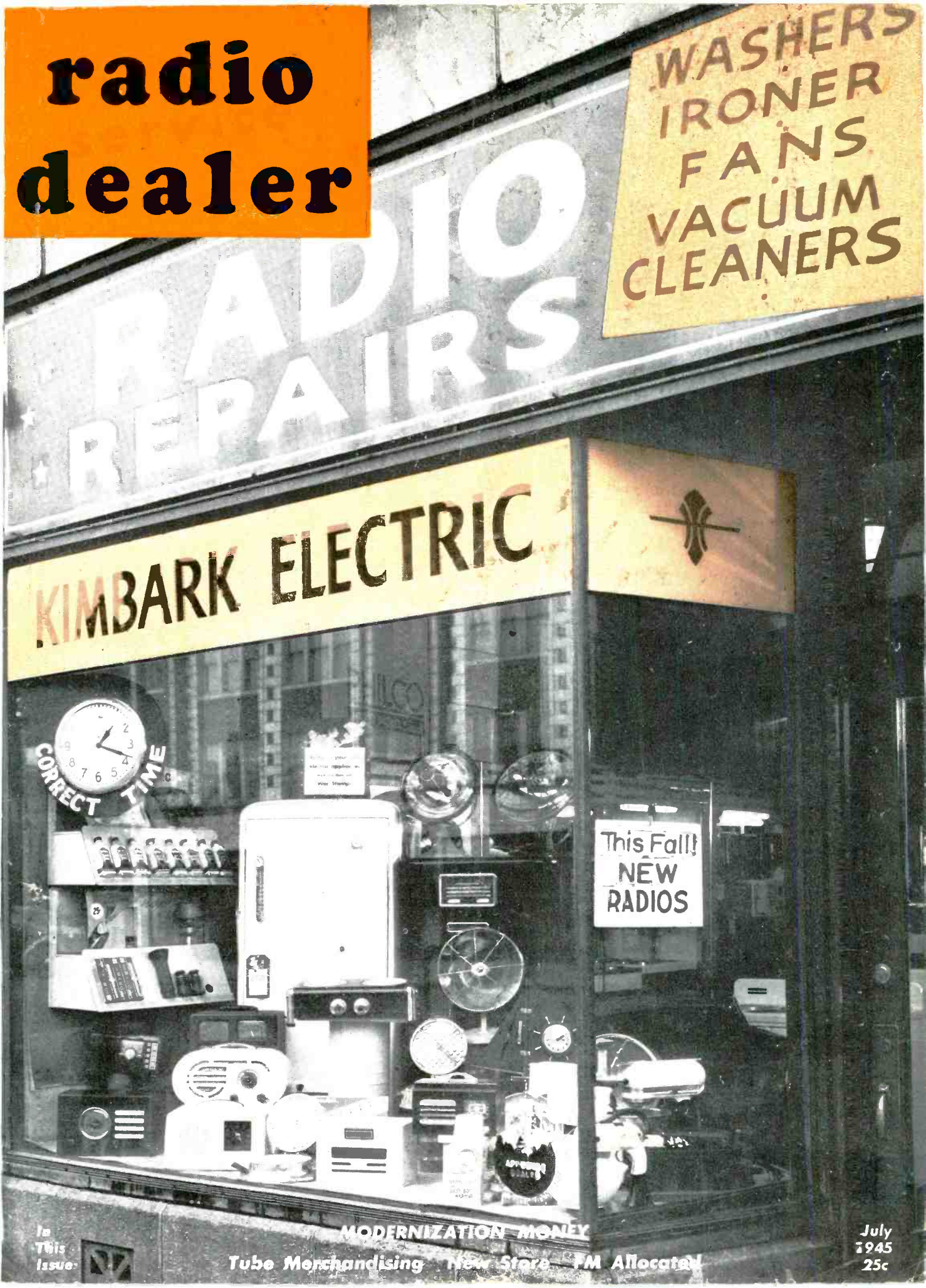
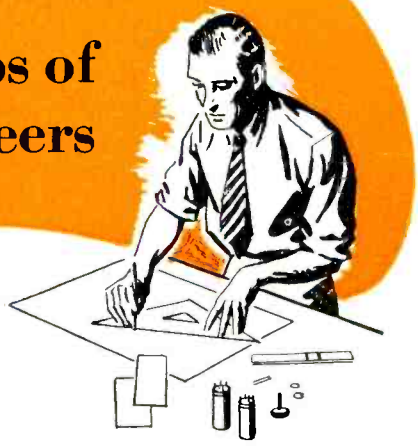
radio dealer



In This Issue: MODERNIZATION MONEY — Tube Merchandising — New Store — FM Allocated

July 1945
25c

FIRST in Research
FIRST in Development
FIRST in the Shops of Service Engineers



Pioneering by MALLORY Has Resulted in These History-Making Developments:

1. High voltage dry electrolytic capacitors.
2. Dry electrolytic capacitors in cardboard containers.
3. Etched plate A.C. capacitors.
4. Dry electrolytic capacitors for operation at temperatures as high as + 85 degrees centigrade.
5. Toroidal type A.C. capacitors.
6. High surge characteristics of dry electrolytic capacitors by employing cellophane separators.
7. F.P. (fabricated plate) capacitors.
8. Capacitors with self-mounting features.
9. Multiple dry electrolytic capacitors with controlled coupling characteristics.
10. Complete information for determining physical size of dry electrolytic capacitors of given rating.
11. Completely standard dry electrolytic filter capacitors.
12. Standard, close capacity tolerances on A.C. capacitors.
13. A standard line of A.C. capacitors in plastic containers.
14. Dry electrolytic capacitors with satisfactory performance at temperatures as low as —40 degrees centigrade.

These are a few of the many reasons why Mallory dry electrolytic capacitors have a deserved reputation for quality—why millions are in service today. Moreover, the Mallory line of capacitors is *complete*, and its distributors are ready to help solve your problems. Avail yourself of this service—begin today by asking for a copy of the Mallory Catalog of Approved Precision Products.

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

More than ever— ALWAYS INSIST ON

P.R. MALLORY & CO. Inc.
MALLORY
APPROVED
PRECISION PRODUCTS

VIBRATORS • VIBRAPACKS* • CONDENSERS
VOLUME CONTROLS • SWITCHES • RESISTORS
FILTERS • RECTIFIERS • POWER SUPPLIES

ALSO MALLORY "TROPICAL"* DRY BATTERIES, ORIGINALLY DEVELOPED BY MALLORY FOR THE U. S. ARMY SIGNAL CORPS, NOT PRESENTLY AVAILABLE FOR CIVILIAN USE.

*Trademarks

Be the ONLY Sparton Dealer in Your Town

HERE'S WHAT THE S.C.M.P. CAN DO FOR YOU

1 If you qualify as a Sparton Radio dealer, you will be given an *exclusive* franchise for your community.

2 All radio shipments will be made to you *direct from the factory,* at dealer-delivered prices.

3 You will be sure of a dependable source of supply.

4 You will be able to offer customers a full line of fine radios — consoles, table models and combinations — some with FM (Frequency Modulation) —at lower-than-usual prices.

5 You will be relieved of the necessity of offering special discounts or costly trade-in allowances.

6 And last — but not least — your selling effort will be backed up with seasonal promotional helps and a powerful campaign of national advertising.

Think what a relief it would be, if you wiped away the headaches!

Think what it would mean to you in *sales* and *profits,* if you were able to offer top-quality nationally-accepted radios in direct competition with the biggest retail outlets!

Are you interested in the S.C.M.P.?

Then — here's what to do about it!

Additional dealer appointments are now being made. *But — only a few territories are open.*

So — *act fast!*

Ask if the Sparton franchise is still available in your community.

ADDRESS: Ed. Bonia, Sales Manager, Radio and Appliance Division.

THE SPARKS-WITHINGTON CO., JACKSON, MICH.

SPARTON

RADIO'S RICHEST VOICE SINCE 1926

ANOTHER BIG

Motorola

COLOR AD

ADDRESSED TO 40 MILLION AMERICANS

☆

There'll be none Finer than...

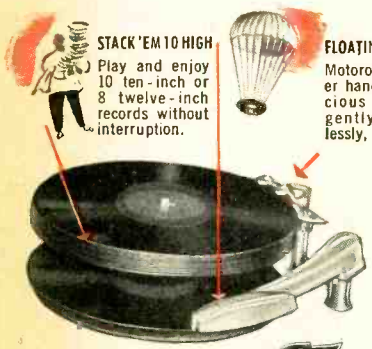
Motorola

Oh what a wonderful changer!

FEATHERLIGHT
The new Motorola tone arm reduces record scratch and wear to the vanishing point.

STACK 'EM 10 HIGH
Play and enjoy 10 ten-inch or 8 twelve-inch records without interruption.

FLOATING ACTION
Motorola changer handles precious records gently, noiselessly, safely!



OVER HALF AN HOUR OF MUSIC WITHOUT INTERRUPTION

Music at its beautiful best! That's what's in store for you soon after Victory. The broadcast programs you love to listen to will come in richly . . . with every subtle tone and overtone! And when you're hungry for your favorite recorded music, you'll discover how scientifically perfect a Motorola record changer can be.

Motorola is still devoted to the making of famous "Handie Talkies," originated and developed exclusively by Motorola Radio Engineers. But make a note . . . to remember! Soon after the war . . . see and hear a Motorola Phonograph-Radio.

GALVIN Mfg. Corporation • Chicago 51, Illinois

Motorola A-M F-M **Radio**

☆ FOR HOME AND CAR ☆

F-M & A-M HOME RADIO • AUTO RADIO • AUTOMATIC PHONOGRAPHS • TELEVISION • F-M POLICE RADIO • RADAR • MILITARY RADIO

RADIO SERVICE DEALER

radio service dealer

Member Audit Bureau of Circulations

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

VOLUME 6 NUMBER 7

JULY, 1945

CONTENTS

Cover: Dealer Looks Forward

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.

SANFORD R. COWAN,
Publisher

LEWIS C. STONE
Editor

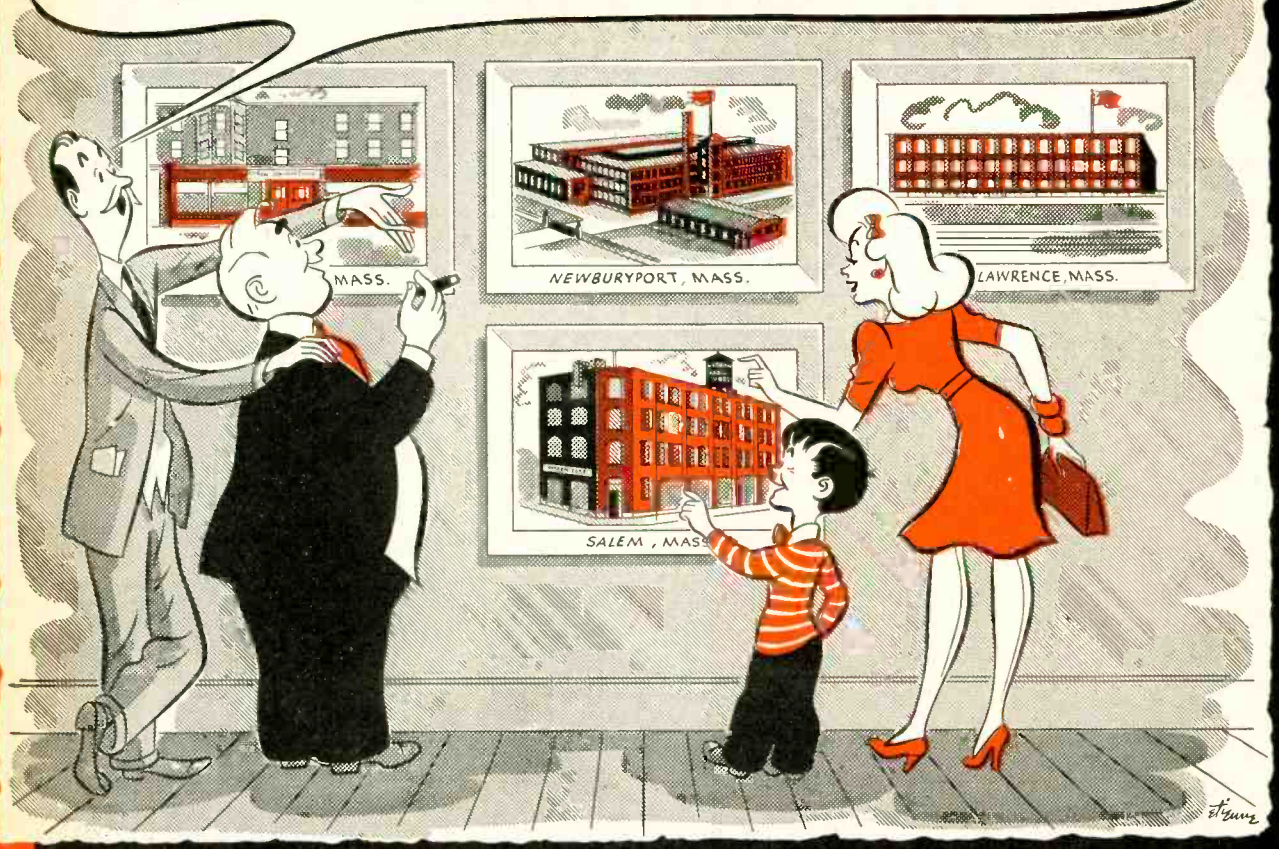
CHARLES H. FARRELL, *Advertising Manager*

HAROLD J. SUGARMAN, *Eastern Adv. Mgr.*

RENIE ARMSPACH, *Circulation Manager*

ELAINE C. WILSON, *Advertising Prod. Mgr.*

NO INDUSTRIAL GIANT...BUT!



True, Hytron may not be in the Goliath class. In the radio tube business, however, it is — and will be — an important factor. It has come a long way in twenty-four years. Customers who visit Hytron's four modern plants for the first time very often exclaim, "I didn't realize Hytron is so big, and is doing such a swell production job. Why don't you tell the boys how you have grown?"

Perhaps we're over-modest. Perhaps we have been taking things for granted. When a company keeps increasing its size gradually over the years, you hardly notice the growth. But when you stop to think — to look back on this expansion through your customer's eyes — you realize that Hytron has grown up. New spacious modern plants — new specialized engineering departments — new high-speed production machinery — thousands of new faces — Hytron surely has changed.

Don't let anyone kid you though. We have our feet on the ground; we have no delusions of grandeur. The magic word "electronics" spells a bright future for Hytron, only if we continue to build into Hytron tubes the high quality which experience has taught you to expect.

BUY ANOTHER WAR BOND

OLDEST EXCLUSIVE MANUFACTURER OF RADIO RECEIVING TUBES

HYTRON

RADIO AND ELECTRONICS CORP.

MAIN OFFICE: SALEM, MASSACHUSETTS

PLANTS: SALEM, NEWBURYPORT, BEVERLY & LAWRENCE

with the publisher.....

Selling Again By Christmas

DAY after day WPB is authorizing civilian goods production. Manufacturers are given no priority assistance and must not allow civilian production to interfere with war orders. Dealers have already received token deliveries of many minor appliances. Replacement radio parts production was authorized to begin July 1st. Radio receivers will be produced in small quantities, starting October 1st, so dealers may have floor samples at least for their Christmas trade.

The real flow of civilian goods cannot be hoped for until the Spring of 1946. Then the fun begins for radio-appliance dealers, a group that has been merchandise-starved almost to the point of obliteration since early 1942. One cannot help but admire the radio-appliance service-dealers of the country. The record shows they have contributed a genuine all-out effort on the home front—"keeping 'em (appliances and radios) working and playing" despite every possible hardship. This service helped maintain American living standards and was a major contribution in the war effort.

About Radio Postwar

ELSEWHERE in this issue is a complete and final report of the FCC frequency allocations which become effective "as soon as possible." Frequency Modulation for home radios will henceforth be in the 92-106 MC band while Television has 5 commercial channels from 54 to 72 and 76 to 88 MC. Amateur television gets its own band, 50-54 MC.

While the frequency changes are being made broadcast stations will continue to use the present FM band of 42-50 MC so radio set owners may obtain programs until they can get a radio service-dealer to modernize their receiver by adding a converter or through circuit revision. Over a half-million radios now in use will require such modernization and represent a tremendous potential for service-dealers.

The FCC is to be congratulated for having "kicked FM upstairs" at this time despite the opposition of many major manufacturing interests who preferred to have FM in the 50-68 MC band. The new, very high frequency assigned to FM will undoubtedly increase the initial cost and selling price of FM receivers. But at the same time, by "going upstairs," these new sets will not be subject to obsolescence for many, many years to come—a condition that would not have been true if the 50-68 MC band had been selected. The public, when properly informed as to what is behind all this frequency shifting will buy radios just as avidly despite higher prices because it is an American trait—we favor higher standards of quality and we have no desire to retard progress, especially in radio, the country's primary source of free entertainment, and news reports.

Let's Keep It Clean

THE months and years immediately ahead impose an obligation upon all radiomen, manufacturers and dealers alike, that they must not shirk if this industry is to survive and prosper. Stated bluntly, in pre-war years the public had begun to look upon the radio industry in an unfavorable light because it was common trade practice to cut-prices, dump merchandise that sold slowly, service at "gyp" prices in certain instances . . . and a multitude of others in common to other industries although not so generally recognized because not so blatantly practiced.

Hereafter price levels must be established and maintained. Manufacturers must not stint on quality. FM models must be true FM types, not mere simulations. Dealers must render service in the true sense of the word. Price-cutting through the ruse of ridiculous trade-in allowances must not reoccur.

So much is at stake that public confidence dare not be jeopardized. We are heading into an era when the radio-television industry will consider a billion-dollar-a-year volume commonplace. Radio and television are still "mysterious" words to the layman. How much greater the field will grow when radio-telephony is common, when handy-talkies, television, two-way car radios, public-address and similar electronic applications are wide-spread in use—provided the sale, installation and service of said equipment is handled on a businesslike basis. Gone are the days when radios will sell for $5.95; when customers will feel they are doing servicers a favor by paying $1 for a new tube and part plus repairs. Circumstances (the war) beyond our control have helped the industry house-clean itself . . . now, let's keep it clean.

S. R. Lowan

Wondering about tube testers?

. . . Here's what Simpson has ready and waiting for your postwar needs

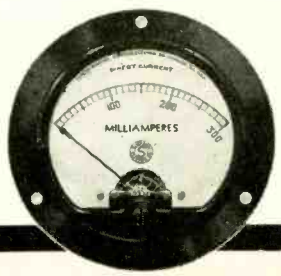
Sensational? Yes . . .

1. This new Simpson Mutual Conductance Tube Tester tests tubes with greater accuracy than any commercial tube tester ever designed.
2. Provides greater flexibility for future tubes than any other tester.
3. Tests tubes with voltage applied automatically over the entire operating range.
4. Simplifies as never before the interpretation of tube condition from mutual conductance readings.

SIMPSON ELECTRIC COMPANY
5200-18 Kinzie Street, Chicago 44, Ill.

Simpson

INSTRUMENTS THAT STAY ACCURATE



IN TELEVISION, MORE THAN EVER, IT WILL PAY TO SELL THE TUBES WITH THE BEST-KNOWN NAME

Television servicing is going to be big business.

It's also going to be profitable business. For it's a complex and skillful operation and your customers are going to pay more . . . and *expect* to pay more . . . than for ordinary radio servicing.

Renewal tubes will account for a large share of the increased cost, for television sets require many more tubes. In addition, each set must have a large picture tube which, while costing much less than pre-war types, thanks to continuing RCA research, is bound to be many times the price of the ordinary receiving tube.

When your customer pays out that kind of money for a single tube, you can bet he'll insist on having *the best*. And the prestige of the tubes you give him will go a long way towards establishing your shop in his mind as *the* place for television service.

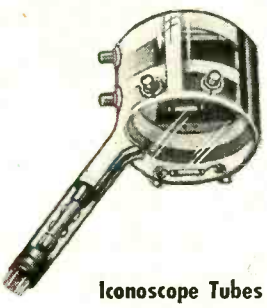
RCA tubes give you the prestige you need to make *occasional* customers *regular* customers. RCA tubes are accepted . . . your customers know them and rate them tops, because, year after year, the RCA name has been associated with leadership in tubes.

Television is no exception. RCA television-tube developments like these *made electronic television possible* . . . and they will bring television profits to you years earlier. They also built television prestige for RCA, which, in turn, is passed on to you every time you display the RCA seal . . . every time you put an RCA tube in a customer's set.

Give your servicing business every break you can after the war. Make the most of your chances by identifying yourself with the *best-known name in tubes.*

The Fountainhead of Modern Tube Development is RCA

RCA TUBE ADVANCES THAT MADE TELEVISION HISTORY

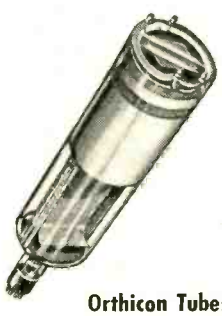


Iconoscope Tubes

—the camera tubes that made all-electronic television possible, bringing high definition to the television screen.

Kinescope Tubes

—first step in electronic television—have been speeded in development by RCA research.



Orthicon Tubes

—specially developed by RCA as camera tubes for outdoor work where light intensity cannot be controlled—a big step forward in outside pickups of special events.

High-Intensity Projection Tubes

—an exclusive RCA development that helped make possible large-screen television for home use, as demonstrated by RCA early this year.

Listen to "THE MUSIC AMERICA LOVES BEST," Sundays, 4:30 PM, EWT, NBC Network

RCA

63-6636-94

RADIO CORPORATION OF AMERICA

RCA VICTOR DIVISION • CAMDEN, NEW JERSEY

LEADS THE WAY . . In Radio . . Television . . Tubes
Phonographs . . Records . . Electronics

WELDING GLASS TO METAL "COULDN'T BE DONE"...

... but here it is!

If you want to have a look at the Capacitors and Resistors of tomorrow, step in and see what has been going on in the Sprague Engineering Laboratories (if wartime restrictions would permit!). Then it will be easy to understand why Sprague has been a FIVE TIME WINNER of the coveted Army-Navy "E" Award!

A typical example is the Sprague Electric Co. glass-to-metal seal. This amazing development answers the old problem of sealing Capacitors and Resistors against leaks and moisture, guarding them against shock—and doing it without the use of glass bushings or adjacent metal rings with "matched" temperature coefficients of expansion. Actually, there were many "scientific" reasons why glass could not be fused to metal—but Sprague not only proved that it could be done, but done economically and in tremendous quantities.

This sort of accelerated wartime engineering is reflected throughout the entire Sprague line—and that means unsurpassed quality for every unit used on every day radio work!

SPRAGUE PRODUCTS COMPANY, North Adams, Mass.

(Jobber Sales Organization for Products of the Sprague Electric Co.)

THE TRADING POST CONTINUES!

Sprague's famous free buy, sell, or exchange advertising service "THE SPRAGUE TRADING POST" appears on page 41 of this issue—and will continue to appear as long as wartime shortages create a need for it. Meanwhile, we'll appreciate it if you continue to use Sprague Capacitors and Koolohm Resistors—*and to ask for them by name!*

SPRAGUE

CAPACITORS FOR EVERY SERVICE, AMATEUR AND EXPERIMENTAL NEED

RADIART VIBRATORS (INDIVIDUALLY ENGINEERED FOR PROPER REPLACEMENT)

GIVE *Exceptional Service!*

The high quality of RADIART VIBRATORS is well known to servicemen everywhere. That high quality has characterized all Radiart Products that have been and are being used by the Armed Forces on all fronts. As production for civilian users expands it will continue to increase the demand for RADIART VIBRATORS.

LIMITED SUPPLY UNTIL V-J DAY

While production for civilian users may increase gradually, by far the greater part of our production will continue to be required for U.S. Armed Forces. We must and will meet all of their schedules on time.

FEWER VIBRATOR TYPES SIMPLIFIES STOCK PROBLEM

By eliminating many little used types of vibrators Radiart has been able to increase production of all popular types. ***Now the dozen or so types of RADIART VIBRATORS necessary for over 7/8ths of all replacements are more readily obtainable.***

Consult the Radiart Vibrator Catalog for complete information on all vibrators for all installations. The Radiart Line is the most complete for all replacement purposes.

Radiart Corporation

3571 W. 62nd STREET • CLEVELAND 2, OHIO

EXPORT DIVISION: 25 Warren Street • New York 7, N.Y.

Right across the "Board"

We've been "burning the midnight oil" . . . not only to deliver to Uncle Sam all the Eastern amplification equipment needed for Army Air Forces bombers and U. S. Navy planes and PT boats, but also to translate our extensive wartime experience into sound amplification equipment for peacetime use.

Our post-war production is *right* on the drawing board! We are ready to manufacture just as soon as Uncle Sam gives the "go-ahead."

To aid the war effort against Japan, our engineers are standing by to consult on any problem of sound amplification. Until the day of final Victory, our resources will be devoted to the design and production of vital war equipment.

Let us send you a series of useful articles prepared by our engineering staff on the newest developments in amplification related to sound systems. Ask for Series 7-C

Buy War Bonds

EASTERN AMPLIFIER CORPORATION

U. S. Reg'n. Applied For

794 EAST 140th STREET • NEW YORK 54, N. Y.

Depend on ARVIN for Sales Help

Family desires for the coming ARVIN Products are being pre-sold now—through many different full-page advertisements in leading national magazines. The page reproduced below is appearing currently in LIFE Magazine, COLLIER'S Weekly, and COUNTRY GENTLEMAN. ARVIN Policies include products with real appeal—backed by effective sales help for the trade.

What do I want?

"I'm **MOTHER**: I want a new little Arvin Radio for my kitchen—another for our bedroom—and a fine, big one for the living room, with an automatic record changer, FM and everything."

"I'm **JIM**: After foxholes and slit trenches—and no company but my rifle—I want a good bed with a radio beside it (Arvin, please)—so I can snooze and be entertained as long as I like."

P. S. "MOTHER, again: I want some other things—an automatic electric iron, those roll-a-round laundry tubs, an electric heater for the bathroom, some new metal lawn chairs—and one of those gay metal-chrome dinette sets (every one of them ARVIN). I'm not asking too much, am I?"

"I'm **SIS** (So the family calls me). I want an Arvin Radio of my own, too—for my room. And maybe we could have a little radio-phono combination for the playroom. (If I'm not overplaying my hand. I'm going to sweet-talk Dad into a portable—for the lawn and our picnics. They're wonderful.)"

"I'm **DAD, the bill-payer**: Looks like this is all on me—and I can't fuss about a single item. This is where the bonds I bought to help win the war will help *keep the peace* around our home. (I'm going to have one of those fine little Arvin table radios of my own, too.)"

ALL THIS—and more, too—will be coming from the eleven plants of Noblitt-Sparks Industries—when war work is done. There'll be Arvin Top Flight Radios—tiny ones, big ones, middle-size ones, table models, radio-phono combinations with AM and FM, floor models, portables and farm battery sets. With them, you can radio-furnish your home completely—and economically—upstairs, downstairs, all through the house and outdoors, too. And there'll be many other fine Arvin Products—well worth buying more War Bonds for now

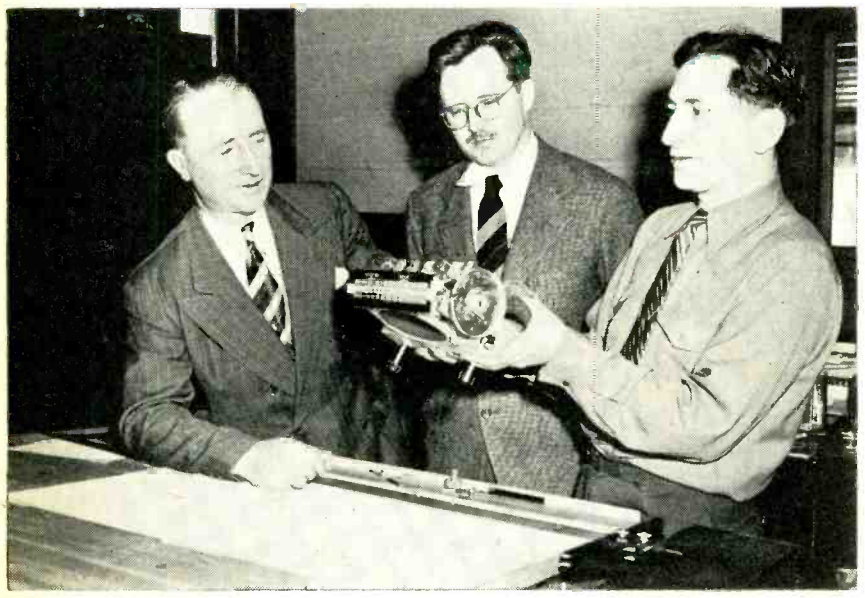
ARVIN Top Flight **RADIOS** AND OTHER *Family* PRODUCTS

ARVIN *is the Name on Products Coming from* NOBLITT-SPARKS INDUSTRIES, INC., Columbus, Indiana

Eleven plants in five Indiana cities — 25 years' experience in manufacturing

In & Around the Trade

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



Shape of radios to come is in hands of Meck Industries' chief engineer Charles R. Wexler. President John Meck, center; St. Louis distributor Tom Brown, left.

L-265 Out in October

Wartime limitation order L-265, barring civilian radio and electronics productions, is scheduled to be revoked about October 1, to become immediately effective. Director Louis J. Chatten of the WPB Radio & Radar Division has informed RMA.

While reconversion of the radio industry may occur sooner than expected a few weeks ago, Mr. Chatten said, nevertheless, he does not anticipate any volume production of home receivers before the first quarter of 1946 due to component shortages and military requirements which will continue to take priority over civilian production *after* L-265 is repealed. Two steps for putting into effect his proposed formula for lifting WPB controls are geared to the following time-table:

First stage: Modification of the L-265 in July to permit unrestricted production of components, including tubes for replacement purposes, and all electronic end equipment except broadcasting, receiving and producing equipment for entertainment purposes. This revision will become effective immediately although based on the estimate that military production may not drop to the 90 per cent level until the end of the third quarter, or September. *Second stage*: Complete revocation of L-265 in October to permit production of home receivers, broadcasting equipment and other civilian entertainment end equipment as rapidly as components become available.

While still uncertain as to the Lend-Lease and Army stockpiling program, as they apply to radio tubes, WPB officials estimate that the 4,000,000 extra receiving tubes for the replacement market will be reached by the end of the third quarter, or September, of this year. The allotment of replacement tubes is expected to increase gradually each month from the current volume of between 1,500,000 and 2,000,000.

Higher Parts Prices

The OPA Radio Parts Industry Advisory Committee recently decided to recommend that Administrator Chester A. Bowles reconsider the reconversion price formula so far as it applies to radio parts, or permit the sale of radio components without ceilings.

Members of the committee expressed the belief that competition in the sale of radio components for new radio receivers will be so sharp that prices will be kept down by supply and demand and that no OPA ceiling will be necessary.

After listening to explanations of the OPA reconversion price formula by several officials, members complained that it did not allow for the substantial increases in administrative expenses and overhead costs which they had experienced since the start of the war. OPA officials admitted there is no provision for rises in administrative costs but stated that increases in "indirect" labor and material costs, in addition to direct labor and material costs, were to be considered in fixing new prices.

The OPA price formula, if applied to the parts manufacturers, officials said, will not require the setting of prices for every item sold by a manufacturer but would be calculated on a flat percentage basis either for a company's overall products or for the products of one of its divisions.

During a discussion of the reconversion price formula members of the committee declared they could not produce and sell radio parts for civilian use under the provisions of the OPA formula and would not accept any civilian order under the present OPA rules.

The proposal will not become official until it is submitted in writing to OPA by Chairman R. C. Sprague of the official committee. However, one OPA official told the committee at the meeting that OPA had already considered the possibility of eliminating price control of radio parts.

RMA Officers, 1945-46

President—R. C. Cosgrove of Cincinnati, reelected. Vice President and Chairman of Set Division—E. A. Nicholas of Fort Wayne, Indiana, reelected. Vice President and Chairman of Tube Division—M. F. Balcom of Emporium, Pa., succeeding David T. Schultz of Newton, Mass. Vice President—George Lewis of New York City, succeeding Walter Evans of Baltimore, Md. Vice President and Chairman of Parts Division—R. C. Sprague of North Adams, Mass., reelected. Vice President and Chairman of Amplifier & Sound Equipment Division Executive Committee—T. A. White of Chicago, reelected. Treasurer — Leslie F. Muter of Chicago, reelected. Exec. Vice Pres.-General Manager—Bond Geddes, reelected. General Counsel—John W. Van Allen of Buffalo, N. Y., reappointed.

Appliance Committee

Ralph E. Sorenson, manager of the small appliance division, Westinghouse Electric Corp., Mansfield, Ohio, was elected chairman of the OPA Small Electric Appliance Manufac-

[*Continued on page* 14]

With STROMBERG-CARLSON the Main Radio in your customer's mind . . .

You'll want to make STROMBERG-CARLSON the Main Radio Line in your showroom!

There's a tremendous pent-up demand for Stromberg-Carlson radios—fine musical instruments for the *main radio* in any home. This is currently being stimulated even farther by vigorous national advertising which carries this *main radio* message to your customers through some 475,000,000 impressions in thirteen leading magazines.

Make this profitable market your own, by becoming an authorized Stromberg-Carlson dealer under the very favorable Franchise Agreement now being offered. Get in touch with your local distributor for details, or write us at once. For Stromberg-Carlson is:

—the important radio unit—the radio unit carrying real profit opportunity —the radio unit with easy-selling public acceptance.

Become an Authorized Dealer now, and organize your postwar business around the Stromberg-Carlson *main radio*—a consistent profit maker whether in an outstanding table model, console, or radio-phonograph combination.

STROMBERG-CARLSON . ROCHESTER 3, N. Y.

RADIOS, TELEVISION, TELEPHONES, AND SOUND EQUIPMENT

In Trade

[*from page* 12]

turers' Industry Advisory Committee at its organizational meeting in Washington, D. C., recently.

Others officers elected were as follows: vice-chairman, Robert Shaffer, vice-president of Dominion Electric Manufacturing Company, Inc., Mansfield, Ohio; and secretary-treasurer, Edward Ploner of Sunbeam Division, Chicago Flexible Shaft Company, Chicago. Other members of the committee are: Patrick J. Fitzgerald, pres. Fitzgerald Manufacturing Company, Torrington, Conn.; C. E. Swartzbaugh, pres. Swartzbaugh Manufacturing Company, Toledo, Ohio; R. M. Oliver, vice pres. Proctor Electric Company, Philadelphia, Pennsylvania; A. S. Knapp, pres. Knapp-Monarch, St. Louis, Missouri; B. C. Neece, vice pres. Landers, Frary and Clark, New Britain, Conn.; Fred S. Tuerk, sales mgr. Hamilton Beach Company, Racine, Wisconsin; Marshall D. Rose, manager Small Electrical Appliance and Fans, General Electric Company, Bridgeport, Conn.; W. E. O'Brien, sales mgr. Toastmaster Product Division, McGraw Electric Company, Elgin, Illinois.

The committee told OPA that at present electric irons, heater pads, and other items are being produced in limited volume for civilian use, although the industry for the most part is producing war goods. Before the war approximately 140 firms produced small electrical appliances with a market value of about $500,000,000.

Prices for goods produced in normal peacetime volume after the war were discussed. OPA said that pricing during the transition period could be speeded up if the agency were now informed of the industry's current labor and material costs, names of component parts, suppliers and other production data with regard to present output. OPA asked for cooperation in securing this information from the industry as soon as possible.

Maximum prices for small electric appliances at the manufacturing level are established in Maximum Price Regulation No. 188—Manufacturers Maximum Prices for Specified Materials and Consumer Goods. Parts that these manufacturers purchase from other concerns for assembly into appliances are priced for the most part under MPR No. 136—Machines and Parts and Machinery Services. Ceilings at the wholesale and retail levels for small electric appliances are gov-

[*Continued on page* 18]

SYLVANIA NEWS

RADIO RETAILER EDITION

JULY *Published by* SYLVANIA ELECTRIC PRODUCTS INC., Emporium, Pa. 1945

NEW BOOKLET SUMMARIZES AND STIMULATES POSTWAR RADIO MARKET

Radio Retailers Can Obtain Helpful Survey Information On Nation-Wide Radio Trends

In further support of Sylvania's big advertising campaign designed to broaden the postwar radio market, Sylvania Electric is widely distributing the new survey booklet "They Know What They Want."

In it the radio retailer will find the answers to questions concerning consumer interest in Television, F.M., how many people are planning to buy a new radio after the war, and many more—giving him a variety of pertinent facts aimed to make it easier for retailers to sell.

In addition, general consumer distribution of "They Know What They Want" is expected to intensify popular interest in postwar radio sets of all types—an interest that will influence postwar sales.

Send for this new booklet and receive a handy summary of the public's future radio wants. *Sylvania Electric Products Inc., Emporium, Pa.*

Consumers are receiving new booklet on postwar radio trends in response to requests stimulated by Sylvania national questionnaire-type advertisements.

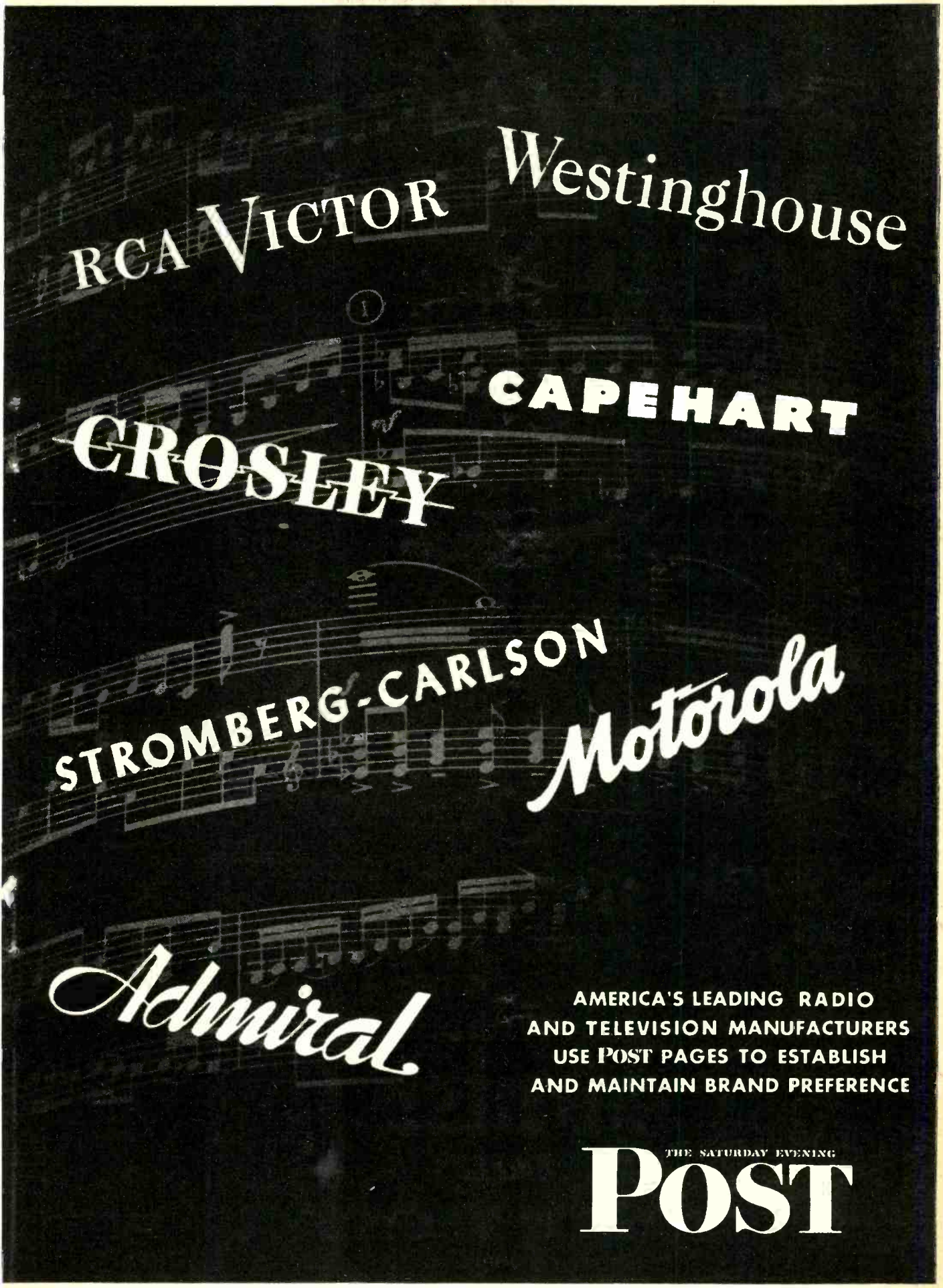
Typical two-page spread of Sylvania Electric's new booklet "They Know What They Want," containing a summary of the public's radio wants and making the retailer's job easier.

SYLVANIA ELECTRIC

Emporium, Pa.

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


Score from The Four Freedoms Symphony
by Robert Russell Bennett
PHILCO
GENERAL ELECTRIC
Bendix
ZENITH
SPARTON
Emerson
FARNSWORTH
ARVIN


RCA VICTOR
Westinghouse
CAPEHART
CROSLEY
STROMBERG-CARLSON
Motorola
Admiral
AMERICA'S LEADING RADIO
AND TELEVISION MANUFACTURERS
USE POST PAGES TO ESTABLISH
AND MAINTAIN BRAND PREFERENCE
THE SATURDAY EVENING
POST

In Trade

[*from page* 14]

erned by General Maximum Price Regulation, unless they are specifically set forth in an order issued under Maximum Price Regulation No. 188.

Frank M. Folsom

becomes executive vice president in charge of RCA Victor Division, moving up from vice-presidency, according to Brig. General David Sarnoff.

Hallicrafters SM

William J. Halligan, president, announces appointment of R. J. (Rollie) Sherwood as sales manager of the Hallicrafters Company, Chicago, producers of short wave radio war equipment.

With more than 15 years of executive and sales experience, Sherwood came to his new position from General Dry Battery, Inc., Cleveland, where he was assistant to the president. He entered sales work soon after completing his studies at the University of Southern California, joining General Dry Battery in its Cleveland office in 1929.

Solar Appoints

Otto Paschkes relinquished the presidency of the Solar Manufacturing Corp. at the organization meeting of directors following the annual stockholders' session to assume the newly created post of board chairman. Elected to succeed him as president was Paul Hetenyi, formerly executive vice president. In his new position, Mr. Paschkes will continue actively as chief administrative officer of the corporation which, at plants in Bayonne and West New York, N. J., and Chicago, Ill., manufactures radio and electronic devices, chiefly capacitors and filters.

P. R. Mallory & Co., Inc., is host at Indianapolis office to group discussing present and post-war problems of radio and appliance industry. L to r: S. Poncher, president Newark Electric Co., Chicago; L. B. Calamaras, exec. secretary, NEDA; Howard W. Sams, Mallory's general sales manager; and William O. Schoning, president NEDA, and owner of Lukko Sales Corp., Chicago.

Golenpaul's 15 Years

Charley Golenpaul celebrates his fifteenth anniversary with Aerovox Corporation. Much radio parts history has been written during that span and much of it by Charley himself, for his sales and administrative activities have extended beyond Aerovox jobber sales which he heads and out into the trade generally. Indeed, it would be rare to find a jobber anywhere who has not been helped by Charley at some time or another, and many jobbers today regard this man as their silent partner in spirit if not in fact.

Golenpaul came to Aerovox in 1930 from Clarostat, where he had been general sales manager. His original assignment was simply "to make himself useful in any way he saw fit". That's all he had to be told. He naturally gravitated to the sales end and soon was selling capacitors in new and unexpected quarters. However, he decided to concentrate on putting the radio parts trade on a sound business basis.

At the time the distribution of parts was a bargain basement proposition, serving mainly as scavenger for surplus and dumped production. By introducing sound business methods, notably packaged and catalogued merchandise at suggested resale prices, and fighting all the way, Charley Golenpaul became the guiding force in evolving the radio parts jobbing business as we know it today. He helped organize the Sales Managers Club and has served several terms as Chairman of the Eastern Group, which post he again occupies.

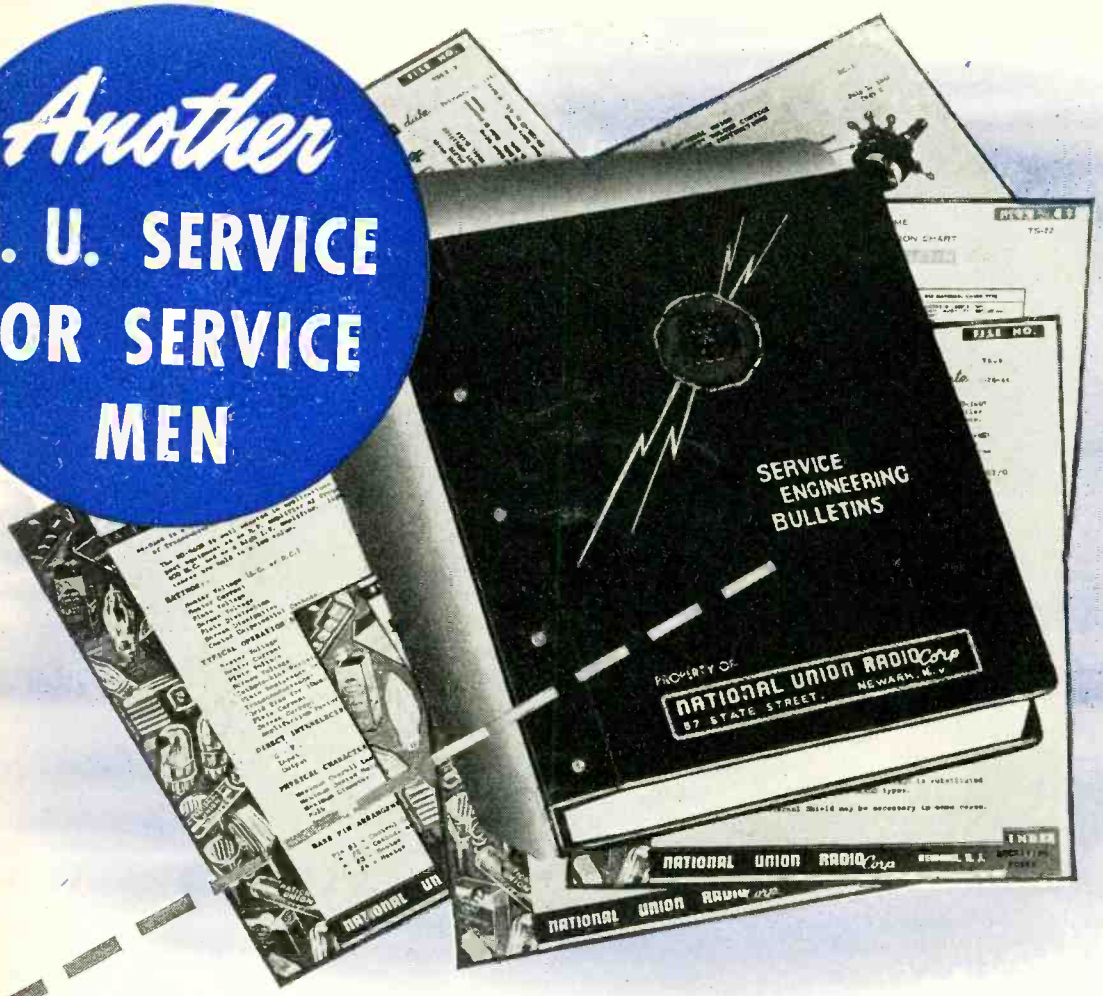
Airport Radio Shop

What looks like the "model airport service station for aircraft radio" has just been opened at the Grand Rapids,

[*Continued on page* 21]

Dave Finn, center, shakes hands with host at party celebrating his promotion to national sales manager of RCA renewal tube division from regional sales manager in Chicago. Host is Walker-Jamieson; shaker, Ralph Walker.

Another N. U. SERVICE FOR SERVICE MEN



UP-TO-THE-MINUTE TECHNICAL BULLETINS

Now available from coast to coast at National Union Distributors, is this big book of N. U. Service Engineering Bulletins. It is loaded with timely technical tips, trouble-shooting short cuts and service suggestions, prepared by top notch N. U. engineers with all the newest radio facts at their finger tips. And all so easy to get at—arranged on handy separate bulletin sheets covering one subject at a time.

A ready reference file of N. U. Service Engineering Bulletins is now on hand at your National Union Distributor. You are invited to refer to it regularly. Bulletins in which you are particularly interested, may be obtained FREE from your N. U. Distributor. *National Union Radio Corporation,* Newark 2, N. J.

Typical Bulletin subject matter

- N. U. 7A4 as a high frequency oscillator
- 3B 7/1291 Ultra high frequency double triode
- 35Z5 filament burnouts
- A simple Loktal to Octal adapter
- Tube substitution data for 25B5
- Replacements for special purpose tubes

After the War, MORE than Before!

NATIONAL UNION

RADIO AND ELECTRON TUBES

Transmitting, Cathode Ray, Receiving, Special Purpose Tubes • Condensers • Volume Controls • Photo Electric Cells • Panel Lamps • Flashlight Bulbs

In Trade

[*from page* 19]

Michigan, Municipal Airport. In charge of the Lear, Incorporated, service shop is Hal Sagert, who has had ten years pioneering experience in itinerant aircraft radio at the Chicago Municipal Airport.

The shop occupies the ground floor of a building about twenty feet by fifty feet, quarters that were recently vacated after Army officers completed ground-school work there. Two shielded testing rooms have been set up. One is designed especially for the service of all types of automatic direction finders only, and the other for the testing of aircraft receivers and transmitters. Space for display and sales, and for demonstrating equipment, complete the layout.

This Field Service Station has been set up in the center of the mid-west private flying activities, and after the war the thousands of civilian-owned aircraft in this territory will no doubt double and triple in number, Mr. Sagert asserted.

Phonographs Only

Audio Industries of Michigan City, Indiana, will concentrate its entire production facilities on the manufacture of phonograph record players, according to an announcement by Paul W. Dolembo, president of the company. Audio Industries, a new name for an old company, manufactured hearing aids and audio amplifiers in addition to phonographs for many years under the name of the Hearing Aid Laboratories.

Mr. Dolembo states, "The new name is more descriptive of our post-war products. We foresee a tremendous market for phonographs. Despite the fact that no phonographs or radio combinations have been made for over three years, sales of records have shown a steady and substantial increase."

The company will not manufacture radios, but will concentrate on phonographs. Distribution will be thru wholesale distributors. The line will include non-automatic and automatic record changer Models — portables — table Models — battery amplified, spring driven models and wireless record players.

Replacement Tube Manager

Appointment of L. E. Septer as manager of replacement tube sales for the Home Radio Division, Westing-

[*Continued on page* 53]

A Familiar Package is Welcomed Back to Distributors' Shelves

DUE to the military demands of American and Allied fighting forces, distributors' shelves have frequently been bare of Mallory vibrators in the past two years. But now the familiar orange and blue cartons are back in stock. Mallory vibrators have returned—to give you even better service than ever!

They have passed all required military tests . . . they have been adopted by the Navy, the Coast Guard, the Signal Corps, the Air Corps, the Marine Corps and other Government agencies . . . they have benefited from 14 years of Mallory "know how," enormously extended by the demands of war.

And the same careful selection of materials . . . the skill in manufacturing . . . the precise adjustment . . . the rigid testing and inspection methods . . . assure you, as always, of a dependable, trouble-free product.

Incidentally, when you order these vibrators from your Mallory distributor, ask him for a copy of the Mallory Vibrator Standardization Chart. It will show you how 65 Mallory Vibrators now replace 101 different types . . . how 90% of your replacement needs can be met with only 12 vibrators!

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

More than ever— ALWAYS INSIST ON

P.R. MALLORY & CO. Inc.
MALLORY
APPROVED
PRECISION PRODUCTS

VIBRATORS • VIBRAPACKS* • CONDENSERS
VOLUME CONTROLS • SWITCHES • RESISTORS
FILTERS • RECTIFIERS • POWER SUPPLIES

ALSO MALLORY "TROPICAL"* DRY BATTERIES, ORIGINALLY DEVELOPED BY MALLORY FOR THE U. S. ARMY SIGNAL CORPS NOT PRESENTLY AVAILABLE FOR CIVILIAN USE.

* Trademark

PROMOTE REPEAT SALES

First sale may be the "final" (non-repeat) sale, depending on handling of customer. A sale is fully consummated when customer returns to the same dealer to buy additional merchandise because number 1 sale was satisfactorily handled on the floor.

by JOHN MECK,

President John Meck Industries, Inc.

AS the war ends, merchandise will become gradually more and more easily available. After a short interval, customer wants will slacken off again. Store shelves will be stocked with goods. Competition for sales between stores and between individual sales people within stores will no longer depend so much on availability of merchandise. *It will depend much more on excellence of service and intelligent salesmanship.* In a small retail establishment like a neighborhood radio store, there are some basic points to follow. When a customer enters such a store, what may he rightfully expect from the sales person? Certainly no less than the following:

1. Pleasant, well-timed attention
2. Understanding of customer's needs
3. Expert knowledge of merchandise
4. Expert knowledge of store policies
5. Pleasant timely closings and departures

These are certainly minimum requirements. Let us consider point 1. for a moment, "Pleasant, well-timed attention": This can be best summed up by stating that some customers want immediate attention upon entering, others prefer time to look, but in either case a pleasant relationship with the sales person is desired. Here the sales person is entirely on his own with full opportunity to exercise his initiative, intelligence, and courtesy. The first few seconds at this point not only have tremendous influences on the subsequent sale or no sale, but they also do much in creating a picture for the customer of the public relations programs of the store.

Point 2, "Understanding of customer's needs": Before you can assist the customer, you must understand his or her needs. The entire responsibility is on the shoulders of the sales person at this point. From a public relations point of view, the customer's request is never ambiguous. The sales person must determine correctly—a need for the customer before an attempt is made to satisfy it.

Point 3, "Expert knowledge of merchandise": More than ever before the seller must know all the facts about this merchandise. He must also know how and when to use the facts. Most customers resist when they are being sold; they prefer to buy. It is important that the sales person recognize this and permit the customer to stand ready with advice, counsel, if it is requested.

Point 4, "Expert knowledge of store policies": All retail stores have rules—rules about payment of bills, return privileges, deliveries, service, etc. These are frequently referred to as policies. Sales people should know and understand all policies they may need to use in their work. Knowledge of policies does much to indicate to the public that the store is operated in a business-like fashion.

Point 5, "Pleasant timely closings and departures": Just as there is danger in hurrying a customer, there is a danger in keeping one too long. Pleasant timely departure is something that a sales person must learn and almost sense. If the conversation continues and the sales person is not too careful, many sales become "no sales" after they have been made, simply because the sales person said the wrong thing—perhaps he made a comment on a controversial issue. Or it may be that the sales person remarked as he handed the package to the customer, "that Mrs. So and So bought exactly the same set yesterday" when Mrs. So and So is the one person the customer would not want to imitate in buying.

It is well to remember here that a sale is never concluded when the customer pays for the merchandise, the order is written or when the goods are delivered. But it can be truthfully said that a sale *has* been concluded when the customer comes back to the same store to buy more merchandise

MODERNIZATION LOAN CHART

The following figures show the maximum amounts, length of loans and financing charges of various classes of store construction and modernization:

TYPE OF IMPROVEMENT	MAXIMUM MATURITY	MAXIMUM AMOUNT	MAXIMUM FINANCING CHARGE
Class 1a: *Repair, alteration, or improvement of an existing structure.*	*3 years, 32 days*	*$2,500*	*$5 discount per $100 per year*
Class 1b: *Conversion of existing structures to provide housing for war workers.*	*7 years, 32 days*	*$5,000*	*$5 discount per $100 per year if $2,500, or less. $4 discount per $100 if in excess of $2,500.*
Class 2a: *Construction of a new structure to be used exclusively for other than residential or agricultural purposes exclusive of residential purposes.*	*7 years, 32 days*	*$3,000*	*$5 discount per $100 per year*
Class 2b: *Construction of a new structure to be used in whole or in part, for agricultural purposes exclusive of residential purposes.*	*7 years, 32 days if secured by first lien, 15 years, 32 days.*	*$3,000*	*$5 discount per $100 per year. $3.50 discount per $100 if maturity is in excess of 7 years 32 days.*

From Document FH-20, on "Title I, Property Improvement Loans, under National Housing Act, as Amended" —Regulations effective July 1, 1944.

MODERNIZATION MONEY

Dealers recognize handicap of selling modern radios and appliances in non-modernized stores. How to get money for meeting competition through modernization.

by LEWIS C. STONE
Editor

THE time has passed when three walls, a ceiling and a doorway can be expected to move any profitable volume of merchandise unless serious consideration is given to attracting customers and encouraging them to buy by means of well laid out interiors with feature displays and arrangements.

Unless this is done, it is reasonable to believe that the first rush of postwar consumer buying will dwindle to a trickling stream that will finally stop, of itself. Up-to-date stores where good lighting, pleasing interiors and show windows invite inspection and purchase of well-displayed, strategically arranged merchandise will attract—and hold—the customers of tomorrow.

Lack of critical materials for building construction and modernization has kept the average dealer marking time during these war years, and necessarily low stocks of available merchandise have also helped to slow down the working efficiency of almost every store operation.

So it is all the more essential that radio and electrical appliance dealers must gear themselves for new and improved merchandising efforts in order to keep in step with the new sets and electrical household appliances that are

Based on various sources and on material from "Modernneering" program of Landers, Frary & Clark.

being designed today and will soon be in production.

The start of any store modernization program is largely a matter to be decided by the dealer, according to the location and condition of the store and his own financial position. Lighting, display fixtures, ceilings, walls, floors may be outmoded or in such disrepair that the need to start at any one of these points is at once apparent.

Just as radio and appliance servicing calls for certain basic test equipment, bench arrangements, parts bins, etc., so does store modernization involve basic requirements (see "14 Points on 'Keeping' Store"). Every store has in stock certain merchandise that may be displayed openly. The assortment of stock carried should control the display that will be typical of the store as a whole. Providing the best display for each type of goods is the best approach to store merchandising.

The dealer should consider the following factors when figuring on an overall or partial job of modernizing his store:

1. Budget the entire program based on a carefully prepared set of cost figures.
2. Set aside a percentage of net profit that will be sufficient to meet the costs involved.
3. Decide upon the method of payment: (a) cash; (b) part cash, part loan; (c) from bank, government agency or other types of financial institutions.

When the store modernization "target" is determined, methods of payment to meet the cost should be selected:

1. Through full payment out of (a) capital; (b) financed by local bank or other institutions.
2. Payment over a period of time, budget fashion, paying in cash for work done each quarter; (a) out of net profit; (b) borrowed on a pre-determined financing program.

In undertaking a budget type of payment, the dealer should become acquainted with his local banker whose knowledge of his business operation and its related capital position substantiates a line of credit that is most important if the dealer's modernization program is based on factors that will not strip his cash or credit position.

The accompanying "Modernization Loan Chart" explains exactly what can be done under the government program for property improvement loans. If the dealer does not own the property, he should be sure that he has a lease over a well extended period of years, even before the architect or contractor is called in for actual work.

14 POINTS ON "KEEPING" STORE

1. Suitable and attractive store front.

2. Good signs identifying kind of business and the store.

3. Attractive show windows suitable for the business.

4. Good sidewalks, easy entrance, store floor at street level.

5. Adequate lighting.

6. Use of light, color and space to create the impression of size and spaciousness.

7. Relating displays of goods to create maximum number of multiple or "companion" sales.

8. Accessible shelf merchandise to invite self-service where desired, by eliminating excessive floor fixtures.

9. Separation of service departments that are separable from selling, to avoid confusion and customer dissatisfaction and to make it easier to handle various merchandise groupings.

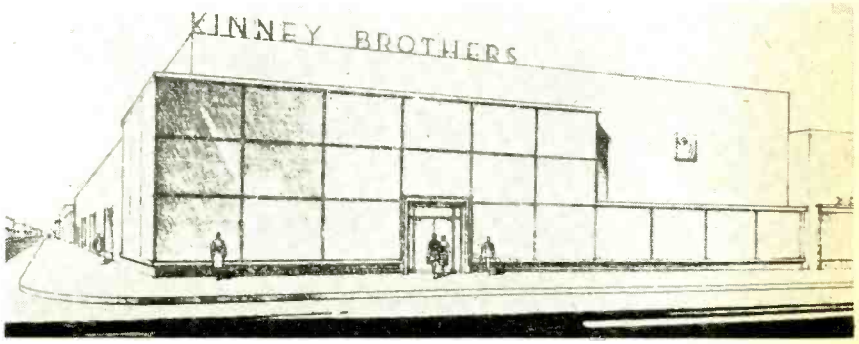
10. Sufficient aisle and circulation space to invite free movement about the store.

11. Temperature in the store kept within the range of comfort, in season.

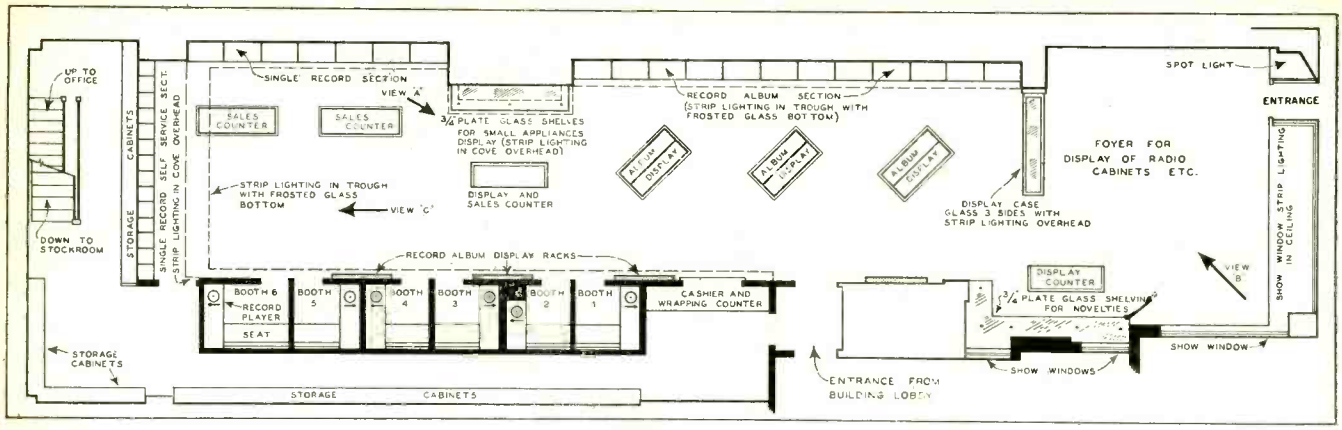
12. Protection of goods against pilferage.

13. Elimination of obsolete equipment, fixtures, decorations, displays, etc., that interfere with operations or take customers' attention from buying.

14. Merchandise arrangements to promote the sale of high-margin items.



Above: Class 1a job. Helen Gunnis Shop, Milwaukee, modernized for records now, expands to radios and appliances postwar. Below: Class 2a job. Kenney Bros., Los Angeles distributors, new postwar "home".



SELLING PLAN

"Depth-of-store" selling begins at entrance (view B photo, page 26) to middle section (view A photo, page 27) to rear (view C photo, page 26). Every foot of store area "works" as background for sales.

One-Man Shop

Time Saved With Front Office Buffer Helps This Dealer Turn Out Two To Three More Radios Today

by S. PRESTON

IN order to cope with wartime conditions and its flood of radios to be repaired, the one man radio shop needs a buffer, someone at a desk by the door to handle routine calls, take in merchandise, answer the phone, etc. so that the shop owner can sit at his bench and turn out a large volume of radio repairs.

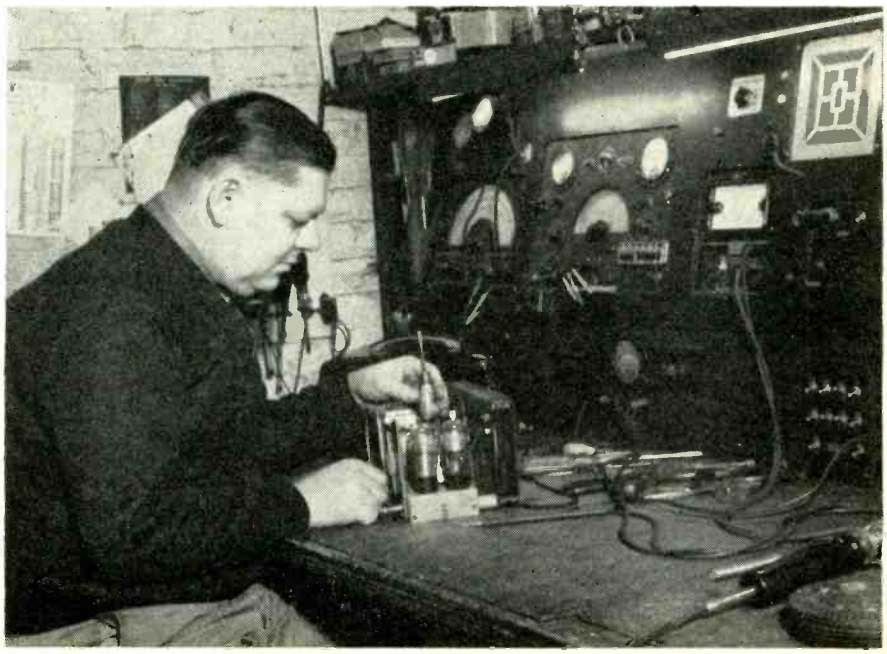
Thus believes Eldo Ary, owner of Ary's Radio Service, in Rockford, Ill., who has operated his business since 1921. Mr. Ary is fortunate enough to have an upper teen age daughter who can spend a lot of time every day at his office and she is able to handle many calls.

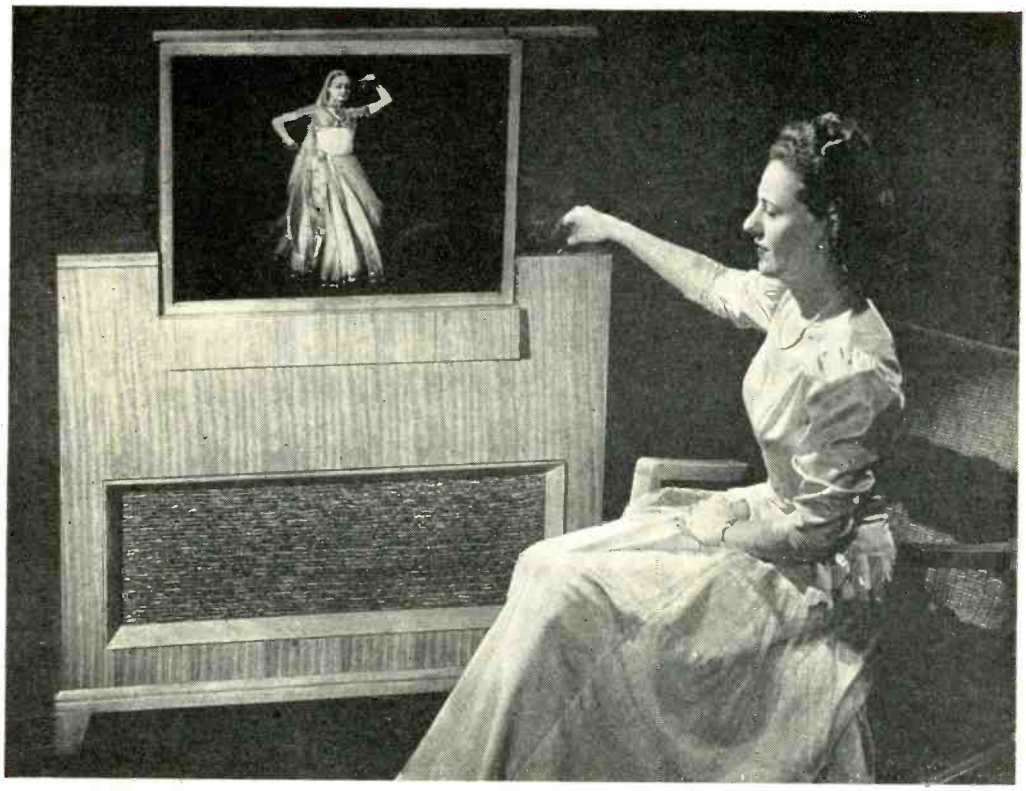
"If you spend two, five or ten minutes talking to every customer who comes into your shop, this may run into hours before the day is over," declares Mr. Ary. "And that can mean falling behind schedule on two or three or more small radio repair jobs. Of course, you have to talk to some customers who come in, due to the nature of the repair job, but many routine calls can be handled by someone in the office without disturbing you."

Those two or three radios extra per day which he is able to repair, because he can stick to his bench work, mean a lot of volume every month and keeps him from having work pile up two and three weeks ahead. Of course, during wartime there are some sets he cannot repair within a week, due to the tube and parts shortage for some models. But to date such sets account for a very small percentage of his total number of sets received for repairs.

Rockford, a thriving war city of 95,000 population had 12 radio service shops before the war; there are less than half that number now. Rockford radio service dealers had a trade association in prewar days with Ary as president. But it is dormant now. There's no time to hold meetings.

With the test equipment goes . . . the screwdriver.





TELEVISION Models Appear

Most recent is GE-issue, above. Actual post-war receivers may be different, due to improvements.

TWO new General Electric electronic developments for the postwar home—a large screen television receiver and a radio-phonograph incorporating the new G. E. electronic reproducer—were demonstrated recently in New York.

The large-screen television receiver produces a picture 16 x 22 inches with a brilliance and contrast not obtained by prewar receivers. The receiver was demonstrated by picking up a special program from the New York television station WNBT. The audience was cautioned not to interpret the receiver as the final postwar product because, it was explained, additional improvements may be developed by the time peacetime manufacture can be resumed.

The second development demonstrated—a new electronic reproducing system—was said by General Electric to be one of the most important developments in the reproduction of recorded music since the application of electronics to the phonograph. The company will use the new system in its postwar radio-phonograph receivers to produce a realism never before obtained in recorded music, officials added.

Although technical details of the system were not disclosed at the meeting, it was said the superior performance is accomplished by improvement of all elements of the phonograph system, from pickup head to loudspeaker. This has resulted in record reproduction incredibly free from chatter, needle radiation and scratch prevalent in former systems, record wear is reduced, and the quality of tone greatly improved. Moreover perfect tonal balance is achieved at both low and high volume. This system will not be confined to high-priced models, but will be used in every G-E automatic radio-phonograph.

Five Points ON TUBE MERCHANDISING

by **BOB ALMY.***

These merchandising steps can "up" sales of tubes from a prewar average of 1 per service job to full kits of 4 or more. Cut and caption opposite are repeated from June issue, which carried article 1.

ARTICLE 2.

A RECENT survey revealed that the public says radio servicemen do a good job. It confirmed the fact that radio service dealers have the good-will of the public. Therefore they are already on first base for postwar merchandising. With this valuable asset, dealers will have an unusual opportunity to greatly increase their sales and profits if they will plan to merchandise for more tube sales per customer in the immediate postwar period.

Prewar, when ample quantities of replacement tubes were available, surveys indicated that *only one tube was sold for every service job completed.* Also, that 52% of all repair jobs require tubes. 30 million tubes were sold by approximately 25,000 service establishments in 1941. Today there is a tremendous need for radio tubes just to take care of normal requirements, to say nothing of those needed to satisfy the largest pent-up demand in the history of radio.

Service dealers everywhere will soon have an unprecedented merchandising opportunity in this great replacement tube market. Merchandising, carefully planned on simple, sound principles and consistently put to use can "up" sales of tubes from a prewar average of one per service job to complete kits of four or more.

There are two kinds of merchandising which will be important to the radio dealer: merchandising in his store and merchandising in the customer's home. In this article some pointers on effective tube merchandising in the store will be outlined. They include: 1. Increasing public acceptance of your service. 2. Personal selling as a part of service rendered. 3. The customer's set as a sales "prop." 5. Simple follow-up methods for customers and prospects.

1. PUBLIC ACCEPTANCE

Public acceptance now enjoyed by most service dealers provides an excellent starting point for the entire tube merchandising plan. Constant effort to improve and increase this plus factor should be made by cooperating with manufacturers. Request and use the material they offer to promote tubes at the point-of-sale. It can be a direct sales-maker by providing effective tools for better business methods, shop equipment and helps give your store and your staff a more attractive and business-like appearance.

Bear in mind that most people are wholly unfamiliar with radio servicing. They are apt to judge and select a service dealer on appearances. Emphasize the importance of "looks" to those who work with you. A tidy shop and neat, efficient employees impress the public favorably and frequently are the direct cause of continuing business from old customers and the steady conversion of more prospects into cash customers.

2. PERSONAL SELLING

Personal selling is the interpretation you give to your customers and prospects of yourself and your store. Customers frequently regard the serviceman as a sort of radio "doctor," the persons who diagnoses and corrects the physical ills of a complex electrical mechanism. Therefore there is a natural opportunity for serviceman to develop and capitalize on a good "dialside manner," with emphasis on personalized service.

Many people are curious to see the inner workings of their set and appreciate simple direct explanations of the importance and part played by various components. The radio is almost animate; it brings them the news; entertains them and their family keeps them company to relieve the tedium of their daily lives. Most of them realize that tubes are vital to set operation. But tubes are also a mystery to most people. They provide an excellent springboard for good sales conversation specifically a springboard to sell complete sets of new tubes with each repair job.

In the immediate postwar period, sets of tubes will be sold if the public realizes that their radios have many "hearts," each one of which must be in good health and work efficiently in a team. And who is better fitted to profit through the explanation of these things than the dealer's serviceman who daily discovers and removes the "troubles," the man who makes it his business to make sick radios well again. So plan and polish your service presentations with lots of personal selling. Develop your best "dialside manner."

3. SET AS SALES "PROP"

By the same token that the serviceman is respected as the radio "doctor" customers are also apt to consider

**Manager Distributor Sales, Sylvania Electric Products Inc.*

his treatment and progress with their "patient" with interest. They are favorably impressed when you begin by giving the chassis a thorough cleaning. Chassis cleaning makes the set look better and reflects your thoroughness and ability to do a good job. But be sure to explain why you always do this, how dust and dirt frequently cause noise and unnecessary depreciation which can greatly decrease the useful life and tonal quality of the tubes themselves.

When you replace faulty components be sure to explain how their failure may affect tube performance. Learn to make showmanship out of your repair operation by always making neat soldering jobs, replacing worn or inadequate insulations and otherwise through the adept use of tools and testing equipment. Customers will be impressed with the way you handle tools, inspection, and treatment of their set.

Use the customer's set as a prop to the utmost, and for effective follow-through remind him that the adjustments and replacements you make cannot alone correct worn-tube performance. Bear in mind you are reconditioning a chassis to serve the tubes and, therefore, you cannot hope to do a complete job unless all tubes are working at peak performance when the set is returned to the customer. Explain this so he will be able to evaluate your service in the final test for his satisfaction: ***the demonstration of a complete set of new tubes in his set.***

4. SHOP AS SALES "PROP"

To fully merchandise yourself and your service will call for increased personal selling and some showmanship. To provide a good stage for the job plan to make maximum use of your shop. Money spent for rental and equipment is an appreciable cost of doing business, but by making them both attractive and workman-like you can turn expense into an investment that pays regular dividends. This need not mean that you must do a fancy redecorating job, but it does suggest that a clean, orderly, well-arranged shop can be a great asset!

And do not overlook the value of your windows. Dress them attractively so that they display both merchandise and your work. Change them frequently even though the change may be only in detail and not in overall display.

Within the shop arrange to have at least two comfortable chairs to accommodate waiting customers. Since many interiors are visible from the street the chairs will tend to reflect your interest in customer comfort. Arrange sets waiting to be repaired and your parts stock in orderly manner. Get into the habit of keeping all tools and testing equipment in good condition. Keep them in the most convenient place for actual use. Remember that men at specialized work are always interesting . . . particularly when their surroundings are in good order.

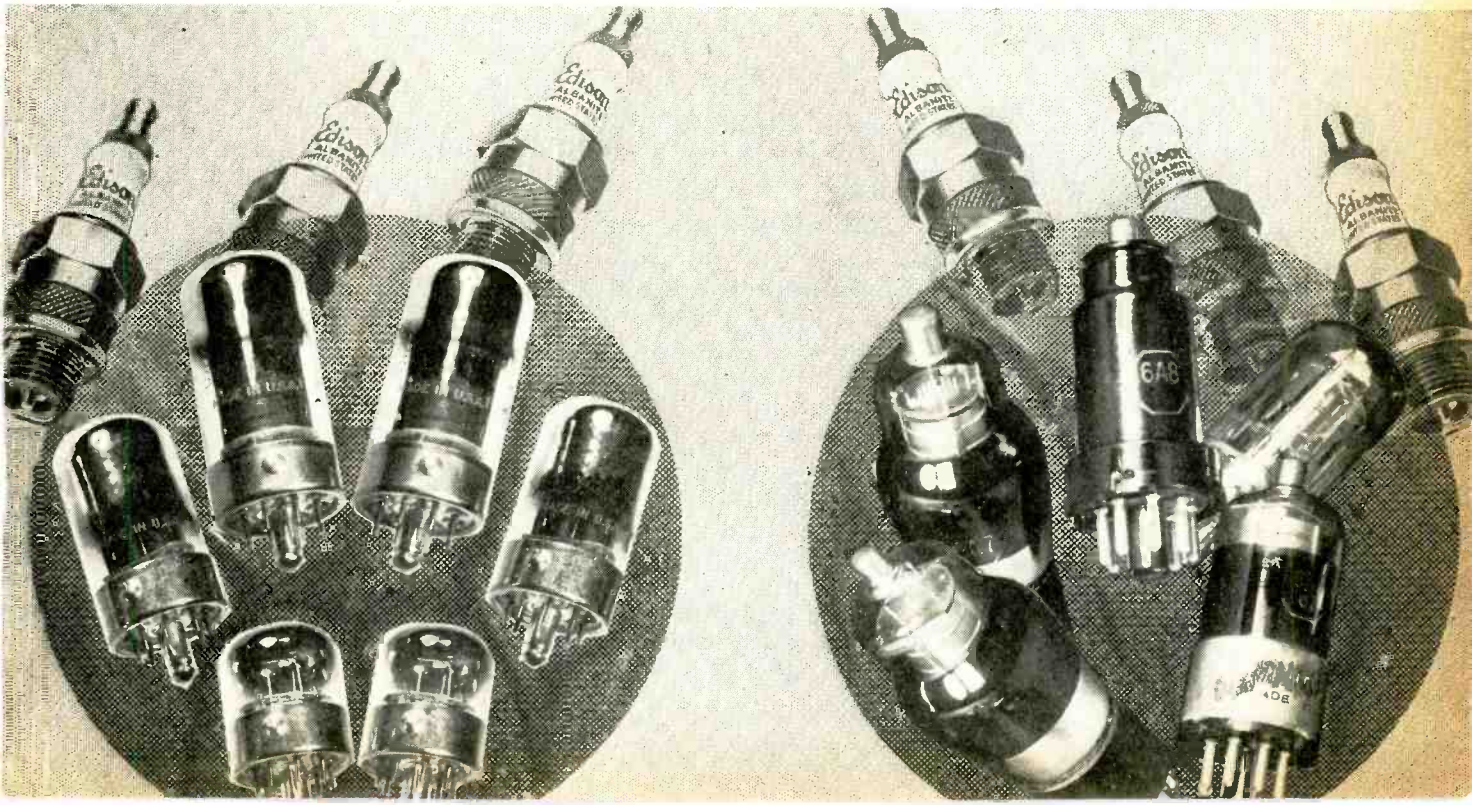
5. FOLLOW-UP

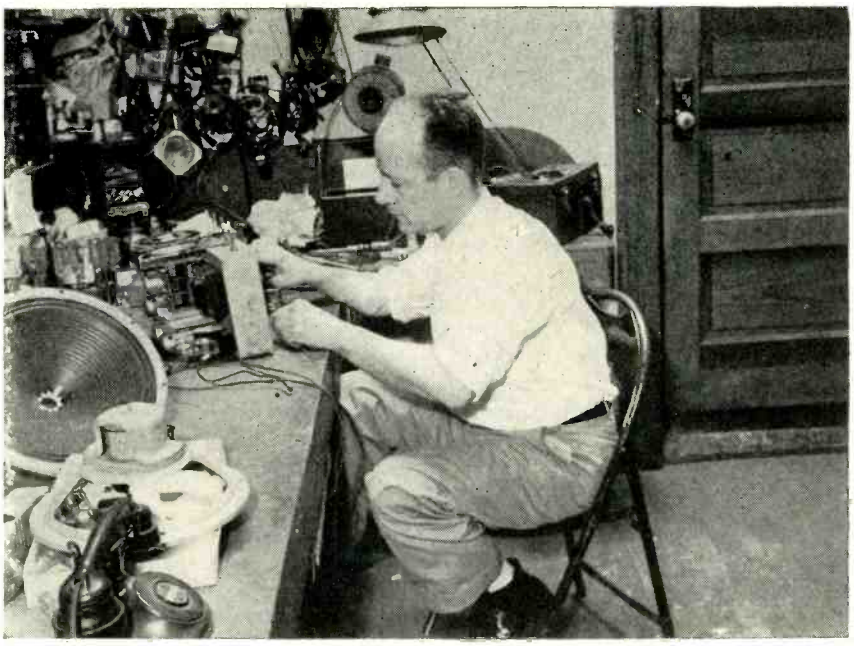
Customer follow-up is an important part of the operation of a radio service dealer's business. It may be effectively practiced in many ways including direct-mail and personal telephone calls. The important thing is to follow-up your customers and prospects regularly. People appreciate being reminded when they need specialized service. Simple and direct follow-up methods give you an opportunity to remind your customers and prospects with timely messages about your service. Use the material manufacturers provide for this purpose.

Messages containing a reminder of the importance of tubes are always timely. The law of averages assures profitable response. Soon there will be an excellent opportunity to directly increase tube sales and profits when wartime servicing ends and postwar servicing begins. Service dealers who prepare their five point merchandising program now, will be ready for their full share of the 100 million tube replacement market in the immediate postwar.

Tubes are the "spark plugs" of radio. Eliminating mixtures of "healthy" and "invalid" tubes will increase radio efficiency.

Material for montage courtesy of Edison-Splitdorf; Sylvania; Tung-Sol.





Departments Speed Jobs

by NELSON FIELD

Profitable handling of peak demand for service on radios, refrigerators, washing machines, etc., by "departmentalizing" jobs among smaller staff.

AT one time the Curtiss Radio and Electric Co., 326 E. Front Street, Traverse City, Mich., had eight employes handling service. Today, during wartime, three men handle a vast volume of repair work at a profit. Per man, the average daily wartime output is much higher than in peacetime. The reason? Departmentalized work.

The three service people at Curtiss Radio & Electric who are turning out considerable work every week are Bernard Curtiss, owner, his brother Maynard and his father C. L. Curtiss. Each has his specific work to do, and this departmentalization helps to speed output. During peace years there was not this close attention to specific jobs. Service men pinch-hit on one job or another and much free service has to be given with new appliances sold by this dealer. Today, with volume being practically all service and repairs, every operation must pay its own way.

"Authorized" work ticket

Curtiss Radio & Electric Co.
No 402
Work Authorized

_____
_____
_____
_____
_____
_____

CURTISS
RADIO & ELECTRIC CO.
326 E. Front St. Phone 825-F1
No 402
All Parts and Labor Cash

Maynard Curtiss, under the firm's wartime operation plan, handles all radio repair work. This includes home and automobile radio work from individuals and dealers. The last few years the firm has been getting considerable work from dealers in nearby small towns whose service departments have folded due to war conditions.

In order to handle the large volume of radio work, Maynard Curtiss spends most of his time at the work bench. By doing only radio repairs and by not having to worry about pickups and delivery, he can concentrate on his work. The result is that one or two extra repair jobs are done per day because of the time saved.

Bernard Curtiss, the owner of the establishment, takes care of customers as they come in. He plans the work, makes out the job tickets. He

also handles the pickup and delivery. The firm charges $1.00 for the average pickup and delivery, and $2 for heavy appliances such as washing machines and refrigerators. His wartime schedule also permits him to make a limited number of outside calls, mostly on refrigerator and washing machine jobs.

The remainder of Mr. Curtiss' time is spent helping out on heavy appliance repairs at the shop or sometimes on radio repairs. He is the balance wheel between the two departments which keeps the repair line functioning at all times.

C. L. Curtiss, the father, handles the washing machine and refrigerator repairs. The shop has the proper equipment for such repairs and there is plenty of room for service operations. Jobs are kept moving as rapidly as possible. The firm has quite a stock of washing machine parts and this helps to keep the ratio of completed jobs high every week, although some delays are occasionally experienced.

"We try to keep all appliance jobs moving through our shop as rapidly as possible during wartime," says Bernard Curtiss. "We know customers want their washers, radios, etc. repaired and back in service as soon as possible, and we also are interested in turning out more jobs. Our schedule and plan accomplish this very satisfactorily. We have managed to make a nice profit in wartime and satisfy our many customers."

Father of trio specializes on washing machine jobs. Across: Son Maynard spends time, makes money, at workbench in firm's radio repair department.

Washers soon to be stocked, l. to r.: Bendix Home Appliance fully automatic model; General Electric wringer model; Laundromat is Westinghouse product.

WASHERS COMING UP

Pent-up demand for washers is figured as high as almost 6 million units. WPB authorized production of 350,000 washers for the third quarter; the same number may be allowed for the last three months of the year. Most of the 29 manufacturers in the industry will stick to one or two of their prewar models or equal. But only about half of them will be able to go into production right away. Others are busy full time with unfulfilled war orders.

Because of OPA-stressed moderate priced line production over the more costly models, firms like Bendix will stick to the cheaper of two prewar automatic models. On the other hand, Westinghouse announces it will resume production of its fully automatic Laundromat, which it began to make just before war broke out.

Driers will be made again by such firms as General Electric, Hamilton Mfg. Co., GE Hotpoint—continuing prewar production and "know-how". But it will be six months before enough washers, driers or ironers will be made to really get to dealers in noticeable quantities. And it all depends on availability of parts and raw materials.

FCC Explains FINAL ALLOCATIONS

ON May 25, 1945, the Commission made public its final report of allocations above 25,000 kilocycles, except for the region of the spectrum from 44 to 108 megacycles. With respect to this region, the Commission proposed three alternative allocations for FM, television, facsimile, non-government fixed and mobile services, and the amateur service.

Its chief concern in making allocations between 44 to 108 megacycles is that FM shall be assigned the frequencies best adapted to its needs. All of the other services for which provision is made in this portion of the spectrum, have allocations in other portions of the spectrum, so that they are not wholly dependent upon their assignments here. FM, on the other hand, is receiving assignment only in this portion of the spectrum, and accordingly it is essential that it receive an allocation which will give it a permanent locus, as free as possible from interferences and other shortcomings.

The three alternatives proposed for FM are: (1) 50-68 megacycles, (2) 68-86 megacycles, (3) 84-102 megacycles. There was unanimity that alternative No. 2 (68-86 mc.) is completely unfeasible. Accordingly, the choice lies between alternatives Nos. 1 and 3. The primary objection to alternative No. 1 is the amount of skywave interference which will result among FM stations if FM is placed in the 50-68 megacycle region.

Interference Studied

For example, interference among 50 kilowatt FM stations at 58 megacycles from sporadic E transmissions alone, assuming a 10/1 ratio of desired to undesired signal and full occupancy of the channel, might be expected for 140 to 480 hours per year at the 50 microvolt contour from stations 900 and 1000 miles distant, respectively. At 84 megacycles, in contrast, interference under these conditions would be anticipated for only 6.5 to 25.5 hours per year. It should be noted that the 140-480 hours per year of anticipated interference would not be spread out evenly throughout the entire year but that the great bulk of it would be concentrated in two or three summer months.

The amount of sporadic E interference will vary with the particular frequency involved, the power of the transmitters, the distance between transmitters, the number of transmitters on a channel, and other factors; but, regardless of these factors, the region of the spectrum above 84 megacycles is markedly superior to the region below 68 megacycles with respect to sporadic E.

In addition to this interference from sporadic E transmissions, interference from F2 transmission at 53 megacycles may be anticipated for as many as 470 hours per sunspot cycle—concentrated in a period of three years—in the case of a sunspot cycle the same as the last one; or interference may exist for as much as 2,650 hours per sunspot cycle if the next sunspot cycle is as severe as the highest on record. These figures for F2 transmission, it should be noted, assume only two stations on a channel; more than two stations on a channel would double or treble the number of hours during which F2 interference would be expected at 53 megacycles. In contrast, no F2 interference whatever is to be anticipated above 84 megacycles.

Set Owners Affected

For listeners buying FM receivers in reliance on a belief that FM is an interference-free service, these figures are extremely serious. They mean, for example, that a listener tuned to a station which is carrying the program of his choice may suddenly find, either that the program to which he has been listening is being interfered with by a station hundreds or even thousands of miles away, or else that control of his receiver has been seized altogether by a distant station completely obliterating the desired program of the local station. These distant transmissions, moreover, are sporadic in nature, with the result that his enjoyment may be further destroyed by an alternation of first one program and then another. The effect may well be to render FM receivers useless to many listeners for substantial periods of time.

Much emphasis was placed on the presumed hardship which would result to the approximately 400,000 persons who had puurchased FM receivers before the war. Most of these receivers are combination AM-FM and the AM part of the receiver will continue to be used. There is now substantial agreement that the band (42-50 Mc.) for which these receivers were made is wholly inadequate and unsuited to FM reception. Accordingly, no one today argues that post-war FM should be degraded to the point necessary to accommodate these receivers.

However, interim operation in the present band from 42 to 44 megacycles is being provided until such time as equipment for the higher frequencies is freely available to the public and until owners of existing receivers have had equal opportunity to adapt or convert them to the new band. In this connection, a converter was demonstrated to the Commission which would make existing FM receivers capable of tuning to the higher frequencies and which should retail for approximately $10.00.*

It has been argued that the bulk of the interference anticipated will be found in outlying rural areas which rely upon low-intensity signals for their radio reception and that if these areas be excluded, FM service will be more than 99 percent perfect. Studies make it clear that urban as well as rural service will be subject to substantial interference on the lower frequencies. The Commission, moreover, is under statutory duty to make available to *all* the people of the United States an efficient nationwide radio service. The Commission's duty is not fulfilled if its provision for FM service is such as to make it impossible for rural areas to enjoy satisfactory FM service.

See "FM Sets Saved From Obsolescence," page 26, May, 1945, issue of RADIO SERVICE DEALER.

Hearings Summarized

Practically without exception all persons appearing at the hearing on June 22 and 23 stated either that they agreed with the Commission's predictions or that in determining the best allocation for FM they were willing to assume that the predictions as to interference contained in the Commission's report of May 25 were accurate. In those cases were exception was taken, no substantiating data were offered. Indeed, the testimony indicated that the Commission's predictions might understate in at least one respect the number of hours of interference to be anticipated at particular contours.

The Commission's predictions were based upon the assumption that receivers will be generally available which are capable of rejecting an undesired signal one half as strong as the desired signal. Manufacturers generally appearing at the hearing were unwilling to state that their post-war receivers would meet this standard. With inferior receivers, an even greater number of hours of interference can be anticipated. The issue, accordingly, is whether the freedom from long-range interference which FM will enjoy at the higher frequencies is to be sacrificed by reason of other considerations.

The point has also been made that equipment for use in the vicinity of 100 megacycles will cost more than equipment for use in the vicinity of 50 megacycles. This will no doubt be true at least temporarily, but it seems equally clear that competition will reduce the differential substantially, and that the benefit to the public resulting from an interference-free service will more than outweigh the slight increase in inital cost for service in the 100 megacycle region.

At the earlier hearings, some contended that FM might be delayed for two years or even longer if FM were assigned to the higher frequencies. At the time of the oral argument, June 22-23, 1945, the estimates of delay were reduced to four months. It may well be that competition will markedly reduce even this four-month estimate. Moreover, this report makes it possible for manufacturers to begin at once their plannning and design for the higher frequencies.

The War Production Board has not yet authorized construction of AM, FM, or television equipment for civilian use; and some months may still elapse before manpower or materials become available in sufficient quantities for such production to begin. If so, the planning and design of equipment for the higher frequencies can be completed before civilian production of any AM, FM, and television equipment is authorized.

Manufacturers, of course, are desirous of marketing FM receivers at the earliest possible moment; and the Commission, too, is concerned that FM receivers shall be freely available to the public early enough to supply the immediate post-war demand. However, the Commission has a duty to consider the long range effects of its action as well as the effects during the months immediately ahead, and it does not propose to provide an inferior FM service during the decades to come merely because of the transitory advantages which may be urged for an inferior type of service.

Allocations Detailed

Upon the basis of data set forth in the FCC report of May 25, 1945, and for reasons given here, the Commission is adopting alternative No. 3, with certain modifications. The allocation between 42 and 108 megacycles is as follows:

FREQUENCY BAND (MC.)	PROPOSED ALLOCATION
42 - 44	Non-Government Fixed and Mobile
44 - 50	Television — Channel No. 1
50 - 54	Amateur
54 - 60	Television — Channel No. 2
60 - 66	Television — Channel No. 3
66 - 72	Television — Channel No. 4
72 - 76	Non-Government Fixed and Mobile
76 - 82	Television — Channel No. 5
82 - 88	Television — Channel No. 6
88 - 92	Non-commercial educational FM
92 -106	FM
106 -108	Facsimile

This allocation is essentially the allocation proposed as alternative No. 3, except that the non-government fixed and mobile services have been moved from 104-108 megacycles to 72-76 megacycles, and FM and television have been adjusted accordingly. The advantage of this change is that it makes possible immediately the use of all 13 television channels below 300 megacycles. Under alternative No. 3, as originally proposed, the entire 6 megacycle television channel between 72 and 78 megacycles could not be used until the aviation markers centering on 75 megacycles were moved. The non-government fixed and mobile services are not under the same disability. They can use the entire band between 72 and 76 megacycles at once, with the exception of approximately one-half megacycle in the vicinity of 75 megacycles to protect the aviation markers.

This shift of the non-government fixed and mobile services from 104-108 megacycles to 72-76 megacycles also results in a possible increase in the number of channels available to the non-government fixed and mobile services, since a 40 kilocycle channel is adequate in the 72-76 mc portion of the spectrum, whereas a 50 kilocycle channel was proposed in the 104-108 megacycle region.

ALLOCATION HIGHLIGHTS

Chairman Paul A. Porter stated that the Federal Communications Commission will move with all possible speed to revise present regulations and standards of good engineering practice for the operation of FM, Television and Facsimile Broadcasting in the new allocations. As soon as these revised rules and standards are adopted by the Commission, the industry will have all the information it needs from a regulatory standpoint to proceed with the planning and design of new receiving sets and transmitters, Chairman Porter pointed out.

"We have had a number of inquiries as to the status of the 420 FM applications and the 119 Television applications now in our pending files. For the time being, these applications must remain in the pending files as there has been no modification of the Freeze Policy (restricting the use of critical materials) which is still in force. No standard, FM, Television or Facsimile applications will be finally acted upon for a period of 60 days from the date when the Freeze Policy is changed.

"Companies which will manufacture FM receivers should build the sets to cover the entire band from 88 to 108 megacycles. This will make possible the expansion of FM in the event facsimile is ultimately located in the 400 Mc region and vacates the band 106-108. Also, if the public is to enjoy the full capabilities of FM, manufacturers must build receivers which will reject undesired signals and noise up to one half the strength of the desired program.

"While the allocation report is a long step toward preparation for conversion, all of us must keep in mind that the first business at hand is to concentrate on beating Japan as speedily as possible."

JOBS FOR VETS IN ELECTRONICS ERA

New opportunities for jobs in industrial commercial, public service and consumer markets.

by VICTOR A. IRVINE
Galvin Manufacturing Corp.

IN outlining the postwar job possibilities in the radio and electronic fields the point to remember is that the industry has grown so tremendously since the war that some of the hitherto smaller branches now almost dominate the tree. Job opportunities for the veteran will include the possibilities for the entire electronic industry. To make this clearer, let's say that electronics is the art of harnessing electrons so that man may be served thereby. Since electrons may be controlled and directed to perform a variety of operations, similar to human functions, as to see, hear, feel, taste, remember, count and talk, etc., the variety and extent of the electronic industry apparently has no horizon. But, adding together what we do know, it is safe to make a few predictions about the postwar job possibilities in this industry.

Spreading Uses

In the Radio division of the electronic industry, let's include AM and FM Radio, radio-phonographs, television, radiotelephone communications and other household and automobile items. This division may be further divided to include the industrial, commercial, public service and consumer sections of two-way radio communications.

Veteran at Hallicrafters Co.

When war started, the radio division of the electronic industry was barely 20 years old. In 1941, the radio industry produced at manufacturer's selling prices approximately a quarter of a billion dollars' worth of goods. It rose to $1,000,000,000 of war goods in 1942 and to $3,500,000,000 in 1944. Needless to say, as the volume rose so grew also the number of peacetime applications to which electronics may be put when the war is ended.

This latter point is most important because of its relation to its job making ability. During the war, consumer production was ended. Except for emergency purposes, not much industrial commercial nor public service electronic equipment was manufactured. This leaves a tremendous backlog of demand for electronic equipment, as wartime necessity and invention have demonstrated the economical utility of new discoveries in the electronic field.

The annual volume, after the war, may not run as high as the war-time volume but it will exceed the former highest peacetime peak. In other words, *there will not be too great a post-war slump in the electronic industry.* This means that there will be plenty of jobs available in this field when the war is over.

Jobs for Many

As in every business, it takes an idea to start things off. So there will be jobs for those who are idea men. Then there will be jobs for those who will be needed to develop these ideas . . . radio engineers, electrical and mechanical engineers, draftsmen and laboratory assistants.

After the design and engineering of radio, comes the manufacturer. This means jobs all the way from men in management down to the fellows who take care of seeing that the finished goods are properly packed and shipped. Next are selling jobs for the manufacturer. What has been manufactured will have to be sold and it will take man power aplenty, after the war, to do the job properly.

After this the distributor enters the picture. Distribution presents a huge, untapped reservoir for jobs. No one knows how many men will be required to fill all the jobs in the distribution picture but the number will be large. The next job maker is the dealer who in turn will employ the salesmen and, except for the small simple items, will require installation and service men.

Installation and service men will also be employed by the manufacturer and the distributor. Then, of course, concerns which use industrial electronic equipment will require more technicians. This branch opens new fields for jobs in industries, commerce, public utilities and public service departments like the police and fire departments.

With the arrival of television, for example, the telecasting studios will require countless technicians, camera men, lighting experts, and so forth. Also artists, writers, directors and others directly or indirectly connected with the entertainment phase of electronics.

With railroads, bus companies, taxi companies, trucking concerns, shipping concerns and others determined to gain the advantages of radiotelephone for use in their business, (the list is too long to include here), it may be seen how diversified and numerous are the opportunities for jobs in the coming Electronics Era.

Two Benches With "One Thought"

Home and auto radio receivers serviced on separate, specially equipped work benches.

by A. P. NELSON

VETERAN radio dealer A. R. Kirkby at Manistee, Michigan, has two separate work benches in his neat, well planned radio repair shop. One bench is equipped for the repair of home radios; the other, for automobile radios.

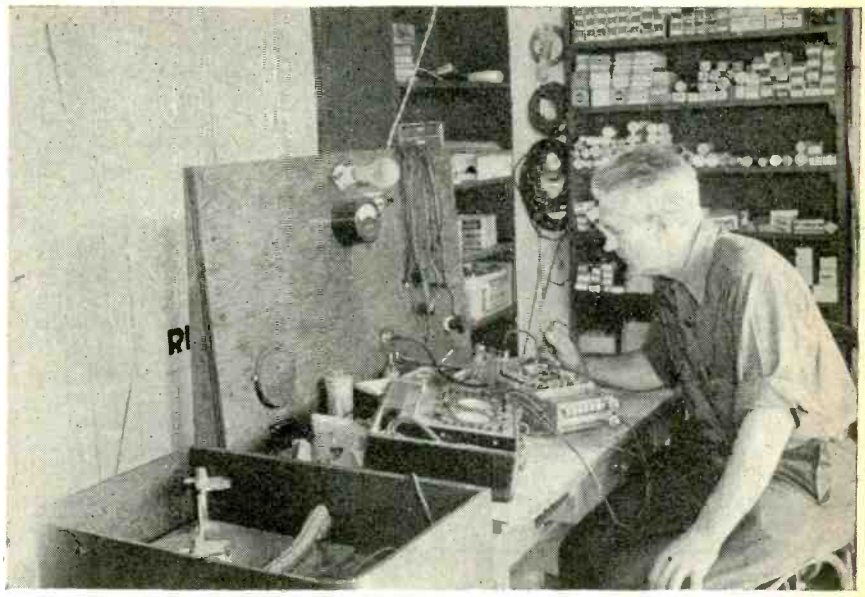
"If I am working on an automobile radio and a home radio customer comes in and wants special service, then I can leave the auto radio sit just as it is," says Mr. Kirkby. "When I go back to it, I know that I can pick up my repairing job just where I left it. I have always contended that a radio service dealer needs bench room when at work — and that is what I have."

Mr. Kirkby worked out the two bench arrangement because he gets a lot of auto radios to repair. He formerly operated a garage and a radio shop. When war broke out and help became scarce he choose radio servicing, closed the garage.

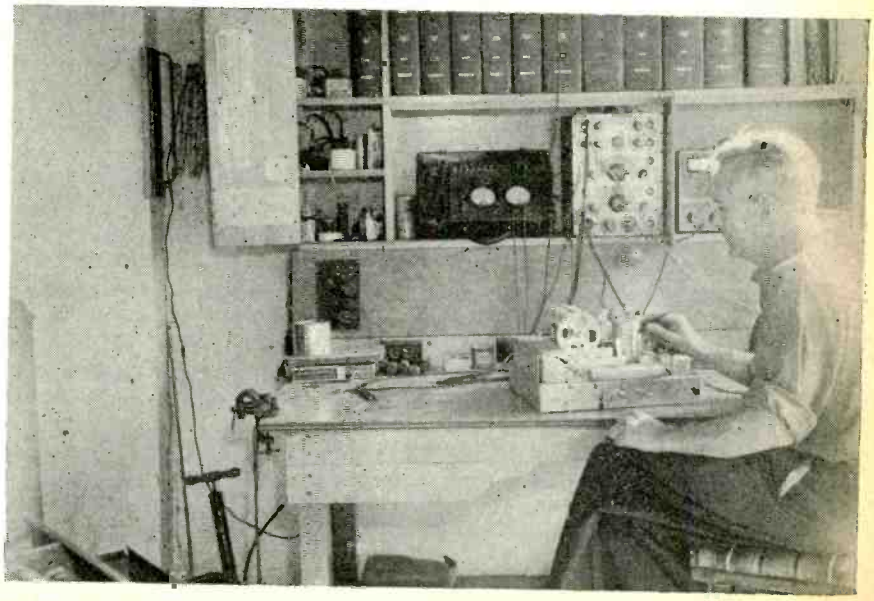
Other dealers in the area bring their auto radios to Kirkby for repair, because they know he has had plenty of experience and that he can do a good job.

"With the volume of auto radio business I handle," says Mr. Kirkby, "I find that my special auto repair bench works out very well. I can handle the work with less confusion, save time and speed the jobs along. And that is important nowadays.

"This is a one man shop, but I turn out a very large number of service jobs every year. I know for a fact that this is only possible because of my two-bench setup. I don't have to waste time just looking for misplaced parts, tools, etc. I've got the space to lay them down and leave them safe from disturbance while I concentrate on my work."



Above, work is organized for auto radios; below, separate bench for home sets.



"SELLING" POINTERS ON SOUND

The wartime production record of "music at work" programs has earned the novel medium a favored position in postwar management and labor plans for factory improvement. That was the opinion of Allan R. Royle, sales manager of the sound equipment division of the Stromberg-Carlson Company, and one of the sound industry's foremost technical authorities, speaking recently before the membership of the Rochester (N. Y.) Engineering Society.

Sound-man Royle made the significant appraisal of the postwar work-music uses of the sound system in a speech which reviewed all the uses to which systems have been put. The uses include: rapid, sure communication, public address, signalling and newscasting. In one war plant, Mr. Royle told his audience, the instant communication feature effected a dollar saving in labor equivalent to several thousand dollars a year over the "telephone-and-search-party" technique previously employed to locate absent personnel.

"With work-music, expertly planned and programmed, another war plant increased a prior-record man day production of 9,608 units to a new high of 11,484 units. A later check bore out these findings when music was played for 25 days and the operators produced at the rate of 23,563.34 components per man days. When the music was shut off for 6 days, output dropped to 19,878.81 components—a decrease of 18.53 per cent. A Vermont war plant discovered that application of music lowered the company's high rate of absenteeism which had been vexing the management," Mr. Royle went on to say.

Sound System Applications

USING SOUND

Plants vary in conditions, operations, personnel and location. In order to receive the utmost benefit from industrial music, programs must suit the needs of each plant. There are not many fixed rules to follow. Some basic principles, however, have become established through accepted use and a few others by controlled experimental research.

What follows is given here as background material for the sake of helping the radio service dealer who works on sound or intends to explore the possibilities of the field, to "round-out" any selling effort with prospective customers.

What to Play

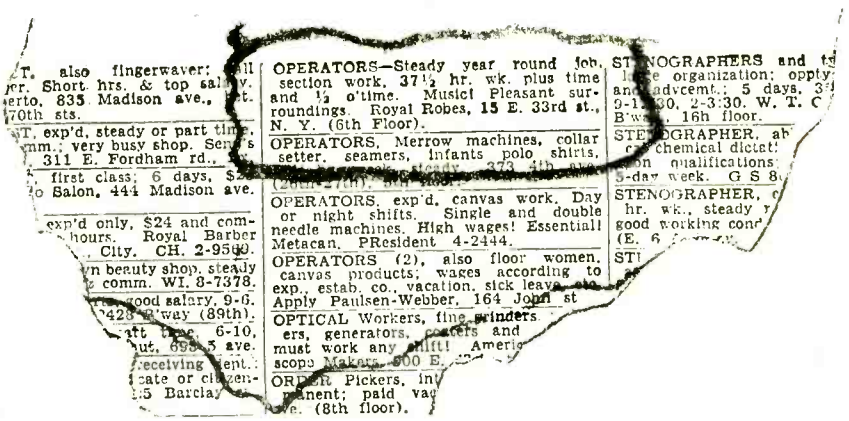
Based upon employee preference, about sixty percent of the music generally used consists of popular dance music. There are seldom more than fifteen new tunes which are hits at any one time, so it becomes necessary to use older selections also, which have become standard.

The other forty percent is mainly composed of Viennese waltzes, popular operetta melodies, polkas, novelties, marches and Latin-American music. Sometimes a small percentage of heavier works, selections from Grand Opera and symphonic pieces are called for. The above mixture is not to be considered specific. Employee preference is a very unpredictable thing. It is affected by many factors—racial extraction, age, sex, geographical location, musical ability and environment, etc.

The client should be reminded that variety is most important in industrial music. Trying to please everyone at once is a hard job and the solution is a compromise. A proportionate amount of what everyone (not just the majority) wants should be included, and the selections mixed so that no standard pattern is discernible. The employees hear the music over and over again in the course of time and get to recognize and object to a pattern.

In general, the music used for factories should be familiar and have well defined melody and rhythm. Full orchestrations are to be preferred to arrangements featuring solo instruments. In the latter case the tune may become lost in the machinery noise.

Avoid selections that have startling or hard to follow passages. The man concentrating on his job follows the music in his head, if not vocally. In fact, it is generally considered a criterion of industrial music's effectiveness if the employees hum or sing along with it.



OPERATORS—Steady year round job, section work, 37½ hr. wk. plus time and ½ o'time. Music! Pleasant surroundings. Royal Robes, 15 E. 33rd st., N. Y. (6th Floor).

OPERATORS, Merrow machines, collar setter, seamers, infants polo shirts,

OPERATORS, exp'd, canvas work. Day or night shifts. Single and double needle machines. High wages! Essential! Metacan. PResident 4-2444.

OPERATORS (2), also floor women, canvas products; wages according to exp., estab. co., vacation, sick leave, etc. Apply Paulsen-Webber, 164 John st

OPTICAL Workers, fine grinders ers, generators, centers and must work any shift! Americ scope Makers, 600 E.

ORDER Pickers, int manent; paid va ve. (8th floor).

Using Sound: **Help wanted ad features "Music! Pleasant surroundings . . ." in bid for workers in tight labor market. Plant broadcasting facilities are featured as significantly as "vacation, sick leave, etc." are listed in another (fourth) ad above, in effort to attract permanent workers.**

PART 3

"Hot" music or jive is best avoided also. The demand for it may be great, but too much of it is overstimulating. It must be used only sparingly. The question of whether or not to use vocals has never been placed on a firm basis. They are used in some plants, and are definitely taboo in others. There appears to be a relation between the use of vocals and the amount of mental effort involved in the work. Generally, it is wise to proceed cautiously in the use of vocals.

When to Play

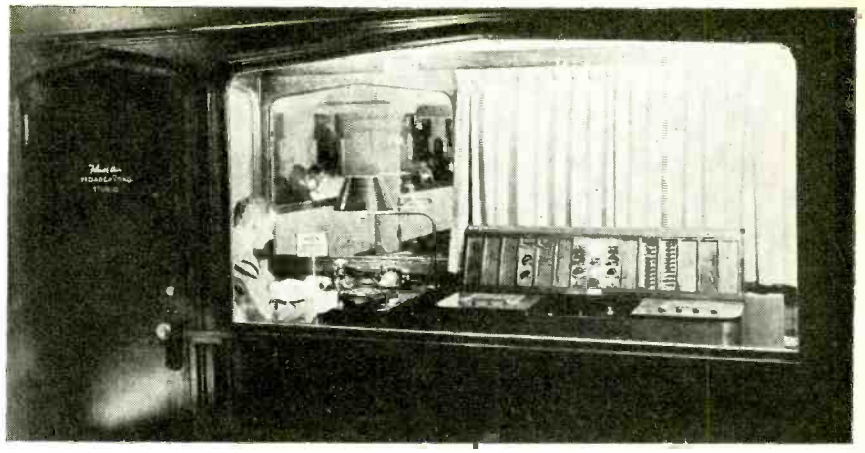
A maximum of about 2½ hours of music per 8 hour shift has been found sufficient. More music, even though the employees request it, causes a surfeit resulting in decreased effectiveness. It is wise to follow the showman's principle of leaving the audience wanting more. The usual practice is to start off in the morning with a short period of march music or other peppy tunes. This helps to wipe away the morning gloom.

The scheduling of playing periods is best determined as a result of studies made in the plant to locate the times of greatest and least fatigue. Music played just before and during a fatigue period serves as a "pick-up". An effective way of grouping selections is to arrange them in order of increasing stimulus. Employee requests are included in the program, but only with discrimination. Those which do not fit in with the over-all plan are played during lunch or rest periods.

How to Play

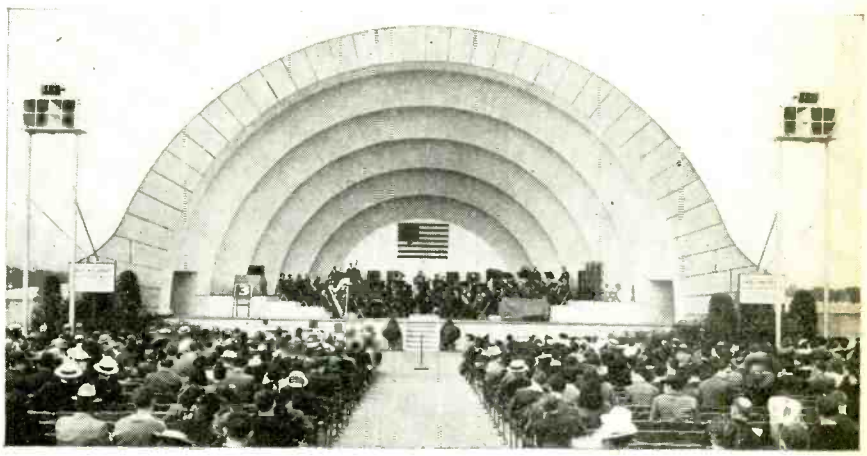
The volume level at which the music is played is generally kept low. The importance of this also increases with the amount of mental effort put forth on the job. Beginning each group at an even lower level and bringing it up to normal over a fifteen second period is a good plan. About 10 to 15 second interval between selections helps to cover changes in key, orchestrations, and music types that might be objectionable if heard in too rapid sequence. It also allows for paging calls to be made without interrupting the music.

Actual operation of work music programs is of course the job of a program director, and it is a difficult one. This section is included in this article to give radio dealers and technicians a picture of the conditions and problems encountered in the use of any industrial sound systems they may be called upon to plan and instal. The facts about programming should also help the dealer consummate deals to supply recordings for plant broadcasting.



STORES: Department store (Filene's, Boston) has its own studio for broadcasting music, "taking the tension out of shopping for customer and sales worker".

OFFICES: Routine work is helped along with music over RCA internal broadcasting system in its Camden plant. *This and top photo from RCA Victor.*



PARKS & PLAYGROUNDS: Loudspeakers are two-element Jensen designed to to produce full musical scale, Grant Park, Chicago. *Photo from Western Electric.*

Input Sources— Recorded Material

There are many ways in which sound can be preserved for future use. A complete discussion of any of them would require volumes. In connection with industrial sound systems we can limit ourselves to disc recording because of the availability of program material.

In disc recording, such as a phonograph record, the sound wave is, in effect, captured physically in the shape of the groove. In playing the record a needle or stylus follows the undulations of the groove. The motion of the stylus is transformed into minute voltage fluctuations by a pick-up or reproducer, just as a microphone functions under the influence of an airborne sound wave.

Phonograph records are pressed out of a hard shellac compound in 10 and 12 inch sizes. The sound wave is in-

TYPE	OPERATION	ADVANTAGES	DISADVANTAGES
PHONOGRAPH RECORDS	Recording is cut by laterally vibrating stylus 78 R.P.M.	Availability of recorded material Availability of reproducing equipment Low cost per disc	Limited frequency range Breakage due to brittleness Short playing time Surface noise
LATERAL TRANSCRIPTION	Recording is cut by laterally vibrating stylus 33-1/3 R.P.M.	Wide frequency response Long playing time Low surface noise Reduced breakage liability	Requires special reproducing equipment Softer discs-easily scratched Discs not distributed through local dealers
VERTICAL TRANSCRIPTION. "HILL AND DALE".	Recording is cut by up and down motion of stylus 33-1/3 R.P.M.	Wide frequency response Long playing time Low surface noise Reduced breakage liability Availability of material recorded specifically for industrial use	Requires special reproducing equipment Must be insulated from floor vibration Softer Discs - easily scratched Discs not distributed through local dealers

Table 1. Varieties of disc recording.

scribed in a special groove laterally. Because of the composition of the moulding compound, phonograph records have an appreciable surface noise. The average range of audio frequencies which is reproduced runs approximately from 100 to 5,000 cycles per second. They are played at 78 revolutions per minute.

Transcriptions were developed primarily for the motion picture and radio industries as a high fidelity means of preserving sound for future play-back. Like phonograph records, they are in disc form with spiral grooves, but there are many points of dissimilarity. They are reproduced at a speed of 33-1/3 revolutions per minute and thus can hold a longer program than a phonograph record for a given size. Transcriptions are made in two sizes—12 inch and 16 inch, the 16 inch size holding up to 15 minutes of recording on a side. Surface noise is very low and the frequency range is extended to the approximate limits of 50 to 10,000 cycles per second. Two types of transcription are available: lateral, as previously described, and vertical, where the stylus motion is up and down.

On the other hand, transcriptions require special equipment for proper reproduction. Because of their slow speed, turntables must be balanced and motors large. Otherwise, speed fluctuations would show up in the form of wavering notes, or wows. Reproducing equipment for transcriptions is more expensive than that needed for phonograph records. It is often very delicate and subject to easy damage. Table I shows the merits of the different types of recorded material.

Reproducing Devices

Pick-ups commonly used for playing discs employ two of the same principles of voltage generation as do microphones: motion of a wire in a magnetic field and the piezo-electric effect of crystals. The former are known as magnetic or dynamic pick-ups and the latter are called crystal.

In order that the stylus should not press too heavily on the disc, causing excessive wear, the arms are counter-balanced or spring-suspended. Low stylus pressure is an important design factor in connection with the frequency response of the unit. It must not be so low, however, that the stylus fails to track properly, or jumps the groove.

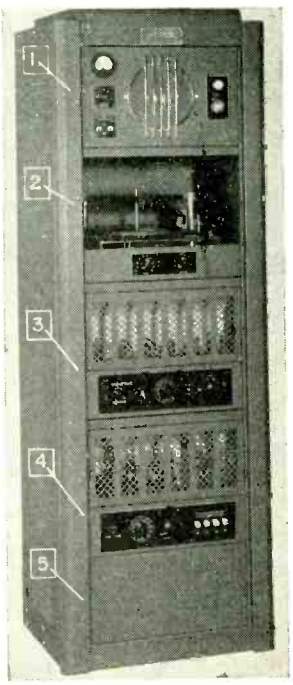
Some pick-ups use replaceable points or needles, while others have a permanent stylus built into the unit. In using replaceable points shadow-graphed steel needles are best. These have been carefully ground to conform to the groove shape, and individually inspected before packaging. As a rule, they are not considered long-playing.

Low pressure pick-ups with permanent styli generally employ a jewel such as sapphire or diamond for the point. The jewels are microscopically ground and polished and will play thousands of records without wear. They must be handled very carefully, as the jewels are brittle and fracture

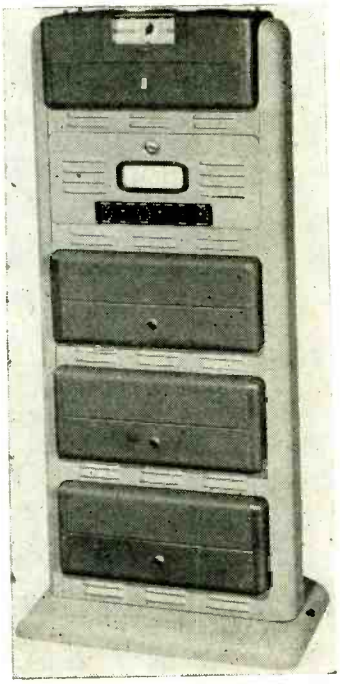
P-A UNITS

Typical equipment, but not identical in arrangement with other makes:
1, Loudspeaker, used as "monitor" when playing music. 2, Automatic phonograph for 10 and 12 inch records, with tune control. 3, Voltage amplifier, automatically balances different voice intensities. 4, Power amplifier-neon lamps indicate defective tubes. 5, Connector terminals. Shields eliminate hum. Relays operate paging circuits.
Newcomb model shown (center) is same as used in hospital opposite.

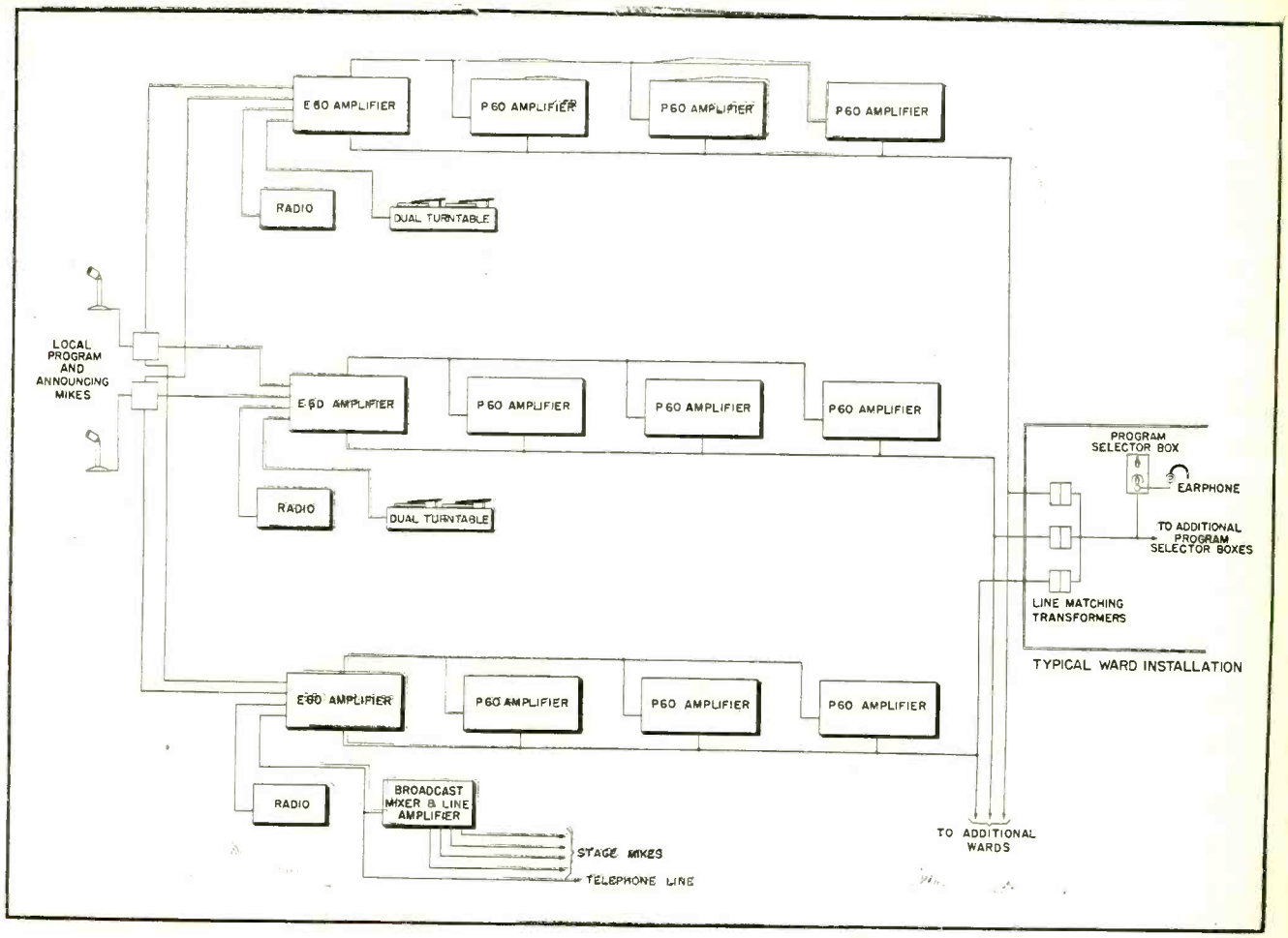
OPERADIO



NEWCOMB

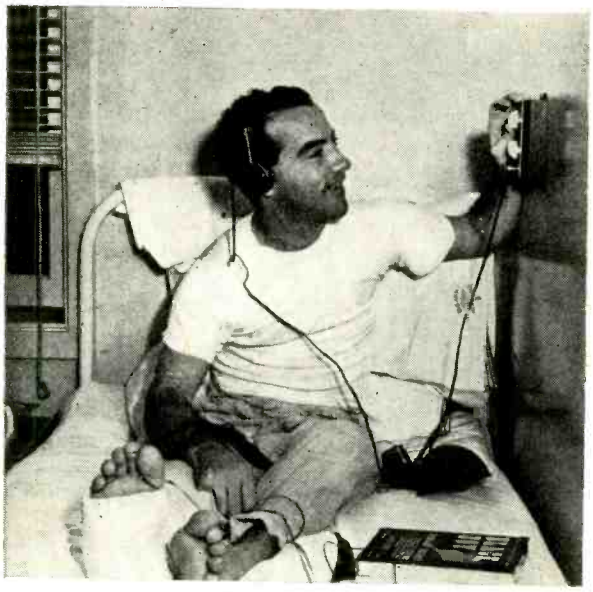


MECK



Courtesy of Newcomb Audio Products Co.

HOSPITALS: Block diagram of sound system in Birmingham Veterans Hospital.



Veteran listens at typical program selector box to lighten the burden of slowly passing time, hasten recovery. The programs are broadcast to the patients from 8:00 o'clock in the morning to 11:00 at night. Special broadcasts originating in the hospital auditorium include discussions by authorities on current events, sports, education, etc. at present. Plans call for orientation programs under supervision of the hospital's surgeon general, which will be designed to aid the convalescent veterans to readjust themselves as they need. Programs tuned in from the outside are whatever the major networks have to offer through the day. Installation of the system was handled by Army engineers, with supervision by Newcomb Company's engineers. Some 38 of the Army's 65 general hospitals will be equipped with a standard program distribution system by the end of 1945. Installations in schools, hospitals are being promoted by RMA special committee chairman L. A. King.

easily. If a cracked jewel point is used, it will ruin the record. Crystal pick-ups should not be used under varying temperature conditions, as their frequency characteristics are altered. At high temperatures they are subject to complete breakdown.

Equalization

In the recording process the amplifier driving the cutter conforms to a definite frequency response which is not flat. The reasons are beyond the scope of this article, but the point to be remembered is that there are several recording characteristics in common use. In addition, the nature of the disc material, and the pick-up have their effects of reproduced frequency response.

An equalizer circuit must be inserted between the pick-up and the amplifier to compensate for these effects. The total effect of the recording characteristic, disc material, pick-up response, and equalizer should result in a flat characteristic being delivered to the amplifier. If two types of recordings are used it is necessary to have a separate equalizer for each.

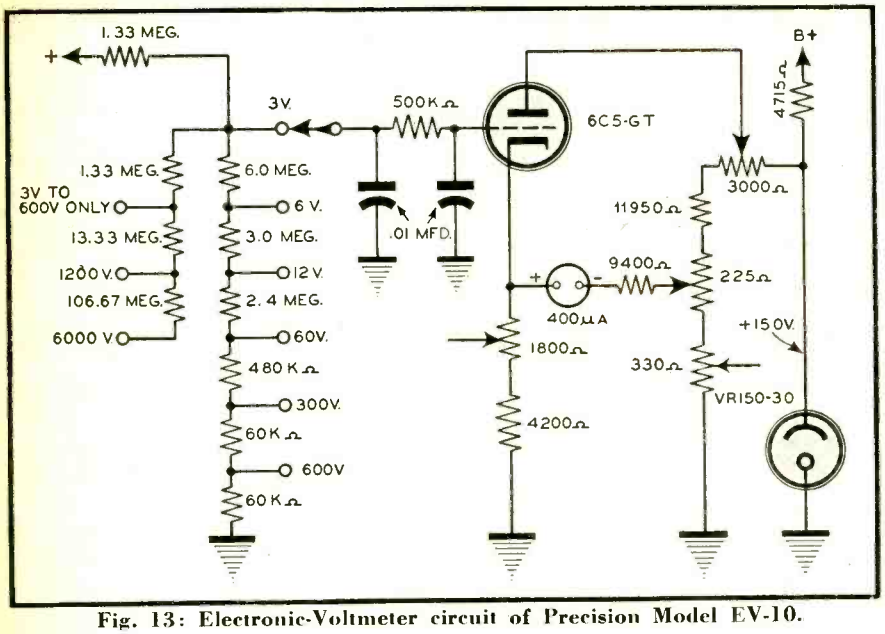


Fig. 13: Electronic-Voltmeter circuit of Precision Model EV-10.

points *A* and *B* are at the same difference of potential from the minus side of the battery, or at points of equal potential. No current flows through the meter since there is no difference of potential across it. If the voltage across R3 is *greater* than the voltage across R1, then point *A* is negative with respect to point *B* and current flows through the meter from *A* to *B*. If the voltage across R3 is *less* than that across R1, current flows from *B* to *A*. It follows that with no current flowing through the meter:

R3 : R1 :: R4 : R2 and therefore

R3R2 = R1R4

Now, if R1 is replaced with a triode type vacuum tube with cathode and plate being made the two connections formerly used for R1, we may vary the current flow through that tube by varying the grid bias, or applied grid

Electronic Voltmeters

by OSCAR E. CARLSON

E.S.M.W.T. Instructor, Temple University

PART 2

THE electronic voltmeters discussed in part one of this article (RSD for June, 1945) offer the advantage of measuring D.C. voltages regardless of the applied polarity. However, a major disadvantage is that only one half of the scale length can be used for measuring from zero to maximum voltage over any given range. But this is offset considerably by the simplicity of circuit and layout of components since only one tube is required plus the rectifier for the power supply.

To get a meter deflection of zero on an instrument such as shown in *Figs. 6* and *9* (see pages 42-43, June issue) for zero applied voltage would require operation of the tube at cut-off. The resultant scale calibration would be extremely non linear and polarity observation would have to be maintained since a negative input voltage would only drive the tube bias beyond cut-off. We are interested in getting use of the full scale length for essentially linear calibration of voltage of one applied polarity.

Current flow is directly proportional to an applied voltage in a Bridge Circuit, where one resistance arm varies in conductance directly with the voltage to be measured. An elementary Wheatstone Bridge Circuit is shown in *Fig. 11*. If the voltage across R3 is equal to the voltage across R1, then

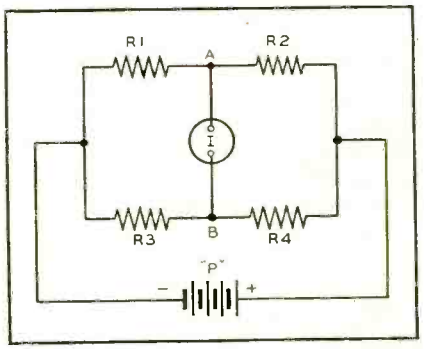
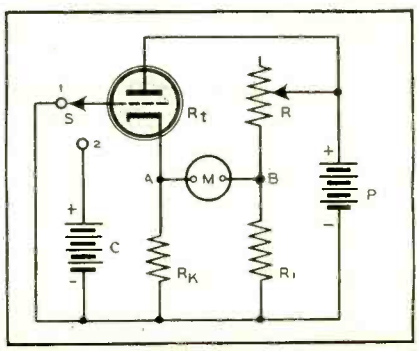


Fig. 11: Above, Elementary Wheatstone Bridge Circuit. Fig. 12: Bridge circuit using plate resistance of vacuum tube as one resistance element.



voltage. A tube biased to cutoff offers an infinite plate to cathode resistance, or appears as an open circuit between plate and cathode. By applying grid voltage, tube circuit from plate to cathode appears as a lower and lower resistance as the grid becomes more positive with respect to the cathode.

To illustrate, consider a tube with plate voltage of 100 volts and drawing 10 milliamperes of plate current.

R = E/1 or 100/01 = 10,000 ohms. Bridge Circuit (*Fig. 11*) may now be converted to circuit in *Fig. 12*. Here the tube plate circuit replaces one arm of the bridge. The value of the resistance of that arm is then a function of the applied voltage "C".

With reference to *Fig. 12*, we may adjust the resistor R so that no current flows through the meter when switch "S" is in position 1. Turning the switch to position 2 causes more plate current to flow through the tube so that the plate resistance Rt is less than with the switch at position 1. Our circuit is no longer balanced to a zero current through the meter. The increased cathode current causes the cathode to be more positive with re-

spect to the minus end of battery "P" than before. Thus point *A* is at a higher potential than point *B*. Current will then flow through the meter from *B* to *A*, considering current flow as electron flow. As long as we operate the tube over a straight portion of its transfer characteristic curve it will vary resistance linearly with values of voltage "C". Thus a linear change in current through the meter is obtained for applied voltage "C" to be measured.

Unbalanced Bridge Circuits

Fig. 13 shows the circuit of the Electronic-Voltmeter portion of the Precision E-V 10 Vacuum Tube Multi-Range Tester. (A schematic of this versatile instrument is shown on page 16 of the September 1944 issue of RADIO SERVICE DEALER.) This Bridge Circuit is similar to the basic circuit, *Fig. 12*, with one major difference as to its use. We have spoken of the advantage of center zero scale for measuring without regard to applied polarity, but that this advantage is offset in most instruments due to the shortened scale. In the Precision EV-10 the bridge circuit is used "unbalanced". That is, with no applied voltage the meter is adjusted for half scale deflection and this point calibrated 0.

A 7-inch meter scale is used which is an improvement on the compressed scale. Here we do not have to reverse test leads, use a polarity switch, or in any way observe the measured polarity; we have more scale length with a center O for either positive or negative voltage than would be obtained with a three inch meter using its full scale length. With this circuit both negative and positive applied voltages are read on a linear scale, since the tube is operated at all times on the linear portion of its transfer characteristic curve.

In this instrument all multipliers are metalized resistors of 1% accuracy. The function of the multipliers in the grid circuit is simply to subdivide the applied voltage for any operating range so that the tube has applied to it the same voltage increments and thus varies in resistance exactly the same for every range. Replacement multipliers should whenever possible be obtained from the manufacturer, but emergency repairs may be made as described in part one of this series of articles.

Fig. 14 is another unbalanced bridge circuit using center 0 so that polarity need not be observed. Here we find linear calibration also. This circuit is that of the Electronic-Voltmeter portion of the Supreme Audolyzer. Resistance values and ranges are labeled on the schematic.

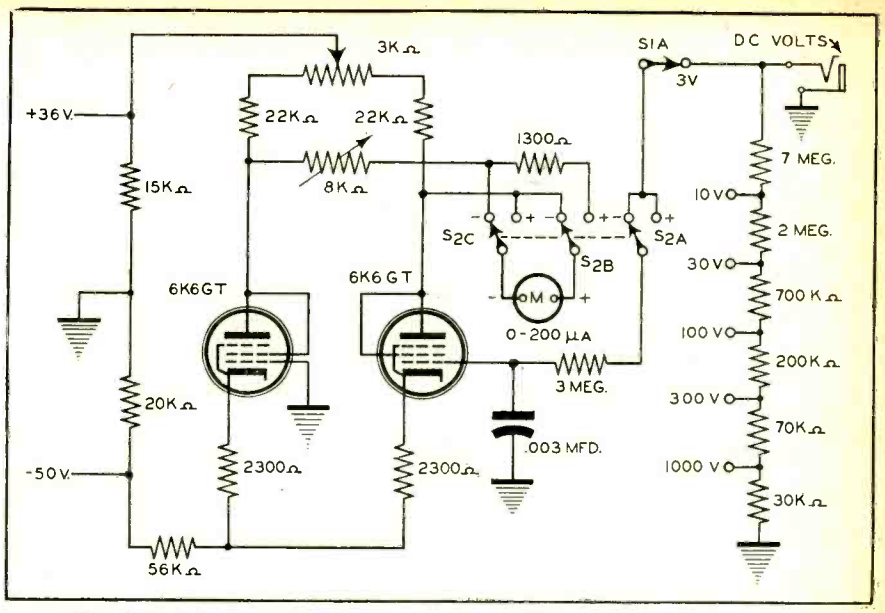


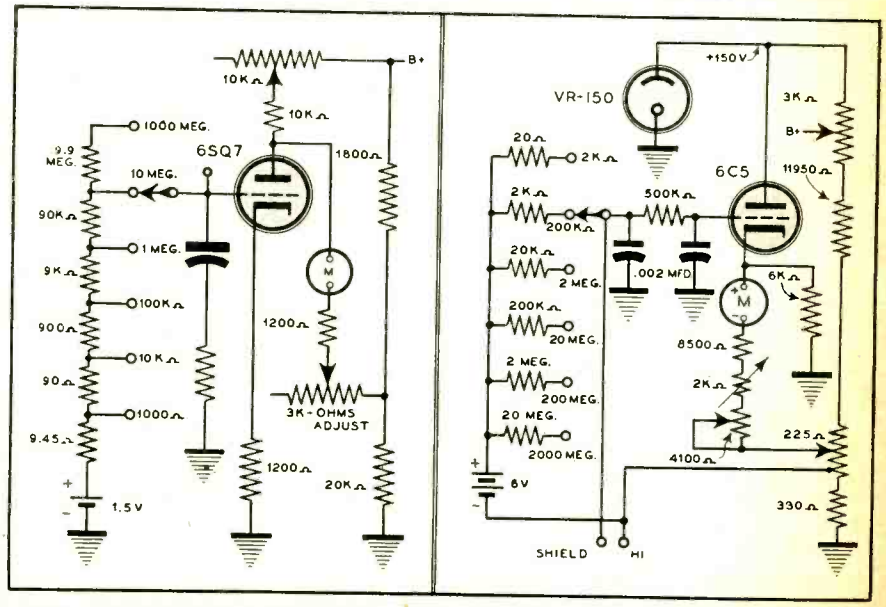
Fig. 15: Electronic-Voltmeter circuit of RCA Voltohmyst Junior.

Balanced Bridge Circuits

We have shown that a vacuum tube may be used as a variable resistance bridge arm. Another tube with all electrode voltage held fixed may be used as the second arm of a bridge circuit. *Fig. 15* shows the Electronic-Voltmeter portion of the RCA Voltohmyst, Jr. Two vacuum tubes are used for the arms of the bridge circuit. Here we find our design slightly more critical, since at balance each tube should offer the same resistance. This requires reasonably well matched tubes and a variable resistor to compensate for the differences between tubes. The two 6K6GT tubes are operated at reduced filament voltage of 5.7 volts. Plate voltage with respect to ground is kept at about 27 volts while the cathode operates about 3 volts above ground. A 200 micro-ampere meter is used and plate current of either tube limited to about 500 micro-amperes. All of these factors tend to reduce to an absolute minimum the grid current flow, which is less than 1/1000 of a micro-ampere.

The reduced grid current achieved in the Jr. Voltohmyst is of such small magnitude that zero adjustment of the instrument on one operating range suffices for all other ranges. The reduced voltages result in extending tube life and that of the other components of the instrument since it may be operated continuously with very low temperature rise. Such a circuit offers the

Fig. 18A (left): Electronic-Ohmmeter circuit of Hickok Model 202.
Fig. 18B (right): Electronic-Ohmmeter circuit of Precision Model EV-10-S.



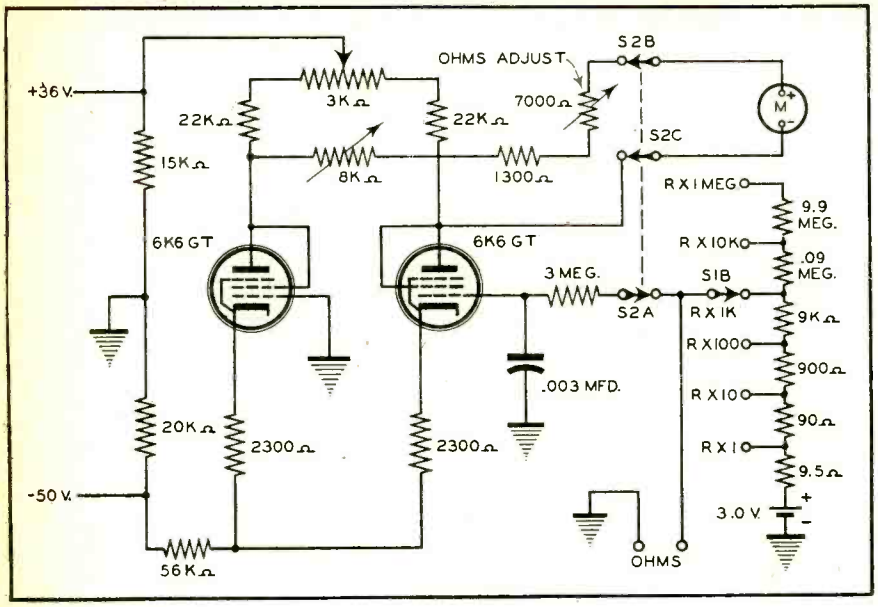


Fig. 18C: Electronic-Ohmmeter circuit of RCA Voltohmyst Junior.

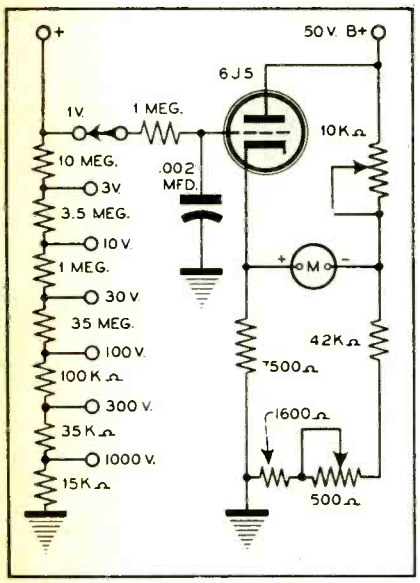


Fig. 14: Electronic-Voltmeter circuit of Supreme Audolyzer.

advantage of greater independence from line voltage variations since the two tubes will offer a plate circuit resistance as a function of the anode voltages which will allow both to vary against line voltage variations.

From *Fig. 15* it can be seen that a positive voltage applied on grid of T1 causes an increase in the plate current of T1 and a decrease in the plate current of T2 since the common point *B* becomes more positive as a function of the increased plate current. This makes cathode of T2 more plus with respect to grid than before, causing the plate current to decrease.

From the above we see that Electronic-Voltmeters are of two essential types. One operating as a Class A amplifier and the other as a portion of a bridge circuit.

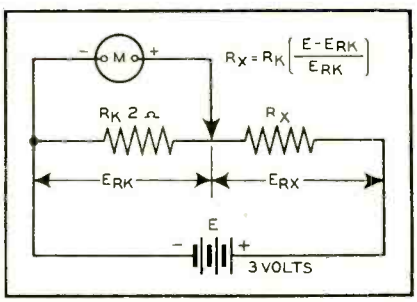


Fig. 16: Elementary Ohmmeter circuit.

Electronic-Ohmmeters

We have seen that our Electronic Voltmeter can measure voltage with the use of negligible current from the source being measured. Now if we can measure voltage we can, with the aid of a standard voltage, determine resistance values by measuring a voltage drop across a known resistor in series with an unknown resistor. A simple circuit for doing this is shown in *Fig. 16*. Since the voltages across Rx and Rk are in series the same as the resistors, the voltages are in the same ratio as the resistances. Rx may be determined in terms of ERx and ERk. Thus Rx : Rk :: E_{Rx} : E_{Rk} and RxERk = RkERx.

If E_{Rk} = 1 volt and Rk is 2 ohms, then with applied voltage of 3 volts, Rx equals 2 ohms × 2 ohms or 4 ohms.

If our meter is adjusted to read 3 volts as full scale deflection, 2 ohms of Rx would cause one half scale deflection or a reading of 1.5 volts. Let us now make Rk = 10 ohms. One half scale reading would result with Rx of 10 ohms. We have found that:

$$R_X E_{Rk} = R_k E_{Rx}$$

$$\text{then } R_x = \frac{R_k E_{Rx}}{E_{Rk}}$$

$$\text{but } E_{Rk} = E - E_{Rk}$$

thus for circuit as *Fig. 16*

$$R_x = R_k \left\{ \frac{E - E_{Rk}}{E_{Rk}} \right\}$$

If Rx is an open circuit, or infinite resistance, then the voltage measured across it would be the full battery voltage. The voltage across Rk would be 0. In *Fig. 16* we have measured the voltage across the known resistor. Thus we have infinite value of Rx indicated with zero meter reading and zero Rx indicated with full scale meter reading. Here again we desire an ascending reading with an ascending value of Rx. Thus our voltage should be measured across Rx. To do this and maintain accuracy requires a nearly infinite resistance voltmeter.

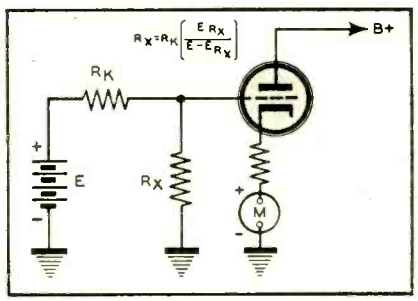


Fig. 17: Elementary Electronic-Ohmmeter circuit.

Such a voltmeter is attained if the vacuum tube voltmeters discussed here have their grid circuit resistance replaced by the unknown resistance of the circuit of *Fig. 16*. The resultant circuit is then the fundamental circuit of *Fig. 17*. Here the unknown resistor Rx is used in a voltage divider circuit and the voltage developed across it is used to vary the plate resistance of the tube in either of the types of Electronic-Voltmeters discussed.

It must be noted that to utilize full meter scale for "ohms", a bridge type circuit must be used. For such a circuit we may now compute the value of Rx by:

$$R_x = R_k\ (E_{Rx}/E - E_{Rx})$$

Fig. 18 shows us the completed Electronic-Ohmmeter circuits of the Hickok model 202; Precision EV-10 and the RCA Voltohmyst, Jr. The values of the resistors in the Ohms scale multiplier are extremely critical to assure accuracy of the calibrated scale. Precision restistors of 1% or 2% accuracy may be purchased for such replacement when and if necessary. Resistors may be "tailored" to

proper value by the following procedure:

Let us suppose that the 20-ohm standard resistor of the Precision EV-10 needs to be replaced. This may be done by utilizing some standard test resistor within the ohms range of that scale. With a 1% standard resistor of say 1000 ohms we can tailor a 20-ohm resistor of our own make until our meter reads 1000 ohms for the 1000 ohm precision resistor. To replace the 2000 ohm standard, tailor a lower value carbon resistor until the 1000 ohm precision resistor reads 1000 ohms on the 200,000 ohm range. The other resistors may be replaced by use of precision resistors such as 10,000 ohms, 100,000 ohms, etc.

For radio technicians who do not have them, standards may be made before equipment failures occur and kept on hand. An exact resistor may be made for each of the ohms scales standards for any instrument by using each scale, the standard being made as Rx. Half-scale deflection will result for each when Rx is the value of the multiplier used on that scale. Such standards may be made, kept in a dry place for future test and repair.

For more material on Electronic-Voltmeters and Ohmmeters the reader is referred to the following:

"How to Calibrate Service Test Equipment", *Radio Service Dealer*, April-May, 1945
"Modern Trends in Service Test Equipment", *Acrovox Research Worker*, September, 1940
"Vacuum Tube Voltmeters", by John F. Rider, John F. Rider Publisher, Inc.
"Electronic Voltmeters", by John H. Potts, *Radio*, July, 1942

Radio "In" the Air for Millions

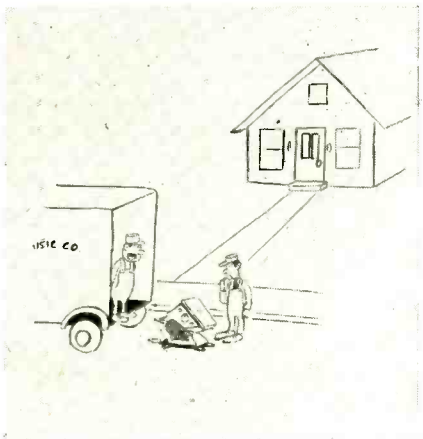
. . . Airpark coverage will open new market to thousands of radio service dealers.

AMERICA will have a minimum of 3,500,000 licensed private fliers by 1960 if progress made since 1929 continues at the same rate during the next 15 years, predicts William A. Mara, Bendix Aviation Corporation staff executive in charge of developments relating to the personal airplane. Since 1929, when Civil Aeronautics Administration records listed only 4,162 licensed private pilots, the nation's roster of accredited personal plane pilots has climbed to 107,327 at the end of 1944, an increase of 2600 per cent in 15 years.

At the end of the war there will be a pool of some 6,000,000 active or potential fliers in the nation. Nucleus of this pool, accordng to CAA estimates, will be at least 500,000 Americans who will have been trained to fly airplanes. These half a million potentially active peacetime pilots will include:

1. 107,327 private pilots holding CAA licenses at the end of 1944.
2. 25,000 licensed transport and commercial pilots.
3. 150,000 pilots listed as trained by the Army Air Forces as of December 1, 1944.
4. 47,000 pilots listed on the United States Navy roster as of December 1, 1944.

These basic figures do not include thousands of pilots still in various stages of army and navy flight training, or tens of thousands of student pilots certified by CAA during the past few years, nor do they include some 19,000 certified aviation mechanics, nor thousands of men and women who currently are taking flying lessons at schools, colleges and airports throughout the nation. The potential pool of six million private pilots will also be swelled by the 2,500,000 men and women already trained by the armed forces in various aviation skills and the more than 2,000,000 workers employed in the nation's aircraft industry during peak war production years.



"All we can do is hope it had metal tubes in it!"

"The planning and development of an efficient nation-wide network of air parks, flight-stops to provide adequate landing facilities for small planes must be greatly expanded to keep pace with a postwar private flying expansion that is already under way," Mara declared. Numerous smaller communities already are taking the lead in building some of the 20,000 "air parks" or smaller landing fields, which experts estimate must be provided to develop full utility for private flying. An "air park," Mara explained, should not be confused with an airport in size, use or cost. "Essentially," he said, "an 'air park' is a level, grassy piece of land, perhaps 300 feet wide and 2,000 feet in length. It need not be hard surfaced but it does need to be well-drained and above all must be adjacent to a highway."

The Civil Aeronautics Administration, which now lists 1,791 landing facilities suitable for personal airplanes, has proposed to Congress that construction of 2,907 additional fields be authorized. Experts have estimated that if 5,000 "air parks" or landing areas were constructed uniformly over the land surface of the United States, there would be no point in the nation located more than 15 miles from suitable public landing facilities.

"There is plenty of factual evidence to support the need for increased landing facilities for private planes," Mara asserted. One private flying school at a small airport in the New York metropolitan area has enrolled nearly 200 new students during the past six months and reports that it could handle more if training planes and manpower were available. From Cleveland, Ohio, came another report that 500 residents of that city have already placed orders for postwar delivery of airplanes.

With Television Coming...

With about 7,200 television receivers in the field today, only metropolitan area dealers get calls for servicing. This material does, however, give readers a foretaste of the specialized work more and more dealers will handle as more stations are built and television receivers have a wider sale.

TELEVISION RECEIVER CIRCUIT

RF and Converter Unit

This section includes all of the circuits between the antenna posts and the output side of the 6AC7 converter tube. Starting at the antenna terminals is a balanced input wave trap consisting of two stages of high pass filter. The radio antenna input is tapped off at the center of the first wave trap coil. The RF is coupled from the wave trap to the 6AC7 RF amplifier through double-tuned circuits (one for each band). The 6AC7 converter tube is coupled to the 6AC7 RF amplifier through individual bandpass filters. Oscillator signals are injected into the converter tube at the same point as the RF signal is injected.

Audio Channel

The audio channel is an FM 8.25 MC IF superheterodyne receiver with noise limiter and balanced discriminator. The first stage of the audio IF is included with the video IF amplifier which follows the converter tube. The output circuits are switched over for use with the radio receiver by means of a push button on the television control panel. Audio IF signals are diverted into the audio IF channel from the suppressor of the 6AB7 1st video and audio IF tube.

Video Section

Four stages of video IF amplification follow the converter tube. the 1st stage being common to audio IF also. Wave traps are provided in interstage transformers T7 and T8 for attenuating 14.25 MC and 8.25 MC respectively. The video is detected in the 6H6 detector and is amplified and finally applied to the picture tube control grid. Contrast is controlled manually by varying the grid bias voltage of the 6AB7 and 6AC7 2nd and 3rd video IF tubes respectively.

Sync IF Amplifier

The video IF is amplified in another stage after the video signal has been taken off and is passed to the Type 6H6 sync detector tube.

Sync Pulse Clipper

The Type 6H6 sync detector tube detects the amplified video IF signal and injects it into the 6AC7 Clipper which separates the video signals by tube cut-off.

Horizontal Oscillator-Output

The negative sync pulses are coupled to the horizontal multivibrator through a very small capacitor (C128) which blocks the vertical sync pulses and leaves only horizontal sync pulses. The sawtooth wave generated in the right hand section of the horizontal multivibrator is coupled to the 6L6 sweep output amplifier which produces a sawtooth current wave in the coils of the deflection yoke.

Vertical Oscillator-Output

The sync pulses from the 6AC7 clipper are coupled into the left section of the 6F8G vertical sync amplifier tube. The tube acts as a low frequency

TELEVISION SERVICING "DONT'S"

Extremely high voltages (6500 volts or more) are used; therefore, every precaution must be exercised to insure safety to the service engineer and to the customer.

The back cover, while in place, protects the user and should never be removed except by a qualified television service engineer.

The power cord plug should not be inserted in a power supply outlet until a good, solid ground connection has been properly made to the receiver chassis.

For safety, be sure to remove the high voltage power supply fuse before working on the receiver with the back cover removed. All adjustments not accessible with the back cover in place can be made without energizing the high-voltage circuits.

Servicing of high-voltage circuits can be satisfactorily performed with the power cord plug removed from the power supply outlet. A resistance check of the circuit components will indicate any trouble existing. High voltage should never be measured with a voltmeter.

The "picture tube" is highly evacuated and is consequently subject to a very great external air pressure. If it is broken, glass fragments will be violently expelled. Handle with care, using safety goggles and gloves.

The large end of the "picture tube" — particularly that part at the rim of the viewing surface — must not be struck, scratched or subjected to more than moderate pressure. Do not force the socket onto the tube or strain any external connections. If it fails to slip into place smoothly, investigate and remove the cause of the trouble.

amplifier thus presenting much more gain to vertical than to horizontal pulses. The resultant signal is fed into the 6H6 Clipper tube and the vertical pulses are separated from the horizontal. The vertical pulses are then amplified and injected into the vertical oscillator circuit. The vertical oscillator is of the blocking type transformer coupled. The generated sawtooth waves are amplified and transformer coupled to the vertical deflection coils of the picture tube.

Low-Voltage Rectifier

Two 5U4G rectifiers are necessary to supply plate current for the low voltage supply which includes the radio receiver. A combination of choke and resistance filters is used so that the audio and oscillator plate supplies will be free from video and sweep signals.

High-Voltage Rectifier

The high voltage rectifier uses a resistance filter. The bleeder is connected across the filter input to reduce ripple. R-46 is inserted in the plate lead for protection.

RADIO ALIGMENT

Depress "Broadcast" key on television control panel and "Manual" key on radio panel. Close gang condenser plates and adjust pointer to first line at front of tuning scale. Connect output meter across voice coil.

I.F. Alignment

Apply 455 KC modulated signal to converter grid through .05 mfd. capacitor. Keep input signal low and volume control on as far as possible. Adjust 2nd and 1st I.F. transformer trimmers for maximum output.

Wave Trap Alignment

Change signal input to antenna terminals and with 455 KC modulated signal input adjust C-704 for minimum output.

R.F. Alignment

Change signal to 18 MC with modulation. Align C-706 with pointer on 18 MC mark and band switch on "D" band. When C-706 is on proper peak the image of the 18 MC signal will be heard at 17.3 MC on the dial. Peak C-703 while rocking the gang condenser.

With 1500 KC signal input and band switch on "B" band align C-707 at 1500 KC and peak C-702 for maximum output. Change signal to 580 KC and adjust C-710 for maximum output while rocking the gang condenser. Retrim at 1500 KC.

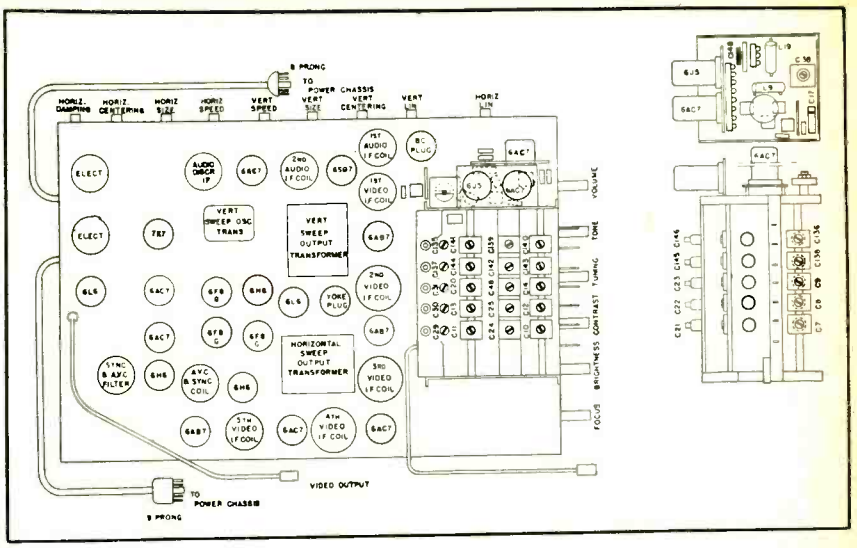


Fig. 4. Trimmer location, television chassis. See next page for schematic.

Table 1: Video I.F. and Sync. I.F. alignment. See page 49 for Figure 1, showing curves mentioned in "comments" below.

Input Freq.	Point of Input	Adjustments	Comments
1.			Connect vertical input cable of cathode ray oscilloscope across resistor R-58 of 6H6 video detector.
2. 7.5-15 MC Sweep	Control grid of 6AB7 (2nd video I.F.)		Connect low output of video IF sweep oscillator to control grid of 6AB7 (2nd video IF) Connect ground lead to chassis. Set horizontal centering and gain controls on oscilloscope to give suitable horizontal deflection. Adjust sweep phase to give curve similar to Fig. 1 curve 3 less markers
NOTE: If sweep oscillator has marker points internally supplied, steps 3 and 4 may be omitted.			
3. Same as in No.2 plus 12.75 MC	Same as in No. 2		Superimpose an accurately calibrated 12.75 MC signal in parallel with sweep signal. Signal will appear on sweep curve in oscilloscope as a wiggle, the center of which is a thin black line. With a pen or crayon mark this point on the screen of the oscilloscope. (NOTE: Hereafter the horizontal controls on the oscilloscope must not be touched.)
4. Same as in No. 2 plus 9.0 MC	Same as in No. 2		Superimpose an accurately calibrated 9.0 MC signal in parallel with sweep signal. Mark screen at point where signal appears on curve as in No. 3.
5 7.5-15 MC Sweep	Control grid of 6AC7 (4th video I.F.	Iron cores of detector transformer T-10.	Connect high tap of video I.F. sweep oscillator to control grid of 6AC7 (4th video I F.) (Do not touch horizontal controls of oscilloscope.) Turn sweep phase to give as near a single curve as possible. Adjust iron cores of T-10 until curve appears similar to Fig. 1, curve 1, with relatively flat top, 12.75 MC mark at one corner and 9.0 MC mark at corner of other side. These conditions plus maximum amplitude insure correct alignment.
6. 7.5-15 MC Sweep	Control grid of 6AC7 (3rd video I.F.)	Pri. & Sec. iron cores of 4th video transformer T-9.	Connect low tap of video I.F. sweep oscillator to control grid of 6AC7 (3rd video I.F.). Adjust iron cores for maximum gain, flatness and proper centering between markers as illustrated in fig. 1, curve 2 The response at the 12.75 MC marker point should be down very slightly.
7 7.5-15 MC Sweep	Control grid of 6AC7 (2nd video I.F.)	Iron cores of 3rd video transformer T-8	Connect low tap to grid Adjust primary and secondary iron cores for maximum gain, flatness and proper centering. See Fig. 1, curve 2 The response at the 12 75 MC marker point should be down slightly more than in step #6.
8. 7.5-15 MC Sweep	Control grid of 6AC7 (1st video I.F.)	Iron cores of 2nd video transformer T-7	Connect low tap to grid Adjust primary and secondary iron cores for maximum gain, flatness and proper centering. See Fig. 1, curve 4. The response at 12.75 MC should be down about 25% from maximum gain
9 7.5-15 MC Sweep	Converter Grid, 6AC7	Iron cores of 1st video Transformer T-1	Connect low tap to grid. Adjust iron cores for maximum gain, flatness and proper centering of the video curve Since T-1 also passes audio IF, check for audio output when video alignment is made See Fig. 1, curve 5. The response at 12.75 MC should be between 50% and 60% of maximum response and the slope of the curve on the 12 75 MC side should be linear between 12.0 MC at the top and 13.25 MC at the bottom. These end limits should be marked on the oscilloscope screen as in steps #3 and #4
10. 7.5-15 MC Sweep	Control grid of 6AC7(4th video I.F)	Iron cores of sync IF Transformer T-14	Connect vertical input cable of oscilloscope across resistor R-75. Adjust cores for maximum gain, flatness and proper centering as indicated by Fig. 1, curve 9.
11. 14.25 MC	Converter Grid, 6AC7	Series iron core of 2nd video transformer T-7	To check alignment of 14 25 MC trap proceed as follows: Connect low tap to grid. Reduce horizontal gain of oscilloscope to minimum Adjust iron core for minimum vertical line length.
12. 8.25 MC	Converter Grid, 6AC7	Series iron core of 3rd video transformer T-8	To check alignment of 8.25 MC trap proceed as follows: Connect low tap to grid Reduce horizontal gain of oscilloscope to minimum Adjust iron core for minimum vertical line length.

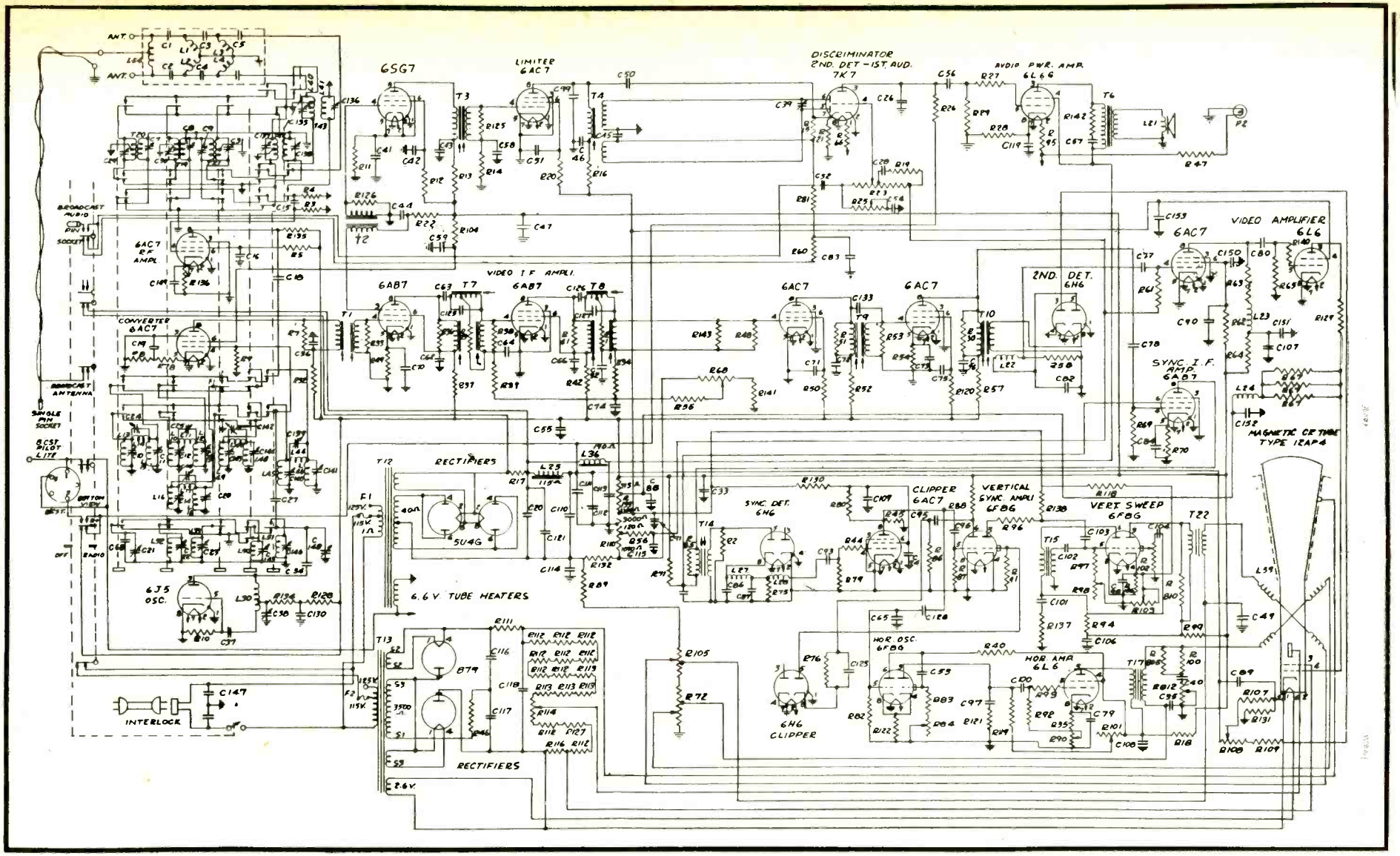


Fig. 5: Schematic of television chassis. This and other diagrams and graphs in this article, as well as the tables and notes on pages 46 to 50 inclusive, refer to Model 90, General Electric Musaphonic combination television and radio receiver, as of 1942. See Schedule "A" opposite for key to symbols.

TELEVSION ALIGNMENT

The problem of aligning the several circuits in a television receiver is much more involved and requires more specialized equipment than the alignment of conventional radio receivers. Fortunately, the use of stable components in carefully engineered circuits of wide-band characteristics reduces to a minimum the necessity for alignment under normal operating conditions. Should alignment beome necessary the following equipment will be needed.

(A) For Video I.F. Alignment:
- (1) Cathode ray oscilloscope
- (2) Wide-band sweep oscillator capable of sweeping from 7.5 to 15 MC.
- (3) Marker system either provided in sweep oscillator or from separate signal generator for locating 12.75 and 9.0 MC points.

(B) Sound I.F. Alignment:
- (1) Cathode ray oscilloscope
- (2) Wide-band sweep oscillator capable of sweeping from 7.75 to 8.75 MC.

(C) R.F. Alignment:
- (1) Cathode ray oscilloscope
- (2) Wide-band sweep oscillator capable of sweeping the following bands.
  - (a) 50 to 56 MC
  - (b) 60 to 66 MC
  - (c) 66 to 72 MC
  - (d) 78 to 84 MC
  - (e) 84 to 90 MC
- (3) Marker system either provided in sweep oscillator or from separate signal generator for locating R.F. 6 MC bandwidth points.

Symbol	Description	Symbol	Description	Symbol	Description
C1,2	100 mmf., mica	C133	3 mmf., ceramicon	R72	6 ohm, horiz. centering control
C3,4	47 mmf., mica	C135	20-200 mmf., trimmer	R73	3,300 ohm, carbon
C5,6	100 mmf., mica	C136	2-12 mmf., trimmer	R75	10,000 ohm, carbon
C7-C14	2-12 mmf., trimmer	C137	20-200 mmf., trimmer	R76	1.8 megohm, carbon
C15,16	2200 mmf., mica	C138-C146	2-12 mmf., trimmer	R78	47 ohm, carbon
C18	2200 mmf., mica	C147	.01 mfd., line capacitor	R79	3.3 megohm, carbon
C19	4700 mmf., mica	C148	Air trimmer	R80	10,000 ohm, carbon
C20-C25	2-12 mmf., trimmer	C149	4700 mmf., mica	R81	68,000 ohm, carbon
C26	47 mmf., mica	C150-C153	.1 mfd., paper	R82	1,000 ohm, carbon
C27	3 mmf., mica	L1-L4	Wave trap coil	R83	56,000 ohm, carbon
C28	.01 mfd., paper	L10-L18	RF interstage coil	R84	100,000 ohm, carbon
C29-C31	20-200 mmf., trimmer	L20	Screen choke	R85	15,000 ohm, carbon
C32	.05 mfd., paper	L22	Video diode choke	R86	4,700 ohm, carbon
C33	.002 mfd., paper	L23	Video choke	R87	470,000 ohm, carbon
C34	2200 mmf., mica	L25	Filter choke	R88	100,000 ohm, carbon
C35,36	4700 mmf., mica	L27,28	Video choke	R89	85 ohm, wire wound
C37	15 mmf., mica		(Combined with L34)	R90	400 ohm, horiz. linearity control
C38	50-300 mmf., trimmer	L30	Oscillator plate coil	R91	1,000 ohm, carbon
C39	5-35 mmf., trimmer	L33	Oscillator coil	R92	470,000 ohm, carbon
C40	.05 mfd., paper	L36	Audio filter choke	R93	470 ohm, carbon
C41-C44	.02 mfd., paper	L52	Oscillator coil	R94	1.0 megohm, carbon
C45	220 mmf., mica	R1	5600 ohm, carbon	R95	35 ohm, wire wound
C46	.002 mfd., paper	R2	10,000 ohm, carbon	R96	10,000 ohm, carbon
C47	.01 mfd., paper	R3	27,000 ohm, carbon	R97	470,000 ohm, carbon
C48	2-12 mmf., trimmer	R4	2,200 ohm, carbon	R98	0.5 megohm, vert. sync. control
C49	4700 mmf., mica	R5	56,000 ohm, carbon	R99	3,900 ohm, carbon
C50,51	47 mmf., mica	R7	3,900 ohm, carbon	R100	700 ohm, wire wound
C52	.02 mfd., paper	R8	180 ohm, carbon	R101	0.5 megohm, horiz. size control
C53	180 mmf., mica	R9	2,200 ohm, carbon	R102	2.0 megohm, vert. size control
C54	.002 mfd., paper	R10	27,000 ohm, carbon	R103	100,000 ohm, vert. linearity control
C55,56	.05 mfd., paper	R11	330 ohm, carbon	R104	56,000 ohm, carbon
C57	.005 mfd., paper	R12	56,000 ohm, carbon	R105	6 ohm, vert. centering control
C58	33 mmf., mica	R13	2,200 ohm, carbon	R106	3,900 ohm, carbon
C59	.002 mfd., paper	R14,15	100,000 ohm, carbon	R107,108	22,000 ohm, carbon
C62	.002 mfd., paper	R16	2,200 ohm, carbon	R109	47,000 ohm, carbon
C63	330 mmf., mica	R17	400 ohm, wire wound	R110	1,090 ohm, 120 ohm, 300 ohm
C64	.002 mfd., paper	R18	220 ohm, carbon		bleader resistor
C65	820 mmf., mica	R19	82,000 ohm, carbon	R111	470,000 ohm, carbon
C66	.002 mfd., paper	R20	47,000 ohm, carbon	R112	390,000 ohm, carbon
C67	10 mmf., ceramicon	R21	100,000 ohm, carbon	R113	330,000 ohm, carbon
C68,69	5 mmf., ceramicon	R22	10,000 ohm, carbon	R114	250,000 ohm, carbon
C70-C73	.002 mfd., paper	R23	2.0 megohm, volume control	R116	270,000 ohm, carbon
C74	0.1 mfd., paper	R25	0.5 megohm, tone control	R118	56,000 ohm, carbon
C75,76	.002 mfd., paper	R26	100,000 ohm, carbon	R119	150,000 ohm, carbon
C77	1.0 mfd., paper	R27	1,000 ohm, carbon	R120	68,000 ohm, carbon
C78	47 mmf., mica	R28	270 ohm, carbon	R121	8,200 ohm, carbon
C79	.005 mfd., paper	R29	220,000 ohm, carbon	R122	1,000 ohm, carbon
C80	0.1 mfd., paper	R30	3,900 ohm, carbon	R124	220,000 ohm, carbon
C81	5 mfd., electrolytic	R32	1,000 ohm, carbon	R125,126	82,000 ohm, carbon
C82	10 mmf., mica	R33	4,700 ohm, carbon	R127	150,000 ohm, carbon
C83	220 mmf., mica	R34	100,000 ohm, carbon	R128	1,000 ohm, carbon
C84,85	.002 mfd., paper	R35	180 ohm, carbon	R129	150 ohm, carbon
C86	27 mmf., mica	R36	3,300 ohm, carbon	R130	100,000 ohm, carbon
C87	47 mmf., mica	R37	10,000 ohm, carbon	R131	3.3 megohm, carbon
C88	10 mfd., electrolytic	R38	3,900 ohm, carbon	R132	330 ohm, carbon
	(Combined with C90,C91)	R39	100,000 ohm, carbon	R133	2,200 ohm, wire wound
C89	0.5 mfd., paper	R40	120,000 ohm, carbon	R134	10,000 ohm, carbon
C90,91	10 mfd., electrolytic	R41	3,300 ohm, carbon	R135	2,700 ohm, carbon
	(Combined with C88)	R42	10,000 ohm, carbon	R136	180 ohm, carbon
C93	.02 mfd., paper	R44	10,000 ohm, carbon	R137	3,900 ohm, carbon
C94	0.1 mfd., paper	R45	100,000 ohm, carbon	R138	4,700 ohm, carbon
C95	.001 mfd., paper	R46	56,000 ohm, carbon	R140	150 ohm, carbon
C96	470 mmf., mica	R47	33 ohm, carbon	R141	100 ohm, carbon
C97	330 mmf., mica	R48	5,900 ohm, carbon	R142	8,200 ohm, carbon
C98	30 mfd., electrolytic	R49	180 ohm, carbon	R143	5,600 ohm, carbon
C99	10 mmf., mica	R50	56,000 ohm, carbon,	R805	1,800 ohm, carbon
C100	.25 mfd., paper	R51	3,900 ohm, carbon	R810	100,000 ohm, carbon
C101	0.1 mfd., paper	R52	2,200 ohm, carbon	R812	400 ohm, horiz. damping control
C102	.01 mfd., paper	R53	3,900 ohm, carbon	T1	1st video and audio IF trans.
C103	470 mfd., mica	R54	82 ohm, carbon	T2	2nd audio IF transformer
C104	.25 mfd., paper	R55	470,000 ohm, carbon	T3	3rd audio IF transformer
C106	10 mfd., electrolytic	R56	22,000 ohm, carbon	T4	Discriminator transformer
C107	5 mfd., electrolytic	R57	2,200 ohm, carbon	T6	Audio output transformer
C108,109	10 mfd., electrolytic	R58	1,800 ohm, carbon	T7	2nd video IF transformer
C110-C115	30 mfd., electrolytic	R60	56,000 ohm, carbon	T8	3rd video IF transformer
C116,117	.06 mfd., paper	R61	470,000 ohm, carbon	T9	4th video IF transformer
C118	.03 mfd., paper	R62	56,000 ohm, carbon	T10	5th video IF transformer
C119	30 mfd., electrolytic	R63	1,200 ohm, carbon	T12	Low voltage power transformer
C120,121	16 mfd., electrolytic	R64	4,700 ohm, carbon	T13	High voltage power transformer
C123	0.5 mfd., paper	R65	100,000 ohm, carbon	T14	AVC IF transformer
C124	100 mmf., mica	R66	1 ohm, wire wound	T15	Vertical oscillator trans.
C125	33 mmf., mica	R67	4,700 ohm, carbon	T17	Horizontal output trans.
C126	330 mmf., mica	R68	2,000 ohm contrast control	T18	Deflection yoke
C127	82 mmf., mica	R69	3,300 ohm, carbon	T19-T21	Antenna transformer
C128	47 mmf., mica	R70	220 ohm, carbon	T22	Vertical transformer
C130	2000 mmf., mica	R71	5,600 ohm, carbon		

Schedule A: Key to symbols in schematic (Fig. 5) opposite; also in tables 2 and 3, page 50.

INSTALLATION AND OPERATION

Antenna

In general, the television antenna should be of the dipole type located as high as is practical and in an area where the horizon in the direction of the television transmitter is not obstructed by buildings or structures. A noticeable gain in signal strength will be obtained as antenna height is increased. Since television radiation reacts similarly to light waves, reflection problems arise which often modify otherwise ideal installation locations. Consideration must also be given noise sources within buildings, or ignition noises from vehicles on adjacent streets. It is usually best to locate the dipole antenna on the side of the building away from the street thus allowing the building to shield the antenna from ignition noises.

The dipole should be erected with arms parallel to the ground and at right angles to the direction of the television station. If noise or reflection interference exist it may be better to point the dipole arms in the direction of the interference.

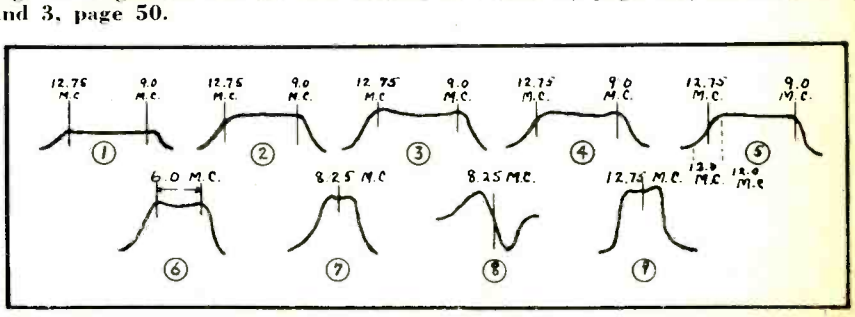
Noise interference and poor signal strength may dictate the use of a reflector. A reflector will increase the signal strength appreciably as well as increase the horizontal directivity.

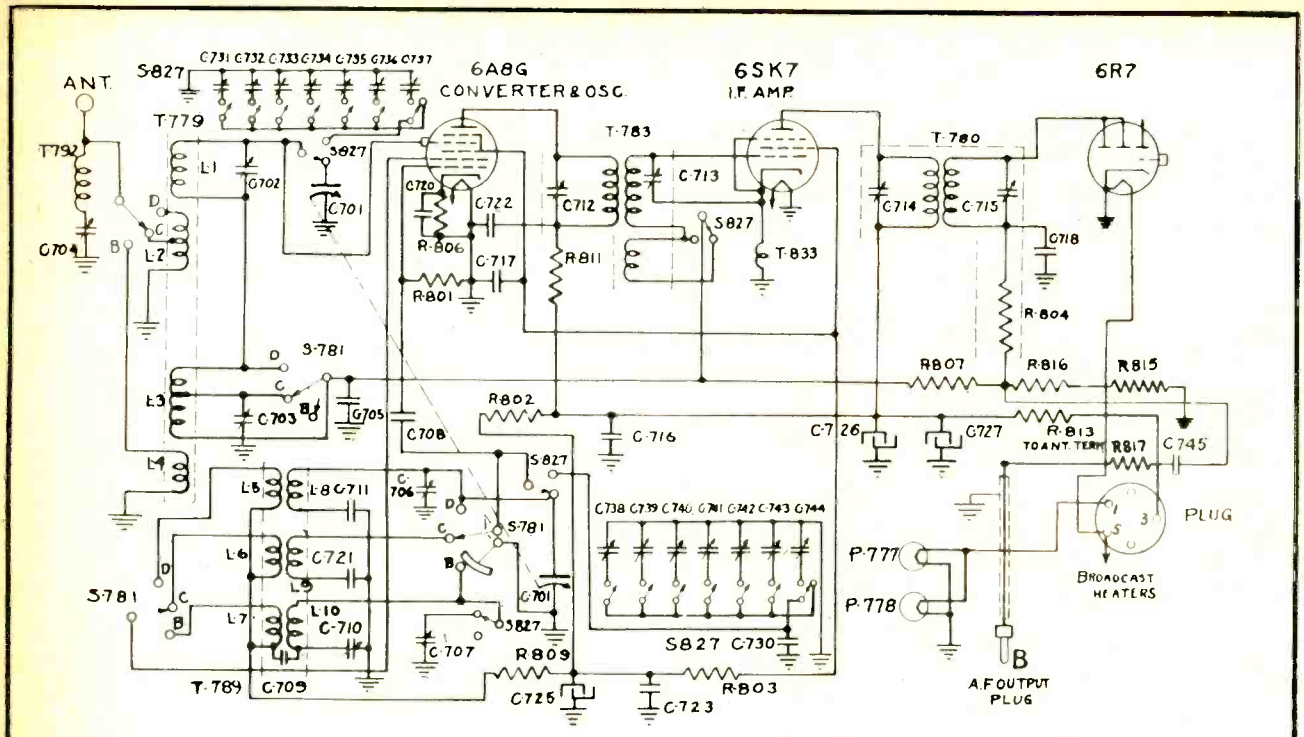
Loudspeaker

To center the voice coil, loosen the two screws which clamp the speaker spider in position. These two screws are available from the rear of the speaker. Shift the spider around until the voice coil is centered, then tighten the screws in position.

[*Continued on page* 50]

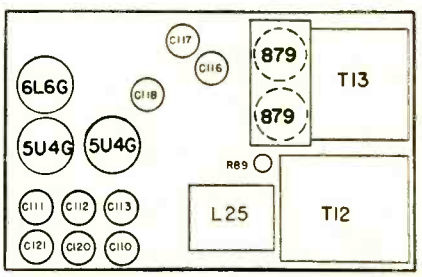
Fig. 1: Alignment curves. For details, see table 1, page 47; and tables 2 and 3, page 50.





C-701	490 mmf. tuning condenser	C-730	20 mmf. temperature compensating capacitor	R-803	15,000 ohms carbon resistor
C-702	3-20 mmf. "B" antenna trimmer			R-804	47,000 ohms carbon resistor
C-703	3-20 mmf. "D" antenna trimmer	C-731	100-490 mmf. station antenna trimmer	R-806	330 ohms carbon resistor
C-704	30-70 mmf. wave trap trimmer	C-732	100-490 mmf. station antenna trimmer	R-807	2.2 megohms carbon resistor
C-705	0.1 mfd. paper capacitor	C-733	100-490 mmf. station antenna trimmer	R-809	3300 ohms carbon resistor
C-706	3-20 mmf. "D" oscillator trimmer	C-734	100-490 mmf. station antenna trimmer	R-811	6800 ohms carbon resistor
C-707	3-20 mmf. "B" oscillator trimmer	C-735	20-180 mmf. station antenna trimmer	R-813	2700 ohms 2 W. carbon resistor
C-708	50 mmf. mica capacitor	C-736	20-180 mmf. station antenna trimmer		
C-709	.005 mfd. paper capacitor	C-737	7-65 mmf. station antenna trimmer	R-815	100,000 ohms carbon resistor
C-710	300-650 mmf. "B" padder	C-738	100-490 mmf. station oscillator trimmer	R-816	100,000 ohms carbon resistor
C-711	4300 mmf. mica capacitor ± 5%	C-739	100-490 mmf. station oscillator trimmer	R-817	15,000 ohms carbon resistor
C-716	0.1 mfd. paper capacitor	C-740	100-490 mmf. station oscillator trimmer	S-781	Band change switch
C-717	.05 mfd. paper capacitor	C-741	100-490 mmf. station oscillator trimmer	S-827	Manual push button switch
C-718	47 mmf. mica capacitor	C-742	20-180 mmf. station oscillator trimmer	T-779	Antenna coil
C-720	.05 mfd. paper capacitor	C-743	20-180 mmf. station oscillator trimmer	T-789	Oscillator coil
C-721	1500 mmf. mica capacitor ± 5%	C-744	7-65 mmf. station oscillator trimmer	T-783	1st I.F. transformer
C-722	.05 mfd. paper capacitor	C-745	.01 mfd. paper capacitor	T-780	2nd I.F. transformer
C-723	0.1 mfd. paper capacitor	P-777	Dial lamp, Mazda No. 46	T-792	wave trap coil
C-725	8 mfd. 400 V. dry electrolytic	P-778	Dial lamp, Mazda No. 46	T-833	Neutralizing coil
C-726	8 mfd. 400 V. dry electrolytic	R-801	47,000 ohms carbon resistor		
C-727	12 mfd. 450 V. dry electrolytic	R-802	6800 ohms 1 W. carbon resistor		

Input Freq.	Point of Input	Adjustments	Comments
1. 50 to 56 MC Sweep	Antenna Terminals	(C-10,11,24) (C-7,29)	Connect oscilloscope vertical input cable across R-104, depress particular push button which tunes band being aligned. Align all trimmers for maximum amplitude and resultant curve shown in Fig. 1, curve 6.
2. 60 to 66 MC Sweep	Antenna Terminals	(C-12,13,25) (C-8,30)	
3. 66 to 72 MC Sweep	Antenna Terminals	(C-14,20,48) (C-9,31)	
4. 78 to 84 MC Sweep	Antenna Terminals	(C-143, 144, 142)(C-137, 138)	
5. 84 to 90 MC Sweep	Antenna Terminals	(C-140,141, 139) (C-135, 136)	
The oscillator trimmers may be set by using a modulated signal generator tuned to the sound channel carrier frequency for the particular band being aligned. With volume control turned partially up, align trimmers C21, C22, C23, C145, C146 for each of their respective bands (#1 - #5) for maximum sound output when the tuning control is set to mid rotation.			



Input Freq.	Point of Input	Adjustments	Comments
1. 7.75 to 8.75 MC Sweep	Converter grid, 6AC7	Iron cores of 3rd audio IF transformer T-3	Superimpose an accurately calibrated 8.25 MC signal in parallel with the sweep signal. Connect the vertical input cable of the oscilloscope across resistor R14. Adjust iron cores of T-3 and T-2 for a maximum output, bandwidth and for the resultant curve shown in Fig. 1, curve 7. The 8.25 marker should appear as a wiggle in the middle of the curve.
2. 7.75 to 8.75 MC Sweep	Converter grid, 6AC7	Iron cores of 2nd audio IF trans-c former T-2	
3. 7.75 to 8.75 MC Sweep	Converter grid, 6AC7	Iron cores of 4th audio IF transformer T-4	Connect vertical input cable of oscilloscope across C-83, using an 8.25 MC signal for marker, align iron cores of T-4 for maximum gain and bandwidth and for curve shown in Fig. 1, curve 8.

Fig. 8 (top): Schematic of radio chassis. Fig. 6 (above): Power unit chassis. Table 2 (mid-left): RF alignment. Table 3 (bottom left): Sound IF alignment. For key to references in these tables, see Schedule "A", page 49.

[*This article begins on page 46*]

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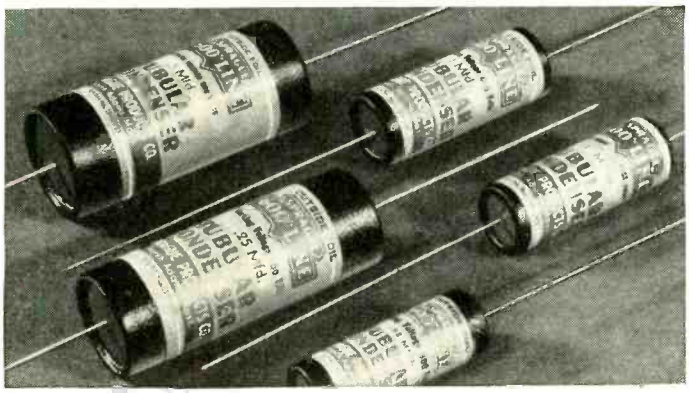

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FOR SALE—New heavy duty deluxe 6v-110v sound mobile system ready to use with instructions; portable amplifier; Supreme substitution box #596; Varitan variable transformer tester; Neon sign transformer; rotary converter, etc. P. Candini, 580 Fox St., Bronx 55, N. Y.

WANTED—2—117Z6 tubes and new or used portable recorder. Joseph Kandra ART 2/c NAS BOX8, Quonset Pt., R. I.

FOR SALE—500-watt radio station with all-wave receiver. Tony Zucco, Third St., Cresson, Pa.

WANTED—1A7, 1N5, 1H5, 1A5 tubes. Clarence Goodall, Jr. R.F.D. #4, Greenfield, Ill.

FOR SALE OR TRADE—#461 Radio City V-O-M: a-c meters; d-c voltmeter; RF ammeter, 12v dynamotor, etc. Need all Rider manuals. J. J. Smith, 2312 South Fern St., Arlington, Va.

WANTED—New or used 6v & 110v amplifier with or without mike and speakers; also recording turntable and arm. Frank Habermann, 16 Princeton Road, Clementon, N. J.

FOR SALE—RCA TMV 122B oscillograph with instructions and schematic. Ralph Hunter, 12 North St., Catskill, N. Y.

WANTED—SX-28. SX-25, sig. shifter deluxe; have some hard-to-get tubes as part payment. What have you? Hank Jenkins, 319 - 14th St., Niagara Falls, N. Y.

FOR SALE—10 lbs. used radio parts such as condensers, knobs, coils, etc. $5 for lot. Jimmy Mowry, R. R. #2, Princeton, Ind.

WANTED—Portable or table radios. Have radio books for sale or trade, Capt. Chas. E. Spitz, Box 818, Perrin Field, Texas.

WILL TRADE—Readrite #739 V-O-M for late model emission type tube tester. Clinton Weddle, P. O. Box 265, Bassett, Va.

FOR SALE—17-tube Meissner television receiver #10-1153. Lester T. Grove, 409 White Horse Pike, Egg Harbor, N. J.

WANTED—Modern tube checker analyzer and adapters for latest tubes. Bud and Bob Radio Repair, 1610 Dimon St., Cincinnati 23, Ohio.

FOR SALE—New 6P7G, 85 and 34 tubes. Want Riders. M. Blan, 64 Dey St., New York, N. Y.

WANTED—Tube checker; analyzers, sig. gen., 5 to 8-watt amplifier, 16" cutting arm & head; misc. test equipment. Sgt. Arthur Oakley, Special Service Office, Lake Placid Club, Essex Co., N. Y.

WILL TRADE—Echophone EC-1 for SX-25 or similar communications receiver. George Freeman, 925 Oak St., Negaunee, Mich.

FOR SALE—New Meissner analyst 9-1040 in carton; R.C.P. #411 V-O-M; precision tube tester #800; capacity analyzer #CB in carton. Marvin Cohen 104 S. Maryland Ave., Atlantic City, N. J.

WILL TRADE—Brewster FM converter, RCA 3-band receiver with BFO, and National NC-100-A dial; Seeburg SB-7 audio amplifier, for RCA receiver. Want National NC-100A or Hallicrafter SX-25 with speaker. W. H. Hicks, Box 53, Manley, N. C.

WANTED—CHT 15890, UTC LS-55, K-407, K-408 put-put transformers; also high imp. Audax pick-up. C. L. Goebel, 221 W. 233 St., Bronx 63, N. Y.

FOR SALE—Automatic record changer; Webster - Chicago deluxe mixer - changer. Walter J. Bartell, 6543 Irving Park rd., Chicago 34, Ill.

URGENTLY NEEDED—Radio inverter to change 6v d-c to 110v 60 cycle a-c. Paul H. Achterberg, Oconto, Nebr.

FOR SALE—New Hallicrafter S-20-R Sky Champion, communications receiver with tubes and headphones. D. C. Jarden, 7149 Ardleigh St., Philadelphia, 19, Pa.

WANTED—Full radio shop repair equipment. Quote price. Clayton E. Wills, Willow Run Village, 1252 Danvers Court, Willow Run, Mich.

FOR SALE—2 Brush RC-20 crystal cutting heads $15. ea. Meissner FM tuner $40. 2 Inca TF 64 audio output transformers for 6L6 tubes $17 ea. f.o.b., Frank Dane, 3852 Eagle St., San Diego 3, Calif.

WANTED—Sky Buddy. Bill Nye, 1802, 12th Ave., Seattle 22, Wash.

WILL TRADE—Want communication receiver and sig. gen. Have stamp collection to trade. Herbert Hoch, 460 E. 52nd St., Brooklyn 3, N. Y.

WANTED—Tester or multitester for all type tubes; also 6A8 and 2525 tubes. Robert Page, Box 97, Homboldt, Ariz.

FOR SALE—Used Radio tubes, parts, supplies, etc. Write for list. J. C. Thimijan, 715 N. 7th St., Lake City, Minn.

WANTED—Phono-oscillator. Jack's Electric & Radio Service, 296 Wainwright St., Newark, N. J.

WILL TRADE—New factory boxed tubes for Radio-Phono combination or recorder-radio combination. Write for list of tubes. V. Ballantyne, 3934 N. E. 81st Ave., Portland 13, Ore.

FOR SALE—HRO with 4 sets of coils, power supply and matching 8" pm speaker; Pioneer 32v to 180v genemotor; Taylor 866's. Dr. Thomas C. Sne, 1223 S. Alvarado St., Los Angeles, Calif.

WANTED FOR CASH—Tester for all tubes and sig. gen. a-c operated. Clifford Jos. Williams, 651 Acker St., N. E., Washington 2, D. C.

FOR SALE—Factory sealed tubes at OPA list prices: 25Z5, 25L6, 12SQ7, 6SK7, 12SJ7, 80, 5Y4, 1H5 and others. Limit 2, no dealers: 10 — 5" pm speakers. M. Okin, The Bronx, New York 59, N. Y.

WANTED—S-19R, SX24 or similar communications receiver. Cash or will trade perfect V-O-M. George S. Maxey, 536 Talbot Ave., Albany 6, Calif.

FOR SALE OR TRADE—Modenzie confidence 36 dynamic tube tester for 50v, 117v locktal tubes, electrolytic and paper condensers. Want late model sig. gen. Edmund Wong, 125 Trenton St., San Francisco 11, Calif.

URGENTLY NEEDED—60 cycle a-c factory made short wave receiver with coils, possibly battery. John W. Schulte, Box 98, Newfield, N. Y.

FOR SALE—National HRO receiver; Hallicrafters DD-1 Diversity; C-D capacitor analyzer #BF-50; mikes phono-turntables, etc. J. G. Tabor, 20420 Riopelle Ave., Detroit 3, Mich.

WILL TRADE OR BUY—Sentinel 6 tube, 3 way portable radio, less batteries. Want hi-fidelity A-M tuner, Meissner or similar. John V. Beyer, 713 Steffan St., Vallejo, Calif.

WANTED—University units and trumpets, state type. Cash or what do you need? J. W. Elfers, P. O. Box 5, Muscatine, Iowa.

SEND US YOUR OWN AD TODAY!

For over two years now, the Sprague Trading Post has been helping radio men get the materials they need or dispose of radio materials they do not need. Literally thousands of transactions have been made through this service. Hundreds of servicemen have expressed their sincere appreciation of the help thus rendered.

Send your own ad to us today. Write PLAINLY—hold it to 40 words or less—confine it to radio materials. If acceptable, we'll gladly run it FREE OF CHARGE in the first available issue of one of the six radio magazines wherein the Trading Post appears every month.

HARRY KALKER, Sales Manager.

Dept. RSD-75, SPRAGUE PRODUCTS CO., North Adams, Mass.

Jobbing distributing organization for products of the Sprague Electric Co.

SPRAGUE CONDENSERS
KOOLOHM RESISTORS

TM. REGISTERED U. S. PATENT OFFICE

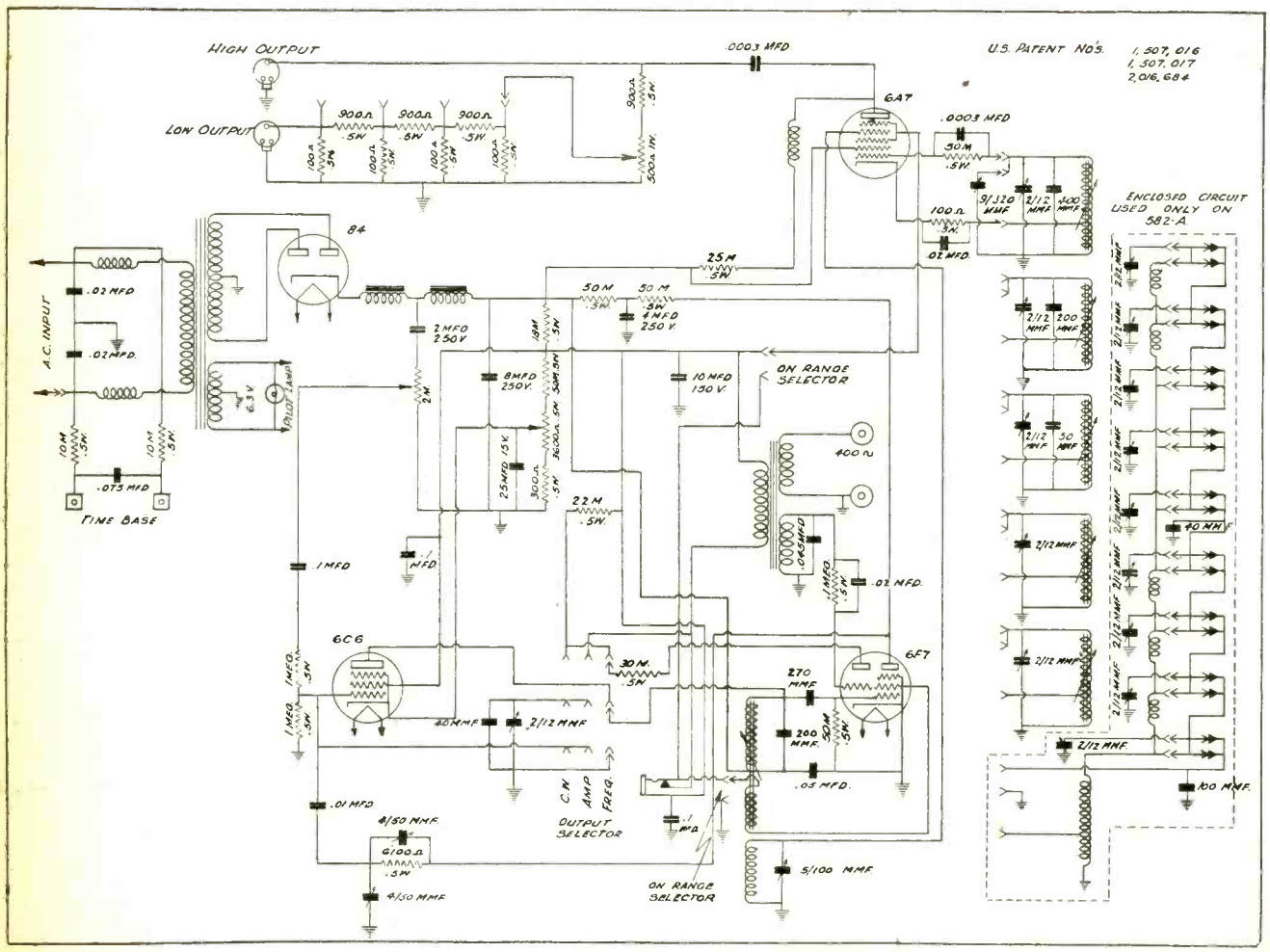
Obviously, Sprague cannot assume any responsibility, or guarantee goods, services, etc., which might be exchanged through the above advertisements

Technical Service Portfolio

Section LI

TEST EQUIPMENT CIRCUITS—Part II

Through the cooperation of test equipment manufacturers we are publishing a series of hitherto unavailable schematics of their instruments. The circuit diagrams will be published without technical comment in a series of "Portfolios" of which this is a part. Subscribers desiring publication of circuits for specific instruments should write to Editor, Radio Service Dealer, for issue priority.



Supreme Instrument Corp. Signal Generator, Model 582 and 582A.

In Trade

[*from page 21*]

house Electric Corporation, is announced by Harold B. Donley, manager of the Division. Mr. Septer will maintain headquarters in Sunbury, Pa.

Veteran of 17 years in the electrical appliance and radio tube merchandising fields, and a former Westinghouse sales executive, Mr. Septer comes to his new post after five years as assistant sales manager in charge of the Replacement Tube Division of the Ken-Rad Tube and Lamp Corporation, Owensboro, Ky. He will have charge of nationwide distribution of all Westinghouse radio receiver tubes sold other than in complete receiver units.

New FM in Design

The Stromberg-Carlson Company has already put design plans in work for an FM radio receiver to meet the new FCC allocations, Lee McCanne, vice-president and general manager of the fifty-one-year-old Rochester, N. Y. communications firm, revealed today.

The FCC decision (June 27) shifted the FM broadcasting band to 92-106 megacycles. The move by Stromberg-Carlson to translate the shift to production design followed the FCC announcement by less than 24 hours, Mr. McCanne declared. He pointed out that the Stromberg-Carlson Company has pioneered in the development of frequency modulation broadcasting since 1939.

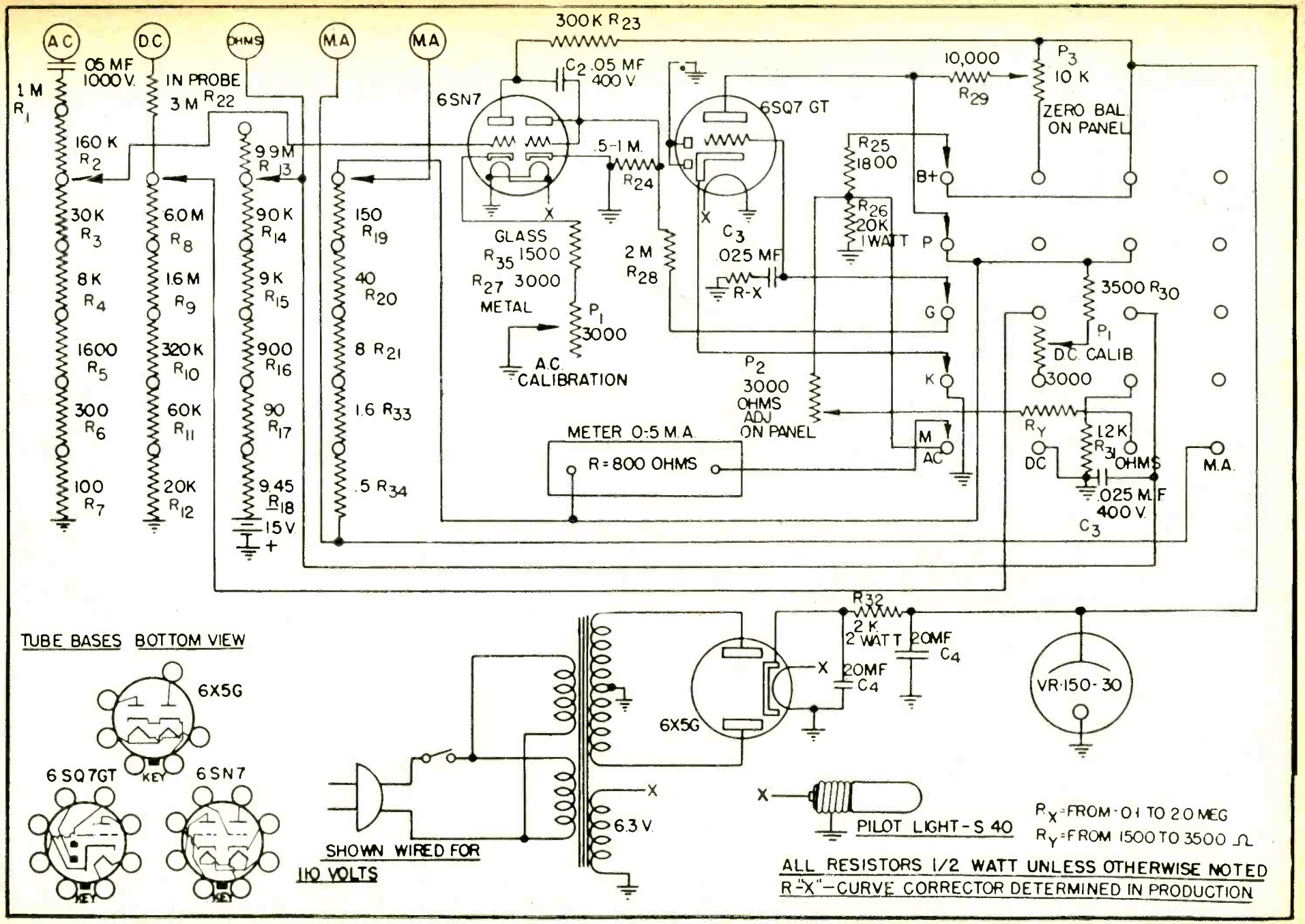
"Once the FCC rendered the decision to shift the band to the higher frequencies, we swung into immediate action to prepare for production as soon as possible within the limits of military necessity, and the availability of labor and materials. This removes the last shackles from our thinking on our postwar line and FM's key position in it," Mr. McCanne went on to say. He predicted "a heavy demand for FM receivers when civilian radio production is resumed."

The company made the radio with which the FCC demonstrated an adapter for the new band allocations.

Radionic Catalog

Radionic Equipment Company has just issued its Catalog "C" of hard-to-get radio parts. This booklet should be of special interest to radio service men and laboratory engineers. All merchandise listed immediately available. Copies may be obtained by writing to the company, Dept. PR, 170 Nassau Street, New York 7, N. Y.

[*Continued on page 56*]



Hickok Electrical Instrument Co. Volt-Ohm-Milliammeter, Model 202.

Centralab

Medium Duty Power Switches

- 7½ amp. 115 V. 60 cycle A. C.
- Voltage breakdown 2500 V to ground D. C.
- Solid silver contacts
- 25,000 cycles of operation without contact failure
- Fixed stops to limit rotation
- 20° indexing

Centralab medium duty power switches are now available for transmitters (has been used up to 20 megacycles) power supply converters and for certain industrial and electronic uses.

It is indicated in applications where the average Selector Switch is not of sufficient accuracy or power rating. Its accuracy of contact is gained by a square shaft, sleeve fit rotor, and individually aligned and adjusted contacts. It is assembled in multiple gangs with shorting or non-shorting contacts. Torque can be adjusted to suit individual requirements. Furnished in 1 pole . . . 2 to 17 positions (with 18th position continuous rotation with 18th position as "off"); and 2 or 3 pole . . . 2 to 6 position including "off".

Centralab

Division of GLOBE-UNION INC., Milwaukee

PRODUCERS OF Variable Resistors • Selector Switches • Ceramic Capacitors • Fixed and Variable • Steatite Insulators and Silver Mica Capacitors

In Trade

[*from page* 53]

New York Television Center

Television is on the eve of startling news developments with the minimum release of electronics equipment, in the opinion of Ralph Austrian, executive vice president of RKO Television Corporation. His recent visit to the West Coast was to gauge the television situation there, from all angles. In talking to heads of the various major film companies, he found that while television was now accepted as an immediate force in the entertainment world, there was no concrete idea on the part of the film companies approached as to how television would adjust itself to the present set-up.

From the production standpoint, there are 13 or more guilds involved in the creation and transmission of television shows. He saw no improvement in either quantity or quality of the televised programs originating in Hollywood, over a year ago, when he was there last.

As the result of his survey, RKO Television Corporation has decided to accelerate plans to produce subjects in the east which will lend themselves to television. New actors, writers and directors will be developed here rather than depend on Hollywood. The facilities are here, he added, to make pictures at less cost than in Hollywood.

There are other factors which make it more feasible to film shorts primarily for television in the East, Austrian pointed out. Most of the factories manufacturing television equipment are here, as well as the large advertising agencies and home offices of the film and radio companies, plus density of population. He stated further that black and white will be the rule since color television is still not perfected.

With restrictions on the manufacture of electronic equipment expected to be lifted by October 1, if not before, television will become a part of our daily lives, to the same extent as motion pictures and radio, Mr. Austrian believes. The industry is ready as soon as it gets the green light to go ahead.

Bids for Dealers

The Olympic Radio line, manufactured by Hamilton Radio Corporation, 510 Sixth Avenue, New York, N. Y., starts its direct bid for dealer favor with an unusually factual brochure entitled, "A Man Has To Think Twice."

Available through Olympic's distributors or direct from the company, the brochure at the outset emphasizes that, though every post-war period brings many brand contenders for leadership, only a few succeed. Sales, advertising and merchandising policies of the Olympic line are under the direction of Jack F. Crossin, director of sales, and Sam C. Mitchell, sales and promotion manager.

Wire Recording

For the first time in history, a concert presented in Carnegie Hall has been recorded on wire. The recording was made on a Lear home radio and wire recorder combination, and the occasion was the concert given by Fred Waring and his orchestra recently.

"The recording on wire at this Carnegie Hall Concert," says William P. Lear, president of Lear, Incorporated, "was done on our present demonstration model. Models for the public, when consumer production is permitted, will have additional improvements. It is an example of what wire recording holds for music, entertain-

[*Continued on page* 58]

In Trade

[from page 56]

ment, education, industry and the home. The recording of events under conditions which are today considered impossible for other recording methods will be an everyday affair with the Lear Wire Recorder, since wire recording will overcome difficulties such as length of continuous recordings, need for technical training or delicate adjustments for purposes of recording, and, most of all, the economy of wire recording over all other methods."

Marshall to Aerovox

The appointment of Frank L. Marshall to the sales staff of Aerovox Corporation in New Bedford, Mass., is announced. Former assistant sales manager of Bundy Tubing Company of Detroit, he now assumes his new duties as assistant sales manager, in the handling of sales to equipment manufacturers.

Astatic Appoints

Frank B. Russell of Drexel Hill, Pa., has been appointed sales representative of The Astatic Corporation to serve radio parts jobbers in the District of Columbia and Virginia. Having just completed a visit at Astatic's new plant at Conneaut, Ohio, Mr. Russell is now getting acquainted with customers in his new sales territory.

More P-A in Schools

The little red schoolhouse of the early postwar era will be wired for sound. The prediction of the advent of the general use of sound in schools was made in a booklet published last week by the Stromberg-Carlson Company, Rochester, N. Y.

The booklet—the result of intensive study and research by one of the nation's foremost authorities on the use of sound in education—is being distributed to 10,000 local, county and state education and school administration officials throughout the nation.

Allan R. Royle, sales manager of the company's fast-growing sound equipment division, said that such streamlined teaching tools as instructional recordings and transcriptions promise to lend invaluable aid in helping educators project school work, particularly in subjects such as English composition, grammar, and the study of foreign languages. The communications official declared that many schools have already discovered some of the general uses to which their sound system can be put. He listed among these school-wide broadcasting of lunch-time music programs, safety announcements, paging individuals, and the instant spreading of alarms. "A flick of a switch in the school of tomorrow and the school principal will be able to convoke a school-wide assembly," Mr. Royle said.

New RCA Posts

Appointment of Julius Haber as assistant director of the Advertising and Sales Promotion Department was announced by Charles B. Brown, advertising director of RCA Victor Division of the Radio Corporation of America. Mr. Haber was formerly Director of Publicity. Harold D. Desfor becomes Director of Publicity. He was formerly assistant to Mr. Haber.

Since joining RCA in 1923, Mr. Haber has handled publicity and special advertising promotions for most of RCA's varied activities.

Mr. Desfor joined the publicity department of RCA Victor in 1941, and for the past two years has been assistant director of the department. Prior

[Continued on page 60]

PLAN NOW FOR PROFITS— From tomorrow's big market for G-E electronic tubes!

IT'S time NOW to look ahead—plan ahead—to when electronic tubes will again be available in volume to increase the figures on the profit side of your ledger.

People then, as always, will buy what they know—and respect. They have known and bought G-E Mazda lamps for decades, until this name has become a symbol for light. Now they see G-E electronic tubes in full-page General Electric radio advertisements that run in 19 leading national magazines reaching 30,000,000 readers every month.

In addition, G-E tubes each week reach the attention of listeners in 7,000,000 radio homes. Under the very eyes of radio dealers and service men a big, profitable market tomorrow—when G-E tubes can be supplied to all who want them—is being built. Retailers who look confidently ahead to prosperous times, are making G-E tubes a "must" for their post-war stocks. Think back over the years to how G-E Mazda lamps have swelled the cash receipts of thousands of stores! Then think forward to the new, identical opportunity offered to radio dealers and service men by G-E electronic tubes! Soon this opportunity will be yours. Prepare to take early advantage of what it offers you in the way of assured income and fullest participation in the benefits of G-E leadership. Write for the name of your nearest G-E tube distributor. Address *Electronics Department, General Electric, Schenectady 5, N. Y.*

Hear the G-E radio programs: *"The World Today" news, Monday through Friday, 6:45 p. m., EWT, CBS. "The G-E All-Girl Orchestra," Sunday 10 p. m., EWT, NBC. "The G-E House Party," Monday through Friday, 4 p. m., EWT, CBS.*

GENERAL ELECTRIC

176-D1-8850

In Trade

[*from page* 58]

to this he carried on special publicity in the radio and entertainment field. A graduate of the University of Wisconsin, Mr. Desfor was also a newspaper feature writer and a free lance magazine writer.

End Radio Interference

An agreement for international cooperation, looking toward the ultimate establishing of standards in connection with the complex problems of radio interference presages far-reaching advances in the future. This agreement has been set up between the American Standards Association, the British Standards Institution, and the Australian Standards Association through the medium of the United Nations Standards Coordinating Committee.

The increasing use of electronic devices, and of motor-operated gadgets, from vacuum cleaners to generators, is causing extreme interference with radio reception. When improperly installed, fluorescent lights can cause serious interference with radio reception. Considering that a physician's diathermy machine on the East coast of the United States has been found to cause disturbances in radio reception on the West coast, it is easy to recognize the importance of this new activity. The intricate electrical systems in a long range multi-engined aircraft, if improperly designed, can seriously intefere with radio reception over a wide pathway. It is evident, therefore, that efforts directed toward the eventual elimination of radio interference must become international in scope.

Much ground, however, must be covered before this will all come to pass. First, there will need to be extensive exchange of information, experience, data, and the like. After scientists and engineers on both sides of the Atlantic, and down under, have explored and investigated sufficiently, some decision will presumably be made upon a standard method for measuring radio interference. Then, after full agreement has been reached, a standard method for suppressing radio interference can be looked after.

Instant Calculator

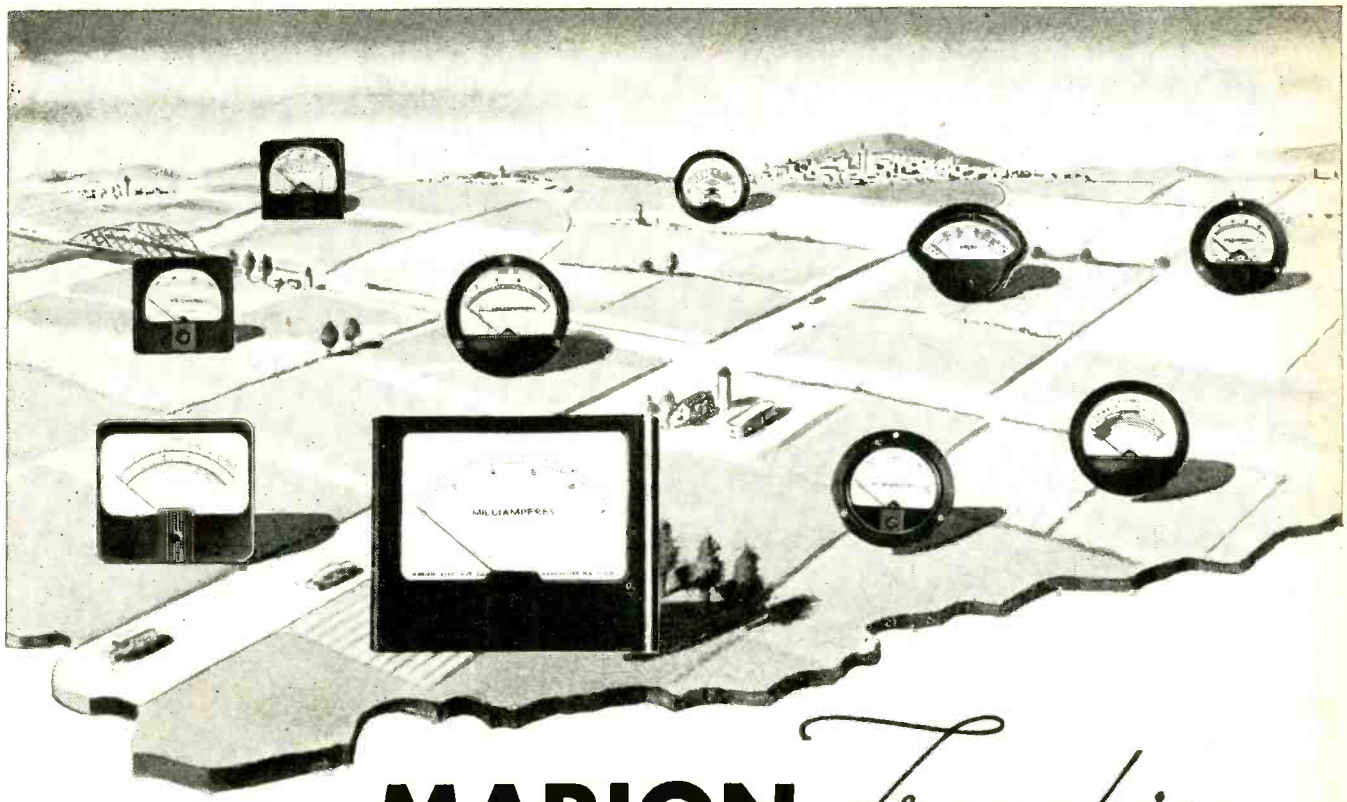
A new slide rule, especially designed to provide a fast and accurate means of solving problems involving resistors in parallel and capacitors in series is announced by Allied Radio Corp.

A single setting of the slide automatically aligns all pairs of resistors which may be connected in parallel, or capacitors which may be connected in series, to provide any required resistor or capacitor value. Range: 1 ohm to 10 megohms; 10 mmfd to 10 mfd. It is a time-saving aid to experimenters, servicemen, amateurs, students, instructors, engineers, and others in the field of radio and electronics. Priced at 25¢. Available from the company, 833 West Jackson Blvd., Chicago 7, Illinois.

Test Equipment

The inherent accuracy and reliability laboratory circuits and techniques reduced to simplest terms for lay operation in everyday industry, characterizes the variety of instruments featured in the "Electrical Test Instruments" bulletin released by Industrial Instruments, Inc., 17 Pollock Ave., Jersey City, N. J. Among the instruments featured are the direct-indicating comparison bridge, capacity and resistance limit bridges, resistance and capacitance decades, Wheatstone bridge, voltage breakdown testers and test fixtures, Kelvin bridge, megohm bridge and megohm meter, and conductivity aparatus. Copy may be had on request.

[*Continued on page* 68]



...A MARION *Franchise*

is a profitable investment

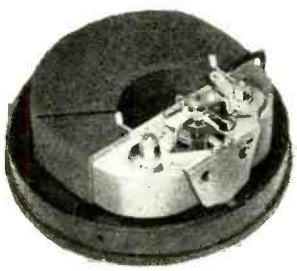
because Marion offers you a complete line of quality electrical indicating instruments, designed and constructed for long, trouble-free performance.

because Marion provides a sound merchandising "package" including the new "MeterTester" which will do a man-sized job in helping you sell more instruments.

because Marion prices are competitive all along the line, and yet you are assured of a healthy slice of profit in every instrument that you sell.

because Marion makes certain that all Marion Jobbers are fully protected against unfair practices and cut-throat competition.

because Marion helps attract customers to you by a full-scale, consistent advertising campaign in leading radio and electronic publications.



Why Marion Instruments Provide Better Service Over a Longer Period of Time

- 1% Accuracy
- Full soft iron pole piece
- Beryllium copper instrument frame
- Solid Alnico magnet
- Beryllium copper mounting bracket
- Individually made metal scale plate (white coated)

For complete details regarding a Marion Franchise, write to our JOBBER SALES DIVISION

MARION ELECTRICAL INSTRUMENT CO.
MANCHESTER, NEW HAMPSHIRE
Jobber Sales Division: Electrical Instrument Distributing Co.
458 BROADWAY NEW YORK, N. Y.

RCA 6-Way Voltohmyst

A new test equipment, the RCA 195-A Voltohmyst, which in one compact unit provides the means for measuring d-c or a-c voltage, resistance, audio level, and FM discriminator balance, is announced to the trade by the RCA Victor Division of the Radio Corporation of America.

The new Voltohmyst is described as one of the most useful and most versatile of all voltage testing devices. In one unit, the instrument combines (1) a 6-range d-c voltmeter, (2) an ohmmeter reading from .1 ohm to 1000 megohms, (3) a 6-range a-c voltmeter, (4) a linear audio frequency voltmeter, (5) an audio level meter, and (6) an FM discriminator balance indicator.

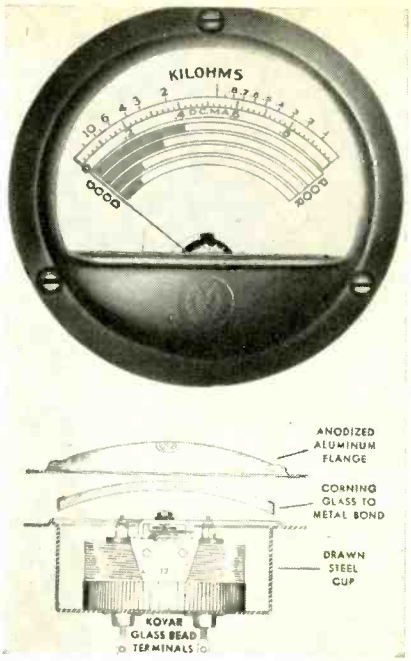
For radiomen it will serve not only as a meter for AVC, AFC, FM discriminator, and bias voltage readings, as have earlier models, but now also for audio fidelity indication and supersonic and low r-f testing. For sound men it will permit level checking with a diode at all audio frequencies (with readings in VU,s on 600 ohm circuits), as well as serving as a handy all-purpose meter.

A bulletin describing the RCA 195-A Voltohmyst can be obtained from the Test and Measuring Equipment Section, RCA Victor Division, Camden, N. J.

Marion Meters

In applying the principles of vacuum tube sealing, i.e., glass-to-metal, in addition to other design refinements, engineers at the Marion Electrical Instrument Company of Manchester, New Hampshire, have achieved true hermetic sealing in their newly perfected hermetically sealed $2\frac{1}{2}$" and $3\frac{1}{2}$" electrical indicating instruments.

By building the mechanism into a protective cup-like frame, and then sealing the glass cover to the metal rim, positive hermetic sealing has been effected with a minimum number of seals. There are no rubber gaskets or cement seals. Tests have proven the effectiveness of the new type of sealing under severe tropical and/or freezing conditions. The instruments can be immersed in boiling brine solution for weeks, or frozen to minus 40° F, without deterioration of the seals. Maximum zero shift during tests was .75%; maximum errors in current at full scale reading was .5%.



Windows are of double thickness tempered glass, processed for solder sealing, and are highly resistant to shock. Completely dehydrated, the instruments are filled with dry air at sea level pressure. A newly designed crowned crystal permits greater scale length, reduces shadows and makes for better visibility. Magnetic shielding makes possible interchangeability on any type of panel without affecting calibration. For extra R. F. shielding, the instrument can be supplied silver plated.

Silver clad beryllium copper hair springs reduce zero shift at all temperatures. The standard Kovar glass bead type terminals with solder lugs and the special phosphate finish on the case, which meets a two-hundred hour salt spray test, are among the features incorporated in the new instruments.

Built to A. W. S. standards the meters are available in all DC ranges. Type HM 2 is directly interchangeable with A. W. S. type MR 24 and 25. Type HM 3 is directly interchangeable with A. W. S. type MR 34 and 35.

New Ohmite Resistors

Series 82 and 83 of Riteohm Precision Resistors are announced by the Ohmite Manufacturing Company,

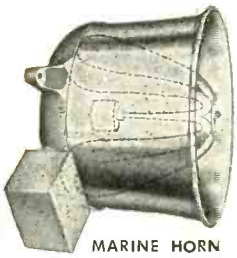
[*Continued on page 64*]

The Famous Three!

Tinker, Evers and Chance were famous for Stamina, Efficiency and Fine Performancee. So are all RACON Products!

There's a RACON speaker, horn and driving unit for every conceivable sound distribution application. Only RACON can supply, when needed, another famous three-in-one combination — Weatherproof, Stormproof, Acoustic Material which is impervious to any weather condition and prevents resonant effects.

Now that industrial war plants can obtain sound installations, remember that RACON's should be used to afford peak efficiency.



MARINE HORN

RE-ENTRANT TRUMPETS

P.M. UNITS

MARINE HORN SPEAKERS, approved by the U. S. Coast Guard, may be used as both speaker and microphone. Available in several sizes.

RE-ENTRANT TRUMPETS, compact, of the double re-entrant type, afford long air-column in small space; deliver highly concentrated sound over long distances.

P.M. HORN UNITS are available in operating capacities of 5 to 50 watts.

RACON ELECTRIC CO. 52 E. 19th ST., N. Y.

RACON

Herman R. Rose, president of General Television & Radio Corp., Chicago, announces purchase of the building formerly occupied by Press Wireless, at 2701-17 Lehmann Court, Chicago.

TRADE PRODUCTS

[from page 62]

Chicago. These are additions to the Ohmite Precision Resistor family which includes the well known Series 71, 81 and 90. The new units may be mounted by means of a through-bolt. The Riteohm 82 has two lug terminals at one end firmly fastened by screws. The Riteohm 83 has radial wire leads.

Riteohm 82 comes in three sizes—11/16" diameter by 1⅛" long, 1 7/16" long or 1¾" long for the 2, 4 and 6 pie units respectively. The minimum resistance is .1 ohm for all units and the maximum is 400,000 ohms for the 2 pie unit, 750,000 ohms for the 4 pie, and 1 megohm for the 6 pie unit. Riteohm 83 also comes in three sizes—½" diameter by 7/16" long, ⅝" long or 1" long. The first two units are 2 pie while the third is a 4 pie unit. The minimum resistance is 10 ohms for all units and the maximum is 200,000 ohms for the small 2 pie unit, 400,000 ohms for the large 2 pie, and 800,000 ohms for the 4 pie unit.

A few common applications for these resistors are voltmeter multipliers, laboratory equipment, radio and electrical test sets, attenuation pads, and electronic equipment requiring extremely accurate resistance components.

For further information write the company for Bulletin No. 125 at 4835 Flournoy Street, Chicago 44, Illinois.

Capacitor Mounting

A new universal capacitor mounting clip, which can be attached to the chassis instantaneously with one simple hand motion and without assembly tools of any kind, is announced by the Prestole Division, Detroit Harvester Company, 4500 Detroit Avenue, Toledo, Ohio.

There are no nuts or bolts used to attach the clip to the chassis thereby eliminating this assembly operation. The pointed retaining tongues bite into the chassis firmly and prevent any loosening due to vibration. The clip is designed to give maximum engagement between capacitor and clip.

It is only necessary to provide for a simple embossure in the chassis and a blue print of the embossure is provided by the company. Clips may also be riveted to the chassis wherever an embossure has not been provided. All clips are designed to fit chassis thicknesses from .032 to .062 which means that all clips, regardless of diameter, will fit one standard chassis embossure. The company states that these clips

[Continued on page 69]

Quick Congratulations!

Thousands of American Retailers have won special recognition for "distinguished service" for their share in the success of the Mighty 7th War Loan! Now, like many of our overseas heroes, taking time out for only a congratulatory handshake as they move from Europe to the Pacific, these retailers are busy planning new Bond selling strategies.

. . . then—back to BIGGER BOND VICTORIES!

Here's your 4-point program to pace your Bond selling advance to the victory gains of our armed forces.

1 Regular Employee Bond Buying helps employees to sell more Bonds! Encourage this systematic saving to help tie the grasping hands of inflation —and build the thrift habit.

2 Advertising is the heavy artillery of Bond sales promotion! Every line of Bond advertising is a life-line to prosperity in the postwar world. Allot more space to Bond advertising.

3 Bond selling Window and Store Displays prevent let-downs in Bond sales! Use more eye-catching displays to keep the urgency of Bond buying before the public.

4 Sell more Bonds by keeping your 7th War Loan Bond selling organization on the job! Maintain all Bond Selling Booths as essential "pill boxes against inflation."

"Eternally keeping at it" is the price of continued Bond sales—and the "unconditional surrender" Bonds help to speed. Today and EVERY DAY buy, advertise, display—and SELL War Bonds!

The Treasury Department acknowledges with appreciation the publication of this message by

RADIO service DEALER

This is an official U. S. Treasury advertisement prepared under the auspices of Treasury Department and War Advertising Council

★

DISTRIBUTOR NEWS

Add Stores

Opening of two new stores at 89 Cherry Street, Waterbury, and 525 Main Street, Stamford, is announced by Hatry & Young, Connecticut distributors. These are in addition to four already established in Hartford, New Haven, Bridgeport and New London. This gives them coverage in every major trading area in the state.

Hatry & Young was started in September 1928 as a service and parts business by Louis W. Hatry and Nicholas T. Young. In 1933 a branch was opened in New Haven, Connecticut, as wholesalers of radio parts, tubes and setts exclusively. In 1934 another branch was opened in Bridgeport, Connecticut, also as exclusive wholesalers of parts, tubes and sets. In 1939 when Hatry & Young became distributors for the State of Connecticut of Wilcox-Gay, all retail activities were dropped and Hatry & Young became strictly wholesale. The firm s set salesmen began calling exclusively on war plants. The service department was augmented and put to work in building, rebuilding and repairing electronic equipment for war plants, laboratories, etc. As soon as the War Production Board permitted facilities for supplying radio dealers and radio repairmen with tubes, tools and repair parts, Hatry & Young took an active part in obtaining such material for these outlets. This was greatly appreciated by the Connecticut trade since their stocks had dwindled to almost zero. Today with the exception of certain tubes, Hatry & Young is supplying radio dealers and servicemen with all of their requirements and very few home radio listeners are without working radio sets.

ADMIRAL

Ross D. Siragusa, president, Admiral Corp., Chicago, announces appointment of the following distributors to handle Admiral radios, refrigerators, electric ranges and home freezers in their territories. With this announcement, Mr. Siragusa stated that Admiral has now completed 98% of the distributorship for the United States:

R. H. Kyle, Charleston, West Virginia. Baltimore Gas Light Co., Baltimore, Maryland. Peaslee-Gaulbert Corporation, Dallas, Texas. Paxton and Gallagher Co., Omaha, Nebraska. L. C. Lippert Co., Sioux Falls, South Dakota. Herbert H. Horn, Los Angeles, California. Appliance Distributors, Inc., Portland, Maine. Northwest Supply Co., Butte, Montana. Havre Jobbing Co., Havre, Montana. Auto Parts Service, La Crosse, Wisconsin. J. A. Fleck Company, Fargo, North Dakota. Edwards Supply Company, Lubbock, Texas. Mascon Distributors, Inc., Springfield, Massachusetts.

BENDIX

Leonard C. Truesdell, general sales manager for home radio, Bendix Radio division of Bendix Aviation Corp., announces the following distributors who will carry the forthcoming line of Bendix AM and FM radios and radio-phonograph combinations:

Graybar Electric Co. for San Francisco area, including Utah; the firm will conduct merchandising from its district headquarters in San Francisco and warehouses in Oakland, Sacramento, and Salt Lake City. General Utilities Distributors Inc., Milwaukee, Wisc., for Wisconsin and upper Michigan. Republic Distributing Co., Providence, R. I., for Rhode Island and three adjoining counties in Massachusetts. D. K. Baxter Co., Sioux City, Iowa, for northwest Iowa, northern Nebraska and most of lower South Dakota. Graybar Elec. Co., for Alabama, western Florida, and eastern Tennessee; distribution headquarters are in Chattanooga, Tenn., and Birmingham, Ala. Texas Wholesalers, Dallas and northern Texas, excluding the Panhandle. Thiele

Winslow Co., San Antonio and south central Texas. Electric Household Distributing Co., Portland, for Oregon, southwest Washington, and two counties in northern California. Stratton-Warren Hardware Co., Memphis, for northern Mississippi, western Tennessee, and northeast Arkansas. McDaid's Electrical Supply, Charleston, S. C., for the city area. Lighting Fixture and Electric Supply Co., Inc., New Orleans, for southwestern Louisiana and Mississippi territory. K. K. Co., Inc., Omaha, for southern Nebraska and southwestern Iowa. Lehr Distributors, New York City, for the greater New York area including Nassau, Suffolk, and Westchester counties. Alford's Wholesale, Albuquerque, N. Mex., for the whole state, except ten southern counties. R. F. Trant Inc., Norfolk, Va., for southeastern Virginia and eastern North Carolina. Gunn Distributing Co., Little Rock, Ark., for the Arkansas territory. Nelson Hardware Co., Roanoke, Va., for western Virginia. Bond-Rider-Jackson Co., Charleston, W. Va., for southern West Virginia and eastern counties in Kentucky and Ohio.

JOHN MECK INDUSTRIES

John Meck, president, John Meck Industries, Inc., Plymouth, Ind., announces the following added jobbers.

Curle Radio Supply, 825 Cherry Street, Chattanooga, Tennessee; Chemcity Radio & Electric Co., 408 North Gay St., Knoxville, Tennessee; Frost Electric Co., 1922 W. End Ave., Nashville, Tennessee; Amarillo Electric Co., 111 E. 8th St., Amarillo, Texas; All-State Distributing Co., 2407 Ross Avenue, Dallas, Texas; United Appliance, 1009 Florence, Ft. Worth, Texas; R. C. & L. F. Hall, 1015 Caroline St., Houston, Texas; S. R. Ross, 1212 S. State St., Salt Lake City, Utah; Snyder & Snyder, 122-126 Church St., Norfolk, Virginia; Seattle Radio Co., 2117 Second Ave., Seattle, Washington; Roy R. White, West 908 First Avenue, Spokane, Washington; Sigmon Radio Supply, 708-10 Biglev, Charleston, West Virginia; Randle & Hornbrook, 536 Seventh St., Parkersburg, West Virginia; Appleton Radio Supply, 1217 North Richmond St., Appleton, Wisconsin; and Reed & Company, 1244 N. 6th Street, Milwaukee, Wis.

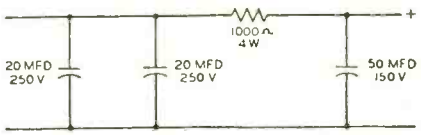
PHONOLA

Waters Conley Co., Rochester, Minn., announce the appointment of twelve more distributors for their Phonola line of portable phonographs:

The Artophone Corporation, St. Louis, Mo. Crumpacker-Covington Co., Houston, Texas. Federal Distributing Co., Kansas City, Mo. Miller-Jackson Co., Oklahoma City, Okla. Omaha Appliance Co., Omaha, Nebr. Southern Equipment Co., San Antonio, Texas. The Southwestern Co., Inc., Dallas Texas. The B. K. Sweeney Electrical Co. Denver, Colo. The Tri-State Distributing Corp., Cincinnati, Ohio. Walther Brothers Co., New Orleans, La. Watts-Newsome Co., Birmingham, Ala. Woodson & Bozeman, Inc., Memphis, Tenn.

The company's factories are at Rochester, Minnesota; its Eastern sales office is in New York at 17 East 42nd Street, and its Midwestern sales office in Chicago at 224 South Michigan Avenue.

SHOP NOTES



REPLACING CHOKE FILTER WITH R-C FILTERS

This filter employs two 20 mfd., 250-volt units in parallel in the input section free operation. A typical filter of this type used in ac-dc sets is illustrated in the diagram.

When replacement filter chokes are not available, sets may be maintained in operation through substitution of a resister for the missing choke and adding sufficient filter capacitors to give hum-and one 50 mfd., 150-volt unit to terminate the filter. The same scheme may be used in replacing electrodynamic speakers with burned-out field coils by using PM speakers. In all cases make sure that the voltage rating of the capacitors and the wattage rating of the resistors used provide an adequate margin of safety.

Solar Capacitor Sales Corp.

1T4 SUBSTITUTION

In using 1T4 tube and adapter instead of 1N5 tubes, it will be found that in some sets this will not work properly—squeals and loss of volume will develop. This can be easily corrected by running wire from No. 1 pin on adapter to center metal piece in top of 1T4 socket and enclosing in grounded metal shield.

It is sometimes well to align set with a 1N5 tube first before attempting to get the 1T4 and adapter working. But once this is done, there should be no trouble.

W. H. Carter, Tenn.

In Trade

[*from page 60*]

Rider Returns

With a number of commendations from the Chief Signal Officer, Lieut. Col. John F. Rider recently completed three years of service in the U. S. Army Signal Corps. For the past seventeen months he has been stationed at Fort Monmouth attached to the Publication Agency of which he was Acting Director at the time of his assuming inactive status on May 30th.

Now returned to his desk as head of John F. Rider Publisher, Inc., he has already set in motion plans for expanding the Rider Manual activities to embrace television and radar.

Key civilian technical personnel of the organization who followed John Rider into his Army work have returned to their former duties and an accelerated program of expanded operations in the Rider development laboratory is the result. Here material for future publications as well as new pieces of electronic equipment will be developed.

An activity to which John Rider is devoting much effort at the present time is that of the post-war problems of the servicing industry—problems not only of the industry, but of the individual and his adjustment to current and predictable conditions of the near future.

From this well rounded program will come many new and timely titles that will be added to the list of Rider Radio Books.

RSD Office Manager

David Saltman, office manager of the Radio Service Dealer organization until he went with the Armed Forces as a buck private, has been raised to the rank of Captain, "somewhere in Germany".

$1.00 PAID FOR SHOP NOTES

Write up any "kinks" or "tricks-of-the-trade" in radio servicing that you have discovered. We will pay $1 in War Stamps for such previously unpublished "SHOP NOTES" found acceptable. Send your data to "Shop Notes Editor," RADIO SERVICE DEALER, 342 Madison Ave., New York 17, N. Y. Unused manuscripts cannot be returned unless accompanied by stamped and addressed return envelope.

TRADE PRODUCTS

[*from page 64*]

may also be used for mounting tubes or wires in other applications. Sizes of clips presently available range from 5/8" up to 1 3/8".

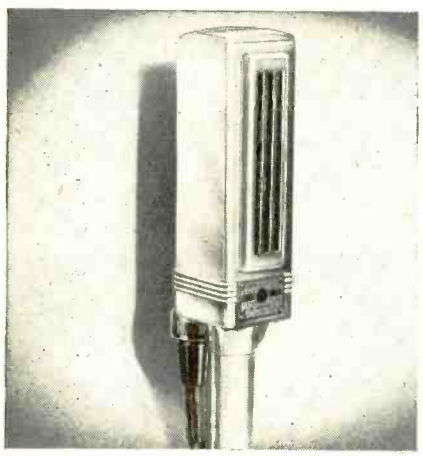
New Mikes

Universal Microphone Co., Inglewood, Cal., in addition to its new microphone models, has announced a

Type 204-C

re-issue of several types that have been unavailable since the outbreak of the war.

The first of these is the 204-TA, dynamic handi-mike. It has been internally restyled and redesigned progressively to meet the need for a rugged, dependable, compact hand-held precision instrument.



Type 808

The re-issue of this model will be marketed in both carbon and dynamic types with a variety of switches and circuits from which to choose, seven models in all.

Technically: impedance is 35-50 ohms; frequency response 200 to 7000

[*Continued on page 70*]

TRADE PRODUCTS

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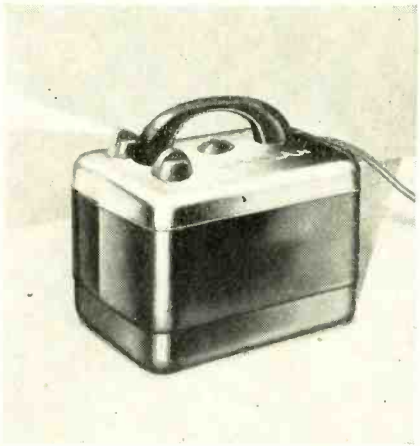
cps.; output level into 50 ohm input; 45 db below 6 milliwatts for 100 bar signal. The shipping weight is two pounds and the assembly includes six feet of rubber jacketed cord, 2 conductors and shield.



Spartan Vaporizer

An electric "steamer" or vaporizer, holding a half gallon of water, running for four to five hours at a filling and on which the current automatically shuts off when the water is gone, is now being manufactured by the Spartan Company of Minneapolis with show rooms in The Merchandise Mart.

Most doctors today say "get some steam into the room" as a treatment for deep chest colds, head colds, sore throats, coughing, and bronchial ailments. But there has been no appliance which holds an adequate supply of water, and yet is completely automatic. The vaporizer is housed in a plastic cabinet, with aluminum top, plastic handle. There are two plastic-fitted openings, one to receive water and the other to emit steam, which can be produced within twenty seconds. A medicament compartment is provided if it is desired to evaporate a vapor oil with the steam. It is small and compact (5" high, 5½" wide, 8" long), for easy storing in bureau drawer or closet shelf. Operates silently, shuts off quietly. Gives a "dry" steam desired by doctors, and because the container is cool does not heat a room to a patient's discomfort. Operates on AC, 110-115 volts, 300 watts.

I R C Catalog

Service Catalog #50 is currently being released through I R C Distributors. The easy-to-use index makes the booklet a real time saver.

ADDRESS CHANGES—

Subscribers to RSD should notify our Circulation Dep't. at least 3 weeks in advance regarding any change in address. The Post Office Dep't. does not forward magazines sent to a wrong address unless you pay additional postage. We cannot duplicate copies of RSD sent to your old address.

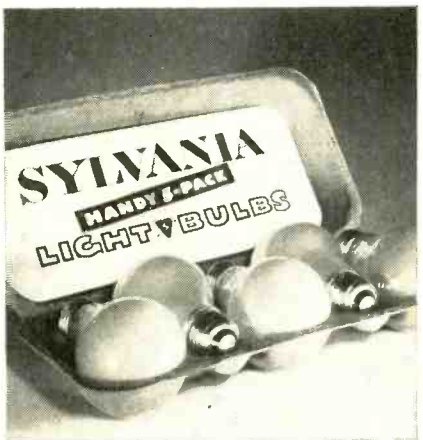
RSD Circulation Dep't.

Cowan Publishing Co.
342 Madison Ave., New York 17, N. Y.

The Catalog features for the first time the smaller size, highly efficient types BTA (one watt) and BTS (one-half watt) as well as presenting the entire BT and BW line in preferred RMA ranges which, it is announced, now will be standard distributors' stock. Also included is data on the new I R C "Century Line" of controls. These 100 controls, according to I R C, will solve over 90% of all service problems.

More "Light" Sales

Sellers of light bulbs can look forward to a much higher unit of sale at no extra cost to them, either in money or in sales time, if light bulbs are offered in a "handy-5-pack" similar to one now being pretested for postwar use by Sylvania Electric Products Inc. This container capitalizes upon the housewife's almost universal habit of buying eggs in



shock-proof molded cartons. Such a "handy-pack" would cost the consumer nothing extra.

To the dealer, the carton offers many advantages. It trades the unit of sale up from one or two bulbs to five at a time. It encourages complete self-service on the part of the buyer. Lastly, it eliminates the need and cost for extra wrapping. Plans will probably call for both a factory-packed carton and one that would be filled from light bulb bins by the buyer herself. This flexiility in merchandising is an important feature of the new device.

High-Power P-A

The Allied Radio Corporation, Chicago, Ill., announces a 60-watt all-purpose amplifying system for use where a wide area is to be covered, such as in paging and distribution of recordings in industrial plants, for large army barracks and fields, school stadiums, railroad depots and yards, church steeples, airport and bus ter-

[*Continued on page 72*]

Ad Index

TRADE PRODUCTS

[*from page 71*]

mi uls, for large office paging, etc.

he amplifier includes four individual y controlled microphone channels. tw individually controlled phono cha nels. universal output for matching any arrangement of speakers, indiv dual controls for high and low fre uencies, optional phono top, etc. It s available separately or with any co bination of speakers and microph nes, depending upon individual requi ements.

Dual Amplifier

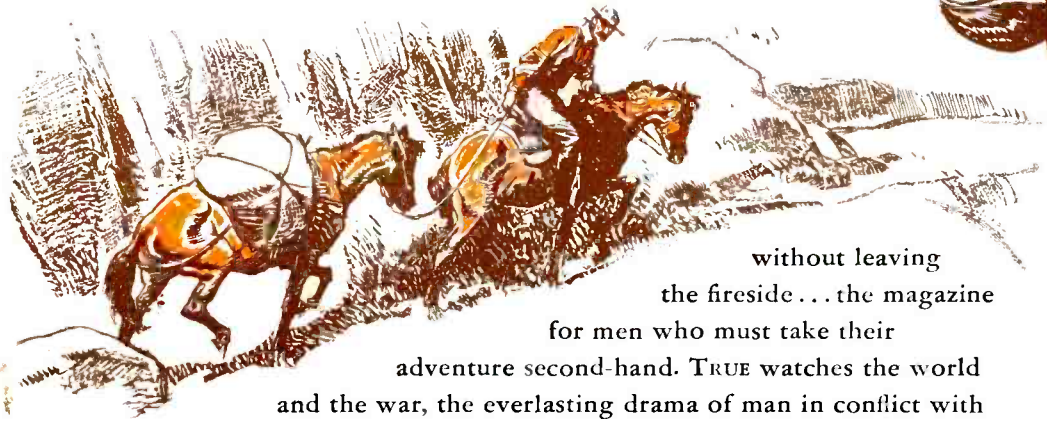
he Soundcaster, a new 40-watt du amplifier designed for either plant bro dcasting or public address service, is nnounced by Operadio Manufactur ng Co., St. Charles, Ill., and three mo lels now are available according to F. D. Wilson, Operadio Commercial So nd Division manager. Standard fea ure on all models is a switch for easy selection of public address mixing, or plant broadcasting service. For plant broadcasting performance, a panel switch permits pre-set volume selection of voice-paging, music or remote microphone.

The basic Soundcaster, Model 1335, is engineered for continuous use wherever commercial or industrial reguirements demand a quality, heavy duty amplifier. Model 531 incorporates a 2-speed, manually-operated, record player for ten and twelve-inch commercial recordings, or sixteen-inch transcriptions. Model 530 features an automatic record-changing mechanism for either 12 ten-inch, or 10 twelve-inch recordings. They are finished in blue-gray wrinkle and each weighs approximately 45 pounds. Recessed pilot lights illuminate panel controls for microphones, recordings, paging, and bass and treble response.

Postwar project . . . personal

"My old gang used to get away every year for two or three weeks in the woods. But something has come up every year since 1940 . . . I still have all my gear in the closet there. The guns need cleaning, and the boots a little neatsfoot—nothing a few hours some Sunday can't make shipshape . . . And when this war is out of our hair, you can believe me that the annual expedition is going to be resumed . . ."

A lot of guns and tackle, trout streams and woods trails, travel folders and holiday schedules . . . have had to be shelved while there was a war to be won. In the interim we have had to be satisfied with retrospect and anticipation, remembering and reading . . . And TRUE has helped, too. TRUE is the young man's fancy



without leaving the fireside . . . the magazine for men who must take their adventure second-hand. TRUE watches the world and the war, the everlasting drama of man in conflict with nature, accident, circumstance; culls the color and chronicle of these off the beaten path, finds authentic fact more interesting than fiction.

TRUE has found more than 600,000 eager buyers each month, virtually all-man, all newsstand at 25c per copy . . . earned exceptional readership and response that get exceptional action and returns for advertising . . . holds a market highly productive at present, and of tremendous profit potentials . . . has a story that ought to be heard now! . . . Inquire TRUE, *a Fawcett publication,* 295 Madison Avenue, New York 17, N. Y.

true **. . . the man's magazine**

OWI uses RAYTHEON tubes IN UNIQUE MOBILE RECORDER

● This "traveling recording studio" of the Office of War Information has *everything* for making recorded pickups for broadcasting on international short wave. Such important equipment must be the finest that science can provide, so Raytheon High-Fidelity Tubes are used to assure the highest quality reception.

Wherever they are employed, Raytheon Tubes live up to their reputation for fine performance. That is why they are first choice among electronic engineers planning post-war products . . . and first choice among radio service-dealers who are building soundly for the future.

There's a real promise of greater profits and greater customer-satisfaction for service-dealers who feature Raytheon Tubes. And there's a revolutionary Raytheon merchandising program planned, too . . . to help you be more successful than ever before.

Switch to Raytheon Tubes *now!*

Increased turnover and profits, plus easier stock control, are benefits which you may enjoy as a result of the Raytheon standardized tube type program, which is part of our continued planning for the future.

Raytheon Manufacturing Company
RADIO RECEIVING TUBE DIVISION
Newton, Mass. • *Los Angeles* • *New York* • *Chicago* • *Atlanta*

Listen to
"MEET YOUR NAVY"
Every Saturday Night
AMERICAN BROADCASTING CO.
Coast to Coast
181 Stations

All Four Divisions Have Been Awarded
Army-Navy "E" With Stars

RAYTHEON
High Fidelity
ELECTRONIC AND RADIO TUBES

DEVOTED TO RESEARCH AND THE MANUFACTURE OF TUBES FOR THE NEW ERA OF ELECTRONICS