radio service dealer

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A BELL FOR INTERMITTENTS
CENTRAL SERVICE

TRANSCONDUCTANCE TUBE TEST
NEW TUBE PRICES

SEPTEMBER
1946

SYLVANIA NEWS
RADIO SERVICE EDITION

SEPT. *Prepared by* **SYLVANIA ELECTRIC PRODUCTS INC., Emporium, Pa.** **1946**

NEWEST AND FINEST IN TUBE TESTERS NOW READY FOR RADIO SERVICEMEN

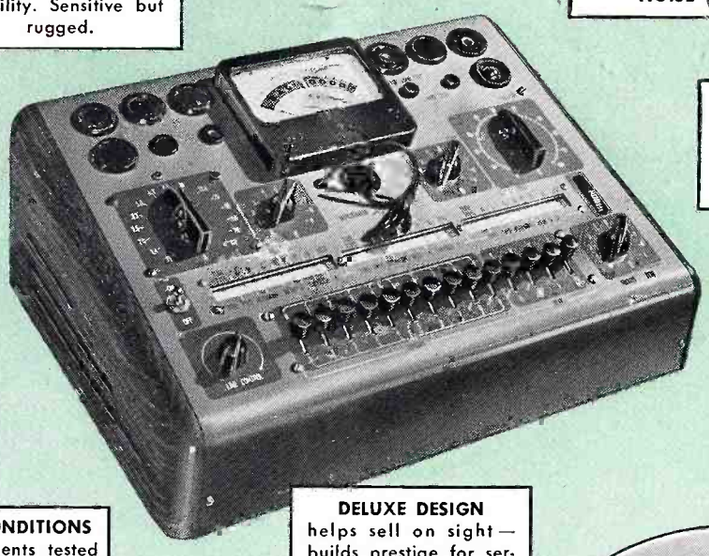
Made by the men who have tested tubes by the million!

LARGE METER
4½ inch size for high legibility. Sensitive but rugged.

PROVISION FOR NOISE TEST

8-FT. LINE CORD — extra long for extra convenience.

LEGIBLE DIAL MARKINGS — lines and numerals in white agoinst green panel.



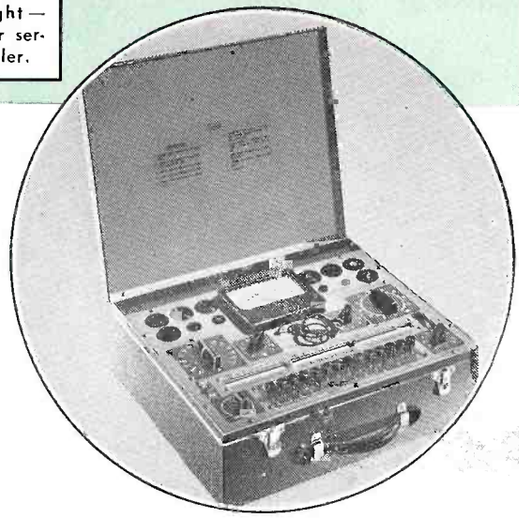
TESTS STANDARD, LOCK-IN, ACORN TUBES.
Extra sockets and switches allow easy adaptation when new tube types appear.

SHORTS TEST
at voltage low enough to prevent tube damage or faulty indications — high enough for full brilliancy on Shorts Indicator.

FINGERTIP CONTROLS
make settings easy.

DYNAMIC CONDITIONS
All tube elements tested under dynamic conditions.

DELUXE DESIGN
helps sell on sight — builds prestige for serviceman or retailer.



Here's the "last word" in tube testers made for discriminating radio servicemen by Sylvania Electric.

Remain up to date easily, economically with this modern tube testing equipment. Now, this advanced type testing unit can be yours — smartly styled, scientifically designed, attractively priced. Besides all the special features, indicated above, the Sylvania tester has been provided with extra sockets and switch contacts to insure quick, inexpensive further modernization as new tube types are developed.

COUNTER TESTER
Type 139 (shown above) 5½" x 12" x 16¼". Net weight 15¾ lbs. Steel cabinet, wooden ends. Two-tone green panel. Power supply: 105-125 volts, 50-60 cycles, 20 watts.

PORTABLE TESTER
Type 140 (shown at right). 5¼" x 13" x 15". Net weight 19¼ lbs. Steel carrying case, sturdy leather handle. Other features same as Counter Type.

SEE YOUR SYLVANIA TUBE DISTRIBUTOR TODAY!

SYLVANIA ELECTRIC

Emporium, Pa.

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

PROFITS ...are Hiding in Unused Radios

At least **1,000,000 portable radio sets** now lie idle waiting for minor repairs . . . *and* for *batteries* that YOU can supply them.

Yes—"Eveready" "Mini-Max" Portable Radio Batteries. You can get them now—all you need. Quickly and easily.

And you can reach this quick, profitable replacement business *simply* by displaying your stock. Most of the owners of those 1,000,000 "dead" sets . . . and a big part of 3,000,000 other portable owners whose sets are still in service . . . don't realize how easy it is to get needed "Eveready" battery replacements.

Get your "Eveready" radio battery stock up on the counter . . . down front in your window. And get your share of these ready-made profits!

The registered trade-marks "Eveready" and "Mini-Max" distinguish products of National Carbon Company, Inc.

NATIONAL CARBON COMPANY, INC.
30 East 42nd Street, New York 17, N. Y.
Unit of Union Carbide and Carbon Corporation

UCC

DISPLAYS RING THE REGISTER!

308 SPRAGUE DISTRIBUTORS TO SERVE YOU

So many users of the SPRAGUE TRADING POST, our free wartime advertising service, have asked for the names of their nearest Sprague distributors that—well, here's the entire list. These firms will supply you with factory-fresh Sprague Capacitors and Koolohm Resistors of the very latest types. They'll be only too glad to serve you.

THE SPRAGUE TRADING POST did its part during the war. Now, both Sprague and its distributors will "follow through" by bringing radio servicemen, amateurs and experimenters the finest components backed with the best service obtainable.

As always, we'll appreciate it if you continue to: *"Ask for Sprague Capacitors and Koolohm Resistors by name!"*

SPRAGUE PRODUCTS CO., North Adams, Mass.

Jobbing Distributing Organization for Products of the Sprague Electric Company

◀ ASK YOUR JOBBER for a copy of the big new Sprague Catalog. Gives full details on the most complete Capacitor line on the market—also Koolohm Resistors and the famous Sprague Tel-Ohmike Analyzer.

SPRAGUE CAPACITORS are specified by part numbers in the popular new HOWARD W. SAMS PHOTO FACT FOLIOS

SPRAGUE CAPACITORS . . . . . .

Ask for Sprague Products by Name!

ALABAMA
Bessemer—Bessemer Radio Supply
Birmingham—James W. Clary
Mobile—Nelson Radio & Supply Co.
Radio Labs
Montgomery—Teague Hardware Co.
Southeastern Radio Parts Co.

ARKANSAS
Fort Smith—Wise Radio Supply
Little Rock—Southern Radio Supply
Texarkana—Lavender Radio Supply Co.

ARIZONA
Phoenix—Radio Parts of Arizona

CALIFORNIA
Bakersfield—Bakersfield Radio Supply
Fresno—Jack C. Arbuckle
Billings Wholesale Radio
Hollywood—Hollywood Radio Supply, Inc.
Long Beach—Radio & Tel. Equip. Co.
Los Angeles—Figart Radio Supply Co.
Kierulff & Co.
Nelson Brothers Co.
Radio Equip. Distributors
United Radio Supply Co.
Universal Radio Supply Co.
Modesto—Jack Warren
Oakland—W. D. Brill Company
E. C. Wenger Co.
Pasadena—Dow Radio Supply Co.
Sacramento—C. C. Brown Co.
Henderson Bros.
Sacramento Elec. Supply Co.
San Diego—Coast Electric Co.
Electronic Equip. Distr.
Shanks & Wright
San Francisco—Associated Radio Distrs.
C. C. Brown Co.
San Jose—Frank Quement
Santa Ana—Radio & Tel. Equip. Co.

COLORADO
Denver—Inter-State Radio & Supply Co.

CONNECTICUT
Bridgeport—Hatry & Young, Inc.
Hartford—Hatry & Young, Inc.
New Britain—United Radio Supply
Universal Radio Co.
New Haven—Thomas H. Brown Co.
Hatry & Young, Inc.
New London—Hatry & Young of New London, Inc.
Stamford—Hatry & Young, Inc.
Waterbury—Hatry & Young, Inc.

DELAWARE
Wilmington—Radio Elec. Serv. Co.

DISTRICT OF COLUMBIA
Washington—Kenyon Radio Supply Co.
Rucker Radio Wholesalers

FLORIDA
Jacksonville—Kinkade Radio Supply
Major Appliances
Miami—Electronic Supply Co.
Major Appliances
Orlando—Radio Accessories Co.
St. Petersburg—Welch Radio Supply
Sarasota—Morley Radio Co.
Tampa—Kinkade Radio Supply
Major Appliances

GEORGIA
Atlanta—Concord Radio Corp.
Southeastern Radio Parts Co.
Specialty Dstg. Co., Inc.
Macon—Specialty Dstg. Co., Inc.
Savannah—Southeastern Radio Parts Co.
Specialty Dstg. Co., Inc.

ILLINOIS
Bloomington—J. W. Arbuckle
Chicago—Allied Radio Corp.
Concord Radio Corp.
Grant Radio Co., Inc.
Nation Wide Radio
Radio Parts Company
Kankakee—Radio Doctors Supply House

INDIANA
Angola—Lakeland Radio Supply
Richmond—Fox Sound Equipment Co.

IOWA
Cedar Rapids—Gifford-Brown, Inc.
Council Bluffs—World Radio Labs., Inc.
Des Moines—Gifford-Brown, Inc.
Radio Trade Supply Corp.
Fort Dodge—Gifford-Brown, Inc.
Ken-Els Radio Supply
Mason City—Radio-Electric Supply Co.
Sioux City—Power City Radio Company
Sioux City Radio & Appl. Co.
Waterloo—Gifford-Brown, Inc.
World Radio Laboratories, Inc.

KANSAS
Pittsburg—Pittsburg Radio Supply
Topeka—Acme Radio Supply
Wichita—Radio Supply Co.

KENTUCKY
Lexington—Radio Equipment Co.
Louisville—Peerless Electronic Equip. Co.
Newport—Apex Distributing Co.

LOUISIANA
Lake Providence—F. H. Schneider & Sons, Inc.
New Orleans—Radio Parts, Inc.
Shreveport—Dunckelman-Pace
Koelemay Sales Co.

MAINE
Auburn—Radio Service & Supply Store
Portland—Frank M. Brown Co.

MARYLAND
Baltimore—Henry O. Berman Co., Inc.
Cumberland—Cumberland Radio Whol.
Salisbury—Dealers Radio Service

MASSACHUSETTS
Boston—De Mambro Dstrs., Inc.
Hatry & Young of Mass., Inc.
A. W. Mayer Co.
Radio Wire Television, Inc.
Sager Elec'l Supply Co.
Cambridge—The Eastern Co.
Holyoke—Springfield Radio Co.
Lawrence—Hatry & Young of Mass., Inc.
New Bedford—C. E. Beckman Co.
Pittsfield—Pittsfield Radio Co.
Roxbury—Gerber Radio Supply Co.
Springfield—T. F. Cushing Co.
Springfield Radio Co.
Worcester—De Mambro Dstrs., Inc.
The Eastern Co.
Radio Electronic Sales Co.
Radio Maintenance Supply Co.

MICHIGAN
Ann Arbor—Wedemeyer Elec. Supply Co.
Battle Creek—Wedemeyer Elec. Supply Co.
Detroit—Ferguson Radio Supplies
Radio Specialties Co.
Radio Supply & Eng. Co., Inc.
Flint—Radio Tube Mdsg. Co.
Grand Rapids—Wholesale Radio Co.
Jackson—Fulton Radio Supply
Kalamazoo—Ralph M. Ralston Co.
Muskegon—Industrial Elec. Supply Co.
Pontiac—Electronic Supply Co.
Saginaw—Radio Parts Company

MINNESOTA
Duluth—Northwest Radio
Minneapolis—Bauman Company
Sidney Rosenthal
St. Paul—Electronic Distributing Co.

MISSISSIPPI
Greenville—The Goyer Company
Meridian—Griffin Radio Supply

MISSOURI
Cape Girardeau—Suedekum Elec. Sup. Co.
Jefferson City—Central Mo. Dstg. Co.
Joplin—M. Brotherson
Mardick Dstg. Co.
Kansas City—Burstein-Applebee Co.
Manhattan Corp.
St. Joseph—St. Joseph Radio & Supply Co.
St. Louis—Walter Ashe Radio Co.
Interstate Supply Co.
Radonics
Springfield—Harry Reed Radio & Sup. Co.

MONTANA
Butte—George Steele & Co.
Kalispell—McIntosh Music House

NEBRASKA
Omaha—Omaha Appliance Co.
Radio Equipment Co.
Scottsbluff—Joachim Radio Supply

NEW HAMPSHIRE
Dover—American Radio Corp.

NEW JERSEY
Camden—Radio Elec. Serv. Co.
Newark—Continental Sales Co.
Krich-Radisco, Inc.
T. A. O'Loughlin & Co.
Radio Wire Tel., Inc.
Perth Amboy—Bennett's Radio Supply
Red Bank—J. H. Kelly Company
Trenton—United Tire Stores Co.

NEW YORK
Albany—Fort Orange Radio Dstg. Co.
Amsterdam—Adirondack Radio Supply
Auburn—Dare's Radio Service
Binghamton—Broome Dstg. Co., Inc.
Federal Radio Supply Co.
Brooklyn—Green Radio Distributors
Stan-Burn Radio & Elec. Co.
Buffalo—Bars Radio & Electronic Parts
Dymac, Inc.
Genesee Radio & Parts Co.
Radio Equipment Corp.
Standard Electronics Co.
Elmira—LeValley-McLeod-Kinkaid Co., Inc.
Fredonia—C. R. Barker
Glens Falls—Ray Distributing Co.
Hempstead, L. I.—Standard Parts Corp.
Ithaca—Stallman of Ithaca
Jamaica, L. I.—Norman Radio Distrs.
Middletown—L & S Radio Sales
New York City—Fischer Distributing Co.
Radionic Equipment Co.
Radio Wire Tel., Inc.
Niagara Falls—Niagara Radio & Parts Co.
Rochester—Beaucaire, Inc.
Masline Radio & Electronic Equip. Co.
Schenectady—Fort Orange Radio Dstg. Co.
M. Schwartz & Son
Syracuse—Broome Dstg. Co., Inc.
Syracuse Radio Supply
Troy—Trojan Radio Co.
Utica—Beacon Electronic Inc.
Watertown—Beacon Electronic Inc.

NORTH CAROLINA
Asheville—Freck Radio & Supply Co.
Charlotte—Dixie Radio Supply Co.
Southern Radio Corp.
Fayetteville—Eastern Radio Supply
Goldsboro—Signal Radio Supply
Greensboro—Dixie Radio Supply Co.
Raleigh—Carolina Radio Equip. Co.
Winston-Salem—C. R. Williams Radio Co.

NORTH DAKOTA
Fargo—Radio Equipment Co.

OHIO
Akron—Olson Radio Warehouse
Ashtabula—Morrison Radio Supply
Canton—Armstrong Radio Supply
Burroughs Radio
Cincinnati—Chambers Radio Supply Co.
Schuster Elec. Co.
United Radio, Inc.
Cleveland—Goldhamer, Inc.
Northern Ohio Laboratories
Winteradio, Inc.
Columbus—Hughes-Peters, Inc.
Whitehead Radio Co.
Dayton—Hughes-Peters, Inc.
Standard Radio & Electronic Prod. Co.
East Liverpool—Hausfeld Radio
Kent—Kladag Radio Labs.
Lima—The Northwestern Radio Co.
Mansfield—Burroughs Radio
Marion—Bell Radio Supply
Springfield—Standard Radio & Electronic Prod. Co.
Steubenville—D & R Radio Supply
Hausfeld Radio
Toledo—Toledo Radio Specialties
Warren—Radio Specialties
Youngstown—Appliance Wholesalers

OKLAHOMA
Enid—Standard Measuring & Equip. Co.
Oklahoma City—Radio Supply, Inc.
Southern Sales Co.
Tulsa—Radio, Inc.

OREGON
Portland—Bargelt Supply
Harper-Meggee, Inc.
Portland Radio Supply Co.

PENNSYLVANIA
Allentown—Radio Elec. Serv. Co.
Beaver Falls—Reliable Motor Parts Co.
Easton—Radio Elec. Serv. Co.
Erie—John V. Duncombe Co.
Harrisburg—Radio Distributing Co.
Lancaster—Eshelman Supply Co.
George D. Barbey Co.
Norristown—Kratz Bros. Co.
Philadelphia—Almo Radio Company
Consolidated Radio Corp.
Electric Warehouse
Emerson Radio of Pa.
Radio Elec. Serv. Co.
N. W. Cor. 7th & Arch Sts.
5133 Market St.
3145 N. Broad St.
Eugene G. Wile
Pittsburgh—Hamburg Bros.
The John Marshall Co.
Radio Parts Co.
Pottsville—Jones Radio Co.
Reading—George D. Barbey Co.
St. Marys—B & R Electric Co.
Scranton—Broome Dstg. Co., Inc.
Wilkes-Barre—General Radio & Elec. Co.
Radio Service Co.
Williamsport—Williamsport Radio Supply

RHODE ISLAND
Providence—William Dandreta & Co.
W. H. Edwards Co.

SOUTH CAROLINA
Columbia—Dixie Radio Supply Co.

SOUTH DAKOTA
Aberdeen—Danielson & Brost Co.
Sioux Falls—Power City Radio Co.
United Radio Supply

TENNESSEE
Knoxville—Bomar's
Chemcity Radio & Elec. Co.
C. M. McClung & Co.
Memphis—McTyier Radio Supply
Nashville—Currey's Radio Service
Radio & Appliance Corp.

TEXAS
Abilene—R & R Supply Co., Inc.
Amarillo—R & R Supply Co., Inc.
Austin—The Hargis Company
Beaumont—Montague Radio Co.
Corpus Christi—Wicks-DeVilbiss Co.
Electronic Equip. & Engin. Co.
Dallas—All-State Dstg. Co.
Crabtree's Wholesale Radio
Southwest Radio Supply
Wanslow & Co.
Fort Worth—Electronic Equipment Co.
Fort Worth Radio Supply Co.
Houston—A. R. Beyer Company
Lubbock—R & R Supply Co., Inc.
San Antonio—Olsen Radio Supply
Tyler—Lavender Radio Supply Co.
Waco—The Hargis Company
Wichita Falls—Wichita Falls Bat. & Elec.

VIRGINIA
Norfolk—Ashman Distr. Company
Roanoke—Leonard Elec. Sup. Co.
Richmond—Johnston Gasser Co.

WASHINGTON
Bellingham—Waitkus Supply Co.
Seattle—General Radio, Inc.
Harper-Meggee, Inc.
Sunset Electric Co.
Spokane—Harper-Meggee, Inc.
Tacoma—Wible Radio Supply

WEST VIRGINIA
Bluefield—Whitehead Radio Co.
Charleston—Chemcity Radio & Elec. Co.
Hicks Radio Supply
Clarksburg—Trenton Radio Co.
Huntington—Electronic Supply, Inc.
Morgantown—Trenton Radio Co.
Parkersburg—Randle & Hornbrook
Wheeling—Wheeling Radio Supply

WISCONSIN
Green Bay—Neslo Electronic Dstrs.
Madison—Radio Dstrs. of Madison, Wis.
Milwaukee—Radio Parts Co., Inc.

MAKING TUBES IS EASY...

If YOU KNOW HOW!

Hytron commercial engineer makes precision measurements of 50L6GT performance in many typical radio receivers. He then compiles weighted averages of tube characteristics selected to be correlated for functional testing.

Out of the commercial engineer's investigations grows this functional production tester. Combined functional and standardized tests are quicker. Operator can be even more accurate, and you are assured of more uniform performance.

FUNCTIONAL TESTING..

You may have discovered that a tube rigidly inspected by standardized testing procedures (JAN, RMA, IRE) still may not perform satisfactorily in your equipment. Ordinary control of basic characteristics may not be enough. Functional dynamic tests—selected and correlated to simulate performance in typical equipment applications—may have to be added.

Simple analogy explains why. Testing of fundamental tube characteristics is like inspection of individual components of multi-ganged tuned circuits. When the tuner is assembled or the tube connected into a circuit, coils and condensers or tube characteristics may not combine properly. Individual variations within tolerances may be in opposition. Operational tests are the only positive checks.

Hytron commercial engineers, therefore, developed functional testers like the illustrated 50L6GT production test kit —essentially a customary equipment circuit. Whether or not a part of the standardized tests, 50L6GT characteristics related to power sensitivity and output are simultaneously checked for smooth dynamic interaction. This comprehensive functional test automatically includes additional minor tests —pertinent but usually omitted from production testing. Hum itself is also measured, because no basic characteristic test controls it adequately.

Another HYTRON EXTRA!

Functional testing is another Hytron extra. Based on painstakingly acquired know-how, it is often the best and easiest way to assure you of uniform, reliable tube performance in your equipment.

SPECIALISTS IN RADIO RECEIVING TUBES SINCE 1921

HYTRON

RADIO AND ELECTRONICS CORP.

MAIN OFFICE: SALEM, MASSACHUSETTS

radio service dealer

Member Audit Bureau of Circulations

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

VOLUME 7 **Number 9**

SEPTEMBER, 1946

CONTENTS

RADIO SERVICE DEALER (title registered U. S. Pat. Off.) is published monthly at Boston Post Road, Orange, Connecticut, by the Cowan Publishing Corp. Executive & Editorial Offices, 342 Madison Avenue, New York City 17, New York. Publication Office, Boston Post Road, Orange, Conn. Subscription rates:—United States and Possessions $2.00 for 1 year, $3.00 for 2 years; elsewhere $3.00 per year. Single copies: 25c. Printed in U. S. A. Entered as Second Class Matter at the Post Office at Orange, Connecticut, under the Act of March 3, 1879. All subscribers should allow at least three weeks for change of address.

COWAN PUBLISHING CORP.

SANFORD R. COWAN,
Publisher

LEWIS C. STONE
Editor

S. L. MARSHALL, *Asst. Technical Editor*
H. N. REIZES, *Adv. Mgr.*
JEAN M. WHEELER, *Circl. Mgr.*
DAVID SALTMAN, *Adv. Prod. Mgr.*

Branch Offices

HAROLD J. SUGARMAN, *Western Adv. Mgr.*
82 W. Washington St., Chicago 2, Ill.,
ANDover 1395

JAMES C. GALLOWAY, *Los Angeles Adv. Rep.*
816—W. 5th St., Los Angeles 13, Calif.
Mutual 8335

In & Around the Trade

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

Bendix radio receiver (middle) entertains Pfcs. Robert Moss and Sydney Schiller, of New York City. Glamor note is Jane Russell, star of Howard Hughes' movie, "The Outlaw," who gave set to vets at Halloran Hospital.

West Coast Show In October

West coast electronics manufacturers have announced plans for the second annual Electronics Trade Show to be held in Los Angeles October 18-20. Plans are being made for 113 exhibits covering all types of electronic devices manufactured in the west. For the first time since termination of hostilities the electronics marvels which helped bring about victory will be shown together with post war developments made possible by unusual war time experiments and applications.

Sponsored by the West Coast Electronics Manufacturers Association the trade show will be presented by the industry's committee which includes Ed Grigsby, chairman; D. F. MacLachlan, and Russell Dietrich, all of Los Angeles, and Les Logan of San Francisco. Officers of the association are L. W. Howard of Los Angeles, president; Ralph Shermund, vice president; H. O. Brown, secretary, both of San Francisco, and J. L. Fouch of Los Angeles, treasurer. A. H. Gudie of Los Angeles is executive secretary.

President Howard of the association has urged electronics manufacturers to make reservations for space as soon as possible. Two floors of the Elks Temple building will be occupied by the exhibits. Because of limitations, space will be alloted in order applications are received. An early sell out is expected according to Howard. Reservations may be made through the organization which is managing the show —The Tabery Corporation, 3443 South Hill Street, Los Angeles. Mr. D. D. Durr is show director. Space is available to western manufacturers and to eastern manufacturers doing business on the west coast. Exhibits will also include computing equipment and components.

MARK-UPS RESTORED

Pursuant to the requirements of the Price Control Extension Act which prohibits any reduction in mark-ups of retailers and wholesalers after March 31, 1946, the Office of Price Administration increased ceiling prices on 20 classes of consumer durable goods.

Average price increases at retail include electric kitchen stoves, 9 per cent; washing machine, 7 per cent; vacuum cleaners, 7 per cent; all small electrical appliances (toasters, electric irons, small space heaters, coffee makers and shavers), 4 per cent; radios and electric phonographs, 3 per cent.

Although the action is effective as of August 19, 1946, dealers may not charge the higher prices until they receive shipments ticketed by manufacturers with the new prices.

Centralab Price Change

A list price increase on volume controls, accessory switch covers and parts becomes effective on September 3. All invoices rendered as of that date will bear the new list less usual discounts. This increase is approved by OPA Order #L-708 under S.O. 142, dated June 27, 1946.

The increases will range from 20% to a maximum of 33⅓% depending upon the item. A list is available indicating the item increased and the amount. All other catalogue items remain at the old list prices. New formal price lists will be supplied as quickly as they are obtainable from the printers.

"We have made an honest effort to absorb increased labor and material costs as indicated by our variation in price increases," stated W. S. Parsons, Vice President. "In no case have we taken the full ceiling officially allowed by the OPA order. Our policy is definitely against inflationary increases that would destroy our mutual interests. The new list prices are modest or only average when compared to increases on other electronic components or equipment."

Concord Parts Bulletin

An up-to-the minute bulletin and supplement to Concord's complete catalog was issued recently. The 8 over-size pages particularly feature new merchandise, just received, now available for immediate shipment from the Concord warehouses in Chicago and Atlanta. Offerings include hundreds of hard-to-find, long-sought items—and also many standard items at money-saving bargain prices. The products of many nationally-known makers of quality radio materials are listed. A free copy may be obtained by writing the Concord Radio Corporation at 901 West Jackson Boulevard, Chicago 7, Illinois.

Olson Ohm Chest

The Olson Ohm Chest, which is the answer to the radio serviceman's resistor problem, is now being produced exclusively by Olson Radio Warehouse. It is a sturdy, solid wood, Walnut finished chest, measuring 9¼"

(*See page* 42)

MEN IN THE NEWS

New Lear Advertising Head

Howard J. Silbar is coordinator of advertising and public relations for Lear, Incorporated. Mr. Silbar assumes the duties of Jean H. DuBuque, who has already left Grand Rapids to become new director of aviation for the City of Dallas, Texas.

For five years before entering the service in 1942, Mr. Silbar worked in

(*See page* 30)

DO NOT REMOVE PRICE TAGS

The Office of Price Administration explained how wholesalers and retailers should handle situations resulting from the fact that ceiling price tickets were removed from pre-ticketed commodities during the period when there was no price control.

1. On "big ticket" items, which include major appliances such as refrigerators, vacuum cleaners, stoves and washing machines, the reestablished regulations state that retailers or wholesalers must not change, remove or in any way disturb the price ticket applied by the manufacturer.

If dealers or wholesalers did remove or change the tickets between July 11 and July 25, they must not sell any of these items until they have received new correct price tags from their supplier or until they have replaced the tags they removed.

2. Pre-ticketing regulations that cover small appliances and radios provide that retailers are required under the regulation to make certain the price on these commodities are correct.

Therefore, if retailers or wholesalers have removed, changed or in any way disturbed the tickets on these pre-ticketed commodities, they must re-attach the correct, or ceiling, price as of June 30, 1946, on these items before offering them for sale.

with the publisher . . .

Decontrol Would Help

RADIO receiver production, in number of units but not necessarily dollar volume, this year may break all previous records. While over 15,000,000 sets may be manufactured this year, there is a bad current shortage, particularly of well-known brands, and especially of consoles and phono-combinations.

RMA releases indicate that July production was down due to holidays and that only 71,500 consoles or phono-combinations were made as against over 770,000 table model receivers. That report could be misunderstood, because the combining of consoles and phono-combinations does not clarify how many units were small or portable record-player-combinations and how many were really large model consoles. Nevertheless, radio dealers, manufacturers and most of all the public itself would like to hear that those production figures changed and that three quarters of a million consoles and console size phono-combinations are rolling off production lines monthly with a corresponding large number of small table models. And don't forget, the public wants F-M receivers, real F-M models with all the trimmings such as beautiful cabinetry, record changers, and even home recorder types.

Radio set manufacturers have found it practically impossible to buy furniture and consoles within price limits allowed by OPA under its former regulations. Conditions now are just a bit better, though the bottle-neck won't be broken for some time. Present OPA regulations give the radio industry, particularly dealers, some relief through increased price markups and yet, for the industry to win complete decontrol from OPA, it must establish a more equable production ratio of high-to-low priced models, meaning consoles and phono-combinations. We emphatically believe that if the radio industry is given decontrol from OPA and allowed absolute free competitive enterprise, this will in a short time assert itself in better radios, more radios, lower prices and a more firmly established industry requiring many more thousands of gainfully employed citizens.

A glance at the record should convince the OPA Decontrol Board that such has been the radio industry's record when left on its own. Now the business is in a chaotic state with dealers barely able to survive, except on servicing, and even that phase of the business is troublesome because parts and tubes are still not available in sufficient quantity to meet the ever-growing demands.

Television's Prospects

AT LAST we can report with enthusiasm that television's prospects for immediate expansion are very bright. During July, a month in which there were 744 hours, over 70 hours of commercial television time were bought by such prominent sponsors as Ford, Gillette, Esso, Gulf and General Mills. These sponsors checked carefully and report that results from their investment were most gratifying. Therein lies the reasons for our optimism. Sponsors will give to television the one factor it has needed most.

Philco's station WPTZ claims the Gimbel Bros. commercials brought "terrific response" while admitting there are only 752 television sets known to be in its trading area. Projecting that into future potentials, what would have been the results had there been 200,000 television sets, or 2,000,000, in the Philadelphia trading zone? Slightly gigantic, might be Hollywood's adjective. Remember, there are only 30 video stations authorized to carry commercial programs, and only 24 of these are now operating. There are probably less than 8,000 operating television sets in the country. Hence, when many sets are out in the field and many stations are functioning, television sales, installation and servicing will be a tremendous adjunct to the radio industry as we now know it.

Tubeless Sets

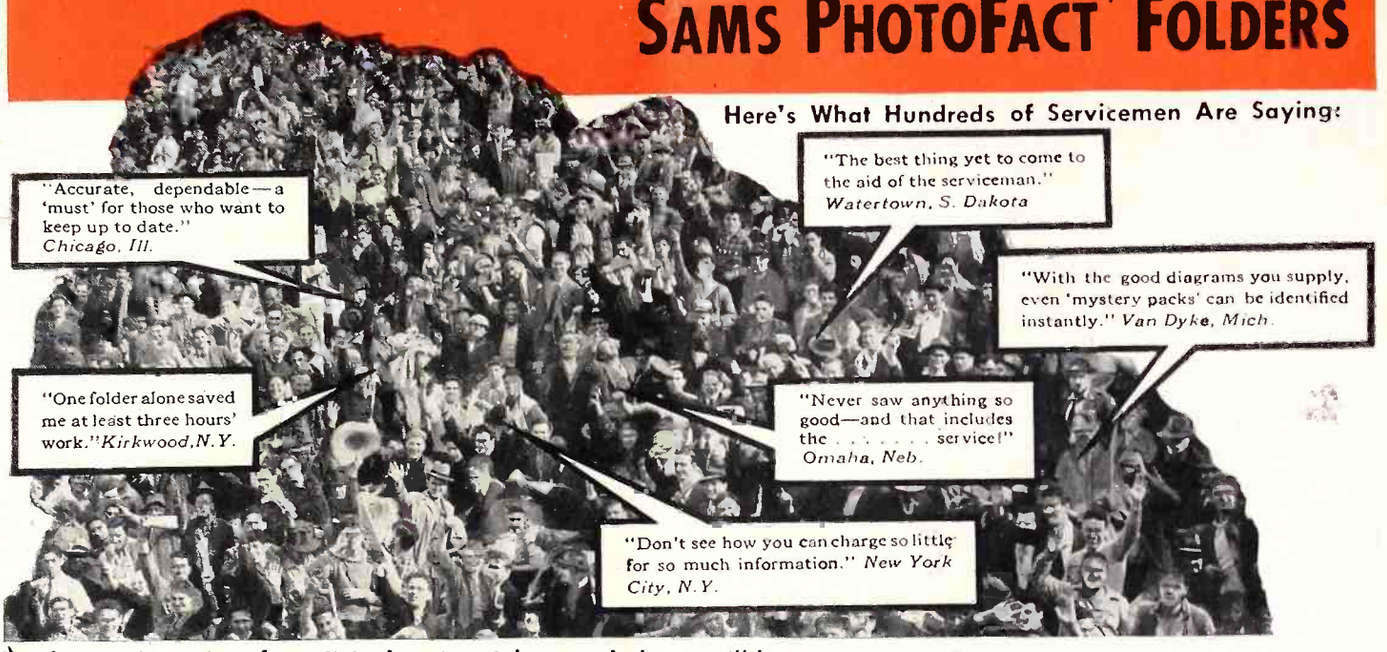
MANUFACTURERS have been authorized by OPA to sell radio receivers bare of tubes, the list price to be computed by deducting from the with-tubes retail ceiling list price the retail list of the tube complement. Retailers may then install the needed tubes, but having done so must not price the set higher than it would have been had the original manufacturer supplied the set complete. How screwy it is!

Dealers can't buy tubes as cheaply as set manufacturers so if they go along with a plan like this they are forced to take a smaller margin of net profit on every radio sold. Wouldn't it have been a better move on OPA's part if manufacturers were allowed to sell sets less tubes at a list price less their actual tube costs, and then dealers could install the tubes (if they could get them) and add the tube complement's list price so that an additional profit would be realized by such dealers on every set sold instead of a reduced profit? Of course it would be better, but that's not what OPA authorized.

S. R. Cowan

Publisher

INCREASE SERVICE PROFITS with SAMS PHOTOFACT* FOLDERS



Photostatic copies of unsolicited testimonials quoted above will be sent on request.

In Each PhotoFact Folder You Get—

1. A cabinet-view photo of the receiver to help you establish identity and control functions. **2.** A top-view photo of chassis and speaker to identify component parts and alignment points. **3.** A bottom-view photo of chassis and/or accessories. **4.** A complete list giving keyed reference to all parts, alignment and schematic diagram. **5.** A complete schematic diagram of the receiver. **6.** Stage gain measurements listed on the schematic diagram. **7.** A complete voltage and resistance analysis chart for rapid check of operational values. **8.** Complete alignment instructions on the receiver consistent with the keyed alignment points indicated in top- and bottom-view photos.

"Just what the doctor ordered!" That's what radio repairmen all over the country are saying of Sams PhotoFact Folders.

No wonder! These revolutionary pictorialized service guides help cut your service time in half! Released in sets of 30 to 50 folders at a time, they're as timely as today's newspaper—cover *all* new radios, phonographs, intercommunication systems and power amplifiers as they reach the market. Yet the cost, including membership in the Howard W. Sams Radio Institute, is only $1.50 a set!

Overwhelming demand has necessitated allotting Sets Nos. 1, 2, and 3. Set No. 4 will be off the press September 25. Use the coupon below to order all four! That way, you'll be completely up to date, and your biggest expense will be behind you. Thereafter it will be easy to pay $1.50 per set without your costs accumulating.

*Trade Mark Reg.

Publication Date of Set No. 4 - September 25

Cut This Out and Mail It to Your Distributor! If you do not know his name and address, send it directly to Howard W. Sams & Co., Inc., 2924 East Washington Street, Indianapolis 6, Indiana, and we will see that your nearest distributor gets it. In Canada—write to A. C. SIMMONDS & SONS, 301 King Street East, Toronto, Ontario.

CHECK ONE OR MORE SQUARES PLEASE PRINT

☐ Send Set No. 1 ☐ Send Set No. 2 ☐ Send Set No. 3 ☐ Send Set No. 4

☐ Send me a specimen folder.

My (check) (money order) (cash) for _____ sets (at $1.50 a set) is enclosed. (If you send cash, be sure to use registered mail.)

Name _____ Address _____

City _____ Zone _____ State _____

Company Name _____

My Distributor's Name _____ City _____

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

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

NEW!! WESTON Mutual Conductance Tubechecker and Circuit Analyzer

MODEL 798—TYPE 3

Outstanding Features

- ✓ Direct-reading mutual conductance tests, and "Good-Bad" indications.
- ✓ New patented high frequency tube testing circuit.
- ✓ AC-DC volt-ohm-milliampere ranges.
- ✓ Tests 4, 5, 6, 7 prong octal, loctal, miniature, and acorn tubes...spare octal and miniature sockets.
- ✓ Hot neon leakage test between any two tube elements . . . neon short check.
- ✓ Adjustable plate, screen, grid bias, and signal voltages.
- ✓ Flexibility in switching simplifies testing present and future tubes.
- ✓ Durable heavy-gauge, light-weight alumium case.

Model 798 combines broad utility, ruggedness, and dependable accuracy for maintenance of sound and electronic equipment. Detailed bulletin available. Weston Electrical Instrument Corporation, 605 Frelinghuysen Avenue, Newark 5, New Jersey.

Weston *Instruments*

ALBANY • ATLANTA • BOSTON • BUFFALO • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND • DALLAS • DENVER • DETROIT • JACKSONVILLE • KNOXVILLE • LOS ANGELES • MERIDEN • MINNEAPOLIS • NEWARK NEW ORLEANS • NEW YORK • PHILADELPHIA • PHOENIX • PITTSBURGH • ROCHESTER • SAN FRANCISCO • SEATTLE • ST LOUIS • SYRACUSE • IN CANADA, NORTHERN ELECTRIC CO., LTD., POWERLITE DEVICES.

LOOK AHEAD

Watch every element of your operation to give real service to customers. Parts inventory, good servicing staff, facilities to handle trade-ins essential to "solid" selling. Handle established brands.

*by R. C. COSGROVE**

WE ARE now entering a period of highly competitive enterprise with OPA ceilings limiting prices on the one hand not only of the end product, but of the component and materials that enter into the end product, and a Government labor policy that encouraged non-productivity and unhappiness on the part of employees, which has resulted in these terrible strikes we have faced. Manufacturers have encountered a great deal of difficulty in getting equipment, tools, plant rearrangements, cleaning up Government contracts, and getting along with their employees on a sound basis.

In spite of all these handicaps—things are starting to smooth out, and production is getting underway in fair amount on those products that were out of production during the war.

PRODUCTION HIGHER

In the month of June, according to the Civilian Production Administration figures, there were 1,378,000 radio sets produced. This is at a higher rate than the best prewar year, which was 1941, and in the year 1946 it is anticipated that as many radio sets as were built in 1941 will be produced.

It's too bad that we don't have a freer opportunity to manufacture—and I still hope the OPA will take off all controls on radio, as I feel that prices are arbitrarily high; that the product has not had the advancement it otherwise would have had, and the quantity produced could have been substantially greater to take up the slack created by no production during the war years. Refrigerator production is still far from its 1941 going rate, caused partially by the fact that three of the largest manufacturers were entirely out of production for a considerable length of time this spring due to strikes.

The capacity for manufacturing radio sets, refrigerators, and other appliances is double that of prewar. In other words, if we had a freer supply of materials, a freer economy, and a good labor situation by now we would have been manufacturing twice as many of these devices as we did before the war.

FM POTENTIAL

Many are wondering what has happened to Frequency Modulation. There has been a terrific amount of information and mis-information published about Frequency Modulation. To add a frequency band to a radio set is not simple. It is expensive; the set costs more, and the engineering and development work takes time.

As you know, we orginally were set up on the 42 to 50 megacycle band, and this was later changed by the Federal Communications Commission to the 88 to 108 megacycle band. *A lot of engineering and development work had to be re-done.* Now parts are required for Frequency Modulation, and the parts suppliers had to tool up for these new parts. There is going to be some Frequency Modulation available this fall, and most of the manufacturers will incorporate it in their sets, particularly in the larger models. One delay has been that plans were laid for Frequency Modulation to be included in the console models, but there haven't been many console models manufactured due to the shortage of wood.

In the month of June, the Radio Manufacturers Association's production figures for console radio phonograph-combinations totalled about 60,000. Of these only 4,315 had FM bands. In addition, there was produced in the month of June 1,264 table model sets with FM. However, in the next few months you will see more FM.

The Federal Communications Commission has licensed a number of FM Stations, and it takes time to build FM transmitters. There has to be some Frequency Modulation broadcasting in an area before people get excited about having FM in their sets. There has been some restriction, through the musicians' Union, that has held back FM programs, and Government restrictions on building have also held back the building of FM stations.

I predict that Frequency Modulation will come along very rapidly this fall.

TELEVISION PROSPECTS

Television is very satisfactory, in my opinion, and I have seen some very fine television reception. A number of companies are manufacturing transmitters, and a number of us are prepared to manufacture receivers. Our own

(*See next page*)

**Vice Pres. & Gen. Mgr., The Crosley Corp.; Pres. Radio Manufacturers Assn.*

WESTERN FALL MARKET

Attended by almost 6000 dealers and buyers coming from thirty-two states, Alaska, British Columbia, the Islands of the Pacific, and several foreign countries, the record-breaking Western Fall Market at the Western Merchandise Mart in San Francisco came to a successful close on August 10. Significant changes in buying trends were most apparent, particularly the marked increase in selective buying, which has not been evidenced in several years.

Great interest was shown in new merchandising and sales training programs designed to create closer cooperation between manufacturer and dealer. *Mart exhibitors generally, reported buying active in all home goods lines with dealers and buyers seeking particularly those types of merchandise available to help re-establish pre-war standards of quality.*

Mr. Cosgrove's article above is based on a speech he made at this meeting.

company in Cincinnati has had an experimental television permit for the past eight years, and we have built some sets that are being tested. Television is not easy to build. It requires a lot of mechanical equipment and the tooling of television sets has been particularly difficult because of the overall tooling scarcity and the exceedingly high investment.

I am looking forward to television becoming the greatest unit in the radio industry. In the years ahead I feel we can anticipate a large volume of satisfactory television business. Programming has not been easy, but this is also being worked out.

There is nothing that will stop television, but I think most people are too optimistic as to the time. Color television is a matter of great dispute in the industry today, but I think the general feeling is that we will have television just as we have colored motion pictures. Many problems still have to be worked out, and I believe that black and white will be on the market in volume some years before color television.

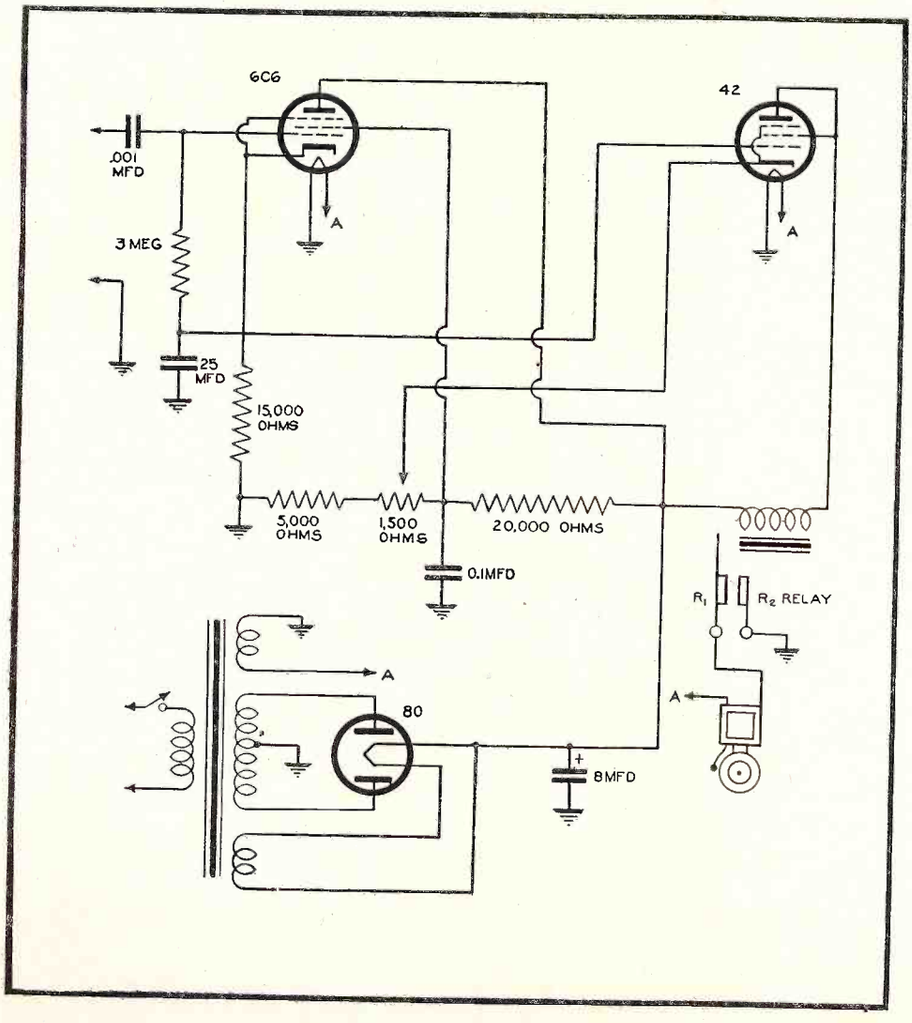
PRODUCT DISTRIBUTION

The *distributor* is facing many problems too, and those good prewar years of large supply of merchandise can be envied. As a whole, the distributor has

(*See page* 40)

A Bell for INTERMITTENTS

INTERMITTENT receivers are generally time-wasters hence profit-reducers. A benchman who normally thrives on hard-to-troubleshoot jobs has been known to "blow his top" when confronted with an intermittent just as he was about caught up with his day's work and ready to go home for much needed relaxation.



In some instances a technician can artificially induce a condition which will prompt the defective intermittent part in a set to "act up" right when he wants it to. For example, if a serviceman suspects that a transformer or coil or condenser opens and becomes intermittent after reaching a certain high temperature or through a voltage overload, he can simulate such a condition by quickly over-heating the transformer by concentrating on it a lighted infra-red lamp, or he can briefly induce a heavy voltage overload just to see what happens. However, such attempts at time-saving short-cuts are not recommended because such practices frequently impair or make defective a component which would have been otherwise perfectly all right—and then, in such cases, the technician would make the repair and later learn that he had still not corrected the original fault in the receiver because in fact he never did get around to finding it.

As most intermittents are temperamental and refuse to fade when the technician is ready and anxious to work on them, and as one can't always make an intermittent intermit at will when you don't know the cause, the solution is to find some means whereby the receiver can be put into operation, not require continuous observation, and yet have it literally cry out, "Now's the time to go to work on me—I'm about to fade!" just before it actually does just that.

A buzzer or bell operated by a simple-to-devise circuit is the answer. The gadget we have in mind starts a bell ringing just before the intermittent set begins to fade. It rings an invitation to the technician to drop his other work temporarily, which he need not do otherwise. This time-saving feature more than warrants the small expense required to build a bell-ringer. Furthermore, such an instrument might be profitably used as an end-check on all repair jobs as a precautionary measure to prevent a customer complaint because some intermittents might thus be caught although they couldn't be detected through a normal circuit checkup.

Take any high impedance relay capable of handling a normal 10 ma flow and which will cut off as the power increases to about 12 ma. Install as shown in the accompanying circuit illustration. By imposing a 2 ma increase in the plate current of a 42 type tube when a receiver is fading the consequent contact made in the switch (R_1-R_2) closes the circuit and

(*See page* 41)

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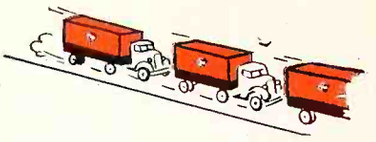

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TUBE DEPARTMENT

RADIO CORPORATION of AMERICA

HARRISON, N. J.

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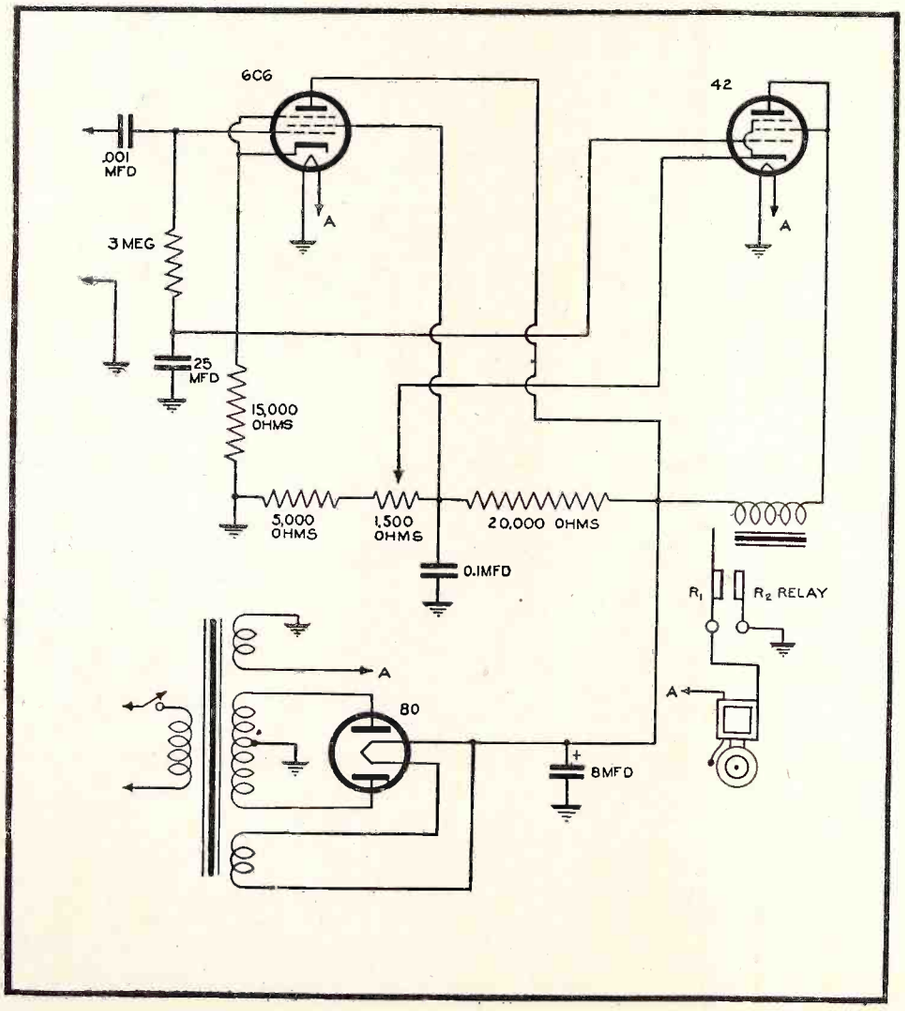

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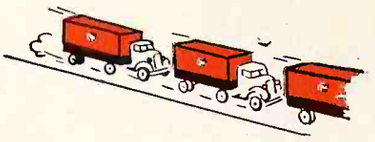

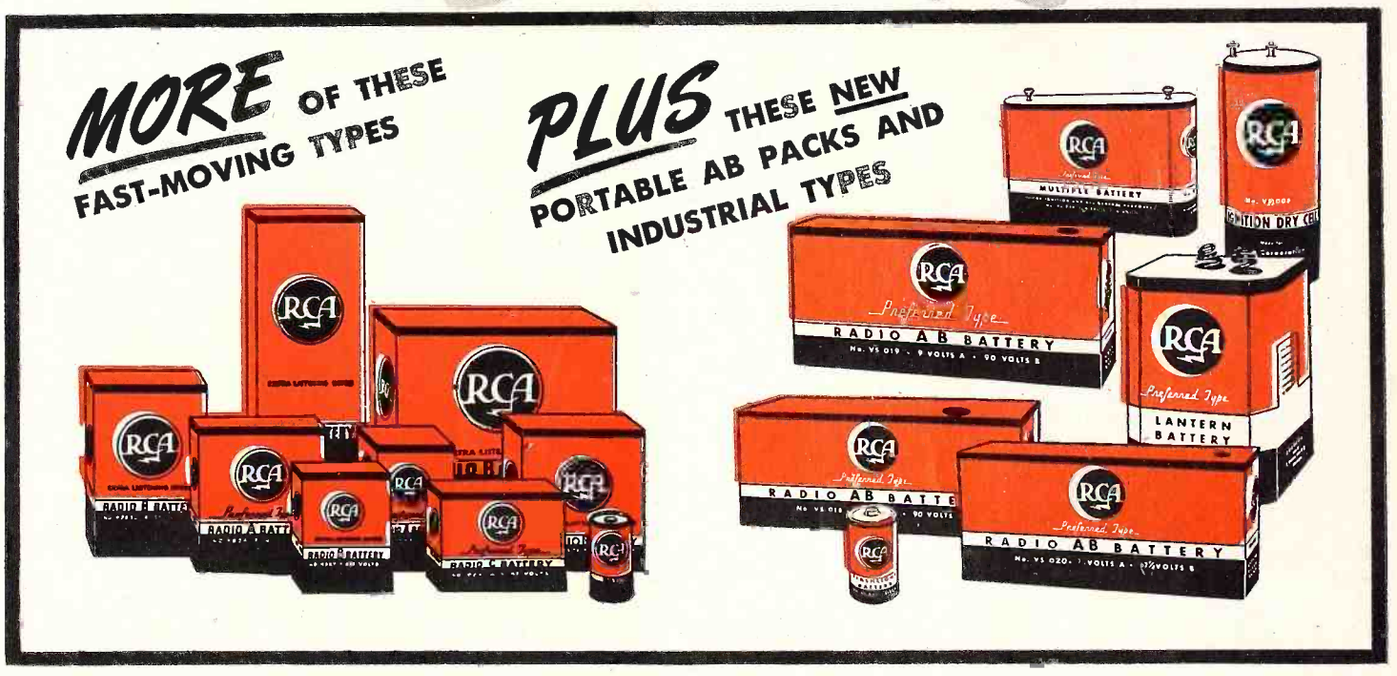

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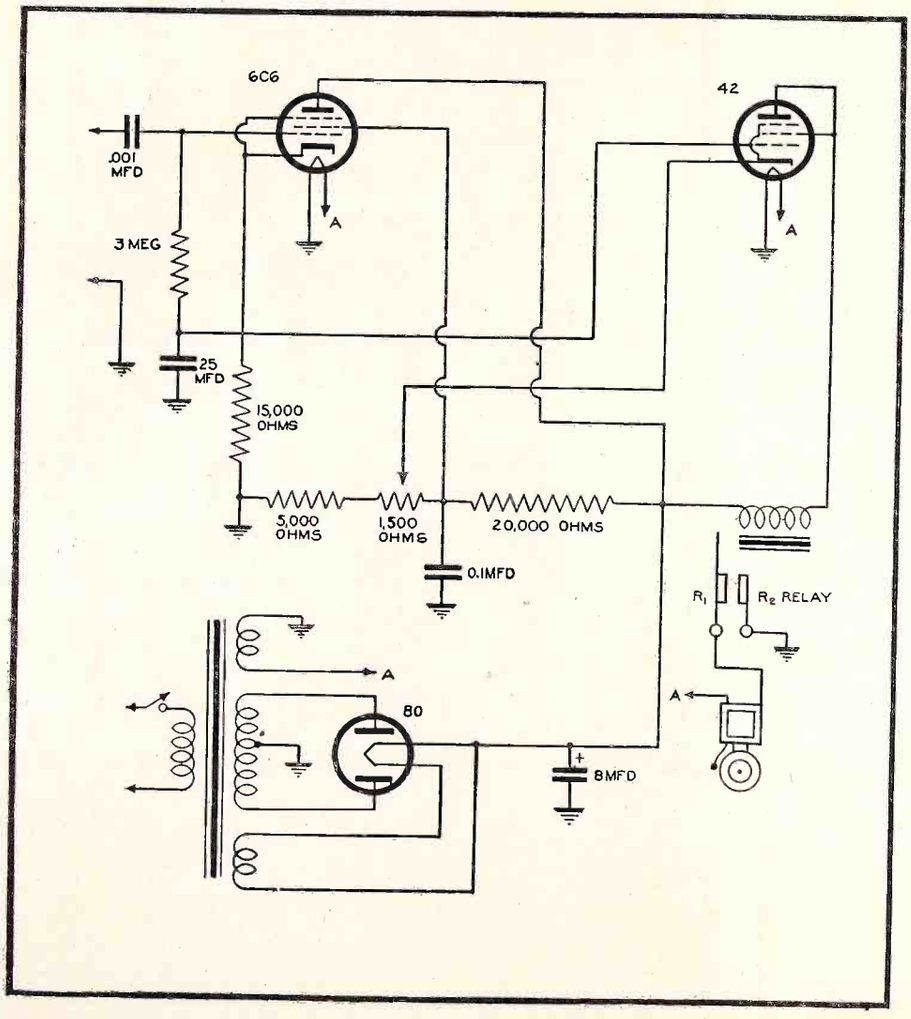

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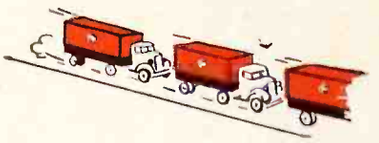

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TUBE DEPARTMENT

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TRANSCONDUCTANCE Reading Tube Tests

by FRED J. LINGEL*

IT IS sometimes necessary to make a more detailed test on a vacuum tube to check defective element spacing or other faults not readily disclosed by the simple emission test. One method is commonly referred to as a "grid to plate transconductance test" or simply a "transconductance test" (dynamic mutual conductance test). Two general types of transconductance test are described below:

TRANSCONDUCTANCE TEST

The transconductance gm of a tube is commonly measured in the laboratory by applying rated DC voltage to all the tube elements and then imposing a small AC signal voltage to the control grid. The AC plate current due to the AC signal is then measured and the ratio of the AC plate current in milliamps x 10^6 to the grid signal in volts is equal to the transconductance in micromhos or $Ipx10^6/Eg=gm$.

This absolute measurement is essential when extremely high accuracy is required. The method, however, is generally slow and requires a complicated power supply, control and measurement setup.

An alternate method is to make a measurement which is directly proportional to gm and calibrate the measuring instrument in micromhos.

The several portable micromhos reading tube testers utilize proportional methods of measurement in order to reduce weight and size of the test set. In each of these testers, consideration is given to providing the greatest accuracy without sacrificing portability, flexibility of tube connections and simplicity of operation.

LABORATORY TRANSCONDUCTANCE TESTER

To make a theoretically completely correct measurement of voltage in all cases, the indicating instrument should not draw current from the line under test, should have low temperature, frequency and working coefficients, etc. In like manner to make a theoretically correct measurement of transconductance, the test circuit should employ a number of special features, such as:

(1) A relatively small sine wave AC signal voltage in the control grid circuit of approx. 0.1 volt.

(2) A relatively low resistance means of measuring the AC plate current generated by this 0.1 volt signal.

(3) A well regulated and filtered power supply to provide the DC voltage for the various elements.

(4) A means of balancing out the tube grid to plate interelement capacity or otherwise eliminating this factor from the test.

(5) A flexible method for accurately setting the various DC element voltages as well as the AC heater voltage to rated values specified by the tube mfg.

(6) A means of obtaining zero plate impedance such as with a large condenser across the plate supply.

(7) A signal frequency high enough to indicate the effectiveness or otherwise check the inherent tube shielding as in metal tubes.

Unless all of the foregoing factors are taken into consideration, it is generally agreed that a highly accurate test of transconductance is not being made.

METHODS

Several methods are available for providing a transconductance measurement which, while not as accurate as the laboratory set up, will provide a measurement which is useful for a large majority of applications.

In each method of transconductance test out of the laboratory there are several factors which contribute to the recognized decreased accuracy. That is, tubes of a given type may indicate different values of transconductance while the laboratory measured transconductance will be constant. In no case, however, has it been found that these factors produce an appreciable error.

Some of the factors which may contribute to errors in other than laboratory transconductance testers are:

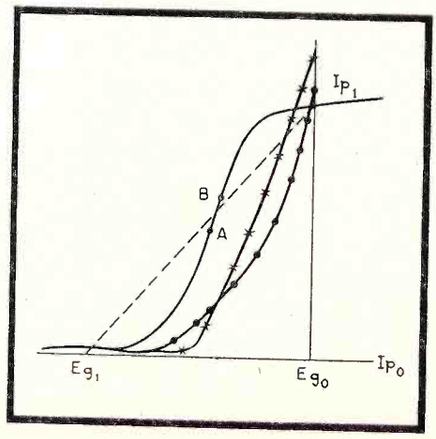
(1) The contact potential on hi mu tubes may vary the effective bias slightly.

(2) The screen current may vary on screen grid and pentodes while the plate current may be constant.

(3) The signal applied to control grid may be excessive in order to provide sufficient meter deflection and may overload the tube.

(4) The grid signal may swing the grid highly positive and thus overload the tube and cause readings to drift.

Figure 1



*Engineering Dept.,
The Triplett Electrical Instrument Co.

In some cases, it may damage the tube under test.

(5) Signal transfer due to interelement capacity may cause a signal in plate through other than grid plate transconductance.

(6) Improper grid bias may give readings other than those at point where tube is used.

(7) Gas, shorted element, and open element checks may not be made before making transconductance test.

(8) Complicated circuit switching may not permit flexible arrangement of element connections to test all tubes.

(9) Provision may not be made to check for tube shielding.

(10) Plate, screen and other voltages may not be DC and may not be of rated values.

PORTABLE TRANSCONDUCTANCE TESTERS

Portable tube testers are not intended to give the same degree of accuracy as that obtained with a complicated laboratory set up. Their principle is similar to that used in the measurement of voltage with a 1000 ohm per volt voltmeter. The voltmeter draws current from the line under test and that current after flowing thru a fixed series resistor is *proportional* to the voltage. The voltmeter does not actually measure voltage but it does give an indication proportional to voltage. In most cases, the resistance of the line is such that the small amount of current taken by the instrument does not influence the voltage. A simple, compact means is, therefore, provided for making voltage measurements without the need of an electrostatic, vacuum tube or potentiometer type voltmeter.

The value gm, in general, is a function of element shape, element spacing, and cathode emission so that measurement proportional to these factors is directly proportional to gm. One of the methods for obtaining a measurement proportional to gm on a triode is to connect the control grid to the cathode and apply voltage between plate and cathode. The resulting plate current for a given type tube free from open or shorted elements or gas is then proportional to gm as illustrated by *Figure* 1.

The curve shown "—" is for filament type cathodes and varies for different tube types but the principle of operation is essentially the same. On cathode types the curve more closely follows line "----" while on variable mutypes, it follows line "eeee".

The slope AB is equal to gm. The slope of the line Eg_1Ip_1 is equal to Ip_1 where Eg_1 is a constant for any Eg_1 (*See page* 42)

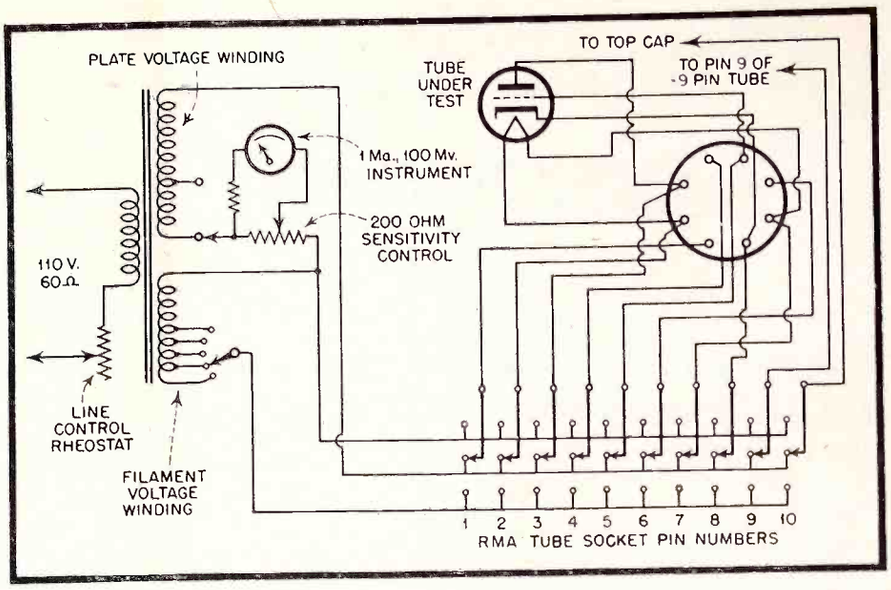


Figure 2 (above). Construction of simplified transconductance tube tester, lever switching.

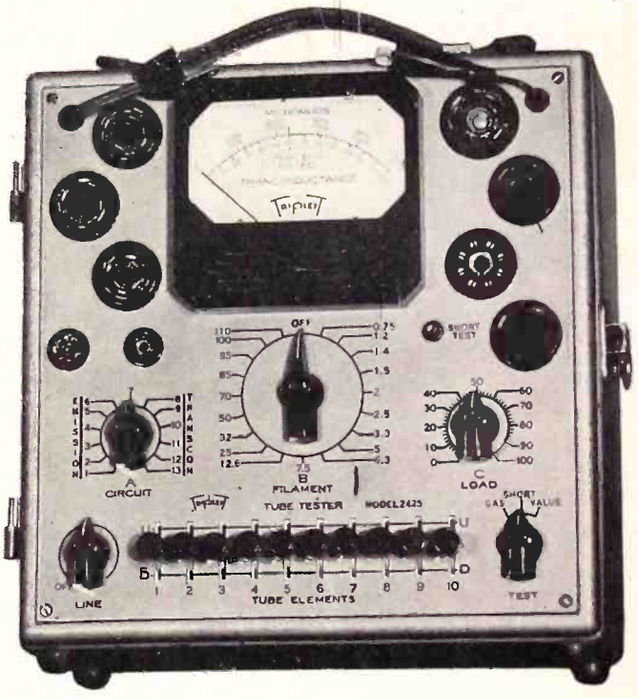
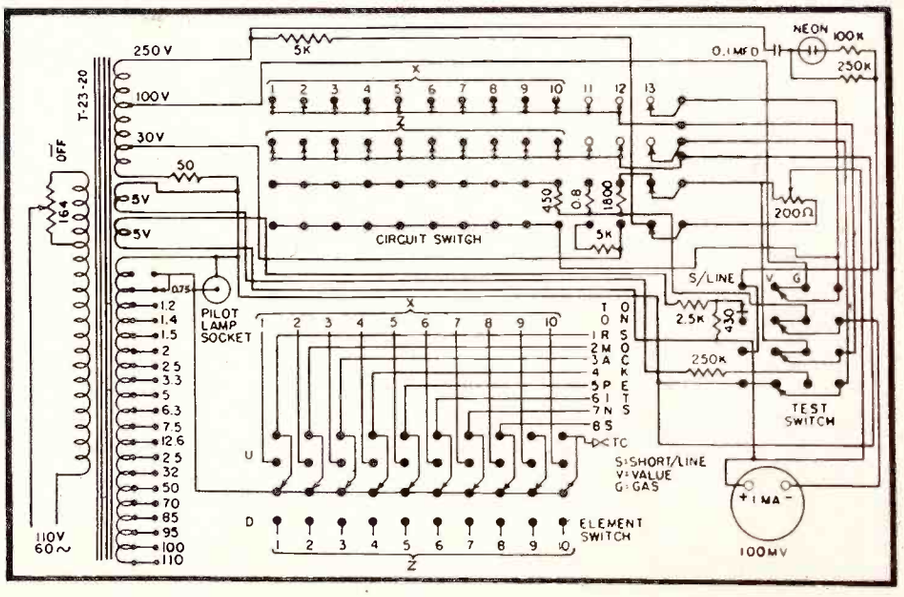


Figure 3 (right). Triplett 2425 principle: "Grid bias is directly proportional to the grid to plate transconductance . . ." (See text).

Figure 4 (below). Schematic of 2425. "The screen grid is tied to the plate in most cases." (See text).



HOW IS YOUR GRID BIASED?

Introduction of the three element tube several years ago has changed methods of supplying a negative voltage for the grid.

by J. B. CRAWLEY

Part 2. (See August)

The other method is to consider the bypass condenser as an a-c impedance. Thus the plate current can be imagined as flowing through the resistance R_k while the a-c plate current component flows through the condenser. It can be seen that if the condenser is large it will look like a low impedance, therefore there will be very little a-c drop across it. In other words, the cathode voltage remains constant.

A point to remember in choosing a bypass is to choose one that has a reactance at the lowest frequency to be amplified of 1/10 or less than the value of R_k.

Example: An audio amplifier tube requires a 2,000 ohm bias resistor. It is desired to have good response down to 40 cycles per sec. The reactance of the bypass condenser should be 200 ohms or less at 40 cycles. Refer to a reactance chart to find what condenser would have this value at 40 cycles or solve for the value from the formula:

$$C = \frac{1}{2\pi F X_c}$$

Another method of keeping the voltage across R_k constant is shown in *Fig. 8*. Here a resistor R_b runs from B+ to the cathode. If the current through R_k is much greater than the current through the tube the voltage across R_k will remain fairly constant regardless of the tubes plate current variations.

BLEEDER BIAS

Instead of depending on the current drawn by one tube to produce a bias it is possible to use the entire current used by all tubes. There are several advantages to this method. *One,* it reduces the number of parts. *Two,* it provides for a simpler method of filtering. *Three,* it simplifies reduction of degeneration. *Fig. 9* shows hookups and methods of connecting filters.

The bias resistor is designated R

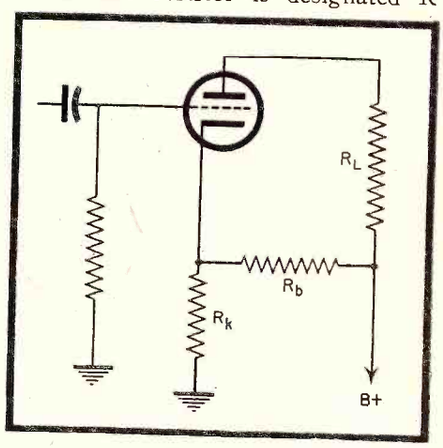


Figure 8

and the condenser serving as a bypass for the resistor, C. Note that circuits A and B are identical except for the connection of C.

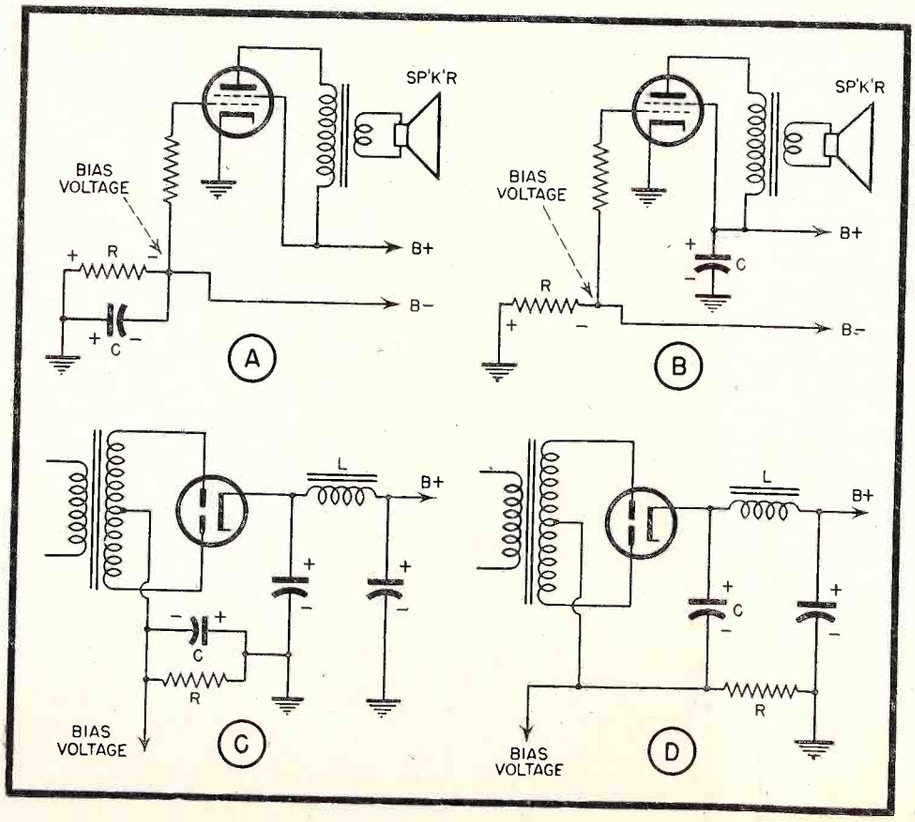
BIAS CELLS

A type of grid biasing that has been more favored recently is the Mallory grid bias cell, suitable for use in preamplifier stages, a-v-c and a-f-c circuits or places where the operation is strictly class A, that is, no grid current flows on any part of the cycle.

The cells come in two voltages, 1-volt and 1¼-volt. They are cup shaped with a flat black disc top. The cup is the negative electrode and the black disc positive on both models. In the 1¼-volt models there is a small depression in both the disc and cup.

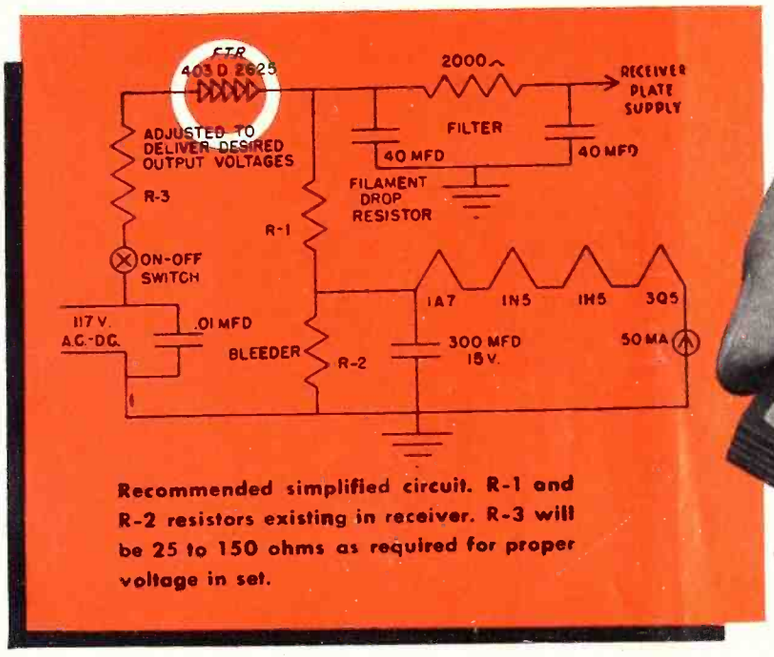
Quite a few advantages may be realized by the use of these cells in circuits where they are suitable. First they have longer life and are much smaller than batteries so they are useful in portable and other battery operated equipment. Graphs compiled by the manufacturer show that the voltage of the 1¼-volt cell is still approximately 1.12 volts after 18,000 hours of operation indicating a long life expectancy. The second advantage of the cell is in high gain audio amplifier stages. One of the common sources of hum in microphone pre-

Figure 9



SHORT CIRCUIT THE RECTIFIER TUBE SHORTAGE

...with Federal's PROFIT-BOOSTING Miniature Rectifier Stack



Recommended simplified circuit. R-1 and R-2 resistors existing in receiver. R-3 will be 25 to 150 ohms as required for proper voltage in set.

29 DIFFERENT RECTIFIER TUBE TYPES NOW REPLACEABLE IN CONSOLE RADIOS, AC-DC PORTABLES, VIBRATOR POWER SUPPLIES!

YOU don't have to turn away repair jobs because there are no rectifier tubes on your shelf. Here's a replacement that is actually an *improvement* . . . and permits you to *earn more money!*

Install this remarkable, new rectifier stack which *costs less than a tube*, and the repaired set starts instantly without warmup, and runs cooler. Only 1¼ x 1¼ x 11/16 inches, it fits anywhere in the chassis. What's more, you can tell your customer it's in for good! For this Federal stack is built to last the life of the set. It withstands overloads, even when charging deformed electrolytic condensers. All metal construction prevents breakage.

Every one of Federal's famous "Center Contact" Selenium rectifiers is designed to give the full measure of dependable performance that has made them the standard of the industry. This miniature, 5-unit stack will help you to more business. A Federal engineer will send full information to assist you in their application. Write department F655.

REPLACEMENT FOR THESE TUBES

5T4	5Y3	6Y5	25Z6	50Y6
5U4	5Y4	6Z5	35W4	50Z7
5V4	5Z4	12Z5	35Z3	117Z3
5Z3	6X5	7Y4	35Z4	117Z6
5W4	0Z4	12Z3	35Z5	OY4
5X4	80	25Z5	35Z6	

ELECTRICAL CHARACTERISTICS

Maximum RMS voltage	130 volts
Maximum inverse voltage	380 volts
Maximum peak current	1200 ma.
Maximum RMS current	325 ma.
Maximum DC output	100 ma.
Approximate rectifier drop	5 volts

Two Federal Miniature Rectifiers in a voltage doubler circuit give 250 volts and 80 milliampere output from 117 volt AC source.

Federal Telephone and Radio Corporation

In Canada:—Federal Electric Manufacturing Company, Ltd., Montreal
Export Distributor—International Standard Electric Corporation

An IT&T Associate — FTR Telephone & Radio

Newark 1, New Jersey

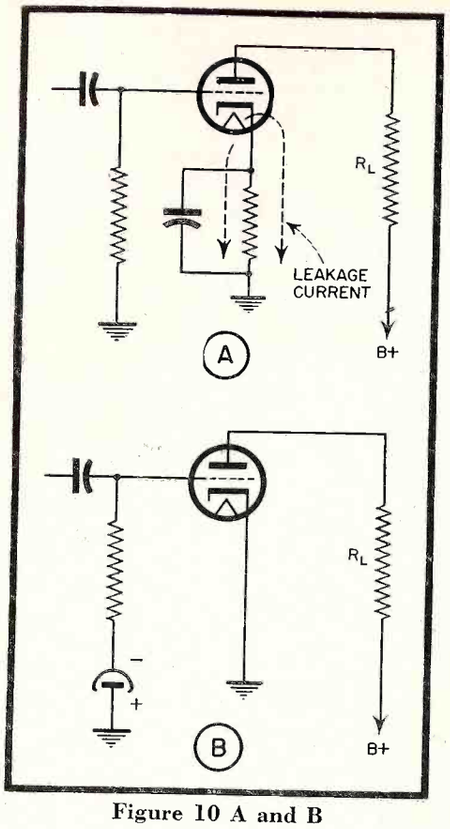


Figure 10 A and B

amplifier stages is due to leakage between the heater and cathode in the preamplifier tube. If a resistor condenser combinatoin is used from cathode to ground to obtain bias any heater to cathode leakage current would have to flow through this impedance and would cause hum.

Fig. 10 shows how the use of a grid bias cell would eliminate this. Note that in *Fig. 10B* the cathode goes directly to ground so any leakage current cannot affect the tube's operation. Use of the bias cell in the above circuit offers the further advantage of giving more uniform amplification. As explained elsewhere in the article, any impedance in the cathode circuit of a tube will produce degeneration, and a reduction of gain. Since condensers' reactance varies with frequency the circuit in *Fig. 10A* will give less amplification at low frequencies than at high frequencies. Circuit B again eliminates this by connecting the cathode to ground, eliminating all degeneration.

Some points to remember in the use of bias cells are:

1—Mount the cell so the black disc is facing down or is vertical, *never facing up*. This is due to the possibility of an air bubble collecting on the surface of the disc and breaking the circuit between the disc and the electrolyte. This possibility is largely overcome in the 1¼-volt model by the depression in the disc.

2—Arrange the circuit to have the cell as near a-c ground potential as possible so it will not be affected by a-c fields. *See Fig. 11.*

3—Do not allow the cell to be short-circuited. Early information led to the belief that the cell would be permanently impaired if short circuited or paralleled with a low resistance. Later information reveals that the cell receives little permanent damage if shorted for a short time. What actually happens when a cell is shorted is that it polarizes in much the same manner as a dry cell. Unlike the dry cell the bias cell has no depolarizing agent and it requires over a day to depolarize and return to normal voltage. Depolarizing can be effected immediately if desired by passing a reverse current from a 4½-volt dry battery through the cell.

4—Try to locate the cell away from transformers, tubes, or other high heat devices.

5—Make sure the coupling and by-pass condensers used in bias cell circuits have no leakage.

A word on how to test the cells is in order. The manufacturer suggests

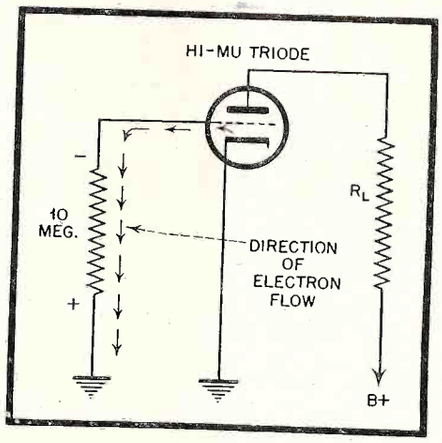


Figure 14

using a slide back type of vacuum tube voltmeter that requires no current but compares the voltage to an adjustable voltage from a battery. Actually many present day vacuum tube voltmeters are suitable since currents of 1 microampere or less will not greatly affect the cell's voltage. The RCA Jr. Voltohmyst, or meters used in the Rider Chanalyst or Hickok Traceometer, etc., are suitable for making cell measurement.

Of interest to men who design their own equipment, the impedance of the 1-volt cell varies from 11,000 to 50,000 ohms and the 1¼-volt models from 10,000 to 40,000 ohms.

GRID RECTIFICATION

A type of bias frequently used in oscillators and RF amplifiers is known as grid rectification bias. A bit of review will help to clarify this theory. Refer to *Fig. 12.* If a battery were connected to a condenser and two resistors as shown (A) the condenser would charge through the resistors with the polarity shown. The amount of time it would take for the condenser to become almost fully charged is approximately 5 RC where R is in ohms and C in farads. This time would be about .00005 sec.

If the battery polarity were suddenly reversed (B) and the 500 ohm resistor removed, the condenser and the battery would be in series and would put a voltage of —20 volts across the 200,000 ohm resistor. This voltage would decrease to zero as soon as the condenser discharged or in about 5 RC sec. or .02 sec. The reason it takes so much longer for C to discharge than to charge is the removal of the 500 ohm resistor.

In *Fig. 13* is shown an r-f amplifier. Suppose that an r-f voltage of ten volts peak is developed across the tuning coil. When the r-f voltage is positive the grid of the tube acts as a diode plate and the tube conducts looking like a 500 or 1,000 ohm resistor. The condenser charges rapidly through this resistance. When the r-f signal goes negative the grid no longer conducts and the condenser must discharge through a low resistance, the battery polarity reversed and the condenser discharged through a high resistance.

Figure 13

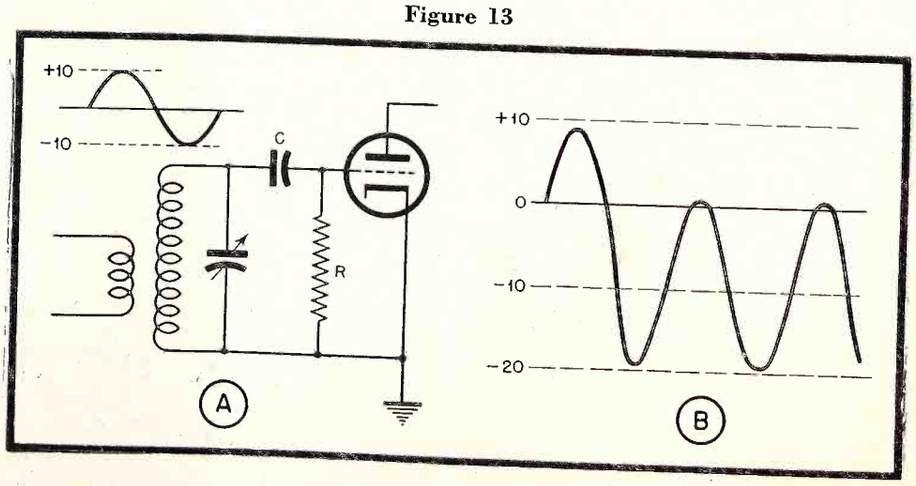


Fig. 13B shows a graph of what happens. The grid goes positive and C charges. The polarity reverses, driving the grid far negative. Before C has had time to discharge the r-f cycle goes positive. However the grid is driven only slightly positive this time since the condenser had time to discharge only a little. The condenser recharges to the peak value of the r-f signal. Note that the grid goes from a slightly positive value down to almost-20 volts. The average voltage on the grid under these conditions will be almost-10 volts or equal to the peak value of the input voltage.

Grid rectification bias is automatic since it varies directly with the amount of grid drive. In high power amplifiers it must be supplemented by some other form of bias to protect the tube in the event the grid drive stops.

CONTACT POTENTIAL BIAS

A new form of bias which is called "contact potential" or Edison effect bias has found recent favor. The method of obtaining this bias is to use a very high value of grid resistor. It would seem at first glance that the tube is operating without bias so that many have erroneously assumed that some tubes operate with zero bias. Edison discovered that if a cold plate were put in an evacuated bulb with a heated filament, a current would flow from the filament to the plate "even when no voltage was applied to the plate."

The reason for this phenomenon can be understood by reviewing thermionic emission. Thermal agitation in a heated filament causes it to emit electrons which form a cloud in the vicinity of the filament. If a metal plate or grid is placed near this filament some of these electrons will be thrown from the cathode with enough velocity to reach the grid whether or not the grid has a voltage on it to attract them.

Now consider the circuit in *Fig. 14.* If electrons emitted from the cathode strike the grid they must flow from the grid through the grid resistor in returning to the cathode. If this resistance is high even this small amount of current will produce a voltage drop across it. Since the electrons are flowing from grid back to cathode through the resistor the grid end of the resistance will be negative. Thus a bias is developed in the grid circuit itself. The value of bias depends on the value of the grid resistor, the cathode material and the proximity of the grid to the cathode The value will range from about .1

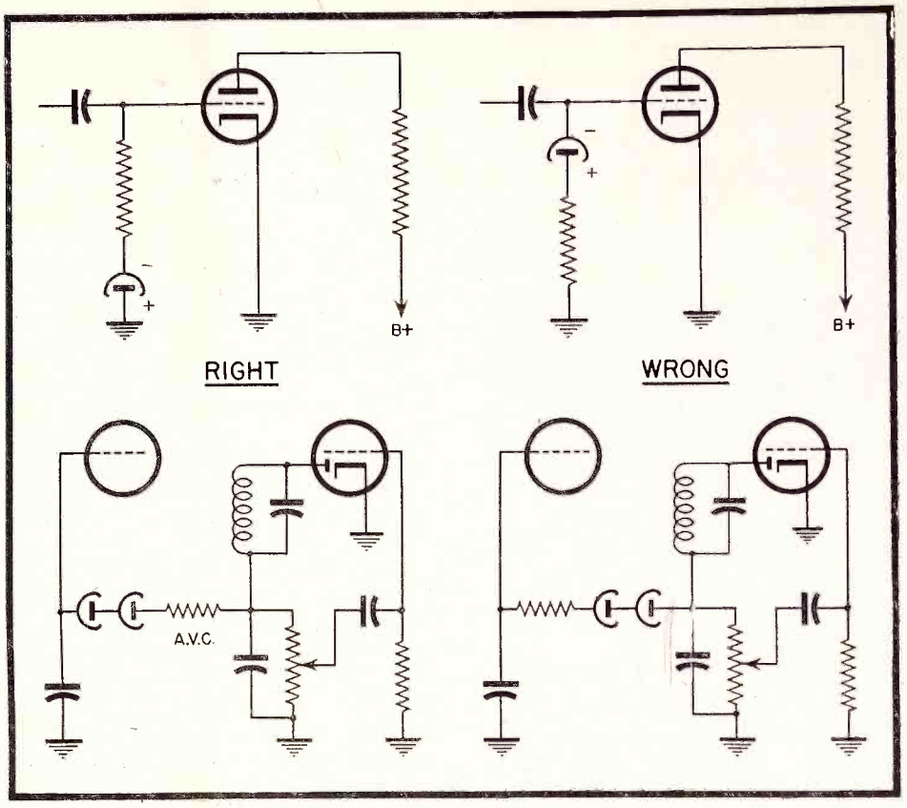


Figure 11

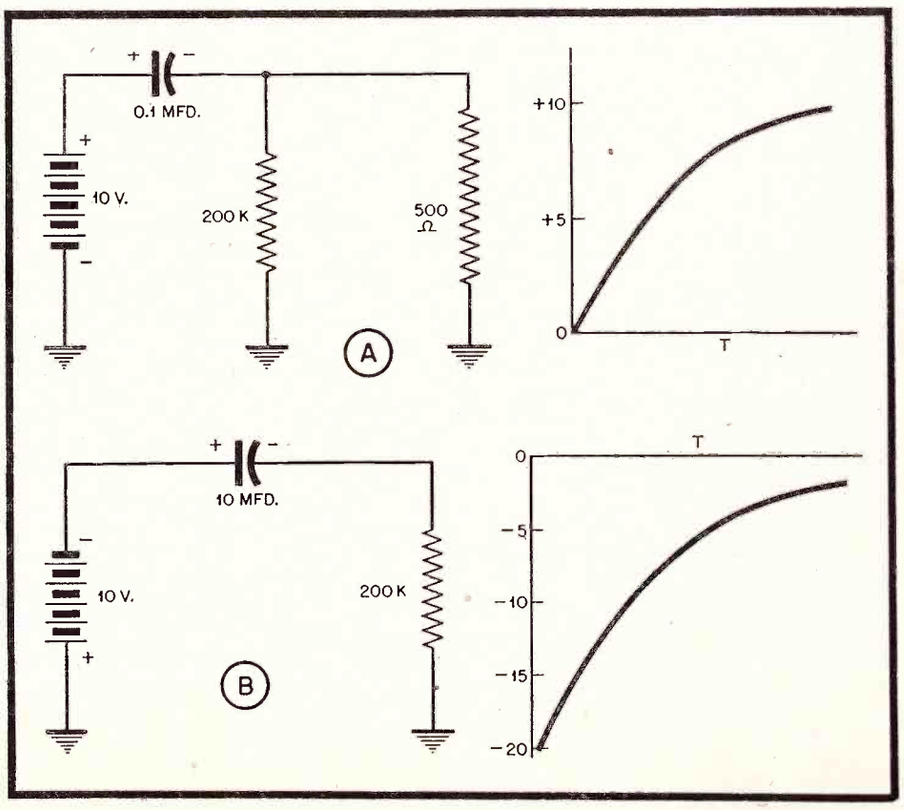
volt to sometimes as high as 1½ volts in high μ tubes. Unfortunately it varies during the life of the tube decreasing rapidly for the first 48 hours and slowly from then on.

This type of bias is applicable in low level, high μ amplifier tubes The reason it is better suited here is that these stages require less bias since the grid drive is low, and the grid being located close to the cathode in these tubes, it increases the contact potential.

Where contact bias can be used it reduces hum and degeneration since the cathode goes directly to ground. It is cheaper since it requires no extra parts for the bias circuit. It offers disadvantages over other methods in

(*See page 47*)

Figure 12



CENTRALIZED Radio Servicing

Centralized "service station" applies factory methods to expedite repair jobs and conditioning of new radio sets, through franchises to distributors and dealers.

WHAT the mechanized laundry establishment is to the local laundry store the Central Radio-Vision Service operation is to the local radio dealer. In this plan the dealer is the receiving point for radio repair jobs; there they are picked up daily or on call by Central's truck and taken to the "factory" for processing. This is the laundry pattern familiar to many a household. The dealer is charged a fee at "wholesale" pre-established rates; he then adds his markup and the customer pays comparable "retail" service prices.

The Operation

The "factory-to-you" radio service plan has been operated by this organization for the past two years. It was designed primarily to meet the service requirements of radio dealers. Central handles no retail merchandise and therefore does not compete with dealers who, in fact, act as authorized agents in each of their protected territories subject to a franchise.

The wholesale pricing plan works as follows, briefly: No charge is made for dealers' store-job pickups and deliveries, the repair job is billed at a wholesale price. The dealer then adds his customary profit. Where jobs are picked up at a customer's home, taken to the factory and then returned, the $1 pickup and $1 delivery charges made are deducted from the amount collected for the job, giving the dealer 25 per cent of the "net". Monthly settlements are made for work done through the dealers direct or with any of their customers.

Production and sales volume is the constant goal, rather than dollar volume. Operating at "wholesale" to provide dealers a reasonable profit, the margin is exceptionally small per job for Central. The turnover, however, is unusually large and steady, predicated on the dealers' assured cooperation in securing repair jobs.

Continuously showing window and store displays (see photos) does the trick. All advertising and merchandising materials, job tickets imprinted for the dealer are furnished without cost. Dealers, during the past two years' experience with the plan, do not hesitate to call in the route-man for pickups, as they have found that the customers are well impressed by the trained approach and evident efficiency of Central's pickup men. Neighbors are accordingly recommended, develop a continuous patronage often that proves profitable to the dealer not only in credit for his share of the earnings on servicing—but actual sales (or prospects) for other new appliances. According to Mr. Leonard Freeman, the underlying reason for this mutual confidence is Central's "gentlemen's agreement" (see illustration).

The organization is expanding its facilities, fixing up two more floors (totalling 2000 square feet floor space). It is now in process of securing and appointing qualified individuals or firms of radio sales or service-minded personalities as distributors in a wide "trading area" embracing New Jersey and some lower New York zones. Like the agencies already operating, newly selected distributors will pick up and deliver among their franchised dealers

Left, from top down: Arnold B. Freeman (at left) is president and production manager; Harold C. Schroeck, treasurer and purchasing agent. Figuring the angles on a tough job. That's a GE tube. Dealer Forgione handles routine servicing in his own shop, increases earning capacity through routing overflow and special jobs to Central. Benchman Bob Carson, one of a crew of 9 experts and specialists caught in a probing moment. "Nosing" for trouble invisible to the naked eye is a daily routine for Danny Farese, another crew benchman.

and their customers under the basic plan, transporting collected radio repair jobs from their local establishments to the Central factory in Newark. Small jobs will be done at dealers' stores and customers' homes when possible.

New Radios

Freeman Electronic ales Organization, consisting of the same persons as Central have also inaugurated a plan for "guarantee of service with sales". This operation will offer to dealers a service on new radio receivers from the time they come into stock until sold, and thereafter for the specified warrantee period. For a percentage fee, based on the manufacturer's retail list price, each set is registered. The dealer is relieved of all responsibility subject to the various manufacturer's warrantees on tubes, parts and components. Included in this plan is store set-up service and maintenance pending sale.

The dealer pays 1 per cent on account (not extra) of the applicable percentage fee in accordance with the period of coverage desired, as detailed in a schedule available to dealers. The balance of the percentage fee is payable with completed information on report of sale. Both manufacturers and distributors of many lines sold by New Jersey dealers have already indicated their satisfaction with the working of the plan and are cooperating by making replacements or "I.O.U.'s" of parts when parts are not available.

Among those subscribing to the plan are a number of dealers who, although they are not franchised agents selling services regularly, patronize Central for "wholesale" radio service on occasion. The method of operation dealers are asked to follow is made simpler by reason of the systematized forms. (1) Registration forms in triplicate (i.e., a white, pink and a blue), 3 x 5 for easy filing. (2) Price chart forms in pocket-size for dealers' convenience, with listings of percentage fees based on coverage period required.

Percentages begin at 5 per cent (of manufacturer's retail list price) on sets up to $50; 4 per cent up to $75 r.s.p.; 3¾ per cent up to $100 r.s.p.; 3½ per cent up to $150 r.s.p.; 3¼ per cent up to $200 r.s.p.; and 3⅛ per cent for sets above $200 r.s.p.

This covers all types of radios, inclusive of combinations with record players, automatic changers; also auto radios, but not television, as yet. Service is rendered without charge to the customers or dealer beyond the coverage free at the customer's home if within five miles of the dealer's store; a slight charge extra if the distance is greater.

The Central Radio-Vision Service outfit is contemplating the publication of both plans in convenient form, for dealers desirous of employing their methods, and merchandising materials, inclusive of their franchise agreement on a pro rata basis.

Top: **Dealer Lloyd Lieb, American Home Supply, points to decal window sign provided by Central.** ***Below:*** **P. Forgione and wife pose before decals displayed on their show windows. Both are typical of dealers who hold Central servicing franchises.** ***Bottom:*** **Forms available to dealers in operation of servicing plan. See text above.**

Acct. No. ..... Date of Application.....
Date Equipt. Received.....
Dealer's Name.....
Address .....
City..... State.....

Do Not Write Here. Approvals Only		
Classification of Dealer	Approval of Equipt.	Final Approval

Equipt. ..... Make..... Model..... Ser. No.....
Retail ..... Rate at 1% ..... Bal. Due ..... Date
List Price $..... Pd. on Acct. $..... on Sale $..... of Sale.....
Sold to ..... Selling Price $..... All Cash Sale? ☐
Address ..... Amt. Cash Pd. $..... Installment? ☐
..... Bal. to be Pd. $?..... How, Many Mos.? ☐

Period of Coverage: 3 mos ☐ 6 mos ☐ 1 year ☐ NOTE: Term of coverage begins on date of sale.

Dealer is required to supply all information in TRIPLICATE on Form R-1, together with payment of 1% of Retail List Price. EACH set must be INDIVIDUALLY REGISTERED. Upon approval thereof by SERVICE, TWO COPIES of registration will be returned to Dealer with official stamp and signature thereon, whereupon EACH such set will be entitled to Store Set-up and Floor Maintenance service as may be required pending its sale. Promptly upon sale of any such set ONE COPY of registration, filled in with completed information and inclusive of Customer's Name, Address, Serial No., and data required, together with payment of balance due based on applicable percentage rate for specified period of coverage, must be sent by Dealer to SERVICE.

PLAN "A" and PLAN "B" PRICE SCHEDULE

Plan "A"—MIDGET RADIOS EXCLUSIVELY . . . . Service for 3 Months

A-1 . . . at Dealer's Store
We set-up and maintain pending sale Price $1.00
Note: A-1 requires each set to be registered promptly on receipt.

A-2 . . . at Our Shop.
No set-up or maintenance pending sale. Price $.50
Note: A-2 does **not** require registration UNTIL sale.

Plan "B"—*FOR ALL TYPES OF RADIOS inclusive of Record Players, Automatic Changers and Recorders — BUT NOT TELEVISION EQUIPMENT

List Price Schedules	3 Mos.
Up to $50.00	5%
Up to 75.00	4%
Up to 100.00	3¾%
Up to 150.00	3½%
Up to 200.00	3¼%
All Over 200.00	3⅛%

DISTANCE CONDITIONS
At Customer's Home—If within 10 miles of Newark, or 5 miles of Dealer's Store; or, if brought to Dealer's or our shop Slight Extra Charge for extra distances.

***ALSO AUTO RADIOS**, at percentage rates applicable as above but not inclusive of original installation.

SPECIAL CONDITIONS: Plan "A" and Plan "B", inclusive of subdivisions thereof now existing or in future to be added, shall be subject to manufacturer's standard guarantees, inclusive of replacements of tubes and parts and other provisos applicable, and likewise subject to O.P.A. guarantees and regulations during the life thereof or any governmental successor or substitute agency. Service hereunder is meant to cover repairs and adjustments as to the labor necessary and regardless of how much or often required subject to the limitations hereof and not beyond. Likewise this service applies only to sets with LOOP ANTENNA; outside or special antenna installations will be charged extra and supplied only on special orders. This offer is limited and subject to conditions and provisions regulating under the basic Franchise Agreement and only applicable to registration of each set of equipment under its individual serial number and approval officially noted. Not responsible for damages or breakage found to be the result of abuse or operation under other than normal conditions; nor because of conditions beyond our control, strikes, acts of God, etc.

NOTE: 1% of Retail List Price payable with EACH Registration

FRANCHISE AGREEMENT

CENTRAL RADIO-VISION SERVICE, hereinafter referred to as "Service", hereby grants a Franchise as "Authorized Agent"

to the firm of _____

a _____, doing business at: _____

City _____ State _____

,namely the above named firm hereinafter referred to as the "DEALER", whereby the SERVICE authorizes the DEALER in accordance with the following provisions, subject to the approval of each party hereto designated by the signature of the authorized member of each firm hereunder, as follows:—

1. The trading area of the DEALER shall be .....
2. The SERVICE agrees to render radio-television repairing and installation services on the orders of the DEALER named herein at the lowest possible prices for the best quality workmanship and materials and in accordance with regulations of O.P.A. or any governmental successor thereto. Also, to furnish advertising and merchandising devices designed to promote sales in cooperation with the DEALER, concentrating public interest and local attention on the advantages to his consumer patrons. No financial obligation is assumed by the DEALER except in such special instances and manner as he may deem advisable and so signify in writing.
3. The SERVICE agrees to serve the DEALER and his customers always in an ethical manner, conscientiously striving to protect his interests and endeavoring likewise to build his local prestige and secure repeat sales for his credit and mutual profit, subject to prevailing price schedules on the following basis: CUSTOMER-HOME JOBS to entitle the DEALER to 25% of the "net sale" — the net sale being the total amount collected from the customer subject to deduction of $1.00 for pick-up and $1.00 for delivery in cases where the job is taken from customer's home. STORE JOBS to be at low wholesale prices and billed to DEALER without charge for pick-up or delivery where such jobs are taken from store. DEALER adds his customary mark-up for his profit on store jobs as he deems reasonable.
4. Settlements — weekly, semi-monthly or monthly — as may be mutually agreed between both parties, as follows: DEALER is paid 25% of the net sale from CUSTOMER-HOME JOBS' collections, as above. SERVICE is paid for STORE JOBS done, as above.
5. DEALER agrees to make reasonable efforts to provide jobs, as above, and accordingly is hereby authorized to display decals and other sales promotional pieces furnished at the start by SERVICE, and from time to time, inclusive of literature for giveaways, mailing and in advertising, imprinted with DEALERS name, address, etc., as "Authorized Agent". The SERVICE is hereby privileged to list the DEALER as its "Authorized Agent" likewise in its advertising and in conjunction with sales promotional activities in accordance herewith.
6. Special services, other than specified herein, shall be subject to supplementary agreements in writing.
7. The duration of this Franchise shall be considered on the basis of a "gentlemen's agreement" — cancellable by either party at any time on written notice with settlements up to date — it being mutually understood and agreed that no privileges or rights are extended one unto the other except for the stipulated purposes hereof and no other, and in the event of such cancellation, for any reason, each will immediately cease to represent the other, the DEALER named herein agreeing hereby to remove all signs and return all materials in relation hereto promptly. However, predicated on the joint objectivity of both parties hereto — i.e., sales cooperation for the purpose of mutual profit and prestige from such radio repairing and installation services rendered by the SERVICE — it is sincerely presumed that this agreement will indefinitely endure and continue as long as profits and harmonious relationship are indicated.
8. It is mutually agreed and understood that nothing herein contained shall be deemed as granting any vested right or interest whatever in CENTRAL RADIO-VISION SERVICE or any of its properties, and nothing other than for the exclusive purposes as herein specified.

IN WITNESS WHEREOF, each of the parties indicates acceptance of the terms, conditions and provisos hereof, by the duly authorized signature of each hereto:

ACCEPTED FOR "DEALER"

..... *Firm name*

BY: ..... *Title*

CENTRAL RADIO-VISION SERVICE

BY: ..... *Title*

Date: .....

MERCHANDISE PRE-VIEWS—17

Radio-in-desk: closed (left) and open for radio and phono playing.

Above, tilt-front console combo.

Below, table model automatic combo.

Three Lear Sets

1. Featuring Lear's radio exhibit at the Chicago show was a combination desk and radio-phonograph. One side contains a Lear radio the other side a Lear Record Changer with ample record storage. Opening one drawer-louvre below the built-in-radio automatically opens all three louvres for radio or record playing. The desk is in 18th Century styling, of hand-rubbed, Honduras Mahogany veneer. The top of the desk is covered in genuine top-grain leather. It is built by Grand Rapids craftsmen.

"Our purpose in designing this desk and radio-phonograph combination," said Nate Hast, merchandise manager of the Lear Home Radio Division, "was to give the American home a piece of furniture which would not only add richness and luxury to the average living room, but would, at the same time, give it a useful as well as decorative purpose.

"There are a great many people who want the very best in radio, but are not willing to spoil the harmony of the room's decoration by placing in it a radio set that does not fit in with the room's atmosphere. By designing this radio and phonograph combination as a fine piece of furniture, we have given the public something that will serve this special purpose." The set will sell at about $750.00.

2. The table model with automatic record changer is of hand-rubbed, genuine mahogany, with a special Lear designed record changer with full automatic operation for 10-inch and 12-inch records. It has an automatic stop, and a permanent type needle. The radio in this set is a single-band, 6-tube set.

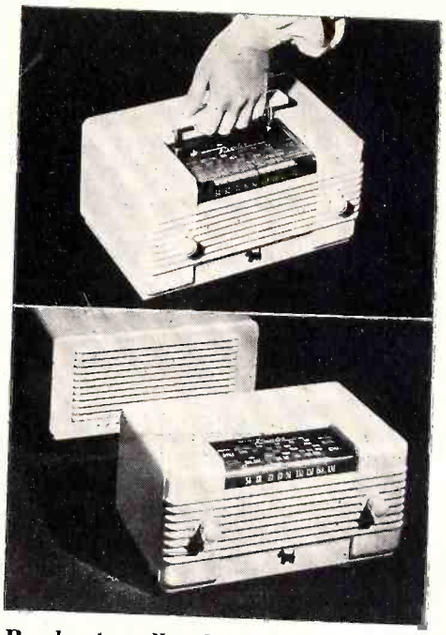
3. The tilt-front model is a contemporary Early American design in mahogany veneers with authentic reeding and antiqued brass hardware. Automatic phonograph record changer plays 10- or 12-inch records. Eight tubes (7 receiving tubes plus rectifier tube), AC Superheterodyne circuit. Automatic volume control. Push-pull and inverse feed-back. All-wave (3 bands). Eight push buttons. Ten-inch Electro-Dynamic speaker. Built-in LO-z loop. Cabinet 41¾ ins. wide by 19½ ins. deep by 38 ins. high.

Remler Portable

The new 1947 Remler Scottie, now being delivered to dealers, has "invisible" carrying handle which drops down out of sight, preserving the smart, sculptured lines of the cabinet. The radio has 5 tubes including rectifire; AC with power transformer. The cabinet and all plastic parts are made by the Remler Plastic Division. A typically nice detail of this deluxe personal portable is the fused safety plug which completely eliminates any hazard of fire.

The large, easy-to-read dial tunes stations by name; the position and high visibility of the dial make it easy to tune while standing or seated.

Styled and built for the quality market, these sets are priced at $45.30,



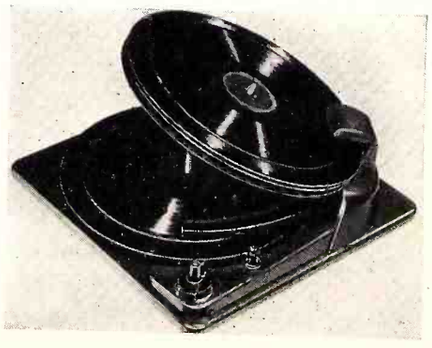
Remler is well-styled from any angle.

OPA approved. Other new Remler receivers are in production. For further information write Remler Company Ltd., 2101 Bryant St., San Francisco 10, California.

Intermixing Record Changer

Model 70 is a new addition to the regular line of automatic record changers made by Webster-Chicago Corp. It will play a 1⅓-inch stack of 10 and 12 inch records intermixed. An automatic "disengage" device relieves pressure on the rubber drive wheel when the machine is not in use. In addition this model has other Webster features: velocity trip, automatic shut-

This Webster plays them mixed.



George Beck (right) manager GE industrial design points out detail on Musaphonic Model 44. With him are Grady L. Roark (left) Musaphonic sales manager, and Walter Arndt, engineer. See "Re-Engineered Musaphonics" below. Above, right: GE Model 417 FM combination. See "GE Adds FM Sets" below for description.

off, improved rim drive, and 4-pole shaded pole motor. Stainless steel spindle is spring cushioned to prevent center hole wear of records. The new model will be available to the trade very soon and announcements will be made through Webster's regular distributing channels. Address: 5610 Bloomingdale Ave., Chicago 39, Ill.

GE Adds FM Sets

The General Electric Company unveiled its first standard line Frequency Modulation and short-wave receivers at a special press showing at the annual convention of the National Association of Music Merchants in the Palmer House. The first FM-AM sets will be phonograph combinations, designed to include all of the innovations developed by General Electric engineers during the war production years. They will sell at prices of approximately $350 and $450. Production has already been started and first deliveries to dealers is set for next month, according to E. Patrick Toal, sales manager of the standard line.

The FM table receivers will be in production early in August with deliveries to begin in September, Mr. Toal said. He estimated that prices on this line will begin at about $65.

The FM receivers shown were Models 417 and 502. They are equipped with an entirely new tuning system which makes use of silver-plated variable inductances, surpassing the efficiency of gang condensers. Model 417 has 10 tubes and a 12-inch Alnico loudspeaker. It has five tuning bands, one for AM, one for each of the low and high FM frequencies, and two for short-ware reception. The cabinet is of hand finished and polished mahogany of 18th Century style. Model 502 has 14 tubes, a 12-inch Alnico 5 loudspeaker and a "squelch circuit". The tuning band arrangement is identical with Model 417.

The table radio-phonograph, Model 303, has six tubes, is equipped with the Electronic Reproducer and has the "fool-proof" record changer. It has a six-and-a-half-inch Alnico 5 loudspeaker. The retail price will be about $99, with delivery beginning next month.

The portable record player, Model 15, is a three-tube amplifier with a crystal pick-up. It is leather-bound and will sell for approximatelyy $40. Delivery should begin in August.

Model 12 is a four-tube manual phonograph table model. It is equipped with the Electronic Reproducer and has an eight-inch Dyna-power Alnico 5 loudspeaker. The price will be about $50.

With these new models added to the standard line, the total number of radios, radio - phonographs and phonographs now in production for standard line dealers comes to 14.

Re-Engineered Musaphonics

The new de luxe radio-phonograph Musaphonic combinations, which will sell at prices ranging from approximately $450 to $600, include so many new features, developed during war-time research, that they have virtually no resemblance to the pre-war Musaphonics, Grady L. Roark, sales manager for the division said.

A new and exclusive General Electric tuning system makes use of silver-plated variable inductances, surpassing the efficiency of gang condensers. A completely re-designed audio system, a single tuning indicator which functions during both AM and FM reception, a "fool-proof" tone arm in the record-player and the exclusive General Electric electronic reproducer. The line comprises four basic models, all operating from the same type chassis, manufactured in eight cabinet styles.

The instruments have 16 tubes, including rectifier and tuning indicator. In addition to the standard broadcast tuning band and 3 short-wave spread bands, each set is designed for both high and low band FM reception. The newly designed audio system powers two 10-inch permanent magnet Alnico 5 loudspeakers. The amplifier has a response to about 20,000 cycles.

In the phonograph the frequency response of the pick-up, properly equalized, is essentially flat from 30 to 8,000 cycles, providing a faithful reproduction of the full range of recorded tone. The record changer will accommodate both 10- and 12-inch records intermixed and is equipped with a shut-off switch which operates after the last record has been played. The electronic reproducer virtually eliminates all needle chatter and surface noise. The single tuning indicator operates during both standard and FM reception. It eliminates guesswork in FM turning and insures the average user razor sharp tuning on both AM and FM.

First sets, Roark said, will begin reaching dealers in September.

New 5" Oscillograph

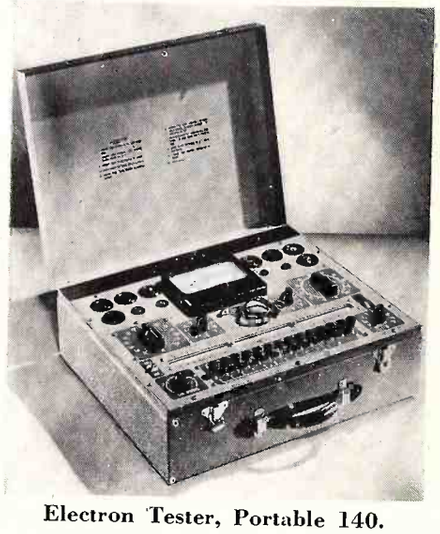
The new Type 274 cathode-ray oscillograph just announced by the Allen B. Du Mont Laboratories, Inc., of Passaic, N. J., answers the long-standing need for a good oscillograph for routine laboratory and production testing and also for radio servicing, at the low cost of $99.50. Equipped with Du Mont Type 5BP1-A 5-in. tube, it is housed in a sturdy green wrinkle-finish steel cabinet with plastic carrying handle. The modern design green front panel has white lettering and black knobs. Measurements are: 14 in. high, 8⅝ in. wide, 19⅜ in. deep. Weight, 35 pounds.

The linear time-base has a range of 8 to 30,000 c.p.s. There is provision be from the vertical amplifier or an external signal. Identical vertical and

horizontal amplifiers have a range from 20 to 50,000 c.p.s. There is provision for intensity modulation. Further technical details are: Input impedance: vertical-direct 5 meg. 50 micro-micro-farads. vertical amplifier 1 meg. 40 micro-microfarads. Horizontal—direct 5 meg. 60 micro-microfarads; horizontal amplifier 5 meg. 40 micro-microfarads. Frequency range: Sine wave response (at full gain) uniform within plus or minus 20% from 20 to 50,000 c.p.s., down less than 50% at 100,000 c.p.s. Deflection sensitivity: Amplifiers at full gain, .65 r.m.s. volt/in; direct, plus or minus 18 r.m.s. volts/in.

Electron Tube Testers

The new electron tube testers based on a patented circuit suitable for all standard receiving and several special types of tubes have been announced by R. W. Andrews, merchandise manager, Radio Tube Division, Sylvania Electric Products, Inc., 500 Fifth Avenue, New York 18, N. Y. The testers are designed especially for use by radio servicemen.



Electron Tester, Portable 140.

The new instruments, a counter type 139 and a portable type 140, provide accurate tube testing facility for shop, spot testing in the home, industrial electronic applications, automobile and mobile radio equipment. Accurate checks of receiving type tubes used in broadcast receivers, FM, television, industrial electronic controls, record players and photo-electric devices may be made under dynamic conditions without damage to tubes.

Design of the testers includes extra sockets and switch contacts for modernization as new types of tubes are developed. Test for shorts may be made without danger of grid-filament contacts due to electrostatic attraction in battery type tubes where spacing between these elements is close. Provision

(*See page* 43)

Type	Retail Price
0OA	$ 2.80
0IA	1.10
OA4G	2.35
OZ4	1.90
OZ4G	1.90
1A1/5E1	1.30
1A3	1.55
1A4P	1.90
1A4T (JA4)	1.90
1A5G	1.90
1A5GT	1.30
1A6	1.55
1A7G	1.90
1A7GT	1.55
1AB5	2.35
1B1	1.30
1B4P (1B4/951)	1.55
1B5 (1B5/25S)	1.55
1B7G, GT	1.55
1C1	1.30
1C5G	1.90
1C5GT	1.55
1C6	1.55
1C7G	1.55
1C8	2.80
1D1	1.30
1D5GP	1.55
1D5GT, G	1.55
1D7G	1.90
1D8GT	2.35
1E1	1.30
1E4G	1.55
1E5GP, G, GT	1.90
1E7G	2.80
1F1	1.30
1F4	1.55
1F5G	1.55
1F6	1.90
1F7G, GH, GV	1.90
1G1	1.30
1G4G, GT	1.55
1G5G	1.55
1G6G, GT	1.90
1H4G	1.20
1H5G	1.55
1H5GT	1.30
1H6G	1.55
1J1	1.30
1J5G	2.35
1J6G	1.55
1K1	1.30
1L4	1.90
1LA4	2.80
1LA6	2.80
1LB4	2.80
1LC5	2.80
1LC6	2.80
1LD5	2.80
1LE3	2.35
1LG5	2.80
1LH4	2.80
1LN5	2.80
1N5G	1.90
1N5GT	1.55
1N6G	1.55
1P5G, GT	1.90
1Q5G, GT	1.90
1Q6	2.80
1R1G	1.30
1R4 (1R4/1294)	2.35
1R5	1.90
1S4	1.90
1S5	1.90
1SA6GT	1.90
1SB6GT	1.90
1T1G	1.30
1T4	1.90
1T5GT	1.90
1U4	1.90
1V	1.20
1V5	2.80
1W5	2.80
1Y1	1.30
1Z1	1.30
2	1.55
2A3 (2A3H)	$ 2.35
2A4G	2.80
2A5	1.20
2A6	1.20
2A7	1.30
2A7S	2.80
2B7	1.55
2B7S	2.80
2E5	1.55
2G5	1.90
2S/4S	2.80
2V3G	3.40
2W3, GT	1.55
2X2/879	2.80
2Z2/G84	2.80
3	1.55
3A8GT	2.80
3B5GT	1.90
3B7 (3B7/1291)	2.80
3D6 (3D6/1299)	2.80
3E6	2.80
3LE4	2.80
3LF4	2.35
3Q4	1.90
3Q5G, GT	1.90
3S4	1.90
4	1.55
4A1	2.80
4A6G	2.35
5	1.55
5T4	2.35
5U4G	1.20
5V4G	1.90
5W4	1.30
5W4G, GT	1.10
5X4G	1.30
5Y3G, GT	.85
5Y4G	.90
5Z3	1.30
5Z4, GT	1.55
6	1.55
6A3	2.35
6A4 (6A4/LA)	1.90
6A5G	3.40
6A6	1.90
6A7	1.20
6A7S	2.80
6A8	1.55
6A8G, GT	1.20
6AB5/6N5	1.90
6AB7(6AB7/1853)	2.35
6AC5G	1.55
6AC5GT	1.30
6AC7(6AC7/1852)	2.80
6AD6G	1.90
6AD7G	1.90
6AE5G	1.90
6AE5GT	1.55
6AE6G	1.55
6AE7GT	1.55
6AF5G	1.55
6AF6G	1.90
6AG5	2.80
6AG7	2.80
6AK6	2.35
6AL5	1.90
6AQ6	1.90
6AT6	1.55
6AU6	1.90
6B4G	2.35
6B5	2.35
6B6G	1.30
6B7	1.55
6B7S	2.80
6BA6	1.90
6BE6	1.90
6B8	2.35
6B8G, GT	1.55
6C4	1.55
6C5	1.30
6C5G, GT	1.20
6C6	1.20
6C7	2.80
6C8G	1.90
6D5G	1.90
6D6	$ 1.20
6D7	2.80
6D8G	1.90
6E5	1.30
6E6	2.35
6E7	2.80
6F5, G	1.30
6F5GT	1.20
6F6	1.30
6F6G	1.10
6F6GT	1.00
6F7	1.90
6F7S	2.80
6F8G	1.55
6G5 (6U5/6G5)	1.55
6G6G	1.55
6H4GT	2.35
6H6, G, GT	1.30
6J5, GT	1.10
6J5G	1.20
6J6	2.35
6J7	1.55
6J7G, GT	1.30
6J8G	1.90
6K4	3.40
6K5G	1.30
6K6G	1.30
6K6GT	1.20
6K7, G	1.30
6K7GT	1.20
6K8, G, GT	1.55
6L5G	1.30
6L6, G, GA	2.35
6L7, G	1.90
6N5(6AB5/6N5)	1.90
6N6G	2.80
6N7, G, GT	1.90
6P5G	1.00
6P5GT	.95
6P7G	2.30
6Q6, G (6T7G)	1.55
6Q7	1.55
6Q7G, GT	1.10
6R6G	3.40
6R7	1.90
6R7G	1.30
6R7GT	1.10
6S7, G	1.90
6SA7	1.20
6SA7GT	1.30
6SB7Y	2.35
6SC7	1.55
6SD7GT	1.55
6SF5, GT	1.20
6SF7	1.55
6SG7	1.55
6SH7, GT	1.55
6SJ7, GT	1.30
6SK7	1.20
6SK7GT	1.30
6SL7GT	1.90
6SN7GT	1.55
6SQ7	1.20
6SQ7GT	1.30
6SR7	1.30
6SS7	1.20
6ST7	1.90
6SZ7	1.90
6T5	2.80
6T7G (6Q6G)	1.55
6U5 (6U5/6G5)	1.55
6U6GT	1.55
6U7G	1.20
6V6	2.35
6V6G	1.55
6V6GT	1.30
6V7	2.80
6V7G	1.55
6W5G	2.35
6W7G	1.90
6X5	1.90
6X5G	1.30
6X5GT	1.20
6Y5	2.80
6Y5V	2.80
6Y6G	$ 1.90
6Y7G	1.90
6Z4 (84/6Z4)	1.30
6Z5 (6Z5/12Z5)	2.80
6Z7G	2.35
6ZY5G	1.55
7	1.55
7A4	1.55
7A5	1.55
7A6	1.55
7A7	1.55
7A8	1.55
7AG7	1.90
7B4	1.55
7B5	1.55
7B6	1.55
7B7	1.55
7B8	1.55
7C5	1.55
7C6	1.55
7C7	1.55
7E6	1.55
7E7	1.90
7F7	1.90
7F8	2.35
7G7 (7G7/1232)	2.35
7H7	2.35
7J7	2.35
7K7	2.35
7L7	2.35
7N7	2.35
7Q7	1.55
7R7	2.35
7S7	2.35
7V7	2.80
7W7	2.80
7X7 (XXFM)	2.35
7Y4	1.55
7Z4	1.55
8	1.55
9	1.55
10	3.40
12A	1.20
12A5	2.80
12A6, GT	2.35
12A7	2.35
12A8GT	1.20
12AH7GT	1.90
12AT6	1.90
12B7 (14A7/12B7)	2.35
12B8GT	1.90
12BA6	1.90
12BE6	1.90
12C8	2.35
12F5GT	1.20
12H6	1.35
12J5GT	1.20
12J7G	1.55
12J7GT	1.30
12K7GT	1.20
12K8	1.90
12K8GT	1.55
12Q7G	1.55
12Q7GT	1.10
12SA7	1.20
12SA7GT	1.55
12SC7	1.55
12SF5, GT	1.30
12SF7	1.55
12SG7	1.55
12SH7, GT	1.55
12SJ7, GT	1.30
12SK7	1.20
12SK7GT	1.30
12SL7GT	1.90
12SN7GT	1.55
12SQ7	1.20
12SQ7GT	1.30
12SR7, GT	1.55
12Z3	1.20
12Z5 (6Z5/12Z5)	2.80
14	2.35
14A4	2.35
14A5	3.40
14A7 (14A7/12B7)	2.35
14AF7 (2XD)	$ 1.90
14B6	1.90
14B8	2.35
14C5	2.35
14C7	2.35
14E6	1.55
14E7	1.90
14F7	2.35
14H7	2.35
14J7	2.35
14N7	2.35
14Q7	1.90
14R7	1.90
14S7	2.35
14W7	2.80
14Y4	2.35
15	2.35
18	2.35
19	1.55
20	3.40
22	2.80
24A	1.10
24S	2.80
25A6	2.35
25A6G, GT	1.30
25A7G, GT	1.90
25AC5G, GT	1.90
25B5	2.80
25B6G	2.35
25B8GT	2.35
25C6G	2.35
25D8GT	2.35
25L6	1.90
25L6G	1.55
25L6GT	1.30
25N6G	2.80
25S (1B5/25S)	1.55
25Y5	2.80
25Z5	1.20
25Z6	1.55
25Z6G, GT	1.20
26	.90
27	.85
27S	2.80
30	1.20
31	1.20
32	1.55
32L7GT	2.35
33	1.55
34	1.55
35 (35/51)	1.20
35A5	1.55
35L6G	1.55
35L6GT	1.20
35W4	1.20
35Y4	1.90
35Z3	1.55
35Z4GT	.95
35Z5G	1.55
35Z5GT	1.00
35Z6G	1.55
36	1.20
37	1.00
38	1.30
39/44	1.20
40	1.90
40Z5 (45Z5GT)	1.30
41	1.00
42	1.00
43	1.30
45	.95
45Z3	1.30
45Z5GT (40Z5)	1.30
46	1.30
46A1	1.55
46B1	$ 1.55
47	1.30
48	3.40
49	1.55
50	2.80
50A5	2.35
50B5	1.90
50C6G	2.35
50L6GT	1.30
50Y6G, GT	1.30
50Z7G	1.55
52	3.40
53	1.90
55	1.30
55S	2.80
56	.95
56AS	2.80
56S	2.80
57	1.10
57AS	2.80
57S	2.80
58	1.10
58AS	2.80
58S	2.80
59	1.90
70A7GT	2.80
70L7GT	2.35
71A	1.10
75	1.00
75S	2.80
76	1.10
77	1.10
78	1.10
79	1.90
80	.85
81	2.35
82	1.55
83	1.55
83V	2.35
84/6Z4	1.30
85	1.10
85AS	2.80
89	1.20
VR90-30 (OB3)	2.80
99 (X99)	3.40
V99	3.40
100-70	1.55
VR105-30 (OC3)	2.80
117L7GT	2.80
117L7/M7GT	2.80
117M7GT	2.80
117N7GT	2.80
117P7GT	2.80
117Z3	1.90
117Z4GT	1.90
117Z6G, GT	1.90
VR150-30 (OD3)	2.80
182B (182B/482B)	2.35
183 (183/483)	2.35
485	2.35
950	2.35
OB3 (VR90-30)	2.80
OC3 (VR105-30)	2.80
OD3 (VR150-30)	2.80
XXD (14AF7)	1.90
XXFM (7X7)	2.35
XXL	1.90

All radio tubes are guaranteed for not less than 90 days from date of sale.

The following maximum charges apply to removing, testing, and replacing all radio tubes in electron equipment brought to this establishment by customer:

Testing all tubes without detaching chassis mechanism from cabinet—$.50.

Testing all tubes if necessary to detach chassis mechanism from cabinet—$1.00.

This schedule conforms to prices for sales at retail as established by OPA Order No. 619, Regulation 136, as amended. Effective August 23, 1946.

Courtesy Sylvania Products, Inc.

RETAIL PRICES, RADIO RECEIVER TUBES

(*Effective August* 23, 1946).

THE above price list includes obsolete and current tubes. According to Sylvania Electric Products, Inc., who issued this list recently, the tube prices listed are based on OPA pricing schedules. Tubes that OPA did not list were priced on the basis of the last price on record. (*Compare with page* 36, *August issue*).

This provides a listing as nearly complete as possible so that it will serve as a convenient pricing guide not only for the commonly required tubes, but also for a miscellaneous variety of less frequently used types.

THE COVER

New Zenith home radio with baby in foreground, surrounded by parents: Ray Herbeck, well known orchestra leader smiles approvingly at his wife as the family listens to her sing new hit tune "Vitamin Pills," recorded by his orchestra. Playback is on set with Cobra radionic tone arm. Mother was Lorraine "Pokey" Benson, who first met Ray when vocalist with his orchestra. (*Photo courtesy Zenith Radio Corp.*)

SERVICE DATA

for

RCA-VICTOR

Models 54B1, -B1-N; 54B2; 54B3

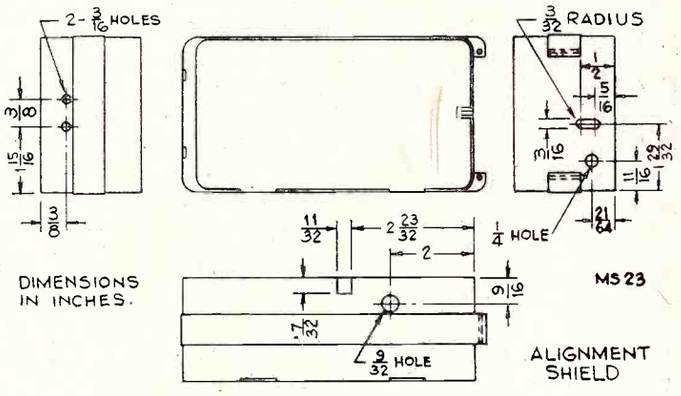
(Chassis RC589. Mfr. No. 274)

Specifications

Frequency Range ..... 550-1,600 kc
Intermediate Frequency ..... 455 kc
Power Supply

Type Battery	Current Consumption	Approximate Life (Intermittent Duty)
"A"—1.5 volt RCA-VS 036 or VS 001	0.25 amperes	3-5 hours
"B"—67.5 volts RCA-VS 016	8.5 milliamperes	25-40 hours

Power Output..... Undistorted 0.05 watts ..... Maximum 0.12 watts
Loudspeaker
Type Permanent-Magnet Dynamic Elliptical ..... 2 x 3 in.
Voice Coil Impedance ..... 11¾ ohms at 500 cycles
Cabinet Dimensions (inches)..... 3-3/16 x 6½ x 4-3/16
Weight..... 3¼ lbs. (net) Tuning Drive Ratio .....1 to 1



Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES **RC 589 54B1 BLACK** **RC 589A 54B2 BROWN**
70444	Board—Speaker terminal board (5 contact)
70445	Board—Terminal board (1 contact)
33111	Capacitor—Ceramic, 33 mmf (C16)
60954	Capacitor—Ceramic, 56 mmf. (C4)
65405	Capacitor—Ceramic, 82 mmf. (C13)
70454	Capacitor—Tubular, .002 mfd., 150 volts (C14, C19)
70627	Capacitor—Tubular, .005 mfd., 600 volts (C20)
70453	Capacitor—Tubular, .02 mfd., 100 volts (C10, C15)
71013	Capacitor—Tubular, .05 mfd., 400 volts (C7)
36718	Capacitor—Electrolytic, 10 mfd., 60 volts (C17)
70443	Coil—Oscillator coil (L2, L4)
70438	Condenser—Variable tuning condenser (C1, C2, C5, C6)
70452	Connector—Loop connector (1 set)
70439	Control—Volume control (R6)
70449	Fastener—Push fastener to hold loop—(2 required)
70429	Grommet—Rubber grommet for tube support (2 required), and to mount variable condenser (3 required)
70434	Hinge—Lid hinge—Model 54B1—Black (2 required)
70984	Hinge—Lid hinge—Model 54R2—Brown (2 required)
70441	Holder—Battery holder
70424	Knob—Tuning knob
70432	Knob—Volume control knob
70708	Lead—Battery lead complete
70450	Lid—Case lid complete with lid support less loop—Model 54B1—Black
70986	Lid—Case lid complete with lid support less loop—Model 54B2—Brown
70447	Loop—Antenna loop complete with connectors less lid — Model 54B1—Black
70985	Loop—Antenna loop complete with connectors less lid — Model 54B2—Brown
70449	Nameplate—"RCA" nameplate
70427	Nut—Retaining nut for lid support stud
70420	Panel—Chrome panel
70422	Plate—Backing plate for mounting hinge on lid—Model 54B1—Black (2 required)
70983	Plate—Backing plate for mounting hinge on lid—Model 54B2—Brown (2 required)
14076	Resistor—820 ohms, ¼ watt (R9)
36714	Resistor—15,000 ohms, ¼ watt (R2)
14138	Resistor—68,000 ohms, ¼ watt (R5)
3252	Resistor—100,000 ohms, ¼ watt (R1)
30652	Resistor—1 megohm, ¼ watt (R7)
12928	Resistor—3.3 megohms, ¼ watt (R3, R10)
30931	Resistor—4.7 megohms, ¼ watt (R8)
30992	Resistor—10 megohms, ¼ watt (R4)
70421	Screw—Case cover mounting screw (1 set)—Model 54B1
71150	Screw—Case cover mounting screw—Model 54B2
70446	Screw—#6-32 x ¼" long self-tapping screw to mount battery holder
70436	Socket—Tube socket
70423	Spacer—Rubber shock spacer
70428	Speaker—2" x 3" elliptical P.M. speaker
70425	Spring—Tuning knob spring clip
70426	Stud—Lid support stud
70451	Support—Lid support
70435	Support—Tube support less tube sockets and transformer
70430	Switch—Power switch (S1)
70442	Transformer—First I-F transformer (L5, L6, C8, C9)
70440	Transformer—Output transformer (T1)
70437	Transformer—Second I-F transformer (L7, L8, C11, C12)
70433	Washer—Spring washer for volume control knob
	MISCELLANEOUS ASSEMBLIES
70456	Bottom—Case bottom—54B1—Black
70988	Bottom—Case bottom—54B2—Brown
70457	Catch—Spring catch assembly
70455	Center—Case center—Model 54B1—Black
70987	Center—Case center—Model 54B2—Brown
70459	Handle—Carrying handle—Model 54B1—Black
70989	Handle—Carrying handle—Model 54B2—Brown
70461	Link—Handle link—Model 54B1—Black (2 required)
70990	Link—Handle link—Model 54B2—Brown (2 required)
70458	Nameplate—"His Master's Voice" nameplate
70460	Screw—#4-40 x ⅛" fillister head screw for case center strip

Alignment Procedure

Test Oscillator.—Connect test oscillator as indicated in chart keeping the output as low as possible to avoid A V C action.

Output Meter.—Connect meter from top lug of TB1 (plate of 354) to ground. Turn volume control to maximum position.

Fig. 1 shows the modifications necessary to convert the center strip portion of a case into a convenient shield to be used as a substitute for the regular case center strip in the RF, Osc. alignment.

Steps	Connect the high side of test osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	Connection lug of C2, located on rear of gang in series with .01 mf.	455 kc	Quiet point near 1,600 kc	C11, C12 2nd I-F trans.
2		455 kc	Quiet point near 1,600 kc	C8, C9 1st I-F trans.
3	*Antenna coupling loop thru 200 mmf. capacitor	1,600 kc	1,600 kc	C5 (osc.)
4		1,500 kc	1,500 kc	C2 (ant.)
5		600 kc	600 kc	L2 (osc.)
6	Repeat steps 4 and 5 for final adjustments.			

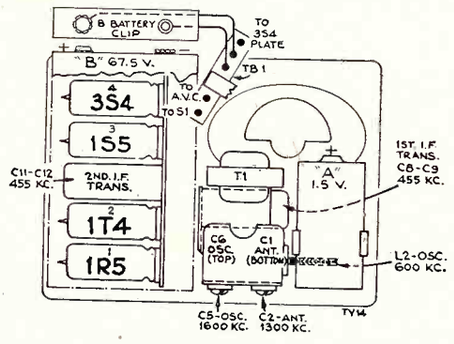
* Steps 3, 4 and 5 require a coupling loop from the signal generator to feed a signal into the receiver loop located in the lid. This loop should be approximately one turn of 6 x 3½ inches coupled to the signal generator through a 200 mmf. capacitor, and loosely coupled to the receiver loop antenna at about 1¾ inches distance, so as not to disturb the receiver loop inductance. Ground test oscillator through .1 mf. capacitor to receiver chassis.

Tools required:

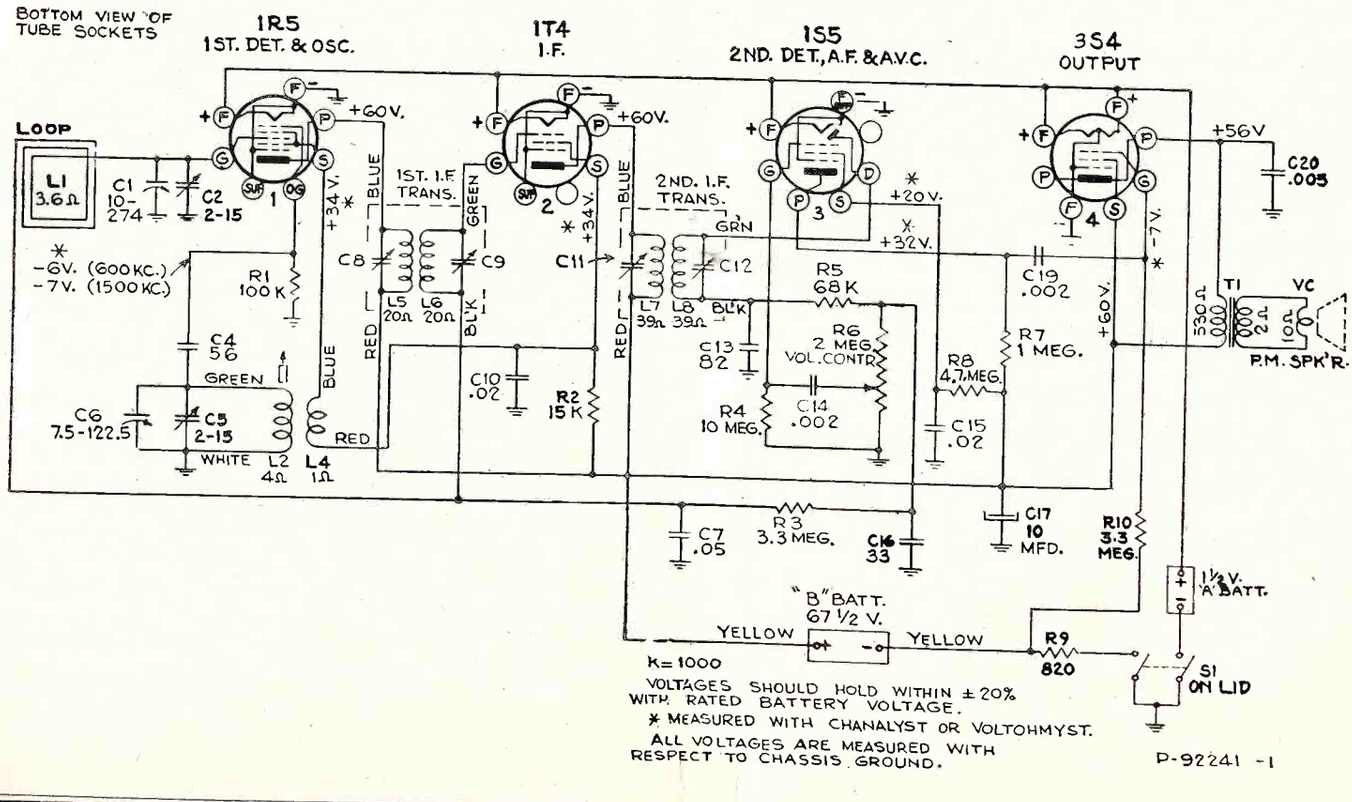
1. One Phillips No. 1 screwdriver.
2. One small neutralizing alignment tool.

CRITICAL LEAD DRESS

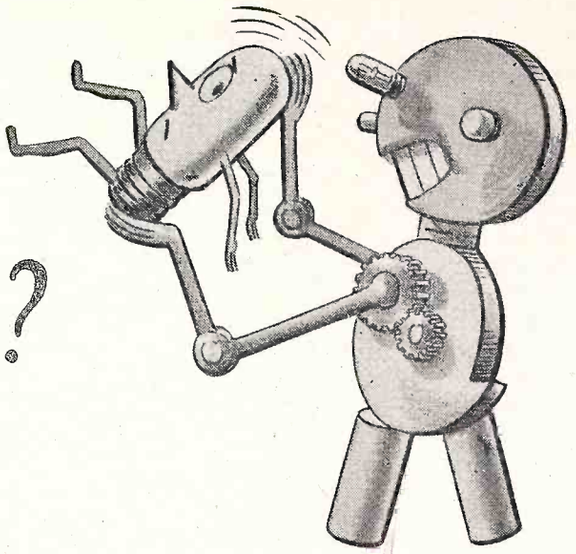
1. Dress blue, green and black leads of second I-F transformer as direct as possible. If excess lead exists, dress down side of socket and flat against chassis to transformer opening.
2. Cross the green and the black leads inside the first I-F transformer can, keeping the green lead to the outside. Keep the blue and the green leads separated as far as possible throughout their length.
3. Dress audio coupling capacitor (C14; .002 mf.) and the lead to the volume control up and underneath the shelf supporting the output transformer.
4. Dress the three capacitors pyramided behind the speaker, parallel to the complete assembly and with enough room behind the battery holder to allow the holder to move when a battery is installed or removed.
5. Dress the "B" battery leads behind the gang frame and over the top of the output transformer.
6. Observe the outside foil connections on all paper capacitors, also the polarity of the electrolytic capacitor (C17).
7. Keep blue and red leads of output transformer above the mounting shelf.



Note: DO NOT install "A" battery without cardboard cover. A rubber band should be placed around each tube for cushioning.

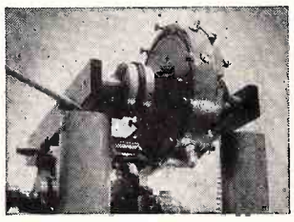


Ever see a robot bouncer?



Radio Dial Lights

Chances are, you'll never need one. But the unique device shown below—actually called a rotary hot shock tester—bounces lamp bulbs up and down more than once a second for eight hours, and gives the lighted lamps a terrific beating. The hot shock tester is just one of many testing devices built by General Electric to assure top quality in G-E Miniature Lamps.



And that's another important reason why it will pay you to sell G-E Miniature Lamps for radio dial lights and other similar uses. Features like these will give your profits a real lift selling G-E Lamps:

1. **Dependable, trouble-free performance.**
2. **High level of maintained light output.**
3. **Low current consumption.**
4. **Long life.**
5. **Profitable to handle.**
6. **Greater dealer acceptance.**

***For information** on prices and types of G-E Miniature Lamps, see your nearby G-E Lamp Office. Or write to General Electric Company, Division 166, RSD-3, Nela Park, Cleveland 12, Ohio.*

GENERAL ELECTRIC

CIRCUIT COURT

SELF-BIAS (HOFFMAN, FIG. 1)

It is the general rule in ACDC receivers, which apply relatively low plate and screen potentials to the tubes, to operate the 12SA7 converter tube with the cathode at zero potential. This is allowable because the tube generates a bias as soon as it begins to oscillate. In the Hoffman models A200 and A302, both containing the 103 chassis, the use of a 68-ohm resistor to provide self bias before the oscillating condition starts is found. This is a five-tube chassis and in general employs the usual tube line-up except for a 12SG7 in the IF stage.

It is probable that the use of the cathode resistor aids in starting oscillation and serves to equalize the generated oscillator voltage over the tuning range. *Figure* 1 shows the schematic of the converter stage. It will be noted that a separate cathode coil is used to obtain feedback, rather than a tap on the grid coil.

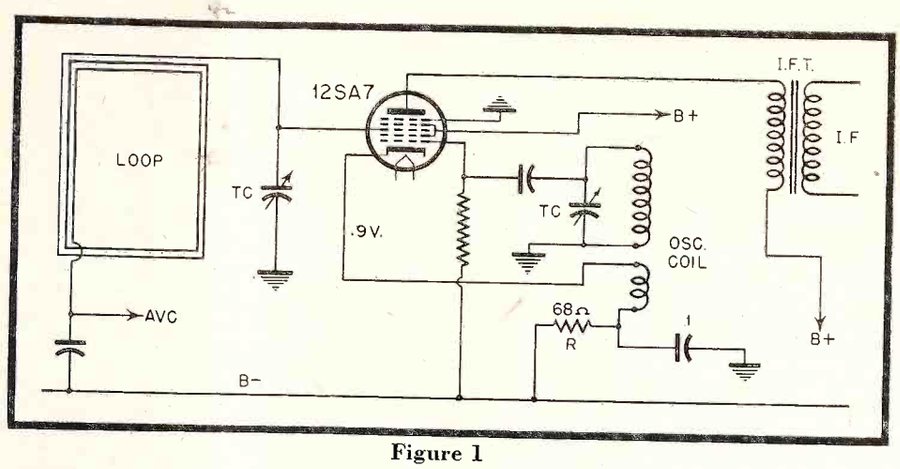


Figure 1

FIXED BIAS (PACKARD-BELL, FIG. 2)

In *Figure* 2 is shown the essential portion of the power supply and output stage of the Packard-Bell model 651. This is a six-tube AC receiver covering broadcast and short wave bands. The interesting features are the use of a 6X5 rectifier and fixed bias on the output stage.

Use of the 6X5 tube, with it's indirectly heated cathode, makes possible the elimination of one secondary on the power transformer. It also protects the condensers in the set since plate voltage is not applied till the rectifier has time to heat. By that time the other tubes will have reached high enough temperature to draw considerable current and limit the voltage.

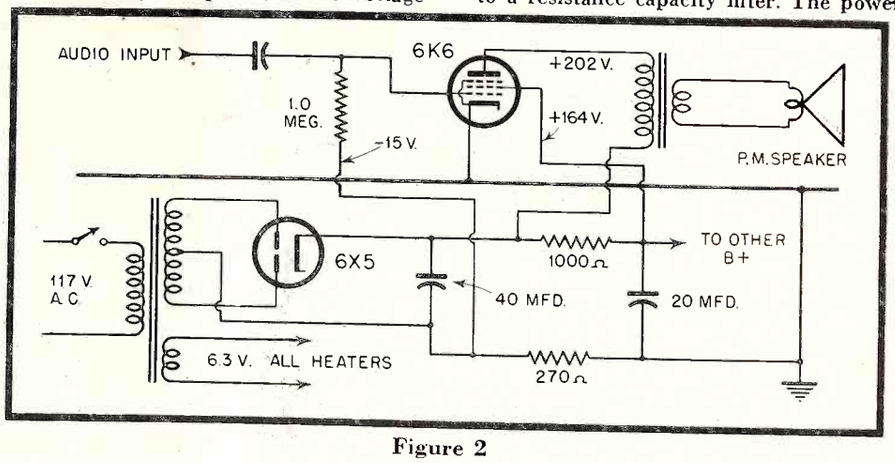
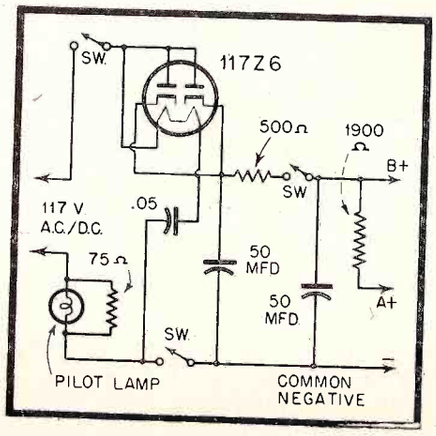


Figure 2

It will be seen that the filter consists of a 1000-ohm resistor in the B plus side and a 270-ohm resistor in the minus side and the two filter condensers. The drop across the 270-ohm unit is 15 volts and this value is applied to the grid of the 6K6 power stage as fixed bias. The full 2.5 watts for which the tube is rated is claimed as output. No high voltages are used in the receiver to obtain the high output. The AC voltage at each plate of the rectifier is only 200, and after rectification it appears as 217 across the first filter. The increase is due to the low drop in the tube and the storage capacity of the 40 mfd. first condenser.

After dropping the 15 volts for the bias voltage there is 202 volts left for the plate of the output stage. The screen, as well as all other tube voltages, comes off after the 1000-ohm filter resistor and operates at 164 volts. This ratio of plate to screen voltages is just about optimum for minimum distortion from a tube such as the 6K6.

Figure 3



PILOT LAMP ON POWER CIRCUIT (SENTINEL, FIG. 3)

The Sentinel model 285P is a six-tube AC-DC and battery set designed for fixed operation. Most of its details are fairly conventional and the tube layout follows the normal scheme. In one feature, however, it differs from most offerings. *Figure* 3 shows the power circuit employed when line operation is used. The 117Z6 rectifier tube has the two sets of elements connected in parallel and supplies voltage to a resistance capacity filter. The power line is fed through a parallel circuit containing a pilot lamp and a resistor to the 117Z6 plates and heater.

With a 75-ohm resistor across it proper voltage is supplied to operate a type 44, 6-8 volt, .25 ampere lamp. This fact should be noted when replacement is made of the pilot lamp. This is one case where the current drawn by the lamp is important. This is a simple solution to the nasty problem of providing a pilot lamp for sets of this type when used on power line source.

RESISTOR FOR HIGH VOLTAGE (SENTINEL, FIG. 4)

Very little cognizance is taken of the fact that a wide variety of line voltages

(*See page* 46)

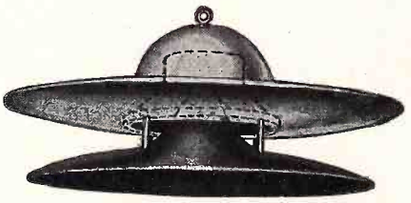
RACON IS THE BEST IN SOUND EQUIPMENT

RADIAL HORN SPEAKER; a 3½' re-entrant type horn. Projects sound over 360° area. Stormproof. Made of RACON Acoustic Material to prevent resonant effects.

PAGING HORN; extremely efficient 2' trumpet speaker for use where highly concentrated sound is required to override high noise levels. Uses P.M. unit.

Leading Soundmen everywhere specify RACON Horns, Speakers and Driving Units when quoting on potential sound installation sales or rental contracts because RACONS deliver maximum output and response for size of driving unit used. There's a RACON sound reproducer for every conceivable purpose. Each affords more dependable and efficient service and they are competitively priced.

SEND FOR CATALOG
OF COMPLETE LINE



RADIAL CONE SPEAKER; projects sound over 360° area. Cone speaker driven. Will blend with ceiling architecture. RACON Acoustic Material prevents resonant effects.

RACON ELECTRIC CO., INC. 52 EAST 19th ST. NEW YORK, N. Y.

MEN IN THE NEWS

(*From page 7*)

the advertising and public relations department of Burroughs Adding Machine Company in Detroit. Prior to that he was correspondent from Michigan for several national business papers. In the army for four years, he served in the European Theatre for three years of that time where he was assigned to Supreme Headquarters for duty in the Public Relations Division and in censorship of the news coming from Europe. A native of Grand Rapids, he is a graduate of East Grand Rapids High School, Grand Rapids Junior College, and the University of Michigan.

GE Appointments

John B. Brawley has been appointed Northeastern District clock representative for the General Electric Company, it has been announced by C. A. Reeves, district manager. His new headquarters are in Boston, Mass.

Flies to Distributors

Merchandise manager Nate Hast, Lear, Inc., home radio division, entering the firm's Beechcraft plane which he uses to make flying trips to distributors and to cover the national territory in the shortest time. Lear own two such planes, used for business trips by Willian P. Lear, president, and other company executives. Lear lines also include aircraft radios, navigational instruments, automatic controls, and wire recorders.

Aireon Vice Presidents

R. C. Walker, president of Aireon Mfg. Corp., has announced the appointment of Kenneth D. Halleck as a vice president and Bernard D. Craig as a vice president and director. Mr. Halleck has been a director of the company for some time. Prior to his affiliation with Aireon, Mr. Halleck

owned and operated his own electrical appliance business in Toledo, O. He was district manager for Kelvinator Sales Corp. prior to 1933. Mr. Halleck attended Bowling Green High School and Dennison University at Grandville, Ohio.

Mr. Craig is secretary and director of Cinaudagraph Speakers, Inc. and of Mid-Co Tool and Supply Co., operating subsidiaries of Aireon Mfg. Corp. He is a member of the American Bar Association, Missouri Bar Association, Kansas City Bar Association, and the Kansas City Club.

Decca Appoints

Decca Records Inc., announces the appointment of Edwin H. Manning as advertising and sales promotion manager. Leonard W. Schneider, who formerly held that position, was recently elected vice president of the company. Mr. Manning has been associated with Decca since 1942.

Cornish Wire Rep

Cornish Wire Company, New York City, manufacturers of industrial and communication wire, announce the appointment of Henry L. Mills to represent their complete line of CORWICO-trademarked products in the Los Angeles territory.

Thanks to Teplitz

At a meeting held in Chicago on August 5th the Board of Directors of Radio Parts & Electronic Equipment Shows, Inc. passed a resolution expressing its thanks and that of its officers and member-exhibitors to Henry H. Teplitz Advertising Agency of Chicago for their excellent efforts in publicizing the 1946 Conference and Show. Teplitz, who is advertising counsel for several leading manufacturers in the industry, donated much of his personal time and effort, as well as that of his assistants, to writing and distributing press releases, advertising material and general publicity for the 1946 Conference and Show. This gratuitous effort was a substantial constribution to the entire parts industry. (*See page* 44)

Amendment to Regulation "W" DELAYS MASS SALES

by A. E. DUNCAN*

$1,500 Credit Yardstick Favors Prosperous Time Purchaser, Penalizes Average Family.

THE recent amendment to Regulation W, curbing consumer credit creates a strange situation by which the government's temporary wartime restrictions on credit have now been removed insofar as they affect the time purchaser in the upper income brackets, while they continue to be imposed on the large majority of the nation's families of more moderate means.

This amendment, which applies to the time sales of automobiles, major home appliances and other listed articles, places unpaid balances of over $1,500 outside the down-payment and maturity terms of Regulation W. In effect, the man who can afford to buy a high-priced car on time can now take as long as he chooses, insofar as Regulation W is concerned, to complete his payments on a balance exceeding $1,500. The buyer of the low-priced car—the customer whose balance on the installment purchase of any average low or moderate-priced family car will be under $1,500—has no such choice; he must complete the transaction on terms restricted by the government—usually no longer than 12 months.

This amendment is inconsistent and may involve serious economic implications. These are suggested by the results of a recent survey of the spread of national savings among various income groups, conducted by the Federal Reserve Board and the Bureau of Agricultural Economics. This survey concluded that 60% of the savings in this country are held by 10% of the nation's families, while the bottom third of the population holds little or no savings. If the conclusions of this survey are anywhere near accurate, it is therefore evident that among large masses of the people the sales of automobiles, refrigerators and other long-awaited durable goods must be underwritten by consumer credit.

This survey underscores the paradox of a regulation which legalizes the extension of credit on unrestricted terms to the prosperous minority who hold ample savings, while limiting the terms on which credit can be extended to the third of the nation's families with negligible liquid assets whose buying power exists mainly through credit based on current earnings.

Consideration should be given at once to the need to rectify the inequitable effects of this amendment, so as to liberalize credit terms in the near future in order to underwrite the steady sales of consumer durable goods.

The question—and it is the key to the coming problem of mass distribution—is: how long can we afford to freeze a third of the nation's purchasing power?

Today the continuation of curbs on credit is intended to check inflation. But a basic cause of inflation, shortages of goods, will be rapidly dissolved by increased production in the period immediately ahead. The ratio between production and the pent-up demand for goods must be watched closely in order to determine the point at which credit must be liberalized.

The turnabout from a seller's to a buyer's market in the automotive industry, for example, pivotally-important to the economy as a whole, is a not-too-distant prospect. In a poll made recently of the representative Detroit Automobile Dealer's Association, opin-

(*See page* 34)

Chairman of the Board, Commercial Credit Co., Baltimore, Md.

MERCHANDISE PRE-VIEWS

(*From page 24*)

is also made for noise testing.

Bost instruments are supplied for 105-1125 volts, 50-60 cycle a-c operation and are rated at 20 watts. Controls are readily accessible and all markings, including those on the 4½-inch meter face are easily read.

AC Phono Operation on DC

A new vibrator inverter, designed to permit operation of alternating current phonographs with direct current, is now in production by Electronic Laboratories, Inc., of Indianapolis, according to Walter E. Peek, vice-president.

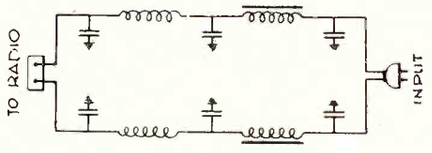
Speaker Repair Kit

New Home Industries (NHI) of New York is currently setting up national distribution of its allied lines of radio components through accredited manufacturer's representatives. Its "Coldpatch" Speaker Repair Kit is finding favor with radio servicemen all over the country. The "Coldpatch" can be applied in a jiffy. It's accoustically correct for sound reproduction. It will not get brittle because it is gummed with a special tacky substance which never dries hard so that it cannot rattle or rasp. The days of cement warping the cone or running into the voice coil are over. The kit contains 37 "Coldpatches"—including 3 varied and convenient sizes plus a 5 in. x 7 in. Cold patch strip which the serviceman can cut to fit his individual needs to speed up speaker repairs.

Radio Line Filter

A radio line filter with six (6) bypass condensers, two iron-core chokes and two RF chokes is announced by New Home Industries. Their engineers designed this special duty filter to make it as efficient on AC as it is on DC. (See cut.)

Nat Hyman, chief engineer, stated, "We are going into production now with our "Regulation" radio line filter to complement the NHI "Standard". Our "Regulation" filter is being manufactured expressly for the table-model



and lower priced radio trade. It has been designed to steady a choppy or rippling line, and to filter out power line noises, fluorescent, elevator and RF noises which are superimposed on the line, by-passing them into the ground. This competitive filter will be popularly priced to get widest possible coverage in the field. Complete information may be obtained by writing to New Home Industries, 216 Eldridge Street, New York 2, N. Y.

The following representatives have been appointed to handle the national distribution of its products. The Branum Co. of Dallas, Texas; Midwest

(*See page 38*)

MASS SALES

(*From page 32*)

ions of veteran dealers as to how long the backed-up demand for new cars will continue to dominate the automobile market ranged from two years, at the outside, down to "ninety days after real production resumes." Beyond this point the mass market for automobile sales is threatened, acording to the majority of dealers questioned, *by the inability of sufficient people to meet the large monthly payments required under the currently restricted maturity period of regulation W.*

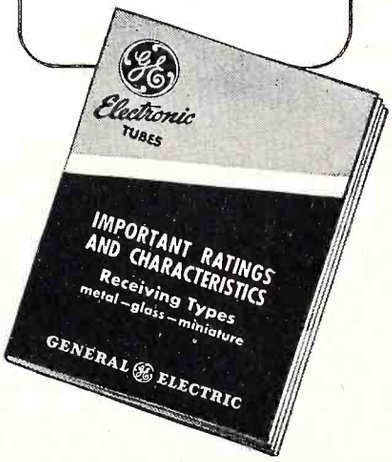
GE RADIO TUBES

TOO many radio owners insist on them, for G-E tubes to linger on your shelves! *Dust doesn't gather on G-E tube cartons.* They're in your store, then out again quickly, with your cash register singing a merry tune of profits and fast capital turnover.... Reasons? ... The biggest one is the General Electric monogram—what it means to millions of people in the way of quality and *proved* performance!

Your neighbors have confidence not alone in their G-E radios, but in their G-E refrigerators, irons, and other home appliances. Their light fixtures hold G-E lamps. Mostly the current that spins their G-E fans and clocks comes from big G-E dynamos and transformers. *Your neighbors are G. E.-minded.* When they want radio tubes, it's second nature to go to the store with the General Electric sign they know and trust ... YOUR STORE!

Opportunity, with an attractive profit message for you, stands at your door. So don't delay! Write for information about G-E tube selling rights to *Electronics Department, General Electric Company, Schenectady 5, N. Y.*

Every tube dealer and service man should have G.E.'s Tube Characteristics Booklet ETR-15. Send for your free copy!



GENERAL ELECTRIC

176-E5-6850

FIRST AND GREATEST NAME IN ELECTRONICS

Shop Notes

STROMBERG CARLSON MODEL 935

Motorboating, when the tone control is turned to the bass position. This trouble has been traced to a defective cathode by-pass condenser, C8-20Mfd. This condenser is contained in the four-section block which contains condensers, C6, C7, C8 and C9, and is located in the left rear corner of the receiver, near the 6H6 discriminator tube.

Another source of trouble in this receiver is the filter block containing the high voltage condensers C1 and C2. High internal leakage in these components results in receiver operation at about one-third the normal power.

STROMBERG CARLSON 1946 FM MODEL 1121

It has been found that the motorboating occurring at the bass position of the tone control, referred to above, takes place, also, in the new S.C. Model 1121. Replacing the 40 Mfd. filter condenser connected to the cathode of the 6V6 output tube will rectify this condition.

ALL RECEIVERS—OSCILLATION AND MOTORBOATING

Oscillation, and motorboating, may be often removed in many receivers by shunting the high voltage electrolytic condensers in the power supply circuit with a 1 Mfd., high voltage paper condenser. The reason for this is that R.F. energy which finds its way into the "B" supply may not be effectively by-passed by some electrolytic condensers. A good paper condenser will always do the trick.

HUM—HIGH GAIN AMPLIFIERS

Hum occurring in a high gain amplifier, not reduced by connecting additional filters in the power supply circuit, may often be entirely eliminated by removing the ground return of the filament winding of the tubes (particularly the first audio tube) and connecting it as in Fig.

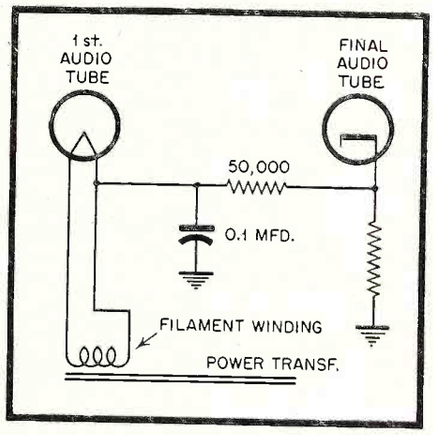


Figure 1

1. In the figure, the return is connected to the cathode of the power tubes through a decoupling filter, consisting of a .1 Mfd. condenser and a 50,000-ohm resistor. In this manner the D.C. potential of the filaments is brought to about the same voltage level as the cathodes of the amplifier tubes. Cathode leakage, the cause of the hum, is thus reduced to a minimum.

HETERODYNE WHISTLES

There are, in general, four varieties of heterodyne whistles. These may be caused by one or more of many sources of interference. By observing the type of whistle obtained, the serviceman can often identify which of the four is causing the trouble, thereby enabling him to correct the condition quickly.

Imagine Frequency Response can easily be checked by setting the dial of the receiver to a frequency equal to the station frequency (in the vicinity of the high end of the dial) plus twice the I.F. This type of interference is characterized

by the ability of the receiver to receive many high frequency stations at two points on the dial. The spurious signal beats against the stations tuned in, resulting in the whistle heard, realignment, additional stages of R.F., or the use of a wave trap will, most always, clear up this condition.

Heterodyne whistles are also caused by a powerful station in the vicinity. If the second harmonic of the station combines with the oscillator frequency, a spurious signal will result equal to the intermediate frequency. This signal beats against the signal tuned in, resulting in the whistle heard. Two remedies for this condition are, the use of an appropriate wave-trap, and shifting the intermediate frequency to a value a little above or below the original.

Occasionally, a whistle is heard on almost every station tuned in. This is indicative of *two powerful stations operating at frequencies, the difference of which is equal to the intermediate frequency* of the receiver. Here again, by shifting the intermediate frequency of the receiver, or employing one or two wave-traps, the whistle can be materially reduced.

A fourth type of whistle, one which is rarely encountered, but which the serviceman might come across, is that caused by *radiation from the oscillator circuit* of the receiver, under unusual conditions of coupling, into the other circuits, the antenna, or the power line. This whistle changes pitch at random. Remedies for occurs on a particular station, and this condition are: shifting the intermediate frequency, reducing the oscillator grid leak value, installing a good antenna,

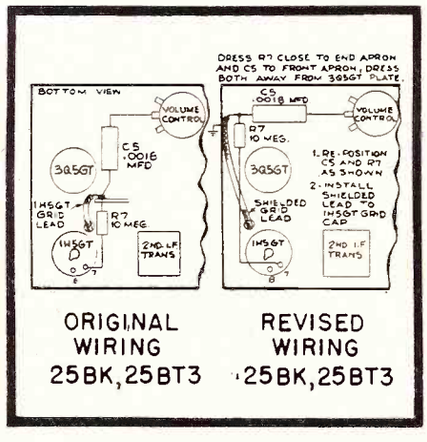


Figure 2

using a power line filter, and shielding the I.F., R.F., and oscillator components. An excellent analysis chart on this subject is available from R.C.A.

R.C.A. MODELS 25BK, 25BT3

To reduce minimum volume on these models R.C.A. suggests re-positioning the 1H5-GT 1st-audio grid capacitor (C5) and grid resistor (R7), and installing a shielded lead to the grid cap of the 1H5-GT tube. These charges are shown in Fig. 2.

ALL RECEIVERS—INTERMITTENT FRYING NOISE

Very often the complete breakdown in an audio transformer, condenser, volume control, the voltage divider, is preceded by a period of time during which the breakdown is intermittent. During this period the receiver gives forth an irregular frying noise. Locating the source of this trouble is extremely difficult with ordinary test instruments. An effective procedure, in this case, is to first locate the stage or circuit causing the trouble; then, with a pair of earphones and a 4½ battery, test each component in the stage, as in Fig. 3. The reason for the effectiveness of this test is that current variations of a few microamperes can be readily detected by a sensitive pair of earphones.

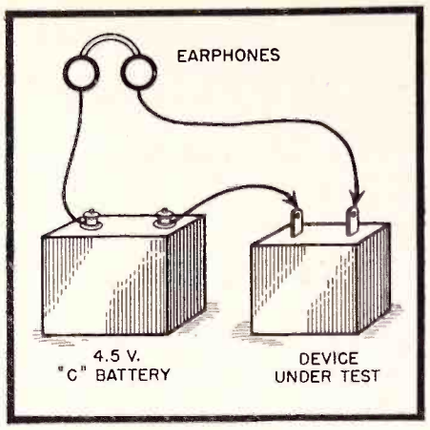


Figure 3

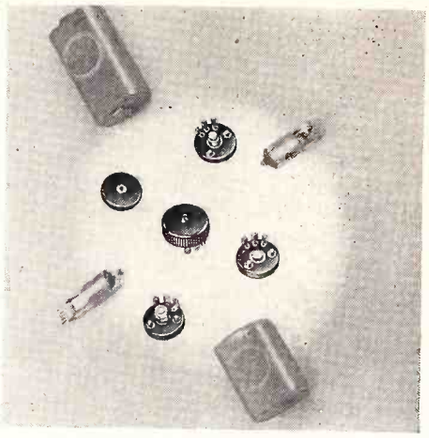
(*From page* 34)

Sales Co., of Cleveland, Ohio; Carl A. Stone Co., of Los Angeles, Cal.; Harold A. Roseberry of Detroit, Mich.; Selkirk Agencies, Ltd., of Vancouver, B.C. Canada.

Miniature Radiohm

Centralab's new Model 1 Radiohm is specifically designed as a high quality volume attenuator for hearing aids, pocket radio receivers and miniature amplifiers. It is smaller than a dime and is designed to accommodate many variations in specifications. It is a perfect companion for sub miniature tubes, batteries and other components. The new type unit will be available in 500 ohms to 5 megohms. Six tapers available. Some of the features are:

Smallest possible size for practical low noise, long life operation. Dust shield to keep out foreign matter. Three optional mounting locations. Optional cam for external switch operation. Separate assembly knob that is not involved with mounting on internal mechanism. Shaft can be extended from knob on terminal side. Rotation stop has internal rugged construction. Resistance element is permanently embodied on high quality phenolic material. Twin resistor contact provides smooth resistance variation in either direction of rotation. Terminals insulated and independent of mounting. Tolerance ±20% standard for all values and curves.



Miniature Radiohm

Photos, construction, drawings and more complete information in a temporary bulletin, form number 934. Write Centralab, 900 E. Keefe Ave., Milwaukee 1, Wisconsin for your copy.

Home Recording Popular

Thousands of families are learning that home recording is enjoyable and educational. To make your own records requires no special skill with any of several good makes of home recorders. All it takes to be your own "M.C." or star entertainer is practice in adjusting the tone and volume controls to accommodate your speaking or singing voice.

Many parents are finding that teaching the children to recite into the microphone makes them less self-conscious and less inclined to mumble some of their words. The children invariably sit with rapt attention to the record as it is played back, for—it seems that children are enraptured by the sound of their own voices.

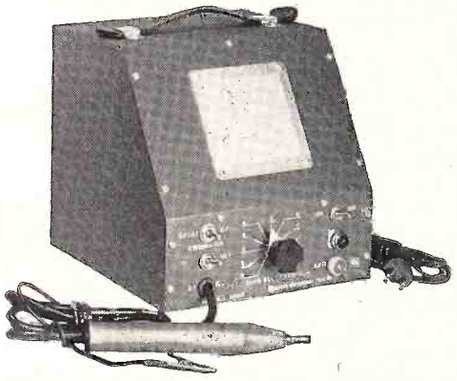
Most of the home recorders can also be used as public address systems and when used in this manner add spice and entertainment to parties or family get-togethers. With a particularly witty member of the party as Master of Ceremonies the "P.A." system offers an evening of laughs and entertainment for all.

As versatile as it is valuable the home recorder is used by some to make their own musical recordings directly from radio broadcasts. In this way you get your own favorite musical albums of just the music you want by the artists you prefer. An album of these records

costs you about $1.80 this way, as a ten-inch recording blank (disc) costs about $.60, and you can use both sides.

We'll probably be hearing more about home recorders as time goes on for there seems to be a rapidly growing demand for good home recorders for educational purposes and for just plain enjoyment.

Emerson Portable Phono Model 521. Three tube amplifier, increased power output with new circuit; 6½-inch Alnico 5 PM dynamic speaker; crystal pickup; self-starting constant speed motor. Plays all sizes records with lid closed.



New Tracer Shoots Trouble Fast

The Precision Electronic Model 200, permits the service man to "listen in" to a signal at any point in a radio receiver. A Polystyrene tipped probe feeds the signal from the R.F., I.F., or A.F. stages into a high gain amplifier with a P.M. speaker. A lack of signal or abnormal condition immediately localizes the trouble.

Through the use of an extremely low capacity coupling, the tracer probe does not disturb the operating characteristics of the circuit. This instrument can be used for quickly locating R.F. and I.F. coil troubles, for checking performance of tuning condensers, for analyzing the condition of resistors and paper and mica condensers. Microphonic tubes and bad speakers as well as defective volume controls and transformers can be spotted in a hurry.

The well designed audio amplifier provides a good test of audio quality. Modulated R.F. frequencies of over 300 Mc. have been successfully checked. This more than covers any frequencies that the service man can ordinarily expect to meet. Operation is from the regular 110-120 volt A.C. 60 cycle line. This tracer, priced at $29.95, is available immediately from the Radolek Company, 601 W. Randolph Street, Chicago 6, Illinois.

Turntable Stand

Solution to the problem of supporting a phonograph turnable for convenient serving is found in the new G-C Turntable Stand. Adjustable to fit any size turntable, the 18-inch height permitting easy inspection and repairs of the motor and changer mechanism. Save considerable time and effort on a hitherto unwieldly job. List price $3.00. General Cement Mfg. Co., Rockford, Illinois.

(*See page* 45)

LOOK AHEAD

(*From page* 12)

done quite well during the war because costs have been substantially reduced, and through his ingenuity and energy other products were substituted for those not being manufactured. Jobbers who were in the electrical, hardware, and other businesses, did well because of the large demand for the products caused by war expansion and a recognition on the part of the Government that these products were essential to building plants, bases, and other necessary facilities.

The distributor is now faced with a shortage of his prewar type of merchandise, with a greater demand on the part of retailers, and with the problem of so adjusting his organization as to build his services in line with the supply of devices.

My own opinion is that the distributor in the years just ahead must do a very selective and aggressive selling and promotion type of work. I think the distributor must concentrate on fewer lines; do a more penetrating type job than ever before; have a very effective and capable selling organization, and really develop a territory with retail distribution that can satisfy manufacturers who have double the prewar capacity and will have tremendous pressure on him to take a very large volume of products in an area that previously absorbed much less.

PRODUCT SELLING

The *dealer* has his problems too. There are too many of them, and I think distributors are going to do a more selective job with their retail distribution. The well-advertised and popular lines of products will be limited and the manufacturers will insist upon high productivity of the individual dealer in order to get into the hands of the consuming public the larger volume that is required. One of the big jobs of the dealer will be the reconversion of sales people, and a new approach to customers.

The dealer will have to have *a good location; a clean place of business; well-displayed merchandise; good sales programs and selling follow-ups with intelligent advertising and promotion.* And in those instances where the dealer is required to service the products he sells, it will be necessary that he have *a parts inventory, good service people and facilities to handle trade-in products.*

The trade-in of appliances and radios will increase substantially with the larger volume of production which of necessity will accompany new models, new features, more desirable products.

I think the training of people is the No. 1 problem of the dealer. There is going to be a lot of very, very severe competition, and customers are going to become very selective; in fact, they are becoming selective right now on radios, and there is a good deal of advertising of so-called "off-brand" table model radio sets at cut prices. *While there is a seller's market at the present time, when products become freely available a capable, courteous, well-trained sales personnel will be essential to success.*

My own personal opinion is that we have all got to "cast our sights" on 1948 and plan to have at that time a successful business. In order to do that everyone of us, whether he be a manufacturer, distributor, or dealer, must program in such a way that he provides a real service to the people with whom he does business, and watch every element of his operation with this thought in mind.

INTERMITTENTS

(*From page* 12)

energizes the bell so it rings. The 6C6 tube's purpose is to change the effective grid bias in the 42 with a consequent decrease in signal strength at the instrument's input terminals.

To ascertain whether there is any fading between antenna and speaker a modulated signal is fed into the receiver's antenna post with the r-f adjusted to approximately 600 kc because at this setting the local oscillator in the set will stop at lower frequencies so if fading is caused by cessation of oscillations such fact will make itself known when the bell rings. Or, because at lower frequencies the condenser is almost completely closed, and should the trouble be caused by plates contacting each other, it will probably so indicate.

While a modulated signal is fed into the receiver, disconnect the speaker voice coil and attach the voice coil terminals of the input transformer to the relay. By means of the 1,500 ohm potentiometer, adjust the cathode voltage of the 42 tube, starting with maximum positive cathode potential. Then, as this voltage is slowly reduced watch the contact poles R_1-R_2 close up slowly. When they are almost entirely closed and are almost touching the bell-ringer is properly adjusted so that a minimum current decrease in the receiver being checked for an intermittent will manifest itself by allowing the poles R_1-R_2 to actually close and form the contact that rings the bell. To determine whether your relay adjustment is sensitive enough either turn down the receiver's volume control or touch any r-f or i-f grid. A ringing bell indicates the instrument's readiness for use. Then, when so fortified, hook it up to any receiver that is operating at low volume level and let the set play without paying attention to it. If an intermittent exists, look sharp when the bell rings for it's time to go to work.

Stromberg-Carlson Production Up

Stromberg-Carlson peacetime radio production reached an all-time high during the month of June, vice-president and general manager Lee McCanne revealed recently. He said that average daily production in July had surpassed the June average, but that an 11-day vacation period in July had cut into the total output. The resumption of accelerated production schedules in August indicates that output will top the June figures, it was said. The company's sound equipment division promises to reach its production quotas set for it in January in the near future.

TRANSCONDUCTANCE READING TUBE TESTS

(*From page* 15)

one tube type and is the cutoff point or the grid voltage at which the plate current becomes negligible. The plate current Ip_1 is, therefore, proportional to the slope of the line Eg_1Ip_1. The slope Ip_1 divided by a constant, in turn, is proportional to slope AB or to gm. The plate current may be considered as that resulting from a change in Eg between Eg_1 required for zero Ip and zero Eg. The plate current reading at Eg_1 need not be made as it will be effectively zero in all cases. It may be seen that the slope Eg_1Ip_1 is proportional to AB for all general purposes in a given type tube. Since the line Eg_1Ip_1 intersects AB, the measurement of Ip_1 also may be made effectively proportional to gm at rated grid bias.

Ip_1 is a function of element shape, element spacing and cathode emission. The larger the plate, the greater the AC plate current for a given voltage. The closer the grid is to the cathode, the greater will be its effect on reducing the space charge around the cathode and the greater the plate current for zero grid bias voltage. The greater the emission, the greater the AC plate current for a given AC signal grid voltage or the greater the plate current at zero grid bias voltage.

It might be said that with the grid tied to the cathode, the grid serves as a vertual cathode. The degree to which the grid serves as a cathode, however, depends on the mechanical characteristics of the grid wires, grid to cathode spacing, etc. These are the same mechanical characteristics that influence the transconductance of the tube.

The circuit in *Fig. 2* illustrates the construction of a simplified transconductance reading tube tester as applied to lever switching. The 8 pin tube socket illustrates the tube connections. In the actual tester, the leads to this socket connect in parallel with the proper pin numbers of 4 pin, 5 pin, 6 pin, and other necessary sockets to cover all the tube base arrangements of the common run of tubes.

TRIPLETT MODEL 2425 TUBE TESTER

The Triplett 2425 operates on the principle that the plate current at zero grid bias on a given type tube free from gas or open or shorted elements is directly proportional to the grid to plate transconductance (previously called dynamic mutual conductance). This is the principle outlined above. See *Fig. 3*.

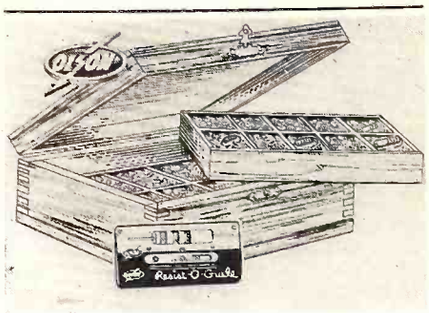
The self-rectified DC causes plate current to flow on only half the cycle and produces an overall heat closely approximating the normal dissipation for the tube. The resulting rectified plate current is proportional to the grid to plate transconductance and the indications closely approximate those obtained with laboratory gm measuring circuits. The resulting gm readings also agree within limits with those in the tube manufacturers data book.

On self-shielded tubes such as the metal series, a check is made of the shield circuit continuity. An open shield connection would cause a tube to read "good" on a transconductance test using a 60 cycle signal and yet be defective in a R.F. stage due to lack of shielding. On Model 2425, the transconductance is read directly from the instrument scale. In some cases, a multiplying factor applies to the scale as noted on the tube chart listing for that tube.

The flexibility of the tester allows an experienced serviceman to set up a new tube not listed on the tube chart by referring to the tube manufacturers published data, setting the levers for the various socket connections, the meter in the proper plate lead, the filament to the proper filament voltage tap and the sensitivity control on the basis of the average of several "good" tubes. The screen grid is tied to the plate in most cases. See *Fig.* 4 for schematic. (*Page* 15).

IN TRADE

(*From page 6*)



x6¼"x3", having a removable tray. There are 20 compartments in the chest—10 in the base and 10 in the tray.

The Chest contains 100 insulated resistors stamped with resistance value and color coded. Ranges include sizes from 5 ohms to 20 megohms, ½ watt to 2 watts, tolerance 10%, all insulated resistors. Every size is popular; no war surplus resistors are used. Every resistor is made by one of the largest resistor manufacturers in the country. The Chest is priced at only $4.95, complete with resistors and a "Resist-O-Guide" which is an automatic resistor color code device. Three wheels are set to match the color of the resistor, and the actual resistance appears in numerals through little windows.

Sell Television Receivers

Television receivers made by Viewtone Television & Radio Corp., Brooklyn 1, N. Y., are daily being installed in homes in greater numbers, according to Irving Kane, president of the firm. Great demand exists for the low costing Vanguard model which sells retail for $169.95, without installation. Fine results are being obtained with the low priced Viewtone television receiver, according to reports from dealers.

Equipped with seven-inch cathode ray tubes, the Viewtone television receivers present a direct view of the program, no mirrors being employed. Other television models include the Aristocrat, which also has a radio and phonograph with automatic record changer, and the Elite, which includes a radio.

Sonora Cabinets

Absorption of the Sterling Wood Manufacturing Co. by Sonora Radio & Television Corp. was announced today by Joseph Gerl, President of Sonora. This move to take over the plant, machinery, equipment, and business of Sterling, Mr. Gerl said, was to insure the continuance of the flow of radio cabinets to Sonora. Current production is 30,000 radio cabinets a month, and an expansion program is under way to increase to 40,000 a month.

(*See page 46*)

MEN IN THE NEWS

(*From page* 31)

GE Credit Corp

General Electric Credit Corporation has opened its Richmond, Virginia, office, according to L. E. Williams, Eastern District Manager of the GECC. The office is located at 1106 East Main Street, Richmond 19, Virginia. Arthur Parker, Jr. is manager.

This is part of GECC's program of establishing additional representation to serve the many dealers in this area selling General Electric and Hotpoint products.

Harper Resumes

Sam M. Harper, one of the veteran manufacturer's representatives in this industry, who disposed of his agency at the start of the War to enter upon special war work, has resumed where he left off, and is now open for good non-competitive lines.

Lines for sale to radio and electric jobbers and manufacturers, also to chain and large department stores, are desired, with rights for New Qork metropolitan and 75 mile radium. Mr. Harper's present quarters: 215 Fulton Street, New York 1.

Radio Firm Changes Name

A. A. Juviler, president of Hamilton Radio Corp., 510 Avenue of the Americas, New York, announces that the company name had been changed to *Olympic Radio & Television, Inc.* Other officers of the company are P. L. Schoenen, executive vice-president; J. F. Crossin, director of sales, and Morris Sobin, treasurer. A nationwide sales organization through 78 exclusive distributors has been set up.

S. J. McDONALD, JR.

His appointment to sales staff of Radio Tube Division of Sylvania Electric is announced by H. H. Ranier, manager distributor sales. He will serve the jobbing trade in the New York-Philadelphia territories.

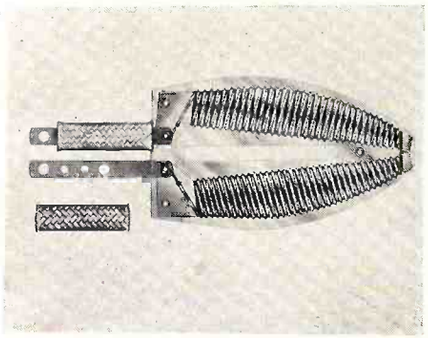
Merchandise Pre-Views

(*From page 39*)

Flat Iron Replacement

A new flat iron replacement element to fit 90% of all electric irons from 5 to 6 lbs. has been announced by the St. Clair Electric Products Company, St. Clair, Michigan. Installation requires a minimum of skill, tools and labor.

Heavy die-cut mica forms are wound with flat Chromel or Nichrome resis-



tance wire for 600 watts on 110 to 120 volt AC or DC service. A 3¾x11/32 inch slot through the center of the element permits easy alignment of the element with the frame and clamping screw during installation. Replacement elements are individually packed with complete instructions for installation.

Silicon Crystal Converters

Compact silicon crystal converters for use as first detectors in high frequency superheterodyne receivers have been announced by the Electronics Division, Sylvania Electric Products Inc. The crystals which are permanently preset in a small cartridge measuring approximately ¾" long and ¼" in diameter are available in three types designed for frequencies up to 10,000 mc. Unlike vacuum tubes, crystal converters require no filament or heater supply and take only a fraction of the physical space. Low thermal noise and i-f impedance are other important features.

Type 1N21B is designed for frequencies in the region of 3000 mc. and is rated as follows: conversion loss, 6.5 db. maximum; thermal noise ratio, 2.0 maximum; l-f resistive impedance, 200 to 800 ohms. Corresponding characteristics for Types 1N23B and 1N25 crystals are as follows: 10,000 mc. and 1,000 mc.; 6.5 db. and 8.5 db.; 150-600 and 100-400 ohms.

The efficiency of these crystals in the microwave region suggests several uses, among them: rectifiers in wave meters, monitors and field strength meters as well as detectors in portable shf receivers.

CIRCUIT COURT

(*From page* 28)

may be encountered in consumers' homes. In a recent survey of power companies it was discovered that the possible limits were at least 105 and 130 volts. Actually a considerably wider range has been reported. In *Figure* 4 is shown

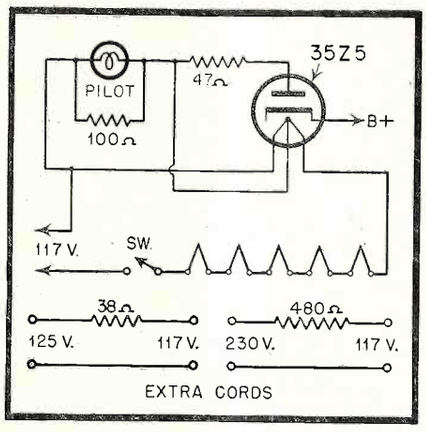


Figure 4

one answer to the problem, and also a solution for the industrial and isolated cases where potentials in the range near 230 volts is found.

The power line circuit of the Sentinel Model 293 is shown. This is a six-tube AC-DC receiver of conventional layout. The one interesting difference is that the normal use is contemplated on a line in the vicinity of 117 volts. If line voltages in the vicinity of 125 are encountered there is provided an extension cord containing a 38-ohm resistor. This should go a long way toward elimination of component failure common in high voltage areas. It is only a logical step to provide a cord with a 480-ohm resistor to enable use of the set on 230 volts.

IN TRADE

(*From page* 43)

Electro-Voice Catalog

A complete new illustrated catalog and selection guide has just been published by Electro-Voice, Inc., South Bend, Indiana, manufacturers of microphones and stands. It gives complete data and information on the most comprehensive line of microphones available today. It includes: Cardioid, Dynamic, Crystal, Velocity, Differential, and Carbon Microphones . . . . .to provide an exact answer for practically every microphone application. The selection chart on Page 3 makes it easy to select the right microphone for each application. In addition, there is a

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342 Madison Ave., New York 17, N.Y.

technical section on various types of microphones.

A copy can be obtained free from any authorized distributor or write to Electro-Voice, Inc., 1239 South Bend Avenue, South Bend 24, Indiana.

Surplus Radio Materials

The Atlanta, Georgia, division of Concord Radio Corporation, announces a new service which will make thousands of government surplus items available to radio and electronic parts buyers—service men, engineers, experimenters and radio amateurs. The new service will be known as the Concord Surplus Division, with Edward Berliant as general manager of the Atlanta branch.

Monthly "site" sales will also be held, which will be announced two weeks in advance each month. Fully-informed salesmen will be in attendance at these sales to assist prospective purchasers. It is also planned to prepare illustrated lists of available materials for mailing to those unable to visit Atlanta to take advantage of the service in person. These lists will be mailed, as issued, to anyone writing to the Concord Radio Corporation, Surplus Division, 265 Peachtree Street, Atlanta 3, Georgia.

GRID BIAS

(*From page* 19)

that it varies with age and introduces some distortion.

CHOICE OF METHODS

The method of bias to be used depends on the application. In high gain voltage amplifiers almost any method may be used, but methods that reduce hum are to be preferred. In extremely high gain stages, contact potential or bias cells will generally be best. In output stages neither of the above can be used. If the stage is Class A some type of fixed or self bias may be used, while in Class B operation fixed bias from a bleeder or bias supply is imperative to avoid distortion. In class B amplifiers the grid draws current so the bias source must have low internal impedance.

In r-f amplifiers and oscillators grid rectification is almost always used supplemented by cathode bias for tube protection. In r-f and i-f amplifiers in radio receivers the a-v-c bias is almost identical to grid rectification bias except that rectification occurs in a separate diode rather than in the grid circuits of the individual tubes. In small t-r-f radios which do not have a-v-c the bias is obtained from a cathode resistor which is mare variable and acts as a volume control.

Ad Index

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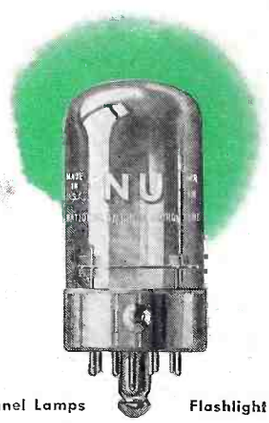

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