

Radio & Electrical Appliance
SERVICE-DEALER

february, 1944
25 cents



this issue:

MICROPHONE MAN*



SO YOU HAVEN'T A SIGNAL GENERATOR

ROAST-OR-GRILLE SERVICING — REFRIGERATOR REPAIR HINTS

with the editor

FOOLED AGAIN!

WPB SHOULD EITHER stop issuing releases on *anticipated* production of consumer durable goods and radio tubes or else make good on its *promises*, none of which have as yet been kept.

The public read WPB's publicity that "4½ million replacement radio tubes are scheduled for production in the first quarter of 1944" and that 2 million electric irons are scheduled for production early this year. Just after publication of such cheery news came a speech by one of the very top men in WPB. But he declared in positive terms that as military requirements get priority, (which is as it should be), there is no likelihood of consumer production for many months at least.

If the publicity men of WPB would simply ask their bosses for the real lowdown and then report the truth everyone concerned would be better off. We can get along without wishful thinkers who intentionally or otherwise foist their views on the gullible and then neglect to give proportionate release when proven wrong. Hitler always ranted loudest that he didn't want any more territory just before making another invasion. If WPB's public relations division is trying to fool us like Herr-ing Hitler did, it too is inviting a deserved squelch.

A SILLY SURVEY!

SURVEYS BRING FORTH generalized opinions which become "the findings." Unfortunately most surveys can be interpreted in several ways and do not bring to light the basic and actual facts. *Facts* are valuable and can be used to plot a course of reckoning while *mere opinions*, even when collated and called a "survey," are still nothing more than expressions of subconscious desires.

The published findings of a recent survey made on behalf of WPB on the subject of civilian shortages (such as radios and appliances) make us retch because they are so obviously misleading and incorrect—perhaps not in statistical count—but in purporting to indicate true conditions.

The Bureau of Census, says WPB, interviewed 5,000 people, representing 7,400 families and found that 88 people of each thousand questioned stated that they were unable to purchase bed sheets, 56 of each thousand did not know where to buy radio tubes and 50 of each thousand could not buy electric irons. If one took such a survey seriously one would believe that bed sheets are much scarcer and harder to buy than tubes or irons. Actually such is opposite the truth. We contacted nine department and ten appliance stores. All nine department stores had for immediate sales (in fact *sales* were going on) large stocks of bed sheets. But not one of the nine department or ten appliance stores had in stock a single electric iron, and of the nineteen stores together only three had limited stocks of radio tubes, most of which incidentally were of the obsolete variety. On what desert was the WPB survey made? What was the purpose of publicizing the survey? If someone is lobbying for bed sheet makers, we in the radio-appliance field had better get ourselves a few lobbyists too.

CONDITIONS PICTURED ANOTHER WAY:

ANOTHER RECENT survey release states that during the past year, 1,430,000 families tried to buy a radio; 160,000 wanted electric stoves; 1,810,000 sought washing machines; 2,250,000 tried to buy electric irons; 1,080,000 sought vacuum cleaners and 1,290,000 searched in vain for mechanical refriger-

(Continued on page 30)

Each day General Electric produces
nearly one million dollars' worth
of electronic equipment



*This means a better
electronic tube for you
after the war*

ALL of General Electric's gigantic production of electronic equipment—*nearly one million dollars' worth every day*—now helps fight the war.

The famous G-E electronic tube is everywhere—in plane, tank, ship—demonstrating under fire it has the engineering excellence which only General Electric's long leadership in electronics makes possible.

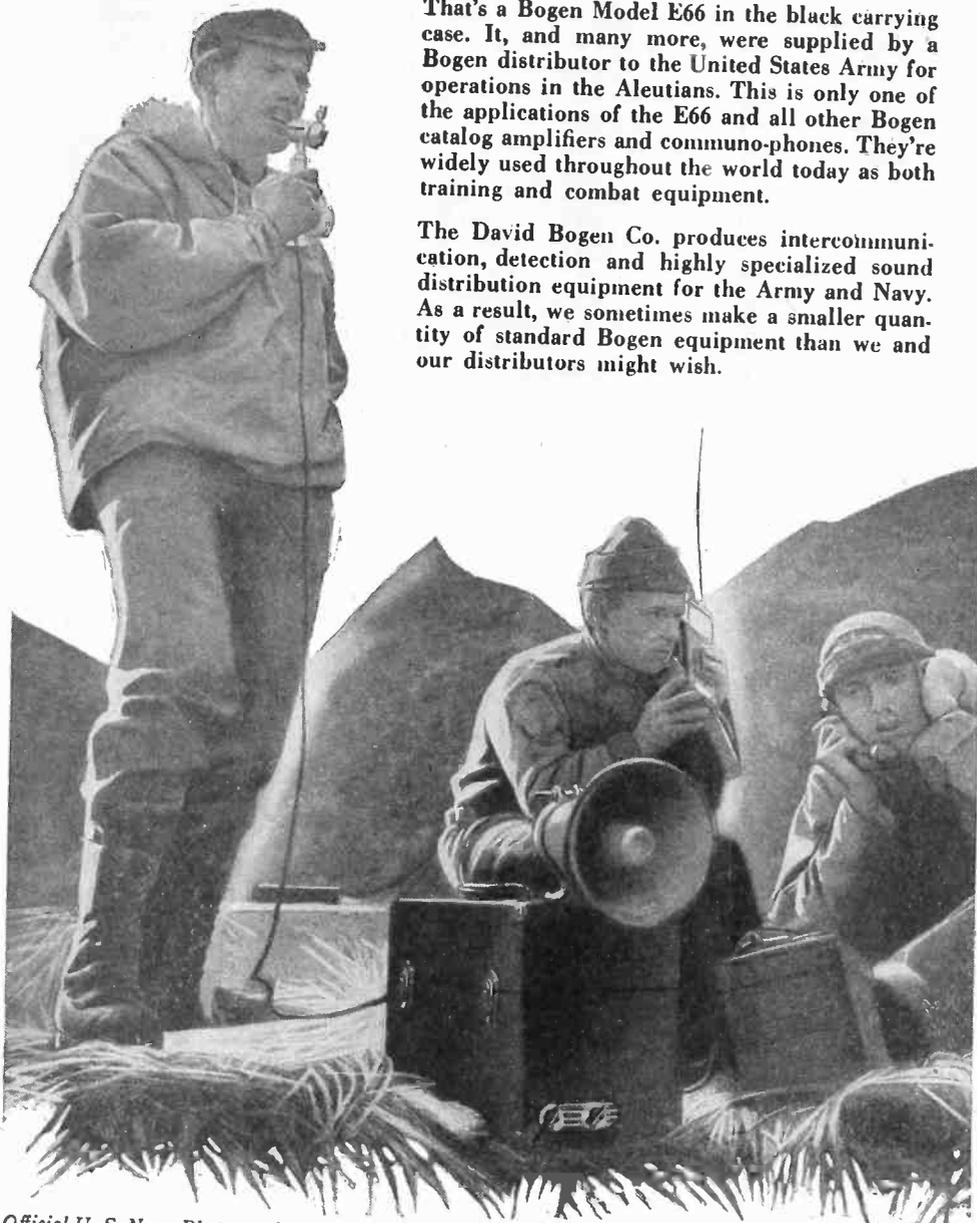
Because military demands come first today, G-E tubes are scarce. When they are again available in quantities, electronic production of equipment in industry and the great consumer need for replacements will offer a huge tube market. Then, you, the radio service man of today, will be the electronic maintenance man of tomorrow, serving the expanded needs not only of radio, but also of television and electronic equipment. Electronics Department, General Electric, Schenectady, N. Y.

Tune in General Electric's "The World Today" and hear the news from the men who see it happen, every evening except Sunday at 6:45 E.W.T. over CBS. On Sunday evening listen to the G-E "All Girl Orchestra" at 10 E.W.T. over NBC.

THERE'S A G-E ELECTRONIC TUBE FOR EVERY PURPOSE

GENERAL  **ELECTRIC**

This one is in the ALEUTIANS



Official U. S. Navy Photograph

That's a Bogen Model E66 in the black carrying case. It, and many more, were supplied by a Bogen distributor to the United States Army for operations in the Aleutians. This is only one of the applications of the E66 and all other Bogen catalog amplifiers and communo-phones. They're widely used throughout the world today as both training and combat equipment.

The David Bogen Co. produces intercommunication, detection and highly specialized sound distribution equipment for the Army and Navy. As a result, we sometimes make a smaller quantity of standard Bogen equipment than we and our distributors might wish.

If deliveries are sometimes delayed, we regret it sincerely. And we'd like our distributors to know that we appreciate their loyalty and patience. We would like to tell them, however, that our experiences as prime contractor for the military services have added considerably to our knowledge. What we've learned will be shown in great new Bogen equipment after the war.

BUY MORE WAR BONDS AND STAMPS

David Bogen Co. Inc.

663 BROADWAY NEW YORK 12, N. Y.



DISCUSSION

Here is space for the manufacturer and the dealer and the discussion of their mutual problems concerning records. Here, too, will be found items of interest to the record trade, such as record reviews, new items of interest, small technical discussions on the accessories of the trade, personnel items and the like.

This column is open to all. Send your contribution to DISCUSSION COLUMN, Midwestern Editorial Offices, Radio & Electrical Appliance Service-Dealer, 7645 No. Sheridan Road, Chicago 26, Illinois.

Recoton Revives 200 Unit

Amongst the war casualties in the music trades field was Recoton's popular tin of 200 needles. The general public liked this unit particularly because it made it easy to keep needles always handy. Dealers liked it, too, because the unit sale of \$1.50 was substantial.

The Recoton Corporation announces that this unit of 200 needles is being reintroduced. Of course, since tins can no longer be obtained, an attractive, colorful, non-critical-material container has been designed for the purpose. Ten such containers come in a display carton that may be used on the counter or in the window.



These war-workers hate the song by the name of *Pistol Packin' Mama*, because their work is packing pistols in boxes all day long. So here they are shown breaking up records also tearing up sheet music of that song and packing them into G.I. boxes and nailing the lid down tight forever. The boxes were later "buried at sea" which shows the extent someone goes for a gag. It was good publicity!

Which Semi-permanent Needle?

FROM the standpoint of the dealer, and except that the product is definitely inferior or dishonestly advertised, the best needle to sell is the one on which he makes the most profit. Since the differences between semi-per-

(Continued on page 41)



SYM-PA-THY!

ME-YOUR
CUSTOMER



all i want is sym-pa-thy

by don herold

I'm a typical, everyday, bothersome customer of your radio shop. We have 3 radios at our house, and sometimes one of them goes hay-wire—although they usually work wonderfully—considering the beating we give 'em.

I know there's a war on, and I know you radio fellers have a heck of a time getting parts and help. I know you're on a spot. So I don't expect you to fix my radio as fast or as good as you usta.

But—this war is on my nerves, too. I'm thinner-skinned than usual! I'm sensitive! I'm tender! So please be a little kind to me, mister. Please explain a little why you can't do this or that—and I'll stand for most anything!

"He said it would be 4 weeks before he could repair our radio—but he was so nice about it that I don't mind."



I quit one radio man because he barked at me and kept putting off my repair job and didn't tell me why. I've gone over to another radio feller who isn't any faster than the first one, but who takes the trouble

to always rub my fur the right way. This is the shop that's going to get my repair business after the war, and I'm hoping to buy a new FM set and a television outfit and a lot of electronic gadgets some day—and this shop'll be tops with me for all that business . . . and maintenance on it.



"They use International Resistors. Must be a good repair shop"

Incidentally, I like to know you are using famous parts in my jobs—such as International Resistance Units—whenever you can get 'em.

No. 1 in a series of special messages prepared by America's famous business writer, humorist and cartoonist, Don Herold. . . In sponsoring these Don Herold "broadcasts," IRC pays tribute to the thousands of Radio Service Men who, whenever possible, specify and use IRC resistance units in their work.



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401 N. Broad St. • Philadelphia 8, Pa.

IRC makes more types of resistance units, in more shapes, for more applications than any other manufacturer in the world.



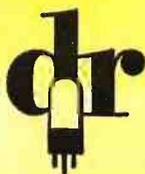


There's new activity at Detrola Radio. Under the direction of Mr. C. Russell Feldmann—a radio-electronic pioneer who led the way in the development of the automobile radio—the Detrola plant and personnel have been completely reorganized. Large sums of money have been spent—for the installation of the most modern research, development and production facilities. Many new workers, including some of the best minds in radio engineering, now proudly wear the Detrola badge. All this plant and personnel are now engaged in supplying the armed forces with an ever increasing flow of precision-built equipment. That's our job today. All of it will be available for the production of ultra-modern, ultra-quality peacetime radio and other devices. That's our aim for tomorrow.

Detrola

goes
forward

under New Direction



DETROLA RADIO

DIVISION OF INTERNATIONAL DETROLA CORPORATION • BEARD AT CHATFIELD, DETROIT 9, MICH.

C. RUSSELL FELDMANN • PRESIDENT

Letters to the Editor

LIKES EAR-RSD

Editor:
Since you have combined ELECTRICAL APPLIANCE RETAILING with your magazine, I think that you have hit the nail on the head. Nearly all of us dealers have been literally forced into the appliance repair business whether we liked it or not. And to tell the truth, we like it. We intend to stay in it; and add to our radio line some appliances. More power to you; keep up the good work.

J. H. Cromwell
Ohio

For the bouquets, many thanks.

Editor:

Let's have more articles on Black Market tubes and tube shortages.

Question: Why can Blank Store get so many tubes—of critical types especially? We note their tubes are not all their own brand, but are from most of the other manufacturers in regular boxes.

F. Lingnor
Wisconsin

There is no need necessarily to suspect every store having scarce tubes for sale. Some get them quite legitimately from manufacturers, and from War Plants which over order, or make a mistake and then get permission from both the military and the WPB to sell the tubes to a dealer. Usually the number of tubes is not great—certainly not large in comparison with the number of tubes the store sold in Peace times.

POST WAR SUGGESTION

Editor:

The problem of disposal of surplus military goods immediately after V-Day is one of extraordinary potential seriousness not alone to the radio industry, but to almost every living American and every U. S. industry. If the government surveys and sells to the highest bidder any volume of surplus war material catastrophe can be the result.

This is a very broad generalization, but the conclusion seems so inescapable that the alternative of dumping all such surplus into the deepest known parts of the several oceans may possibly be a better course. Let us examine briefly the possibilities in either course as it may affect the radio industry.

The pre-war peace-time annual dollar volume of the radio industry is frequently stated to be about \$300,000,000. Military procurement for 1943-4 is at the oft-stated rate of about \$4,000,000,000—over thirteen times the industry's peace time sales. At first glance just the 1943-44 military radio/electronic procurement might have been industry's total sales expectation thru the years 1943 thru 1955. Cursory thinking could draw some awful maxims from the prospect of dumping onto the civilian market in a hurry some thirteen years' civilian consumption-rate in the form of military radio equipment. This is not a fair estimate of the situation, however.

To begin with, the equipment which might be dumped is not in the form of broadcast receivers, hence presumably of little interest to the general public. The actual number of units of equipment produced for the military in 1943-44, may very probably be less than the number of broadcast re-

(Continued on page 32)

These 2 GHIRARDI BOOKS Will help you to Diagnose, Locate and Repair Receiver Troubles EASIER • BETTER and FASTER



ALFRED A. GHIRARDI

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MODERN RADIO SERVICING

The book that trains you quickly to MAKE MORE MONEY and get a bigger job as a Radio-Electronic repair technician BECAUSE it is by far the largest, finest, most easily understood how-to-do it training course on the subject!

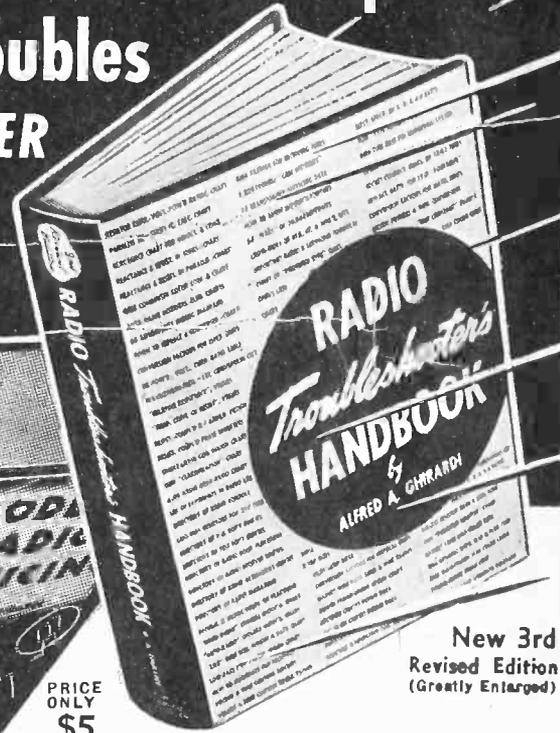
Test Instruments—Troubleshooting—Repair

"Modern Radio Servicing" is the only single, inexpensive book that gives you a thorough training in the construction and working of all types of test instruments; receiver troubleshooting procedure; circuit analysis; testing, repair, and replacement of individual receiver parts; installation; adjustments, maintenance; service shop management, etc.

No other book can compare with this one for complete, easily understandable instruction on every phase of service work. "I recently finished a course in Radio Repair at one of the N. Y. radio schools and all my learning at this school did not help me to understand and repair radios as quickly as did this one book. I made my money back on one job alone!" writes Henry Miller of Brooklyn, N. Y.

You, too, can get a thorough and practical working training in Radio-Electronic servicing from this famous Ghirardi book—by yourself, in spare time at home—just as Mr. Miller and thousands of others have done. Its 1300 pages and 706 illustrations help you visualize every action. The 720 self-testing review questions help you check your progress. Progress as fast as you want to. It's the biggest servicing training bargain you can buy anywhere. You are protected completely by our

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744 big pages, check-full of just the kind of time-saving, money-saving, tabulated and charted servicing data that servicemen are finding invaluable.

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Ghirardi's RADIO TROUBLESHOOTER'S HANDBOOK isn't a "study book." It's an on-the-job data book to be referred to in your everyday work. For example, don't waste your time on complicated troubleshooting for every ailing receiver you are called upon to repair! First, look up its model number in the big Trouble Case History Section of the Handbook which lists common troubles and their remedies for over 4,800 models of receivers and record changers.

CHECK-FULL OF SPEED-UP DATA

Nine times out of ten the Handbook will give you the exact clue you need to repair a receiver at once—often without any testing at all! Similarly on tubes, parts, replacements, substitutions, color codes, circuit alignment, auto radio, batteries, vibrators, ballasts, grid bias resistors, condensers, transformers, tone controls, filters, etc., etc., you get pages of quick-find, tabulated data to help do every repair job better—AND A LOT FASTER! This big new Handbook that weighs over 4 pounds is yours to use every day to make more money for only \$5 complete (\$5.50 foreign) and our Money Back Guarantee protects you. Order today!

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 MODERN RADIO SERVICING, \$5. (\$5.50 foreign).

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Address
City (and Dist. No.) State

REPAIR ANY KIND OF RADIO EQUIPMENT
PREPARE FOR A BETTER JOB AS A RADIO-ELECTRONIC TECHNICIAN

SPRAGUE TRADING POST



A FREE Buy-Exchange-Sell Service for Radio Men

"MIGHTIEST MIDGETS OF ALL"



SPRAGUE Atoms

Sprague Atoms meet practically every dry electrolytic capacitor replacement need. Play safe! Use them universally on every job. Ask for them by name!

FOR SALE—3 port. elec. phonograph units with crystal pickups, absolutely new. 2 with 33 $\frac{1}{3}$, and 78 rpm Gen. Ind. motor; one with 78 rpm motor. 12" turntable. Carrying case. Compl. with cord. For 110V 60 cy. Trade or sell. David A. Bensman, North High School, Sheboygan, Wis.

WANTED—Hallicrafter S-29 Sky Traveler in A-1 condition. Give full description and particulars and price in 1st letter. Sgt. Dwight G. Lancaster, Hqs. 1st Bn., 1787 A, A.P.O. 302, New York, N. Y.

WANTED—Tube tester, VTO, AF-RF signal generator, Rider manuals, etc. Describe & state price. M. E. Zuccarello, Rt. #2, Jefferson Highway, c/o O. C. Harrell, Baton Rouge, La.

FOR SALE—Cinematone jukebox amplifier, pp 6F6's in output, nearly new, \$25. 1 composite PA amplifier, pp 41's in output, \$20. 1 ditto, pp 6F6's, compl. with 2 Stromberg dynamic speakers, used, \$35. 2 Astatic JTT-30 crystal mikes, new, \$12.50 ea. 1 Turner BX crystal mike, new, \$9. 2—12" electro-dynamic speakers, new, \$7.50 ea. 2 Shure 99-CW 12" crystal pick-up arms, no cartridge, new, \$1.75 ea. Myron E. Kluge, 1913 Montrose St., Los Angeles 26, Calif.

FOR SALE—Weston 0-1.5 mil. meter. 0-3 amp. 0-60 mil. 0-5 V DC. 0-140 AC, and other meters. Also Kolster amplifier with tubes. Would like Ghrardi's "Radio Physics Course" and "Radio Troubleshooter's Handbook". A. M. Replogle, Union City, Ind.

WILL TRADE — G-E 0-100 R-F thermocouple milliammeter (without thermocouple reads 0-1 DC mills, approx.) Want tubes: 1S5, 1S4, 1R5,

1T4. Paul Merriman, 413 E. Burgess St., Pittsburg 14, Pa.

FOR SALE—Helpful hints on tube substitution and adapting for unobtainable tubes (50L6, 35Z5 etc.). Lots 6SA7, 6SK7, etc., \$1. Want 200 ohm line cords, small late sets, any condition. J. English, E. 1813 13th St., Spokane, Wash.

SWAP OR SELL—Have many popular tubes and parts, also some test eqpt., meters, and photo eqpt. Want Hickok #155 signal tracer, and Sprague or Solar condenser analyzer, also Rider's Manuals Nos. 3, 10, 11, and 12. Need 1A7, 12SA7, 6A7, 35Z5, 35L6, 50L6, 12SK7, 12SQ7, 25L6, and 25Z6 tubes. T. B. Thomas, 3055 University Ave., San Diego 4, Calif.

WANTED—Sig. generator and tube tester for all types; 2-speed recording unit with or without amplifier; also Superior signal tracer. Cash. A. A. Foth, 422 West 3rd St., Newton, Kans.

FOR SALE—Triplet 1671 vibrator tester; tested used tubes such as 26, 27, 57, 58, 47, 71A, 01A. Want 35L6, 50L6, 12SA7 and a 7" bench saw with fairly large table. Royce Saxton's Radio Shop, Route 1, Pontiac, Ill.

FOR SALE—Westinghouse detector amplifier, type DA, style 307190, with receiving tuner type RA, style 307189, wave length 100-700 meters. Laws on Hostutler, 806 Hudson Ave., Takoma Park, Md.

WANTED—Output transformer, 50-watts or more. J. T. Boyer, Jr., 1820 S. Main St., Winston-Salem, N. C.

WANTED—All-wave signal generator; Radio City tube and set tester, or Superior #1240 and 1250 combined tube and set tester. Have for trade new and used power and audio transformers, some mica condensers, resistors, used speakers, A-K radios. Clarks Radio Shop, Corinna, Maine.

TUBES FOR SALE — Guaranteed. Many in orig. cartons. 50% off list. 6—6A8; 6—6F5; 6—6F6; 12—6K7; 6—6Q7; 4—25L6; 2—2A7; 4—6A7; 6—6C6; 6—6D6; 3—6I5; 3—6J7; 2—6L6; 2—6U7; 2—6Y6; 3—39; 4—41; 6—42; 6—45; 2—47; 4—71A; 2—56; 4—57; 6—58; 6—75; 4—78; and one or two each of most any other number. Albert H. Klee, 3246 White Plains Road, Bronx, New York, N. Y.

FOR SALE OR TRADE—17-watt P.A. system, 2 enclosed speakers, Shure crystal mike, floor std.; desk std., almost new (Webster #417). Also G-E Tungar double charger. Arlington Radio Service, 158 Jamaica Ave., Brooklyn, N. Y.

WANTED—Radios and radio parts stocks. Give prices, describe fully. Flat River Supply Co., Flat River, Mo.

FOR SALE OR TRADE—Hickok dynamic mutual conductance tube tester T53; and Precision E200 signal generator. Want electronic multitester such as Voltomyst Sr. or Jr., set of Rider Manuals, and condenser analyzer. O. B. Bach, 21 S. Walnut St., Milford, Delaware.

WANTED—Damaged or burned out meters, for cash. Send full details for offer. Also have Majestic phono motor and speakers to trade for 100 KC or 456 KC crystals. Radio Industries, P. O. Box 494, Kokomo, Ind.

URGENTLY NEEDED — Late model signal generator, vacuum tube voltmeter, and late tube tester. Sgt. Roy Addis, 12th H.B. Proc. Hq., Army Air Base, Lincoln 1, Nebr.

WANTED—Burned out radio tubes 12 to 50 volts. 5c ea. All letters answered. Midway Electric Co., Route 1, Box 56, Adrian, Minn.

WANTED—Will buy or trade for a gasoline generator with approx. output of 110 AC @ 60 cy. at about 300 watts. Photographic eqpt. to trade. Pfc. M. Silva, 18th R.V.D., Sq. B., Kearns Field, Utah.

WANTED—Late model tube tester, V-O-M, oscillator, or what have you? John I. Pierce, 201 West Washington, McAlester, Okla.

WANTED — Following tubes: 1A7, 1B7, 1D7, 1A5, 1T5, 1H5, 1N5, 7A8, 6D8, 12SA7, 6Q7, 50Y6, 50Z6-7. Also want filament transformers, 0.3 @ 3 ma. Cash. Otis B. Martin, Jacksonville, Ark.

FOR SALE—Various parts, etc. to close out an estate. Variometers, transformers, magnafomers, condensers, etc. Write for list. A. M. Jones, 9 N. Oak Ave., Pitman, N. J.

NEEDED URGENTLY — Small superhet communications receiver such as EC-1 or Skybuddy, any condition. Have for trade one 0-150 AC voltmeter (Welch Lab model list @ \$9.65); one Beede 0-7 AC meter; one Readrite (0-20) 0-100 mills. Also have tubes. Write for list. Teddy Powell, Box 13, Hohe Sound, Fla.

WANTED — Complete set Rider's Manuals. Howard Schwartz, 46 Attorney St., New York 2, N. Y.

V-O-M WANTED — Triple beam Weston preferred, but others considered. Also want 1A7 and 1A5 tubes. Henry P. Mason, 2602 Yorkway, Dundalk 22, Md.

WANTED—New or used RCA RP-160 Changer with or without crystal. Must be A-1. Have GI-RM4 recording motor and GI model "A" motor, both perfect. Dick Nelson, 1213 Leeds Terrace, Halethorpe 27, Md.

URGENTLY NEEDED for essential work: a dependable signal generator and a V-O-M. J. W. Floyd, 1601 Goodyear Blvd., Akron 5, Ohio.

WANTED—Capehart FM de Luxe Radio-Phono, new or used, with or without records. For war plant—priority available. Walter S. Kraus Co., 43-10 Forty-eighth Ave., Woodside, N. Y.

EQUIPMENT FOR SALE — One Clough Brengle OCA signal generator; Superior 1230 signal generator, both in perfect condition. Also one 10-1154 Meissner analyst, factory built, A-1 condition. J. F. Martin, 142 Ralph Ave., Brooklyn 33, New York.

URGENTLY NEEDED for WERS use: National One-Ten receiver. Describe fully. For sale: 32V DC adjustable G.I. Flyer phono motor (heavy duty) less t.t. Also have std. 6" Par Metal relay rack for 19" panels. Chas. W. Schecter, Scenic Drive, R. #2, Muskegon, Mich.

WANTED—Dynamic condenser tester, Solar QCA or CE or Aerovox 95; also a beat frequency oscillator. P. D. Padva, 1546 S. Christiana Ave., Chicago, Ill.

WILL TRADE new single phase 110/220 V, repulsion induction motor for radio test eqpt. or FM converter. What have you? J. Leo Phelan, RFD #3, Waterbury 83, Conn.

FOR SALE — Genuine Philco tubes, 15—71A; 8—77; 3—79; 1—#1 ballast; 3—#6 ballast; 3—33; 2—34. Also have model 6C Bogen PA system compl. except for mike stand. Want Rider's Manuals complete. Have old Readrite tube tester, not up to date, but in good condition. Harold P. Towner Sr., 206 E. Naples St., Wayland, N. Y.

YOUR AD RUN FREE

Send us your Sprague Trading Post advertisement today. We'll be glad to run it free as part of our special wartime advertising service to the radio profession. WRITE CAREFULLY OR PRINT. Hold it to 50 words or less. "Equipment for Sale" and "Wanted" advertisements of an emergency nature will receive first attention. Different Trading Post ads appear regularly in RADIO RETAILING—TODAY, RADIO SERVICE-DEALER, SERVICE, RADIO NEWS and RADIO-CRAFT. Please do not specify any particular magazine for your ad. We'll run it in the first available issue that is going to press. Sprague, of course, reserves the right to reject ads which, in our opinion, do not fit in with the spirit of this service.

Dept. RSD-42, SPRAGUE PRODUCTS CO., North Adams, Mass.

SPRAGUE CONDENSERS KOOLOHM RESISTORS

Obviously, Sprague cannot assume any responsibility, or guarantee goods, services, etc., which might be exchanged through the above advertisements

New Appointments & Personnel Changes

Ben Kievit, by Sylvania Electric Products, transferred to New York City, as Field Engineer in Equipment Sales Dept. . . .

Cyrus T. Read, by The Hallicrafters Co., as Public Relations Counsel with new offices at 540 N. Michigan Ave., Chicago. . . .

F. W. Schor, by the same company, to be Chief Engineer in Charge of Development. . . .

Wing Glerum, by the same company, to be same except "in Charge of Production". . . .

William A. Foote, by Littelfuse, Incorporated, to office of Sales Coordinator. . . .

Louis J. Kunert, elected President of National Radio Institute Alumni Ass'n. . . .

William J. Massey, by Westinghouse Lamp Division, to be general lamp sales manager. . . .

William C. Speed, by Reeve Sound Labs, to be Vice-President in Charge of Manufacturing. . . .

Lester Via, by John Meck Industries, to its engineering dept. . . .

David Gross, by Allen B. DuMont Labs, to be Sales Director of Materials Test Div. . . .

Samuel H. Cuff, by the same company, to be General Sales Promotion Manager for Television. . . .

James H. Jewell, by Westinghouse, to be Assistant Manager of the Industry Dept. . . .

Ted Pockrandy, by Universal Microphone Co., to be supervisor of their Dept. T-45 (lip mike dept.). . . .

Tom P. McDermott, Inc., by The Crosby Corp., as exclusive wholesale plate distributor for Oklahoma. . . .

Ralph A. Hackbusch, by Stromberg-Carlson of Canada . . . as its Vice-President and Managing Director.

H. A. Crossland, by General Electric Company . . . as its Manager of Sales of the Receiver Division.

Charles B. Brown, by RCA/Victor Division of Radio Corporation of America . . . as its Advertising Director.

Frank M. Folsom, by Radio Corporation of America . . . as its Vice-President and Director.

Ben Boldt, by American Phenolic Corporation . . . as its Advertising and Sales Promotion Manager.

Stanley H. Manson, by Stromberg-Carlson Company . . . as its Head of Publicity Department.

F. Leo Granger, by Stromberg-Carlson Company . . . as its Radio Service Manager.

Civilian Production is

Temporary: OWI

The Office of War Information issued the following statement on curtailments of war production, basing its data from the Navy, the Army, the Production Board, and the U. S. Maritime Commission.

None of the curtailments, or "cutbacks," to date has been based upon plans for resuming manufacture of civilian goods. No considerable curtailments for that purpose can be scheduled during 1944 unless the war in Europe should take an early decisive turn in our favor, ending hostilities not later than June or July.

In & Around the Trade

Being a condensed digest of some of the happenings in and around the radio trade as compiled by the Editors

Until then, whatever resumption of civilian production WPB permits must be considered purely as temporary, and subject at all times to a return to military production when required.

The present series of adjustments in war production and those projected for coming months are dictated by:

(1) Changing military requirements resulting from combat experience.

(2) Overproduction of some raw materials and military equipment. This has come about largely because at the war's outset our production goals had to be scaled high enough to provide for any contingency—the seeming possibility of the fall of Russia, an invasion of this continent, or almost total destruction from the air of Britain's and Russia's war industries.

The consensus of officials of the Army, and civilian war agencies is that any return to civilian manufacture during the year, beyond the 2,000,000 electric irons and 50,000 bathtubs recently authorized by the War Production Board, will probably be in goods necessary to maintain the civilian economy. WPB states, "Our severely burdened railways and motor transport systems and our heavy war industries must have first call on replacements and maintenance equipment as they become available." Indications also are that some electric refrigerators and stoves for war housing may be scheduled for 1944 provided the situation in metals continues to ease and further cutbacks in war items provide facilities for manufacture.

MRO Ratings Revised

Preference ratings available to various industries for maintenance, repair and operating supplies (MRO) have been adjusted to reflect a revised pattern of relative urgency, the War Production Board announced today.

The ratings have been adjusted by means of changes in the lists of CMP Regulation No. 5. Those industries which are included in List I are eligible to use an AA-1 preference rating, and those in List II an AA-2 preference rating to obtain MRO items.

The changes which are made by Amendment No. 3 to CMP Regulation No. 5, as amended September 13, 1943, are as follows:

1. Batteries, dry cells have been moved from List II to List I, thereby making the AA-1 preference rating available to manufacturers of these products.

2. Lighting equipment and accessories for aircraft, airport and marine purposes have been moved from List II to List I, permitting manufacturers of such items to use the AA-1 preference rating. At the same time, a new listing has been included for lighting equipment and accessories other than aircraft, air-

port and marine, which permits the manufacturers of these products to use the AA-2 rating.

3. Use of the AA-1 rating has been limited to manufacturers of search lights and flood lights, thus making manufacturers of spot lights and parts ineligible to use it. Formerly, manufacturers of all these products were eligible to use the AA-1 rating.

4. Public warehouses eligible to use the AA-2 preference rating have been limited to dry and open storage warehouses.

5. Refrigerated warehouses of perishable food products have been made eligible to use the AA-1 preference rating, by being included in List I.

New Stancor Catalog

New 36-page illustrated catalog describes various types and sizes of stock transformers manufactured by Standard Transformer Corp., together with complete and detailed specifications, was issued today. It lists not only transformers for most electronic applications but many stock converters as well for the conversion of AC to DC. Valuable charts are provided quickly to identify the correct units to be used in various applications. Sent free upon request. Ask for catalog 140-FRSD.

Belmont Builds

Construction was started this week on an addition to the plant of the Belmont Radio Corporation, Chicago. The estimated cost is \$70,000. The addition will provide space for the firm's augmented laboratory staff which is developing electronic devices for the armed forces.

The construction work will extend the second-story portion of the plant and will give an additional floor area of 200 x 45 feet.

Amperex Expands

Expansion of the facilities of the Amperex Electronic Products to additional space was announced this week by S. E. Norris, Sales Manager, with the information that Plant No. 2 has been placed in operation.

Located at 25 Washington Street, New York, the new unit is the latest increase in the firm's productive capacity. It represents an expansion of approximately 2000% over normal production.

Connally Leaves OPA

Reagan P. Connally, director of the Consumer Goods Price Division, has resigned in order to return to his duties as president of the Interstate Department Stores, New York City, Administrator Chester Bowles announced.

Famous Signatures

George Washington

Abraham Lincoln

Thomas Jefferson

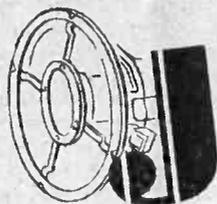
John Hancock

Benjamin Franklin

Woodrow Wilson

Theodore Roosevelt

Thomas A. Edison



Jensen

Manufacturers and Designers of Fine Acoustic Equipment

Microphone Man

"Integrated Sound", was the term devised to describe the installations sold by the author who is well-known throughout all the Windy City by the title of "Microphone Man"

**by
Larry McGee**



The author beside one of his "Integrated Sound" installations which provides continuous music of all types in a cocktail lounge

WHEN in 1933 the *Chicago Sound Systems Company* was founded, it adopted the slogan, "Our Business Is Sound." For the past eleven years it has never wavered from that and has handled *Sound* in all of its phases. And this in spite of depressions and temptations to abandon the field for what have sometimes been called greener pastures."

Of late our firm has been specializing in "Integrated Sound Systems." An "Integrated Sound System" is one which is custom-built or assembled especially for a particular customer, to meet, exactly, his

type of installation problem. For instance, if a cocktail lounge desires continuous music of one sort or another, the *System* might consist of both FM and AM tuners (or perhaps complete radio receivers), a 12 to 18-record record-changer (remotely controlled by means of our own gadgets), a series of microphones for the "live" acts, perhaps a piano reinforcement, or a guitar attachment for the musicians, one or more amplifiers varying from 18 to 30-watts output each and six to twelve loudspeakers properly concealed in the wall, behind various mirrors, drapes, etc.

That is quite a "package" to sell or to install. It is not done in any slipshod manner either. If it were, we could not afford to guarantee the units (less tubes, microphone cables, phonograph records and needles) for one year, the tubes for 90 days and the rest at replacement cost for a period of one year.

From the above it can be seen that our present ideas of *Sound* sales have come a long way from those of the man who in the "old times" nailed up a speaker here or there, strung his mike wire across the floor or ceiling and plugged in a store-bought amplifier which had never been seen, tested, nor engineered for the job. Not that we still don't use amplifiers other than our own make right now. We use "store-bought" units. But we only employ them for the type of job for which

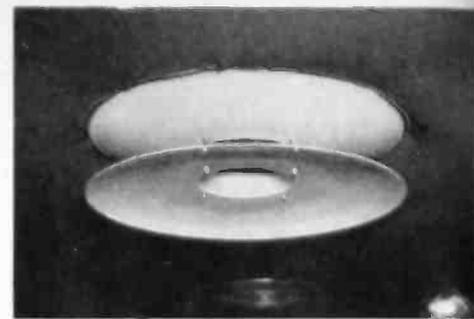
they were originally designed; and then we make it our business thoroughly to understand what we are buying.

Since *Chicago Sound Systems Company* has been established sufficiently long, we are usually called in at the "blueprint" stage when *Sound* is required. Sometimes we are called in after the structure in which the



Typical bar installation. Top panel has two speaker controls also magic eye, audio output-level indicator. A fine radio tuner with shortwave can be seen under controls. At the bottom are power switches, master amplifiers gain control, and the unusual, special remote reject and selector push-buttons for the record changer

Editor's Note: Larry McGee, who wrote this article, is a well-known figure in Chicago audio circles. His experiences date back over a dozen years wherein he has tackled everything from a crystal detector to a jumbled juke-box coin slot. His gadgets are the real reason why his firm has been singularly successful and are only matched by their designer's imagination ingenuity. We hope to be able to have Larry give us the low-down on some of his "hotter" items in the near future. Meanwhile, it would be well to have the reader understand that Larry has designed and supervised more sound installations in the Windy City than anyone in or out of the business. And that, we say, is something of a record!



The usual factory installation now quite common. The speaker mounted on the board is for the music and main office pep-talks or other entertainment while the square box with the perforated back contains the speaker of the office-factory paging system

A ceiling speaker with a deflector-baffle to prevent blasting the customers with high notes. This type of diffuser acts to even out the highs and lows, making good sound possible

Unusual office paging system with a booster amplifier to the left on the top of the phone. This is necessary to raise the microphone level to the correct value for use over very long lines into another building. The set holds AC pickup to a minimum because the output is grounded 500-ohm line. Amplifier to right is for use in the same building in which it is located

power should be to override the inherent noise level. We compute this by a sound level meter working against a factory-calibrated microphone and a sound (output) level meter. We attempt to override the noise level by from 3 to 6db. Converting this db level into wattage gives us the actual output level we must supply; we furnish a unit developing 45% more as a reserve. Where this is not possible in one amplifier without distortion, we use two or more.

Next, we try to maintain sound in an even space of from 3 to 6 feet above the floor, (except in "balcony" locations where we must reach higher). This space coverage determines the number of speakers we must use. Normally, and wherever possible, we try for infinite baffles by burying the speaker flush in the walls of the establishment. To better to do this, we have developed a special type of ring which permits the speaker rim to be flush-mounted with the wall. This refinement has paid us handsomely in the fine quality of reproduction, and the many resultant recommendations by satisfied customers.

units are to be used is complete; then we do not hesitate to have the walls torn into, the floorboards lifted away, and other changes made, if we are to give our assurances that the "Integrated System" is to work at maximum efficiency. But regardless of when we are called in, the whole job is tackled from an engineering viewpoint.

There are many who will say that this cannot be done, that there are no engineering standards for the Sound Business. To them we say that *Ohms Law* has not been repealed, and sound distribution still follows well defined laws of nature. Wherever possible, then, we not only make physical space measurements, but we take our equipment into the location. This will tell us what the

Factory amplifier and record-changer system. An FM tuner is included for radio entertainment that is static-free in this type installation. The single-record player is used while the record changer is loaded with a new batch, thus giving continuous music. Workers' output is usually increased; and absenteeism is cut down



Prior to FM, most of our jobs were in cocktail lounges. Now with fine music and fine quality music available without static interference, we have been called on to equip one after another of the city's finest hotels and restaurants. We soon found out that in such an installation, the best in amplifiers and in speakers was required to give the fine quality demanded by such a clientel. So we can truthfully say that FM has opened up a vast, new, and good-paying market to us.

The War, too, has brought our business up. Demand for music in plants, the increased tempo of doing business and the expansion have all acted to jam us with orders. All of this business has been on priority basis, and our equipment component parts have not been too difficult to

locate. In war factory installation our sales talks have been backed up by the discovery that music not only aids the morale of the workers but improves their output. This is no mere pipe dream. In a survey conducted by the *WPB* in over 100 plants, it was found that planned industrial music is universally liked by the worker, and, once given a trial, was equally well liked by management. The survey also revealed that 76% of the plants used phonograph music, and improved morale was claimed by 87% of these, while 57% expressed the belief that music improved production. In fact, according to the *Radio Corporation of America*, there are over 1000 leading war plants with "broadcasting" systems—music for the workers—in use.

Because at the outbreak of the war we had an extensive stock at hand, we have been able to make some *rental-installations* in *non-war* plants with amazing results. There is no doubt in our minds that music in the better plants is here to stay.

Our *Systems* are sold as a packaged unit. There is no talk of so many microphones, so many tubes, so many watts, etc. Our salesman, neatly dressed—and looking like a businessman, not an open-collared radio mechanic—calls on the prospect and finds what is wanted. He returns to our shop with plans of the location either of blue-print type or his own measurements. These are pored over by our engineer who makes the recommendations reduced to writing. A price, or rental value is placed on the complete unit, and the "bid" submitted. This is made on the basis that we will meet the customer's *Sound* requirements, with our *System* for "so-many dollars" period. If we get the work—we have been singularly successful in this method of doing business—we proceed with the installation; and usually the customer does not know what he is getting until he is shown the completed job and urged to make a trial.

Here it is well to mention that all of our jobs are figured to run at



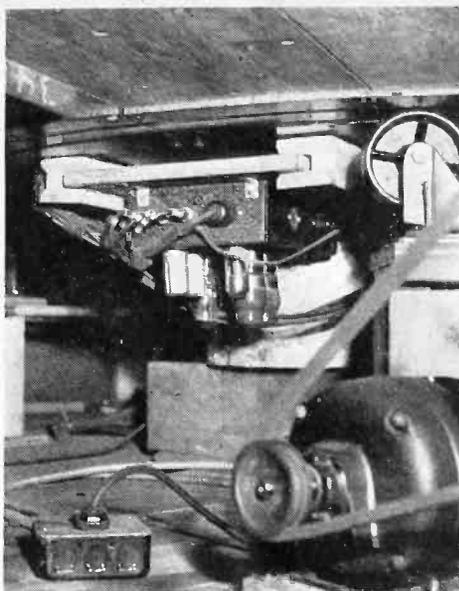
The Microphone Man's gadget is what makes this rebuilt juke-box record-changer tick. Tearing out the coin slot, he attaches his own solenoids which operate with a push-button up stairs. Records can be rejected and as many as are desired can be selected in advance for playing a pre-determined amount of time. Record changer can be turned on, started and also stopped from remote location. Metal housing is now replaced by a wooden box since steel is not available to this use. Box is built for customer

approximately 70% of rated output. The reason for that is simple. Sometimes the small extra power is necessary to override unusual noise; but more often the extra power will not be required. However, because the unit is operating normally near its peak output, the controls will not be sensitive; i.e., a broad sweep of the volume control will not bring about a sudden blast of music. Remember that almost every radio or sound engineer worth his salt has a delicate touch on the controls, while almost every bar-tender who has had to be nurse to a volume control, hates the job so much that he gives it scant attention, and throws the control around without care.

We have mentioned our guarantee before. What about repairs? If these are required within the guarantee period they are made without charge. If outside the period they are charged for on an hourly basis depending upon the ease of location of the amplifier unit. Some units take a half hour to get at; others can be reached in a matter of seconds. In either case, and except for the replacement of an obviously burned-out tube, all repairs are made in our shop.

Believe us, the customer does not exist who appreciates your laying out oodles of feet of soldering iron wire, trouble lamps, parts and tools while his place of business is either working or being cleaned up for the next day. So we make no repairs at the place of the customer. We remove the offending amplifier, speaker or microphone and leave a temporary working unit in its place. Then we take the deficient unit to the shop and repair it at our convenience.

The cost of the "loaned" unit is figured in the repair bill, and is ap-

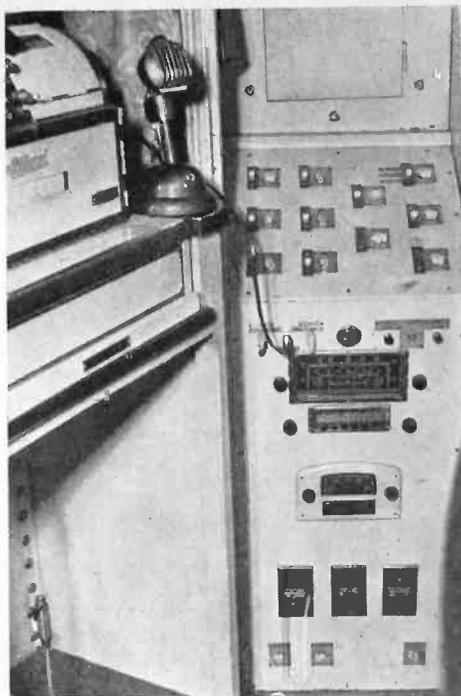


A unique under-stage installation in which the stage revolves continuously carrying with it musicians and other entertainers. The amplifier is suspended up-side-down and attached to the stage, turning with it. All AC inputs for lights, portable guitar amplifiers and the one in the picture as well as the output speaker lines are connected through a commutator and brush arrangement housed in an enclosure for safety. Usual method is to use microphone jack as connector for amplifier, but that was found unsatisfactory here and soon discarded

preciated by the customer. Rarely does it take us over 5 minutes in a place. True, we had to overcome the natural tendency to see "if just this one more thing" will "cure the set." Now we are hardened to this situation, and its "yank it out—fix it at home!" Your customers really appreciate it if you can give them the working unit in a few minutes time and get out of their place. They cannot work if you're fiddling around their bar—or their production line—or their telephone operator's position!

One of our newest business sources are funeral parlors. Here there are special problems which we have solved with a series of interesting gadgets which will be the subject of some future article. For instance, there can be no *herrumpf* when the record starts due to the pickup arm being dropped on the record. So we have devised a cutoff which "kills" the amplifier until the record has been started and the pickup arm in position. Again the quality must be good with no needle scratch. So while we agree that scratch filters take out a considerable band of music, still our customers would rather be *music-band poor* than to be *needle-scratch rich*. And our filters give them what they want!

One of our other simple gadgets is a tone accentuator instead of an attenuator. We have found that the



One of the highest priced Integrated Sound installations in Chicago. For use in three separate rooms of very large restaurant, it contains three 30-watt amplifiers, one record changing unit, one AM radio tuner and one FM tuner. Also available is a paging system and microphone for entertainment. Each of the twelve speakers can be switched to any one of the amplifier outputs and the entire system is controlled from an easy central location. Switching panel and the amplifiers are radio tuners are built into a closet where all is out of way

average ear does not necessarily want a booming bass; it just wants the bass more pronounced. So our tone controls do not attenuate the treble, leaving the bass remaining, but rather strengthen the bass while leaving all the treble in the set on full. This, we have found gives a much more life-like tone for the greatest number of listeners, and pleases the most of our customers.

Where do we get the component

(Continued on page 30)

Showing the thought which goes into an installation. Speakers are always carefully concealed. This one (arrow) is worked into the mural design. The special ring, which makes flush-wall mounting possible, is development of the "Microphone Man". With speaker in wall, the baffle is of infinite type



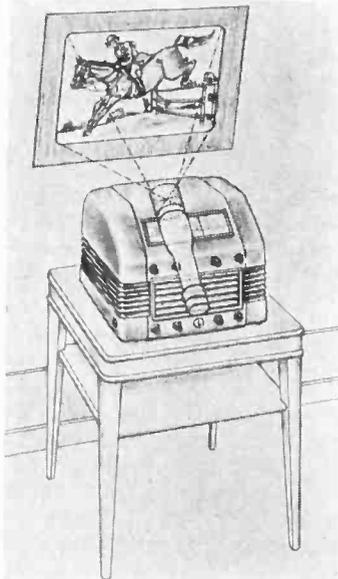
What's News in Pictures



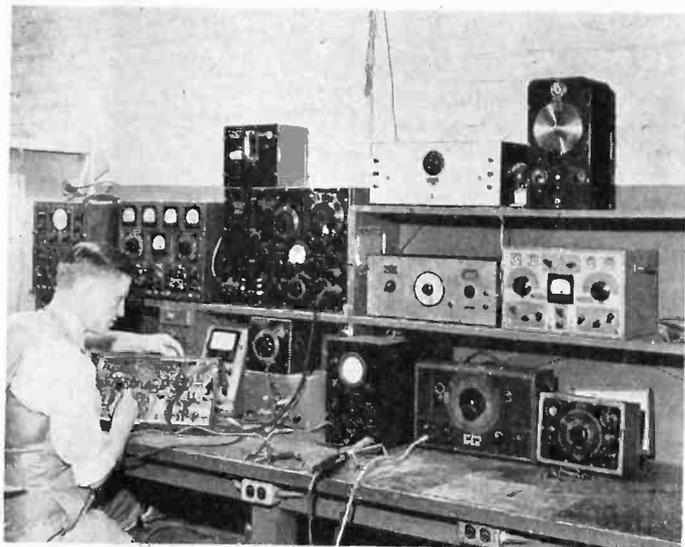
Universal Executives discuss "U" Plan for "V"-Day post-war program. B. C. Neece, V-P & General Sales Manager talks with E. J. VanBuskirk and W. J. Cashman about the coming Plans to Produce For Peacetime



Your community radio serviceman may be in this picture! This is the Communication Net Station of the Marines on hard-won Tarawa



Emerson Radio Co. of NY proposes that their post-war telly set will project the images on the wall in back of set



What the serviceman will get very used to is seen in this test bench set up by Spokane Radio Company to check all electronic equipment before delivery

The beautiful store of Bailey Radio, Buffalo, N. Y.



ELECTRICAL APPLIANCE

Retailing

Registered U. S.
Patent Office

SPOT NEWS

Circular Fluorescent Lamps

Dealers and appliance salesmen of portable lamps and lighting fixtures will have a brand new lighting unit when circular fluorescent lamps become available. As soon as conditions permit, the Westinghouse Lamp Division will add these to its line of Mazda F lamps. Sizes to be produced and current consumption will range from 20 to 40 watts.

There are no production facilities for these new lamps at present and due to the heavy demands of industry and the military, no sample lamps are available. Prior to going into production on these new lamps, complete information about auxiliaries and accessories will be released.

U Plan Sets Tempo

With over 15,000 requests for "U" books pouring into New Britain, Conn., from all sections of the country Universal's "U" Plan for "V" Day dealer post war planning program has the whole country sizzling from large utility companies and department stores to small dealers.

The plan is being offered to any qualified merchant of electrical equipment regardless of whether or not he was a Universal dealer before the war. In emphasizing this point Mr. Cashman said, "It is in the industry's interest to have all dealers better prepared to face the future. 'A bird in the hand is worth two in the bush' and we believe the 'U' Plan for 'V' Day will flush prospects for post war appliances from cover, changing a potential industry demand to specific demands on dealers' books throughout the nation, thus enabling dealers to plan better for the post war period through information secured from their customers. In addition it provides a method for a more orderly flow of merchandise through dealer stores following the war. We believe that through national dealer application of the 'U' Plan the entire industry will be in a better position to compete for the consumer dollars following the war."

A four color "U" Plan book being mailed to dealers requesting it outlines the 5 easy steps which put post war business on the dealers' books today and presents 10 ways in which the dealer benefits from applying this down to earth formula of post war planning. It stresses the need for more dealer participation in the war bond activities. Then it illustrates the advertising campaign and free point of sale promotion package to be used by dealers to set up the plan in their stores and to identify themselves to "U" Plan consumers. It shows the dealer how to

promote the plan locally and how to proceed with consumer to get the greatest ultimate benefit from the plan. Plan books are being furnished free by Universal to dealers.

Universal wraps up the plan as a package merchandising job by providing the dealer with a dynamic set of point of sale merchandising materials.

Odds 'n Ends

Production quotas for ice refrigerators for the first quarter of 1944 will be about 40,000 more than the quotas for the last quarter of 1943. . . . Japanese blockade of Calcutta, the sole port of export for shellac, would have seriously handicapped the war effort if it had not been for the development of highly improved spirit varnish replacements. Today several importers are selling more of the substitute than they ever did of shellac varnish. It is estimated that in 1941 this country consumed from 10,000,000 to 15,000,000 pounds more than total world shellac production. The demand for replacements grew so large that it was necessary to limit the use of many of these substitutes to military products.

Appoints Larson

Announcement of the appointment of the Larson Distributing Company of Denver, Colorado as distributor in the Colorado territory for The Crosley Corporation of Cincinnati, has just been made.

The Larson Distributing Company is headed by Otis L. Larson, who has been operating the company for the

past 17 years. The company was operated as the Larson-Nash Motors Company from 1927 to February, 1943, as the distributor of Nash automobiles in Colorado, Wyoming, New Mexico, and western Nebraska.

The company is now occupying temporary offices and display rooms at 1269 Broadway, Denver. It plans to change to a new location, on which an option has been obtained when civilian production of household appliances is resumed. The company is now equipped with a complete parts department.

Crosley Sells Factory Branch

In line with the announced policy of The Crosley Corporation to handle its post-war distribution of civilian products largely through independent distributors, the sale of the Crosley factory branch at 1512 South Michigan Avenue, Chicago, to The Harry Alter Company, of 1728 South Michigan Avenue, Chicago, has been announced.

On January 2, the Harry Alter Company took over both the personal and the physical properties of the Crosley Chicago branch and operate the branch as a part of its extensive merchandising and distributing business in the Middle West.

N.E.W.A. to Hold 2nd Annual War Conference

Charles G. Pyle, Managing Director of National Electrical Wholesalers Association, announced that the Second War Conference of the Association will be held at the Stevens Hotel, Chicago,

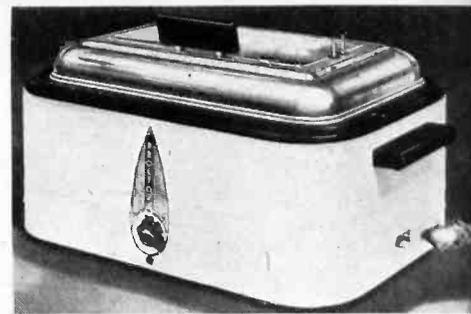
(Continued on page 38)

"I've got a loud-speaker that I'd like to get rid of . . . Err-r I mean a RADIO set loudspeaker!!"



Servicing Roasters

Complete servicing manual for Proctor "Roast-or-Grilles" which will help the repairmen fix these units in his shop



The Square Roast-or-Grille

A ROASTER may be returned by a customer with the complaint that they tested the temperature with an oven thermometer, and found it higher than the temperature indicated on the dial. An oven thermometer will read *much higher* than the dial on the front—because the oven thermometer is reading surface temperature of the roaster rather than the air temperature in the roaster. This must be brought to the customer's attention.

A thermometer suspended three (3) inches below the lid of the roaster will give the desired reading.

The ideal oven temperature with the pointer at 400 degrees, is 455 degrees actual temperature in the oven with a plus or minus variation of 25 degrees permitted as a difference between one roaster and another. The oven temperature referred to is the temperature recorded by a thermometer at the time the pilot light has just turned on, the roaster having cooled from the overshoot temperature. The overshoot temperature may always be disregarded. The overshoot temperature is the peak temperature attained immediately after the pilot light has turned off for the first time, after the roaster has heated up from cold. This temperature will always be at least 100 degrees over the normal suitable temperature of the roaster at any given setting. The overshoot peak temperature is purposely permitted to be high to compensate for the heat loss when the lid is opened and cold food is inserted. Careful tests have shown that no harm ever comes from this overshoot peak temperature and that it is actually beneficial. You will note that the actual oven temperature in the roaster with the dial set at 400 degrees is and should be from 30 to 80 degrees higher than the reading on the dial.

Reprinted Courtesy Proctor Electric Company.

We have deliberately produced this condition in order to permit the regular temperature setting indicated by most cook books to be employed with our "Roast-or-Grille." Experience has shown that in an electric roaster, due to the nature of the air circulation, a considerably higher thermometer temperature must exist prior to the insertion of the food than would be proper in a conventional oven. The PROCTOR is the only roaster at present which has a thermostat compensated to permit actual baking and roasting at the temperatures called for in regular cook books. Other roasters call for the dial to be turned up to a considerable higher temperature than recommended by most cook books. As far as roasting and baking are concerned, this is simply to say that we have had our eye on the finished result rather than on the matching of the temperature inside the oven with the numbers of the control dial.

When temperature-testing our "Roast-or-Grille," turn the adjusting knob to the position marked 400 degrees on the dial. After the circuit has broken two or three times, the temperature in the oven should be between 430 and 480 degrees at the time the light next turns on. If the temperature is within these limits, the thermostat is correct.

If it is determined that the thermostat is either defective or out of adjustment, this thermostat assembly *must* be replaced. New thermostat assemblies may be obtained from the factory where they are carefully tested and adjusted. Under no circumstances should anyone outside the factory attempt to change the adjustment of this thermostat.

Does Not Heat

If a roaster is returned, that doesn't heat at all, it may either be a defective thermostat, in which case replace same, or a defective

heating unit, if so, we would prefer to have it returned to the factory.

1. Remove lid and place roaster upside down supported in such a manner that the hinge does not touch the table and the roaster is level.

2. Remove bottom plate—gently tapping the edge.

3. Remove insulating material from around the lamp assembly and thermostat box (*Figure 1, No. 1*).

4. If lamp is burned out it can be unscrewed and replaced at this time. (*Figure 1, No. 2*).

NOTE: *The lamps to be used are Mazda radio pilot lamp, No. 41, 2.5 volts. Replacing lamps must have the solder filed off the bottom. Lamps obtained from the factory are filed and ready to install.*

5. To remove thermostat box (*Figure 1, No. 3*) first slip out thermostat box retainer bar from under supports or bottom cover brackets. (*Figure 1, No. 4*).

6. Disconnect thermostat box from control knob by cutting the small brass pin closest to the knob. (*Figure 1, No. 5*).

7. Now turn thermostat box so that the connections are easily taken off by use of socket wrench or pliers.

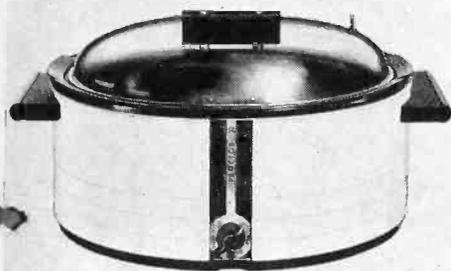
8. Remove thermostat box and install new one.

NOTE: *Caution and care must be taken to see that the same connections are made to the new thermostat as they were made to the old thermostat, if they are not, the pilot lamp will not operate correctly.*

9. Make sure all connections are tight, then place thermostat back in place and connect the shaft to the control knob. (*Figure 1, No. 6*).

10. The greatest of care will have to be taken when re-packing the insulating material after it has been removed.

11. Be sure the thermostat box is fixed firmly in place before any insulating material is replaced. The reason for this is to prevent any insulating material from getting in



The Round Roast-or-Grille

between the thermostat box and the enamel pan. The exposed nichrome wire and connections must be covered with sheet asbestos to prevent them from coming in contact with the insulating material, which will attack and destroy the heating wire touching it.

12. Place pilot lamp into the spring which is attached to glow cone—clearing out any insulating material that might hinder the light from showing through the glow cone.

13. Replace bottom cover, tapping gently to make cover fit in place.

14. Put back the four screws; drawing them up tightly.

Rectangular Roaster Notes

Theory of Operation

This appliance has one bottom element and one side element connected in series with an adjustable thermostat.

The adjusting knob is turned to the temperature wanted as shown on the dial. During the time the temperature is being built up, the pilot light will cause the cone (Figure 2, No. 13) to glow. When the desired temperature has been reached the thermostat will break the circuit, and the cone will cease glowing.

The following is a list of possible defects, complaints, etc., which may be encountered.

- 1—Defective thermostat
- 2—Bottom element burnt out
- 3—Side element burnt out
- 4—Pilot light not operating
- 5—Side handle broken

Defective Thermostat

The complaint may be that the roaster will not heat, gets too hot, or will not get hot enough.

It must first be determined; if there is a circuit in the roaster? To do this, use a series lamp, making sure that the adjusting knob is not on the off position. A circuit indicates that the thermostat is out of adjustment and should be replaced with a new one.

To replace thermostat, or to expose same for further test, proceed as follows:

- 1—Remove lid and place roaster

upside down, supported in such a manner that the hinge does not touch the table and the roaster is level.

2—Remove four sheet metal screws from bottom cover supports (Figure 2, No. 1), and then remove bottom cover by gently tapping its edge.

3—Remove glass wool insulation blanket.

4—Connect test leads across thermostat terminal connections (Figure 2, No. 8,) to determine if there is an open circuit. If there is an open circuit the thermostat is most definitely defective and you should remove the assembly by:—

- 1—Remove adjusting knob pin.
- 2—Disconnect thermostat terminal screws (No. 8)
- 3—Remove thermostat bracket screws (No. 5)

5—The defective assembly may now be removed and the new assembly installed by reversing the above procedure.

Caution on Installing Knob

Before attaching adjusting knob to the new thermostat, turn the thermostat, shaft to the right as far as possible. Insert adjusting knob, place pointer on or near the 500° setting, and fasten by means of a small pin.

Bottom Element Burnt Out

The roaster will not heat. A test lamp connected in series with the roaster indicates that there is no circuit.

1—Remove bottom plate as instructed in 1 and 2 under paragraph on "Defective Thermostat."

2—With test lamp prongs located at the right hand terminal pin (Figure 2, No. 20) and the screw and nut connection (Figure 2, No. 7) it may be determined if a circuit exists in the bottom element.

3—Should there be no circuit, the lower element may be removed by disconnecting the screw and nut connection (No. 7) and the nut on the right terminal pin (Figure 2, No. 20).

4—Remove old element and install new element using reverse procedure.

Side Element Burnt Out and How to Make Replacement

1—Remove bottom plate as instructed in 1 and 2 under paragraph "Defective Thermostat."

2—With test lamp prongs located at the left hand terminal pin (Figure 2, No. 20) and at the screw and nut connection (Figure 2, No. 3) it may be determined if a circuit exists in the side element.

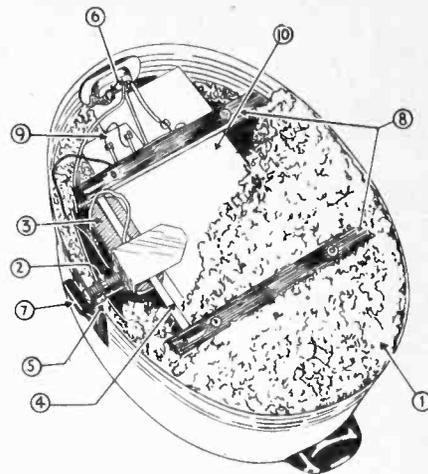


Figure 1

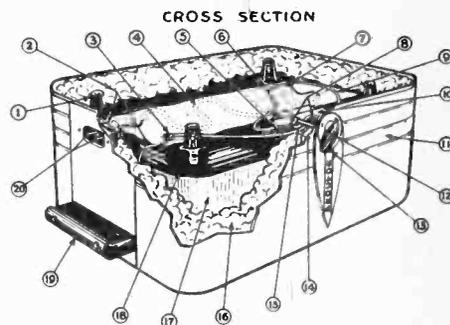
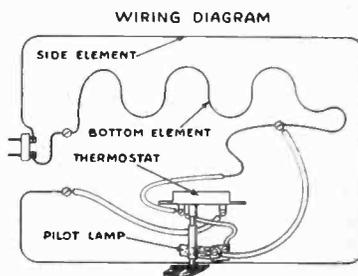


Figure 2



Wiring Diagram

3—Should there be no circuit remove element as follows:

a—Remove adjusting knob (Figure 2, No. 12).

b—Disconnect wire connections at terminals (Figure 2, No. 20). Thermostat terminal screws (Figure 2, No. 8), screw and nut connection (Figure 2, No. 3) and (Figure 2, No. 7).

c—Disconnect screw and nuts (Figure 2, No. 5) holding thermostat to inner well pan.

d—Remove thermostat and bottom element.

e—Slip body from well. Keep glass wool insulation in place.

(Continued on page 34)

REFRIGERATOR REPAIR HINTS

Hints on trouble location as well as theory of operation of some of the electrical parts of the Philco units

Theory of Operation

THE starting relay is very positive in its action, and yet very simple in the matter of parts. Connected in series with the running winding of the motor, is the winding of a solenoid coil magnet. See *Figure 1*. When the temperature control contacts are closed, the solenoid coil winding is energized. The magnetic field or flux developed by the solenoid coil attracts and controls an armature mounted on a spring steel arm or reed. This arm also includes a contact, and together comprise part of the motor starting winding circuit. Energizing the armature causes the starting winding circuit to be completed, and the motor will start.

The current required by the motor, at starting, is comparatively high, based on normal running current, and as a consequence, the magnetic field developed by the solenoid coil,

is also relatively high. However, as the motor speed comes up, the starting current decreases, with a consequent decrease in the strength of the aforementioned magnetic field, until the solenoid magnet will no longer hold or control the armature. The spring steel arm will then return to its original position, opening the starting winding circuit.

The relationship between rotor speed, line current, and flux density of the solenoid magnet, are very carefully determined at the factory, and no adjustments effecting any of these factors can be made or are necessary.

In series with each other and with the running winding, is a thermostatic arrangement, consisting of a bi-metal strip and heater grid. The physical relationship between the bi-metal strip and the heater grid is very close, so any heat radiation from the heater grid will affect the bi-metal strip.

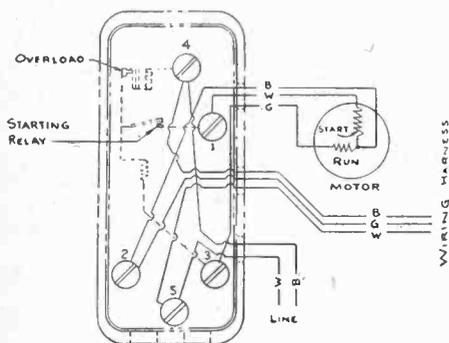
Attached to the bi-metal strip is a contact, which, with another contact properly mounted, form part of the main line circuit. The bi-metal strip is so mounted, and its action is such that under normal conditions, these contacts remain closed. The application of heat, as caused by an overload condition, will in turn cause the bi-metal strip to shift its position

and pull the two contacts apart, breaking the main line to both the relay and the motor.

As will be readily apparent, this action and consequent break would tend to lag and be quite sluggish in its operation. To overcome this condition, a very unique feature has been incorporated as part of the overload protection. On the free end of the bi-metal strip, is mounted the keeper or armature, of a miniature magnet. The magnet proper is mounted in the base of the relay. The bi-metal strip, as previously mentioned, when heated, will flex or shift its position. The strength of the magnet is carefully worked out, so that when a definite point is reached, the armature or keeper will be instantly drawn to the magnet, effecting a quick break for the contacts.

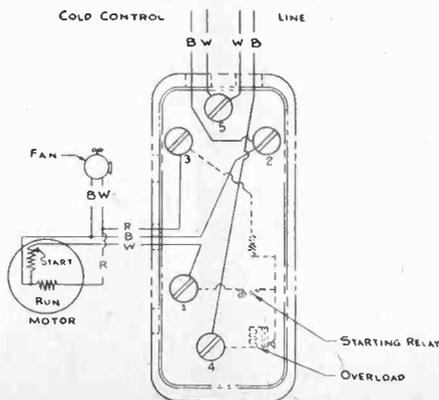
As soon as the main line circuit to both the relay and motor is broken, current will cease to flow through the heater grid, and the temperature of the bi-metal will decrease. After an interval of time, the holding action of the magnet will be overcome by the action of the bi-metal strip. The main line circuit will again be closed, the starting relay will operate, and the motor will tend to start and run. If the over-

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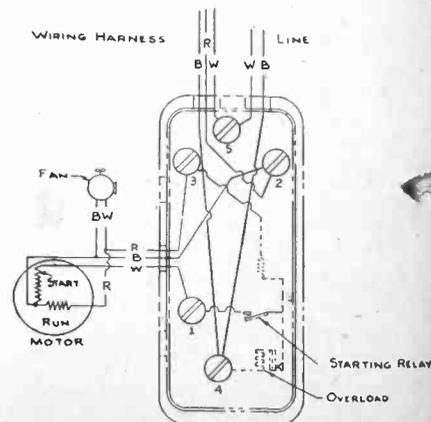


All L, M., and R models: Back view Diagram for Parts 5195-5, 6, 7, 8, 9

Model KX-6 only: Back view Diagram for Parts 5195-1, 2, 3, 4



Models K5, K6, K7, KC5, KC6, KC7: Back view. Diagram for Parts 5195-1, 2, 3, 4



TECHNICAL INFORMATION

Color Code for Relays

- Red—R
- Green—G
- White—W
- Black—B

Relay should be mounted with the top up. Check mounting as you go

load still remains, the overload protection will again function.

Motor Overload Protection MODEL E

All of the motors with the exception of DC motors are equipped with cycling overload relay. This overload relay is an integral part of the motor and as a result, service on it should not be attempted in the field. If for any reason this relay refuses to function properly, the motor should be replaced and returned to the nearest *Wagner Electric Corporation Service Station*.

The cycling overload relay is designed to open the circuit at any time that the motor becomes overheated due to an overloaded condition or to the use of improper current supply. When the circuit has been opened long enough for the relay element to cool sufficiently the relay will again close the circuit. If the motor is stalled this device will open the circuit approximately 40 seconds after the excess current starts to flow and will cool and close the circuit in approximately two minutes. However, this time limit is variable, being in proportion to the amount of load, the temperature of the room and so forth. This opening and closing of the circuit is fully automatic but trouble of any kind will be brought to the user's attention because this intermittent running of the unit will not provide proper refrigeration.

The DC motors are equipped with Buss fusetrons. These fusetrons are similar in action to the ordinary type screw-in fuse, the only difference being that a surge of current does not tend to blow a fusetron. Fusetrons require a steady flow of excess current for a period of several seconds, before they will blow. These fusetrons may be replaced at

any time. Never install fusetrons with a higher rating than is provided with the motor as damage may result to the motor.

MODELS K, L, M AND R

The action of the cycling overload section of the starting relay is explained above. Servicemen should check the action of this mechanism on every service call regardless of the reason for the call since failure of this device can result in a burned-out compressor motor.

The check can be made in a minute or two as follows:

(1) Stall the motor by shutting the unit off and turning it back on before the pressures have time to equalize in the system. (*It may be necessary to start and stop the unit more than once to accomplish the stall.*)

(2) Time the period between the actual stalling and the time that the overload opens the circuit. The opening of the circuit is indicated by a definite click of the switch and the stopping of motor hum.

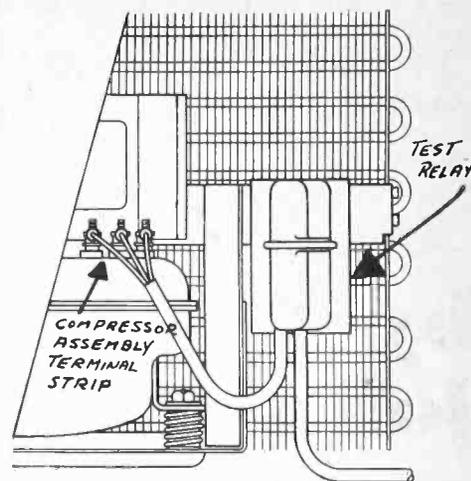
(3) If the interval between the stalling of the unit and the opening of the circuit exceeds 10 seconds replace the relay.

Testing Relay Operation

MODELS K, L, M AND R

Test the running winding circuit with a test lamp across the two outside terminals of the compressor body (red and black leads shown as "common" and "run" on the wiring diagrams). No light on the test lamp across these terminals indicates relay or overload trouble or faulty connections or wiring. Remedy: Replace relay and overload or correct wiring. Sufficient time should be spent on this test to be sure that the automatic overload has not opened the circuit.

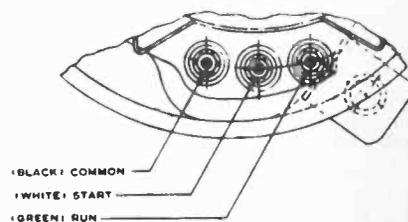
If there is light from "common"



Mounting Test relay: models L, M, and R. Usual relay is not shown in position

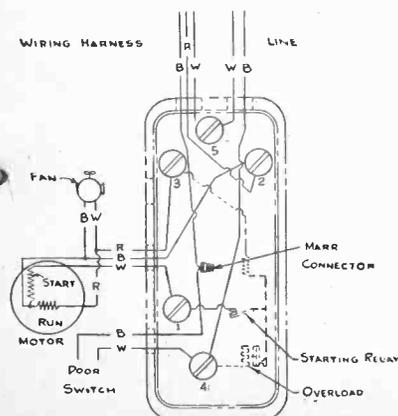
to "run" and light from "common" to "start" and the unit still will not start the difficulty probably lies in the motor or compressor itself. It must be remembered, however, that this condition will exist for a short time only since the automatic overload will cut out in a very short time under these conditions. After the overload cuts out under these conditions there will be no light on any of the three terminals until the overload has cooled and allowed the circuit to close.

To verify conclusions remove the
(Continued on page 40)



Wiring of the test relay

Model KX-4 only. Back View Diagram for Part 5195-1, 2, 3, 4



Part No.	Volts	Cyc.	Amps.	H.P.	Ser. No.
5195-9	110-120	50/60	3.9	1/6	6931389-G17
5195-7	220	50/60	1.9	1/8	6931389-G14
5195-6	110	25	3.2	1/8	6931389-G2
5195-5	110-120	50/60	3.2	1/8	6931389-G6
5195-4	110	50	4.3	1/8	5368633-G5
5195-3	220	50/60	2.1	1/8	5368633-G6
5195-2	110	25	3.2	1/8	5368659-G1
5195-1	110	60	3.9	1/8	5368633-G1

Identification Information

"SO YOU HAVEN'T A SIGNAL GENERATOR!"

by
john h. potts

SERVICING by signal tracing first flamed into prominence in the radio servicing picture some five years ago. It was a success from the very start because it showed how to locate the *hard-to-find* troubles in difficult servicing jobs. Thousands of signal-tracing instruments are now in use, and many more thousands will be bought when they are again available. Yet it is also true that a large number of perfectly good signal-tracing instruments are simply gathering dust in service shops because their owners either never bothered to learn how to use the equipment, or because the signal generator, usually required for shooting trouble, along with the signal tracer, had developed some fault which made it inoperable and which could not be fixed under present conditions.

There are a good many signal generators in just such condition. Often the trouble is due to failure of some mechanical component which cannot be replaced. But the lack of a signal

generator need not mean that the signal tracer cannot be used. There are many substitute signal sources which will do the trick, and which require little or no constructional work.

Before going on to these substitute signal sources, consider, briefly, a review of some of the basic features of signal tracing. This will help those who are just breaking into the field and who may have a chance to pick up a second-hand signal-tracing instrument.

Fundamentally, signal tracing is a system of checking receiver circuits while the set is operating without disturbing the performance of the circuits being tested. A signal is fed to the antenna input circuit and is checked, stage by stage, as it progresses from the input terminals to the speaker. If, at any point along this path the signal disappears, becomes noisy, or weaker than it should be, or is otherwise adversely affected, the trouble is immediately localized

in that stage or circuit where the trouble is first noted.

For example, in checking a receiver having one r-f stage, a converter, two i-f stages, detector and two audio stages, the signal source would be connected to the input terminals, the set tuned to the same frequency as the input signal (which could be a broadcast station signal), and then that signal followed through the set. The first test point would be the antenna connection itself, to make certain the signal was getting to the set. Then the first r-f tube would be checked. The signal should be stronger here, because it would normally be amplified by the step-up in the antenna coupling coil. In the i-f stages the signal at the second i-f grid should be stronger than that at the first i-f grid, because of the added amplification of the intervening i-f stage. In the audio stages, naturally, the signal would be stronger at the last a-f grid than at the first stage grid, and even greater at the plate of the output tube. But if there were anything wrong with the performance of any of these stages so tested, the amplification would suffer, or perhaps, due to a loose connection, bad tube, or some similar defect, the signal would become noisy. Wherever the trouble first occurs is the stage which to in-

Figure 1. In servicing by signal tracing, there are only 11 points in the average receiver where readings need be taken. Most faults show up early in tracing check

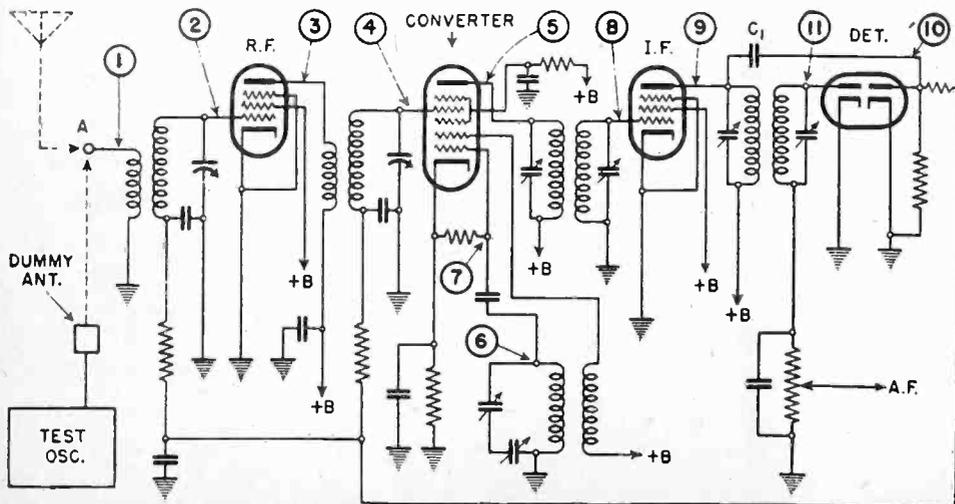
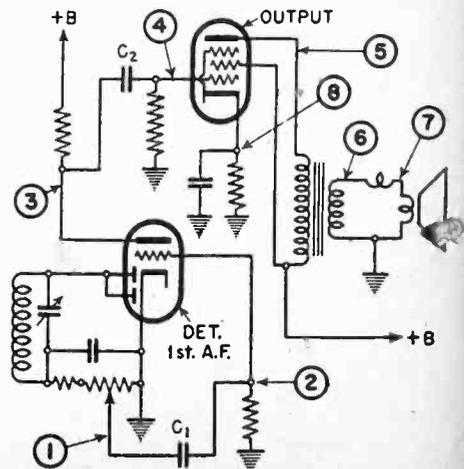


Figure 2. Points in an amplifier circuit where signal should be checked



The lack of a signal generator need not keep the serviceman from proceeding with the most advanced signal-tracing methods. The author describes several substitutes most of which the serviceman should have

investigate, because stages which follow simply amplify the trouble along with the signal. These test points are shown in numerical order in Figure 1 (for the rf-if circuits) and Figure 2 (for the a-f circuits).

A block diagram of a typical signal tracer is illustrated in Figure 3. This is composed of five separate instruments, or channels, as designated. Three—the r.f.-i.f., oscillator and a-f channels, are designed specifically for signal tracing. Note that the oscillator channel is not an oscillator—it is simply a tuned r-f amplifier and detector which is calibrated to check the frequency of superheterodyne oscillators. The voltmeter and wattage indicator channels are not directly a part of the signal-tracing system, but are used in conjunction with the other channels for complete receiver operation testing.

The signal to be checked is picked up by a special probe which, for the r.f.-i.f. and oscillator channels, has a very small capacitance (less than 2 mmf) built in near the probe point. This assures that there will be no appreciable detuning when the probe is touched to the high side of a tuned circuit. The probe is connected to the channel by means of a shielded cable, terminating in a plug.

For checking in audio circuits, the same type of probe and cable is used but the small built-in capacitor is omitted because there are no circuits in the audio portion which would be detuned when the probe is connected.

It is apparent from the foregoing that some sort of r-f signal is needed for test purposes. The handiest signal source would be an ordinary broadcast signal, and this may be used provided some means of controlling the signal strength is employed. The simplest method is to connect a potentiometer across the antenna and ground leads, with the moving arm connecting to the antenna input connection to the receiver. This set-up is shown in Figure 4.

In checking a signal for distortion, the broadcast signal has definite advantages over the signal supplied by a test oscillator, in that the former has pure modulation and signal distortion is quite readily noticeable,

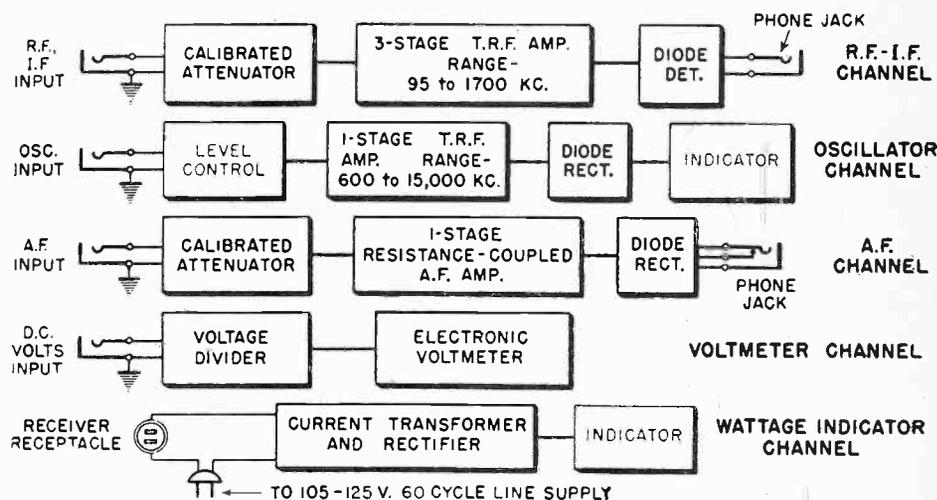


Figure 3. Block diagram of component divisions of commercial signal tracing equipment. There is no electrical connection, internally, between various integral parts

while the latter furnishes a 400-cycle signal which is not always of good wave form. Also, distortion on a single-frequency signal is not as easily detected by ear as on a voice or music-modulated signal. When the 400-cycle signal is used, it is better to use a 'scope for checking distortion.

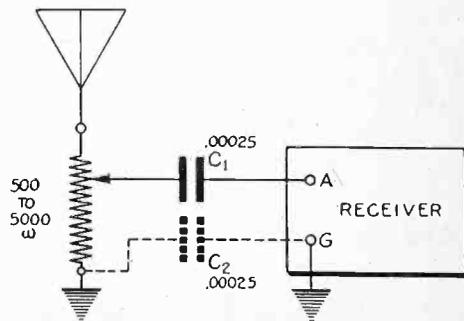
The limitations of the broadcast signal are that the modulation is constantly changing, so it is not practical to check amplification in audio stages by this means. Also, unless a large antenna is employed, the direct signal pickup from exposed leads in the receiver, or from unshielded coils, may be sufficiently great to cause confusion in checking signal levels.

A method of providing a signal of fixed strength and which eliminates the danger of direct pickup from the coils and wiring of the receiver under test is to utilize the signal from the oscillator section of another receiver. The receiver whose oscillator signal is to be so utilized is set up and tuned to some point near the low-frequency end of the dial, preferably where no broadcast signal is picked up. The signal frequency of the oscillator will then differ from the dial calibration frequency by an amount equal to the intermediate frequency. Thus, if the receiver is tuned to 600 kc, and the intermediate frequency is 450 kc, the

oscillator frequency will be equal to 1050 kc. This 1050-kc signal may be used as the signal source for test purposes.

Coupling to such an oscillator is best made through a small capacitance, which may be formed by using two pieces of insulated wire, one of which is soldered to the grid lead of the oscillator and the other is connected to the receiver under test. These two wires are then twisted together for a few inches of their length, taking care that no bared wire portions of one wire touch the other. Coupling is thus made through the insulation of the wires. Using such an arrangement, the signal level

Figure 4. Using a broadcast signal for signal tracing. Condenser indicated as C2 is used only in AC-DC sets; for others, grounds are joined

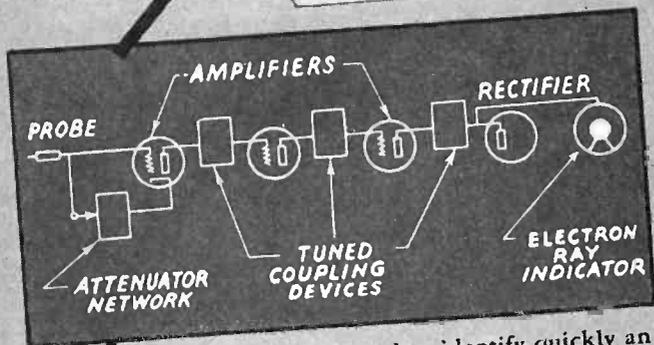
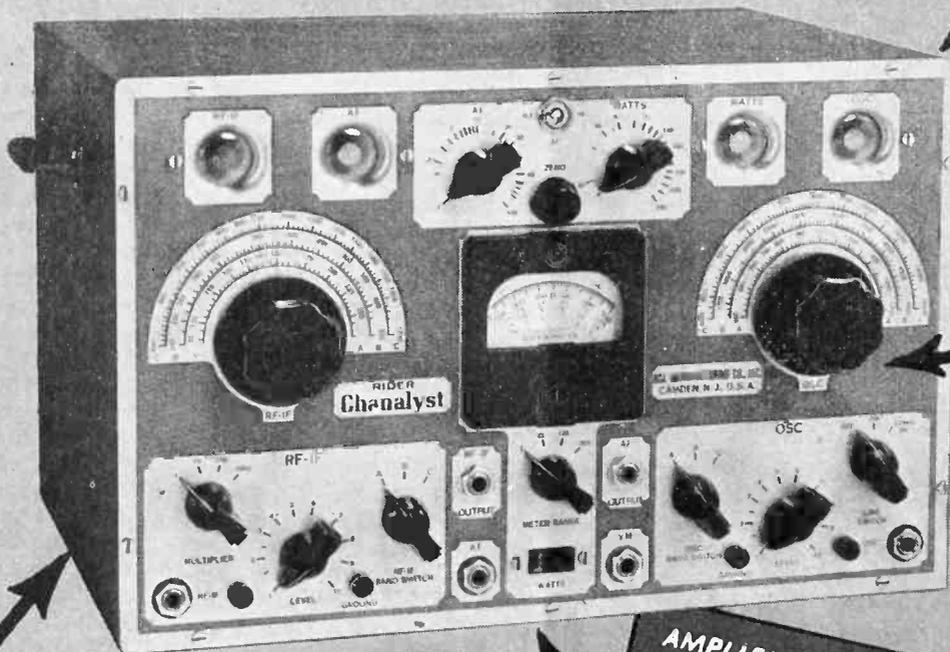


It's the Time it Saves!

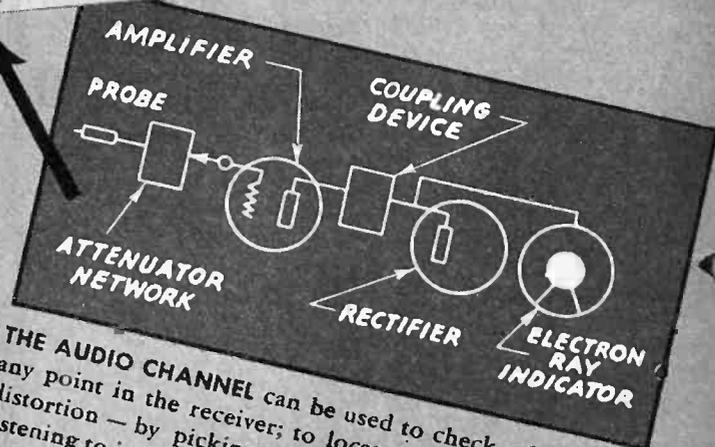
THAT MAKES THE RCA CHANALYST SO IMPORTANT

IN MANPOWER CONSERVATION

Are you using yours to best advantage?

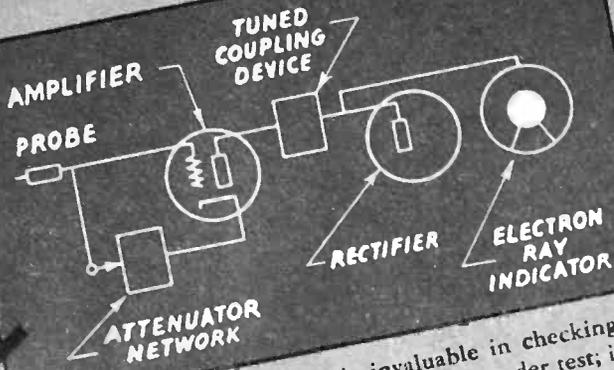


THE RF-IF CHANNEL can be used to identify quickly an oscillating r-f, mixer, or i-f stage; to check noise, distortion, and gain in r-f and i-f stages; to check r-f and i-f bypass condensers without removal from chassis; to determine intermediate frequency; and in general check any part of the rf-if circuits of a receiver.

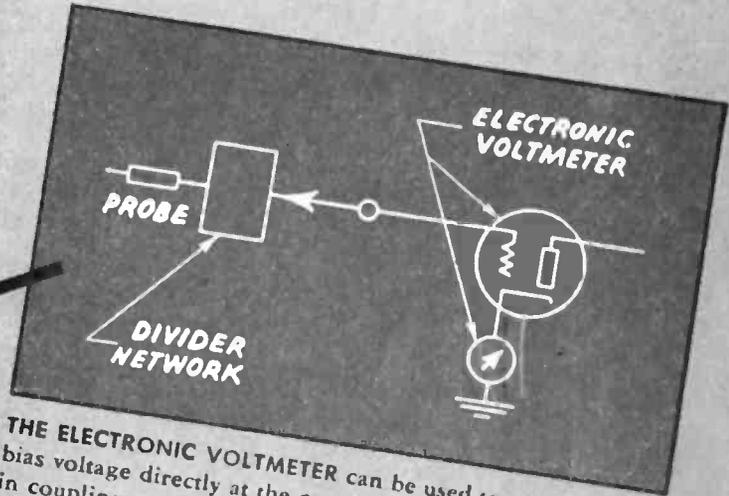


THE AUDIO CHANNEL can be used to check a-f voltage at any point in the receiver; to locate the origin of hum or distortion — by picking the signal off at any point and listening to it on headphones or looking at it on an oscilloscope; to check signal level, gain, or loss in tubes and coupling units.

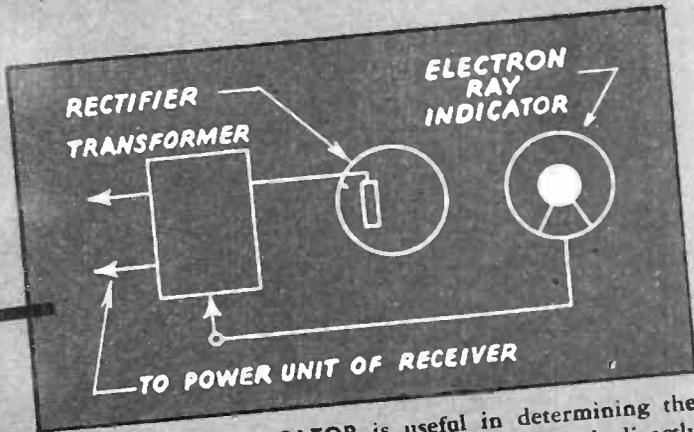
BUY MORE WAR BONDS



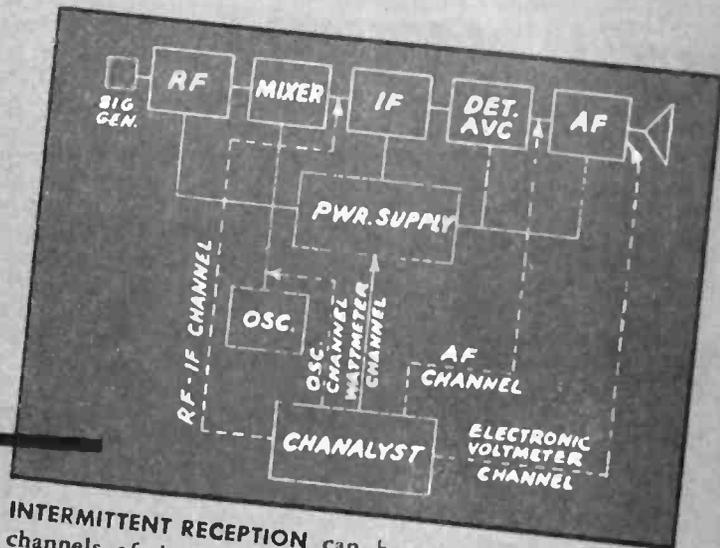
THE OSCILLATOR CHANNEL is invaluable in checking the performance of the oscillator in a receiver under test; it can be used to check oscillator output, frequency, or drift without disturbing operation of the receiver.



THE ELECTRONIC VOLTMETER can be used to measure AVC bias voltage directly at the control grid; to measure leakage in coupling condensers; to check overloading in audio circuits; to measure d-c operating potentials without interfering with receiver performance; as an output meter for alignment purposes.



THE WATTAGE INDICATOR is useful in determining the amount of power consumed by the receiver. It reads directly in watts—indicates any trouble, such as transformer breakdown, which places an abnormal load on the line.



INTERMITTENT RECEPTION can be analyzed by using all channels of the Chanalyst simultaneously. In solving the toughest service problems, use of the Chanalyst is the best, the most convenient and the quickest way.

Please Note: Deliveries of the Chanalyst are subject to the regulations of WPB Limitation Order No. 265.



Test and Measuring Equipment
RADIO CORPORATION OF AMERICA

Camden, N. J.

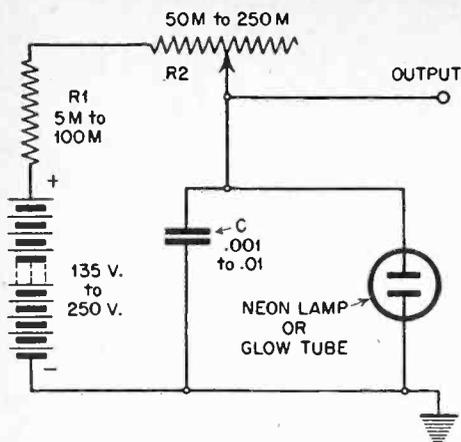


Figure 7. A simple relaxation oscillator. R1 is the limiting resistor

may be controlled by varying the amount of coupling, which can be done by twisting together more or less of the lengths of wire. Once adjusted, this need not be readjusted for practically all receivers with the same type of antenna input coils.

The signal supplied by such a device is not modulated. Consequently, it is suitable only for checking signal levels in r-f and i-f stages. If the receiver oscillator employed is part of a discarded chassis for which there is no further need, the oscillator may be revamped to provide a self-modulated signal by simply substituting a high-resistance oscillator grid leak, of the order of 2 to 5 megohms. The pitch of the resulting audio signal modulation will decrease as the grid-leak resistance increases. The wave form of such a modulated signal will be bad, to be sure, but it will work.

It is convenient to use a separate oscillator for signal-tracing purposes, even though a signal generator is at hand. In busy shops, the signal generator is usually in demand for alignment purposes and, since there are never enough instruments to handle the work when several servicemen are working simultaneously at the bench, it is a good idea to hook up a fixed-frequency oscillator, to be used just for signal tracing purposes. This oscillator may be in bread-board form and takes only a few minutes to hook up. The parts may be obtained from a discarded receiver.

A suitable circuit for such an oscillator is shown in Figure 5. This circuit may be varied in any desired manner, to correspond with that used

in the converter circuit from which the oscillator coil was removed. As shown, it is a self-modulated oscillator, tuned by a shunt condenser and trimmer to a fixed frequency in the broadcast band, preferably where no broadcast signal will interfere. A frequency near 600 kc is preferable for signal-tracing purposes. The values of shunt capacity will be determined by the coil used, but in general the values shown should do the trick. The coil should be shielded and the shield grounded. The output coupling condenser C3 is not critical in value, and neither is the potentiometer, which is used as an attenuator.

If an a-c/d-c set oscillator is used for this purpose, with an a-c/d-c power supply in place of the battery, care should be taken to use a blocking condenser in both the antenna and ground output connections, to avoid crossed grounds, which would cause a short-circuit in the event that the receiver under test is also of the a-c/d-c type. In general, the ground connection through the blocking condenser may be omitted when testing this type of receiver. The connection if used, should be in the manner shown in the dotted lines for C2 in Figure 4 and C6, in Figure 5.

A very simple and useful signal source is a buzzer or similar noise-making device, which creates a signal having harmonics in the broadcast band. If the fundamental frequency is low, as is usually the case, the harmonics in the broadcast band will be so close together that it will be unnecessary to tune the receiver at all. For example, if the buzzer frequency is around 400 cycles, the broadcast-band harmonics will be separated by only this amount throughout the band. Naturally, the receiver will not differentiate between, say, signals of 1000 kc and 1000.4 kc, supplied by the buzzer.

In addition to eliminating one of the usual steps in signal-tracing, the need for tuning of the signal source and the set under test to the same frequency, this buzzer test signal source is invaluable for aligning purposes. It is not necessary to "rock" the gang condenser when padding the oscillator, if this type of signal source is used, because there is no detrimental effect due to the detuning when the rocking is eliminated. All that happens is that another harmonic, very close to the original, is picked up as the aligning signal.

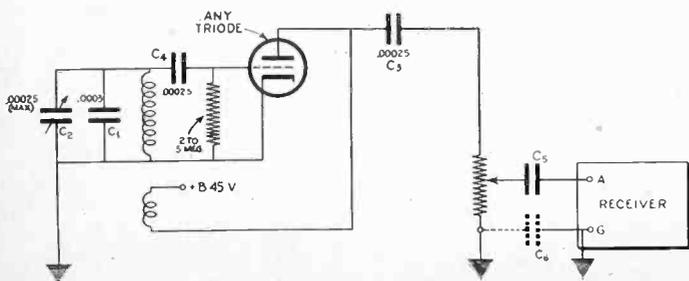
In using the buzzer signal for aligning, it is of course still necessary to use a signal generator to spot the intermediate and r-f frequency points. The usual practice is first to align the i-f's in the customary manner, starting at the last stage and working forward to the mixer, peaking the stages at the designated intermediate frequency. Often the stages may be pulled roughly into line in a single operation, feeding the test oscillator signal to the converter grid. This assures that the proper i.f. is being used. Then the final peaking is done by the buzzer noise source, which is especially advantageous in aligning the superheterodyne oscillator circuit, the most ticklish part of the aligning operation. One large company found that this method saved 20 per cent in the production time required for aligning—and produced a better job. So it's well worth while.

For those who use the cathode ray oscillograph with a frequency-modulated oscillator as a signal source for aligning, of course this stunt is not so helpful. The frequency-modulated signal used with the 'scope also eliminates the need for rocking the gang condenser during aligning. But the buzzer method is faster for those who don't know their 'scope technique too well . . . and there aren't many who do.

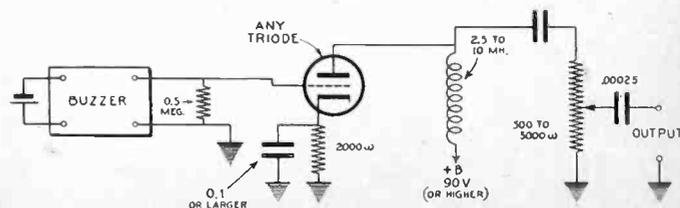
Still another advantage of the buzzer-type signal source is the ease with which "dead spots" or insensitive spots in various points of the range of bands in all-wave receivers may be checked. By simply feeding the buzzer signal to the set and rotating the gang condenser over its range, weak or dead spots will be immediately detected. If the set is checked only at the aligning points, which is customary in most shops, or is given only a brief operating test after repair, it is all too easy to pass receivers in which the oscillator has gone dead over portions of a band, particularly on short-wave bands, where the slightest change in the dressing of the leads in the oscillator circuit, or of wires near it, may cause absorption effects which will render the oscillator inoperative over a small range, often necessitating a call-back.

Ordinarily the signal output of a buzzer will not be sufficiently great, without amplification, to provide strong harmonics in the broadcast

(Continued on page 34)



Left: Figure 5. Signal tracing with fixed frequency oscillator. Below: Figure 6. Amplified buzzer is signal tracing equipment



Technical Service Portfolio

SECTION XXXVI

The use of plural inputs, even of different levels and impedances is the subject for this month

IN PUBLIC address and other sound service work it is often necessary to feed simultaneously to the amplifier the output of two or more mikes, or of a mike and a pickup. Such cases occur when several persons are singing, and more than one mike is being used; or, as a convenience, for an announcer to cut in and describe some action or music which is being picked up by another mike, or reproduced by a phonograph pickup. In traveling sound trucks, an audio mixer circuit is employed for spot advertising talks, which are cut in on musical programs from records, and there are, of course, many other applications with which the experienced sound man is familiar.

A good audio mixer circuit makes one amplifier - and - speaker do the work of two or more. And often the design of such a mixer is relatively simple—particularly when high-impedance crystal mikes are used. Then there are no complications introduced, such as the matching of impedances, which are common headaches with the low-impedance varieties of microphones often used in broadcast work. While carbon mikes also fall within the category of low-impedance types, their relatively high output level simplifies the design of the mixer circuit.

In this article we are going to cover mixer circuits for both high and low-level mikes—for those which give high voltage output, constituting the majority of public-address types, as well as the low-output types, which, while less sensitive, often pro-

vide better fidelity than those with greater output but of the same general category.

Before going into this subject in detail, let us discuss a few general considerations regarding the use of mikes and pickups. A good crystal mike will generally require at least three audio stages for maximum output; the gain provided by the a-f amplifier of an ordinary receiver is not enough. However, the cheaper

the use of an impedance-matching transformer. It is understood, in the circuits which we are about to describe, that when an impedance-matching transformer is normally employed with the mike, the input circuit shown in the diagrams is to connect to the transformer secondary and not directly to the mike terminals.

With respect to pickups, the same remarks apply. Often there are frequency-compensating networks which are designed to connect to the input of the amplifier. When such is the case, the network should usually be placed close to the amplifier input; otherwise the capacity of the shielded lead will cause a considerable falling off in the high-frequency response. With some types of networks, where a fixed length of shielded wire is employed, the network is placed close to the pickup arm. There the capacity of the shielded wire takes the place of the usual associated filter condenser.

One of the simplest mixer circuits is shown in *Figure 1*. The potentiometers R_1 and R_2 are shunted across the mikes (or a mike and a pickup) and the resistors R_3 and R_4 are placed in series with each lead to the grid so that, when one of the volume controls is turned down to zero, it will not short-circuit the output of the other volume control. Because the volume controls are in parallel, the effective load on a crystal mike is

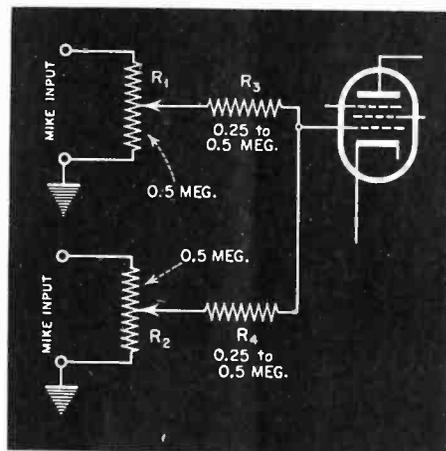
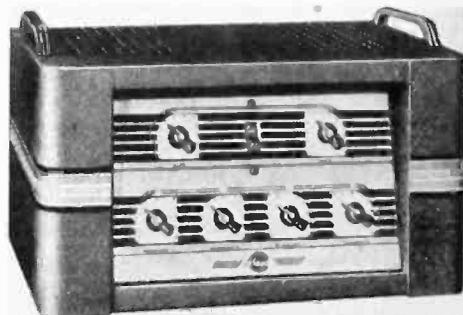


Figure 1

single-button carbon types—now very seldom used for high-grade p. a. work—have plenty of sock, and the gain of the a-f amplifier of practically any set is sufficient to furnish a good, healthy output signal. However, when we switch to the better, double-button type of carbon mike, there is almost always a considerable decrease in sensitivity, with the result that the inexperienced user is apt to think there is something wrong with the mike. There isn't; it's just that the higher grade mike requires more gain in the amplifier with which it is being used.

With crystal mikes, the sound-cell types are less sensitive than other types. But, just as with carbon mikes, they provide better fidelity of output. There are other types of mikes, such as the *Velotron*, which give considerable output; and low-impedance types of the velocity variety, in which considerable step-up in output level is obtained through

A typical commercial amplifier (Lafayette) which uses plural inputs. Its output is 50-watts peak; frequency response 30-1400 cps; 4 input channels with remote control of different levels and impedances; will handle from 6 through 10 loudspeakers with ease



Two types of fine loudspeakers. One to right is of high-fidelity type, while other is 28" permanent magnet type. Both are made by Jensen



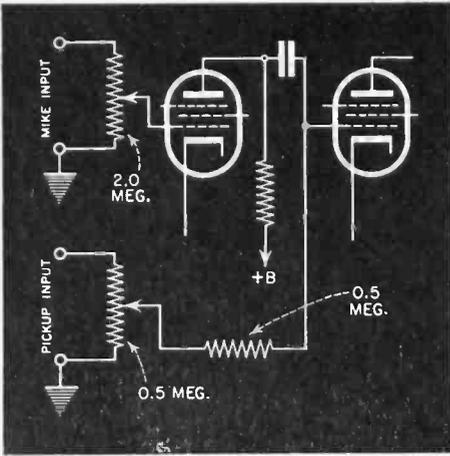


Figure 2

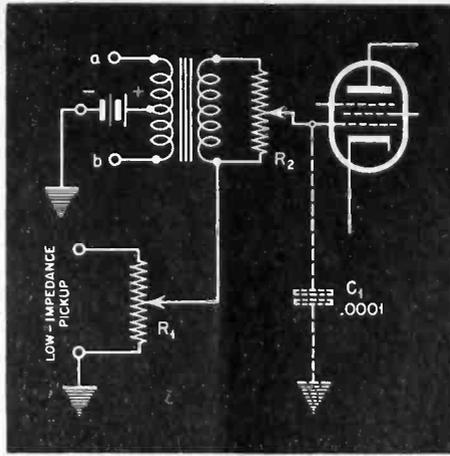


Figure 3

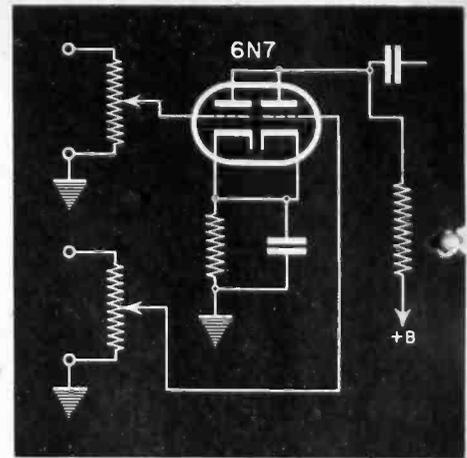


Figure 4

about $\frac{1}{4}$ -megohm—too low a resistance for best reproduction—and this shows up in a decreased low-frequency response. For speech work, however, it may be satisfactory, and for other types of mikes where a $\frac{1}{4}$ -megohm input load isn't serious, it provides a simple way out of the problem.

Often the output of the pickup is considerably higher than that of the mike with which it is to be mixed. In such cases it is a good idea to feed the pickup output into the second stage, while the mike connects to the first stage input, an arrangement shown in *Figure 2*. A 2-megohm potentiometer is shown in the mike input circuit. This is better for crystal mikes; but if the mike will stand a lower value of resistance it is better to limit the value to 0.5 megohm. This is because the very high resistance types tend to get noisy in a short time. And noise is particularly noticeable when the potentiometer is connected in the input circuit of high-gain amplifiers.

Note that an isolating resistor is used in series with the lead to the grid of the second stage amplifier, into which the pickup feeds. This 0.5 megohm resistor is necessary in or-

der to avoid short-circuiting the output of the first stage when the pickup volume control is set at zero.

We have mentioned frequently that the volume control of the unused mike or pickup is set at zero. This is desirable, particularly when the pickup or mike is connected, in order to reduce hum pickup to a minimum.

In *Figure 3*, we have a common circuit employed for use with a double-button carbon mike and a low-impedance pickup. When the mike is plugged in, the battery circuit is closed and the proper excitation current is applied to the buttons. Note that while a low-impedance pickup is specified, actually the circuit is adapted to use with any type of pickup. But if a low-impedance type is employed, the resistance of the volume control should be the same as that of the pickup impedance. In some cases, this will mean that R_1 will be of the order of 10 ohms, while R_2 will approximate 50,000 ohms. If a high resistance is employed the frequency response will suffer, unless the pickup itself is also of a high-impedance type. The condenser C_1 is sometimes necessary to avoid spurious high-frequency noise.

One of the most popular forms of

mixers is the dual-triode tube type shown in *Figure 4*. Because each control is completely isolated from the other, there is no reaction on other circuits when one is adjusted, as is the case in the circuits of *Figures 1* and *3*. In this circuit mixing takes place in the plate, rather than the grid circuit, because of the common plate load resistance. Although a type 6N7 dual triode tube is specified, there is no reason why any other dual triode may not be used, such as the 6SC7, 53, etc., provided that the gain of each section is the same.

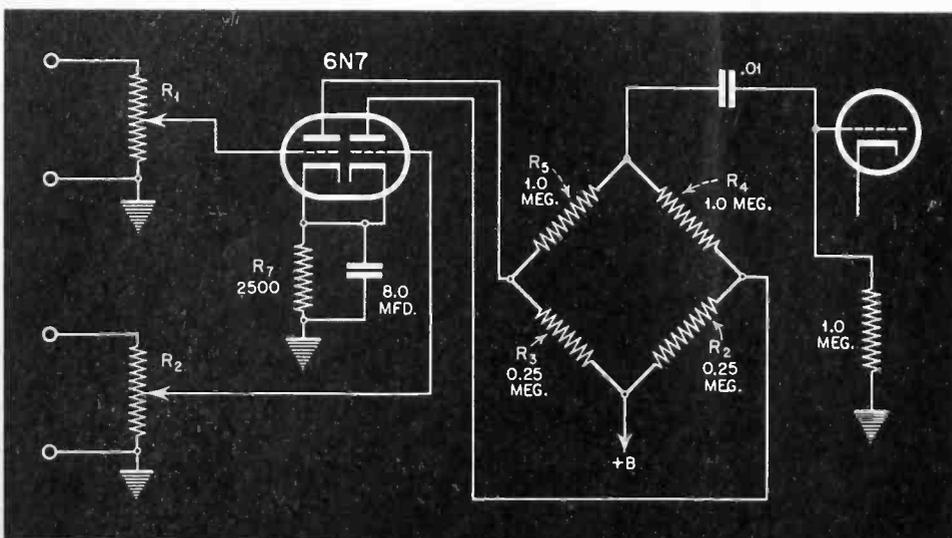
Although simple, the circuit of *Figure 4* is subject to limitations. Because a common plate load for the two triodes is used, it should be one-half the value which would normally be used were individual plate load resistors used. This limits the voltage output which may be obtained before serious distortion sets in.

A method which combines the advantages of the circuit of *Figure 4* but permits increased output without distortion, is shown in *Figure 5*. In this circuit the bridge arrangement in the plate circuit allows individual plate load resistors to be employed, yet the mixing effect is retained. In a variation of this circuit, the values of R_3 and R_4 are reduced to 0.1 megohm and R_4 and R_5 to 0.5 megohm. Under these conditions, the cathode resistor should be reduced to 2000 ohms. When so used, a peak voltage output of 35 is attainable and a voltage gain of 10.

A circuit which combines that of *Figure 4* with a modified version of *Figure 1*, to provide four-channel mixing for two mikes and two pickups, is shown in *Figure 6*. This circuit may be improved upon by inserting the bridge isolating resistors shown in *Figure 5*, which have been omitted for the sake of simplicity in *Figure 6*.

Note that a volume control is provided in the input circuit of channel A but not in channel B. The purpose here is to use the volume control in channel A to reduce the output level

Figure 5





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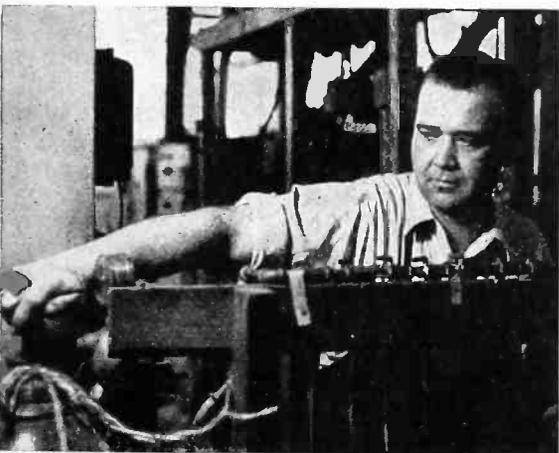
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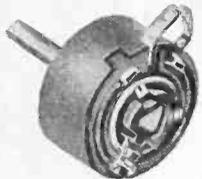
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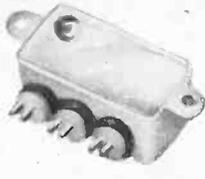
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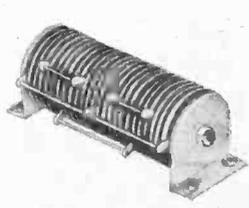
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MICROPHONE MAN

(Continued from page 13)

parts? We build some amplifiers ourselves; we redesign the record-changers (which are torn-down juke-box record-changers) so that the money-slot is discarded and the "reject" and "start" can be operated remotely; we use good-make FM and AM tuners and also fine radio chassis for that part of the installations; we buy the best in speakers and microphones, being super-careful to match impedances both in microphone outputs and amplifier outputs, respectively; and we see to it that there are enough speakers to cover the space adequately.

Our post-war plans consist of returning to the manufacture of amplifiers in greater quantities, the standardization of the units so that we can "build" from one to another unit without discarding what the customer already has. This means that we will gradually standardize on speakers, microphones, pickups, FM & AM tuners and the like. Actually it will resolve itself into four different amplifier sections and three different power sections. These, with the other accessories mentioned above, will fill any problem for any installation.

We plan further to return to the "specialty" field of building amplifiers for guitars, piano reinforcers, and the like for the many musicians who will be among the boys when "Johnny Comes Marching Home."

We believe that the country is standing on the verge of a tremendous upswing in manufacture and luxury. With it, as sure as anything, will come an increased demand for *Sound—good Sound*. Thus we are sure that we will be able to say in the Post-War period as in the past, that "Our Business Is Sound."

WITH THE EDITOR

(Continued from page 2)

ators. More than half of the 1,430,000 who wanted to buy a radio could not obtain either a new or used one. Over 3,600,000 people attempted to buy replacement radio tubes but 2,240,000 of them failed to get the right tube. We believe that the survey figures could have been multiplied 10 times and the results would have been nearer to the truth. However, let us continue—

Only 75,000 of the nation's 3,690,000 electric cooking stoves were out of order and about 8,000,000 of the country's 46,380,000 radio sets were currently out of order, continues WPB, and of those not operating, 6,610,000 are in homes that depend upon a single set. Note, if you will,

the WPB figure of only 46 million old sets! All statistics heretofore published indicated that there were over 65,000,000 radio sets around not long ago so we wonder how there is a convenient discrepancy of no less than 20,000,000 radios all of a sudden. Presidential candidates, take notice! You are fast losing voters who might be swayed by radio to vote the right way! But let us continue again, it gets more interesting—

The WPB release also states that 1,810,000 people tried to buy washing machines but only 330,000 were available last year; and apparently, says the survey, 840,000 of the country's 17,670,000 washing machines are now out of order and practically 80% of all washers in use are obsolete. There are in homes 29,750,000 electric irons in working condition and only 1,600,000 irons are out of order. To us, this is all hog-juice. Figures are bandied around by Washington bureaus without regard to fact. A more accurate survey would probably show that about 29,000,000 homes need new electric irons, and don't have one in working condition.

The foregoing would indicate that there is an acute shortage of all types of appliances, and particularly of certain types of replacement parts such as thermostats for electric irons; heating filaments for electric ranges, and certainly tubes for radios.

STILL ANOTHER SURVEY —AND DANGER!

SCRIPPS-HOWARD NEWSPAPERS in 13 cities recently interviewed 6,400 women shoppers asking this question, "Concerning the following products, do you expect the first models after the war to be drastically improved?" Answers "Yes" were: radios, 69.1%; electric refrigerators, 57.4%; small appliances, 55.6%; washing machines, 55.3%. And to the question, "If models are the same as they were in 1940, will you be interested in buying them as soon as available?" the replies were: "Will Buy" 54.5%; "Will Not Buy" 45.5%. There lies a dangerous situation, but it can be corrected.

Offsetting the good news that average women do not expect too much in the way of radical design or fantastic performance regarding first made, post-war civilian goods is the threat of vast hold-back of buying by 42.5% of the potential who



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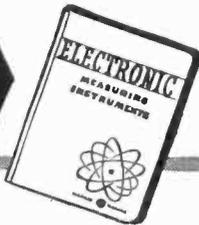


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would not be satisfied with prewar models quickly made available. If manufacturers and dealers do not act to prevent delayed purchasing they will go broke before they can launch newly styled lines a year afterward. Yes, post-war planning and educating must be done right now so that 95% of the 45.5% group of hold-backs will be convinced that they should have voted the other way.

S. R. Cowan

LETTERS

(Continued from page 7)

ceivers built in the industry's last peace time production year. This is because of the immeasurably higher quality of military equipments, their often larger size, greater complexity and far wider variety. These factors spell a much higher unit price—which adroitly twisted by smart surplus buyers, could operate as a very demoralizing influence on the general public.

Let us imagine a newspaper advertisement headed "\$10,000.00 Army Radar — only \$198.00." What a task the average dealer would have in persuading Mr. and Mrs. Public that they didn't want a radar — what they really wanted was a nice new 1941 (pre-war) model of a midget receiver or a ditto am/fm automatic phonograph combination. This is not a nice thought to contemplate, yet silly as the whole idea seems, the industry has asked for it by its advertising to the public to expect superb new radios "and things" after the war. The public is going to want those new things, and wanting them while being offered pre-war "bird's nests" in the first flush of renewed civilian business, it is going to be ripe for unscrupulous offerings of surplus military equipment under the same high-sounding new names the industry's advertising has sought to publicize. But then—hindsight is so much better than foresight.

Let's take a possible case—an extreme one. Let's consider electrical meters. Military equipment uses them in profusion. And it is almost invariably accompanied by spares—plenty of pretty, brand new meters never out of factory boxes. Amateurs, service-men, industrial users, even manufacturers are grand prospects for \$4.00 net instruments at .29c apiece. Suppose surplus operators can so offer government equipment and spares—what happens to employment in the meter factories until this surplus is absorbed?

That, to the writer, is the crux of the situation. Just as much as the next man he loves to buy at give-away prices. But not if the real price be starvation.

Expand this thought to vacuum tubes, capacitors, resistors, switches—all the component parts of military equipment which may be sold so cheaply that every service man will be engaged in "cannibalism"—instead of promoting prosperity for himself, his jobber—and the manufacturer by legitimate purchasing. Let's not even bother to think about anything so small as the amateur market from which many a jobber and manufacturer draws sustenance, if not entire livelihood—it can be wrecked completely in terms of new post-V-Day business by the offering of military equipment of high, though admittedly specialized quality at low prices.

But what indicates that selling prices of surplus military goods may be so low as to hurt legitimate business? Too many factors suggest this to seem to be capable of denial. Uncle Sam first "surveys" surplus equipment, then offers it on a public-bid, or auction basis to the highest bidder—in lots. Lots are so large, red-tape so seemingly fearsome, that the individual buyer and the small jobber are shut out at the start. Sale is for cash—so the ready-money surplus operators are at home. Size, variety and the large unsalvageable portion of each lot offered brings the price down to a few pennies on the dollar. Then profit must be realized fast—yet a large profit can be obtained by doubling low cost-price and

selling in small lots to individual jobbers who are attracted by the ability to offer "specials" at still but a tiny fraction of their original cost—at a truly horrible mark-down from their new production cost.

True that not all the military procurement of the war period could be dumped. Plenty will be destroyed in service, plenty may be abandoned overseas to hurt the export market, plenty leased-loaned, plenty retained by what we devoutly hope will be our heavily augmented post-war Army and Navy. But the indiscriminate dumping of just one, or even two, percent of total war-time military procurement can be damaging in the extreme to American employment and hence to post-war prosperity, so stupendous are the figures involved.

The aim of every human being is to "get something for nothing." But is such desire not better squelched—if the price be national, and therefore individual, calamity?

Considering that the major part of today's so-large-as-never-before-to-be-even-dreamed-of annual American industrial production is for war, the expansion of the possibilities inherent in government V-Day dumping reaches into every individual industry. The possibility poses the unpleasant thought of everybody buying surplus, nobody working to produce new goods, then nobody working, then nobody buying—soon everybody starving. Wrecking of the American industrial machine, which without any surplus problem is going to have quite a job gearing itself down to a dollar-reduced post-V-Day operation, is a seemingly probable answer to government dumping.

So—why not orderly, slow dumping over many years? Because it's pretty much of a contradiction in terms—a practical impossibility. Why not limited dumping? Who limits it intelligently, and how?

Why not give it to needy foreign nations? Maybe—on food, clothing, medicines, bare essentials, but *not on manufactured goods*—such would operate to emasculate or destroy our needed export markets.

Why should not the military retain the surplus? Storage problems, technical obsolescence, deterioration with age. And so on ad infinitum to the pussy-foot "answers."

All these and similar expedients seem to the writer to fall in the class of "sending a boy to do a man's job." They are temporizing, not positive, attempts to deal with a situation of unprecedented size, one fraught with potential ruin.

Awful as is the thought of total destruction, it may be the best answer. The cost in material and man-hours of this potential military surplus is already on our tax bill—and on the tax bill of our children's children. If we could significantly reduce this burden by dumping, that would be wise. But past experience is that dumping will yield only the tiniest fraction of original cost—maybe not enough to leave any net cash salvage after handling and selling costs to the government. But the tax bill *must* be paid if we are to escape ruin as a nation. If the price of dumping is to even partially reduce new production, to reduce continuing employment, to diminish individual purchasing power and hence to reduce national taxable income, is it not better to destroy the past to preserve the future?

There are sufficient savings, sufficient stored-up demand for every commodity and service, to probably carry us over the transition from widespread war employment and good earnings to the same for after V-Day in peace time. Dare we take the chance of upsetting in even small measure the unavoidably delicately balanced national economy? Dumping of military surplus can do exactly that, yet yield no commensurate financial return to the taxpayer.

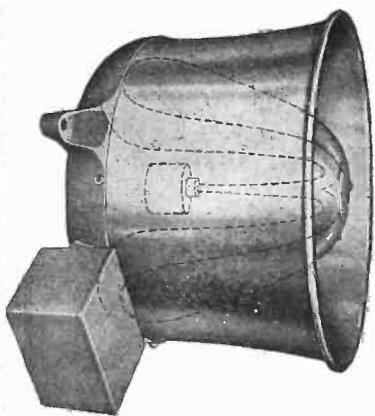
Would the radio industry be well advised to petition the government thru its trade organizations to destroy rather than dump the military surplus of radio/electronic equipment after cessation of hostilities?

McMurdo Silver,
Connecticut

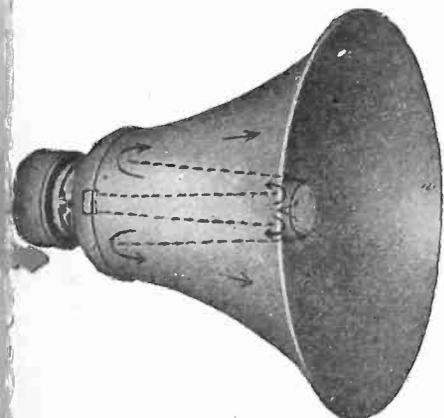
For the opportunity to publish the views of Mr. Silver we are duly grateful. Mr. Silver, well known engineer and "oldtimer" in every phase of radio has excellent reason to know whereof he speaks. What do you readers think of what he says?



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SIGNAL GENERATOR

(Continued from page 24)

band. If such is the case, a simple amplifier, such as that shown in *Figure 6*, may be employed to boost the output. This is only one of many possible designs; the audio stage of a discarded receiver, with r-f chokes placed in series with the plate loads to boost the high-frequency harmonic output, will serve very nicely. The grid connection to the amplifier may be made to the buzzer vibrator post, which should be insulated from the case. The amplifier ground may connect to the buzzer battery terminal.

Many electric safety razors of the vibrator type give out a nice, healthy noise signal which may be applied to this purpose. Connections should in all cases be made through small blocking condensers to points in the razor vibrator circuit which provide the strongest signal.

It is perhaps simpler, however, to use some sort of electronic device to produce the noise signal. In this way, the annoyance of the constant buzz or other audible sound is avoided and, at the same time, it is often possible to get sufficient noise signal output without an amplifier, so that the amount of equipment needed becomes definitely less. The disadvantage is that, at the present time, it is difficult to obtain some of the components needed for such electronic devices.

A small neon bulb, $\frac{1}{4}$ to $\frac{1}{2}$ -watt may be pressed into service as a relaxation oscillator which will give a high signal output without amplification. Such a circuit is illustrated in *Figure 7*. Coupling to the set under test may be made through a pair of insulated wires twisted together, as was previously described, or by means of a small capacitor, not greater than 25 mmf. A potentiometer of 5000 ohms or less also may be connected, as in the foregoing circuits, to control the signal level to the receiver under test.

There are, of course, more elaborate electronic circuits of the multi-vibrator type which are very well adapted to this purpose. One of this type, and a good one, was described by H. F. Gulliver in the February, 1943, issue of *RADIO SERVICE-DEALER*. But this article confines itself to the simplest types because it is realized that few servicemen have much time these days to delve into more elaborate circuits.

It should be pointed out that in signal tracing there are some faults which are traced without the use of any signal source whatsoever. If, for instance, the set under test is noisy, then the source of the noise is within the receiver. The process of testing by signal tracing then resolves itself into a search for the noise source within the receiver, which is done in the manner described in the instruc-

tion book which accompanies each instrument.

Hum and oscillation are also types of defects where no external source of signal is necessary in localizing the trouble. Checks are made from point to point until the components affected are isolated, after which a conventional check of the relatively few components involved locates the exact source of trouble.

Signal tracing is not a cure-all for all the shortcomings of trouble-shooting; rather it is a means of cutting down to a minimum the time required to locate the source of trouble in "hard-to-find" defects, such as shorted trimmers across low-resistance r-f grid coils, open coupling condensers in ave-diode circuits, intermittents of all types, and those conditions where the sensitivity of the receiver is appreciably reduced due to such troubles as moisture absorption in r-f and i-f transformers, poor ground connections due to corrosion, and a host of other obscure defects with which every serviceman has to cope. By simplifying the signal source, the time is still further reduced which must be devoted to trouble-shooting.

««««« »»»»»

SERVICING ROASTERS

(Continued from page 17)

f—Cut away old side element and clean well.

g—Wrap wide asbestos strip around roaster well making the overlap at the center of end opposite body terminals. The asbestos strip should be against lugs projecting from the bottom of the well. Secure this strip with tape.

h—Wrap over the asbestos strip, the strip of mica tape centering it on the asbestos strip. Secure with tape.

i—Place element over the mica tape; the straight leads should project through the holes in the small asbestos blank and must be at the end corresponding to body terminals.

j—Over the element place the $\frac{1}{16}$ " thick asbestos strip and secure with tape. Overlap at the

(Continued on page 38)



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You're undoubtedly already following through with outside banners and store-wide displays to make everyone realize you're all-out for the 4th War Loan. There are some splendid posters to be had direct from

the Treasury, or from your local War Finance Committee. And, of course, you can make your own, too.

Here's a thought. Have you explained to your sales staff that each clerk who sells \$200, or more, of War Bonds will receive from the Treasury Department a special *individual citation* expressing the appreciation of the Nation for this vital wartime service? Set as your store's goal: "100% Citation Winners!" Tie this in with the natural team rivalry, and you have a powerful sales stimulant.

And here's another thought. People buy in about the ratio they are urged to buy. So give the Bond Drive a good play in your advertising, and don't fail to furnish each sales person with an inexpensive, *but prominent*, lapel card or button, reading: "We are selling War Bonds for the 4th War Loan."

And here's a final thought. The best salesman always "sells" himself first. Buy all you can as individuals. And buy all you can as an organization.

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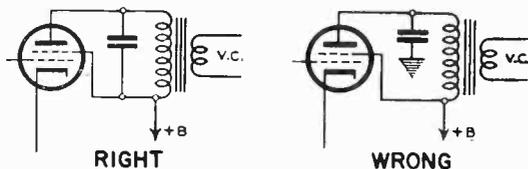
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CONDENSER HOOKUP PRECAUTION

Card 1

When replacing an output plate bypass condenser, the connection should be from the plate to B+, never



from plate to ground. This prevents condenser burn-out as it operates at much lower voltage.

Submitted by Spears Radio Service

GRUNOW MODEL 1191

Card 2

When the input condenser "sizzles," it is due to a short circuit in the rectifier tube or in the leads to the rectifier socket.

Submitted by Willard Moody

LOCATING SHORTS IN VARIABLE CONDENSERS

Card 3

When bright-metal, plated on variable condensers, peels, a short circuit results which in turn causes the set to fade intermittently. To ascertain if a condenser is shorted due to peeling plates or oxidization, connect a resistance meter between the stator and rotor and turn gang to fullest mesh.

In some cases it will be necessary to disconnect the stator leads, and then connect a high voltage line to the rotor and to the stator. Rock the gang slowly, meanwhile tapping the condenser frame gently with the insulated handle of a screwdriver. If sparks show between the plates, obviously a short exists.

Submitted by J. E. Simmons

REJUVENATING 50L6, 35L6 or 35Z5 TUBES

Card 4

To give new life to weak or some dead 50L6, 35L6 or 35Z5 tubes when the filament is not open, put the tube in tube tester. Apply 117 volts to the filament for about 30 seconds. Then apply correct voltage and the tube should check OK. If first operation does not do the trick, repeat operation. If no results in three tries, the situation is hopeless.

Submitted by Viles J. Bergeron

REJUVENATING TUBES

Card 5

To rejuvenate battery operated tubes and a lot of other electric set tubes which are paralyzed or weak, insert them into the tube checker. Then take a small roll of cotton saturated with wood alcohol and fitted into a piece of stiff wire so that it can be held, lighted, without burning yourself. Light the cotton and hold it against the bottom of the tube or against the side until it reads quite a little more on the checker than the proper test. Then when the tube cools you can tell if you have applied enough heat by your checker meter. We are using this on 30, 32, 34, 1N5, 1A7, 45, 47 and a lot of other numbers. The "treatment" seems to take the substance that's on the inside of the glass and deposit it back on the elements of the tube, making them bright, shiny and new. With older tubes better luck will be had by applying the heat to the "getter" in the lower part of the tube.

Submitted by G. O. Phillips

SUBSTITUTE FOR 12SA7GT TUBE

Card 6

To substitute a 12A8GT tube for a 12SA7GT which will work well, take the wire from pin 6 of the 12SA7GT socket and move it down to pin 8, at the same time moving the wire that was on pin 8 to the top cap of the 12A8GT. There may be a bit of hum which can be eliminated by fiddling with the power supply, shielding, etc. In most cases the changeover will work OK, however.

Submitted by Emmett E. Underhill

SIMPLE TEST SET

Card 7

I have a number of jacks on the panel of my test unit which are connected to 4—8—16—20/20 mfd condensers. Then I also have a rotary switch which connects these in series and parallel. By using the test prods I can put the capacities "in" the set I am testing without getting a shock, using many different capacities.

Submitted by Charles R. Wright

DELCO R-1143

Card 8

Push button tuning dead: defective 6A8 stage. Manual tuning may work o.k. If manual is dead and push button tuning is used, check 6K8 stage which may be defective. Two separate mixers are used in this unusual circuit, one for push button tuning (6A8); the other for manual tuning (6K8).

Submitted by Robert Brewster

GENERAL ELECTRIC MODEL L 641

Card 9

To avoid comebacks on this and other late GE models, replace all the by-pass condensers that have high voltage on them. This need not be done until the set has become inoperative. Then the blowing of one by-pass condenser often throws the rest into position of receiving too great a load.

Submitted by Spears Radio Service.

REPAIRING SHORTED VARIABLE CONDENSERS

Card 10

Remove the condenser gang from set. Use long bristle brush dipped in white gasoline (be sure not to use leaded or colored gas) and clean between the plates carefully, to remove dirt and metal that is possibly causing a short. Rinse by pouring clean white gasoline over the plates. Allow to stand until dry. Mix a very thin solution of white shellac and alcohol.

Hold condenser up with plates out of mesh and pour shellac solution over the plates, being sure that all their surfaces are given a thin coating. Remove excess shellac by gently shaking in a swinging motion. Let unit dry thoroughly until shellac hardens. Oil bearing, if necessary.

Submitted by J. E. Simmons

PHILCO MODEL 84

Card 11

A 25mfd 25-volt bypass condenser connected across the bias dropping resistor will pep up this set considerably. Check the 2nd detector screen by-pass condenser. It often develops leakage and causes weak reception.

Submitted by Spears Radio Service.

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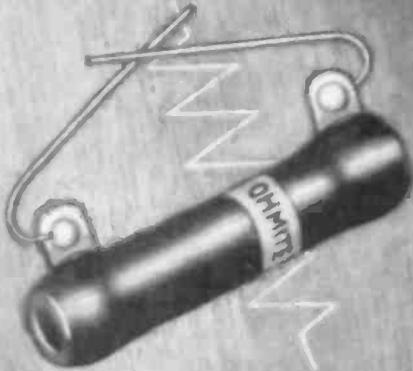
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(Continued from page 34)

end opposite terminals.

k—Fold over the edges of the wide asbestos strip on the long sides only.

l—Bind the element in place with the banding straps making the seal opposite the terminal end. Use two straps each securing a folded edge of the wide asbestos. Pull the straps tight.

m—Slip two porcelain bushings over each lead wire and test for short to ground.

n—Assemble body to well taking care that glass wool is evenly distributed between the well and the body.

o—Replace thermostat and bottom element.

p—Make connections as shown on wiring diagram.

q—Replace asbestos shield around thermostat as in original assembly.

r—Fold asbestos strip over bare resistance wire as in original assembly.

s—Replace bottom glass wool. No glass wool is placed in space between front of thermostat, pilot light reflector and bottom cover.

t—Replace bottom cover and thermostat knob.

u—Test for short circuit.

Pilot Light Not Operating

The roaster may operate with the pilot or signal light not working.

To replace this lamp (6-8 volt) it is necessary to remove the bottom cover as described in 1 and 2 paragraph in "Defective Thermostat."

The bulb is snapped in place and not screwed into a socket.

Immediately after installing the bulb the roaster should be tested to see that the bulb is making the proper contact in order to operate.

To Replace a Broken Side Handle

1—To perform this operation it is necessary to remove the bottom cover, such as described in 1 and 2 paragraph 1-A.

2—Disconnect the pilot lamp lead wires (No. 7) and (No. 5).

3—Disconnect the terminal leads from terminal pins (No. 20).

4—Remove adjusting knob.

5—Slip body from well, keep glass wool insulation intact.

6—The handle may now be replaced or repaired.

7—To assemble reverse above procedure.

SPOT NEWS

(Continued from page 15)

Illinois, April 19th through April 22nd, 1944. This will be the Association's Thirty-sixth Annual Meeting.

Mr. Pyle indicated that the War Con-

ference will include a complete review of the membership's participation in the many phases of the war program served by their numerous houses. The present status of Government regulations and orders affecting electrical wholesaling will be considered, as well as the probable changes in prospect.

Post-war plans for electrical wholesalers and appliance distributors will be featured in the report of the Post-War Planning Committee. That Committee, headed by Mr. Herbert Metz General Lamp and Lighting Sales Manager of Graybar Electric Co., Inc., New York City, has conducted several outstanding forum meetings since its appointment at Buffalo, New York last May. Its report at Chicago will be a noteworthy one.

Creative Opens New Sales Headquarters

Creative Plastics Corp., Brooklyn, N. Y., manufacturers of insulating Grommets and other fabricated plastic parts for industrial uses, has opened New York City sales and executive offices at 393 Seventh Ave.

These offices, established for the convenience of Creative's out of town customers, expeditors and salesmen, both for now and postwar, will be open Mondays through Fridays.

Todd Harris, Sales Manager, will be in attendance at the New York offices Tuesdays and Thursdays, while Paul E. Monath, Purchasing Agent, will be present Mondays and Fridays. On Wednesdays, both will be at the Brooklyn plant.

Rasmussen Bullish on Post-war

It is none too early to start to get prepared for the tremendous post-war market in radios and major household appliances that will get under way as soon as civilian production is again permitted, probably before the complete cessation of hostilities, declared J. H. Rasmussen, commercial manager, The Crosley Corporation, Cincinnati, when he addressed the annual meeting of the Minnesota Hardware Dealers' Association.

Rasmussen urged hardware dealers of Minnesota and nearby states, who may have lost their identity as radio and major household appliance dealers in the past year or two, to start identifying their stores as radio and appliance stores now—in preparation for the time when products are available.

"Certainly, it is not too early to start an up-to-date prospect list," Rasmussen asserted.

In addition to electric refrigerators, washers, radios, and other household products that were being made before the war, there will be a greatly increased business in new major appliances that were just getting started when war came, Rasmussen told the dealers.

"Frozen food cabinets probably will be in great demand when production is permitted," he said. "The room cooler was just beginning to come into its own in 1941. Forecasts for post-war manufacture of room coolers vary from 100,000 to 250,000 a year but, with the right unit at the right price, sales might mount to a million a year."

Other untapped markets, which may be expected to develop after the war, include electric kitchen cabinets, gar-

page disposal units, electric dishwashers, etc., he pointed out.

"Some types of metals are now being made available for civilian production and the manpower log-jam is beginning to ease because of some reduction in certain types of war production, like small arms, ammunition and tanks," Rasmussen said. "As a result, many authorities are predicting a sizeable increase in certain civilian production which will get to market before mid-1944.

Greater efficiency has made it possible for us to produce greater quantities of war material in December, 1943, than we were producing in mid-1943 and with fewer employees.

"We are now laying our plans for further expansion of our business to prepare for the tremendous markets which we believe will exist after the war. All of our plants have been completely modernized, and the most modern equipment and machines have been installed. Additions have been built and new properties have been added, including our own tool and die plant.

"Millions of American families need new refrigerators right now. They need the first models to be produced which will be from the tools and dies just used. However, where critical materials were used in the last production, there may be material substitutions.

"Sales stimulation will be provided by the sharply-improved second models, which probably will have a normal year's model changes. Still later, the really new models, which probably will not appear until the final phases of the war have been terminated for some months, will provide a real sales impetus.

"In the meantime, everyone who buys will have obtained a sound value, a beautiful and efficient refrigerator. Approximately the same program will be followed in radio. Undoubtedly, the first models to be produced will have new designs in wood cabinets."

Rasmussen pointed out that the radio and major appliance business has almost limitless opportunities but that it requires a greater degree of specialization than some others.

"To be successful, it should not be side-line business, on a haphazard basis," he asserted.

"Good service is a 'must' for a successful operation. Attractive store and window display, promotion and advertising go hand-in-hand with radio and appliance merchandising.

"Inventory investment, the amount of floor space required, and other factors involved should be in relation to the operation and the potential of the trading territory.

"Many retailers are today making complete plans for their post-war radio and appliance departments. Enlarged department floor space plans are already being laid out. Merchandising programs have been developed. Arrangements have been made for department heads who are to start work several months in advance of the time production will begin. Tentative arrangements have been made with salesmen—and so on.

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REFRIGERATOR REPAIRS

[Continued from page 19]

three leads to the compressor terminals (black, white and red) and attach a test relay using the same color coding. If the relay and overload is to be replaced be sure that the new relay and overload is installed in the same position as the one removed.

If the circuit and components are complete and functioning and the unit not running the unit must be replaced.

Causes of Overload—All Models

Excluding actual unit trouble that is covered in another section, there is little cause for overloading except in cases where voltage is not within reasonable limits or where air to the condenser is restricted.

On all calls, therefore, the condenser fans should be inspected on those models using fans and in all cases the condensers should be cleaned with a stiff brush to remove all lint and dust.

Model K units have a housing over the condenser that must be removed to properly clean this part. When this housing is removed it will be noted that air is drawn through an opening in the unit compartment floor and it, therefore, is important that the unit be so located that the housing and the opening coincide.

The opening in the flue on the back of the cabinet should also be checked to be sure there is no restriction.

Testing for Leaks

If for any reason it is suspected that there is a leak in the system, the entire system (including the tubing, valves, receiver, condenser, evaporator, and compressor, as well as eccentric shaft seal) should be thoroughly gone over with a swab that has been dipped in a strong solution of ammonia. (The ordinary household varieties of ammonia are not strong enough to give a good test and therefore are not recommended. A concentrated solution of approximately 28% is recommended and may be purchased at any drug store.)

Where a leak occurs there will usually be oil visible, the amount varying with the size of the leak; however, this is not always true in the case of the eccentric shaft seal, as a small amount of oil is generally present at this point even when the seal is functioning properly.

If the leak is in the low side of the system (namely evaporator, suction line, eccentric shaft seal, or crankcase gasket), the refrigerant will escape while the unit is not operating and the pressure is above zero (0) gauge or atmospheric pressure;

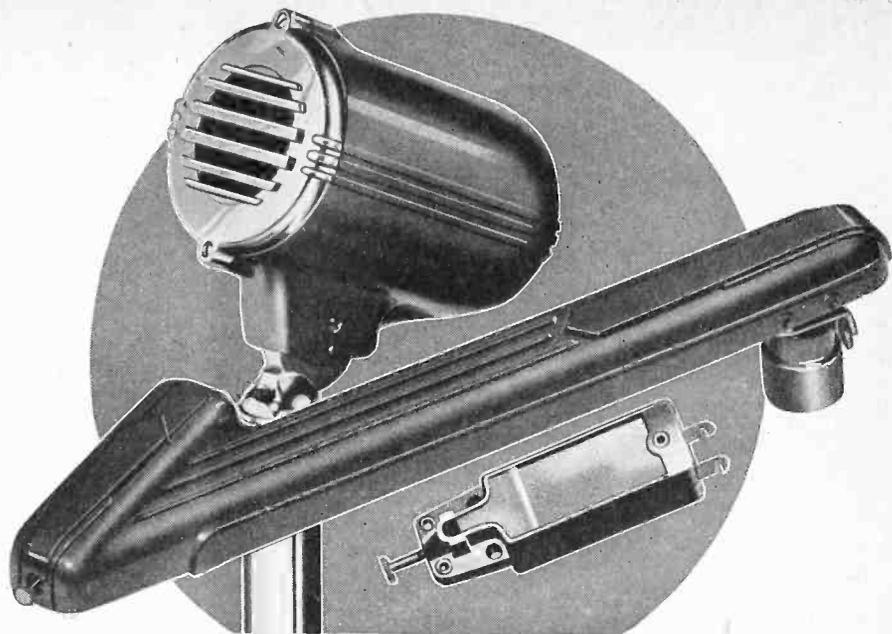
ut, when the machine is operating and the back pressure is below zero (0) gauge or atmospheric pressure, the system will absorb air through the opening. Therefore, before attempting to test for leaks on the low side of the system, a pressure must be built up in the low side of the system. If the conventional copper tube connections are used when attaching the gauges, the unit will have to be shut off, the evaporator thawed, and warm water placed in the cube trays until sufficient pressure is built up in the low side.

When a back pressure of approximately thirty pounds has been built up in the low side, the tests should be made, however, if the manifold flexible line hook-up is used for attaching gauges, the two manifold valves may be opened slightly, allowing the high pressure vapor to return through the manifold to the low side. As soon as the low side gauge reaches thirty pounds, the manifold valve should be closed to eliminate any possibilities of liquid refrigerant returning to the crankcase. In either case, the system is now ready to be tested.

Tests for high side leaks (namely compressor head condenser, receiver tank, liquid line, or fittings) may be made at any time, as there is always pressure on these parts. If it becomes necessary to increase this pressure in order to locate the leak, this may be done by covering the condenser and allowing the unit to operate for a short time. In this case, the high side or pressure gauge should be carefully watched so that the pressure will not become excessive. The test is then made by saturating the swab with liquid ammonia and then passing it over and around the various parts. The swab should be held reasonably close to the parts—approximately one-half inch will give a very delicate test. However, the ammonia should not be allowed to come in contact with the metal parts. The presence of white smoke will indicate that sulphur dioxide is escaping and if the exact location of the leak cannot be detected by watching the source of smoke, a small amount of medium motor oil may be poured upon the suspected parts. Small bubbles will appear in the oil at the leak. When the leak has been located, the necessary steps must be taken to eliminate the difficulty.

Which Semi-permanent Needle? (Continued from page 4)

Semi-permanent needles are mostly technical and little understood by the buying public, the dealer should carry those which are displayed in the most eye-appealing manner, and which are nationally advertised. This last is important so that there will be a demand for the product even though the organization of the



SUPPLY YOUR JOBBER NECESSARY INFORMATION WITH ALL ORDERS

● In placing an order with your Radio Parts Jobber for Astatic Microphones, Pick-ups and Pickup Cartridges, it is important that you supply him with necessary priority ratings, signed certificates, contract numbers, and such other information as may be helpful to him in having your order go into production. Above all else, do not neglect to give the ultimate use for which the part or parts desired are intended. These facts are demanded from your jobber and he must depend upon you for this information. Your cooperation eliminates waste motion and insures earlier deliveries.

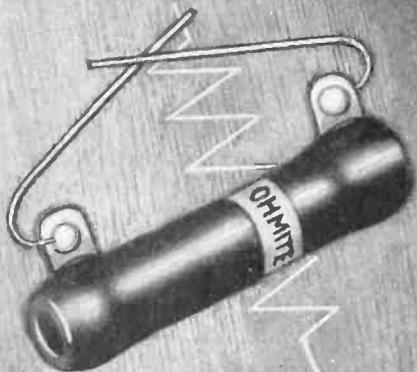
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IN CANADA:
CANADIAN ASTATIC, LTD.
TORONTO, ONTARIO

THE ASTATIC CORPORATION
YOUNGSTOWN, OHIO

OHMITE

10 AND 20 WATT BROWN DEVIL RESISTORS



*For Dependable
Service in Electronic
Applications*

Long known for their dependable performance—Ohmite Brown Devil Resistors serve today in critical war applications—in radio communications and other electronic equipment. Their extra sturdy, wire wound, vitreous enameled construction insures permanent resistance. These same units will be ready to serve your peacetime needs after Victory is won.



Ohm's Law Calculator
Helps you figure ohms, watts, volts, amperes—quickly, easily. Solves any Ohm's Law problem with one setting of the slide. All values are direct reading. Send only 10c in coin. (Also available in quantities.)

CATALOG 18

Gives helpful information on Ohmite stock resistors, rheostats, chokes and tap switches for all types of applications. Free. —Write for it.

Authorized Distributors
Everywhere



Ohmite Manufacturing Co.
4846 Flournoy, Chicago 44, U.S.A.

(Continued from page 34)

end opposite terminals.

k—Fold over the edges of the wide asbestos strip on the long sides only.

l—Bind the element in place with the banding straps making the seal opposite the terminal end. Use two straps each securing a folded edge of the wide asbestos. Pull the straps tight.

m—Slip two porcelain bushings over each lead wire and test for short to ground.

n—Assemble body to well taking care that glass wool is evenly distributed between the well and the body.

o—Replace thermostat and bottom element.

p—Make connections as shown on wiring diagram.

q—Replace asbestos shield around thermostat as in original assembly.

r—Fold asbestos strip over bare resistance wire as in original assembly.

s—Replace bottom glass wool. No glass wool is placed in space between front of thermostat, pilot light reflector and bottom cover.

t—Replace bottom cover and thermostat knob.

u—Test for short circuit.

Pilot Light Not Operating

The roaster may operate with the pilot or signal light not working.

To replace this lamp (6-8 volt) it is necessary to remove the bottom cover as described in 1 and 2 paragraph in "Defective Thermostat."

The bulb is snapped in place and not screwed into a socket.

Immediately after installing the bulb the roaster should be tested to see that the bulb is making the proper contact in order to operate.

To Replace a Broken Side Handle

1—To perform this operation it is necessary to remove the bottom cover, such as described in 1 and 2 paragraph 1-A.

2—Disconnect the pilot lamp lead wires (No. 7) and (No. 5).

3—Disconnect the terminal leads from terminal pins (No. 20).

4—Remove adjusting knob.

5—Slip body from well, keep glass wool insulation intact.

6—The handle may now be replaced or repaired.

7—To assemble reverse above procedure.

SPOT NEWS

(Continued from page 15)

Illinois, April 19th through April 22nd, 1944. This will be the Association's Thirty-sixth Annual Meeting.

Mr. Pyle indicated that the War Con-

ference will include a complete review of the membership's participation in the many phases of the war program served by their numerous houses. The present status of Government regulations and orders affecting electrical wholesaling will be considered, as well as the probable changes in prospect.

Post-war plans for electrical wholesalers and appliance distributors will be featured in the report of the Post-War Planning Committee. That Committee, headed by Mr. Herbert Metz, General Lamp and Lighting Sales Manager of Graybar Electric Co., Inc., New York City, has conducted several outstanding forum meetings since its appointment at Buffalo, New York last May. Its report at Chicago will be a noteworthy one.

Creative Opens New Sales Headquarters

Creative Plastics Corp., Brooklyn, N. Y., manufacturers of insulating Grommets and other fabricated plastic parts for industrial uses, has opened New York City sales and executive offices at 393 Seventh Ave.

These offices, established for the convenience of Creative's out of town customers, expeditors and salesmen, both for now and postwar, will be open Mondays through Fridays.

Todd Harris, Sales Manager, will be in attendance at the New York offices Tuesdays and Thursdays, while Paul E. Monath, Purchasing Agent, will be present Mondays and Fridays. On Wednesdays, both will be at the Brooklyn plant.

Rasmussen Bullish on Post-war

It is none too early to start to get prepared for the tremendous post-war market in radios and major household appliances that will get under way as soon as civilian production is again permitted, probably before the complete cessation of hostilities, declared J. H. Rasmussen, commercial manager, The Crosley Corporation, Cincinnati, when he addressed the annual meeting of the Minnesota Hardware Dealers' Association.

Rasmussen urged hardware dealers of Minnesota and nearby states, who may have lost their identity as radio and major household appliance dealers in the past year or two, to start identifying their stores as radio and appliance stores now—in preparation for the time when products are available.

"Certainly, it is not too early to start an up-to-date prospect list," Rasmussen asserted.

In addition to electric refrigerators, washers, radios, and other household products that were being made before the war, there will be a greatly increased business in new major appliances that were just getting started when war came, Rasmussen told the dealers.

"Frozen food cabinets probably will be in great demand when production is permitted," he said. "The room cooler was just beginning to come into its own in 1941. Forecasts for post-war manufacture of room coolers vary from 100,000 to 250,000 a year but, with the right unit at the right price, sales might mount to a million a year."

Other untapped markets, which may be expected to develop after the war, include electric kitchen cabinets, gar-

bage disposal units, electric dishwashers, etc., he pointed out.

"Some types of metals are now being made available for civilian production and the manpower log-jam is beginning to ease because of some reduction in certain types of war production, like small arms, ammunition and tanks," Rasmussen said. "As a result, many authorities are predicting a sizeable increase in certain civilian production which will get to market before mid-1944.

Greater efficiency has made it possible for us to produce greater quantities of war material in December, 1943, than we were producing in mid-1943 and with fewer employees.

"We are now laying our plans for further expansion of our business to prepare for the tremendous markets which we believe will exist after the war. All of our plants have been completely modernized, and the most modern equipment and machines have been installed. Additions have been built and new properties have been added, including our own tool and die plant.

"Millions of American families need new refrigerators right now. They need the first models to be produced which will be from the tools and dies last used. However, where critical materials were used in the last production, there may be material substitutions.

"Sales stimulation will be provided by the sharply-improved second models, which probably will have a normal year's model changes. Still later, the really new models, which probably will not appear until the final phases of the war have been terminated for some months, will provide a real sales impetus.

"In the meantime, everyone who buys will have obtained a sound value, a beautiful and efficient refrigerator. Approximately the same program will be followed in radio. Undoubtedly, the first models to be produced will have new designs in wood cabinets."

Rasmussen pointed out that the radio and major appliance business has almost limitless opportunities but that it requires a greater degree of specialization than some others.

"To be successful, it should not be a side-line business, on a haphazard basis," he asserted.

"Good service is a 'must' for a successful operation. Attractive store and window display, promotion and advertising go hand-in-hand with radio and appliance merchandising.

"Inventory investment, the amount of floor space required, and other factors involved should be in relation to the operation and the potential of the trading territory.

"Many retailers are today making complete plans for their post-war radio and appliance departments. Enlarged department floor space plans are already being laid out. Merchandising programs have been developed. Arrangements have been made for department heads who are to start work several months in advance of the time production will begin. Tentative arrangements have been made with salesmen—and so on.

BUY MORE BONDS!

"THE HELP SITUATION" by Lariar



Tired of competing with war industries for the services of experienced radio men? Tired of training help and then losing them to war plants that can afford to outbid you?

Here is help you can afford; help that is trained, help that can be depended upon to stick with you and work as long and as hard as you.

RIDER MANUALS reduce to a minimum, the time required to trace troubles in faulty receivers. RIDER BOOKS tell how to speed servicing work by means of modern, short-cut techniques. In making it possible for fewer men to produce more work they are contributing to the solution of the "help" problem for servicemen all over the world.

When you need help, competent, dependable help, remember Rider Manuals and Rider Books. They can provide the extra help you need; The Extra Hand you must have if you are to meet your patriotic duty to "keep 'em playing."

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 Abridged Manuals I to V [1 volume]...\$12.50
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 Servicing by Signal Tracing
 Basic Method of radio servicing..... 3.00
 The Meter at Work
 An elementary text on meters..... 1.50
 The Oscillator at Work
 How to use, test and repair..... 2.00
 Vacuum Tube Voltmeters
 Both theory and practice..... 2.00
 Automatic Frequency Control Systems
 — also automatic tuning systems..... 1.25
 A-C Calculation Charts
 Two to five times as fast as slide rule..... 7.50
 Hour-A-Day-with-Rider Series —
 On "Alternating Currents in Radio Receivers"—
 On "Resonance & Alignment"—
 On "Automatic Volume Control"—
 On "D-C Voltage Distribution"..... 90c each

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Circulation Department

RADIO & ELECTRICAL APPLIANCE SERVICE-DEALER
342 Madison Avenue New York 17, N. Y.

REFRIGERATOR REPAIRS

[Continued from page 19]

three leads to the compressor terminals (black, white and red) and attach a test relay using the same color coding. If the relay and overload is to be replaced be sure that the new relay and overload is installed in the same position as the one removed.

If the circuit and components are complete and functioning and the unit not running the unit must be replaced.

Causes of Overload—All Models

Excluding actual unit trouble that is covered in another section, there is little cause for overloading except in cases where voltage is not within reasonable limits or where air to the condenser is restricted.

On all calls, therefore, the condenser fans should be inspected on those models using fans and in all cases the condensers should be cleaned with a stiff brush to remove all lint and dust.

Model K units have a housing over the condenser that must be removed to properly clean this part. When this housing is removed it will be noted that air is drawn through an opening in the unit compartment floor and it, therefore, is important that the unit be so located that the housing and the opening coincide.

The opening in the flue on the back of the cabinet should also be checked to be sure there is no restriction.

Testing for Leaks

If for any reason it is suspected that there is a leak in the system, the entire system (including the tubing, valves, receiver, condenser, evaporator, and compressor, as well as eccentric shaft seal) should be thoroughly gone over with a swab that has been dipped in a strong solution of ammonia. (The ordinary household varieties of ammonia are not strong enough to give a good test and therefore are not recommended. A concentrated solution of approximately 28% is recommended and may be purchased at any drug store.)

Where a leak occurs there will usually be oil visible, the amount varying with the size of the leak; however, this is not always true in the case of the eccentric shaft seal, as a small amount of oil is generally present at this point even when the seal is functioning properly.

If the leak is in the low side of the system (namely evaporator, suction line, eccentric shaft seal, or crankcase gasket), the refrigerant will escape while the unit is not operating and the pressure is above zero (0) gauge or atmospheric pressure;

out, when the machine is operating and the back pressure is below zero (0) gauge or atmospheric pressure, the system will absorb air through the opening. Therefore, before attempting to test for leaks on the low side of the system, a pressure must be built up in the low side of the system. If the conventional copper tube connections are used when attaching the gauges, the unit will have to be shut off, the evaporator tested, and warm water placed in the cube trays until sufficient pressure is built up in the low side.

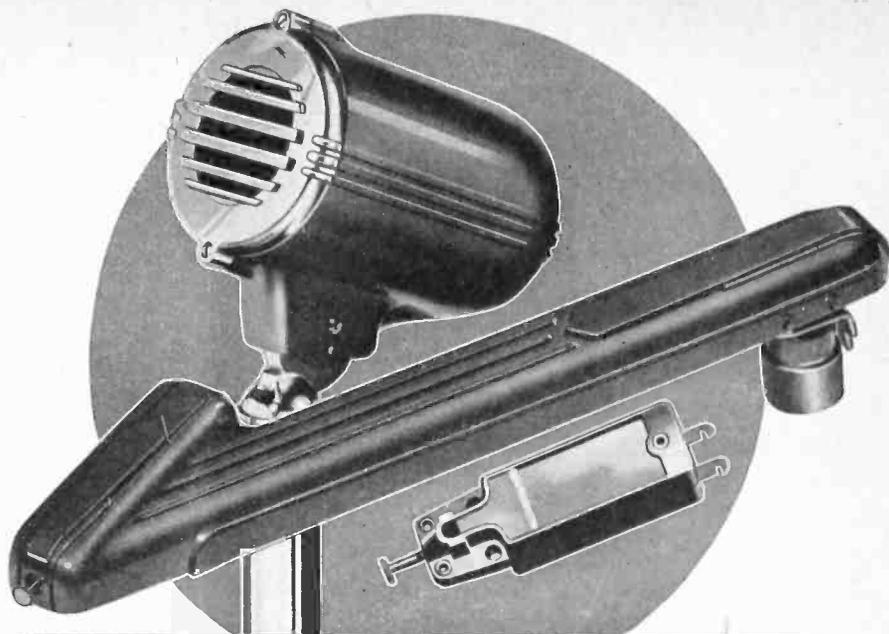
When a back pressure of approximately thirty pounds has been built up in the low side, the tests should be made, however, if the manifold flexible line hook-up is used for attaching gauges, the two manifold valves may be opened slightly, allowing the high pressure vapor to return through the manifold to the low side. As soon as the low side gauge reaches thirty pounds, the manifold valve should be closed to eliminate any possibilities of liquid refrigerant returning to the crankcase. In either case, the system is now ready to be tested.

Tests for high side leaks (namely compressor head condenser, receiver tank, liquid line, or fittings) may be made at any time, as there is always pressure on these parts. If it becomes necessary to increase this pressure in order to locate the leak, this may be done by covering the condenser and allowing the unit to operate for a short time. In this case, the high side or pressure gauge should be carefully watched so that the pressure will not become excessive. The test is then made by saturating the swab with liquid ammonia and then passing it over and around the various parts. The swab should be held reasonably close to the parts—approximately one-half inch will give a very delicate test. However, the ammonia should not be allowed to come in contact with the metal parts. The presence of white smoke will indicate that sulphur dioxide is escaping and if the exact location of the leak cannot be detected by watching the source of smoke, a small amount of medium motor oil may be poured upon the suspected parts. Small bubbles will appear in the oil at the leak. When the leak has been located, the necessary steps must be taken to eliminate the difficulty.

Which Semi-permanent Needle?

(Continued from page 4)

Semi-permanent needles are mostly technical and little understood by the buying public, the dealer should carry those which are displayed in the most eye-appealing manner, and which are nationally advertised. This last is important so that there will be a demand for the product even though the organization of the



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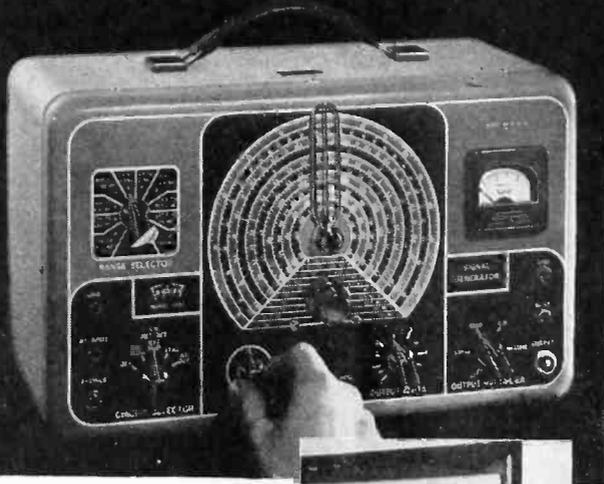
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TORONTO, ONTARIO

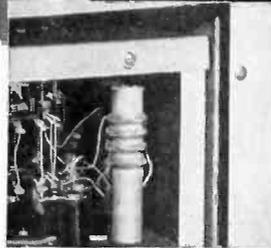
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**MODEL
No. 1632**

Signal Generator



Continuous coverage—100 KC to 120 MC—
all frequencies fundamentals. New high fre-
quencies for frequency modulated and tele-
vision receivers. All coils permeability tuned.
Litz wire wound against humidity with
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will be available to you after the war.



*Triple shielding through-
out. Steel outer case, steel
inner case plus copper
plating.*

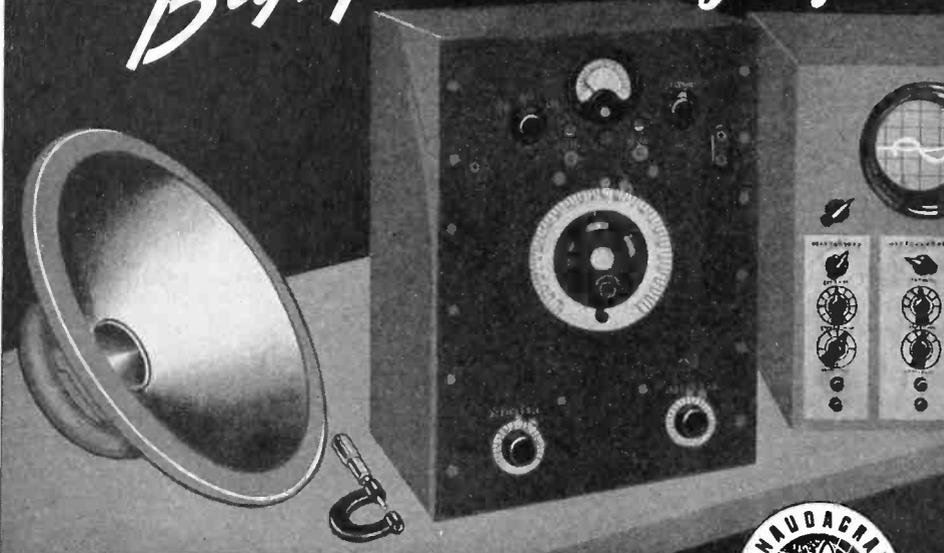


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Bluffton ■ Ohio ★ ★ ★

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*Engineered for Today's
Big. Precision Job!*



Cinaudagraph Speakers, Inc.

3911 S. Michigan Ave., Chicago

"No Finer Speaker Made in all the World"



store has been successful in disposing of merchandise without these usual aids. Thus it will pay to look into the company which is putting out the needle and at the same time asking oneself: what is my profit on this needle against, say, that one?; what is the manufacturer doing to create buyer demand?; does the display have eye appeal?; is there plenty of advertising at the point of sale?

From a sales point, the needle that is unconditionally guaranteed is the better one to handle because of the money-back feature which prevents loss to the dealer. And be sure that the term unconditional guarantee means just that: that the manufacturer will refund the purchaser's money regardless of when the needle is returned and for whatever the reason.

Technically, the needle to sell should keep surface wear of the record to the minimum; should keep surface noise below objectionable level; and should absorb mechanical sound other than that of the music or speech intended to be reproduced. The phonograph needle should have an alloy tip ground to the proper radius so that it neither digs up the record nor rests on the sides of the grooves; in other words it should be neither too fine nor too blunt. This is a matter of research, since the needle point must have a tolerance less than the tolerance of the groove. Here the dealers' guarantee of a good needle rests solely with the organization which produces it. Pick a good manufacturer!

One of the latest developments in needles of semi-permanent nature, is the plastic shank. This is created by moulding the shank of the needle into some plastic material which will act to reduce further the mechanical shocks and noises inherent in almost all recordings.

Finally, it will pay the dealer to carry only such needles in his line, regardless of price, or whether they are semi-permanent, sapphire, steel-shaft, or cactus, which have at the situs of contact with the record, i. e., the point, only material of correct hardness and surface smoothness which will assure distortion-free reproduction, minimum wear on the record, and minimum mechanical and surface noise.

Submitted by:
**Fred Williamson, Chief Engineer,
AERO NEEDLE COMPANY,
Chicago, Ill.**

Here 'n' There

WHAT'S NEW: Cleveland, Ohio, policemen are on the watchout for the King Sisters. They're making a personal appearance at the Annual Police Pension show there. . . . Lena Horne has been signed for a series of Charlie McCarthy radio programs. The Victor songstress will sing as Charlie's "honored guest." And watch for a new Lena Horne record due soon. . . . "All The Things You Are" is taking its place as a "standard" song alongside such tunes as "Stardust," "Night and Day," if requests made to bandleader Charlie Spivak are a criterion. His arrangement is one of the most popular in the band's library.

RESIGNATION of Charles O'Connell as director of Red Seal Artists and Repertoire was announced today by J. W. Murray, General Manager of

VICTORY CONDENSERS

Here it is! . . . the Government approved Victory Condenser that we are producing for immediate delivery on L265 ratings or better. Write for complete list of Victory items and prices.

For VICTORY Buy United States War Bonds and Stamps



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CLAROSTAT

ROLLING ON TO



★ Clarostat continues to be engaged 100% in the most important job of all—winning the war—on land, sea and in the air.

But after victory has been won, Clarostat provides the trade—servicemen, jobbers and others—that Clarostat products for initial and replacement uses alike, will once more be generally available for peacetime pursuits. Meanwhile, let's keep 'em rolling!




Controls and Resistors
CLAROSTAT MFG. CO., Inc. 285-7 N. 6th St., Brooklyn, N. Y.

RCA Victor record activities. Mr. O'Connell, whose resignation takes effect March 31, will be retained by the company as a consultant on recording matters.

MUSICIAN OF THE YEAR: Metro-nome Music Magazine, after reviewing the activities of all known musicians for the past year, has voted C.P.O. Artie Shaw the "Musician of the Year." Just returned to this country from an extensive tour which took him and his band to practically every tiny outpost in the Pacific area, Artie is enjoying the last of a thirty day furlough before returning to his naval duties. Where he will go next he, of course, cannot say but he does not expect to be sent back to the South Pacific again at this time.

GENE KRUPA has decided to remain with Tommy Dorsey's orchestra at least for their tour to the Pacific Coast and for the band's picture work in Hollywood. He is a terrific hit with the band at the Paramount in New York.

Reviews

DECCA:

Black Label (18,000 series) Release

Ink Spots—"Don't Believe Everything You Dream"; "A Lovely Way To Spend An Evening"

Here is another disc that can be counted on for long-haul popularity once the first run on them is past. The two songs released on this record are well suited for the customary half-sung half-spoken Ink Spots treatment. First comes from RKO's "Around the World"—it's a pop ballad. . . . Coupling is also from an RKO picture, "Higher and Higher" first released in New York on New Year's Eve. (18583)

Blue Label (4,000 series) release

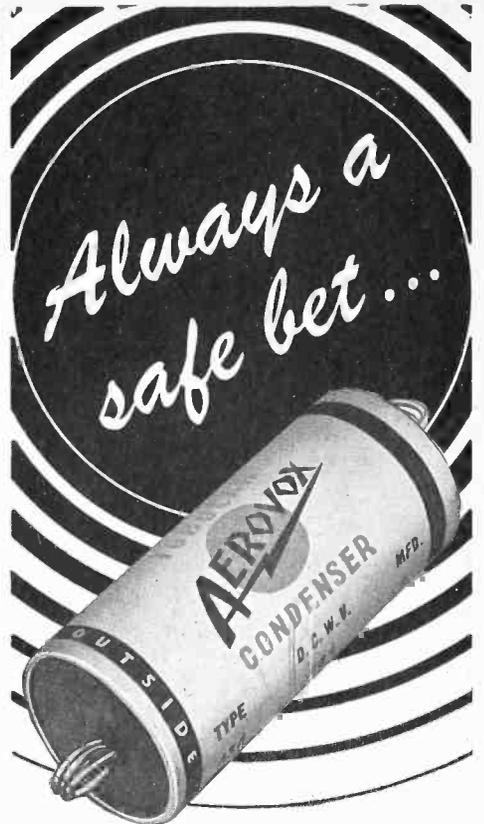
Jerry Wald & His Orchestra —"Shoo-Shoo Baby"; "Crazy Blues"

Jerry Wald started off like a house afire back in August, 1942. After making four sides, notably "Mad About Him, Sad Without Him . . . etc. Blues," the musician's strike intervened. This is his return engagement—still on Decca Blue Label—still featuring both solo clarinet and vocal-and-clarinet duets. "Shoo-Shoo Baby" is one you already know as a hit. It features the Wald clarinet and Ginnie Powell's vocal together in harmony. Song comes from Universal's "Three Cheers for the Boys." . . . Coupling is a solid blues tune in dance tempo. Clarinet takes the lead, followed by a sax ride. (4431)

Sepia (8,000 Series) Release

Richard Huey and His Sundown Singers — "Hurry Sundown"; "Blues Boogie Woogie"

From the WOR Mutual program, The Sheep and Goats Club, comes this distinctive group, consisting



● Yes, even as the pinch of all-out war becomes felt in radio replacements as in other fields, Aerovox paper tubulars remain the safe bet. The following selected Victory numbers, used singly or in combination, can take care of over 90% of standard paper capacitor replacement needs.

D.C.W.V.	CAPACITY
600	.001 mfd.
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600	.005 mfd.
600	.01 mfd.
600	.02 mfd.
600	.05 mfd.
600	.1 mfd.
600	.25 mfd.

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ORDER NOW! — from your
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Ask for display material. Write
for additional information.

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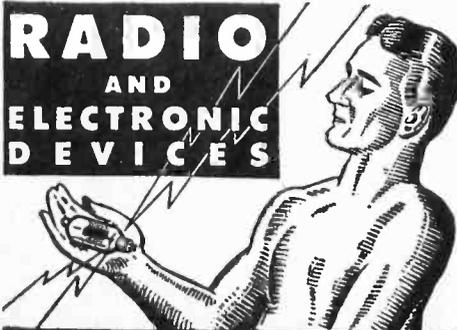
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**RADIO
AND
ELECTRONIC
DEVICES**



BURSTEIN-APPLEBEE CO.
1012-14 McGee St. Kansas City, Mo.

of four men and a girl. They are
accompanied by two drummers.
Combination of blues with a jungle
beat—something new in the record
rack. First is their theme song—
slow blues with Bahaman drum
background. . . . Coupling is sung
in staccato boogie-woogie rhythm
with percussion accompaniment.
Pleasant to hear and certainly dif-
ferent. (8656)

VICTOR-RCA

Thomas: Overture to Mignon (11-
8545); **Arturo Toscanini and the
NBC Symphony Orchestra**

For an impressive debut record
release of 1944, RCA Victor pre-
sents a brilliant performance of
the Mignon Overture by Arturo
Toscanini and the NBC Symphony
Orchestra. Maestro Toscanini is
said to be particularly fond of this
concert piece, and it is evidenced
in the singularly beautiful version
offered here on a Red Seal disc.

The delicate introduction of the
Overture leads into the graceful
strains of the familiar aria "Con-
nais-tu le pays?", which Mignons
have sung since the opera's
premiere performance at the Opera
Comique in Paris, Nov. 17, 1866.
Violins then lead into a sparkling
polonaise in which we hear the
melody for "Je suis Titania," the
vivacious aria of the frivolous ac-
tress Philine who is Mignon's ri-
val for Wilhelm's love. The Over-
ture closes with a gay finale. Tos-
canini has communicated his own
appreciation of and feeling for this
Overture to the talented artists of
the NBC Symphony Orchestra, and
the result is a highly polished and
effervescent reading of a delightful
piece of work.

"Leaves of Grass" on Victor

An unusual item on Victor's Feb-
ruary list is a Red Seal album of se-
lected poems from Walt Whitman's
famous "Leaves of Grass." The dra-
matic reading is by Ralph Bellamy,
popular film and stage star, now ap-
pearing in the Broadway hit "Tomor-
row the World."

POST-WAR PLANNING

American business must "keep its
feet on the ground" when announcing
post-war plans lest it impair its own
profit possibilities, warned J. J. Nance.
He also stated that out of the war will
come greatly improved products for
civilian use — radios, refrigerators,
automobiles, etc., but that these im-
provements will come through evolution
rather than revolution.

The public will be longing for prod-
ucts it has had to do without; dealers
will be screaming for something to
sell, and they won't be too particular
whether the product has every gadget
of the never-before-seen variety. Be-
ware of fantastic and futuristic types
of advertising on whatever models can
be produced quickly!

We must begin our planning now,
and make sure it is the type of plan-
ning that will develop reconversion—
not retard it.

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Keep this fact clearly in mind: *electronics* is the growing art of harnessing electron tubes—in many cases, familiar types of radio tubes—to new applications; and it means everything to your future.

Big as the radio and communications industry has been, it is only *one phase of electronics*. Hitherto your opportunities have been practically limited to that one phase—transmission of sound. At the start of the war, television—transmission of sight—was just opening up.

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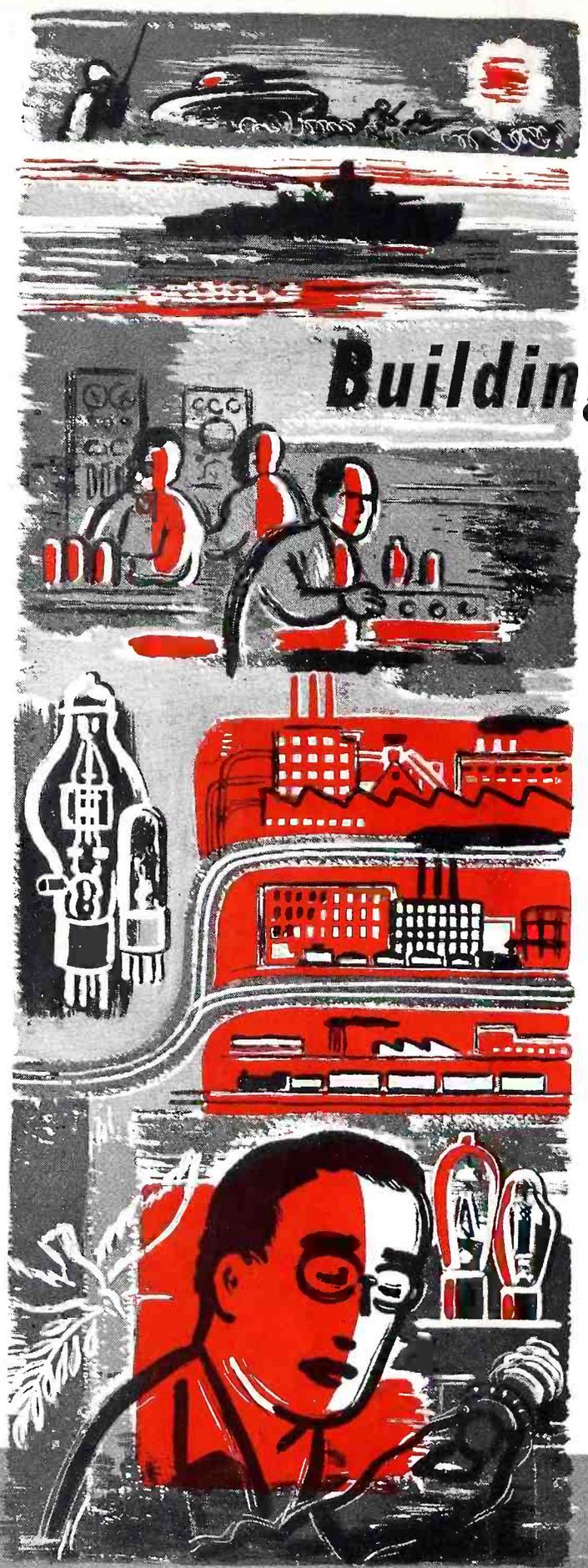
YOU will draw income from this vastly widened field. You will be a *bigger man*—expanding, reaching out, grasping opportunity. RCA Engineers and RCA Tube and Equipment Distributors and Servicemen, working together, can help enormously to make electronics the biggest industry, and the greatest public service, this country has ever known!

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