

# radio service dealer

In  
This  
Issue:

## ARE DEALERS READY?

Markets for Television Tube Numbering System  
Dealer License Survey

February, 1945

25c

# Look Ahead...Through Your Mallory Distributor's Eyes

**I**T takes a real *leader* to plan ahead. And that's how men become Mallory distributors—on the basis of the *leadership* they show!

Only the *best* radio wholesalers are selected to handle Mallory Precision Products. They've really got to know radio... know how to sell... give exceptional service... prove that they're alert and on their toes.

The Mallory distributor who serves your

area is a good man to cultivate and know. His experience is broad, and you know you can depend on it. His stock is the best that money can buy. *And he'll really help you with your procurement problems—without cost or obligation to you.*

As you look ahead to tomorrow's uncertainties, remember your Mallory distributor! He's there to help you along the way. And back of him, already planned or in service, are amazing developments for the future!

## Here is What He Offers

1

A complete line of Mallory replacement parts... many of them first developed by Mallory research... ALL of them guaranteed against premature failure by years of service in the field.

2

A program of standardization that meets the maximum number of application needs with the minimum number of parts... reduces investment, simplifies replacement, speeds up delivery.

3

Efficient service... backed by detailed information on prices, parts, catalog numbers... promptly applied whether orders are large or small... especially effective in meeting emergencies.

4

Technical service helps... bulletins, booklets, catalogs, letters, with complete data on what to use and where to use it... special publications on radio fundamentals and new developments.

5

A background of personal experience... acquired through years of service in radio... helpful in solving difficult or unusual problems... effective in training dealer personnel.

6

Commercial "know how"... implemented by sound methods of keeping your business on the beam... with special attention to promotion devices that help sell your story to the public.

*The Part Your Mallory Distributor Plays Is Important TODAY—to YOU!*

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

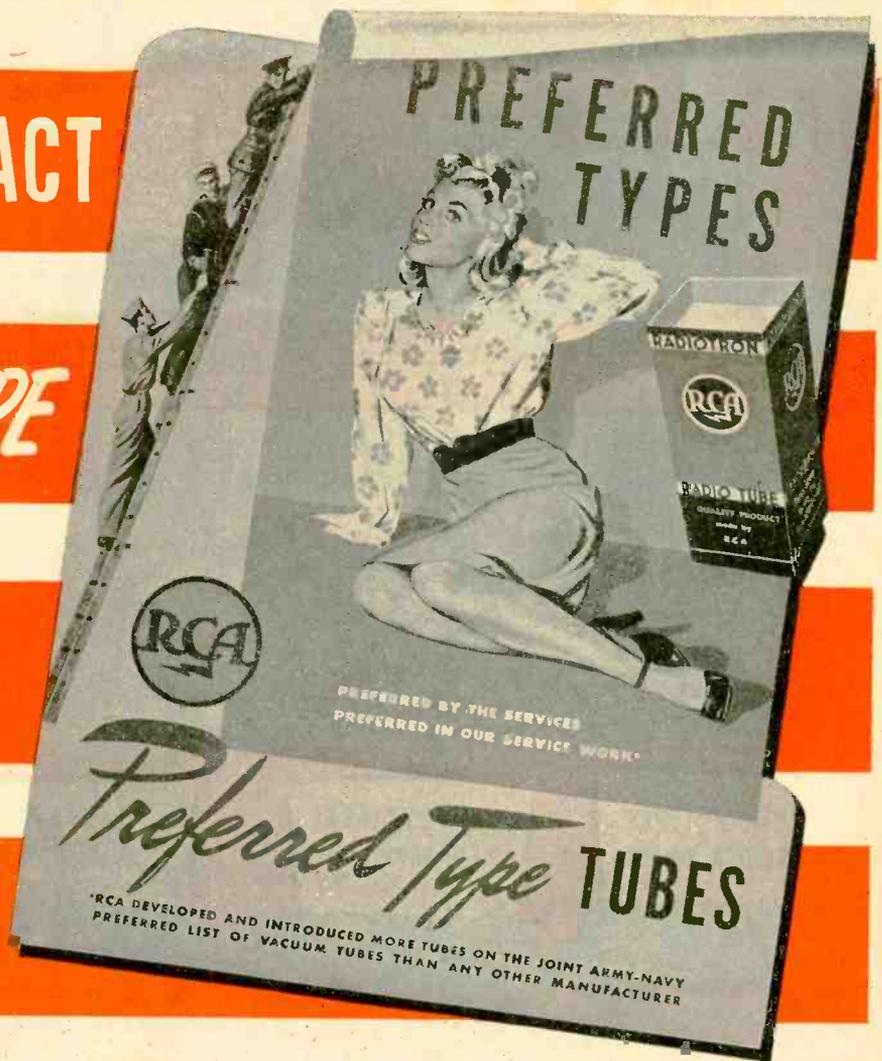
★ ★ **RCA LEADS THE WAY** ★ ★

**HOW TO ATTRACT**

**PREFERRED TYPE**

**TUBE SALES**

**YOUR WAY**



**T**HAT'S easy...just put up this sign *now*. Naturally, there won't be any Preferred Type Tubes to sell till after the war, but it's not too soon to let people know where they can come to get them when they *are* available.

This is the latest step in RCA's continuous program of merchandising to support RCA distributors, dealers and servicemen during the war. Prewar, many up-to-the-minute RCA sales aids helped you sell and expand your markets... displays, indoor and outdoor signs, RCA clocks, and many others. After V-day, look for an even greater RCA merchandising service to direct sales your way.

Meanwhile, hard-hitting RCA advertisements in top magazines are doing the same job... building toward an even greater radio and electronics business for you after the war.

Get your "Preferred Type Display" from your RCA distributor.

*The fountain-head of modern Tube development is RCA!*

New, full-color 40-inch by 28-inch display easel (shown here in black and white) to help you maintain your identification with RCA, and to sell the Preferred Type Idea... which means greater profits for you in the future.



62-6636-89

**RADIO CORPORATION OF AMERICA**

RCA VICTOR DIVISION • CAMDEN, N. J.

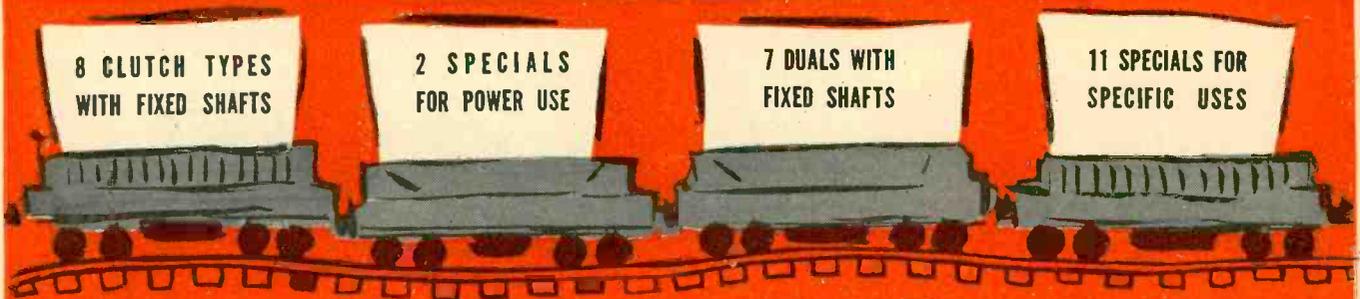
LEADS THE WAY... In Radio... Television... Tubes...  
Phonographs... Records... Electronics

# GET ABOARD! . . .

## IRC's NEW "CENTURY LINE"



100 ALL-PURPOSE CONTROLS THAT WILL CARE FOR BETTER THAN 90% OF ALL YOUR SERVICE NEEDS! THIS MEANS *BETTER DELIVERY, SMALLER INVENTORY, MORE PROFIT THROUGH FASTER TURNOVER.* ASK YOUR PARTS JOBBER ABOUT THE NEW IRC CENTURY LINE TODAY.



The IRC "Century Line" was developed because wartime restrictions and critical material shortages made it impossible to produce in sufficient quantity all of the exact duplicates, plus the many special controls which are in demand. The controls included in this streamlined version are all of the same high IRC quality for which

the entire industry has always shown preference. Extreme care based on exhaustive study of sales records and set designs makes this "Century Line" the kind a busy service man would choose for himself. All numbers in the Century Line are available for urgent civilian replacement needs under L-265 priorities.

# INTERNATIONAL RESISTANCE CO.

DEPT. 22-B • 401 N. BROAD ST. • PHILADELPHIA 8, PA.

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

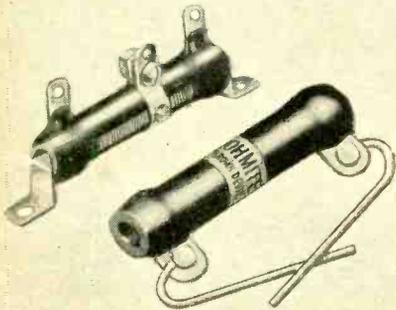


# OHMITE RESISTORS

+

## Your Guide to DEPENDABLE RESISTANCE CONTROL

+



The service-record of Ohmite Brown Devil and Dividohm Resistors before and during the war... is your best guide to resistance-control tomorrow. Widely used in military and industrial equipment... everywhere! Write for Stock Unit Catalog No. 18.

Authorized Distributors Everywhere



**OHM'S LAW CALCULATOR**  
 Figures ohms, watts, volts, amperes... easily. Solves any Ohm's Law problem with one setting of the slide. Send only 10c in coin.

**OHMITE MANUFACTURING CO.**  
 4845 FLOURNOY ST. • CHICAGO 44, U. S. A.

Be Right with **OHMITE**  
 RHEOSTATS • RESISTORS • TAP SWITCHES

# radio service dealer

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

VOLUME 6, NUMBER 2

FEBRUARY - 1945

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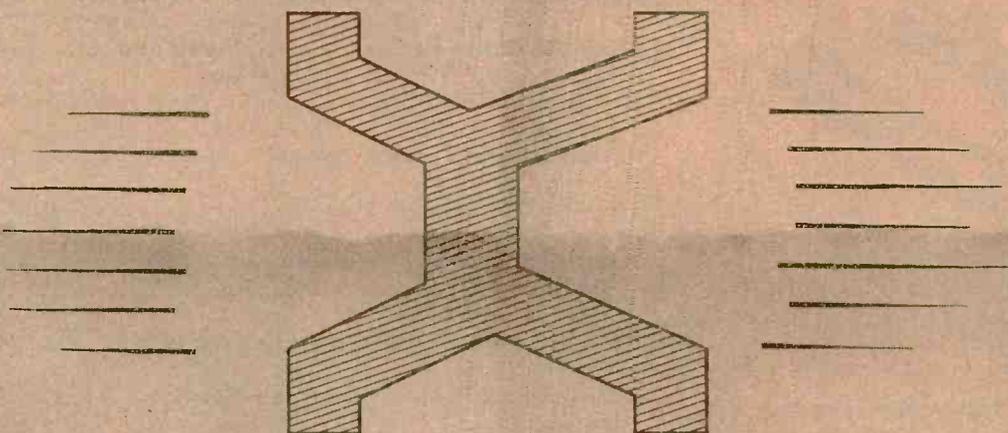
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# Quality Counts



**I**N THE International Bureau in Sevrés, France, there is a peculiarly shaped rod, a picture of which is shown above. That rod is the internationally accepted length of the meter, the basic unit of the metric system. Its length determined mathematically as a part of the terrestrial meridian contained between the north pole and the equator, its shape developed after much experimentation and its composition a special platinum and iridium alloy,

it is a standard of quality to which the whole world refers . . . In the judging of any product, *it is the quality that counts.*

In the antenna field, THE WARD PRODUCTS CORPORATION is a nationally known manufacturer of quality products. WARD sectional and one-piece antennas are the workmanship of craftsmen using modern equipment under ideal conditions . . . For quality antennas for all applications, look to WARD.



BUY WAR BONDS

# WARD

*Antennas*

THE WARD PRODUCTS CORPORATION, 15231 E. 45TH STREET, CLEVELAND 3, OHIO

# with the editor . . . . .

## Licensing — A HOT Subject!

THIS column hit the jackpot when it recently discussed the subject of licensing radio servicemen. Letters from subscribers expressing pro and con licensing sentiments still pour in. It's still nip and tuck. The anti-licensing group fears regimentation and graft while the pros support licensing because they feel that truly skilled technicians and the servicing profession as a whole are being penalized by the few incompetents.

Industry leaders like T. F. Joyce, RCA vice-president, have publicly stated that soon over 85,000 men will earn their livelihood from various types of radio-electronic-television maintenance work. Obviously in the best interests of all, incompetents should be kept out of the profession by the most expedient means. Perhaps licensing is the answer, especially if one must pass an examination to qualify for a ticket.

Believing that none is better qualified to determine such a controversial subject as this than the servicing profession itself, we've opened a Forum on the subject. A Questionnaire for

radio dealers and technicians to use appears in this issue. The paramount problem, as we see it, lies in two major factors: 1) Does the radio industry as a whole, and particularly servicemen, favor licensing and a periodic examination to qualify men as to their technical skill?; and 2), (provided the majority favor question 1), What method of licensing—and what standards of competency should be inaugurated? (Elaborating on this, a), should licensing be Municipally or State controlled? b), What minimum standards of technical skill should be established to qualify technicians for a license? And c), Should an enforcement body be set up to judge whether violations were wilfully committed?)

Gentlemen, your opinions and suggestions may be expressed via our questionnaire or in any other manner you deem more suitable. Shoot the works! Perhaps there is here the making of a radio servicing profession the peer of any other now held in higher regard simply because a license and examination are a part of it.

## FCC's New Frequency Proposal

REGARDLESS of one's political views or opinions about government bureaus, it must be acknowledged once again that our Federal Communications Commission has consistently proven itself competent, far-sighted, deserving of acclaim. A study of FCC's proposed postwar frequency allocations as published in our January issue proves the point.

By moving FM up on the dial, 90 channels instead of the present 40 are provided. Of the 90, 70 are intended for commercial stations and 20 for educational purposes. That 46 FM stations and over a half-million FM receivers now in use will require modification under the new

rulings is incidental as FCC has planned far ahead into the postwar era. The Commission explained that 53 FM stations are now operating while 248 applications are pending.

Television gets a break, space being provided in the very high frequency band for color television development. But the allocation of the 460-470 kc band for "walkie-talkies" whereby individuals or business firms would have practically free scope to do as they please in the way of 2-way communications — that *is* something! It portends the potential: "A radio for every man, woman and child capable of hearing and speaking". Dealers and servicemen, — sounds great, eh?

## Wire Recorders

UNTIL recently only one major manufacturer marketed a Wire Recorder and backed it up with publicity. At outbreak of war, several other big firms got active in the wire and tape recording-playback field, but the military services have been using their entire output, so the gadget is sort of drifting out of mind.

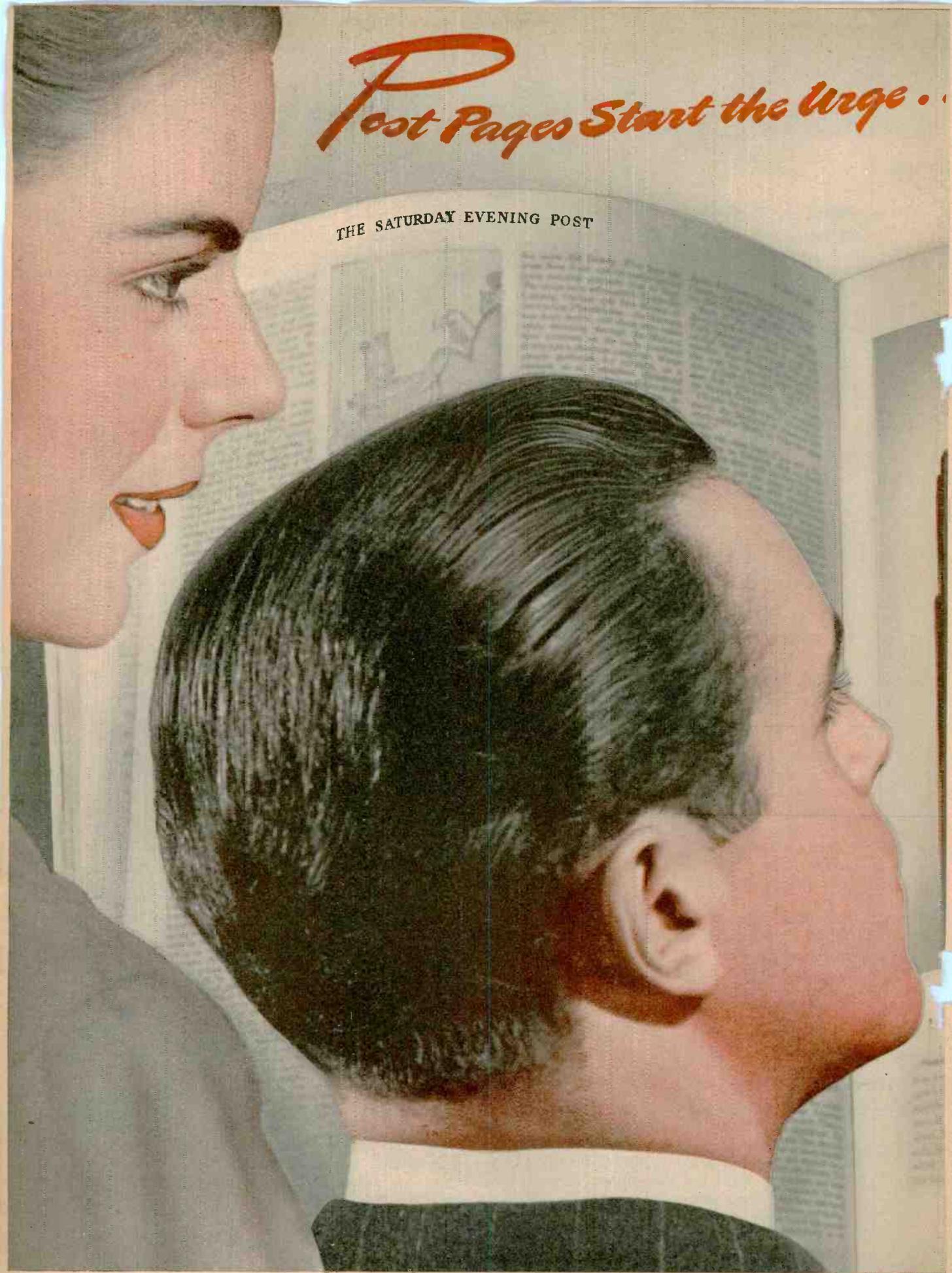
It now becomes apparent that wire and tape recording-playback units stand high as potential threats in some of the fields now dominated by recorders, phonographs and discs. We do not

propose to discuss the merits or demerits of wire-tape recording as compared with present phono-records, but dealers should avidly read whatever may be published on the subject in the future. For here is a new development that may eventually have huge sales and servicing potentialities.

*S. R. Lowan*

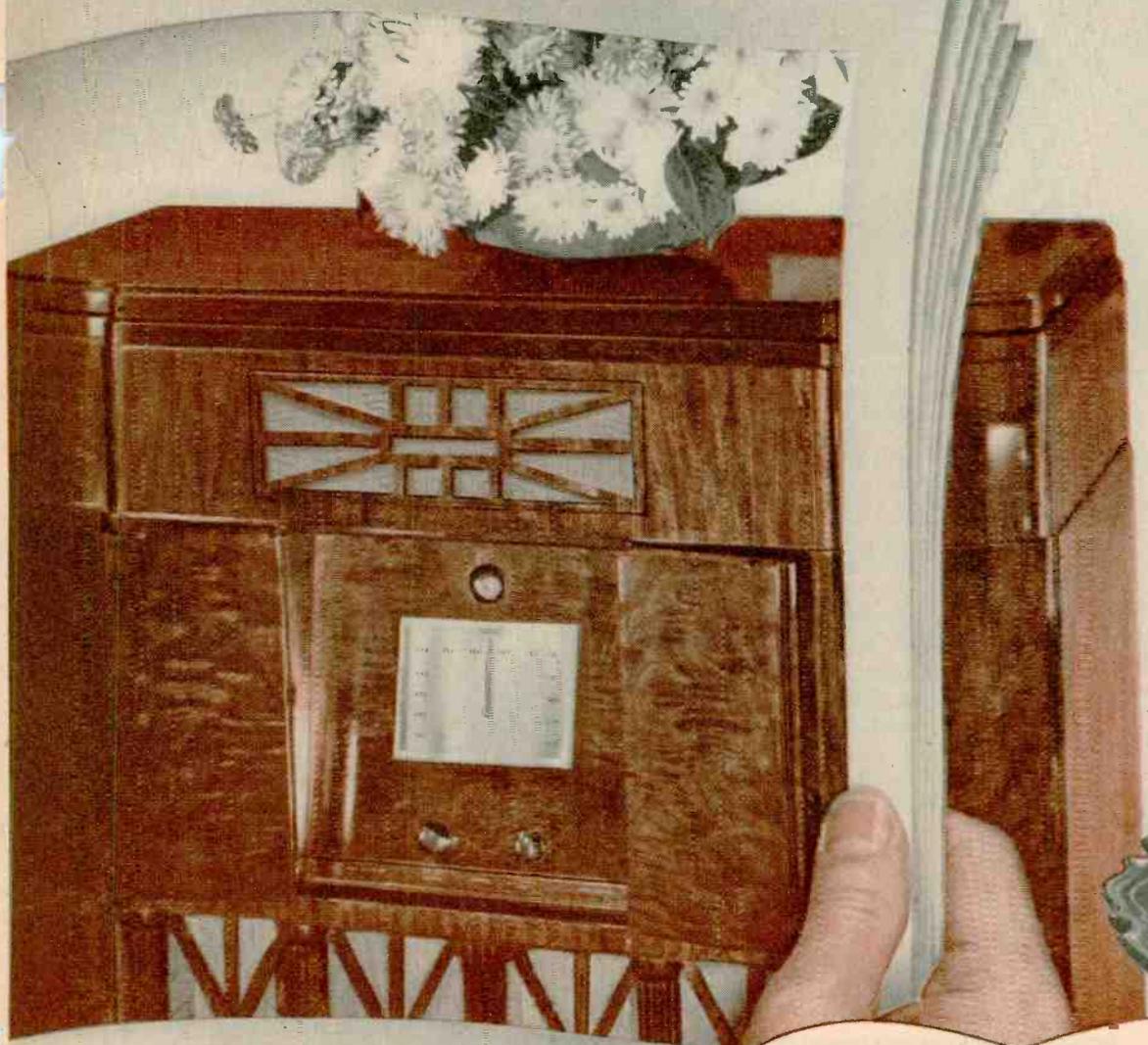
*Post Pages Start the Urge...*

THE SATURDAY EVENING POST



*... that Ends with Buying Action!*

THE SATURDAY EVENING POST



TONE TRUE AND STATIC FREE

*The "Urge to Buy"....  
originates on the pages of*  
THE SATURDAY EVENING  
**POST**

# In & Around the Trade

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



**Distributor appointments continue active. Sidney H. Rogovin, eastern regional manager, Admiral Corporation, stands by as contract for M. J. Fitzimmons Mfg. Co., Rochester distributors, is signed by Lindsay W. Morrison, sales manager.**

## "Hold" That Meeting

Organizations planning to hold conventions, conferences, trade shows or group meetings after February 1 "will have to show how the war effort would suffer if the meetings were not held," Col. J. Monroe Johnson, Chairman of the War Committee on Conventions, announced.

The committee approved the form of application required of organizations planning group meetings to be attended by more than 50 persons. Information required by the committee includes:

Whether the planned meeting is a convention, conference, trade show, or government meeting; the date and location of the proposed meeting and name of hotels or other facilities that

will be used; attendance planned, previous frequency of meetings; location and attendance of last previous meeting; average attendance at similar meetings before the war and during the war; from what area those attending are drawn; what steps have already been taken to curtail attendance; why the objectives of the meeting cannot be attained through "Conventions by Mail"; why a group of 50 or less to whom powers are delegated cannot transact the necessary affairs of the organization and in what way and to what extent the war effort would suffer if meeting were not held.

Other decisions reached by the committee include:

(1) Industrial, business, labor, fraternal, professional, religious, civic, social and governmental organizations

are included among those requiring permits,

(2) The issuance of a special permit to hold meetings of more than 50 does not guarantee transportation or hotel facilities or imply priorities for their use.

(3) The general exemption from the need for applying for special permits for meetings of less than 50 does not mean that the committee approved the holding of such meetings. It was emphasized that meetings of any size that directly or indirectly constitute a strain on transportation, housing facilities or other critical situations should be canceled immediately.

Application forms are available at all ODT regional and district offices, at most hotels, convention bureaus and from the national ODT office in Washington, D. C. All applications should be sent directly to Secretary Clare, Room 7321 Interstate Commerce Commission Building, Washington 25, D. C., where they will be reviewed by the committee.

## Substitute Tubes for Servicing

A Radio Tube Task Committee has been created to advise on methods for increasing production of radio receiving tubes, the War Production Board announced today. Requirements for 1945 are about 25 per cent higher than the 12,000,000 a month required in 1944, according to WPB.

At the first meeting of the committee, Harold Sharpe, assistant director of the radio and radar division of WPB, and Major William A. Gray, chief of the tube section of the radio and radar division, outlined future production requirements. The WPB officials reported that the Army and Navy are doing all they can to place orders promptly as an aid to facilitating increased production this year. The committee expressed the view that existing manufacturing facilities, if fully utilized, are sufficient to increase production to the extent required, in spite of the fact that the lower schedules for 1944 were not quite met.

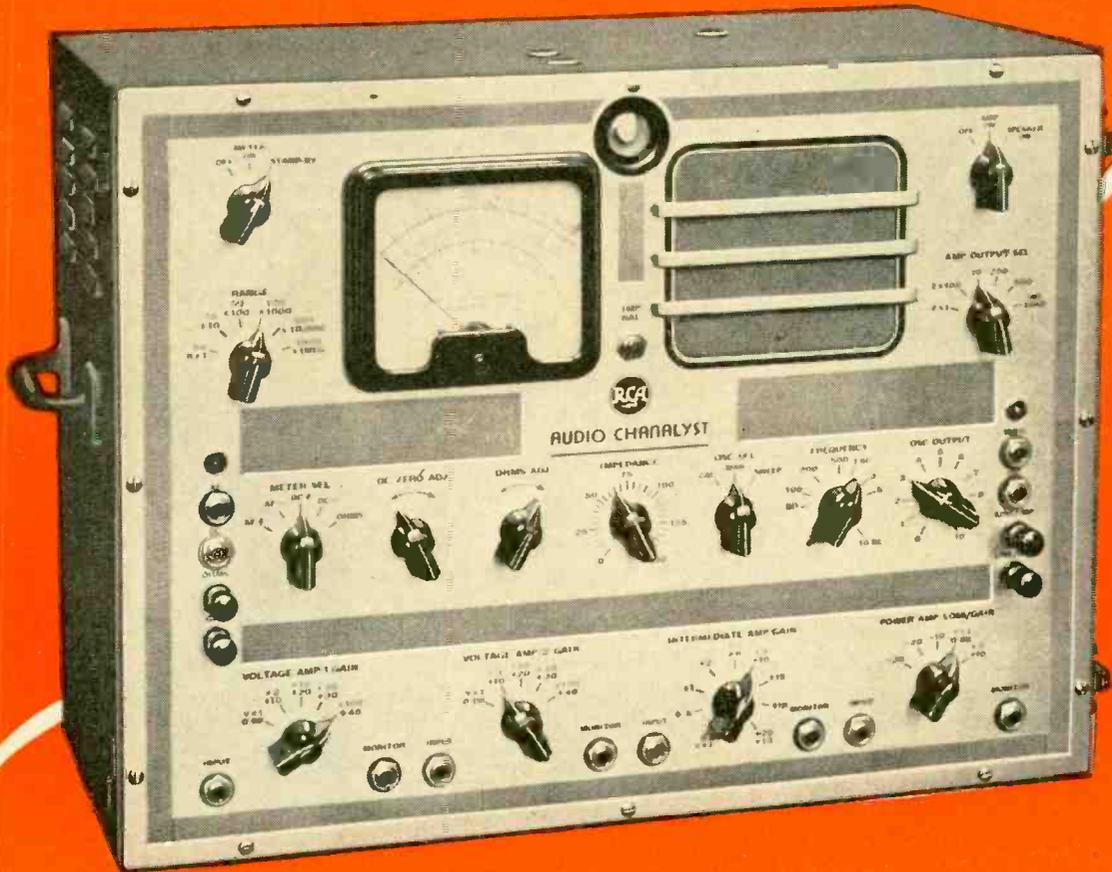
A part of this required increase, according to Bob Almy, manager, Sylvania distributor sales, must come from capacity formerly scheduled by WPB for civilian production. The "MR" directives issued by WPB during 1944 have been discontinued, and all scheduled tube production will be for war usage. This means that deliveries of "MR" tubes for civilian use may decrease to a new low. Some few tubes will be available for civilian replacement requirements, but the quantities will be limited.



**From the West Coast comes this photo of a luncheon meeting held recently by the Electronic Parts and Equipment Manufacturers Sales Managers Club, Western Division. One of the last meetings held before the "hold" order issued by ODT.**

[Continued on page 10]

*A complete, compact test-bench  
in a single unit!*



*...the new* **RCA 170-A AUDIO CHANALYST**  
that tests everything—from microphone to multiple speakers

Available on rated orders  
**FOR COMPLETE INFORMATION**  
Use The Coupon

Test & Measuring Equipment  
Dept. 110A  
Radio Corporation of America,  
Camden, New Jersey  
Please send me complete information  
about the new RCA 170-A  
Audio Chanalyst.

Name.....  
Company.....  
Street.....  
City.....State.....  
97-6136-110

● With the 170-A you can systematically test any sound system completely for failure to operate, weak output, interrupted operation, and distorted or noisy output.

● You can check the presence, absence, or character of a signal throughout its path—from source to load.

● You can check gains or losses, measure component values, and test the voltages of any item supporting or controlling the signal.

● You can narrow down poor performance to its cause, and locate the defective part in an amazingly short time.

● You can use it to solve signal-interruption problems by multi-channel monitoring.

● In an emergency, you can use the RCA Audio Chanalyst to substitute for defective amplifiers by bridging the signal through it, and thus around the defect.

**BUY MORE WAR BONDS**



**RADIO CORPORATION OF AMERICA**

RCA VICTOR DIVISION • CAMDEN, N. J.

In Canada, RCA VICTOR COMPANY LIMITED, Montreal

## In Trade

[from page 8]

It is suggested that radio service dealers keep in close touch with their distributors. Frequently, substitute types become available which, by the use of adaptors or rewiring of sockets, will serve as wartime expedients to repair receivers when the exact replacements are not available.

In this connection, the series of tube substitution charts which were published in the November, December and January issues of **RADIO service DEALER** should be referred to by servicemen for comprehensive data on substitutions for 150 ma. and 300 ma. tube types, and battery set tubes. In the March issue, the series of substitution charts will be completed with the publication of data on transformer and auto receiver type tubes.



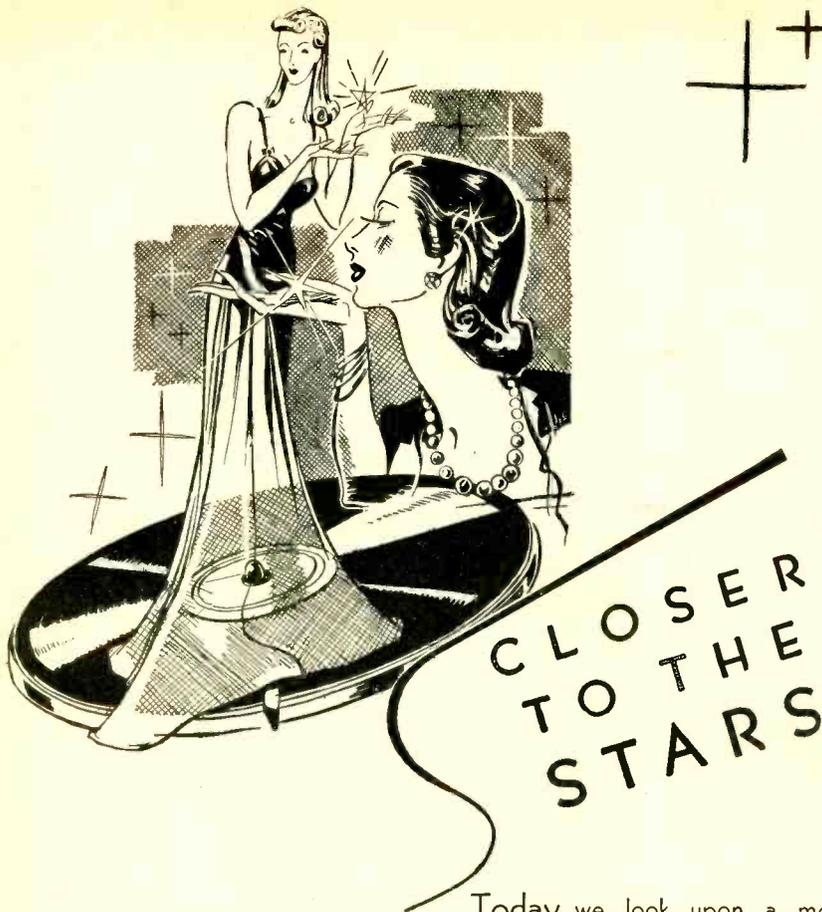
Claude J. Hendon

### Manager of Tube Sales

Claude J. Hendon has been appointed Manager of Sales in the Tube Division of the General Electric Company's Electronics Department, George W. Nevin, division manager, has announced. Mr. Hendon has been with the G. E. organization since 1927 when he was employed by the Edison General Electric Appliance Company in Atlanta, and a year later transferred to Chicago to become assistant sales manager for small appliances for the company. Mr. Hendon will headquarter in Schenectady.

### Mikes for Civilians

Universal in February will launch a series of full page ads announcing the new D-20 microphone, the company's first new product for civilian use since Pearl Harbor. Thirty days later it will announce complete technical details and photographs in the trade press.



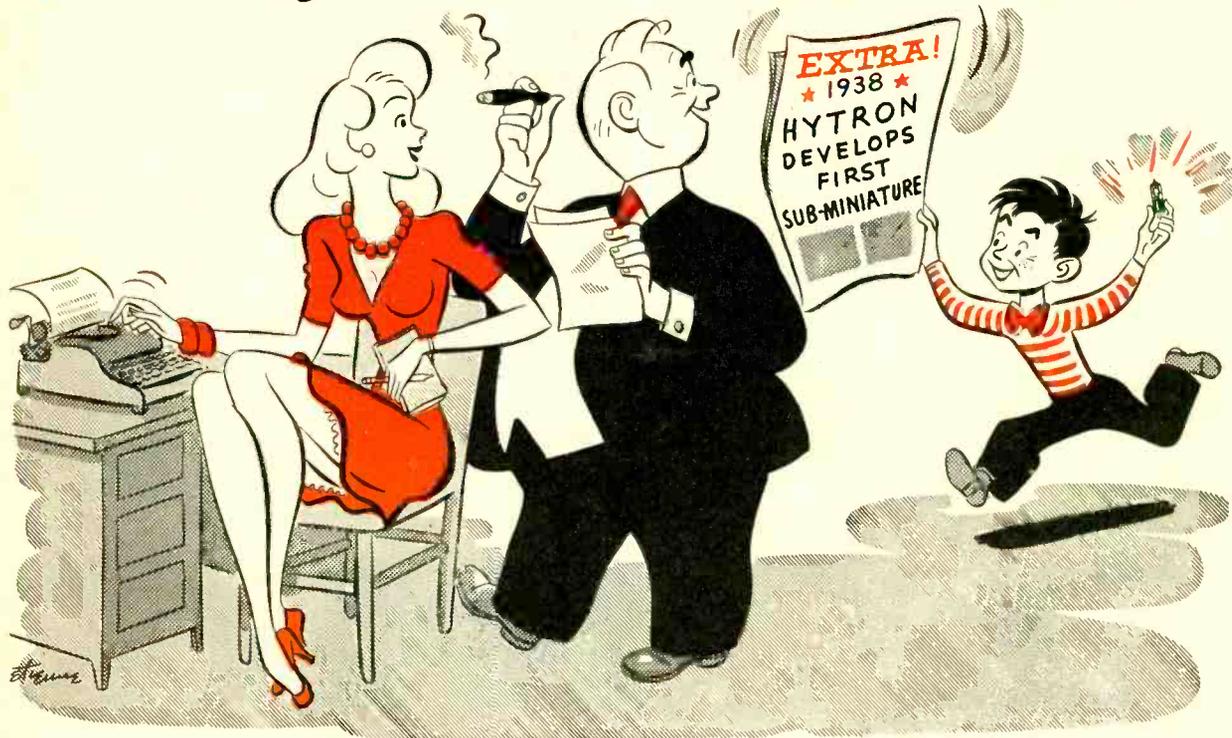
Today we look upon a moving, active, thinking world. Things are happening—fast. Science has rushed ahead fifty years. Dreams are becoming realities. Truly we are coming closer to the stars. The Astatic Corporation is a factor in this moving, living plan, and from Astatic research laboratories come new and improved products for a new era. Not the least important of these is a zephyr-light pickup for phonograph equipment, which will reproduce the living voices and the instrumental artistry of the entertainment world with a clarity, beauty and true-to-life realism heretofore unknown. As FM will contribute to the improvement of radio reception, so will Astatic sound detection and pickup products advance the fidelity of phonographic recordings to bring the great American audience closer to the stars.

*"You'll HEAR MORE from Astatic"*



1938

.. and again **THEY SAID IT COULDN'T BE DONE!**



**H**ytron's telescoping of receiving tubes to BANTAM GT size was at first considered impracticable. Development of the BANTAM JR. was another impossibility to be proved possible. This first sub-miniature was a tiny tube whose diameter was about that of your little finger—and it was a pentode at that! As a production tube it just didn't seem to make sense.

Encouraged by hearing-aid manufacturers eager to gain the additional sensitivity of the vacuum tube, Hytron sweated it out for two long years. Operators were trained to assemble the minute parts under magnifying glasses. A simple reversal of the conventional stem made baseless tubes possible. Problems of obtaining suitable vacuum with such small bulbs, were licked.

Finally in 1938, Hytron introduced the first successful sub-miniature. Tiny but rugged despite a hair-like filament and a diminutive mount structure, its low current drain and compactness made the BANTAM JR. a natural for all kinds of portable equipment, hearing aids, and military electronic devices. After the war, watch for even smaller and better Hytron sub-miniatures.

### HYTRON HYLIGHTS

BALLAST TUBE PROFITS FOR YOU



Are you getting your share of business on Hytron resistance tubes? Hytron makes the most complete line of exact replacement ballast types. The fast-moving types listed can be supplied to Hytron distributors within a week after receipt of order. (L-265 priority certification is satisfactory for replacement.)

- |      |         |
|------|---------|
| K42B | L49C    |
| K49B | L49D    |
| K49C | L55B    |
| K55B | L55C    |
| K55C | 10-610* |
| K80B | 100-70  |
| L42B | 100-77  |
| L49B | 100-79  |
|      | PB57*   |

\*Used only on Pacific coast.



OLDEST EXCLUSIVE MANUFACTURER OF RADIO RECEIVING TUBES

# HYTRON CORPORATION

ELECTRONIC AND RADIO TUBES

MAIN OFFICE: SALEM, MASSACHUSETTS  
 PLANTS: SALEM, NEWBURYPORT, BEVERLY & LAWRENCE

BUY ANOTHER WAR BOND

# No Tools Required to Install These ATTACHABLE SWITCHES for Mallory Volume Controls

THEY'RE easier to install than any other "off-on" snap switch—no tools are required to attach them to volume controls! That's why so many service men prefer to use Mallory Attachable Switches.

The Mallory switch designed for controls of 1½" diameter fits Mallory standard universal controls, carbon and wire-wound types, TRP tapped controls and Universal

dual controls. The Mallory switch designed for 1⅛" diameters fits Mallory MR, MK, UM, TM and DTM controls.

Both may be rigidly mounted without any bending or alteration of the volume controls. Both are available in circuit arrangements to suit any type of application. See your Mallory distributor!

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



<p><b>For 1½" Diameter Controls</b></p>	<p>To attach switch, remove dust-proof plate from back of control.</p> <p>ACTUATING ARM</p> <p>Turn shaft as far as it will go in clockwise direction.</p> <p>Make sure switch actuating arm is in proper position, as pictured.</p> <p>Insert tongue of switch into long slot. Press down, slide up slightly and switch will snap into place. Move back slightly to lock.</p>	<p><b>For 1⅛" Diameter Controls</b></p>	<p>Remove cover.</p> <p>Line up switch actuator of volume control with Letter V.</p> <p>Line up switch cam with Letter V.</p> <p>Line up guide rib on switch and on control as shown, press switch down tightly until switch tabs snap over ears on control cup. To remove switch, bend up ears.</p>
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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

# NEW MINIATURE TUBE PROMISES COMPACT RADIO, TELEVISION, PHONOGRAPH COMBINATIONS

Smaller home radio receivers and compact radio-television-record player combinations are foreseen as postwar possibilities as the result of new miniature electron tube developments in the laboratories and engineering departments of the Radio Corporation of America which were revealed at the winter technical meeting of the Institute of Radio Engineers at the Hotel Commodore, in New York City.

It was pointed out that the development of these tubes will complete the necessary complement of miniature tube types for home receivers, other required types having already been developed. Typical savings of 20 to 40 per cent in equipment size are made possible by the smaller size of the miniature tubes, some as small as your little finger, and comparable reductions in the size of other components. Today these tubes are helping to main-

tain instantaneous communications in a swift-moving global war; tomorrow they will help to provide improved television, FM radio, facsimile, personal radio, and other communications equipment.

The cathode-type miniature tube, now playing an essential role in military and naval communications, came into being shortly before our entry into the war. The "wedding" of the acorn type tube, developed by RCA as part of a program of research in the ultra high frequency field, and the filament-type miniature tube, developed and introduced by RCA in 1938, produced the first cathode type miniatures in 1940. The object of merging special features of the two earlier types was to combine the efficient high frequency performance of the acorn with the smaller size and lower cost of the miniature.

worth of equipment during 1944, as compared with a peace-time volume of radio products amounting to \$325,000,000.

Mr. Cosgrove appeared as guest speaker on the Mutual network radio program "Your America," presented by the Union Pacific Railroad Company, as the representative of the nation's radio industry and of the Radio Manufacturers' Association which he heads.

"In this country alone," Mr. Cosgrove said, "we produce more radio and radar equipment than our Allies and the Axis combined. In the United States, we have more than 60,000,000 home receivers, or more than half of all of the radios in the world. Forty per cent of all the broadcasting stations in the world are in our own country.

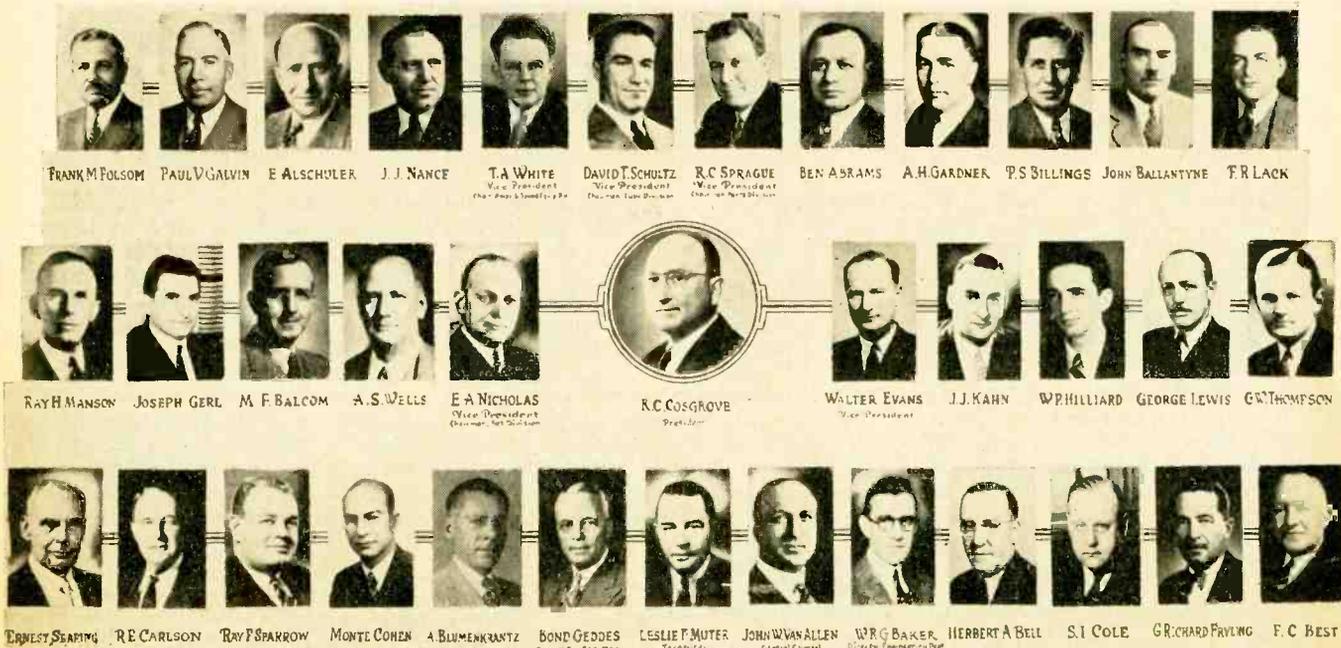
"How free of government interference and how great a public contribution the industry has been able to make is best indicated by comparison with other countries where most of the broadcasting is completely government-controlled or government-operated. In certain countries, such as England, one must pay a license fee to own a radio.

"After the war, this great industry will bring out finer radios and other electronics equipment because of the advancements and knowledge gained through our war experiences. The engineering departments of the leading companies in the radio industry have been enlarged greatly and the numbers of persons trained in the arts and sciences of radio have multiplied probably five-fold."

## BIGGEST RADIO MARKET HERE

Citing the tremendous contributions made to the war program by America's radio industry, R. C. Cosgrove, president of the Radio Manufacturers' Association and vice president and gen-

eral manager, manufacturing division, The Crosley Corporation, Cincinnati, declared on a nation-wide radio program today that the radio industry has produced more than \$4,000,000,000



Newly Elected Board of Directors, Radio Manufacturers Association, 1944-45.



Expands original store space (shown right) to handle large volume industrial motor and armature service and repair in addition to radios and appliances.

## DEALER Keeps Motors Going

**Dealer in war-plant area drums up new trade, expands appliance service department to handle volume motor and armature repairs.**

**W**ILLIAM VAN DOMELEN, owner of the Wm. Van Domelen Co., Menominee, Mich. (population 11,000) had always concentrated very heavily on selling in the past and as a result had built a fine sales organization which hung up some excellent records on radios, ranges, refrigerators and the like. Bill also had a fine service department prior to the war, and this helped keep his many customers satisfied and in a repeat frame of mind.

Always known for his keen merchandising ability, Bill Van Domelen did some tall thinking after Pearl Harbor. He reviewed his setup. He recalled his days at the big Allis Chalmers plant in Milwaukee where he had worked on electrical apparatus. Plus that experience he had

had years of sales and service on practically all electrical appliances sold to the public.

### Calls on New Trade

One day Bill got an idea of how he could help his country during wartime, and in so doing, help himself. He got into his car and visited the big mine owners in the Upper Peninsula of Michigan, as well as all large industrial plants in that area. He told the owners of such plants that he planned to set up an electric motor and armature repair works at Menominee, which he would handle in addition to his regular electrical appliance repair business. Would there be any chances of his getting some of their work?

The plant and mine people were

interested. They asked Bill how quickly he would be able to service them. He told them he thought he could give them one and two week service on most jobs, with three weeks as the limit on any big job. This was surprising. The best they were getting out of repair shops in larger cities was a month to two months' service. They agreed to give him a chance on a few jobs to see if he could make good on his promises.

Encouraged, Bill went back to Menominee and rented a big building from an automobile dealer for \$150 a month and got a long term lease. Then he switched his repair crew into the new quarters and readied his shop for the repair of big motors. Some of the crew continued to handle the appliance repairs that came in.

It wasn't long before the first industrial motors started to come in. Bill and his men worked hard on them, got them out in record time. The owners were pleased with the quality of the work and the speed of the jobs. More work came to the Menominee shop. Word began spreading about Van Domelen's organization and what it could do. Bill, in the meantime, had gotten his priorities from Washington and was all set to handle all the work for vital war industries in that region.

### Women Hired

As the work began to flow in, Bill realized he would have to increase his working force. He knew he would have a difficult time to get enough men to handle all the work, so he began to train women for much of the lighter work in the big shop. It was an intricate job to rewind a motor. Van Domelen claims his staff of women workers, now numbering more than 20, are proving themselves very adaptable to this type of work and the jobs they turn out are of the highest quality.

"They catch on quicker," he said, in pointing out that the average woman worker becomes an experienced hand with about 90 days of training. "They are more patient and scarcely ever does any one of them turn out a shabby or sloppy job."

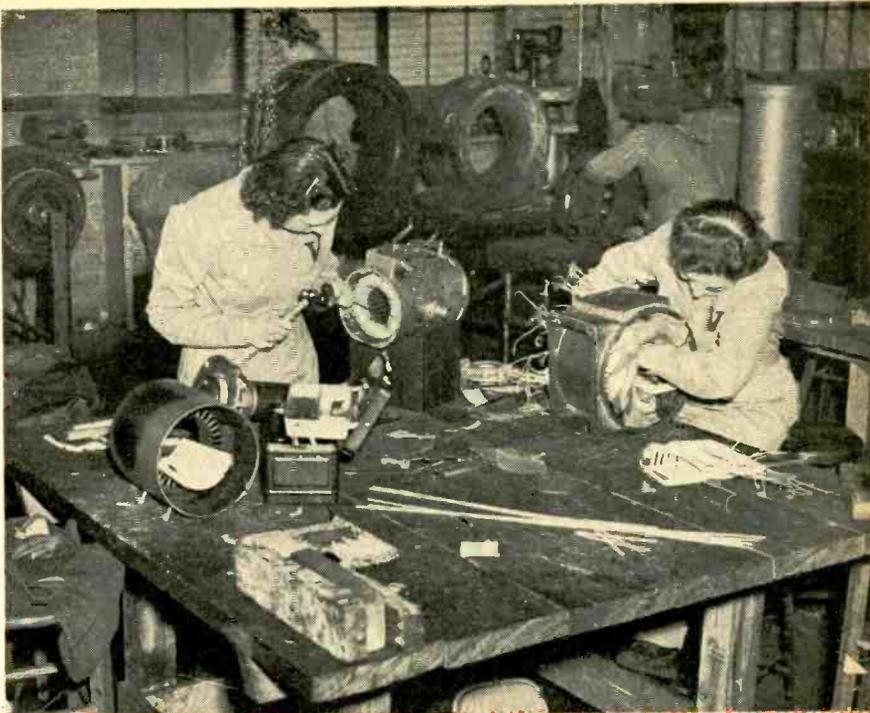
The staff of women workers was drawn from every walk of life. Some came from offices where they gave up operation of typewriters and other clerical duties in favor of a job at a work bench. Others are housewives who are helping to add to the family income.

### The Customers Deliver

Under its present setup the firm handles electrical motors up to 700 h.p. In one instance a city in northern Michigan had a transformer break down, throwing lighting and refrigeration and other power facilities there into chaos. The transformer was brought to Menominee by truck and Van Domelen and his crew worked 2 days and 3 nights on the job to complete it in record time. In another instance a 36-hour job resulted in keeping a Wisconsin shipyard from closing down. Van Domelen makes these big industrial plants transport their own motors to his plant and call for them when finished. He says he can't spare a single man for delivery.

"Our girl employees are so well trained at the present time that they can practically do all the rewinding," he says. "This leaves only the assembly for the men which helps us a great deal, for the women we have at the present time are very efficient."

"When there will be more appli-



Women are employed to rewind and rewire—and the men assemble—the heavy industrial motors being handled by this appliance service dealer.

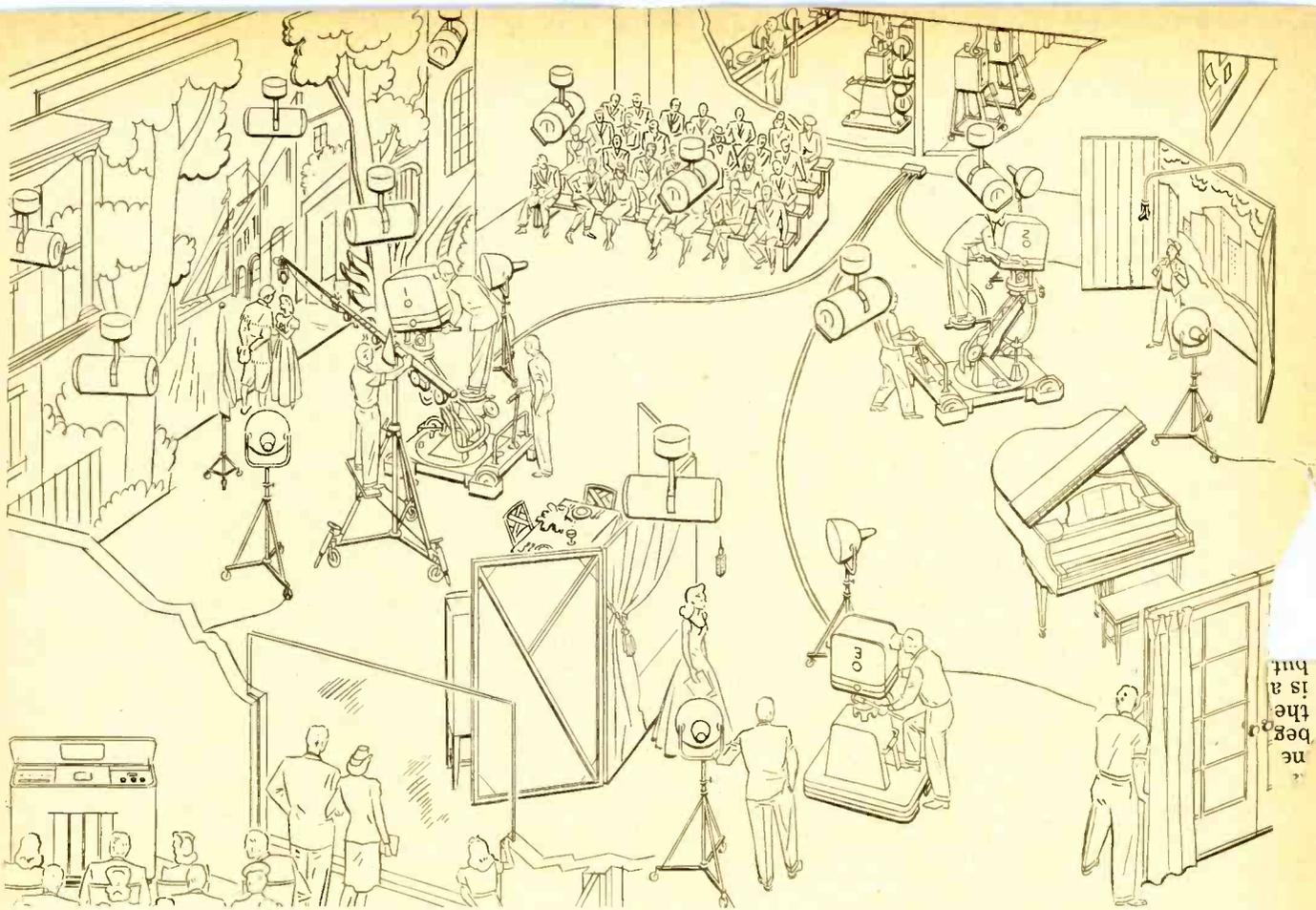
ances to sell in the postwar era," Bill added. "I am going to sell them. I expect that my industrial work after the war will drop to about 30 per cent of what it is today, and I want home appliance sales and service to fill the gap. We have sold more than 3,000 refrigerators to homes in this area and that means we have many satisfied customers. Right now, we service quite a few appliances in our shop and will continue to do so, as

we want to retain the good will of our customers and maintain contact with them. We are going to need their business when peace comes. In the meantime we are concentrating on the war business."

Last year the Van Domelen Co. did a gross business of around \$150,000 giving Bill a neat profit, because he had enough initiative and ability to capitalize on his assets when problems presented themselves.

100% active now, new trade in motor repairs will taper off to 30% of volume post war. Meantime dealer keeps good-will of customers for radio and appliance sales at end of war.





# "LIVE" MARKETS FOR

by **LEWIS C. STONE**  
*Managing Editor*

**Dealers will need intensive, aggressive efforts to sell television receivers. Growth of tele-market post-war to every home that now has radio depends upon initiative and showmanship of program makers.**

**T**ELEVISION'S biggest problem today is not one of engineering, but of intelligent programming, according to RKO Television Corporation (subsidiary of RKO Corp.). A great deal of experimenting has been going on in television programming during the past few years in an effort to develop what has become known as the "new technique." It is neither the technique of the motion picture, the radio nor the theatre—but rather an adapted combination of all three.

If (the statement continues) a situation can be presented more effectively with film than with live talent, then the camera should be used. If live actors can carry a situation to better advantage than film, then naturally they should be used. Perhaps combinations of both live talent and film might be needed to strike the right note. Only experienced showmanship can supply the right answer,

## 1. MAKING THE PROGRAMS

produce the right kind of programs to interest owners of home television receivers.

### **NATIONAL AND LOCAL TELECASTS**

Relay stations which will pick up programs from originating points in metropolitan centers will transmit them to local or satellite stations. With the addition of certain equipment (such as the General Electric "lighthouse" tube), satellite stations can broadcast locally-originated programs.

Certain newspaper interests who

plan to enter the television field have proposed supplying their cameramen with motion picture cameras to pick up events like ice carnivals, horse races, parades, ball games, special events and other crowd-gathering scenes. These items of local interest will be picked up on the spot and broadcast to owners of home television receivers in each community.

### **FEATURES AND SHORTS**

Another source of entertainment to owners of television home receivers is promised in the proposed "scrambling gadget" (details of which are

**NOTE**  
See also, "Television Survey—Year by Year"—in  
October, 1944 **RADIO SERVICE DEALER**

held confidential for the time being by inventor Dr. A. H. Rosenthal, and the Scopony Corp. of America). Subscribers to the service will get television showings of older feature and short films that had played all theatre accounts. Subscribers would pay around \$2.50 weekly. Differently cut patterns of celluloid or paper are to be issued weekly or monthly to paid-up subscribers, which they can insert in the unscrambling device. The device can be built in as a fixed part of any tele-receiver of any type, whether cathode ray tube, Skiatron,

supersonic, etc., or manufactured as a separate small attachment. The service will not interfere with reception of regular sponsored network radio or video programs.

### SHOPPING

Several prominent department stores already have applied for television permits from the FCC, and applications for other stores are being prepared. Television will be used by department stores as another advertising medium and to supplement local newspaper advertising.

According to Paul L. Chamberlain, of the General Electric Company, there will be two types of television for department stores and other similar establishments. One is a television-by wire system which will operate inside the store to feature any merchandise anywhere in the store through the use of television sets located at strategic customer traffic

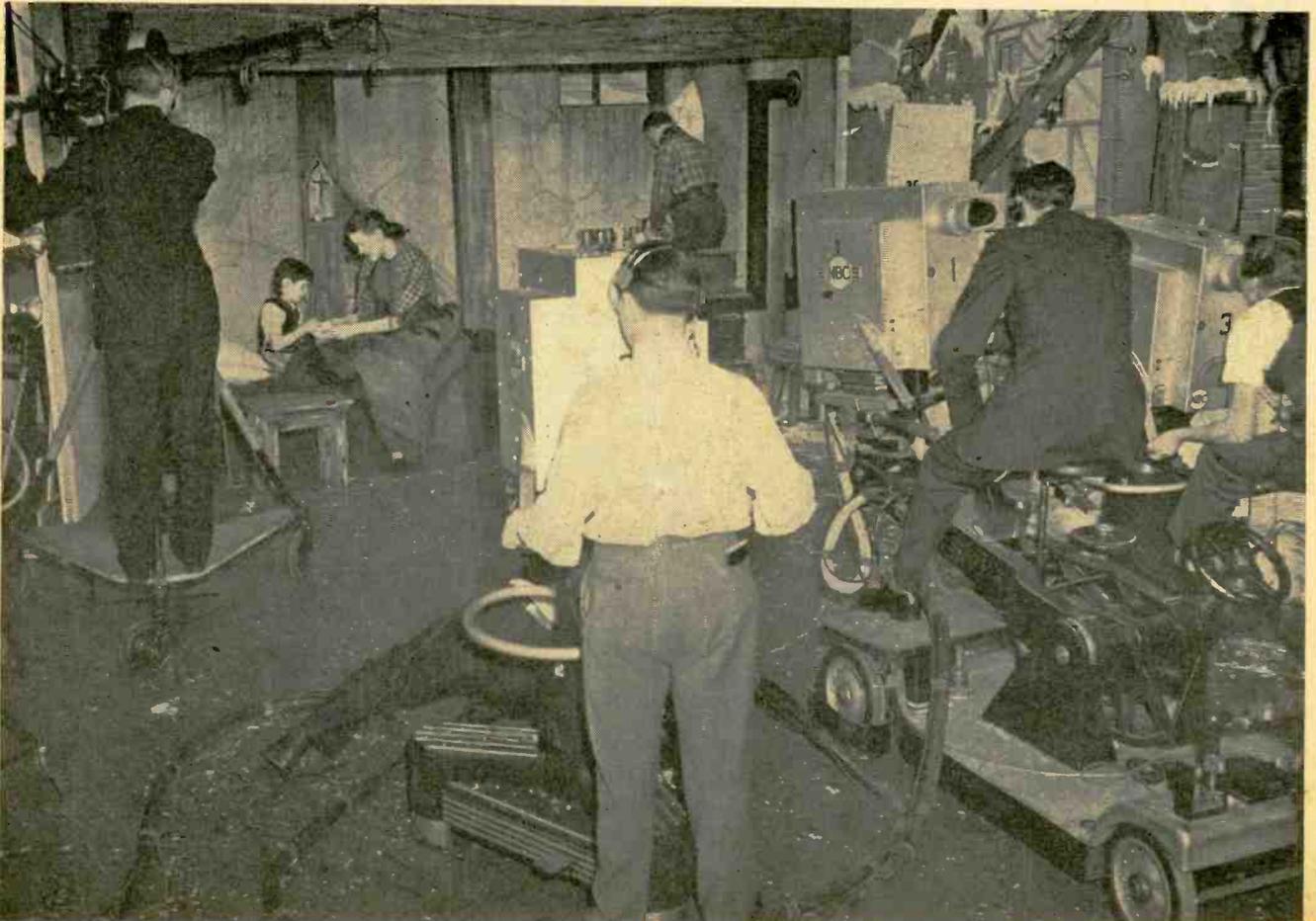
**Opposite:** Typical studio activity, tele-casting program from three stage settings, used in sequence. Below: Actual "take" calls for sound boom, long-shot camera (in center) and two mobile units for closeups. As cameras are operated light intensities are transformed into variations of electrical intensity and travel through the coaxial cable (on floor in foreground) to control room, thence to transmitter, and "on the air".

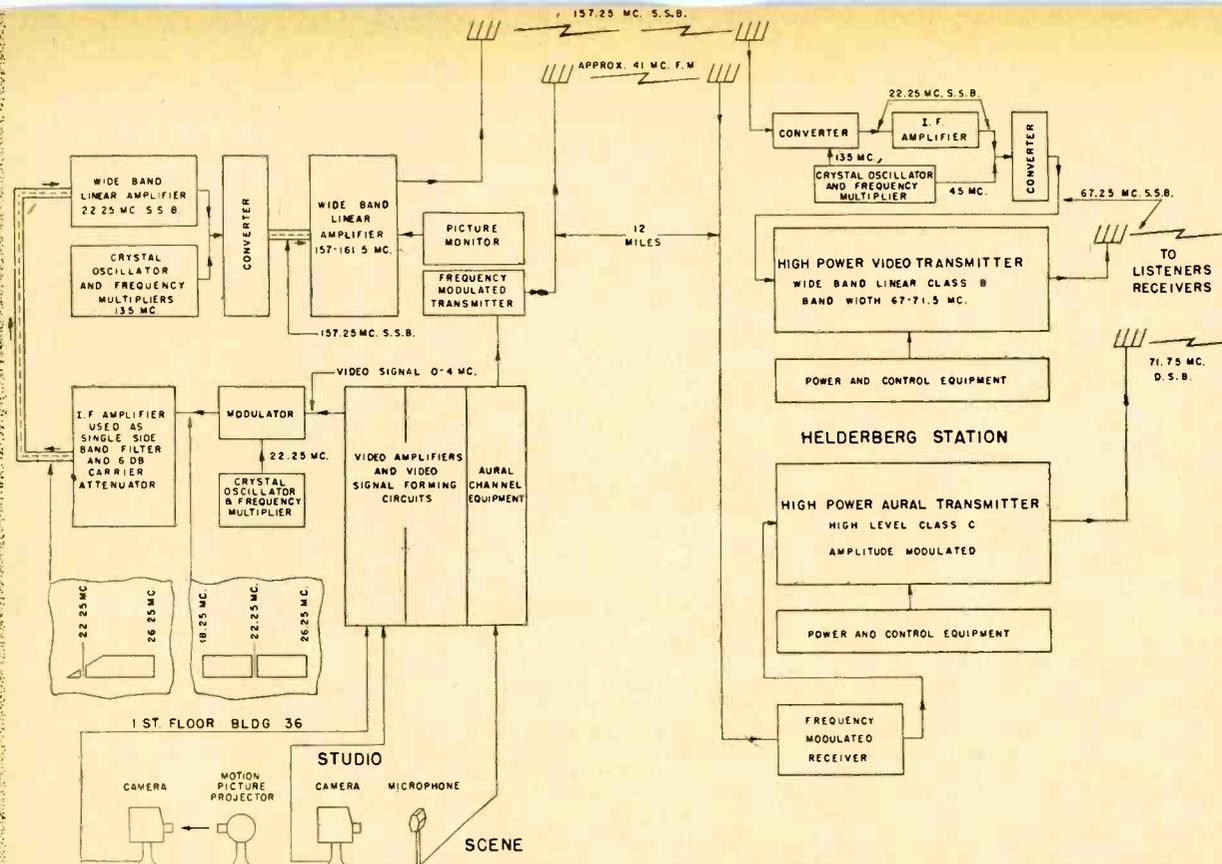


"Reaching" the market: Antenna of WNBT atop the 1280-foot Empire State building tower. Quadrants relay the audio portion of programs. Image signals go out from radial curved elements below.

spots in the store. The other is broadcast television, which will bring products and product demonstrations direct into the home.

# TELEVISION RECEIVERS





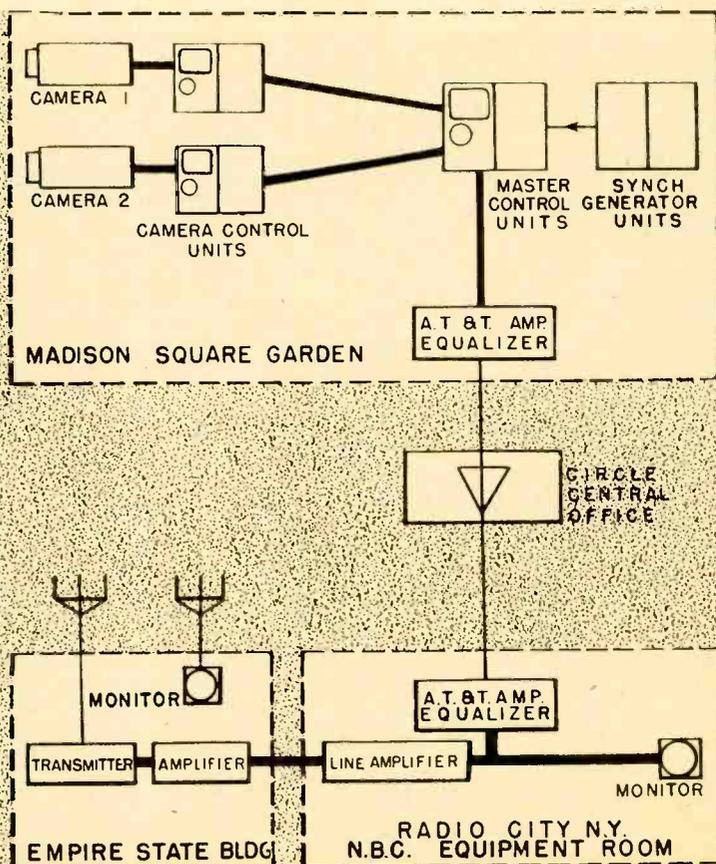
## 2. DELIVERING THE PROGRAMS

**W**HEN the nature of the material made it commercially necessary to transmit a single radio program to remote broadcasting stations, the long-line transmission circuits of the AT & T and affiliated companies were used. But television programs cannot be transmitted that way. Communications engineers have worked out a number of solutions to the problem of network tele-casting:

### RELAY STATIONS

Erection of new wireless radio relay stations to pass along programs from point of origin to the next transmitting station. By the installation of as many relay stations as may be needed, networks can be developed to cover any number of cities. Widely scattered television broadcasting stations can be reached with simultaneous television network programs by putting up the required number of intermediate television relay stations.

Top: How telecasting is "organized" in General Electric's station WRGB, in operation since 1939. Right: Layout of television remote pickup equipment.



## TELECAST COVERAGE

The AT&T propose to instal networks of coaxial cables in the following areas. Dates and cities selected are subject to change:

1945

New York-Washington

1946

New York-Boston

Washington-Charlotte

Chicago-Terre Haute-St. Louis

Los Angeles-Phoenix

1947

Chicago - Toledo - Cleveland-Buffalo

Southern Transcontinental Route

(Including Charlotte-Columbia - Atlanta - Birmingham - Jackson-Dallas-El Paso-Tucson-Phoenix)

1948-50

Southern Transcontinental (completion)

Washington - Pittsburgh-Cleveland

St. Louis-Memphis-New Orleans

Kansas City-Omaha

Des Moines-Minneapolis

Atlanta - Jacksonville - Miami

Los Angeles-San Francisco

Current opinion among many communications and television engineers is that the relay tower and the coaxial cable will make a combination that promises to "deliver" radio and television programs to nearly every home in the nation.

The television relay station is a simple tower on the top of which the relay equipment is enclosed. The antennas are large parabolic reflectors which concentrate the microwave energy into very narrow beams. These stations are unattended, and need only periodic servicing by field engineers. The equipment is reversible by remote control so that pictures and sound may be transmitted in either direction. The stations will be spaced within line-of-sight of one another across the country. The distances between relay stations will vary: between mountain tops they might be 60 miles apart, while on flat ground only 20 miles will space them.

Both the General Electric and the American Telephone & Telegraph

(continued on page 31)

## MEN OF (tele-) VISION

Some of the prize winners and what they did. Awards made at first conference of Television Broadcasters Association.

### GENERAL CONTRIBUTION

#### First Award:

Brig. Gen. David Sarnoff, on leave from the presidency of Radio Corporation of America. Citation: For his initial vision of television as a social force and steadfastness of his leadership in the face of natural and human obstacles in bringing television to its present state of perfection.



### TECHNICAL PIONEERING

#### First Award:

Dr. Vladimir K. Zworykin, RCA Laboratories, Princeton, N. J. Citation: For development of the iconoscope and the storage principle of picture pick-up, resulting in the first practical television pick-up equipment.



#### Coordinate Awards:

Dr. Peter Goldmark, Columba Broadcasting System, New York City. Citation: For work in the development of motion picture pick-up equipment and electronic analysis and control of equipment for color television.

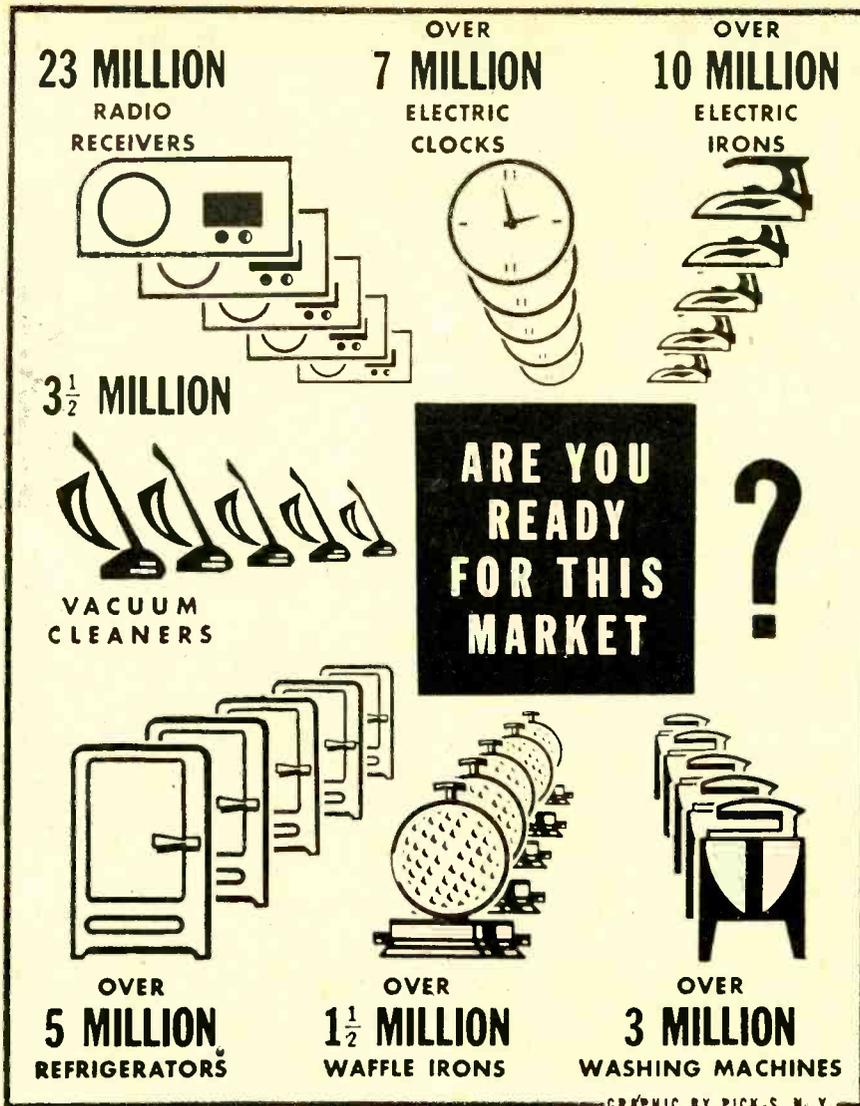


F. J. Bingley, Philco Radio and Television Corp., Philadelphia, Pa. Citation: For improvement in contrast of television pictures through flat face tubes and experiments on link operations particularly as regards outdoor events.



Dr. Allen B. DuMont, Allen B. DuMont Laboratories, Passaic, N. J. Citation: For the development of the cathode ray tube to a satisfactory commercial instrument of television control and reproduction.





Based on figures by Sumner Slichter

# ARE DEALERS READY?

by **WALTER FULLER**, *Chairman, Committee for Economic Development*

**Is THE MARKET represented by pent-up demand for radios and appliances really big? How long will demand last? C.E.D.'s Chairman discusses trend in national income, says, "Prepare now to sell, sell, sell as never before."**

**W**AR trading is so out of kilter, with every man in business able to sell three to twelve times whatever he's got on hand, that many are justified in being

puzzled about the future. They may well ask, "What's possible?" Several members of the Committee for Economic Development have from time to time undertaken to answer that

question in part. Sumner Slichter, Chairman of the Research Advisory Board, has given some figures on pent-up demand (see chart).

"How long will demand last?" is

**Almost as many radio receivers are in demand as the combined totals for the other appliances illustrated. Chart (opposite) prepared under supervision of Sumner Slichter, chairman of Research Advisory Board, Committee for Economic Development.**

a harder question to answer. Many people find it difficult to believe that the present income can be maintained at current levels. Therefore they are very pessimistic about the future.

In 1914 exactly the same pessimism existed. For example, some very outstanding men in business at that time are reported to have declared that while we would in that year have a national income of \$31 billions, our country could not stand an economy of those proportions. That figure, however, proved but a stepping stone from an earlier 1889 income of some \$10 billions.

And in 1919, only five years from the time we had reached a figure "we couldn't stand," the national income was at \$62 billions. The national average income from 1925 to 1929 was \$74 billions, with a low during the depression of \$59 billions. Dur-

ing the war period, however, an all time high average of \$106 billions has been reached and maintained.

Looking at the post-war period, then, we are not going to reverse this long time trend. Nobody will be satisfied with a level of \$75 billions after the war. Opinions differ, however, on what the figure will be. Some think \$125 billions. Others think that isn't high enough. Some estimate \$140 billions, others \$150, and some even as high as \$175 billions.

### **Selling Makes Markets**

There is a relationship between the level of national income and selling expenditure. Over the entire period of years analyzed in this study, selling expenditure has remained fairly steady, between 37 per cent and 42 per cent of the national income. So

perhaps the investment which goes into selling effort is the force which determines the amount of national income.

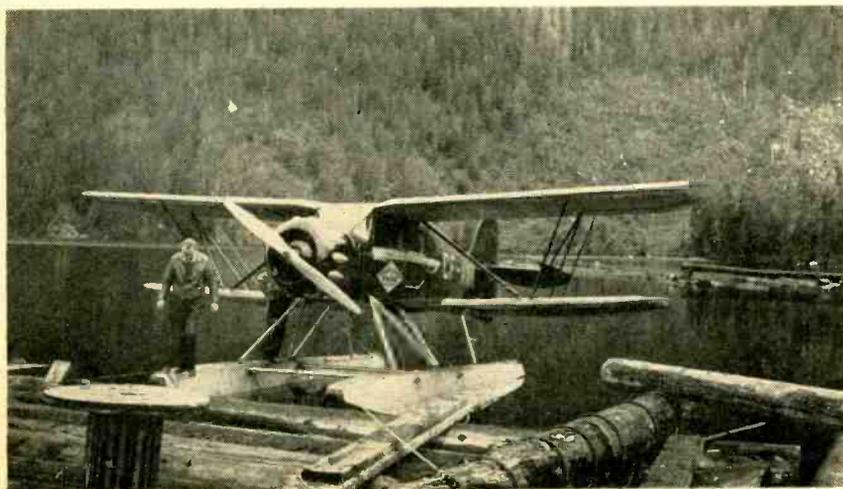
It is the responsibility of each and every businessman to prepare now to sell, sell, sell as we have never sold before. We must prepare to swing our gigantic war machinery quickly and efficiently, back to the production of the goods of peacetime living and then to sell those goods continually. We must prepare for a steadily rising standard of living. And that also is the job of selling. We must prepare for a return of opportunity in America. We must prepare for expanding jobs and rising payrolls. And these are the results of selling.

According to Neil Petree, prominent Los Angeles retailer and C.E.D. regional vice-chairman, dealers must go all-out for planning. *Alert and aggressive retailers should be studying now the necessary expansion of their facilities, the improvements in methods of display and the possibilities of branch operations, particularly as regards the service end of their business.*

## **Flying Radio Service Shop**

by S. H. COOKE

**Has British Columbia, Canada, inaugurated the first flying radio service dealer "shop"? Readers will perhaps write the editor about flying shops in the USA.**



**T**HE broken coastline of B. C. is said to spread out for some 7,000 running miles if we include waterways which stab into the coastline. A city radio service-dealer can worry along even with limited tire and gas priorities to bring in repair sets and deliver them. Along the rugged coastline from Puget Sound to the Alaska boundary is a large area, certainly a difficult one to service, even by water transport.

Spillsbury & Hepburn Ltd. of Vancouver, B. C., specialists in marine radio service and communication technicians who have had to double up their building capacity to take care of their ever-increasing directional finder and radiotelephone installation and servicing business, have found time a factor in the installation and servicing of various radiophone stations with sets they have built. While they still maintain water transport service connections, they recently added a Waco Cabin Biplane private flying radio service unit carrying stock parts and fitted with a complete repair shop for regular electronic service.

In addition to general marine radio installations and repairs, this firm has installed over a dozen new coast stations, and innumerable radiotelephone sets on board commercial coastwise fishing vessels, work-boats, tugs and deepsea vessels.

# The MULTI-TESTER

by OSCAR E. CARLSON

**HOW multi-range meters are designed, constructed & operated.**

## PART 4

For the Complete Series See Issues for October and December, 1944; and January 1945.

### MULTI-TESTER TROUBLES AND REPAIRS

With no other meter available to aid in checking, we still have test equipment. We have the meter of the multi-tester that we are to repair. This together with a few resistors, a power supply (or batteries) and some simple arithmetic, will enable us to do a good job of ascertaining the proper value of the replacement resistor.

R1, R2, and R3 (Figure 24) are a small portion of the total shunt so that to replace them properly a different "test" circuit must be used. R3 may be replaced and measured by circuit in Figure 26B, as may R1 and R2. Construct new R3 to be approximately 50 ohms and connect in circuit. Set switch of multitester to 10 milliampere range. Adjust 1500-ohm potentiometer of test circuit in Figure 26B until meter reads full scale deflection. Then shift switch to 100 milliampere position. Meter deflection should fall to 1/10 of full scale deflection. Tailor the shunt, R3, until with this set-up the meter falls back to 1/10 of full scale reading as described above.

To replace R2 proceed as above for

constructing R2. Make it about 5 ohms. Then with circuit as in 26B, but with the 3900-ohm resistor shorted, set switch to 100 milliampere position and adjust the 1500-ohm potentiometer for full scale de-

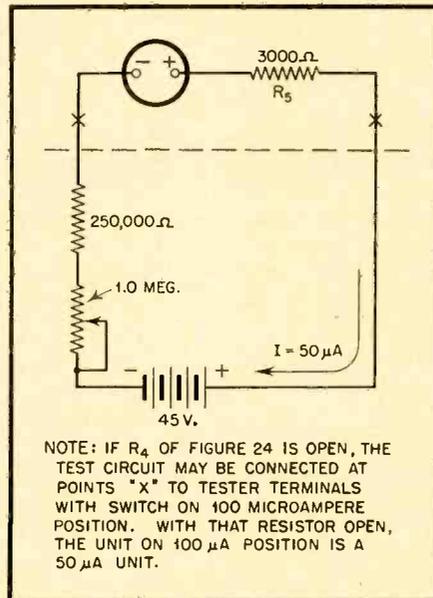


Figure 25

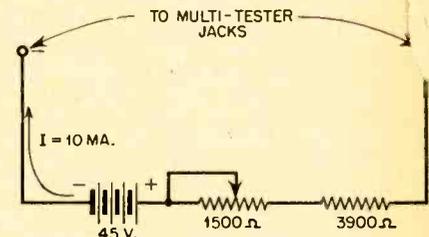


Figure 26-B

flection on the meter. Turn switch to the 500 milliampere position. This should cause the deflection to drop to 1/5 of the full scale deflection. Tailor shunt until that ratio is achieved. To replace R1 (Figure 26A), wind shunt of about 1.1 ohms. Then with circuit as for replacing R2, adjust R1 for same variation as for R2 above.

To replace R4 (Figure 24), the test circuit as in Figure 25 is used. This circuit is adjusted to limit current flow to 50 microamperes. With R4 replaced as in Figure 26A (but without changing the potentiometer adjustment) and switch at 100 micro-ampere position, the meter should read half-scale deflection. Adjust R4 until under the above condition half-scale deflection is achieved. The high voltage and high value of resistance of the test circuit in Figure 25 are chosen so that when connected as in Figure 26A the current will not change appreciably due to the altered resistance of the circuit.

If R5, the meter multiplier resistance, opens or alters value it may be replaced with a 2700-ohm carbon resistor filed to proper value. It can be checked as follows: Figure 27A shows a test circuit to allow use of meter alone as a voltmeter to measure 100 milli-volts. The potentiometer and fixed resistor make the voltage divider system across 1500 milli-volts, or 1.5 volt battery. Adjust potentiometer as in Figure 27A until meter reads full scale. Always

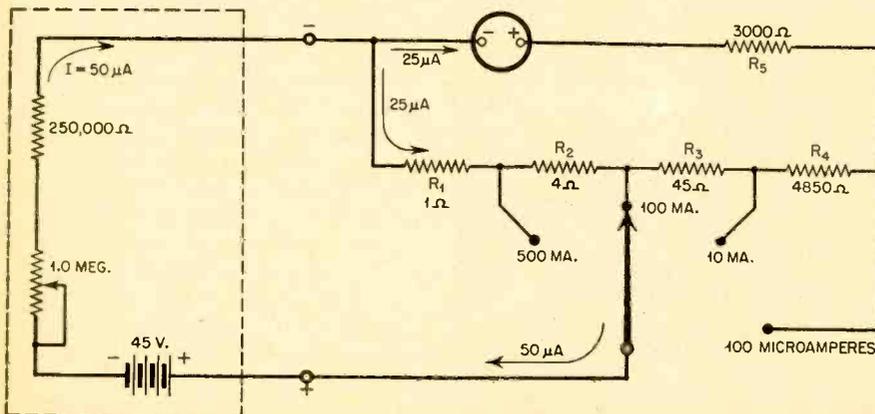


Figure 26-A

start by shorting the meter with the potentiometer. Then connect the replacement R5 as in Figure 27B. The deflection of the meter pointer should now drop to 2/5 of full scale as indicated by 4 on the 10 volt scale. With R5 of proper value the voltmeter combination of our test circuit is for 250 millivolts.

Figure 28 shows the DC voltage measurement circuit of the Simpson model 260. If any resistor changes values a group of 5% carbon resistors may, by selection for closest tolerance, be made to yield a replacement of very close tolerance. If R2 (Figure 28) fails, place voltage across terminals with switch in 2.5 volt position so as to get full scale reading. Replacement R2 should, when switch is at point for 10-volt scale, give 1/4 scale deflection for the 2.5 volts used to give full scale 2.5 volt range. This procedure

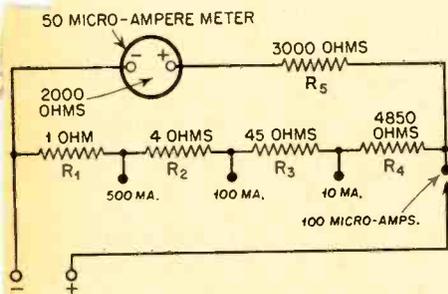


Figure 24

may be carried out for all resistors, R2, R3, R4, and R5 by using proper test voltage for a lower scale than the one for which the multiplier is being replaced. R1 may be checked by getting close correlation between the lowest three ranges. Of course, as described before, another voltmeter may be used to parallel this circuit and the resistors adjusted until both meters read the same.

The AC voltage scales may be treated the same way. Here the sensitivity is 1000 ohms per volt and the circuit is as shown in Figure 29. The resistors of the multiplier circuit for AC are consequently 1/20th of the value for the corresponding DC ranges. The Rectox rectifier unit, is not repairable but is easily replaceable with units purchased from the manufacturer of the multi-tester. Resistors R1 and R2 whose values are determined by the individual rectifier are shown in Figure 29 and come with the rectifier.

The ohmmeter circuits of the Simpson 260 are shown in figure 30A, 30B, and 30C. Referring to Figure 30A, with  $R_x$  equal to zero ohms, R1 is adjusted so that the meter reads full scale. The meter is in that circuit operating as a 0 to 1 1/2-volt voltmeter. To replace R4, the 11 1/2-ohm resistor, we first construct an approximate 12 1/2-ohm wire-wound resistor. To tailor that to 11 1/2 ohms requires precision

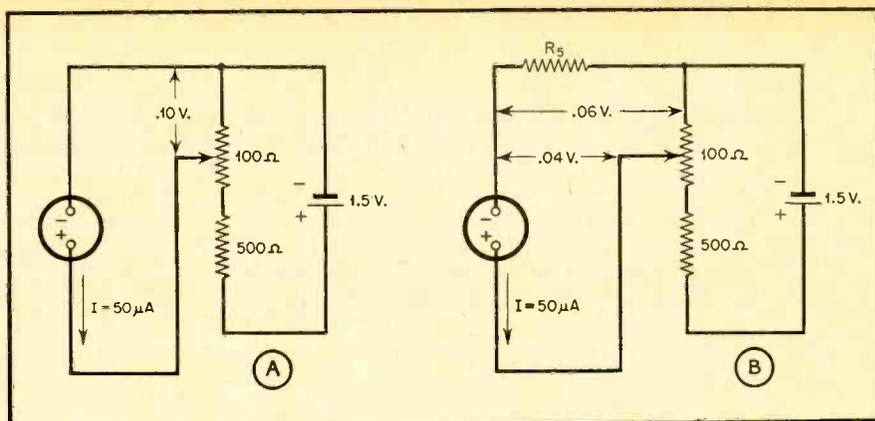


Figure 27-A-B

measurement which can be accomplished by using the current ranges as an ohmmeter. In Figure 24 we note the use of a universal shunt. With the test circuit in Figure 31 we may adjust the current-limiting resistor so that the meter reads full scale with the multi-tester switch on the 10 milliamper tap. On that range for full scale deflection we have flowing through the 50 ohm shunt combination, 10 milliamperes minus the 50 microamperes flowing through the meter. Or the meter and series resistor act as a 0 to 1/2-volt voltmeter.

If we now place our homemade resistor across the 45-ohm resistor of the shunt combination in Figure 24, the meter will drop back to some

other value. When the resistor is properly tailored to 11 1/2 ohms the meter drop-back will be to 2.92 milliamperes on the 10-milliamper scale reading. Under that condition the meter reads the voltage across not 50 ohms but across

$$(1 + 4) + \frac{45 \times 11.5}{45 + 11.5}$$

or 14.6 ohms. The meter will then indicate a voltage of  $.01 \times 14.6$  or .146 volts. The voltage is the current reading divided by 20. The current across the resistance is then  $20 \times E$ , or 2.92 milliamperes. The resistor may now be placed in its proper place in the ohmmeter circuit.

(Continued on page 36)

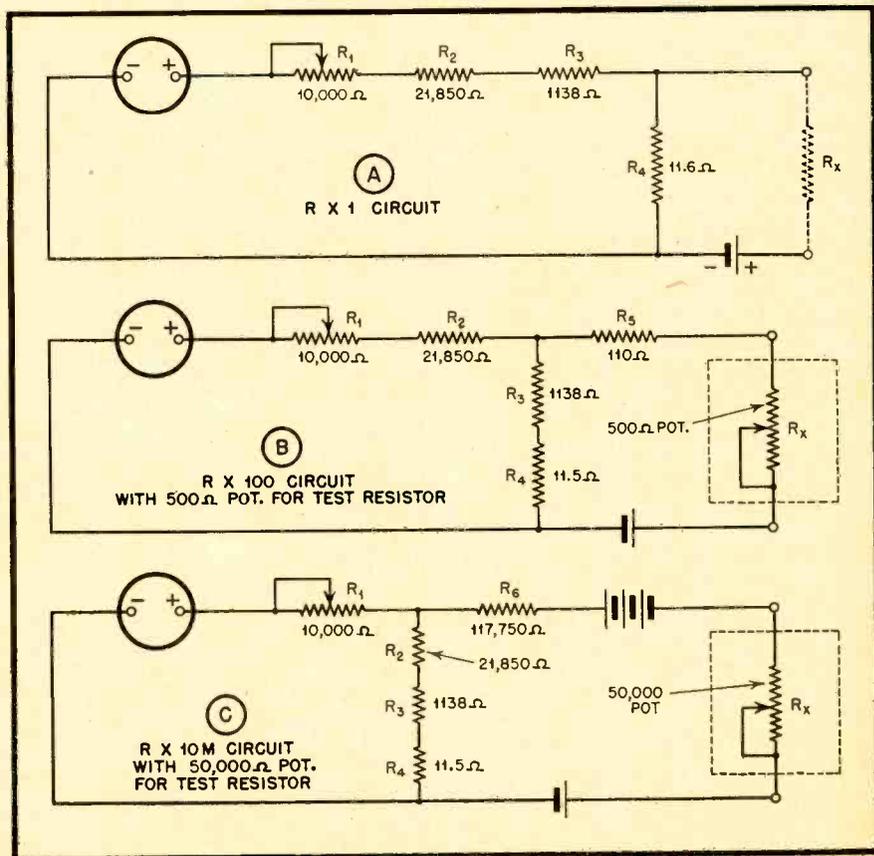


Figure 30-A-B-C

# How to Adapt Standard Receivers for Police Calls

## PART 2.

**A profitable sideline for servicemen now and post-war, in modernization of standard broadcast and auto receivers to pick up police programs on the assigned frequencies.**

### Oscillator Frequency

Assuming a police frequency of 2482 Kc and i-f of 260 Kc the method of adjustment is as follows: Set the signal generator to 2482 Kc. Set broadcast receiver to any convenient place on high frequency end of dial, say 1450 Kc. Couple the signal generator to the grid of the converter. Switch in adjustable coil. Move iron core of adjustable coil in and out until the signal generator is heard. The oscillator is now on the correct frequency and it should be possible to pick up police calls. However, it must be remembered that the converter input circuit is not tuned to resonance and the signal may be weak. How to tune the input to resonance will be described later.

### A Better Method

If an all-wave receiver with a shadowgraph or tuning meter is available in the repair shop there is an even better method of adjusting the oscillator frequency to the correct value. The antenna of the all-wave receiver is coupled very loosely to the oscillator coil of the set we are working on. If the oscillator is functioning properly it should be possible to pick it up in the all-wave receiver. As our desired frequency is 2482 Kc and the i-f is 260 Kc, our oscillator frequency must be either 2482 minus 260 (2222 Kc) or 2482 plus 260 (2742 Kc). To hear only one police station, 2222 Kc may be used. To make our tuned circuits track better so that we can tune anywhere in the band, the higher frequency should be selected. Generally, we will be called upon to adapt the receiver for one particular frequency only.

by **GEORGE ING**

**Chief Radio Engineer,  
Station KONO**

Once the desired oscillator frequency is determined a trial setting of the iron core of the adjustable coil is made. Tune in the oscillator on the all-wave receiver. Note its frequency from the dial setting. If the oscillator frequency is too low, screw iron core out. If still too low, decrease number of turns in the coil. If oscillator frequency is too high screw iron core in. If still too high, add turns.

As mentioned before, our converter input circuit is not tuned to resonance. And if there is an r-f stage ahead of the converter, it also is not in reso-

nance. These circuits may be resonated in exactly the same manner as the oscillator was, by paralleling the permeability tuned coils across the tuning inductances. However, it must be remembered that the oscillator circuit must be tuned to the correct frequency first. Then we work back towards the antenna.

If there is no tuned r-f stage ahead of the converter, only two simple switching operations are required to change from broadcast to short-wave. This is shown in Figure 3. The equivalent of the two single pole-single throw switches usually can be found on a one-gang band selector switch. The switch is mounted inside the receiver so that the leads will be short to both tuned circuits. If necessary, an extension can be placed on the shaft so that the switch can be mounted in the best position inside the receiver. To reduce noise pickup, the adjustable coil paralleling the conver-

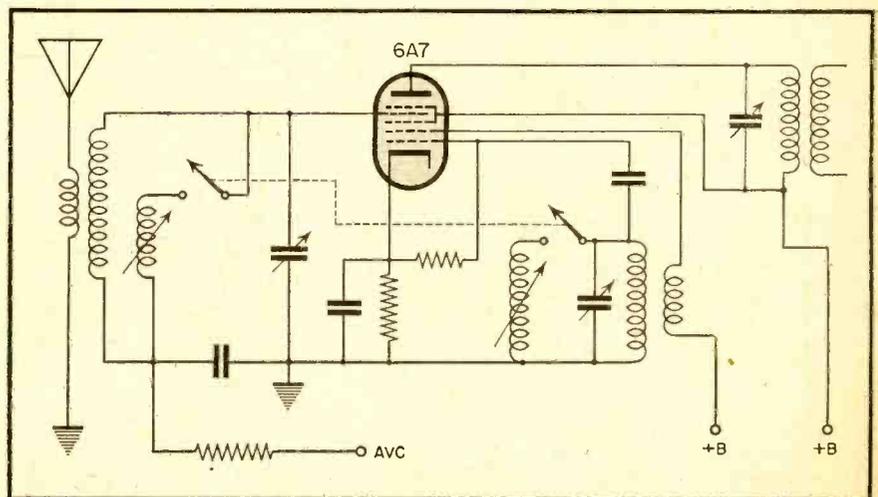


Figure 3

ter grid tuned circuit may be mounted in a small shield can. The leads of the added coil should be connected directly across the existing r-f coil. In most receivers the r-f coils go to ground through a condenser, in order to allow the AVC bias to be fed in through the bottom end of coil. If we ground our added coil instead of returning it to the bottom end of the existing coil, the AVC action for that particular stage will be eliminated.

Incidentally, if we refer back to Figure 1, showing a loop receiver, we can see that if this set had used the conventional antenna transformer input circuit instead of the loop, we could switch our adjustable coil across the secondary coil to receive police frequencies.

### Pushbutton Sets

Certain types of pushbutton sets can be altered easily to receive police calls. Receivers using tuned circuit substitution, that is, a separate fixed tuned circuit for each pushbutton, usually can be changed so that one pushbutton can be set on a police radio station frequency. A diagram of a typical receiver of this class is shown in Figure 4. It will be noticed that when the two-gang selector switch is in manual position the regular ganged variable condenser is used for tuning purposes. When the selector switch is in positions 1, 2, 3, 4 and 5, fixed tuned mica trimmers are in parallel across the r-f and oscillator coils to tune to the desired station. To receive police frequencies, inductances are paralleled across the fixed tuned condensers as shown by the dotted lines in the illustration.

If we have a "fortunate" combination of desired signal frequency and

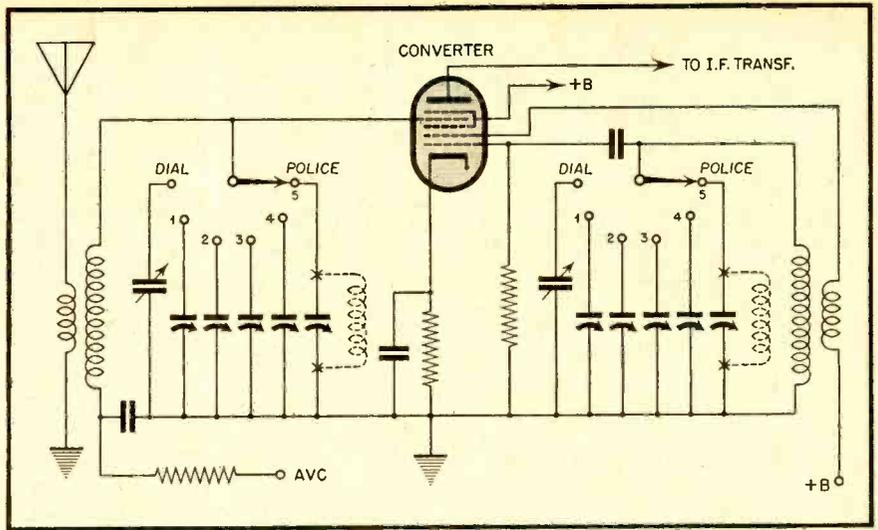


Figure 4

i-f frequency, it will not be necessary to parallel an inductance across the oscillator coil. Adjust the oscillator tuning condenser by the method described previously. (Set broadcast dial to frequency double the i-f frequency, less the desired frequency). After the dial is set to the correct position, adjust the r-f tuning. It may be necessary to do a little cutting and trying with our added r-f coil, but all fine tuning can be done with the trimmer condenser.

If it is necessary to increase the frequency of the oscillator, we must parallel an inductance across the tuned section of the oscillator circuit as shown in Figure 4. This inductance may be quite small physically—#30 wire on a quarter inch form having proved satisfactory. However, the inductance paralleling the r-f coil should be wound with Litz wire on a form at least one half inch in diameter

in order not to lower the "Q" of the input circuit too much. Be sure to scrape each strand of the Litz wire before soldering. (The adjustable permeability coils have not been specified here because the trimmer condensers already in the circuit may be used to tune the circuit).

In some pushbutton sets such as the Zenith 1740 used in Fords and the Philco MoPars, it will be found that instead of using trimmer condenser in the oscillator circuits, a separate permeability tuned inductance is used for each pushbutton position. In changing these sets select the pushbutton tuning to the highest frequency. In changing several Zenith 1740's to operation of 2482 Kc, it was noticed that the smallest oscillator coil would not tune quite high enough. Removing 4 or 5 turns solved this difficulty.

[Continued on page 38]

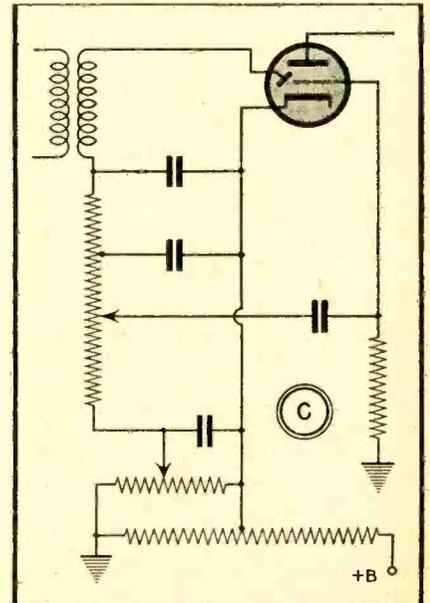
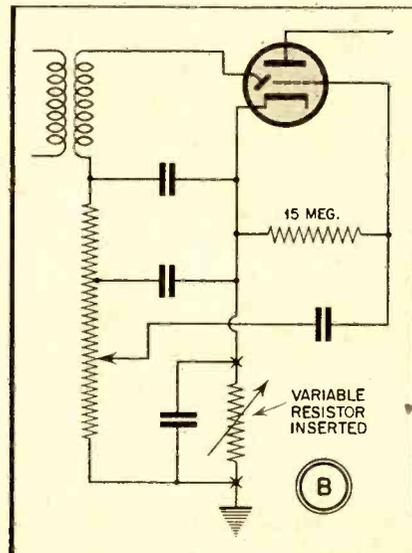
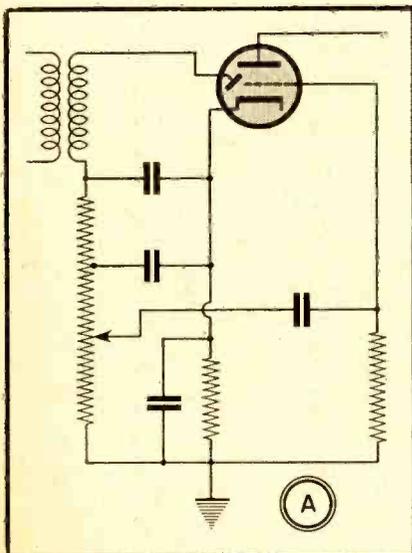


Figure 5-A-B-C

# REVIEW OF RADIO Tube Numbering System

**S**ERVICEMEN who have been in the business for many years and have grown up with the various tube nomenclature systems have little trouble keeping the numerous types straight in their minds. It may appear almost hopeless, however, to those who are just starting to work with tubes.

An explanation of the systems employed will probably be a big help to many of our readers and we hope that even those of you who don't need this will find a few interesting points.

## Prior to 1933

Originally, of course, tubes were assigned numbers like 201, 235, 246, etc., with certain companies distinguishing their products by causing theirs 301, 401, etc. This eventually became confusing so the figure in the hundreds place was dropped and those types became '01, 35, and '46, etc. These numbers had no connection with the tube characteristics. Type 35 was a 2.5 volt R-F tetrode; Type 36 was a 6.3 volt R-F tetrode and Type 37 was a 6.3 volt triode. Obviously some better arrangement was needed so a systematic method of numbering was worked out.

## 1933 to 1944

The type number assigned to any tube in this system consists of 3 or 4 groups as follows:

1. A figure group ....1; GT
2. A letter group ....A; 1;
3. A figure group ....1; 1;
4. One or more letters.LN;5;  
(sometimes) 5; T.

In the above examples 1-A-1, 1-LN-5 and 1-T-5-GT the first figure 1 means that the filament voltage is around 1.0 volts. The figures 1 or 5 in the third group indicate the number of useful elements. The letters in the second group are generally assigned in order as the types are brought out but may have a special meaning as described later. The final letters generally describe the mechanical construction or size which is also described later.

**A supplement to the series of Tube Substitution Charts which began in the November, 1944 issue. The more recent exceptions and rules in tube identification are covered. Substitution Charts will continue in March**

by **ENGINEERING DEPARTMENT, RADIO DIVISION,  
Sylvania Electric Products Inc.**

Similarly Type 6A3 is a 6 volt tube having 3 useful elements, in this case a power output triode. Type 6A4 is similar with one more grid terminal; it also has a third grid connected internally, but this is not counted as no connection to it is brought out.

This seems fairly simple, so far, but it started to get confusing when metal tubes were added. These have a terminal for the metal shell; therefore, this had to be counted, as it was useful for shielding, so a simple cathode-type triode became Type 6F5. In order to prevent confusion when a tube similar to Type 6F5 but in the glass bulb was announced, it was called Type 6F5G, although there really are not 5 useful elements. The G indicates a glass bulb on the recent types only (having the octal base). Unfortunately, there is no designation to distinguish the old glass types from the metal types. They have to be remembered or looked up. Type 6E5 is an indicator tube in a glass bulb with 5 useful elements. Type 6F5 is a metal triode with 4 useful elements plus a metal shell.

## Lock-in Types Added

The next additions were the Lock-In types in which the 6.3 volt tubes can be distinguished from the other construction by being called "nominal" 7.0 volt tubes such as Types 7A4, 7B8, etc. Similarly, the 12.6 volt tubes with nominal ratings of 14.0 volts are called Types 14A4, 14B8, etc. On some of the low voltage tubes, the Lock-In construction is indicated by the letter L as first

letter of the second group such as Type 1LN5, which is similar to Type 1N5, but of Lock-In construction (exceptions are listed later). This is not a general rule, however, because Types 1LN5 and 1N5, while very similar, differ in that the suppressor grid of Type 1LN5 is brought out to a terminal while in Type 1N5G, it is tied internally. Lock-In Type 1LN4 is similar to Type 1H5G, so it is difficult to see similarities between these groups. Exceptions; Lock-In Types without either "L" or "Nominal" Volts rating 1AB5, 1R4, 3D6 and 3B7.

The next development was the introduction of a single-ended metal and glass tube to compete with the convenience of the Lock-In types which have no top cap. Thus, Type 6SK7 is similar to Type 6K7 except that the S indicates that the base has been changed to allow all connections being made on the bottom. Similarly, Type 6SJ7 and 6J7; 6SS and 6S7. There are exceptions here too; Type 6SA7 is not like Type 6A7 because Type 6A7 has the old base, and no metal type with a top cap has been made similar to Type 6SA7. Converters formerly required one more connection than the eight available in single-ended construction, so a new type of converter had to be invented. It has 7 elements, including shell, and the S was added to show that it belonged in the group with the other single-ended types.

The next major change was the reduction in size of the bulb on many types like 6J7G. This was done just to get a smaller tube, and since the

characteristics were the same, it was called Type 6J7GT, the "T" standing for tubular bulb. This resulted in a tremendous number of types and to reduce the number required in stock, it was decided to mark the small tube Type 6J7GT/G, meaning that it could be used in place of either Type 6J7G or 6J7GT.

### First Numeral Group

In assigning these numbers to tubes, it was hoped that certain letters would be associated with particular characteristics, but as more and more tubes were brought out, exceptions were found necessary. A few of the rules with their exceptions are:

0—Cold Cathode—br requiring no heater supply.

Exception: 01A (contracted from 201A).

1—Filament volts between 0.1 and 2.1 volts.

Exception: IV. (from the earlier systems)

2—Filament volts between 2.1 and 2.9.

Exception: 2.8 volt battery tubes were marked 3A8, 3LF4, etc.

3—Filament volts between 3.0 and 3.9.

5—Filament volts between 5.0 and 5.9.

6—Filament volts between 6.0 and 6.9.

7—Filament volts between 7.0 and 7.9, etc., after 25 volts actual value given.

Note (1): When heater or filament is center tapped for use in two voltages, the higher voltage number is used. Exception: Type 6Z5 may be connected for 12 volts also.

Note (2): On Cathode Ray types this first number refers to the screen diameter in inches.

Note (3): 7 and 14 are "nominal" ratings; operation should be at 6.3 and 12.6 volts.

### The First Letter Group

The letters U, V, W, X, Y, Z—commonly are used to indicate rectifiers.

Exceptions: Type 6U7G, 6U5, 6U6GT, 6C6G, 6V7G, 6W7G, 6Y6G, 6Y7G, 6Z7G, 7V7, 7W7 and 14W7.

S—as first letter of the letter group indicates single-ended tubes, related to grid-cap types.

Exceptions: Type 6S7, (but 6SS7 is single-ended), 1S4, 1S5, 7S7, these are single-ended but could by their construction be no other way.

### Third Group

Numbers 1 to 8 designate number of useful elements brought out to terminals.

Notes: (1) In metal tubes, the shell counts as one element.

(2) In Type 6A5G, heater and cathode are tied internally, as well as brought out, counting as two elements.

(3) Shielding by or in base does not count as an element.

Exceptions: On some types the heater tap or the shielding lug has been counted as an element—Examples 7G8, 28Z5, 3D6, 7C4, 7E5, 3B7, 7V7, 7W7, 7A8, 35Z5GT, etc. The reason this rule has so many exceptions is that there has been no general agreement on the inclusion of filament center taps, shielding lug, suppressor grids when tied internally and split screens as useful elements.

### Double Letters in Second Group

Combinations like AB, AC, AD, and AE were used when all the single letters were used up.

Rules: L preceding another letter means Lock-In construction—Example 1LN5.

S as second letter of the group indicates single-ended construction previously explained.

P as second letter of the group is for cathode ray types—Example 3BP1.

### Final Letter Group

A—Quick Heating—Old types like 24A. Reduced filament current as in 01A, 112A, 01AA. Smaller bulb size—as in Type 6L6GA. Also used for other minor changes which in general do not affect interchangeability.

E—Minor construction change to make tube suitable for export. (Seldom encountered in American sets).

G—Glass bulb ST-12 size to ST-16.

GT—Glass bulb T9 size.

GT/G—Glass bulb T9 size. Interchangeable with G and GT types.

H—Horizontal assembly—example 1F7GH.

H—Heater type construction when originally made as a filament type—as 2A3H.

L—Lock-In construction but with octal base and standard octal connections.

LA—Not really a final letter group as the tube was originally called LA.

LT, ML, LM—Glass or metal tube fitted with a Lock-In type base.

MG—Metal-glass construction—a glass tube enclosed in a metal shell.

P—Pentode Construction—as in 1B4P.

S—With shield sprayed or soldered on. (Generally as supplied for Majestic replacements).

T—Tetrode Construction—as in 1B4T.

T—Special construction for use in transmitters—as in 210-T.

V—Vacuum—example 83V (As different from mercury vapor).

V—Vertical Assembly—example 1F7GV.

X—Low Loss base for H-F use (Ceramic).

Y—Low Loss base for H-F use (Phenolic).

Whenever possible, the 12 volt equivalent of a 6 volt tube has kept the same letters. For instance, Types 6A8GT and 12A8GT are identical ex-

cept for heater rating. There are a few exceptions to this:

7C7—14C7—Similar but not exactly the same.

7A5—14A5—Similar but not exactly the same.

6A7—12A7—Nothing similar.

6A5—12A5—Nothing similar.

6B8—12B8—Nothing similar.

6C8—12C8—Nothing similar.

6B7—12B7—Nothing similar.

### Third System—1942

A third system has been added recently due to the large number of new types developed for military purposes. Complete details of this cannot be listed since the system includes a letter which indicates the purpose or classification of the tube. These new designations all take the form of 1-T-21 in which the initial figure 1 shows that the input wattage to the cathode is between the minimum and maximum values of 0 and 10 watts. The T designates whether the tube is an oscillator, power amplifier, etc.

The following letters have been assigned so far:

A—Single element tubes—ballasts, etc.

B—Rectifiers—full and half wave Regulators—spark gaps, etc.

C—Triodes—including three element gaseous tubes.

D—Tetrodes—including four element gaseous tubes.

E—Pentodes.

F—Hexodes.

G—Heptodes.

H—Octodes.

L—Vacuum sealed capacitors.

N—Crystal detectors and rectifiers.

P—Photo emissive tubes.

R—Mercury pool rectifiers.

S—Vacuum sealed contactor type switches.

Some letters are also reserved for groups of tubes which at present are only made for military use. Originally this system was set up by the RMA to take care of transmitting and special purpose tubes but the dividing line is not very sharp so we can expect that some tubes from this series will eventually be used in receivers. Where new receiving types can be fitted into the older system they will of course be added.

The final numerals start with 21 and go on up as more types are developed. This number (21 or higher) serves to distinguish tubes of this nomenclature system from the preceding groups and also provides all the room for expansion that should be required for some years to come.

This article can not be considered as absolutely complete and accurate because of the number of exceptions that have been made and the length of time covered. We believe, however, that the most important rules and exceptions are correct and will be of assistance to servicemen in understanding tube type numbers.

# Refrigerator Dealer **BUSY on SERVICE**



**Specialist in refrigeration and cold storage locker plants handles own and outside repair jobs. Reconditions and sells domestic models.**

by **A. N. NOLAN**

**W**ARTIME service demands have stepped up the activity of James Skibba, owner of the Watertown Appliance Co., Watertown, Wis. Not only does he handle his own work—chiefly refrigeration service, both domestic and commercial—but he is getting more and more dealer work from this area. Other shops, losing their service men in war work and to selective service, gladly give him all their refrigerator repair and service work. Besides himself, Skibba now has only a part-time helper. Consequently he has to work far into the night in order to take care of old and new customers.

### **Gets Priorities**

Skibba tries to do as much refrigerator service and repair work as possible in the homes of the owners. His charges are \$1.25 for a call (minimum) regardless of how short the time may be. On jobs where he works an hour or more the charges are \$1.50 an hour for labor. Skibba covers about 1,500 miles monthly with his service truck, in about a 20-mile radius. So far he has been getting enough gasoline from his local ration board for this purpose, the officials apparently realizing he is one of the few men in the area who can perform this service work.

Finished with his daily outside service calls, he returns to his shop and tackles some of the bigger repair jobs which had to be taken in. There are many of these to-be-repaired jobs at this time.

"Nowadays, because I am short of help I don't encourage refinishing of refrigerators unless absolutely necessary," says Skibba. "I have so many mechanical repairs to make that I tell folks we are trying to get as many machines working as possible, in order to be fair to all. If I had one more qualified man we could perhaps handle such refinishing work, as there is much of it to be had."

Skibba is gratified with the large number of satisfied customers he is making. During his 6 years in business he has established a reputation for quality work. He will not sell domestic refrigerators because he gets service work from other dealers. However, he has sold commercial units and will continue to do so after the war.

This operator has the necessary priorities on handling commercial refrigerator repairs. He says that his work takes him into bottling plants, locker plants, bakeries, drug stores, groceries and many other commercial establishments.

Before the outbreak of war, Mr. Skibba also sold and installed locker plants. He helped in the layout, furnished the machinery and the lockers. At the present time he services a number of cold storage lockers plants.

After the war, Mr. Skibba plans to develop this field considerably. He believes that there will be many more locker plants installed in Wisconsin and that he can get a number of these jobs anywhere in the state.

### **Reconditions and Resells**

"I feel quite certain that the post-war era will bring good business for appliance dealers," he says. "At the present time I have many orders for refrigerators. I also look for continued good service business on refrigerators and other appliances after the war. Right now I often buy used electric refrigerators and recondition them for resale. Because there are ceilings on such items, it all depends on how reasonably I can buy the used machines. If I have to pay too high a price, I don't monkey with the job, for there will be no profit in it for me."

While Skibba specializes in refrigeration repairs, he does repair other appliances also, mainly washing machines and vacuum cleaners and some other items.



## A NEW STAR IN THE ELECTRONIC FIELD

The stage is set for something new in Universal's line of products. Next month will bring the appearance of a new microphone to meet markets made by present and postwar demands. This will be the first microphone of its kind offered by Universal since the War. Universal has, since before Pearl Harbor, been manufacturing microphones and electronic voice communication components for the U. S. Army Signal Corps.

We are still pleased to manufacture all the microphones our fighting men require and we are pleased to make a new microphone to fill their and essential home front needs.

← Emblems of quality in war production

**UNIVERSAL MICROPHONE COMPANY**  
INGLEWOOD, CALIFORNIA



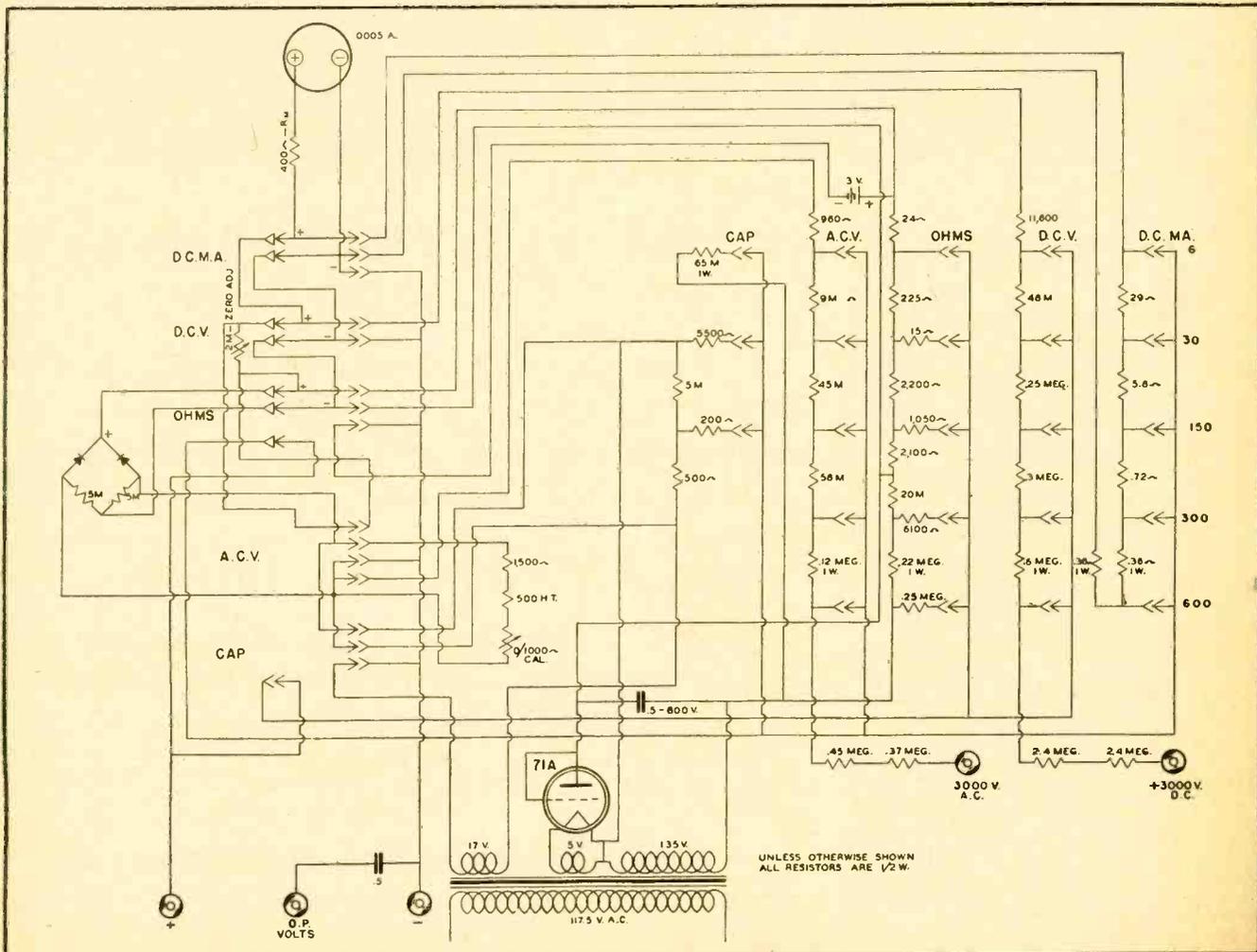
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# Technical Service Portfolio

Section XLVI

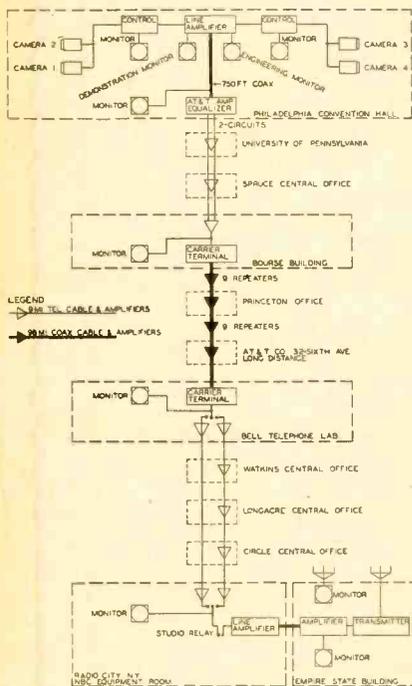
## TEST EQUIPMENT CIRCUITS—Part 6

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 Instruments Corp. 0-3000 V. Multimeter (Model 547)

**TELEVISION**  
(from page 19)



Arrangement of equipment, with coaxial cable, used in television broadcasting program from Philadelphia to New York.

Companies propose erecting experimental links of this type, similar to those now operating between New York-Schenectady and New York-Philadelphia.

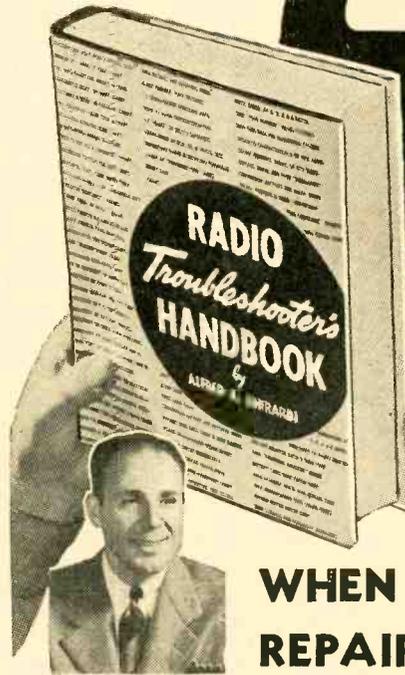
**COAXIAL CABLES**

These cables are special circuits designed to accommodate the very wide frequency bands typical of television signals. As recently as mid-January, the following statement was made before the Advertising Club of Washington by T. F. Joyce, general manager of RCA's radio, phonograph and television department:

"In 1943 there were no publicly announced plans for the establishment of facilities with which to connect television stations together to provide a nation-wide television broadcasting service. In 1944, the American Telephone and Telegraph Company announced its plans to build a coaxial cable to connect the principal cities of the United States, thus making possible a nation-wide television system. AT&T estimated that this coaxial cable could be completed from coast to coast in five years.

"The frequency allocations for television and the standards for broadcasting recently recommended by the FCC will allow for the immediate development of television, once our enemies have been defeated and the WPB gives the 'go-ahead' signal."

**DO 2 JOBS  
IN THE TIME  
NORMALLY  
REQUIRED FOR  
ONE!**



A. A. GHIRARDI

**GHIRARDI book First—Not to your tester**

Don't waste time on elaborate testing of every set that comes to you for repair! **FIRST** look up its model number in the big Trouble Case History of Ghirardi's completely revised, greatly enlarged 3rd edition **RADIO TROUBLE SHOOTER'S HANDBOOK**.

Four times out of five you'll find listed there not only the cause of the trouble — but **ALSO** the exact step-by-step directions for fixing it. You'll save a whole of a lot of time — and make a lot more money! For example, Serviceman Ralph E. Locke of Calais, Me., says "Ghirardi's Handbook quickly gave me information I'd been looking for for two days and solved a tough job!"

**"PAYS FOR ITSELF"**

Herbert Perry of Denver says "Helped me the first evening I took it home — and the set it helped me fix paid for the book."

Over 400 pages of this big, 744-page manual-size book are filled to the brim with the Trouble Case Histories (common trouble symptoms, their causes and remedies) for over 4800 radio models of over 200 popular makes — practically every model in use today.



You can buy Ghirardi's famous 1300-page **MODERN RADIO SERVICING** singly for only \$5 (\$5.50 foreign)—but here's your chance to get it along with the new 3rd Edition **RADIO TROUBLESHOOTER'S HANDBOOK** for a special money-saving price of only \$9.50 (\$10.50 foreign). Actually, **MODERN RADIO SERVICING** is the only complete, inexpensive volume that gives you a thorough course in modern radio service work—explanation of the inner workings of all Test Instruments; Troubleshooting Procedure; Circuit Analysis; Testing & Repair of Parts; Installation; Adjustments; and Maintenance. Tells what to do, How to do it, and Why. Order today. 5-day Money-Back Guarantee.

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TIME  
ON 4 JOBS  
OUT OF 5!**

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But this is just the beginning! There are hundreds of additional pages of priceless servicing information covering 74 **VITAL RADIO SERVICE SUBJECTS**. Each page is devoted to helping you repair more radios *easier* and in *less time*. Included is the most complete tube chart ever published anywhere, covering **EVERY** tube type; invaluable hints on substitution of tubes and other scarce parts; **IF** alignment peaks for over 20,000 superhets; a big data section on **IF** transformer troubles and dozens of graphs, charts, and data compilations.

Remember, Ghirardi's **RADIO TROUBLE-SHOOTER'S HANDBOOK** is **NOT** a study book. It goes right to work for you the minute it arrives. You simply **turn** to it when you want the answer to a servicing problem — and there are mighty few it won't help you solve!

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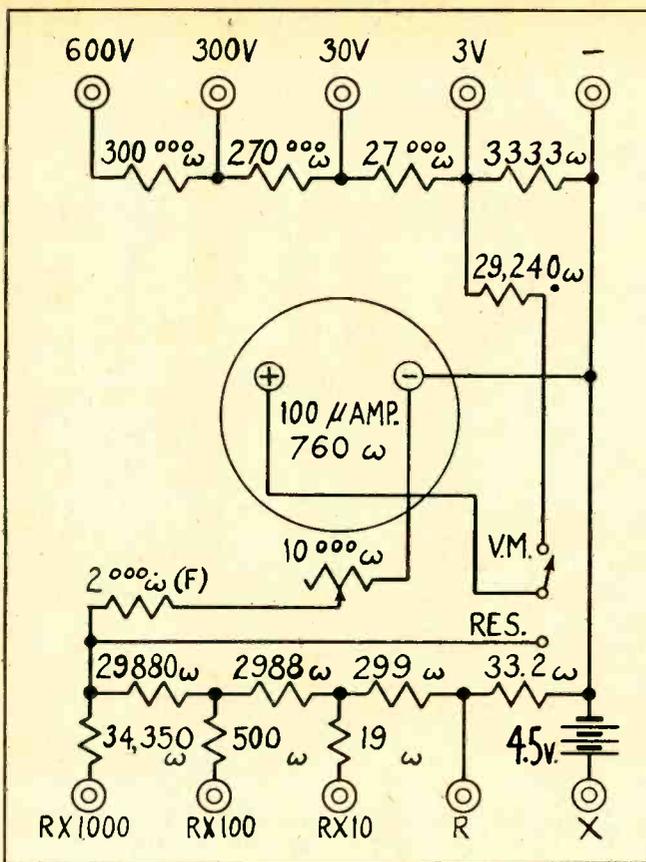
Enclosed find \$..... for books indicated, or [ ] send G.O.D. for this amount (U.S.A. Only) plus postage. If not satisfied, I may return the book(s) at the end of 5 days and receive my money back.

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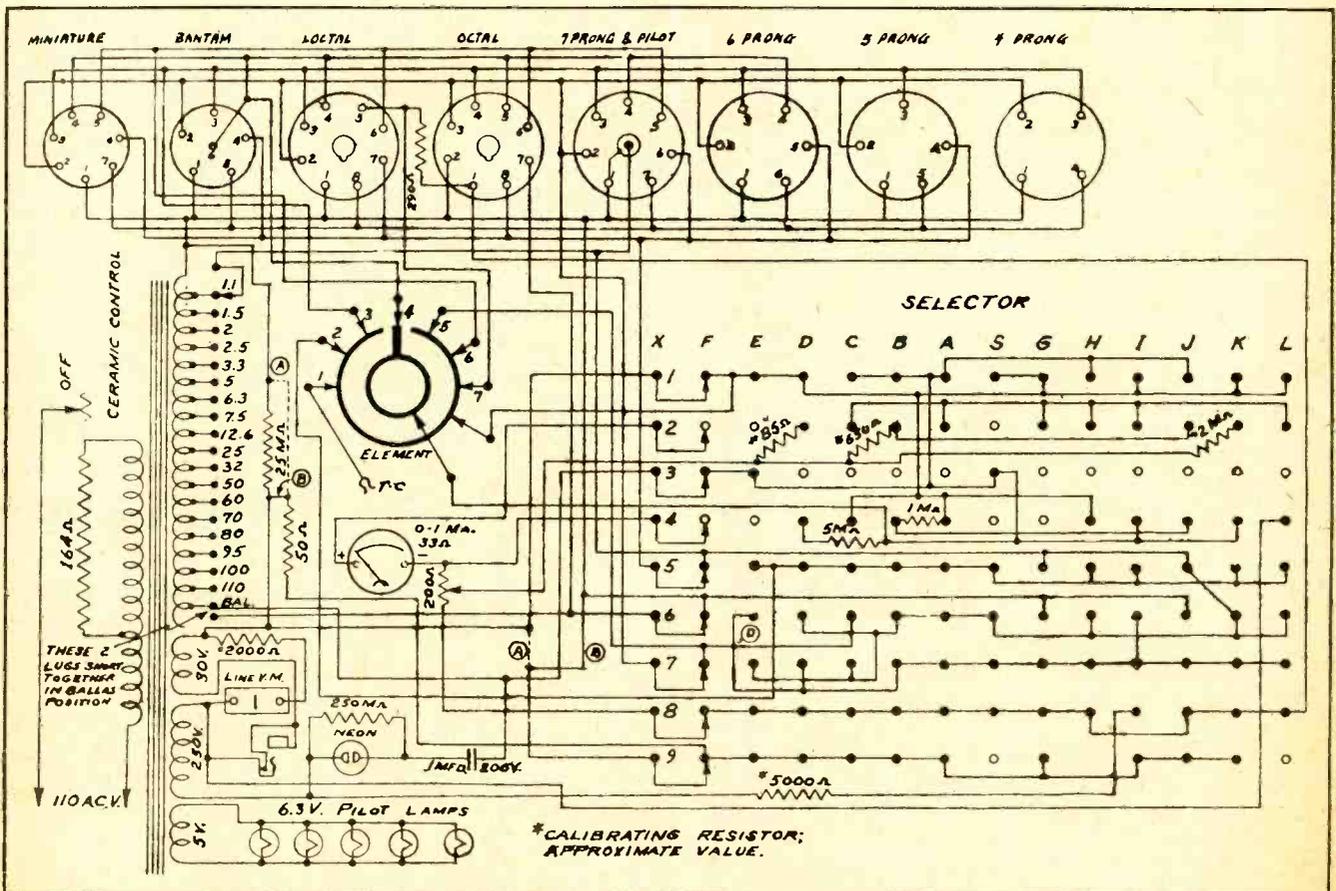
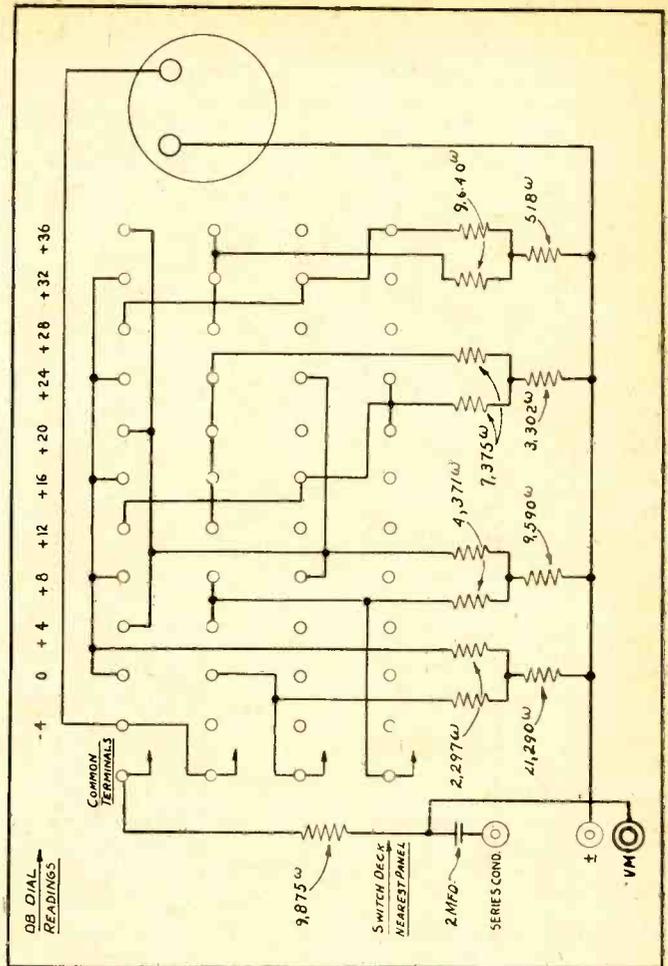
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Weston Electrical Instru. Co. Above: Volt-Ohmmeter, Type 3C (Model 564). Right: Rectifier Type Voltmeter (Model 695).

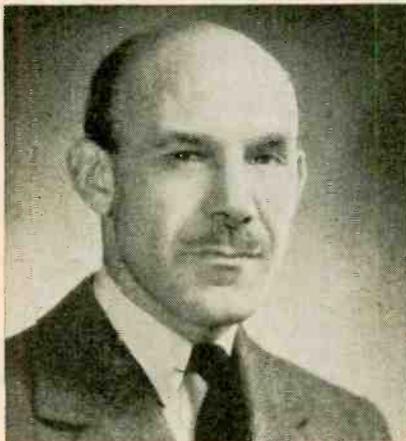


Triplet Electrical Instrument Co. Dynamic Tube Tester (1612-13)

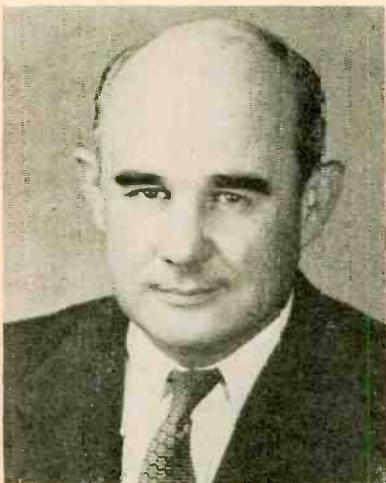
## MEN IN THE NEWS



Thomas A. White, appointed president and general manager of Jensen Radio Manufacturing Company, Chicago, Ill.



George Faurie becomes manager of advertising and sales promotion, Westinghouse Radio Receiver Division.



E. C. Brode is the new manager of distribution for The Crosley Corporation, Cincinnati, O.

## Sideline Item

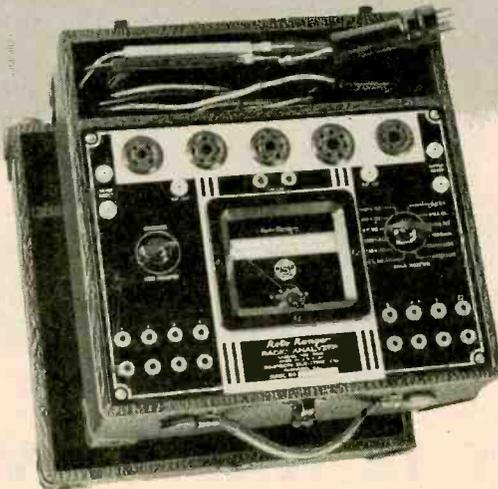
List prices of the new "slimline" fluorescent lamps, which are scheduled for production as soon as war conditions permit, have been announced by the Westinghouse Lamp Division, Bloomfield, N. J. The new lamps, all high efficiency hot cathode types, will be available initially in 42 inch, 64 inch, 72 inch and 96 inch overall length, including sockets and single pin bases at both ends. The 42 inch lamp, which measures  $\frac{3}{4}$  inch in

diameter, is listed at \$1.55; the 64 inch fluorescent tube, also  $\frac{3}{4}$  inch in diameter, is \$1.75; the 72 and 96 inch lamps, both one inch in diameter, \$2.00 and \$2.70 respectively. The "slimline" lamps were developed for showcases, wall cases or coves in stores, restaurants or other places where a long, slim light source is desired, said Ralph R. Brady, manager of the commercial engineering department for Westinghouse.



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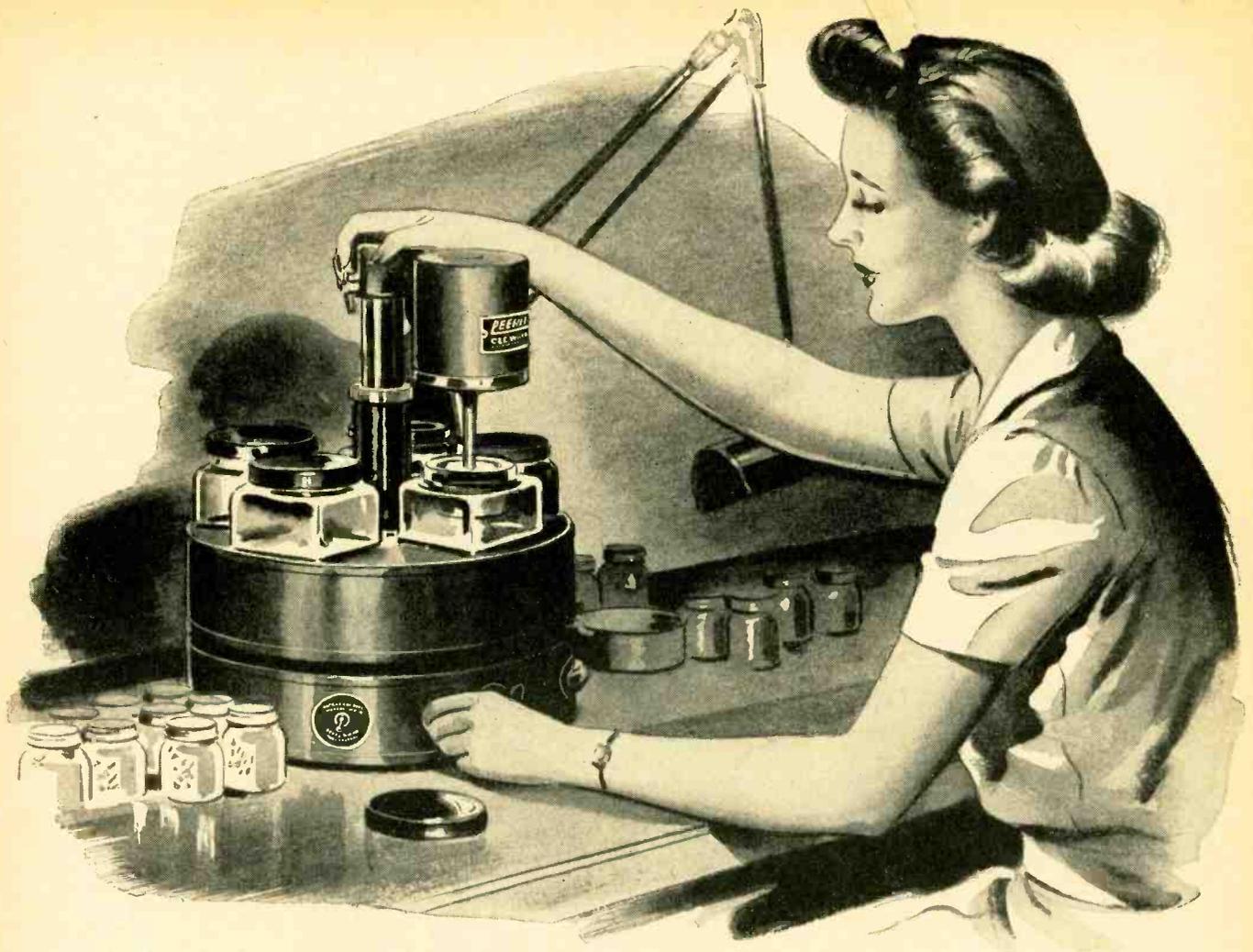
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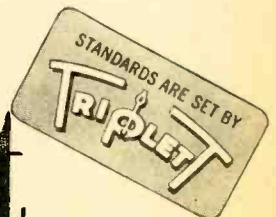
• The special equipment and solutions with which jewels are washed are minor parts of the Triplet method of manufacturing fine electrical measuring instruments but they are significant. They typify the dozens of out-of-sight Extra Precautions that assure your permanent satisfaction with Triplet Instruments. These Extra Care provisions are routine in Triplet plants but through them Triplet maintains in mass production the hand-made quality of fine instruments.

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HAPPEN . . .

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WITH

**ALNICO 5**



Among all the miracles that have been talked about for a great and glorious postwar era, here is one thing on which you can really count: JENSEN Speakers will be built around the wartime developed *ALNICO 5* JENSEN naturally pioneered in the use of this remarkable new magnet material which weighs only a fraction of other magnetic alloys of equal strength. Thus JENSEN postwar speakers with *ALNICO 5* will be lighter and more compact, but still as highly efficient and rugged as ever. JENSEN military loud speakers are now using *ALNICO 5* in great quantities.

And as soon as conditions permit, *ALNICO 5* will become a feature of JENSEN PM Speakers.



**Jensen**

SPEAKERS WITH

**ALNICO 5**

*Specialists in Design and Manufacture of Acoustic Equipment*

JENSEN RADIO MANUFACTURING COMPANY • 6601 SOUTH LARAMIE AVENUE, CHICAGO 38, ILLINOIS

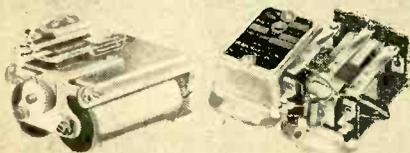
# CONCORD SERVICE

is unsurpassed

SO SAY LEADERS OF Industry • Wartime Agencies Laboratories • Schools

RADIO AND ELECTRONIC PARTS AND EQUIPMENT

Tens of thousands of enthusiastic customers are proof of Concord leadership. We can supply you with anything from a single capacitor to complex laboratory installations. Two strategically-located Concord stores—Chicago and Atlanta—are geared for speedy action.



### SENSITIVE RELAY . . .

Fully adjustable sensitive relay with 2000 ohm coil. Ideal for plate circuit or photo cell applications. Minimum pull-in current only 2.5 milliamperes. SPDT Contacts.

MA10-C113  
Your cost, each \$4.75

### THERMAL TIME DELAY RELAY . . .

Loach Type 1054T with 375 ohm 24 volt DC coil. Delay adjustable from 20 seconds to 1 minute. 1/4" fine silver DPST contacts, normally open, will handle 50 amps at 12 volts DC, 25 amps at 24 volts DC, or 6 amps at 110 volts AC.

MA10-C121  
Your cost, each \$3.35



**FREE!** Special 16-page Supplement of "hard-to-find" and urgently needed parts and equipment. All items are ready for immediate delivery . . . but are, naturally, subject to prior sale.



### MAIL THIS COUPON

CONCORD RADIO CORPORATION

901 W. Jackson Blvd., Chicago 7, Ill., Dept. K-25

Please rush me the 16-page "Special Supplement" published by the CONCORD RADIO CORPORATION.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_

CONCORD RADIO CORPORATION

Lafayette Radio Corporation

901 W. Jackson Blvd.  
CHICAGO 7, ILL.

265 Peachtree Street  
ATLANTA 3, GA.

## Multi-Tester

(from page 23)

The values of R2 and R3 on the R × 1 scale are not so important as their inaccuracy may be compensated for by R1. To replace R3 or R5 adjust the replacement for either so that with Rx equal to 0 on the R × 100 scale as in Figure 30B, the meter reads full scale when the setting of R1 has not been altered from its zero adjustment on the R × 1 range. R5 if correct, will allow 1.34 volts across R3 and R4 which causes full scale deflection of the meter when R3 is switched from the position shown in Figure 30A to that shown in Figure 30B.

In Figure 30C the meter is used as a 0 to .35 volt voltmeter, this voltage being across R2 + R3 + R4 with Rx equal to 0. R2 or R6 (Figure 30C) may then be adjusted so that the meter reads full scale deflection with Rx equal to 0. For this replacement R1 should not be altered from its setting for the R × 1 range. If R2 is too low the meter will not "zero" between those two ranges. Increasing the value of R2 until the

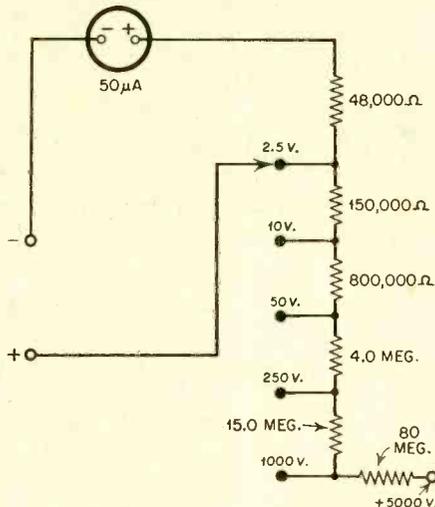


Figure 28

meter reads full scale without altering the setting of R1 gives proper resistance value for R2. If R6 is too low the meter will read off scale. To prevent this use a variable 25,000-ohm resistor as Rx when adjusting R6. Tailor R6 by filing a carbon resistor of 110,000 ohms up to such value that with the variable Rx set to zero resistance, the meter reads just full scale.

### CONCLUSION

The above circuits of the Simpson model 260 are typical of many 20,000-ohm-per-volt multi-testers and should indicate to the reader methods applicable to the repair or adjustment of his particular tester.

Meter repairs have not been included here due to the delicate nature

of the work. Outside of replacing shunts and multipliers in meters there is little that can be done under prevailing conditions to repair meters. Replacing springs, jewels, etc. is more of a watchmaker's job and many servicemen have found the

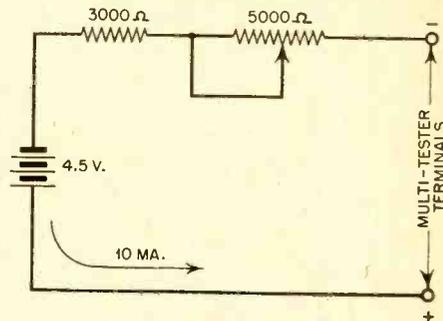


Figure 31

local watchmaker a reliable meter repair expert. The serviceman can give the watchmaker the names of companies supplying replacement springs, pointers, meter jewels, etc.

The following bibliography is included for those who wish to pursue the study of multi-testers and meters further.

Mallory Yaxley Radio Service Encyclopedia—Supplement #3 to 3rd Edition, Dec., 1939.

Modern Radio Servicing—Alfred A. Chirardi

Design and Maintenance of Ohmmeters—"Technical Portfolio"—"RADIO SERVICE DEALER," May 1942.

Milliammeters—"RADIO SERVICE DEALER" Dec., 1942.

Electric Instruments, The Eyes and Ears of Industry—Westinghouse Booklet B-2209-A

Measurements In Radio Engineering—Termer—McGraw Hill Publishing Co.

Calibration Sources for Service Test Equipment—Aerovox Research Worker, April, 1944.

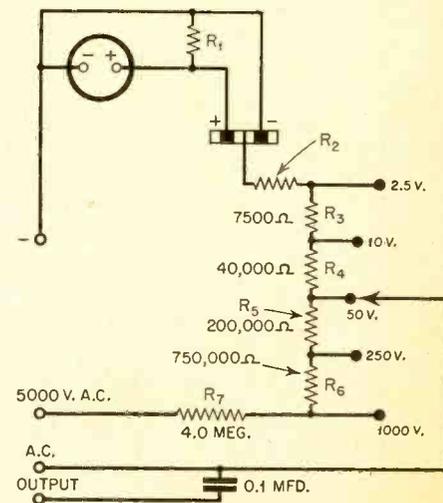


Figure 29

# SYLVANIA NEWS

## RADIO SERVICE EDITION

FEBRUARY

Published in the Interests of Better Sight and Sound

1945

**SYLVANIA  
SERVICEMAN  
SERVICE**



by  
**FRANK FAX**

A large, attractive, three-color display banner featuring the phrase "Complete Radio Service" is now ready for distribution to servicemen by Sylvania Electric.

The banner, pictured below, measures 46 by 28 inches; is printed in black, green and white on special weather-proofed "ducking" material making it suitable for use either inside or outside

**COMPLETE  
RADIO SERVICE**

WE RECOMMEND

**SYLVANIA  
RADIO TUBES**



of the store. It has six metal grommets to provide extra reinforcement.

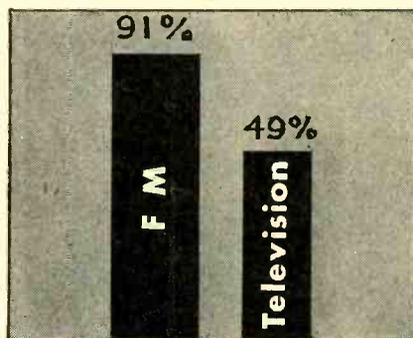
This useful, durable and attractive display banner may be obtained for only \$.40 (three for \$1) from your local Sylvania distributor, or from Frank Fax, Sylvania Electric Products Inc., Emporium, Pa.

This newest display is another in the extensive list of Sylvania promotion material designed to help servicemen merchandise both their own service and the Sylvania products they sell.

## Present Set-Owners Rate FM First In Current Sylvania Radio Survey

*91% of Consumers Interviewed Say They Want This Feature In Postwar Receivers*

Preliminary reports of the nationwide survey being conducted by Sylvania Electric indicate a high degree of public interest in frequency modulation. Of the thousands of set-owners who have been interviewed, 91% have indicated their desire to have FM incorporated in their postwar receivers.



Graph shows percentages of set-owners stating that they want FM and television in their postwar sets.

70% say they are willing to pay an additional sum in order to get this feature.

Television, while also a subject of considerable interest, ranked behind FM in the tabulation of survey results. 49% of those interviewed stated that they wanted television reception after the war. The same percentage indicated their willingness to pay extra for it.

### Service Aspects

This expression of popular interest in frequency modulation suggests the probability that servicemen, after the war, will find the FM feature increasingly common in the sets they will be called on to repair.

Results of other phases of the set-owner survey are now being tabulated, and findings will be published in future issues of SYLVANIA NEWS.

### Survey Continues

While the analysis of the results of personal interviews is going on, Sylvania is continuing its survey, and broadening its scope, through the medium of a series of questionnaire-type advertisements appearing in leading national magazines.

The purpose of these advertisements is to gather additional information on consumer preferences and interest in various types of radio and television receivers. This Sylvania research should be helpful to servicemen in their postwar planning.

### SYLVESTER SURVEY

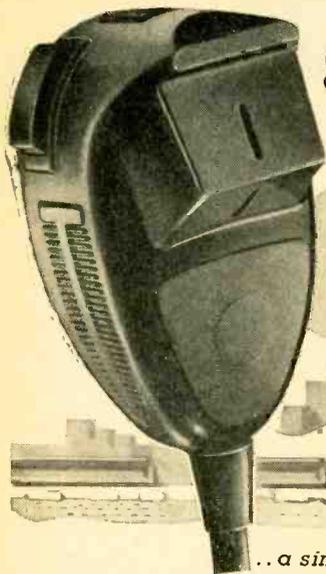


"Would you be willing to go as high as \$300 to have FM and television included in your radio set?"

# SYLVANIA ELECTRIC

SYLVANIA ELECTRIC PRODUCTS INC., Radio Division, Emporium, Pa.

MAKERS OF RADIO TUBES; CATHODE RAY TUBES; ELECTRONIC DEVICES; FLUORESCENT LAMPS, FIXTURES, ACCESSORIES; INCANDESCENT LAMPS



## Electro-Voice MODEL 205-S

For  
RAILROAD  
MARINE  
AIRCRAFT  
POLICE  
EMERGENCY  
INDUSTRIAL CALL SYSTEMS  
IN NOISY LOCATIONS  
... and many other applications

... a single button, hand-held, carbon DIFFERENTIAL microphone, designed for maximum intelligibility under extreme noise

Ambient noise is fed into dual apertures, shown in photograph, in correct phase relationship to provide almost complete cancellation of the entire noise spectrum. Speech that originates close to one of these apertures is faithfully reproduced. Articulation percentage is at least 97% under quiet conditions, and 88% under a 115 db noise field. The Model 205-S is unusually versatile ... can be used, indoors or outdoors, for all speech transmission in any noisy, windy, wet or extremely hot or cold location.

Because the 205-S is a noise-cancelling microphone, it must be used in a manner different from any other type. The microphone should be held so that the lip-rest will touch lightly against the upper lip. This brings the mouth and instrument into the correct position for proper transmission. As with all Electro-Voice microphones, the Model 205-S is guaranteed to be free from defect in material and workmanship — for life.

### SPECIFICATIONS OF THE MODEL 205-S

**OUTPUT LEVEL:** Power rating: 27 db below 6 milliwatts for 10 bar pressure. Voltage rating: 10 db above .001 volt/bar, open circuit. Voltage developed by normal speech (100 bars): .32 volt.  
**FREQUENCY RESPONSE:** substantially flat from 100-4000 c.p.s.  
**ARTICULATION:** at least 97% articulation under quiet conditions; 88% under 115 db of ambient noise.  
**AVERAGE BACKGROUND NOISE REDUCTION:** 20 db and higher, depending on distance from noise source.  
**WEIGHT:** less than eight ounces.  
**INPUT:** standard single button input is required.  
**CURRENT:** 10-50 milliamperes button current.  
**HOUSING:** molded, high impact phenolic housing; minimum wall thickness, 5/32"; vinylite carbon retainer.

**TEMPERATURE RANGE:** from -40° to +185°F.  
**PRESS-TO-TALK SWITCH:** available with or without hold-down lock. Double pole double throw contacts provide an optional wide assortment of switch circuits.  
**STANDARD SWITCH CIRCUIT:** provides closing of button circuit and relay simultaneously.  
**THERMAL NOISE:** less than 1 millivolt with 50 milliamperes through button.  
**STURDY CONSTRUCTION:** capable of withstanding impact of more than 10,000 6" drops to hard surface.  
**POSITIONAL RESPONSE:** plus or minus of 5 db of horizontal.  
**CONDUCTOR CABLE:** 5 feet of two conductor and shielded cable, overall synthetic rubber jacketed.

Model 205-S, List Price. \$25.00

Model 205-S, with switch lock, List Price. \$26.50

# Electro-Voice MICROPHONES

ELECTRO-VOICE CORPORATION • 1239 SOUTH BEND AVENUE • SOUTH BEND 24, INDIANA  
Export Division: 13 East 40th Street, New York 16, N. Y. U. S. A. Cables: Artoh



# STANCOR

Transformers

## THE STANDBY OF SERVICEMEN

Call your nearest Stancor Jobber—or write us for his address

### STANDARD TRANSFORMER CORPORATION

1500 NORTH HALSTED STREET • CHICAGO



## Police Calls

[from page 25]

It may be well to mention that the above and many other auto receivers use an untuned coupling circuit between the r-f stage and the converter. Often the circuit will include a wave trap tuned to the i-f frequency or to a code frequency. This coupling circuit should be by-passed to improve reception on police frequencies. A .002 mfd. mica condenser connected from plate of the r-f tube to grid of the converter should be tried. In the case of the above receivers a substantial increase in volume on police frequencies will be noticed. In adapting receivers using tuned coupling between the r-f and converter stages it is often convenient to change to untuned resistance or choke coupling in order to eliminate the necessity of an additional coil switching operation. Some reduction in performance on broadcast frequencies may result, however.

### Squelch Circuits

Some sort of squelch circuit is almost a necessity for car receivers tuned to police frequencies. The usual conglomeration of static, power line buzz and ignition noise normally does not bother broadcast reception because when the broadcast carrier is tuned in it is generally strong enough to override all such noises. However, in police call reception, the receiver must be maintained in a sensitive condition even when the station is not on. Some of the more expensive car receivers have built in squelch circuits which effectively limit noise.

Figure 5 shows three variations of delayed diode rectification which can be applied to receivers not having a squelch circuit. In each case a small negative bias is applied to the plate of the diode signal rectifier section of the usual duo-diode-amplifier tube. The negative bias is adjusted so that all noises below the level of the desired carrier will not be rectified and passed along to the audio amplifier. In practice this is done by slowly increasing the negative bias (by increasing the cathode resistance) until the noise in the receiver is barely perceptible.

Figure 5 (a) shows how we may take advantage of the voltage drop across the cathode bias resistor to furnish the required delay voltage. Instead of returning the bottom end of the volume control to the top of the cathode resistor as usual, it is returned to the bottom end. This

[Continued on page 42]

# SPRAGUE TRADING POST

A FREE Buy-Exchange-Sell Service for Radio Men



## YOU CAN GET KOOLOHMS NOW!

At last, greatly expanded production is beginning to match even the tremendous war equipment demand for Sprague KOOLOHM Resistors. As a result, we have been delivering good quantities of 5- and 10-watt sizes in all ranges to Sprague distributors — and hope soon to make a similar announcement, both with regard to KOOLOHMS in other sizes and to many of the previously unavailable Sprague Capacitor types.

As always, we'll appreciate it if you ask for them by name!

**FOR SALE** — Clough-Brengle 3" oscillograph, \$120; 1" RCA 'scope, \$60; Solar condenser and resistor bridge, \$10; Radio mag. type QVTVM with regulator tubes, \$35; Jackson tube tester for all new types, \$35; Triplett 1000v AC pocket meter, \$15; dynamotor 6v to 220v DC, \$10; Gernsback's manuals #1, 2, 4, 6 and 1941, \$25; Proceedings of I.R.E. for 1942, '43, '44, all for \$8. Eddie, 1724 Central Ave., Middletown 6, Ohio.

**WANTED** — One or two RCA M1-6205 crystal microphones, high or low impedance. Cash. J. W. Eifers, Box 5, Muscatine, Iowa.

**FOR SALE** — Howard #438 comm. receiver with crystal, 110v, 60 cycle. Good condition. \$36.50. C. R. Davis, 116 Iron St., Bucyrus, Ohio.

**FOR SALE** — DeVry sound port. projector, 35mm. complete with amp. and speaker, good condition, \$150. Have 3½ DC generator, 1000 watts; also DC radio analyzer, and car radio. Want AC tube tester. Breakbills Radio Shop, Republic, Mo.

**URGENTLY NEEDED** — Any one of following output transformers: UTC LS-55; OHT 15S90; K-407; K-408. State condition and price. C. L. Goebel, 221 W 233 St., Bronx, New York 63. N. Y.

**WANTED** — Test eqpt., tubes, and small table top radios to open sales and service shop. John D'Alessandro, 2223 So. Juniper St., Philadelphia 48, Pa.

**WANTED** — Short-wave receiver and personal portable radio, any make. Robert Tobin, 615 Hort St., Westfield, N. J.

**WANTED** — Late tube checker in A-1 condition. Can also use V-O-M or other AC-DC meters. Merritt Radio, 537 Webb St., Clayton, N. Y.

**WANTED** — Test eqpt. to open shop, 0-1 DC ma meter; tube checker; multi-meter; V-O-M; VTVM. Want to trade 0-200 microamperes. All letters answered. T. L. Liles, 320 W. 7th St., Owensboro, Ky.

**WILL TRADE** — Have test eqpt. incl. Supreme 570 sig. generator; large ast. of tubes; Rider's manuals 1-10, etc. Want comm. receiver such as Hallcrafters SX24, SX23 or similar. E. W. Edwards, 57th & East Ave., Route 2, La Grange, Ill.

**WANTED** — Test eqpt. incl. AC operated sig. generator, tube tester, multi-range meter, all vols. Rider's manuals, etc. Give make, age, condition, price, etc. J. W. Hoskins, 212 Middlefield Rd., Palo Alto, Calif.

**URGENTLY NEEDED** — #913 cathode ray tube, also 9002 tube. Cash or will trade one each 68Q7; 12SA7; 12SK7; 50L6; 12Q7; 25L6; GL930 and many others. Wm. J. Beswick, Box 56, Tiltonsville, Ohio.

**FOR SALE** — Philco 050 tube tester; also R-55 V-O-M. Both practically new, in A-1 condition. W. E. Peets, Brookhaven, Mass.

**WANTED** — FM tuners, Meissner or Stromberg-Carlson preferred. Also broadcast band tuner. Carl Wolf, 227 W. Iowa St., Evansville 12, Ind.

**WILL TRADE** — 6P5GT; 6K8G; 6W5; 6X5; 7C5; 42; 6F5GT; 1V; 31; 1J5G; 78 tubes. Want 70L7 or 70A7 45Z5 and 50L7. Want recording motor for cash. J. Sanford Martin, %YMCA, Danville, Va.

**WANTED** — 6SJ7; 6AD7G; 6F6G; 5Y3G; 5Y3GTG; 35Z5 tubes, etc. Also want phono turntable & pickup. All letters answered. Henry Martin, Box 588, Bluefield, Va.

**WILL TRADE** — Recorder mixer record changer, a 2-in-1 unit for a good volt, ohm meter with an AC-DC scale. Outfit has no amplifier. New, never used. M. Muskopf, 1868 Niagara St., Buffalo 7, N. Y.

**WANTED** — 50L6, 45Z3, 12A8, 25Z5, 30, 1N5, 1A7, 1H5, 12SK7, 6C5 tubes. All letters answered. Grover Radio Service, 2325—15th St. N.W., Washington 9, D. C.

**TUBES FOR SALE** — 1.4, 2.0, 6, 12, 25, 35, and 70 volt types. Urgently need test eqpt. of all kinds. Everett Trent, Austerlitz, Ky.

**ACORN TUBES FOR SALE** — 954; 855; 956; 957; 959, also all kinds of tubes. Write for list. Sable Radio, 7 Dyer St., Dorchester, Mass.

**COMPLETE SERVICE EQPT. FOR SALE** — Includes Philco, Supreme, Precision, Superior test eqpt., service manuals, all tools, over 200 tubes in cartons, 300 tested (not in cartons), transformers, condensers, etc. If interested, write for list. Leon Luke, P. O. Box 143, Nashville, Georgia.

**WANTED** — Sig. generator, tube checker, V-O-M, and new or used 35Z5GT, 58, 24, A75, 1A7, 12SA7GT, and 50L6GT tubes. What have you? F. B. Williams, 1297 Catalpa St., Beaumont, Texas.

**WANTED** — Meters of 0-1 ma. and 0-50 microammeters and 0-100 microammeters, also one 955 and three 6AB7 tubes. L. E. Hathcock, 324 Randolph St., Portsmouth, Va.

**WANTED** — Portable P.A. system complete. Have tube tester for sale. Roberts' Electric Shop, Bucklin, Mo.

**FOR SALE** — Supreme 501 tube tester, good condition, \$35. Will test all tubes. All letters answered. Donald Jackson, P. O. Box 592, Ojai, Calif.

**FOR SALE** — Philco 050 tube checker, checks all types \$50. Guidos Radio Service, Latrobe, Pa.

**WANTED** — Com. receiver such as Sky Buddy 5T in good condition, or Echophone EC1 or EC2. Chester French, 4328 Crittenden Drive, Louisville 9, Ky.

**FOR SALE** — 35L6, 12SQ7, 6L6 tubes, etc., also Webster amplifier for large installations, phono motors, test instruments. Service-Radiolectric, P.O.B. 235 Roberval, Quebec, Canada.

**WANTED** — #1240 Superior tube tester and Meissner LF90 converter. Cash. John Lininger, 3942 Drexel Drive, Toledo, Ohio.

**WANTED** — Utah duotone concentric 15" "woofer-tweeter," must be perfect. Cash, or will trade. Have Jensen JHP-52 16" woofer-tweeter with hi-frequency cutoff switch, and two Meissner AC FM tuners. Martin Whitman, 1801 Popham Ave., Bronx, New York 53, N. Y.

**FOR SALE** — Several amplifiers complete; crystal mike; Baldwin headphones; Hallcrafters receiver; Meissner signal shifter complete; power supplies 3000v-1250v etc.; new final ampl. pair of HK54's in driver stage, also many parts. Jack Clark, Jenners, Pa.

**URGENTLY NEEDED** — Radio tubes of all makes & types, condensers, by pass coils & resistors, radios of all makes & types, also other hard-to-get items. Pioneer Valley Radio Service, R.F.D. #2, Box 104, Greenfield, Mass.

**WANTED** — Back issues of the Electrical Experimenter and Modern Electrics previous to 1918. Cash. J. T. Lipani, 157 Leverett St., Boston 14, Mass.

**WANTED** — Hallicrafter SX-24 or SX-25 and HT-6 or HT-9. J. T. Moore, 5712 Berkshire Lane, Dallas 9, Texas.

**WANTED** — Late model tube tester, signal generator, 'scope, and other good test equipment. Will trade RCA auto set, Motorola ditto and some tubes, or will pay cash. Write at once. C. V. McMillan, R.R. #1, Abilene, Kans.

**URGENTLY NEEDED** — 25A7G or GT tubes. Will pay cash for any quantity at OPA wholesale. Potter Radio Service, La Farge, Wisc.

**FOR TRADE** — New items 5" PM speaker, tubes, 0Z4, 5Y39, 6C6, 6E5, 6F6, 6H6GT, 6J7, 6K7, 6N7, 3-6V6GT, 25Z5, 26, 27, 80, 45, 45, used items, 9" oval PM speaker, tubes 1V, 5Z4, 6C5G, 27, 2-6V6, 35Z5, 2-41, 2-78. Will trade for a good amplifier. Describe fully. Bill Dobbins, 2930 Fashion Ave., Long Beach 6, Calif.

**WANTED** — Record changer, automatic pick-up not necessary but can be used. Also 78 rpm turn table. Pvt. Sidney B. Mason, Sect. "M", Lowery Field, Colo.

**WANTED** — Cathode ray oscilloscope. M. Broiman, 3451 Park Heights Ave., Baltimore, Md.

**NOTICE!** — Please write plainly and describe your equipment accurately when sending advertisements to be run free of charge in the Sprague Trading Post. This will help simplify our job of handling a tremendous number of advertisements every month—and will assure prompt, accurate presentation of what you have to sell or what you want to buy.

## 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 five radio magazines wherein the Trading Post appears every month.

HARRY KALKER, Sales Manager.

Dept. RSD-25, SPRAGUE PRODUCTS CO., North Adams, Mass.

Jobbing Sales Organization for Sprague Electric Company



# SPRAGUE CONDENSERS KOOLOHM RESISTORS

T.M. REGISTERED U. S. PATENT OFFICE

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

## DISTRIBUTOR NEWS

The following new distributor appointments are announced by officials of the various companies listed:

### ADMIRAL:

Ross D. Siragusa, president: City Electric Co., Inc., Syracuse, N. Y., exclusive distributors of radios, electric ranges, refrigerators and home freezers in this territory. This company was established in 1919 and were

Admiral and Stewart-Warner distributors before the war. Home Supply Co., Dubuque, Iowa, for that territory. Tri-State Distributors, Inc., Albany, N. Y., for that territory. United Distributors, Inc., for the Washington, D. C., territory.

Export rights for the company's complete post-war line have been granted to Ad Aurienna, Inc., 89 Broad St., New York City. The franchise includes all parts of the world except Canada and Alaska.

United Distributors, Inc., will handle radios, refrigerators, electric ranges and home freezers for the Boston trading area and part of Vermont. The firm plans to include a theatre for demonstrating television equipment in a new \$400,000 building to be located in Cambridge, Mass.

### BENDIX:

Leonard C. Truesdell, general sales manager, home radio: Florida Radio and Appliance Corp., Miami, Fla., for the entire state, excepting the extreme northwest portion. Kelly How Thompson Co., Duluth, Minn., for Minnesota, North Dakota, Montana, northern Wyoming, western Wisconsin, northwestern Michigan, and western South Dakota. The Pittsburgh Products Co., Empire Bldg., Pittsburgh, Pa., for all of western Pennsylvania except the counties bordering on New York, and including northeastern half of West Virginia, with Monroe, Belmont and Jefferson counties in Ohio. The Walter E. Schott Appliance Co., Cincinnati, O., for the Tri-State area including the southwestern corner of Ohio, southeastern corner of Indiana and ten northern Kentucky counties.

These appointments bring to a total of 21 the key distributors who have been assigned to market the company's radios from coast to coast, post war.

### CROSLEY:

E. C. Brode, manager of distribution: Heating & Air Conditioning Supply, Inc., Reno, Nev., will cover upper California and most of Nevada. Superior Distributing Co., for eastern Kansas and western Missouri, for radios and refrigerators including complete lines of parts for service and repairs.

### EMERSON:

Hub Cycle and Radio Co., Inc., opens new, larger quarters to expand activities in the New England territory on the company's lines of radios

including home projection television. E. E. Forbes & Sons Piano Co., Birmingham, Ala., for the territory.

### GENERAL ELECTRIC:

C. R. Pritchard, general sales manager, appliance and merchandise department, announces that the department's postwar distributing organization for major appliances is completed. There will be about 60 wholesale distributing outlets for refrigerators, ranges, water heaters, home laundry equipment, dishwashers, sinks and kitchen cabinets. These distributors, operating in assigned areas, will maintain sales organizations and local warehouse stocks at over 125 points, and will be prepared to serve the retail dealers in every city and town in the United States, Hawaii and Alaska.

Better than 50 per cent of the distributing outlets will be independent wholesalers, many of whom have been with G. E. since its electric refrigerator was introduced in 1927. While there have been some divisions of large territories and appointments in smaller markets, the company will have about the same number of independent distributors as it had before the war.

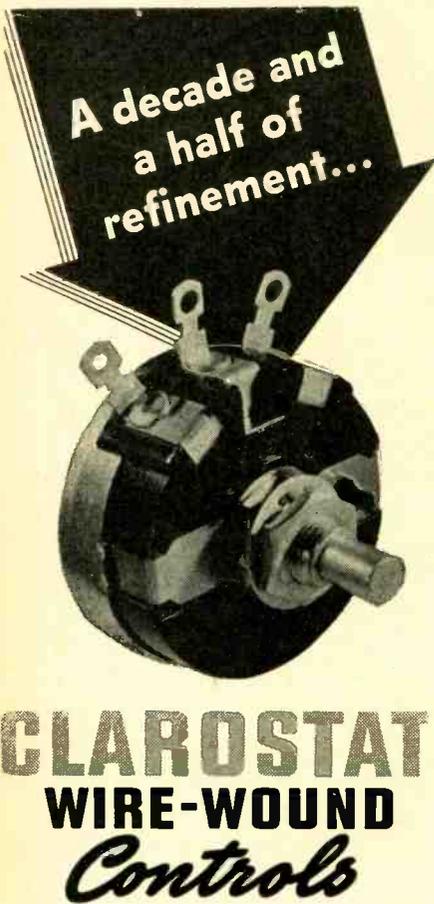
G. E. will operate its own wholesale distributing branches in nine major markets. Seven of them, located in New York, Newark, Cincinnati, St. Louis, Pittsburgh, Los Angeles and Philadelphia, are new. They were added to the two branches which General Electric operated before the war. Mr. Pritchard pointed out that these branches are in large metropolitan markets where product specialization is essential, and that the branches would devote all of their efforts to the promotion and sale of major appliances. At this time the company has no plans for expansion of its factory branch program beyond these major metropolitan markets. The G. E. Supply Corporation will continue as a wholesale distributor of major appliances in about the same number of markets as before the war.

In accordance with industry practice, and in order to reach all types of retailers, G. E. will continue to distribute its traffic appliances through multiple wholesale outlets serving the electrical, department and furniture store, hardware, jewelry, drug, mail-order, utility and chain-store trades.

### MOTOROLA RADIO:

William H. Kelley, general sales manager: Given Distributing Co., Inc., Keith Building, Syracuse, N. Y., for the city area. The newly organized

[Continued on page 46]



**A decade and a half of refinement...**

**CLAROSTAT**  
**WIRE-WOUND**  
*Controls*

★ This latest refinement of the well-known Clarostat wire-wound rheostat or potentiometer is a still tougher control. And provably so. It copes with extreme vibration and other mechanical abuse, fully matching its well-established electrical ruggedness. ★ Now available only on high priorities, this Clarostat item will be generally available to you after the war. Meanwhile, keep your eye on Clarostat!



CLAROSTAT MFG. CO., Inc. • 285-7 N. 6th St., Brooklyn, N. Y.

# STRAIGHT TO THE MARK!



Our Navy's PT Boats are driving the war home to the enemy at high speed. They're shooting straight to the mark! They're demonstrating the power of American ingenuity and industry to the Jap war lords!

Eastern is serving on board these scrappy, hard-hitting PT Boats. Eastern equipment helps them carry out each assignment—swiftly and surely. Amplifiers, only a few short years ago, were thought of mainly in connection with sound systems. Today, they are an important part of many essential war instruments.

Eastern is proud to utilize its engineering and production facilities in the war effort . . . certain that its war-time experience will result in better-than-ever post-war sound and electronic equip-

ment. Until the victory is won, Eastern will continue to devote all its resources to the design and manufacture of war equipment. To aid the war effort, our engineers are available for consultation on any amplification problem you may have.

*On request, we shall be glad to forward brochure containing the first of a series of articles covering technical phases of interest on sound amplification prepared by our engineering staff. Ask for Brochure 2-C.*

*Buy MORE War Bonds*



**EASTERN AMPLIFIER CORPORATION**

794 East 140th Street, New York 54, N. Y.

# **EASTERN** AMPLIFIERS

## Police Calls

[from page 38]

arrangement makes the diode plate negative with respect to the cathode by the amount of the bias voltage. The voltage drop across the bias resistor is normally sufficient. However, the bias resistor may be increased to supply more delay bias at the risk of increased audio distortion.

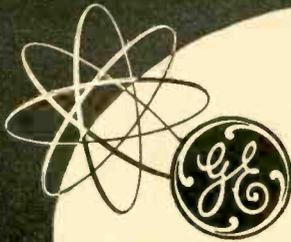
In many late model receivers a system known as grid leak biasing is employed for biasing the grid of the audio amplifier following the diode rectifier. The bias is developed across a 10 or 15-megohm resistor in the grid of the amplifier section of the duo-diode-triode or pentode. The cathode is usually grounded. To apply squelch action the cathode is lifted from ground and a variable resistor inserted. The grid leak is returned direct to cathode. The cathode resistance required may in some cases be as high as 50,000 ohms, depending on the tube type used. A 10 mfd bypass condenser across the added cathode resistance sometimes gives increased volume. This circuit is shown in Figure 5 (b).

Figure 5 (c) shows a variation of (a). In this case the cathode is connected to a tap near the ground end of a voltage divider across the power supply. The voltage drop from cathode tap to ground provides the negative bias for the amplifier section of the tube. The delay bias for the diode plate may be obtained from a 5000-ohm potentiometer placed across this section of the voltage divider. The bottom of the volume control should be bypassed to ground through a 10-mfd condenser. If this is not done it will not be possible to cut the volume off entirely.

More elaborate squelch systems than the above described may be used but they have the disadvantage of requiring an additional tube. In addition to the squelch circuit, all usual precautions should be taken to eliminate interference from the car electrical system. A distributor suppressor and a generator condenser should be installed.

The serviceman will find that each make of receiver offers a different mechanical and electrical problem and he will have ample opportunity to exercise his ingenuity and knowledge of circuits.

The writer has adapted over thirty car receivers to combination broadcast and police reception and has obtained results, depending on type of set, ranging from fair to performance equalling standard police receivers.



# UNIMETER

This unit fulfills an extremely important need for general utility portable service equipment. It has wide range coverage for both a-c and d-c measurements of voltage, current measurements on d-c and the popular ranges on resistance.

The UM-3 is designed to clearly indicate all the functions which aid in the prevention of application of high voltages when preparing for current or resistance measurements.

Other G-E units for better servicing include: Tube Checker TC-3, Unimeter UM-4, and Oscilloscope CRO-3A.

For details write: *Electronics Department, General Electric, Schenectady 5, New York.*

**Electronic Measuring Instruments**



## UM-3 GENERAL ELECTRIC

177-D2

## SPEED UP REPAIRS WITH THESE G-C AIDS!



FREE  
STEEL  
CABINET

### G-C Dial Belt Kits

Exact replacement woven fabric belts. Easy to install — no stretching — no adjustments — a perfect fit every time. Kits come with 25, 50, 100, 200 or 300 belts.



### Radio Chemical Laboratory

Twenty 2 oz. bottles. A complete assortment of cements, solvents, coil dopes, lubricants, cleaners, etc. Brushes in bottle caps. Indexed steel rack.



### G-C Ne-O-Lite

New improved design. Useful hundreds of ways. Tests AC and DC lines, DC polarity, fuses, etc. You can't afford to be without this handy all-purpose trouble shooter.

Order From Your Radio Parts Jobber  
ALWAYS ASK FOR G-C PRODUCTS



## GENERAL CEMENT MFG. CO.

ROCKFORD, ILLINOIS

### \$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 Defense 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.



**Youth and Experience**—That's one combination that enables Meissner "precision-el" to produce the quality electronic equipment for which Mt. Carmel is gaining national recognition, for skill in electronics is rapidly becoming a tradition in this little city on the banks of the Wabash.

# "PRECISION-EL"

You'll find it  
in Mt. Carmel, Illinois

Yes, here at Mt. Carmel, the men and women of Meissner bear the name of "precision-el" proudly. It is an honor and responsibility—an honor to be ranked with the most skilled craftsmen in an industry that is precision itself; a responsibility to uphold the Meissner standards of quality, accuracy and dependability.

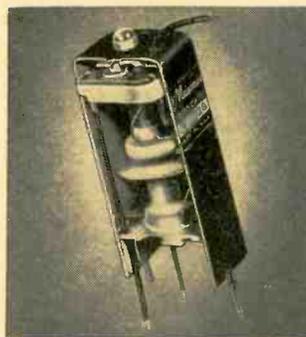
On this page you will meet a few of the hundreds of men and women in Meissner's employ. Remember that they are your guarantee of performance when you use Meissner products, precision-built by "precision-el."



**Light, Airy workrooms like this** make any job pleasant. And when it's a precision job in electronics, like those jobs these men and women of Meissner are doing, no wonder they are able to merit the name "precision-el" for their pride in an exacting job well done.



No part is too small to merit the concentration and precision workmanship that characterizes Meissner precision-built products. Here a member of Meissner's "precision-el" shows why the name is so well deserved by the men and women of Meissner.



### "Step Up" Old Receivers!

These Meissner Ferrocart I. F. input and output transformers are getting top results in stepping up performance of old worn receivers. Special powdered iron core permits higher "Q" with a resultant increase in selectivity and gain, now available for frequency range 127-206. Ask for numbers 16-5728 input, 16-5730 output. List \$2.20 each.



# MEISSNER

MANUFACTURING COMPANY • MT. CARMEL, ILL.

**ADVANCED ELECTRONIC RESEARCH AND MANUFACTURE**  
Export Division: 25 Warren St., New York; Cable: Simontrice

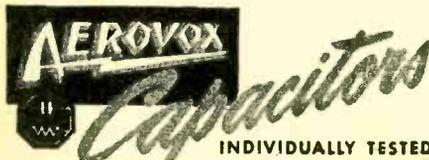


• Yes, millions of Aerovox capacitors are in daily use, rendering outstanding service year after year. Such are our best salesmen. And we expect that sort of service from Aerovox capacitors. Remember, each and every Aerovox capacitor, regardless of type, size or price, is *individually tested* as a matter of regular production routine. You play safe when you standardize on Aerovox capacitors for your jobs.



**See Our Jobber . . .**

He can help you with your wartime capacitor requirements. Ask for latest catalog. Or write us direct.



AEROVOX CORP., NEW BEDFORD, MASS., U. S. A.

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Export: 13 E. 40 ST., NEW YORK 16, N. Y. - Cable: 'ARLAB'

# RADIO SERVICE DEALER SURVEY

Undertaken in an effort to ascertain the Radio Industry's opinion on the question:

1. Shall Radio Servicemen and Technicians be required to undergo examination as to their technical ability?
2. Shall Radio Servicemen and Technicians be licensed or not?

Any person engaged in some phase of radio retailing, servicing, distribution or manufacturing may participate.

**TEAR OUT AND MAIL**

Survey Editor,  
RADIO service DEALER,  
342 Madison Avenue, New York 17, N. Y.

**PRINT ALL ANSWERS**

- I do not favor licensing of radio servicemen and technicians.
- I favor licensing of radio servicemen and technicians (Select one): Under
  - Municipal Law;  State Law.
- I favor general license certificates for all classes of technicians.
- I favor license by degree of skill, such as:
  - Grade A or Master Technician (one who has practised radio servicing 2 years or more);
  - Grade B or Associate Technician (one who has practised radio servicing 1 year or more, but less than 2 years);
  - Grade C or Apprentice (a beginner, or one who has practised servicing less than 1 year).

I believe \$..... is a fair examination fee—

I believe \$..... per annum is a fair license fee:

(a) for Grade A \$.....; (b) Grade B \$.....; (c) Grade C \$.....

I suggest that a Licensing Commission be established to determine technical standards, and prepare necessary oral and written examinations, in the following manner:

.....

.....

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.....

.....

.....

.....

.....

.....

My name is: (give if you wish) .....

Address: (you must indicate at least the city in which you do business) .....

..... State.....

I am a radio repair shop  owner without technical training;  owner with technical training;  employee.

**FADA**  
*Permanent*  
**NEEDLES**

List \$1.00

**Special Introductory Offer 39¢**  
(TO DEALERS ONLY—IN LOTS OF 6 OR OVER)

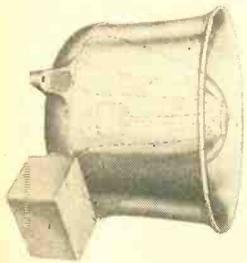
- Plays 4M Records without changing
- Better Tone Reproduction
- Help Reduce Background Hiss
- Longer Record Life

**FADA OF NEW YORK**  
928 BROADWAY NEW YORK 10, N. Y.  
Large Stock of Replacement Parts and Cabinets

# MEMO

Tell Joe to be sure  
to specify RACON  
Speakers for that  
big P.A. job to  
assure our getting  
the contract.  
Everybody knows  
RACON'S are "tops".

SEND FOR OUR CATALOG



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.

It is common knowledge that well-planned Public Address installations and sound distribution systems effectively accomplish their purpose, such as speeding up production, eliminating time wastage in communicating orders and instructions, etc. That's why such P-A installations are being authorized, in fact, are being urged upon factories in war work.

The vital components of any sound installation are the loudspeakers and driving units. These must be absolutely dependable and efficient, rugged, afford long, troublefree service. And they must deliver more watts of energy output per watt of input for economy's sake. That RACON speakers do all these things best and at lower cost is a recognized fact too. That's why soundmen who specify RACONS have an edge on competitors. They usually get the contract.

HARTFORD . . . New London . . . New Haven . . . Bridgeport

## Tubes-- TUBES-- TUBES!!!

- ★ By the time this is published, the tube shortage will be at its worst.
- ★ Military requirements are (Jan. '45) at their highest, leaving us in the lurch.

★ **Typical: a 30-day allotment TO US of 600 tubes YOU want.** Less than 2 tubes per customer for over 300 GOOD Hatry and Young customers. Every time YOU get more than 2 "hot" types, you've hurt some other fellow.

★ So, we are always wrong, you feel.

★ **THEREFORE:** This seems certainly the safest time to wish you a Very Happy Tube Year in 1946.

*Electronics Specialists*



*Consultants • Expeditors*

## DISTRIBUTOR NEWS

[from page 40]

Appliance Division of Higgins Industries, Inc., New Orleans, La. (builders of famous wartime landing craft) will distribute in southern Louisiana and southern and central Mississippi. In addition to the complete Motorola line of radios, the distributor will handle Blackstone complete home laundry equipment, Eureka vacuum cleaners; Electromaster electric ranges and water heaters; Carrier air conditioning; food lockers, quick freezers, including complete locker storage systems.

Specialized training and promotional services will be available for dealers, salesmen and servicemen. During the past several years, Higgins Industries, Inc., has maintained a retail and wholesale business serving as distributor for marine accessories and air conditioning equipment. The new appliance division is an expansion of this activity.

### OLYMPIC:

Jack F. Crossin, director of sales, Hamilton Radio Corp., New York; Joseph Kurzon, Inc., New York City, for the area covering the five boroughs

[Continued on page 48]

## "RSD" Subscribers, ATTENTION

"RSD's" subscription lists are at the saturation point. New subscribers can be served only when an old subscriber fails to renew an expiring subscription. This condition will obtain until our paper quota is increased. Meanwhile, future issues of "RSD" will carry more pages of text than ever before.

"RSD" subscribers are notified one month before their subscriptions expire. By renewing about-to-expire subscriptions promptly old readers are sure to be served regularly and not miss issues. Subscribers who neglect to send a renewal order promptly will have their orders placed on the waiting list along with new subscribers becoming eligible for reinstatement when an opening occurs.

We are striving to take care of old friends first, after which it's a case of "first come — first served". Please cooperate. Answer expiration notices promptly or extend your present subscription now. Thank you.



## Extend YOUR "RSD" Subscription NOW

A 1-year renewal subscription to RADIO SERVICE DEALER costs — \$2.00 — 2-year renewal subscription costs \$3.00.  
Canadian & Foreign Subscriptions are \$3.00 per year.



## AMERICAN RETAILERS ARE SELLING MORE AND MORE WAR BONDS

**A** SINGLE patriotic retailer in the East has donated over 150 pages of advertising to War Bonds—and made over 40,000 individual sales!

He's just one of the thousands of far-sighted retailers who knew a good thing when they saw it, and climbed on the bond wagon.

Representative, too, is the midwest retailer whose sales in 9 months, without advertising, amounted to \$35,000. During the next 9 months, with advertising, his War Bond sales topped the impressive total of \$315,000! At the same time, he made what he rightly called a "profitable investment" in the future of his community—and his own store! This is also true of the countless progressive retailers who are giving floor space

—in one case the entire first floor on Pearl Harbor Day—to bond selling activities.

Every War Bond you and your organization sell is an immediate aid in curbing inflation. A constructive help, too, in building economic security for your community! Healthy reserves in War Bonds will enable families to carry on comfortably through the reconversion period—maintain normal living standards—and look forward with confidence. Their reserves are your reserves—and your community's reserves!

The growth of your business is dependent upon the growth of your community. Advertise . . . display . . . sell War Bonds to help win the war—and peacetime prosperity for your community—and your store!

*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.* ★

**SEND  
SHOP NOTES  
See Offer on Page 42**

**NATION-WIDE  
MAIL ORDER  
DISTRIBUTORS  
SINCE 1928**



**RADIO AND  
ELECTRONIC  
DEVICES**

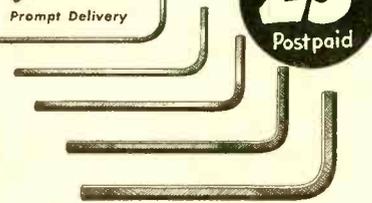
For...

**TRADE... INDUSTRY...  
COMMUNICATION...  
PUBLIC UTILITY...  
VOCATIONAL AND  
EXPERIMENTAL  
APPLICATIONS**

**BURSTEIN-APPLEBEE CO.**  
1012-14 McGEE ST.  
KANSAS CITY 6, MISSOURI

ANOTHER **OLSON** SCOOP!  
Radio Warehouse

**5 HEX  
Key Wrenches**  
Prompt Delivery **25¢**  
Postpaid



Here's a chance you've been waiting for! Handy, hexagonal Key Wrenches in five different sizes... all for one bargain price. Get this Olson Special wrench-set of many uses!

**Free Catalogs**  
Are you getting our monthly Catalog of Available Parts? Write us at once and you will receive them regularly. No charge, of course.

MAIL COUPON NOW!

**OLSON RADIO WAREHOUSE**  
73-B MILL ST., AKRON, OHIO

Please send me \_\_\_\_\_ sets of Hex Wrenches at 25c per set.  
I enclose \_\_\_\_\_ in  coin  stamps.  
NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_

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**• Ted McElroy**  
World's Largest Manufacturer of  
Wireless Telegraphic Apparatus  
COMPLETE CENTRAL OFFICE EQUIPMENT  
**McElroy Manufacturing Corp.**  
82 Brookline Avenue • Boston, Massachusetts

**DISTRIBUTOR NEWS**

[from page 46]

and the counties of Nassau, Suffolk on Long Island, and Westchester county. Other lines handled: Magic-Air vacuum cleaners, G. E. appliances, Mix-Master, Hanovia sun lamps, and Manning-Bowman appliances.

**RCA-VICTOR:**

J. W. Cocke, Dallas regional manager: McGregor's, Inc., Memphis, Tenn., covers that area plus Little Rock, Ark., territory, for radio and phonograph instruments, records, tubes, parts, test equipment and industrial sound equipment. Midland Specialty Co., El Paso, Texas, for west Texas, New Mexico, and Arizona territories. Export sales in Chihuahua, Sonora and Baja-California, Mexico. Lines handled will be the same as mentioned above, and in addition: Gibson refrigerators, Apex washing machines, Duo-Therm heaters and Proctor appliances.

**STEWART-WARNER:**

Frank A. Hiter, senior vice president: Kinney Brothers, Los Angeles, for southern California and the Pacific Coast. The Kinney brothers are the owners of Kinney Iron Works, Kinney Aluminum Co., National Aircraft Equipment Co., Kinney Engineering Co., and several other southern California manufacturing enterprises. In addition to radio, the distributors will handle home appliances.

**STROMBERG-CARLSON:**

Bell-Clark Co., Allentown, Pa., for eastern Pennsylvania covering Easton, Allentown, Wilkes-Barre, Scranton and Reading.

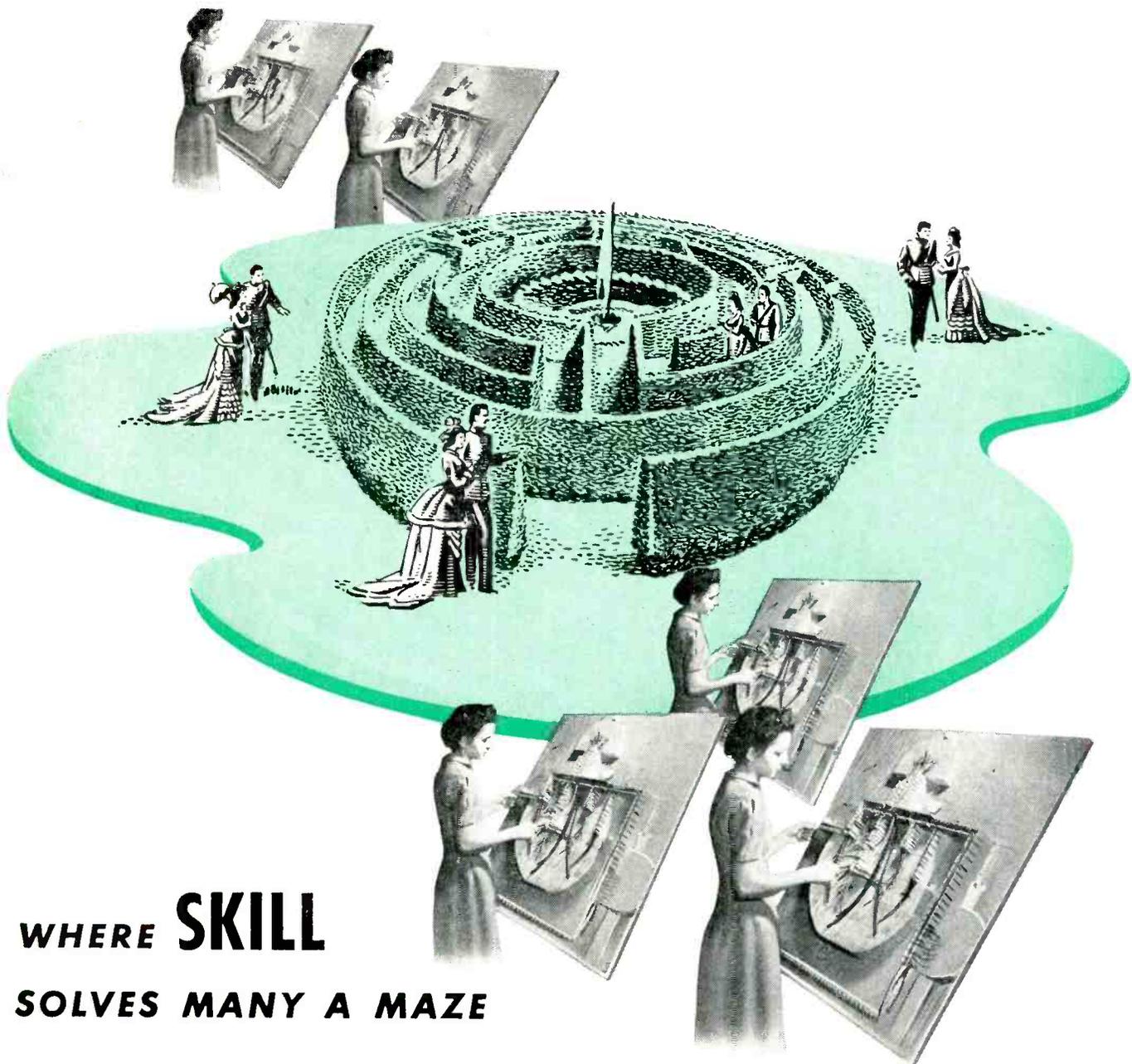
**ZENITH:**

Henry C. Bonfig, vice president in charge household radio: Shobe Inc., Memphis, Tenn., for one of the largest and most important trading areas in the South, including west Tennessee, northeast Arkansas, northern half of Mississippi and southeast Missouri.

**ITEMS:**

R-L Electronic Corp. open at 731 Washington Blvd., Chicago, Ill., as distributors of radio and electronic parts.

Walker-Jimieson, Inc., Chicago, Ill., expand their office and warehousing facilities. Operadio intercommunication units, which the firm distributes, provide instant communication between key personnel located in various parts of the premises.



**WHERE SKILL  
SOLVES MANY A MAZE**

**I**ntricate problems in electronic munitions making, requiring advanced radio engineering, find ready solution at International Detrola, where the quick questions are: how well?—how exacting?—how swiftly can we build it? Trainloads of first-quality equipment sent to our troops afield echo the answers. The day is coming when these war-tested talents will provide the very finest in Detrola-built Radio Receivers . . . Television Receivers . . . Automatic Record Changers, and other electronic instruments.

**DETROLA RADIO**

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

C. RUSSELL FELDMANN



PRESIDENT

**BUY MORE WAR BONDS**

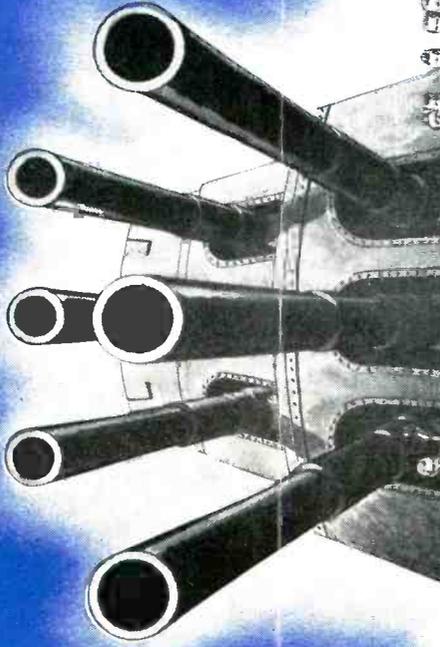
# "Meet Your Navy"

Now Carries the RAYTHEON Name  
Info 3,500,000 Radio Homes Each Week!!

## Free!

Ask your Raytheon distributor for colorful, attention-getting "Meet Your Navy" display to tie in with this great program. Easel-mounted, 17 1/2 inches x 20 1/2 inches.

All Four Raytheon Divisions  
Have Been Awarded Army-  
Navy "E" with Two Stars



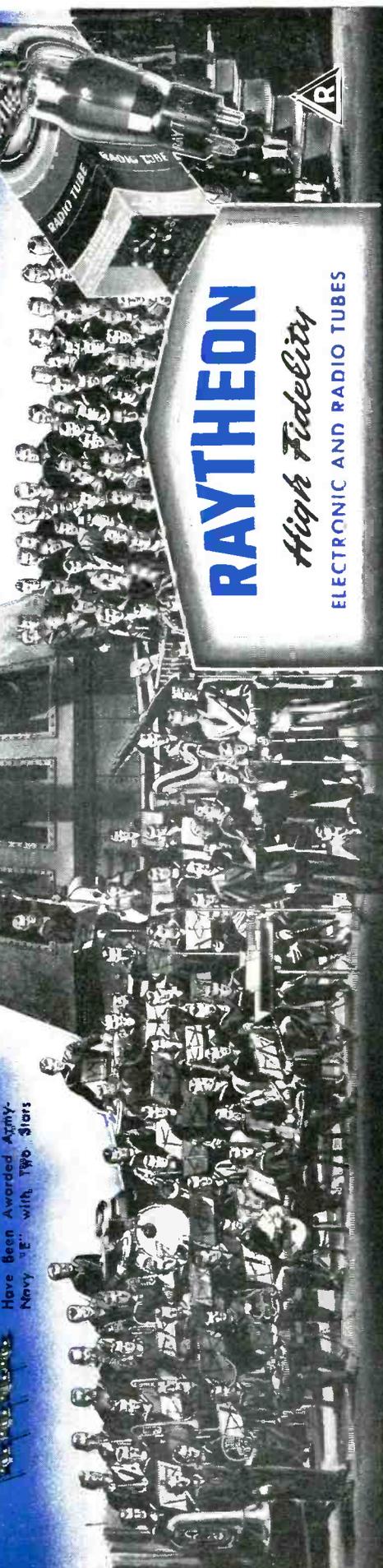
*Every Saturday Night*

ENTIRE BLUE NETWORK

*Coast to Coast 181 Stations*

RAYTHEON MANUFACTURING  
COMPANY

*Waltham and Newton, Massachusetts*



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