower prices to consumers. The main thing for service-dealers to bear in mind is this: study your cost and overhead figures carefully day after day and be sure that your merchandise and services are always sold at a price level that affords a proper profit return on every transaction you engage in.

S. R. Lowan

Publisher

where you see the name STANCOR you can count on QUALITY



STANCOR stands for the highest standard of transformer performance . . . Wherever you see the black-and-yellow STANCOR merchandise display, you know you can rely on the product and the distributor who stands behind it. Yes, STANCOR stands foremost with radio service men . . . for the most complete selection of Replacement and General Purpose Transformers . . . and for advanced designs and universal application . . . Now, STANCOR adds new streamlined plant facilities to serve you better and faster . . . to help you make your service business bigger and more profitable.

standardize on STANCOR TRANSFORMERS

STANDARD TRANSFORMER CORPORATION • CHICAGO, ILL.

NEW . . . Simpson Model 305RC Tube-Tester with "No Backlash"* Roll Chart

With the addition of the new Simpson "No Backlash"* Roll Chart to the 1947 version of our Model 305, this famous instrument becomes beyond question the finest tube-tester on the market in its price range. Read the description of this new Roll Chart in the panel below.

Model 305RC provides for filament voltages from .5 volts to and including 120 volts. It tests loctalc, single ended tubes, bantams, midgets, miniatures, ballast tubes, gaseous rectifiers, acorn tubes, Christmas tree bulbs, and all popular radio receiver tubes.

Like other Simpson tube-testers, the Model 305RC incorporates 3-way switching which makes it possible to test any tube regardless of its base connections or the internal connections of its elements. This method, the result of exhaustive research and expensive construction, protects the Model 305RC against obsolesence to a degree not enjoyed by competitive testers. No adapters or special sockets are required. In addition to having a complete set of sockets for every tube now on the market, this tester has a spare socket, to provide for future tube developments.

The Model 305RC has provision for testing pilot lamps of various voltages as well as Christmas tree bulbs. It tests gaseous rectifiers of the OZ4 type—also tests ballast tubes direct in socket for burnouts and opens. Has neon bulb of proper sensitivity for checking shorts. This tube-tester is fused, and has the latest improved circuit. It provides for line adjustment from 100 to 130 volts, with smooth vernier control.

Model 305RC is distinguished for its beautiful exterior. It has a two-tone metal panel in red and black on a satin-finished background. Sockets and controls are symmetrically arranged for quick operation. The large, modern, fan-shaped instrument has an exceptionally long scale. It has "good" and "bad" English markings, also a percentage scale for matching and comparing tubes. Cases, both portable† and counter style, are made of strongly built hardwood, durably and beautifully finished.

Size, 11"x11"x6". Wt. 10 lbs. Shipping wt., 15 lbs.
Dealer's net price, portable or counter model.....**$59.50**
For 60 cycle 115 volt current only.
For 220 volt or 60 cycle, add..... **7.50**
Standard Model 305, with book-type speed chart **49.50**

Counter Model 305RC. Same instrument as portable model, but set in fine walnut finished hardwood case, with tilted, easy-to-use panel.

†Finished hardwood cases are standard on portable models. When these are not available, the instrument is housed in attractive simulated-leather covered case.

*6 Exclusive Features Make This the Finest Roll Chart Ever Designed for Tube-Testers . . . . . .

- "No Backlash" feature of this Roll Chart automatically takes up all slack in the paper chart and, by keeping it in constant tension, makes it impossible to turn the selector wheel without turning chart. Gives precision selection at all times. Also prevents chart from tearing or getting out of alignment.
- Gearing is such that only 6 turns of selector wheel will run the entire length of the 12½ ft. chart.
- Easy to read. The clear Lucite window is just wide enough to show 2 tube settings, or both settings on a multi-purpose tube.
- Entire unit removable by taking out four screws. Just lift from receptacle to make new entries or install new chart.
- Chart ingeniously fastened to rollers, affording easy replacement and constant alignment.
- Rigid, light-weight construction. Gear driving mechanism incorporates heavy-duty precision brass gears and parts.

Simpson

INSTRUMENTS THAT STAY ACCURATE

SIMPSON ELECTRIC COMPANY
5200-5218 W. Kinzie Street, Chicago 44, Illinois
In Canada, Bach-Simpson, Ltd., London, Ont.

FAIR PROFIT MARGINS FOR DEALERS

by JOHN MECK*

WHAT is the radio manufacturer's obligation to his dealers? Indeed, does he *have* an obligation over and above the obvious duty to conduct his relationship with his dealers on an equitable basis?

It is my thinking that he does have, and that, particularly during the present period of readjustment, it is the responsibility of the manufacturer to give his dealers every aid it is in his power to provide. The manufacturer's obligation does not end there, however. It is imperative that the co-operative measures he undertakes should be carefully planned to give the utmost in effective result. Even the best-intentioned gesture is of little use if it is carried out in a haphazard manner.

One of the most important services the manufacturer can render to his dealers is the establishing of the fairest margin of profit he is able to provide.

The ability to do this is dependent upon several things. First of all, it is based on the state of mind of those who set the wholesale and retail price scale. If they are, in the true sense, men of goodwill, they will make every effort to keep jobber and dealer rates at a level which will allow for a reasonable profit for those who devote themselves to the promotion of the company's merchandise.

However, this is not completely a matter of goodwill alone. It requires true engineering skill to evolve manufacturing process which are progressive in result, and, at the same time, reasonable in price. It means also a constant watch over every department of the firm—the office, for example, as well as the engineering department—so that there is no unnecessary waste. In a word, the company must be, in the broadest sense, efficient.

Then too, the manufacturer must be a kind of seer who is able to look into the future and guess, with reasonable accuracy, what the new demands of the public will be in the forthcoming months. This requires a diligent check on new trends in the radio industry among competitors, particularly those whose main interest lies in new development.

At the present, for example, one of the biggest problems of the astute manufacturer is to decide how soon the demand for FM and television will become a matter of major importance. It is his job to anticipate this demand accurately enough to be able to provide equipment for his dealers when they need it—not too soon, and certainly not too late. Dealers must not miss the flood of sales which is bound to eventuate when all the influencing factors are co-ordinated to a point to arouse real interest of the radio-buying public.

Advertising promotion on a national scale is one of the most tangible ways in which the manufacturer can contribute to his dealers' welfare. This takes many forms, of course. Magazines and radio networks offer two of the most potent sources of advertising.

The dealer, however, is basically a local business man whose trade stems from his own community. Although national advertising is of definite benefit to him, he needs, in addition, promotion of a more localized nature. With this thought in mind, I evolved a plan for my own dealers which other manufacturers might find of interest. It consists of an arrangement whereby the company contributes one-quarter of the cost of any Meck radio newspaper advertising bill with the stipulation that another quarter is to be contributed by the jobber, and the remaining half by the dealer himself. It is proving to be a real incentive toward helping the dealer to help himself. At the same time, it is a very real assurance of the company's interest in establishing him in his own locality.

Dun & Bradstreet tells us that at present 2,000 new businesses are started each day in the United States. Each day, also, 1,200 new businesses fail. A certain percentage of these are radio shops. Many of them represent the total capital of G.I.'s who are struggling to regain their footing in a peacetime world. It is our duty —indeed, it is our privilege—to see that these newcomers to our field are aided and encouraged by the manufacturers whose well-being is so intimately linked with the success of these new ventures. We can help best by treating dealers, whether they be new or established, with a real understanding of their situation. And the day may not be too far distant when those of us who make a genuine effort in this direction may find that it was an investment which pays the most satisfying sort of dividend.

President of the John Meck Industries Inc., Plymouth, Indiana

STANDARD WARRANTY FOR PARTS

At its monthly meeting held January 9th, the Association of Electronic Parts and Equipment Manufacturers (EP and EM) made recommendations for the adoption of a standard warranty to be used by manufacturers who sell radio parts distributors. The proposed warranty contains certain provisions intended to bring about uniformity in the handling of defective products. The period of warranty is left for determination by the individual manufacturer. The warranty has been submitted to the Sales Managers Club, Eastern Group, for its comments and will then be submitted to the Radio Parts Coordinating Committee for further discussion.

At the same meeting, the Association announced the admission to membership of Speed X Manufacturing Company of San Francisco, California. No-Ox Laboratories of Los Angeles, California and Feiler Engineering Company of Chicago.

Consideration is being given to the date upon which EP and EM will meet jointly with the Sales Managers Club, Eastern Group during the May 1947 Trade Show.

SIMPLE METHODS OF

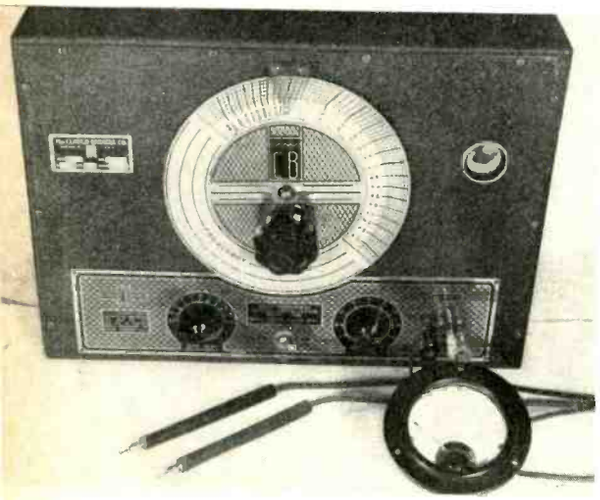


Figure 1. Workbench setup for making measurements at 400 or 1000 cycles. Components: oscillator, crystal diode, milliammeter and test prods.

Direct impedance measurements for voice coils, filter chokes, transformer windings, capacitors & resistors.

by J. PACE

IN receiver and amplifier servicing, as well as in experimental testing, it is helpful to know actual impedance values. Components whose impedances are sought frequently by servicemen include:

loudspeaker voice coils,
audio and filter chokes,
transformer windings,
electrolytic capacitors,
and inductively-wound resistors.

Any trick for estimating impedance values, such as the practice of assuming the impedance of a component, to be a certain number of times its d. c. resistance, cannot give full satisfaction. The results obtained by such means are very approximate and are not even slightly correct in many cases.

Radio men who have been confronted with this problem will be pleased to learn that they can make direct impedance measurements with simple equipment which may be found in most shops. No longer is there any excuse for guesswork. Two simple methods of measuring impedance are explained in this article.

METHOD 1

It will be desirable to measure the impedance of audio components at frequencies near the center of the a. f. spectrum. Usually 400 or 1000 cycles, or both, are employed. Where there is doubt, it will be best to consult manufacturer's specifications. For this measurement, a tunable audio-frequency oscillator with self-contained output (gain) control will be required. The oscillator is standard equipment in all amplifier shops.

EQUIPMENT NEEDED

Simple additional equipment required are a O-1 d. c. milliammeter and a Sylvania 1N34 crystal diode. The crystal diode converts the meter into an a. c. milliammeter. This arrangement is superior to a standard rectifier-type a. c. milliammeter, since the oxide rectifier employed in the latter has a rather troublesome error at 400 and 1000 cycles. The entire setup is, in effect, an ohmmeter operated at audio frequencies and giving direct readings of impedance in ohms.

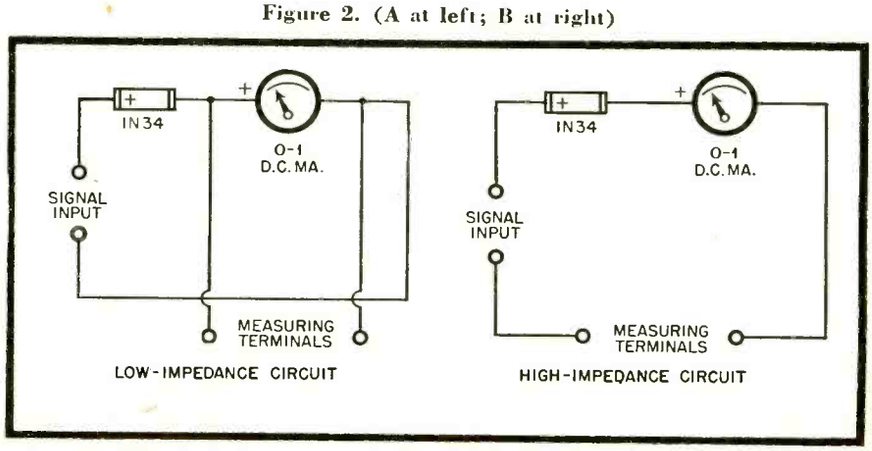
The impedance measuring circuits for Method 1 are shown in *Figure* 2. A 400- or 1000-cycle signal is fed from the audio oscillator into the SIGNAL INPUT terminals. The impedance under test is connected to the MEASURING TERMINALS. For impedances from 1 to 2000 ohms, use the circuit shown in *Figure 2-A*. For impedances from 100 to 10,000 ohms, use the circuit shown in *Figure 2-B*.

The meter first must be calibrated, as will be described later in this article. After calibration, impedence measurements are made as follows:

(1) Connect the audio oscillator to the signal input terminals.

(2) Adjust the oscillator output control to give exactly full scale deflection of the meter with the MEASURING TERMINALS of circuit 2-A *open*—or with the MEASUR-

Figure 2. (A at left; B at right)



Determining Impedances

ING TERMINALS of circuit 2-B temporarily shorted.

(3) Conect the unknown impedance to the MEASURING TERMINALS and read the impedance value in ohms directly from the calibrated meter scale or by referring the milliampere reading to a calibration chart.

This procedure is as simple as checking a resistor with a common ohmmeter.

By including a low-resistance double-pole, double-throw switch, the low- and high-impedance circuits may be combined to provide a dual range impedance meter. The simple combination circuit is shown in *Figure 3*. When the switch is in its LOW position, the unknown impedance is connected automatically in parallel with the milliammeter, as shown in *Figure 2-A*. When the switch is in its HIGH position, the unknown impedance is connected automatically in series with the meter, as shown in *Figure 2-B*.

The photograph, *Figure* 1, shows how the oscillator, crystal diode, milliammeter, and test prods may be set up quickly on the workbench to check impedance in the manner just described. In this photograph, the crystal diode may be seen connected to one of the oscillator output terminals, just above the milliammeter. Some servicemen will favor this sort of temporary setup to tying up equipment in a permanent impedance meter.

METHOD 2

In some cases, 60-cycle impedance measurements will be satisfactory. When this is true, the audio oscillator will not be needed. Instead, 6.3 volts, from the secondary of a small filament transformer, may be applied directly to the SIGNAL INPUT terminals of the impedance meter circuit.

The meter must be set initially to full scale by means of a voltage control (Variac or wirewound potentiometer) connected in the *primary* circuit of the transformer. A voltage control in the secondary circuit will upset the impedance calibration.

Figure 4 shows proper connections for a 60-cycle signal source. *Figure* 5 is a photograph of a temporary workbench setup for 60-cycle impedance measurements. The voltage control shown here is a Variac.

CALIBRATION

Initial calibration of the impedance meter is as simple as using the instrument. The following procedure must be followed:

(1) Set the milliammeter to full scale, as previously explained.

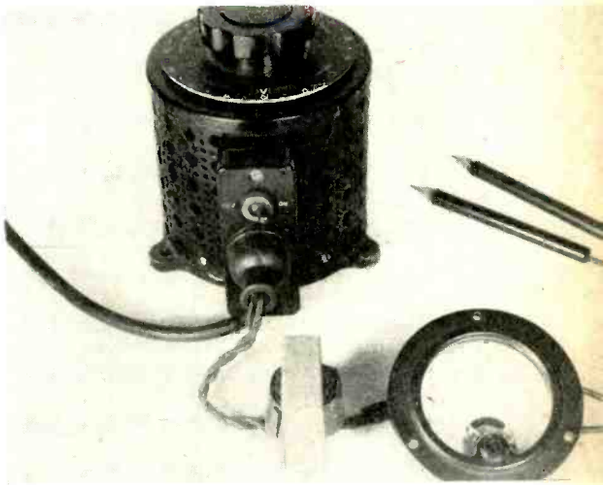


Figure 5. Workbench setup for making 60-cycle impedance measurements. Voltage control is used instead of audio oscillator.

(2) Connect a number of resistors of known resistance value one by one to the MEASURING TERMINALS, and record the meter reading for each of these resistances. Use as many resistances as obtainable with both low- and high-impedance circuits.

(3) Make a chart showing milliammeter readings corresponding to the various resistances—or, better still, draw a special scale for the meter, having it read directly in *ohms*. (*See page* 30)

Figure 3.

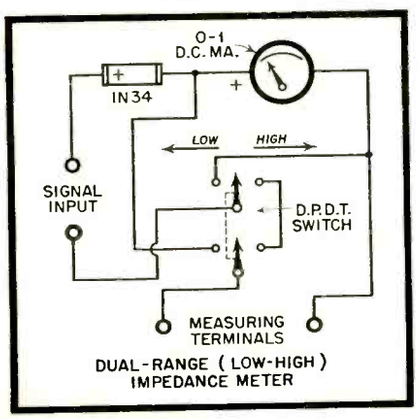
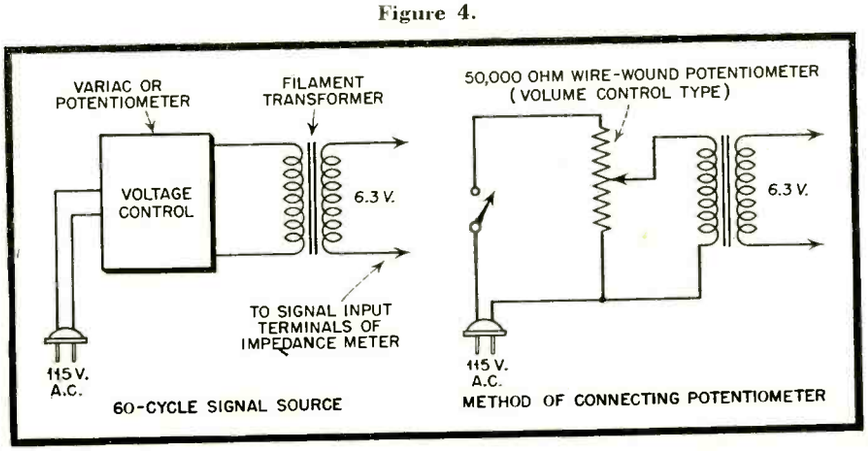


Figure 4.



CIRCUIT COURT

RESISTANCE CAPACITY FILTER, (TELETONE SERIES D)

The Teletone, Series D, illustrates still another variation of the resistance capacity filter for B voltage supply. The rectifier in this case is a 35Y4, loctal version of the usual type. The actual filter action is performed by a two section Pi filter consisting of three 20 mfd. capacitors and a first resistor of 100 ohms, followed by a 1500 ohm section. See *Figure* 2.

At the point marked B+1 power is fed to the 35A5, output tube, plate and the 14A7 I.F. plate. At point B+2 all other plates, and all screens are connected. This scheme provides maximum power output. A notable addition is the 15 ohm resistor in series with the first filter capacitor.

In this position, the resistor serves to limit the charging current to the capacitor, protecting both the rectifier and the filter, particularly when the set is first turned on. Once the initial surge has passed, the resistor has practically no effect on the circuit. As is commonly the case, where the surge protecting resistor is in series with the D. C. output of the rectifier, there is a constant voltage drop across the unit, the voltage being lost to the subsequent tube circuits. All drop across R (*Figure* 2-*A*) is lost in heat!

Figure 2-A.

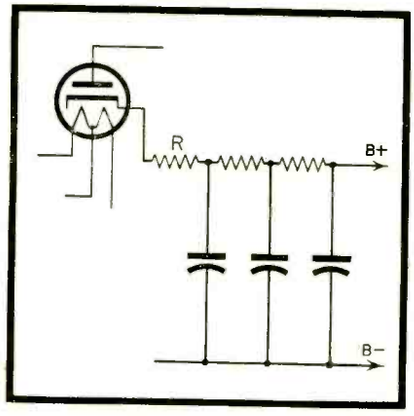
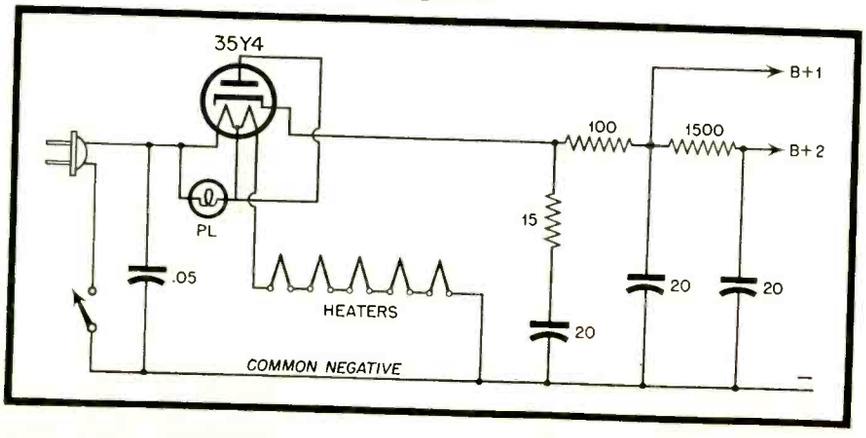


Figure 2.



HIGH AUDIO GAIN "PERSONAL" TYPE, RCA 54B SERIES

Probably a forerunner of many "personal" type receivers to be offered —at least until the so-called proximity fuse tubes come into wider use—the RCA 54B series offers several interesting details. While the circuit is essentially straightforward, it may be of advantage to examine the several variations from usual practice.

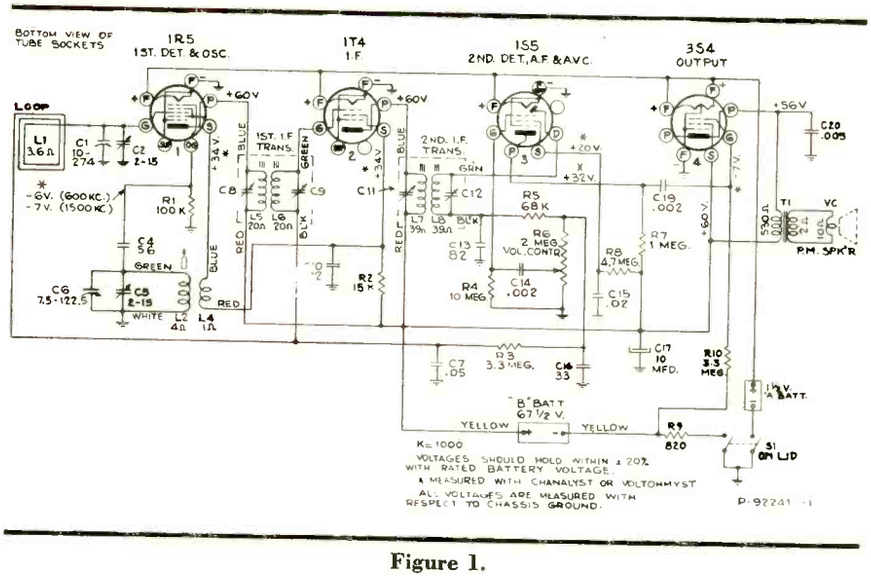
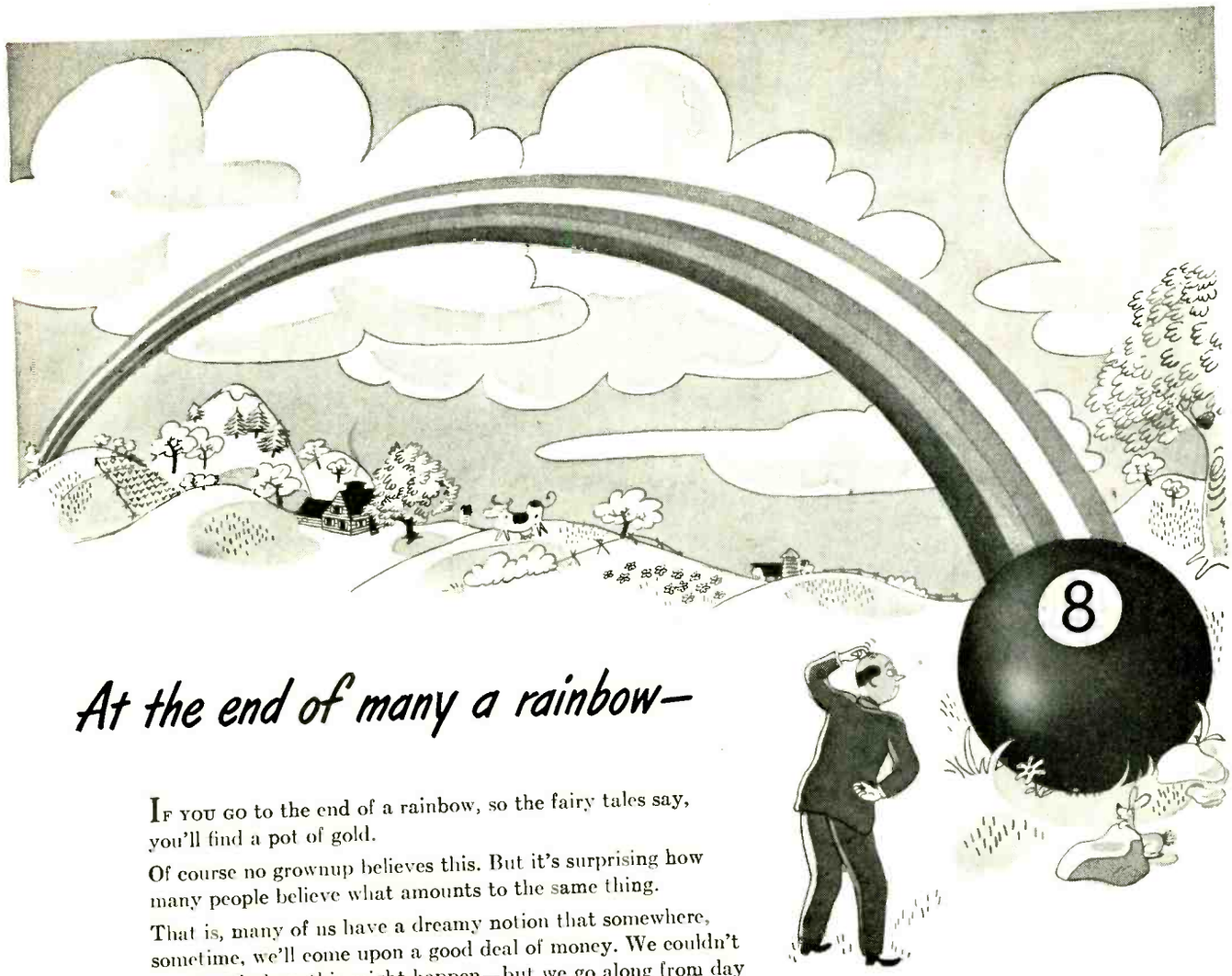


Figure 1.

The circuit, shown in *Figure* 1, shows the tube line-up to be similar to others previously employed. The types IR5 (Mixer), 1T4 (I.F. Amplifier) and 1S5 (Second Detector and First Audio) perform their appointed functions. In this case the output tube is a 3S4 with the two halves of the filament in parallel to provide full output on a single flashlight—type "A" battery.

The "B" circuit is supplied by a 67½ volt battery, which also provides bias for the output stage. It will be observed that a resistor, R-9, 820 ohms, appears in the negative lead of the "B" battery, and that only the grid return of the 3S4 tube connects to the battery, or negative end of the resistor. This arrangement, with the normal plate current drain of good tubes and a new battery, provides a negative potential of 7 volts to be applied to the 3S4.

The 1S5 is self-biased by means of a large grid resistor: 10 megohms. The combination of this element and the very high values of plate load and screen dropping resistors, R-7 (1 meg..) and R-8 (4.7 meg.), effectively prevent excessive B drain and contribute to high audio gain.



At the end of many a rainbow—

IF YOU GO to the end of a rainbow, so the fairy tales say, you'll find a pot of gold.

Of course no grownup believes this. But it's surprising how many people believe what amounts to the same thing.

That is, many of us have a dreamy notion that somewhere, sometime, we'll come upon a good deal of money. We couldn't say exactly how this might happen—but we go along from day to day, spending nearly all we make, and believing that *somehow* our financial future will take care of itself.

Unfortunately, this sort of rainbow-chasing is much more apt to make you wind up behind the eight ball than with a pot of gold.

When you come right down to it, the only sure-fire way the average man can plan financial security for himself and his family is through saving—*and saving regularly.*

One of the soundest, most convenient ways to save is by buying U. S. Savings Bonds through the Payroll Plan.

These bonds are the safest in the world. When you buy 'em through the Payroll Plan, they mount up fast. And in just 10 years, they pay you $4 back for every $3 you put in. They'll come in mighty, mighty handy when the time comes to send your kids to college, to buy a house, or to weather a rainy day.

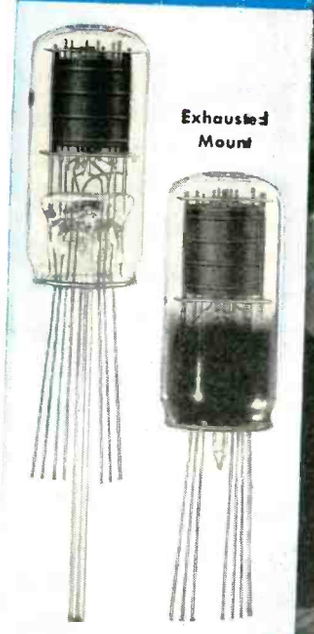
So isn't it just plain common sense to buy every U. S. Savings Bond you can possibly afford? You bet it is!

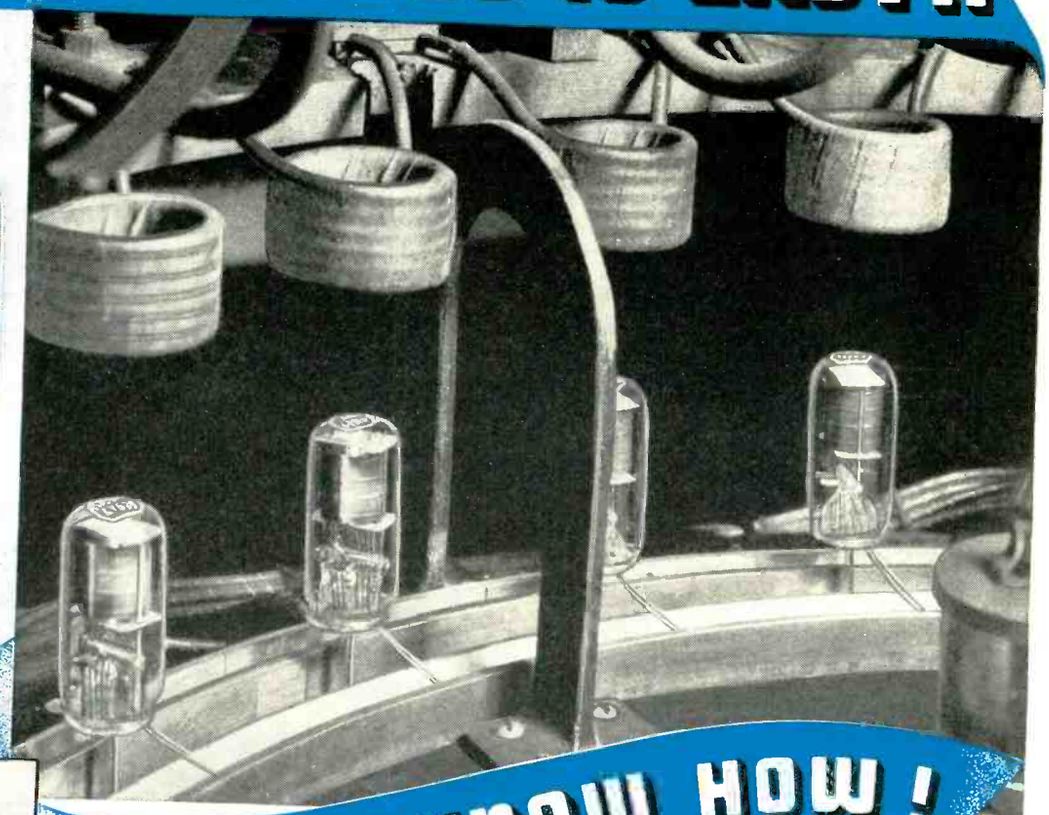
P. S. You can buy U. S. Savings Bonds at any bank or post office, as well as at your place of business.

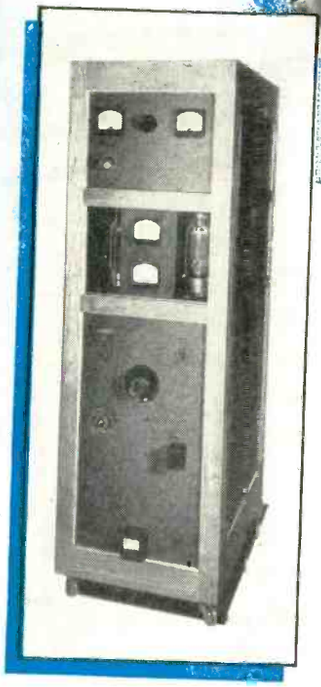
SAVE THE EASY WAY... BUY YOUR BONDS THROUGH PAYROLL SAVINGS

Contributed by this magazine in co-operation with the Magazine Publishers of America as a public service.

MAKING TUBES IS EASY..







If YOU KNOW HOW!

BIG TUBES MAKE LITTLE ONES

That's right. Big power tubes help build little receiving tubes. Secret of the electronic tube is its ability to pass a controlled stream of electrons through a vacuum. During the intricate exhaust process, electronic induction heating assists in creating that vacuum.

The induction heater (small illustration) is a 750-kilocycle, 6-tube, 10-kilowatt power oscillator whose tank coil is coupled to the exhaust coils. Four of these coils poised over Hytron 12SA7GT sealed-in mounts are caught by the camera a split second before the exhaust machine automatically positions them around the mounts.

High frequency current in the coils quickly heats red hot by induction the internal metal parts of the mounts. Gas driven off is sucked through the exhaust tube of each mount by the vacuum pumps. Heater leads riding in the two circular tracks supply filament power to activate each cathode. Also by induction heating, "getters" are flashed to absorb residual gasses. Fingers of gas flame finally melt and seal off the exhaust tubes.

An intricate machine—assisted by electronics itself—performs the ticklish exhaust job easily, speedily. Again know-how supplants the element of human error with the infallibility of the machine. Machine-paced, a sequence of finely-controlled precision operations gives you Hytron tubes of typically uniform quality.

SPECIALISTS IN RADIO RECEIVING TUBES SINCE 1921

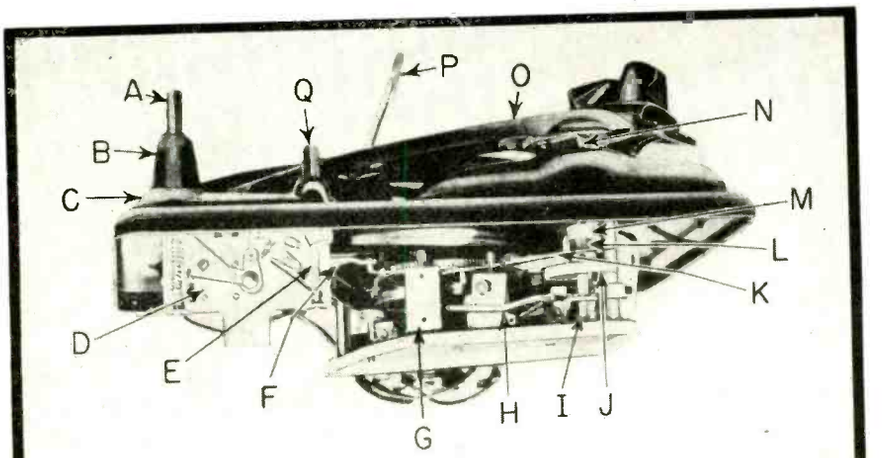
HYTRON

RADIO AND ELECTRONICS CORP.

MAIN OFFICE: SALEM, MASSACHUSETTS

Have you received your copy of the new, comprehensive Hytron Miniature Tube Reference Guide? If not, write for it today.

SERVICING RECORD CHANGERS



A – START AND MANUAL RECORD REJECT PLUNGER SWITCH.
B – MANUAL-AUTOMATIC SETTING COLLAR.
C – SWITCH ASSEMBLY TOP PLATE.
D – SWITCH ASSEMBLY LOWER PLATE.
E – SENSITIVE OFF SWITCH SPRING AND BUTTERFLY TRIP ASSEMBLY.
F – MANUAL TRIP LEVER.
G – AUTOMATIC AND TRIP ROLLER ASSEMBLY.
H – TONE ARM RAISING LEVER.
I – SHAFT MOUNTING FOR CLUTCH-TRIP FINGER AND TONE-ARM RAISING DISC.
J – TONE-ARM RAISING DISC.
K – TRIPPING FINGER.
L – CLUTCH COMPRESSION SPRING.
M – CLUTCH ADJUSTMENT COLLAR.
N – TONE-ARM REMOVING AND ADJUSTING ASSEMBLY.
O – TONE-ARM ADJUSTING SET SCREW.
P – SPINDLE.
Q – OFF SWITCH PLUNGER.

Drawing A. (For guide to key indications, see page 19).

On-bench experiences in servicing, repairing and adjusting automatic record changers supplied with recent model radio sets

by J. J. CARROLL

AS with all automatic record changers, without exception, there comes a time when they will go out of order and will require some adjustment. The Webster Model 56 is no exception to this rule. From comparing notes with other radio servicemen and from my own personal experiences I have found the Model 56 one of the easiest on which to make adjustments. The chief reasons for this are that the adjustments are in very accessible locations and most adjustments on the unit can be made with a screw-driver, a pair of pliers, a can of good quality light oil and two size number eight (#8) Bristol wrenches.

For almost a year now we have been servicing and making adjustments on the Webster Model 56 and have kept notes on all of the common ailments and have also noted the adjustments used to correct these ailments.

Listed in the order of their frequency they are:

1. Automatic trip fails to function.
2. Motor will not shut off after last record is played.
3. Manual trip fails to function.
4. Pick up arm action intermittent on automatic operation.
5. Automatic mechanism trips before coming to end of record.
6. Pick up arm will not raise enough to play full stack of records.
7. Tone arm will not drop on record lead groove.
8. Two or more records drop at once.

9. Records drop on tone arm.
10. Records break.
11. The "ON SWITCH" will not start the motor.
12. Audible click heard during cycle.
13. The turntable runs unevenly and "WOWS."
14. The tone arm locks in manual position.
15. Tone arm will not seat itself in its rest position on top of the "off button."
16. Tone arm drops on rubber pad.
17. Changer trips at start of record.
18. Needle sticks in groove.
19. Reject button will not trip mechanism.

Analyses of these service requirements are detailed in the following text.

Figure B.

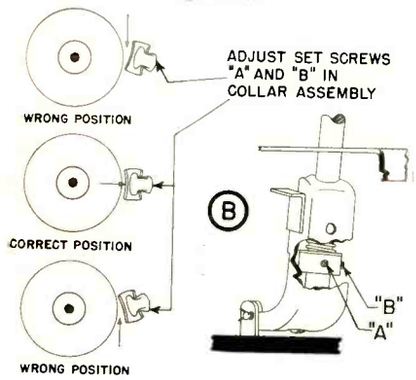


Figure C.

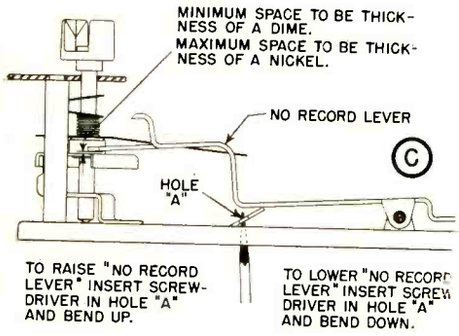
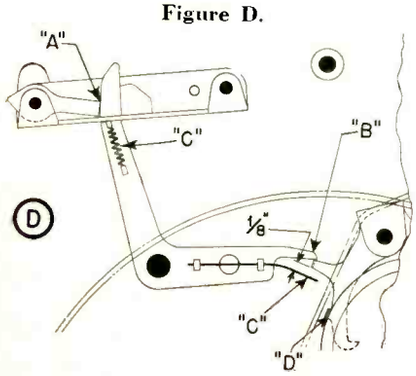


Figure D.



1. The automatic trip mechanism on this changer is of the velocity type and should function whenever the pickup arm moves toward the spindle ⅛ inch in any ½ cycle of the turntable. NB: After the arm has moved in 1" on a 10" record.

TROUBLE	CORRECTION
Automatic trip finger too loose (A-M).	Increase clutch tension.
Velocity trip and roller assembly binding (F-B).	Reset bent part and lubricate.
Manual trip lever binding at rivet (D).	Lubricate and work free. *Do not permit oil to get in clutch.*

2. This trouble can be caused by either the "No Record adjustment" going out of line or some part of the "off mechanism" switch becoming defective.

"No Record" adjustment out of line (C).	Bend lever up or down.
Off switch won't actuate (A-E).	Hair spring binding on shaft.
Off switch won't actuate (A-Q).	Shaft binding in collar.
Off switch won't actuate (A-E).	Bend up pin thru butterfly.

If you locate the trouble in the switch assembly you may find it best to follow the manufacturer's recommendation, that is, to return this switch assembly to the factory. However there may be a few there so you may want to try yourself before doing so. If you should find it necessary to use a lubricant, only a very fine light oil should be used and then absolutely no oil at all should be put on the off plunger hair spring. The tension is so set, that no further drag can be tolerated.

3. The manual trip lever has as its main functioning part a 2½-inch straight spring attached to its end. This spring is attached by force fitting it through a slot and then bent to its proper angle. While we are on the subject of this lever, it would be good to note that in the earlier models of this changer there was frequent trouble caused because the lever would travel back and forth unrestrained. However the manufacturer has corrected this by placing a coil spring from the lever to the frame which will allow it to work only when the trip lever button is depressed.

Manual trip mechanism won't work (D-C).	Spring bent too far back. Spring loose in holder. Spring missing from holder.

4. The tone arm is held in position in its socket by a shaped spring clip with a short pin on either side of the "U". It is possible that in transporting the changer or rough handling of the tone arm that it may work its way loose.

Tone arm action erratic (A-N).	Set tone arm back in socket.

5. Doesn't finish playing records.	Changer not level.
Doesn't finish playing records. (D-B).	Check for excessive vibration. Manual trip lever traveling. If early model—install spring.
6. Insufficient rise on pickup arm. (A-H).	Remove lever and bend up.

7. This adjustment lever screw set on top of tone arm itself has been discussed in an earlier paragraph. Let's hope that other manufacturers will follow Webster's example in this case.

Arm drops short of record (A-O).	Move adjustment clockwise.
Arm drops too far into record (A-O).	Move adjustment counter-clockwise.

Figure E.

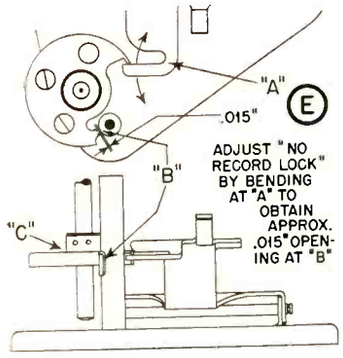


Figure F.

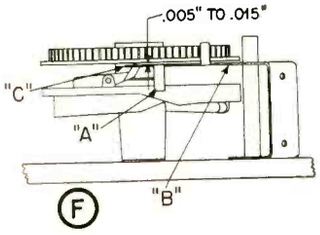
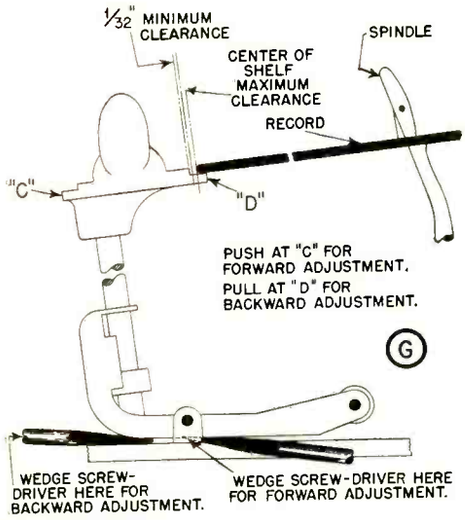


Figure G.



KEY TO DRAWING REFERENCES IN TEXT

Text under "trouble" headings is keyed with drawings, of which there are 7, identified by letters A to G inclusive. The first letter refers to a drawing, the second letter to the part shown in that drawing. Thus A-Q in text means drawing A, part Q; E-B in text means drawing E, part B. Effort has been made to place drawings near related text wherever possible.

8. This trouble is almost entirely confined to the way the records seat themselves on the "Spindle" lip and the "Record Platform" lip, or the type records used as extra thin in diameter. I have seen records play on this model Webster that would not play on other manufacturers' machines, but then every changer does have its limits. *So, don't overlook the possibility that the records may be of the "war born" very thin type.*

TROUBLE	CORRECTION
More than one record drops at once.	Records not seated properly.
More than one record drops at once.	Records extra thin type.
9. One or more records drop on tone arm (B).	Record platform at incorrect angle.
10. Record centers or edges break (B).	Record platform too close to spindle.
11. "On switch" won't function (A-D).	Open contacts on switch.
"On switch" won't function (A-A).	Plunger shaft binding.
"On switch" won't function (A-D).	Broken wire.
"On switch" won't function (A-D).	Switch contacts spread too far apart.
12. This rhythmic click is caused by the velocity trip and roller assembly being out of adjustment or bent.	
Audible rhythmic click (F-A).	Adjust lip on trip and roller assembly.
Audible rhythmic click (D-C).	Wire on manual trip finger bent too far in.
Turntable thumps and vibrates.	Fibre gear teeth broken. Turntable edge dented. Roller assembly hook bent up.
13. There are usually only one or two things that will cause this kind of trouble. The main one being that some lubricant found its way on to the rubber idler wheel or the turntable drive surface. Any foreign material getting on to these surfaces will cause the turntable to run unevenly, and give off the familiar "wow" sounds. In the category of foreign materials we have always looked for, and have often found, that some of the "mohair type" flocking had worked its way loose from the turntable surface and was drawn underneath onto the idler wheel or the turntable surface itself. This is most commonly found when the machine is used for about a week or so.	
Turntable runs "off" speed. Turntable "wows."	Remove lubricant on idler wheel. Remove flocking on turntable drive surface.
14. Tone arm locks in manual position (E-A).	Hook on "No Record Lock" is bent too far down. Bring hook up slightly.
15. Tone arm slips from "Off" button (E-B).	The hook on the Tone Arm Raising Disc should be bent a little away from where it seats itself, so as to rest in groove.
16. Tone arm will not actuate on automatic (E-C).	Tone Arm Raising Disc should be adjusted by loosening one Bristol set screw* and tightening the other, so that the lever operating this disc will catch in the start groove.

(*See page* 34)

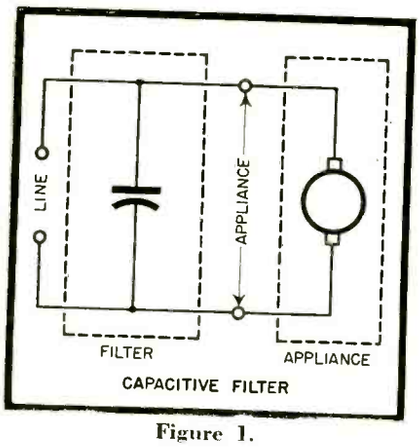


Figure 1.

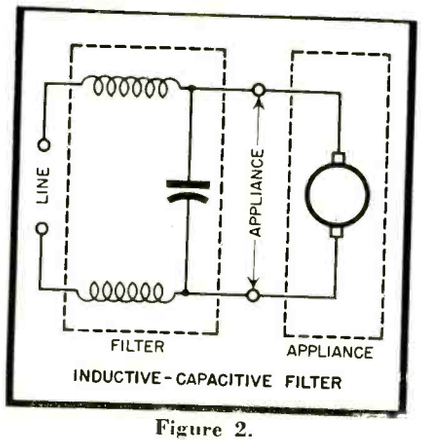


Figure 2.

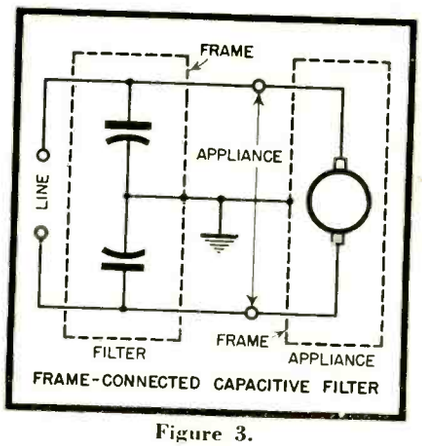


Figure 3.

HOW TO BLOCK THAT

A Shop Notes Feature

by S. L. MARSHALL

Electric appliances or devices which develop sparks in any form will cause noise interference in radio receivers. This is due to the radio frequency energy generated by the spark. This energy is in the form of a radiated waves covering a wide frequency range, so that, the interference is observed all over the dial. This energy may also enter the receiver by direct conduction through the common power line. Suitable filtering and shielding will reduce, considerably, this type of interference. There are, at present, a variety of such filters on the market. Their circuit and applications are now explained.

Motors, etc.

The simplest type of noise filter for appliances using motors is a condenser shunted across the device causing the disturbance. See *Fig.* 1. Where a maximum reduction of interference is desired the capacitive-inductive type of filter shown in *Fig.* 2 is recommended.

The foregoing filter circuits apply to devices which are not contained within metal housings. Where a metal frame houses the appliance, more effective reduction of interference is obtained by use of the filter circuit illustrated in *Fig* 3. Observe that the center-tap of the filter condensers connects to the housing of the appliance and is grounded. This reduces both line noise and radiation interference. At this point it might be well to point out that much of the latter type of interference can be eliminated by suitable placement of the receiver with relation to its distance from the source of interference.

Maximum noise reduction is effected by use of the filter circuit illustrated in *Fig.* 4. This circuit uses a capacitive-inductive type of filter with the condensers center-tapped and connected at this point to the metal housing of the appliance. A good ground connection should be made from this point.

Oil Burners

A fifth type of noise eliminator is illustrated in *Fig.* 5. This circuit applies to oil burner installations where the atomized oil fuel entering the combustion chamber is ignited by gas-electric or electric ignition. A capacitive-inductive filter is used. For optimum results the following additional measures should be taken

1. Bond all housing members to a common ground with heavy, low-impedance connections. If the burner is a conversion unit wrap a suitable screen mesh around as much of the burner as possible.
2. Insert suppressor resistor (10,000 ohm, 5 watts) in the secondary leads of the ignition transformer.
3. Shield the connection between the secondary of the ignition transformer and the spark electrode.
4. Run all connecting leads through BX or conduit.
5. Locate filter as close as possible to the ignition transformer, keeping all connections as short as possible.

Flashers, etc.

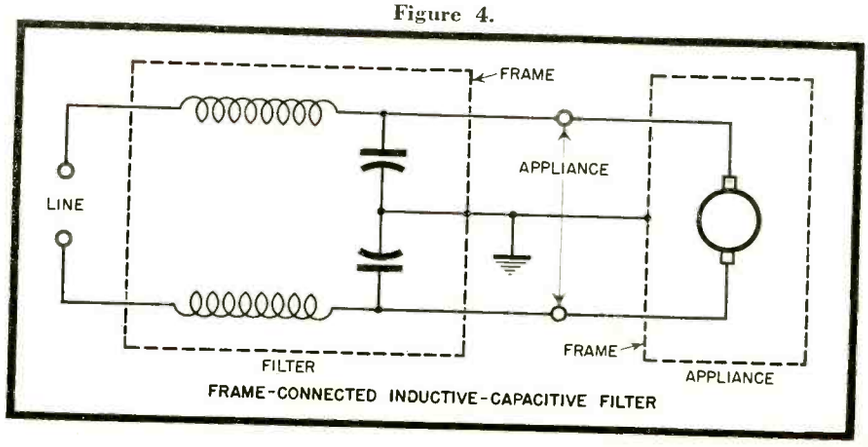
Electric circuits in which momentary contacts are employed, such as in signs, flashers, etc., often give rise to serious radio disturbances. *Fig.* 6 illustrates a circuit which effectively reduces this type of interference. Notice that the filter inductances, the breaker contacts, and the load are all in series, and that the center-tap of the condensers connects to the appliance housing and is grounded at that point.

Fluorescent Fixtures

The reduction of fluorescent tube noise depends on two factors:

1. The amount of noise induced directly through the line—which noise can be reduced considerably by means of a filter such as the one illustrated in *Fig.* 4.
2. The amount of radiated interference—which may be reduced by remov-

Figure 4.



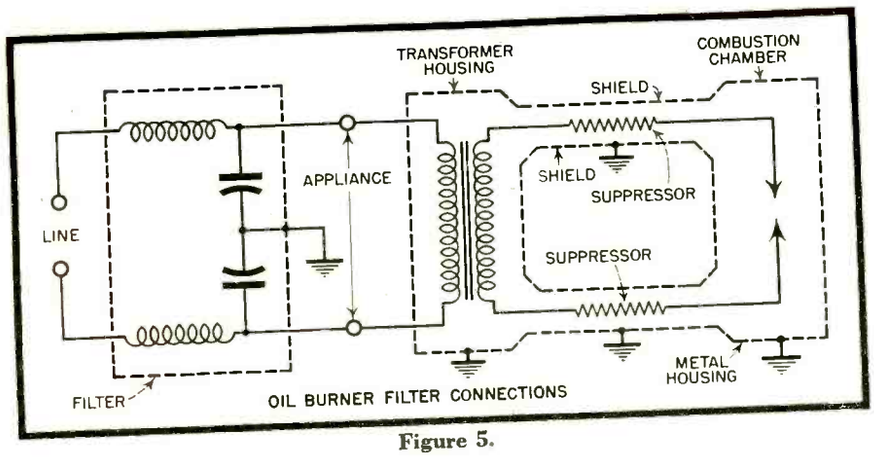


Figure 5.

INTERFERENCE

ing the receiver beyond the influence of this field. Some cases have been reported where the radiated field was reduced considerably by winding a thin wire around the tube and connecting one end of the wire to the grounded frame.

The following service notes on Zenith receivers is made available by their Service Department.

ZENITH 7A02-7A04

Dead—48-mmfd. condenser on automatic may be grounded against automatic frame or latch bar.

ZENITH 12A3

Hum—Change 6J5 in first audio socket.

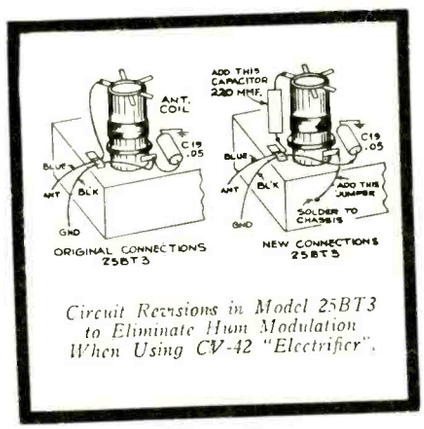
ALL CHASSIS—ZENITH

Weak short wave—Open R.F. choke in plate circuit of 1232 tube.

Noisy—Dial rubbing against escutcheon. Stator lugs on braid of gang condenser rubbing against side of opening in chassis. Make sure all locktal type tubes are firmly seated in sockets.

Cannot be aligned—Check for open or rosin connection on primary winding of wavemagnet.

Overloads—Usually due to open resistor in A.V.C. circuit of first detector.



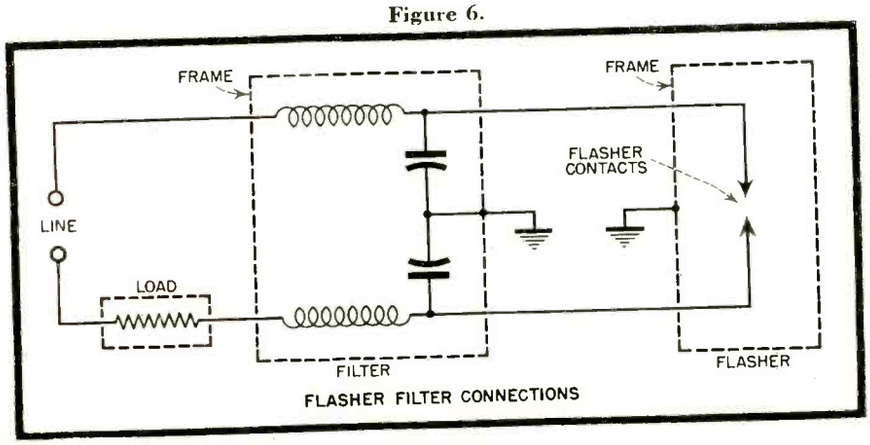
Circuit Revisions in Model 25BT3 to Eliminate Hum Modulation When Using CV-42 "Electrifier".

Figure 7.

R. C. A. VICTOR 25BT3

Hum Modulation with CV42—The changes shown in the accompanying sketch, *Fig.* 7, are recommended to eliminate hum modulation when using Model 25BT3 with CV-42 "Electrifier." These changes may be made without removing the chassis from the cabinet, and require the addition of only one part, a 220 mmfd., mica condenser

Figure 6.



HANDLING SMALL TOOLS

IT is always a good time to control replacement costs by judicious and careful use and repair of radio service equipment and this applies to the small tools as well as major equipment and machinery. In addition, the strong possibility of not being able to replace immediately certain small tools requires even more exercise of care in the use of small tools by every member of the organization.

The following pointers have been condensed from a number of recently installed operations guides by radio service-dealers all over the country and represent the most typical and widely used from each of these special lists. Every serviceman can use them profitably.

(1) Guard against "mushroom" heads on tools. In the case of tools with iron or steel handles, such as punches and chisels. the condition can be remedied by grinding off the "mushroomed" part of the head before it is bad enough to cause the handle to split or chip.

(2) A "mushroomed" wood handle will split and chip easily so must be repaired quickly. An iron or steel band should be driven over the top of the handle to keep it from spreading.

(3) A clean, perfect tool will go far to maintian efficiency, and will have a longer useful life.

(4) Never use a large heavy hammer on a tool that is small or frail. Be sure that every tool is being used correctly.

(5) Never use a small tool for a large job, except when absolutely unavoidable.

(6) Whenever possible use only a rubber or wood hammer on wood handle tools.

(7) Varnish all tool handles regularly; it keeps out grease and dirt that will weaken any handle.

(8) Tape all tool handles whenever possible; that protects them from wear of all kinds.

(9) Too much pressure should not be exerted on any tool or small machine carrying a motor . . . this loosens bearings and causes overheating.

(10) All such motors should be oiled frequently; with an oil that will not become sticky or gummy.

Operating Hints from a "BOSS" Service Dealer

How to get in "solid" with your servicing trade

(Continued from January)

by S. HELLER

Your next step is to attach the aerial, when a built-in antenna is not present. There are several important facts the novice should know about aerials, to avoid embarrassment.

Aerials and Grounds

First: if you hear a TRF set whistle, distort, or tune in several stations simultaneously, don't assume the set needs repair on those counts, until you have tried a shorter aerial on it. TRFs—and even some superhets—commonly distort when too long an aerial is used, because the tubes are overloaded by the excessive signal.

A quick way of getting the effect of a shorter aerial is to remove the outside aerial lead, and place your finger on the set's aerial binding post. If this causes the set to play too weakly, hold the external aerial lead in one hand and touch the set's aerial binding post with the other. This has the effect of lengthening the aerial more than if the finger alone were used, but less than if the aerial alone were used.

If distortion, whistles, and several-station reception disappear, the remedy obviously lies in shortening the customer's aerial — if he does not have a shortened aerial at home, and is complaining of only the symptoms described above.

Whistling on a TRF may be due to an unextended aerial—i.e., the antenna wire may be bunched up, instead of being drawn out to its full length. Incidentally, don't be convinced an internal trouble is present, if reception on a TRF fades while you are moving the aerial about. In many of these sets, a drop in volume occurs when the aerial gets too close to the grid-cap of the detector tube. This is normal — don't mistake it for fading. The remedy, of course, is to remove the aerial from the vicinity of the detector tube grid-cap.

A word of caution — never connect an aerial lead from a radio to an external ground, like a pipe, unless you are certain there is a condenser in series with the aerial lead. Otherwise you may not only blow a fuse, but also burn out an antenna coil, and possibly a volume control as well. (See *Fig.* 3).

What about ground leads? These may generally be left disconnected. When external noises transmitted by the power line become annoying, however, connection of the set ground to an external ground may prove helpful in minimizing them.

If the set doesn't play after all the preceding steps have been taken, make a quick preliminary inspection before checking the tubes. See that the tubes are fully in their sockets — you can waste an awful lot of time checking voltages, etc., when the only thing wrong is a tube loose in its socket.

In some instances a tube may have been forced incorrectly into its socket. Your rapid inspection when withdrawing the tubes for testing should tell you that. Tubes may also have been placed into the wrong sockets. If you suspect this to be the case, examine the circuit wiring. Look to see that the line cord goes to the ballast or rectifier tube, the oscillator coil connects to the oscillator tube grid, etc. As your eye becomes more experienced, you will instantly note if a grid clip has been connected to the wrong tube. You will know, for instance, that no grid lead coming from an IF coil belongs on an oscillator tube grid-cap.

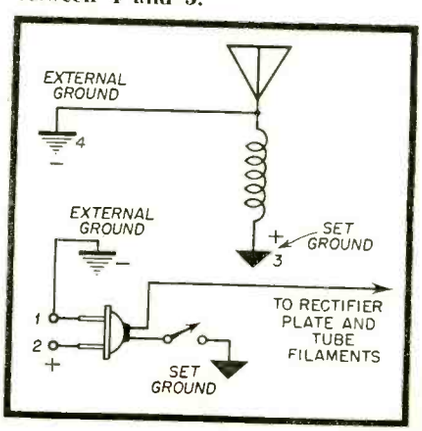
"Stuck" Chassis

Difficulty is sometimes encountered by the novice in removing table-type sets from their cabinets. Warping of the wood may cause a bind to develop. Inclining the cabinet at a sharp angle on the workbench, so that the chassis would slide out if it weren't jammed, and then pressing down on the control shafts, will often get the mechanism out. Or the chassis may be moved from side to side, and worked loose in this way.

Screws sometimes show obstinacy in

(*See page* 28)

Figure 3. How antenna coil is burned out when aerial lead is attached to an external ground. On portion of AC cycle where points 2 and 3 become positive towards 1, which is externally grounded, a short-circuit current flows between 4 and 3.



Now! A 2-Band, Table Model with Console Features — Standard and Short Wave Reception with Interference Eliminator

Here's the kind of price-quality feature which brings extra business into a fine radio shop. Air King precision craftsmanship enables you to present to your most appreciative customers a 2-Band, high performance radio finished in rich American walnut. The set has superb good looks and exceptional tone. When you see how brilliantly it demonstrates and remember that it offers fine radio reception on both standard and short wave, anywhere in the country, you can see its great possibilities as a stepper-up of immediate sales income.

Note this combination of Air King Features—

Interference eliminator that blocks out code telegraph. Built-in Phonograph Jack to accommodate automatic record changer. Convenient panel control for phonograph connection. 6 Tubes (including rectifier) with Superheterodyne circuit. 7 inch Selectorloop. Alnico #5 "Tone King" speaker.

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The Royalty of Radio Since 1920

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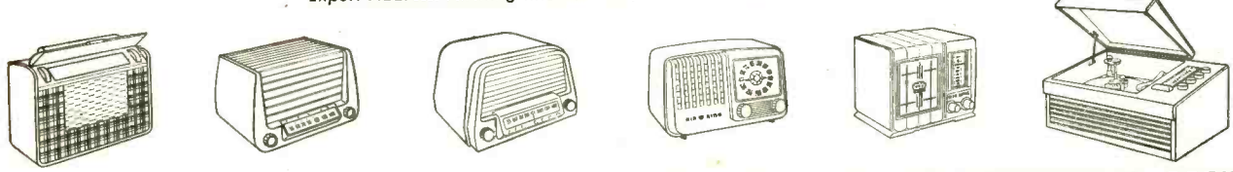


★ WE HAVE A LIMITED NUMBER OF DISTRIBUTOR AND DEALER TERRITORIES OPEN ★

MERCHANDISE PRE-VIEWS

Benjamin Abrams (right) president of Emerson Radio and Phonograph Corp., receives engraved plaque from Gordon Shannon, assistant factory manager, in formal presentation of 7th million radio set to come off company production lines.

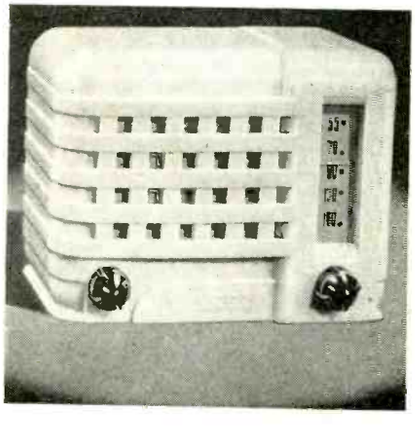
EMERSON'S LINE

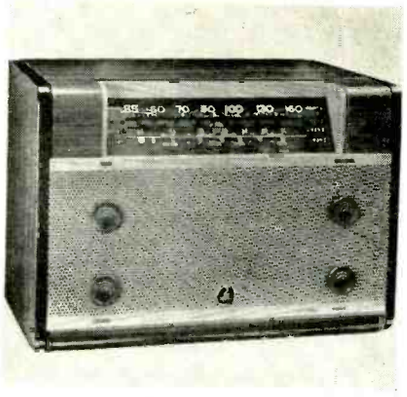
Emerson Model 536

Emerson Model 536, battery portable, AC-DC, 7 tubes, will be available this month (February). To retail for $50, batteries extra. (See cut).

Model 540, a fistful of brass-lunged radio; 5 tubes, with "slug" tuning (the kind GE calls "guillotine"—see

Emerson Model 540





Emerson Model 524

January issue). Claimed to be the smallest AC-DC room radio. To sell for $19.95 in walnut, $24.95 in ivory, red or green-plastic. (See cut).

Model 511 promises to be this company's most popular general purpose room radio. Sells for $29.95; case finished all round in plastic, can be positioned anywhere. Chassis removes from bottom of case for servicing.

Personal Radio Model 508 now has an extra strip of plastic material riveted inside the lid to depress the on-off switch more positively than in earlier models.

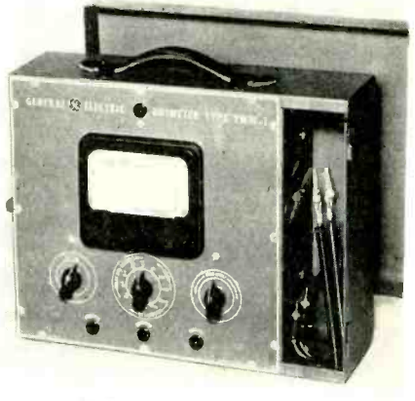
Model 524 is a 10-tube AC job, 4-band superheterodyne table receiver: broadcast and 3 shortwave bands. 10 watt output; 6-inch PM speaker; range from 535 kc up to 22.7 mc. To retail for $149.95. (See cut).

Electromatic 3-Way

Electromatic battery portable AC-DC; 5 tubes, miniature: 35W4, 1T4, 1S5, 1R5, 3Q4. Uses Ever-Ready batteries: two #482, two #786. Iron core transformer, weight 11¼ lbs. 3-way switch for swing from AC to DC, to batteries or to "rejuvenator" circuit. Latter gives dry cells a lift if left on overnight in connect position. Battery condition indicator in head of station dial, "on" when battery operated. Regular pilot light goes on when set is on house current. Retail price $45.75, including batteries. Available early March. Company at 88 University Place, New York 3, N. Y.

General Electric Model 447

While resting between scenes in her new picture "The Birds and the Bees," Jeannette MacDonald, Metro-Goldwyn-Mayer star, tunes in her first FM radio program on General Electric's new Model 417 combination receiver. Sets are coming off Bridgeport, Conn., production lines of the company. Receiver has both low and high band FM, standard and two short wave bands, phonograph with automatic record changer and electronic reproducer.



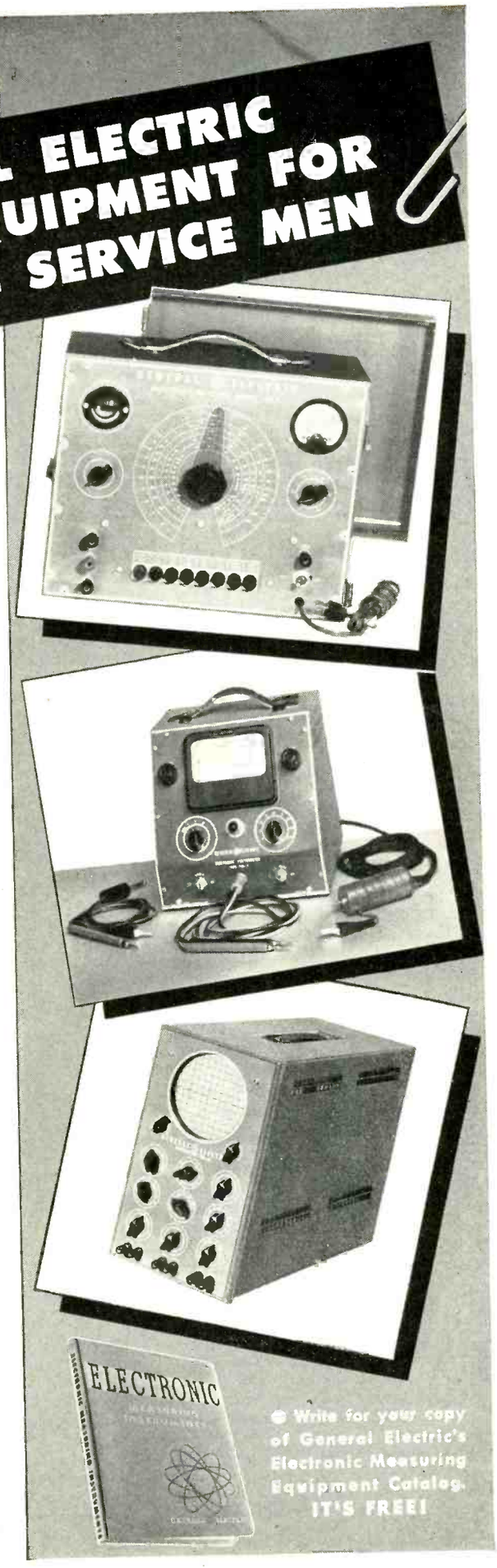
G.E. Unimeter YMW-1

Above is a new unimeter, Type YMW-1, announced by Specialty Division, General Electric Co., 12-pound multi-range measuring instrument is rated 20,000 ohms per volt. Accurate measurement of volts, ohms, current and decibels, plus a single rotary selector switch, which controls all functions and ranges, are features. All operations, except the 50 microampere current range reading and capacitor for output measurements are available without changing the test leads. Separate two-position switch handles a-c or d-c volts. Specifications available from the company, Wolf St., Syracuse, N. Y.

(See page 28)

For Better Testing!

NEW GENERAL ELECTRIC SERVICE TEST EQUIPMENT FOR UP-AND-COMING SERVICE MEN



IT'S NEWS—and good news for service men who want to see work move into the shop fast—and out again. The new line of General Electric service test equipment has been designed to do just that. Quick, accurate, efficient service work means more dollars, more satisfied customers and more business.

First in this list of fine equipment is the Capacitance-Resistance Bridge, YCW-1. Check the jobs it can do to make your job easier.

- Measures capacitance from .000005 to 200 microfarads ± 1% in three convenient ranges.
- Measures resistance 5 ohms to 20 megohms ± 2% in two convenient ranges.
- Power factor is measured on the high capacitance range by a potentiometer in series with the standard which has a scale of 0 to 50 percent.
- Insulation resistance is indicated directly by a panel meter. A 0 to 2500 megohm range is covered with a dc voltage supply of 500 volts.
- Electrolytic leakage test is provided which will indicate whether the leakage is excessive.
- Polarizing voltage — a continuously variable dc voltage supply from 0 to 500 volts is available for polarizing the electrolytic condensers.
- Turn ratio of transformers is measured by switching one coil or section of a coil into the Wien bridge circuit and the other section of secondary coil is compared with it.

The YCW-1 is compact, portable and needs only to be plugged into any 115 volt 50 or 60 cycle line to operate.

GENERAL ELECTRIC ELECTRONIC VOLTOHMETER

The Type PM-17 permits measurement of actual operating voltages without excessive circuit loading or detuning. In addition to dc voltages, both audio and radio frequency voltages may be measured from 200 cycles to more than 100 megacycles. An ohmmeter circuit is included for convenience in measuring high and low ohmic values of resistance. Fluctuations in line voltage and changing of tubes have little or no effect on calibrations. Entirely portable, it can be carried anywhere and can be plugged into any 115 volt 60 cycle line. Supplied with the Electronic Voltohmeter are two alligator clips, two pairs of leads, and an r-f probe.

GENERAL ELECTRIC OSCILLOSCOPE

The CRO-5A is really a laboratory quality unit for service work. Accurate and rapid, it was designed primarily for studying voltage and current wave-forms, but it also can be used to study any variable which may be translated into electrical potentials by means of associated apparatus.

All amplifier and sweep d-c potentials are electronically regulated to give a stable trace even under adverse power line variations. The unit is compact, portable, and sturdy in construction so that ordinary jars and vibration will not damage it. Completely self-contained, it will operate on any 115 volt, 60 cycle ac power source.

For complete information on these General Electric Service Test instruments, write to: *General Electric Company, Electronics Department, Syracuse 1, New York.*

GENERAL ELECTRIC

164-F2

● Write for your copy of General Electric's Electronic Measuring Equipment Catalog. IT'S FREE!

Management men: L. to r., seated: Jackson O. Keith, sales manager; Howard W. Sams, president. Standing: James R. Ronk, chief engineer; Wm. Renner, field engineer; Don Shaw, vice-president and treasurer; B. V. K. French, director of field relations.

PROFIT POINTERS

by **LEWIS C. STONE**, *Editor*

OF real interest to the community of radio service-dealers is the Radio Service Clinic which Howard W. Sams & Co. have established. Some 3,000 square feet of floor space has been reserved for setting up a well equipped service shop. This shop will operate on a "clinical" basis only. That is, it will do consulting work for over a score of retail service shops, dealers and jobbers.

With frequency modulation and television here, this clinic is a necessity. Advice and help will always be on the basis of proven facts—no guess work. The clinic will develop service routines, and in addition, time charts, parts cost, suggested parts inventories, suggested consumer charge, suggested printed forms are items that have been scheduled for immediate analysis.

The Radio Service Clinic Section will be maintained at 2805 East 10th St., Indianapolis; headquarters of the company remain at 2924 East Washington St., in that city.

Accompanying the announcement of the establishment of the clinic, the firm included a number of monographs issued by the Howard Sams Institute, on the following subjects:

1. How Much Is Your Labor Worth?
2. Accounting Procedures for Radio Service Engineers (in process).
3. How To Make Radio Cabinet Repairs.
4. How To Increase Your Business.

The monographs are very much to the point. Number 1, on labor charges, is a 24-page, letter-size compilation. Divided into four parts or chapters, the first part describes methods and gives examples of how to find overhead charges per hour for labor. The second part shows how to divide total overhead to be recovered, by estimated hours of productive labor. In part three, the serviceman's cost analysis is carried another step—to find the overhead charge per hour of productive labor for a shop with two employees in addition to the owner. And part four shows how to calculate the value of productive labor by prorating overhead expenses to radio sales, parts sales and productive labor sales, on the basis of sales.

This monograph was prepared in response to numerous requests received by the organization for methods that will help determine how to charge customers for time spent repairing radios. The costs per hour are determined through an analysis of monthly costs, such as rent, heat, supplies and postage, advertising expense, shop supplies, etc. In these basic tables, it is assumed that the radio service technician or engineer is spending full time on radio repair business, without any additional labor expense except that furnished by himself. This is expanded in following parts to cover the owner plus additional help, plus additional sources of income other than straight servicing.

With the help of the computations shown, the service technician should be able to analyze his own operation and steer his way into levels of steadier and more satisfactory profits.

Monograph three, on building a successful radio service business, covers the operating principles which must be observed for success. The basic principles are discussed briefly, but clearly and simply, throughout the 12 pages of this compilation. And in the order in which they are presented they are: Good will; salesmanship (two pages); reputation; location of shop; importance of an impressive shop; business-building methods; types of advertising: local newspaper advertising, directory advertising, radio advertising, direct-mail advertising, "on-the-spot" advertising; periodic home inspection; cooperative association; public relations. A bibliography of books on selling is included.

Monograph three (four pages) tells how to make radio cabinet repairs. Subjects covered include: materials and supplies needed; how to renew finish; how to remove mars and scratches; how to remove blisters; how to remove dents and depressions; complete refinishing instructions. A word of caution appears at the end of this text: "Repairing the finish of radio cabinets requires a certain amount of skill that cannot be acquired without practice. Therefore it is wise to try out these suggestions upon cabinets that are not too valuable. Complete refinishing jobs should be done by the radio service engineer only after considerable experience."

The monographs described above are being distributed to members of the Institute.

Monograph 3 stresses same care refinishing cabinets as when finished new, involving machine polish, spray, rubbing. (Hoffman Model B-1000 cabinet finishing at factory, below).

SPRAGUE TRADING POST

SWAP—BUY—SELL

FOR TRADE—New Precision sig. generator E-200; Simpson V-O-M #260; meter case; custom signal tracer for 16 mm sound projector with or without amplifier and speaker. Floyd Fellows, 45-27 170th St., Flushing, N. Y.

FOR SALE—Supreme tube and set tester #89 de luxe, 1st class shape, with tube sheet, $25; Solar capacitor tester; also 300 tubes of all numbers, some used, all good. Send for list. All letters answered. George L. Emering, 524 Market St., Seaford, Dela.

WANTED—Hallicrafters SX25, SX23, Hammarlund HQ-129X or similar receiver. Will buy or trade radio equipment. Describe fully. E. W. Edwards, 57th St. & East Ave., LaGrange, Ill.

FOR SALE—Weston #772 20M. ohms per volt analyzer in hardwood case. Perfect condition. Ohmmeter never used so no batteries included. $40 f.o.b. A. P. Bonfigli, 509 Hancock St., Wollaston 70, Mass.

JOB WANTED—Young man recently graduated from radio school with first phone and second telegraph licenses anxious to get to work. If you have anything to offer, write: Forrest C. Jones, 625 N. Front St., Reading, Pa.

WANTED—Old time 5-tube battery operated Faraway radio receiver. This set was very popular about 20 years ago. You may have one stored in your attic or shop. Harry Matzke, New Auburn, Wisc.

FOR SALE—Deluxe kilowatt phone/cw transmitter, RME DB-20 preselector and Hammarlund HQ-120-X receiver. Write for details. B. N. Gensler, 573 Chester St., Brooklyn 12, N. Y.

WANTED—Hickok signal generator. State model, condition and price. Also want Rider's manuals and condenser checker. A. H. Gibson, 515 So. Laverne St., Los Angeles 22, Calif.

FOR SALE—Hallicrafters Skybuddy Model L 5-PA, excellent condition. $20. L. H. Casto, 350 W. 4th Ave., Columbus, Ohio.

SWAP OR SELL—R.C.P. volt-ohmmeter #420 SP, used only twice. Want television parts or Superior channel analyzer, or what have you? Walter V. Jandro, Success Park, Bldg. 58, Apt. 218, Bridgeport 8, Conn.

FOR SALE—Westinghouse dual microammeter 200 microamps each 3¼" diameter, blank scale, new $4.50. Cathode ray scope, used for radar. 115v., 60cps., 3" screen, 11 tubes, black crackle finish case, made by G-E, brand new, $25. I. Rubin, Box 153, Shrewsbury, N. J.

FOR SALE—B.C. 610-D xmitter new, as purchased, in original packing box. V. E. Beck, 7007 No. 33 St., Omaha, Nebr

WANTED—Rider's Manuals #6, 7, 8 and 9. Can also use some diagram manuals of individual manufacturers. Will pay cash. State your minimum offer. Empire Radio Service, 316 Rodman St., Fall River, Mass.

FOR SALE—Triplett 666H V.O.M., slightly used, $15; also eleven 1626 tubes, new in sealed cartons, $1 each. Want two 25R8 tubes. Ferd Launeckis, R.F.D. Box 42, Brooklyn, Conn.

WANTED—From surplus BC-610 components, 1 ea. upper r.f. control panel complete or 1 McClintock MD-3051 special meter, TU-54 tuning unit, exciter plate transformer, P.A. chassis or components. Cash or will swap tubes or parts at cost. Malcolm E. Hughes, 4819 Euphrosine St., New Orleans 15, La.

FOR SALE—Supreme radio tester #450, good condition with test leads and adapters, $30. Will trade for Weston rectifier type microammeter in bakelite case. Inspection privilege. Motor & Appliance Maintenance, Box 603, Dover, N. J.

FOR SALE—Rider chanalyst, Riders' manuals. Hickok sig. generator and tube tester, Weston test oscillator, Aerovox capacity res. bridge, Clough-Brengle R.F.O., also a complete stock of tubes. Send for list. Arthur L. Dykeman, Kenesaw, Nebraska.

FOR SALE—Vol. #3 of Audel's Elec. Library, also Vol. 3 of Hawkin's Elec. library. Both for $2. Brand new. Also have Delico port. radio for sale, good condition, $24. Daniel Seidler, 4355 So. Honore, Chicago 9, Ill.

POSITION WANTED—Veteran of AAF ground radio maintenance, honor graduate of AAFRMTS, also civilian experience. Married, one child. Age 26. Willing to go anywhere. Lowell M. Cozart, RFD #1, Box 320, Bluefield, W. Va.

FOR SALE OR TRADE—Riders' Manuals, vols. 1, 2, 3, 4 and 5. Want VTVOM or Rider's manuals Nos. 8, 10, 11, 12, or 13. Clinton Weddle, Bassett, Va.

FOR SALE—Army BC-342 receiver 15000 kc. to 1 8mc., BFO crystal filter. 110v 60 cy. a.c. operation. Set has QST revisions and noise limitar. $60. Hartland B. Smith, W8VVD, 467 Park Ave., Birmingham, Mich.

SELL OR TRADE—17 tube television kit incl. all tubes and #5BP1 picture tube. Want home recorder or test eqpt. What have you? Daniel Platek, c/o Star Radio Service, 1484 Westchester Ave., Bronx 59, New York.

FOR SALE—Stromberg-Carlson #69 all-wave converter. Complete coverage from 1430 kc. to 25 mc. in 3 bands. Beautiful walnut cabinet. $20 f.o.b or trade for what have you? R. A. Bischoff, 1309 N. 6th St., Burlington, Iowa.

FOR SALE—Hallicrafter U-SX-28A with speaker, $175 or trade for AM-FM receiver; give cash difference or take FM tuner for 88-108 mc band if to do. Clyde Whaley, 612 Bedell Bldg., San Antonio 5, Texas.

WANTED—National CRM oscilloscope or similar home-made 'scope for modulation checking. Donald E. Griffith, 51 Ridge Rd., Quonset Point, East Greenwich, R.I.

FOR SALE—Brand new Westinghouse Rectox copper oxide rectifiers. Low voltage, will handle 10 amps. Ideal for testing auto radios or for battery chargers. $3.75 each. Meyes Radio Service, 6149 Limekiln Pike, Philadelphia 41, Pa.

FOR SALE—Hickok AC-51 tube tester. Used very little. Now at factory being completely modernized. A-1 Radio Service, Selah, Washington.

FOR SALE—Supreme #599 tube and set tester in new condition. $45. James T Goodliff, Garfield Ave., Harborcreek, Pa.

WANTED—S9 or SX9 Hallicrafter Super-Skyrider, white panel preferred. Also need an SX17 complete with speaker. Describe condition, name price. Matthew Healey, 681 Harris Ave., Providence 9, R.I.

WANTED—Weston 772 voltohmmeter or similar. Have Motorola car radio; National short-wave receiver and other items. Will exchange lists. Glenn Watt, Chanute, Kans.

URGENTLY NEEDED—Speaker cone for F-63 General Electrical Radio. Frank Pyle, 104 Constitution Circle, Clairton, Pa.

YOUR OWN AD RUN HERE FREE!

Sprague will gladly run your own TRADING POST ad free of charge in the first available issue of one of the six radio magazines in which this feature appears. WRITE CAREFULLY or print. Hold it to 40 words or less and confine it to radio subjects. Sprague reserves the right to rewrite ads as necessary, or to reject any that do not in our estimation fit in with the spirit of this service.

Harry Kalber *Sales Manager*

ASK FOR SPRAGUE CAPACITORS and *KOOLOHM RESISTORS by *name*!

*Trademark Reg. U.S. Pat. Off.

Operating Hints From A "Boss" Service Dealer

(*from page 22*)

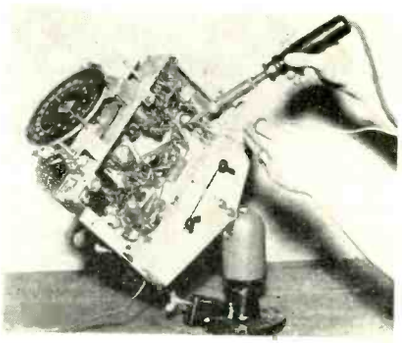
coming out. When they appear to be jammed, a long heavy screwdriver will prove very useful in loosening them. In cases where machine screws are locked against metal, a drop of oil may do the trick. Holding the screw tightly to one side as it is worked loose is helpful. If nothing else is effective, the screw head will have to be sawed off, and the screw punched out; otherwise, it must be drilled out.

When knobs refuse to come off, a piece of string can be twisted around the knob, and pulled. This method will remove many of the not-too-obstinate cases. Using two screwdrivers as levers, one on each side of the balky knob, is often effective. The nail-removing or claw side of a hammer may also be used on the knob. A piece of cardboard should be placed between the hammer and the cabinet to prevent scratches.

(*See page 39*)

Merchandise Pre-Views

(*from page 24*)



"Holds" The Job

A universal work positioner to hold and position virtually all kinds of benchwork quicker and easier for production, assembly, service and maintenance, is in mass production by the Garfield Engineering Corporation of Kansas City, Missouri.

Efficiency and productivity of workers are increased by permitting him to work with both hands free. It holds light or heavy work and permits turning 360° at any angle or horizontal or axial planes and 180° on vertical planes. Change position of work quickly and easily and lock it by fingertip adjustment of pressure control knob. A new principle of pressure applied to a ball and socket joint makes this possible. Powrarms are produced in both hydraulic and mechanical models.

By standardizing as far as practicable, uses of the Powrarm Positioner in various industries a comprehensive, standard line of attachments will be supplied for the great majority of users. This new product will save many man-hours of production and rework expense wherever manufacture, maintenance, assembly or repair is done.

Bruno Bit Set

A new auger bit set for fast, easy wood-boring is announced by Bruno

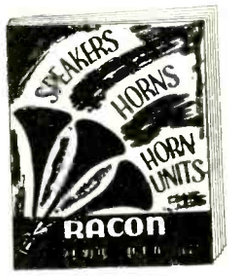
(*See page 30*)

Preferred FOR OVER 20 YEARS

RACON commercialized the "Morning Glory" loudspeaker horn back in the early 20's — was immediately recognized as the finest line of speakers obtainable. RACON is still out front! RACON commercialized in the early 30's cellular horns and air-column speakers — contributed to the success of "talkies" in sound pictures. And since then, throughout the 40's RACON has been engineering new advances in horns, speakers and driving units for public address, paging and sound distribution systems.

RACON introduced Marine Speakers (first ever approved by the Bureau of Marine Inspection & Navigation). RACON introduced the most successful "Blast-Proof" units to withstand gunfire. RACON has Re-entrant Trumpets, Demountable Trumpets, "High-Fidelity Tweeters", Radial Horns and Driving Units for all purposes.

RACON introduced Acoustic Material that prevents resonant effects, Storm Proof Material that is impervious to any climatic condition. Driving Units having 60 watts peak and 30 watts continuous power ratings (which are higher capacity than other brands afford) . . . These are RACON achievements. You get the finest when you specify RACONS.



Send For Free Catalog

RACON ELECTRIC CO., INC.

52 East 19th St., New York 3, N. Y.

SIMPLE METHODS OF DETERMINING IMPEDANCES

(*from page* 13)

• IMPEDANCE METER CALIBRATION CHART •

LOW RANGE (Figure 2-A)		HIGH RANGE (Figure 2-B)	
IMPEDANCE (OHMS)	MA.	IMPEDANCE (OHMS)	MA.
1	0.02	100	0.92
2	0.03	200	0.86
3	0.04	250	0.84
10	0.10	300	0.81
20	0.19	500	0.73
30	0.26	1000	0.58
50	0.36	2000	0.42
100	0.53	3000	0.33
200	0.69	10,000	0.13
250	0.74		
300	0.77		
500	0.85		
1000	0.92		
2000	0.96		

Intermediate points may be found by plotting the above values in two graphs.

Figure 6.

(4) When later making impedance measurements, simply refer to the chart or special meter scale in order to read impedances directly in ohms.

Figure 6 is a calibration chart showing milliammeter readings for various common impedance values. This chart can be used with your own impedance if your milliammeter has an internal movement resistance of 100 ohms approximately. However, best accuracy will be obtained by making a calibration of your own.

Merchandise Pre-Views

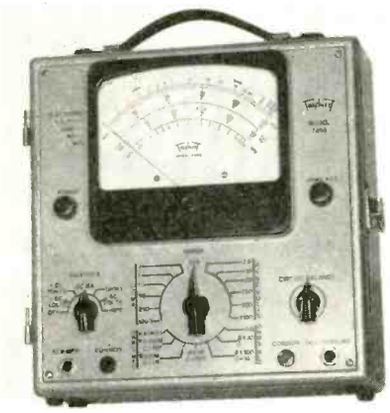
(*from page* 28)

Tools, Beverly Hills, California, manufacturer of a complete line of precision cutting tools for home and industrial use. The set consists of an 8¼" shank and a number of quick-change boring heads, packed in a rigid two-color plastic case. It comes in two sets. One set contains six boring heads, ⅝" to 1¼" by eighths. The second set contains eleven boring heads covering a range from ⅝" to 1¼" by sixteenths. Both sets are available with straight shanks for use in bench drill, drill press or portable drill, or with square shanks for use in hand brace.

Now for the first time, the manufacturer states, it is possible to bore many different size holes with one auger bit by simply changing the boring heads. This saves time for the operator, as it is easier to change boring heads than to switch bits. The operator simply loosens the set screw and inserts the desired size boring head. The boring head locks securely with a positive-seal precision fit. Set screw merely acts as a safety lock. This new tool bores easily on an angle and is particularly well suited for cutting dowel and bolt holes.

Triplett Model 2450 for FM and Television Work

Engineering considerations render this Electronic Volt-Ohm-Milliammeter most useful for FM and Television work or any sensitive circuit requiring a high impedance measuring device. Long-scale 6" meter with



Triplett Model 2450

three-color markings for greater readability provides greatest accuracy in all applications.

Two voltage regulator tubes provide absolute stability for both the positive and negative voltages, within a line variation range of 90 to 130 volts. This important feature assures accurate, uniform measurements within the limits of source voltage variations, and provides positive voltage regulation for the most exacting measurements.

Ranges: D.C volts: 0-2.5-10-50-250-500-1000. A. C. volts: 0-2.5-10-50-250-500-1000. D. C. milliamps: 0-0.1-1.0-10-50-250-1000. ohms: 0-1000 (midscale 10)-10,000-100,000. Megohms: 0-1-10-100,1000. Capacity in mfd: 0-.05-.5-5-50-500.

Webster-Chicago Needle

A completely new and different phonograph needle with a nylon knee, scientifically designed to give finer record reproduction, is being introduced to the trade by Webster-Chicago Corporation, well-known manufacturers of Webster Record Changers. Extensive research was carried on to utilize the unique properties of nylon plastic in designing a phonograph needle with "knee-action" in the vital area between aluminum shaft and sapphire jewel tip.

The internal resistance or self-damping characteristic of nylon greatly suppresses all mechanical resonances such as needle scratch and surface noises and improves tracking at low needle pressure. The nylon knee in this needle absorbs vertical shocks caused by the pinch effect of record grooves; it levels out horizontal shocks of needle "bounce." Nylon "knee-action" absorbs and reduces needle and surface noises, prolongs the life of the fine quality sapphire tip, protects records and produces a high fidelity of record reproduction.

The individual Webster needle is packaged in a distinctive jewel case of clear plastic. For showcase and counter there is distinctive permanent display case of clear plastic, designed for horizontal or vertical display or to be hung on the wall.

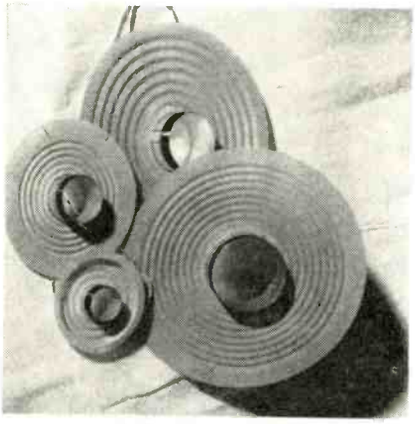
Aluminum for G.E. Voice Coils

Aluminum instead of paper bases for voice coils is used in the manufacture of General Electric loudspeakers, being marketed by the

(*See page* 32)

Merchandise Pre-Views

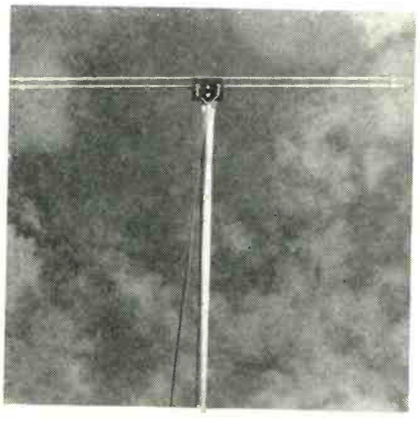
(*from page 31*)



G.E. Voice Coils

Specialty Division of the company's Electronics Department at Syracuse. Division engineers say that the use of aluminum offers five important advantages: it can handle higher wattages; the voice coil is unaffected by temperature and humidity; the coil, moving part of the speaker, will have longer life; it will not warp or crack; it will afford better control on gaps.

The photograph shows the construction and design of the aluminum foil based voice coil, which is a part of all General Electric loudspeakers.

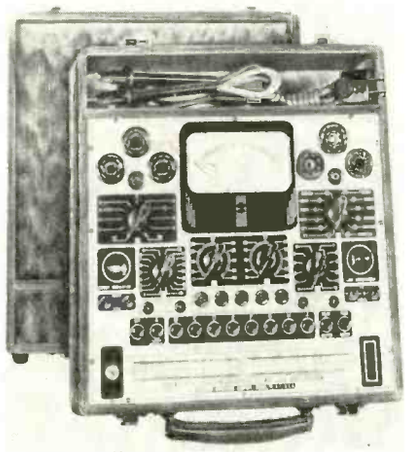


Stromberg-Carlson Antenna

A new external dipole FM antenna, called the Dyna Tenna, designed for use on both the 44 to 50 and the 88 to 108 mc band is being distributed to authorized dealers of Stromberg-Carlson Co., Rochester, N. Y., according to Leo Granger, company service manager. It is adjustable and may be peaked to the particular frequency of any individual station for maximum response, at the same time maintaining practically flat overall response throughout both bands. The "U" tube sections are de-

signed on the principle of the slide trombone, are easily adjusted and locked in place and are calibrated in frequency graduations on both sides. The upper side functioning as a quarter-wave folded dipole covers the lower frequencies in the 44 to 50 mc band. The lower side operates as a half-wave folded dipole in the higher frequencies of the 88 to 108 mc band.

Flexible construction permits vertical as well as horizontal polarization to accommodate many of the new FM stations now using vertically polarized transmitting antennae. It is supplied with 60 feet of low loss, 300 ohm, rugged, plastic-covered lead-in wire recently standardized by the industry.



Tube-Battery and Set Tester

Precision Apparatus Co., Inc., 92-27 Horace Harding Blvd., Elmhurst, L. I., N. Y., announces the availability of their 954-P Electronamic Tube-Battery and Set Tester. It is a portable combination mutual conductance type vacuum tube tester, radio battery tester and 37-range super-senstitive A.C.-D.C. Multi-Range Set Tester, with ranges to 6000 Volts A.C. and D.C. at 20,000 ohms-per-volt D.C. It provides for accurate and reliable solutions of tube test, set measurement and other service or laboratory problems arising from modern radio (AM and FM), television, industrial and laboratory practice. A wide-faced 4½" rectangular bakelite cased meter provides utmost visibility.

Tube and battery analyzing features include the "Electronamic" Circuit, developed by Precision engineers, which in one operation tests all radio receiving tube types for both mutual conductance and cathode structure. It tests all tubes with filament voltages to 120 volts. Tests all portable radio dry bat-

(*See page* 34)

RECORD CHANGERS

(*from page* 19)

17. Change trip as soon as tone arm hits record (A-M).

Loosen clutch tension by raising the collar holding the compression spring in place.

18. The needle sticks in one record groove somewhere during record playing cycle.

The clutch adjustment may be found to be too tight or the clutch surfaces may be gummy in one spot. The clutch should be taken apart and cleaned with carbon tetrachloride or other non-oily cleaner and then put back and readjusted.

19. Reject mechanism will not work when reject button is pressed (I).

The straight wire spring on the Manual Trip Lever, should be bent a little closer to the point where it strikes, or if the spring is loose in its holder it can be tightened by pressing its contacts with a pair of pliers.

**NOTE: The set screw, Bristol type, used in this changer are of the rocking type. It is necessary to use two of them when making any adjustments, alternately tightening one and loosening the other.*

Merchandise Pre-Views

(*from page* 33)

teries (A, B and C) from 1.5 to 135 volts. Each tube and battery is tested under load conditions and merit directly read on a simple 3-colored "Replace-weak-good" scale, in addition to the calibrated reference scale. It features an automatic push-button system; free-point element terminal selection to locate terminals of all filaments, regardless of rotating pin positions. All regular A.C.-D.C. analyzing connections are made through only two polarized pin-jacks.

The 954-P provides wide range current scales from 60 microamperes to 12 amperes; resistance to 69 megohms and DB ranges to +70 DB. The "P" model is furnished in a walnut finished portable hardwood case with tool compartment and hinged removable cover; also available for panel or counter mounting.

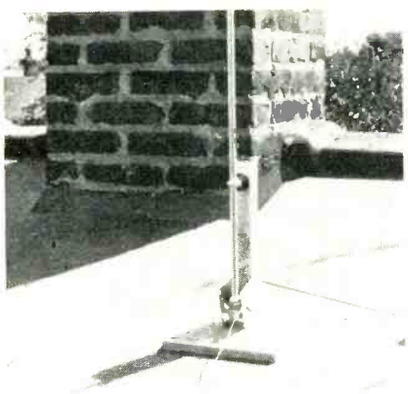
Toy Radio

Electronic toy radio receiver requiring no tubes, no batteries, no electricity. Brings in strongest local station anywhere in broadcast band

when clipped to some form of antenna and ground. Uses radar type crystal detector, and rubber fitting for ear. Designed for youngsters but will serve as personal or portable radio for adults.

Antenna may be bed spring, wire fence, screen door, or any ungrounded window frame, etc., but for loudest reception a 50 to 100 ft. rooftop aerial is recommended. Ground may be waterpipe, gaspipe, radiator, etc., or ground clip may simply be held in hand. Can be used as microphone when clipped to phone terminals of most radio sets.

Comes complete with instructions, packed in colorful display box with total weight of 1 lb. $2.45 retail. Taybern Equipment Co., 120 Greenwich Street, New York 6, N. Y.

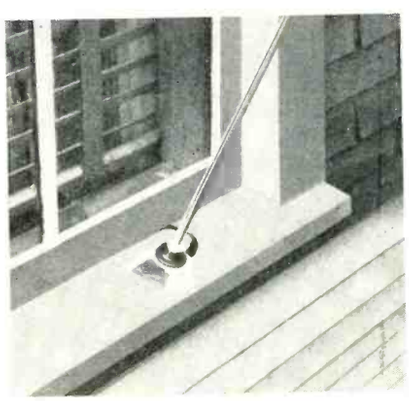


Above: **Ward House Mast**
Below: **Window Type Mast**

Radio Masts

The Ward Products Corporation, 1523 East 45th Street, Cleveland, announces a new line of house and window radio masts, engineered for vertical polarization and the ultimate in home reception. It is stated that the masts are designed for greatest signal efficiency, explaining that being vertical, the same as broadcasting antennas, they assure the best pickup of signals. Both types of masts feature a telescopic design, and are

(*See page* 36)



MERCHANDISE PRE-VIEWS

(*from page 35*)

weatherproofed with heavy cadmium plating.

The house mast extends to 12 feet for greatest signal pickup, and is collapsible to 4 feet for easy handling. The window type extends to 8 feet, and may be collapsed to 40 inches. This mast, with built-in lightning arrestor, may be mounted easily in a variety of roof positions, including installation on the soil pipe, if desired. The installation of the window mast on window frame or sill of home, apartment or office building is an operation that takes only three minutes.

H-F Cable Eliminates Noise Pick-up in FM Receivers

A new, improved twisted dual conductor high frequency cable specially designed for FM and television receivers to free them from locally induced interference even under the most adverse conditions has been developed by Federal Telephone and Radio Corporation, Newark, N. J., manufacturing associate of International Telephone and Telegraph Corporation. Known as KT-51, this cable is for use wherever a balanced transmission line is needed.

Every characteristic of the KT-51 is carefully checked by precision instruments. The characteristic impedance of KT-51 is 95 ohms while its attenuation is 1.7 db at 30 Mc, 3.6 at 100 Mc, and 10.0 db per 100 foot at 400 Mc. Although the maximum capacity unbalance is given as one percent it is a very conservative figure as most actual measurements show a lesser degree of unbalance.

The development of this cable eliminates a "weak" link in high quality FM and television receivers. Obviously the quality of the receiver output cannot be any better than the signal it receives and if local interferences are allowed to be induced into the lead-in wire a limitation is imposed on the peak quality of the received signal. However, when this cable is utilized, the noise induced is so negligible that it doesn't affect the signal-to-noise ratio of even the most sensitive sets.

Gift-Of-The-Month

The new Olson Gift-of-the-Month Club recently announced by Olson Radio Warehouse, Inc., has been joined by over 12,000 Radio servicemen. This new club organized by the firm sends its members who participate a free gift each month.

All radio men are urged to join. Gifts will be announced periodically and everyone has the opportunity of getting in on the deal. Further information will be gladly given by Olson Radio Warehouse, 73 East Mill St., Akron, Ohio.

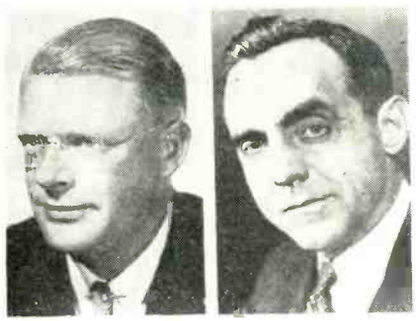
MEN IN THE NEWS

Leon Alpert

Eastern Amplifier

Leonard A. Meyerson has retired from Eastern Amplifier Corporation, resigning as President. Leon Alpert has purchased a 50% interest in the company and has assumed complete supervision and control of general management. Walter E. MacDonald has been appointed general sales manager.

An Export Division has been established under the direction of K. Streuber, formerly Export Manager for R.C.A.-Interntaional.



New Vice-Presidents of Sylvania Electric: Robert H. Bishop (left), director of sales; Conda P. Boggs, director of manufacturing.

Bruno-N.Y. Appoints

Appointment of Sid Pressler as manager of the Radio Parts Department is announced by Gerald O. Kaye, general sales manager for Bruno-New York Inc., metropolitan wholesale distributors. The dept. will handle RCA Victor tubes, parts, test and sound equipment, and the products of 40 nationally-known manufacturers of radio parts.

Other appointments are: Richard Harris as assistant to Phil Silverman,

(*See page* 38)

MEN IN THE NEWS

(from page 37)

RCA Victor Record Dept. Manager; and David Oreck as assistant to Dave Wagman, RCA Victor Radio & Television Sales Manager.

Richard H. Schellschmidt has been appointed advertising manager, reports John Meck, president, John Meck Industries, Plymouth, Ind. He was formerly personnel director.

MISCELLANEOUS

Stewart-Warner Sets

I. and M. Sufrin, wholesale distributors of Stewart-Warner Radios in the Pittsburgh Tri-State Trading Area, are very pleased with the results of the first promotion of Stewart-Warner Radios made in the Pittsburgh area.

Almost all of the radios strategically placed were sold within several days. Off-brand merchandise was passed up by the purchasers. Customers were particularly gratified by Stewart-Warner Table Model combinations which can be changed into a consolette by attaching four legs.

Volume Control Cross-Index Guide

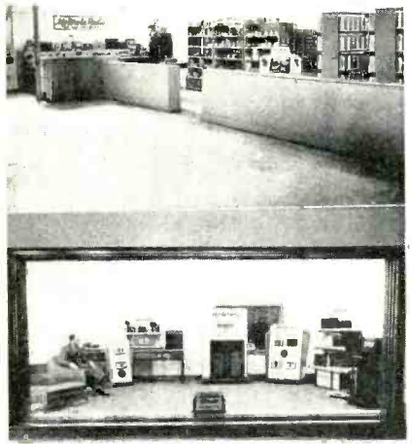
Countless hours and headaches are being eliminated as the Volume Control Cross-Index Guide issued by Clarostat Mfg. Co., Inc., 130 Clinton Street, Brooklyn 2, N. Y., comes into general use. Consisting of a collection of cards printed on both sides with the complete cross-index of corresponding type numbers of four leading volume control manufacturers, arranged in numerical order, the dealer or serviceman can instantly pick out his favorite brand type for any other brand type. The Volume Control Cross-Index Guide may be had

free of charge from any Clarostat distributor or by writing the company.

Stromberg-Carlson Ad Service

A 32-page Retail Advertising Service Book is being distributed by Stromberg-Carlson Company to its authorized dealers prior to release of details of the company's cooperative advertising plan, Stanley H. Manson, manager of advertising and public relations, announces.

The book, designed and produced by McCann-Erickson, Inc., advertising agency for Stromberg-Carlson, is divided into three parts: Illustrations, Complete Ads, and Advertising Helps.



New, modernized quarters of Mueller & Selby, Omaha distributors for Motorola home and auto radios, at 2615 Farnam St. in that city. Adjoining parking space leads to driveway into 50x50 foot drive-in radio repair and parts department, top photo. Lower photo shows soundproof audition studio for set demonstrations.

OPERATING HINTS

(from page 28)

In concluding our article, your boss will like you to remember some "don'ts":

DON'T touch the alignment screws until you have had some experience in recognizing the symptoms of misalignment, and know the practice, as well as the theory, of alignment.

DONT leave your soldering iron too long on a condenser lead—the terminal may come off, and ruin the condenser.

DON'T replace a rectifier tube whose filaments light, but which has no emission, without testing the filter condensers for shorts.

DON'T forget to test for shorts between rectifier cathode and B— after you have replaced a filter condenser. Poor soldering may cause such shorts.

And finally, DON'T be discouraged if you are thrown out of the first nine jobs you get. *It's the tenth one that counts!*

Ad Index

PRESS OF THE WILSON H. LEE CO.
ORANGE, CONN. PRINTED IN U.S.A.

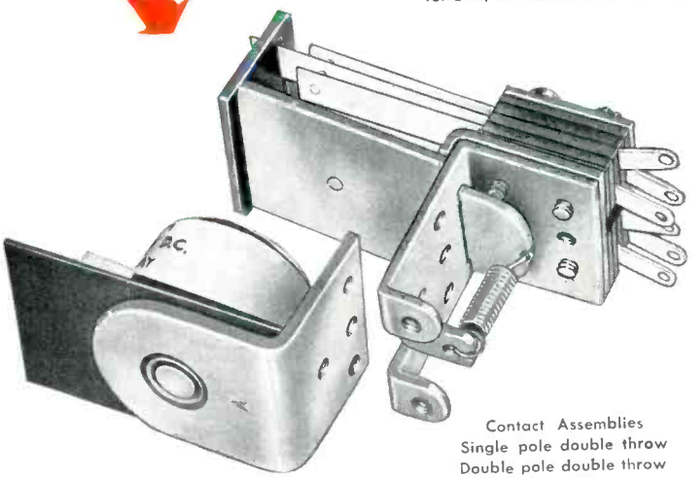
New! Series 200

A RELAY BY GUARDIAN with Interchangeable Coils

BUILT IN TWO PARTS

A. C. Coil Assemblies available for 6 v., 12 v., 24 v., 115 v.
D. C. Coil Assemblies available for 6 v., 12 v., 24 v., 32 v., 110 v.

★ Two basic parts—a coil assembly and a contact assembly — comprise this simple, yet versatile relay. The coil assembly consists of the coil and field piece. The contact assembly consists of switch blades, armature, return spring, and mounting bracket. The coil and contact assembly are easily aligned by two locator pins on the back end of the contact assembly which fit into two holes on the coil assembly. They are then rigidly held together with the two screws and lock washers. Assembly takes only a few seconds and requires no adjustment on factory built units.



SERIES 200 RELAY

Contact Assemblies
Single pole double throw
Double pole double throw

On Sale at Your nearest jobber NOW!

See it today! . . . this amazing new relay with interchangeable coils. See how you can operate it on any of nine different a-c or d-c voltages — simply by changing the coil. Ideal for experimenters, inventors, engineers.

TWO CONTACT ASSEMBLIES

The Series 200 is available with a single pole double throw, or a double pole double throw contact assembly. In addition, a set of Series 200 Contact Switch Parts, which you can buy separately, enables you to build dozens of other combinations. Instructions in each box.

NINE COIL ASSEMBLIES

Four a-c coils and five d-c coils are available. Interchangeability of coils enables you to operate the Series 200 relay on one voltage or current and change it over to operate on another type simply by changing coils.

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GUARDIAN ELECTRIC

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