



# RADIO SERVICE NEWS

PUBLISHED · IN · THE · INTEREST · OF · RADIO · SERVICE · SALES · ENGINEERS

MARCH, 1938

CAMDEN, NEW JERSEY

Vol. 4, No. 2

## TUBE CONTEST ANNOUNCED

### NEW RCA TEST OSCILLATOR IS A-C OPERATED, SELLS FOR \$29.95

Big Easily-Read Dial And Accuracy of 2% are Other Features of New Instrument

Low price and complete a-c operation distinguish a handsome new RCA Test Oscillator No. 153 which makes its bow to the trade this month.

RCA Test Oscillators have been popular ever since the old Model 97 made laboratory accuracy and light weight available in an instrument priced to fit the needs of service men. Despite the fact that RCA Oscillator No. 153 has several new features and is of traditional RCA quality, the price of \$29.95 is the lowest at which an RCA Oscillator has ever been offered.

Nothing has been overlooked to make this oscillator ideal for service use. The size and weight make it suitable for use in the customer's home as well as in the shop. The control panel with its large dial is designed both for convenience to the operator and impressiveness to the customer.

#### Greater Accuracy

The full-vision airplane-type dial, 6½ inches in diameter, covers over 50 inches of dial scale length in the six bands. Accuracy of calibration is within 2%. The fundamental frequency range is 100 kc to 30,000, ample for servicing all home receivers. For ultra h-f testing, harmonics of the last band may be used. Other features of the No. 153 Oscillator are:

1. Completely a-c operated.
2. High RF Output. (1.0 volt). Essential for locating trouble on an inoperative or completely misaligned set or for single stage alignment work.
3. Three attenuator taps plus fine control giving continuous

(Continued on Page 6, Column 3)

### Television Parts Announced To Experimenters

Fascinating New Field Of Operation Is Opened To Amateurs

In line with RCA's policy of encouraging amateur interest in television and cooperating with those amateurs who may wish to experiment in this fascinating field, the company has now made available to amateurs certain specialized television parts that would be difficult to obtain elsewhere.

In announcements in RCA Radio Service News and other leading trade papers, RCA recently explained the present status of television and offered amateurs for the first time two television receiving tubes, RCA Kineoscopes (Registered Trade Name) Nos. 1800 (9-inch) and 1801 (5-inch) priced at \$60.00 and \$40.00 respectively. The parts now offered to amateurs are for use with these two tubes.

#### Folder on Request

An illustrated sheet describing the parts and giving wiring diagrams.

(Continued on Page 7, Column 4)

### Poor Charlie!



What is this strange power Charlie McCarthy has over women? Charlie appears not to entirely approve of the actions of Andrea Leeds, another NBC performer—and if he really doesn't we are at last convinced he really is a dummy

### Big Prizes For Letters About Metal Tube Jobs

Modernization Contest Starts At Once; Ends April 30th

How would you like to win, absolutely free, a wonderful assortment of the famous RCA Test Instruments—five major service instruments and an assortment of small tools totaling \$250.00 in value? That's the reward you'll get if you are the first prize winner in a new contest being sponsored by the Radiotron Division of the RCA Manufacturing Company, Inc.

It is called The RCA Modernization Contest and you don't have to buy anything, save labels, or work puzzles. All you have to do is write a winning letter about a type of service job that radio service engineers are doing every day at a nice profit to themselves.

The RCA Modernization Contest was designed to help the service shops and dealers who are cashing-in on the market created by the improved performance obtained in radios which have been changed over from "G" type (octal base and glass envelope) to all-metal tubes. Hundreds of dealers have discovered that their customers are eager to have their radios modernized for metal tubes when they are told how little it costs. RCA wants to know how these sales are being made and how the work is being done, and they are willing to pay well for the information.

#### Corresponding Types

Nine popular types of all-metal tubes are replacements for corresponding "G" types so far as general characteristics and bases are concerned. To obtain the improved performance from the better shielding and sturdier construction of the metal tube, all that is necessary is to slip the metal tube into the socket or make minor trimmer readjustments for the several types used in radio frequency sections of the receiver.

These interchangeable types are as follows:

6A8G—6A8	6F5G—6F5
6L6G—6L6	6H6G—6H6
6L7G—6L7	6J7G—6J7
6F6G—6F6	6K7G—6K7
6J5G—6J5	

#### Plenty of Prizes

The first prize is a dream: five famous RCA test instruments plus all the small RCA bench tools; fourteen units in all valued at over \$250. The winner gets his choice of any five RCA test instruments, not including however the large laboratory type 9" oscillograph.

The second prize is a complete Home Study course in the RCA Institutes, oldest and best known of the nation's radio schools. The winner of this second prize may choose any of the Institutes' three courses:

The Radio and Sound—regular  
(Continued on Page 5, Column 4)

## FRANCHISE PLAN ADOPTED FOR COMMERCIAL SOUND DEALERS

RCA Authorized Dealers Will Have Many Selling Advantages; Applications Being Received

### New Window Display For Tube Dealers

First Unit Of New Service Is Ready For Shipment

Striking window displays throughout the year are now available in the 1938 radio tube display service, according to Forrest E. Crain, in charge of Radiotron advertising.

"With our new window display service and a supply of window display cards, you have attractive windows 12 months of the year," said Crain, in describing the service before a recent meeting of RCA radio tube distributors. "The 'walking' figures of the first unit, which is now ready for shipment, never fail to attract attention in a window, and they can be used in a thousand different ways, in groups or in conjunction with other store merchandise. They add life to any window

(Continued on Page 4, Column 5)

A rare opportunity is now open to a limited number of people to become Authorized Dealers in RCA Commercial Sound Equipment. A plan recently inaugurated will give several valuable advantages, including a protected territory and exclusive merchandise, to those who can qualify.

"The selling and renting of commercial sound amplification equipment is a specialized business and needs a special type of dealer, although by no means need the dealer specialize exclusively in this field," declared W. L. Rothenberger, Manager of RCA Commercial Sound Section, in announcing the new plan. "The business is growing so rapidly that there is a real opportunity for a limited number of dealers to feature commercial sound work and to become known in their communities as headquarters for this type of equipment."

"In the commercial sound business there is particular need of close cooperation between factory, distributor, and dealer. We are therefore encouraging our distributors to select outstanding dealers or service shops to be Authorized RCA Commercial Sound Dealers.

#### Dealers Benefit

"These dealers will receive many benefits. Only a limited number of dealers will be chosen, thus giving each Authorized Dealer a protected territory. Exclusive RCA mer-

(Continued on Page 6, Column 3)

### AC Operated Oscillator



Newest member of the famous RCA family of Test Oscillators is No. 153, shown above. It is distinguished by its high degree of accuracy, wide range, large dial, and low price of only \$29.95. It is entirely a-c operated

## ANTENNA STOPS INTERFERENCE FROM HIGH LINE

### Magic Wave Antenna Gives Good Reception In Bad Spot, Says Dealer

For perfect reception under adverse conditions, install an RCA Magic Wave Antenna suggests B. L. Hinnant, of the Columbus Motor Company, Whiteville, S. C., who supports his suggestion with a report of his actual experience using this remarkable antenna system.

"We want to drop you a line in praise of your new Magic Wave Antenna," wrote Hinnant in an unsolicited letter to the RCA Manufacturing Company. "We have a customer who lives about 300 feet from a 60 kv line and who is fed from a transformer operating on a 4,000-volt primary derived from this same line. For five years radio reception was an impossibility with either a battery or an electric radio.

"Today we tried an 86BK (an RCA Victor battery receiver) with



Magic Wave Antenna Kit

the conventional antenna, locating both the radio and the antenna in the most favorable spot in the house with respect to the power line, and it was impossible to even hear anything but a station background of speech.

### Magic Wave Solves Problem

"The writer then erected one of the RCA Magic Wave Antennas on two 40-foot poles, all work being done in accordance with the instructions furnished. The antenna was located 75 feet from the house. Reception was perfect with the battery set and equally good with the electric set. Needless to say we sold him a nice electric."

Columbus Motor Company  
B. L. Hinnant

### Other Features Praised

Splendid performance is only one of the features that service engineers are enthusiastic about in their comments on the Magic Wave Antenna, according to L. A. Goodwin, Jr., of the RCA Parts Sales Department, who receives many unsolicited letters praising this new RCA achievement in antenna systems. "Performance is the first consideration, of course," stated Goodwin, but the adaptability and ease of installation of the Magic Wave antenna have also made a big hit with the men who have to erect them. This antenna can be adapted

## LOW PRICED RADIOS ADDED TO RCA'S LINE

### Electric Tuning Now In Small Radios; Two Sets Have No Dial

Announcement of a number of outstandingly low-priced RCA Victor instruments, with Electric Tuning and other features, was made by Paul C. Richardson, Manager of the Radio and Phonograph Division, following three regional meetings for RCA Victor wholesalers in Philadelphia, Chicago and San Francisco.

Included in the new series are a 4-tube AC-DC table model; two extremely compact Electric Tuning table models; and a 5-tube AC Superheterodyne table model, all under the \$20.00 price bracket. There is a 6-tube chest type model selling for \$39.95 as well as a 6-tube electric tuning table model at \$49.95. A 7-tube electric tuning radio in both table and console types, sells for \$69.95 and \$89.95, respectively. The prices are all F. O. B. Camden, N. J.

At the meeting, Mr. Richardson announced an increase in the list price of the 87K-1 from \$89.95 to \$99.95. Two exceptional values in phonograph-radio instruments were also presented by Mr. Richardson in the U-106 and U-108 models, with automatic record changing mechanisms for both 10" and 12" records. The U-106 is priced at \$199.95 and the U-108 will be priced as a companion instrument to RCA Victor's U-109, which sells for \$450.00.

### Distributors Enthusiastic

All of the new models were enthusiastically received by the wholesalers at their premier showings in the three cities. At the Philadelphia meeting, Henry C. Bonfig, Commercial Vice President, outlined the Company's merchandising program. He was followed by Mr. Richardson who presented the new home receiver models. Jack C. Marden showed five new auto radios, ranging in price from \$19.95 to \$59.95 which had been announced a short time before.

E. W. Butler, presented the new phonograph-radios and Ted Wallerstein, Record Sales Manager, discussed the opportunities in the musical merchandising field. T. F. Joyce, RCA Victor Advertising Manager, reviewed the Company's advertising and sales promotion for the past year, and D. J. Finn presented the promotion program for the new merchandise. Fred Wilson, Manager of Field Activities, acted as master of ceremonies for both the Philadelphia and Chicago meetings. The same RCA Victor executives

to any type of job—vertical or horizontal signal collector may be used and the antenna proper may be anywhere from 20 to 120 feet long.

## A Hit



RCA Victor's newest sensation, this dial-less radio that brings you your six favorite stations at the touch of a button, has made a big hit wherever shown. This is Model 94X1; it's priced surprisingly low

conducted the Chicago meeting, and James W. Cocke, Western Division Manager, and Tom Joyce divided the presentation duties in San Francisco.

### 94X-1 and 94X-2 Have No Dial

The model that attracted the most attention was the 94X-1, a compact four-tube AC-DC receiver with six push buttons, housed in a cabinet measuring only about 8" x 8" by 6". There is no dial and all the controls, including one for volume, are on top of the case. The pre-selected stations are indicated on the buttons. Other features of this model are a built-in antenna and electrodynamic speaker. The list price of this as well as all the other 4-tube table models and the 5-tube set will be announced locally by the wholesale distributor in each territory. The same 4-tube chassis is also available in a maple cabinet, with a "waterfall" roll top. This is Model 94X-2.

The 94X is a 4-tube, AC-DC operated receiver, with conventional manual tuning. This model has a clock-type dial. Also in the lowest price bracket is the model 95-T, a 5-tube AC operated superheterodyne of the chest type, with a rectangular clock-type dial. Model 86-T-2, selling for \$39.95 is a 6-tube table model with unusual performance features, in a chest-type of cabinet, rounded at one end for extra smartness in styling. It has RCA's straight-line dial.

Another sensational table model now in the RCA Victor line is the Model 86T-6. Although this instrument has the modern small chest-type cabinet, it includes electric tuning with six-button instantaneous electric tuning, straight-line dial, and a six-tube three-band superheterodyne circuit. The list price is only \$49.95, F. O. B. Camden.

Distributors showed great interest in model 87T-2, an Electric Tuning radio with seven tubes, straight-line dial, and Magic Eye tuning indicator. This instrument lists at \$69.95 F. O. B. Camden. 87K-2, is a 7-tube superheterodyne with three bands and the same features as the 87K-1 model which RCA Victor announced several weeks ago. It is enclosed in a different style of cabinet, and has RCA Electric Tuning, at a list price of \$89.95, F. O. B. Camden.

### Low-Priced Combinations

The two new phonograph-radios are equipped with automatic record changing mechanisms to accommodate both 10" and 12" discs. They utilize a new "feather weight" true-tracking crystal pick-up. The U-108 is a deluxe instrument, with Electric Tuning, higher-fidelity tone quality, a dynamic expander, Magic Voice and many other distinctive features. This 16-tube instrument incorporates every modern feature for complete home entertainment, and is housed in a luxurious cabinet designed after the Adam furniture period.

The U-106, is a 9-tube combination which brings high-quality record reproduction and radio reception into the home at a new low price for its value. All the controls, including the dial and the Electric Tuning push-buttons are concealed under a spring-balanced lid of a down-to-the-floor cabinet of substantial proportions. Priced at \$199.95, the U-106 represents the biggest phonograph-radio value in RCA Victor history, Mr. Richardson said.

## Public Favors New Forms Of Auto Antennas

### Orders Prove Owners Approve Streamlined Auto Aerials

That the public "goes for" auto antennas that are attractive as well as efficient is proved by the way orders have piled in for the recently announced new RCA Auto Antennas, states J. A. Milling, Sales Manager of RCA Parts Department.

"The early auto antennas were tolerated but not approved by car owners. This is proved by the hit our new streamlined antennas have made. We have had many reports from dealers indicating that they have discovered that they can sell the new antennas not only to purchasers of new auto radios but also to people who want to eliminate their present unsightly aerials. And the smart appearance of the new streamlined auto antennas is making it easier to sell not only antennas but also the auto radio itself.

### Monogram Aerial Popular

"The RCA Monogram Antenna and the Cowlenna seem to share equally in public favor, with the Rodenna that fastens on the hinge and the old-reliable Di-Pole for running board installation not far behind.



Monogram Antenna

"The Monogram Antenna, although the highest in price—\$4.95 list—has the edge on any of the other types in popularity. This is probably because it preserves perfectly the symmetry of the car's lines and is so easy to install. The telescopic sections allow it to fit any car and the top section is held in place by a cemented cup—no drilling required.

### Advertising Stunt

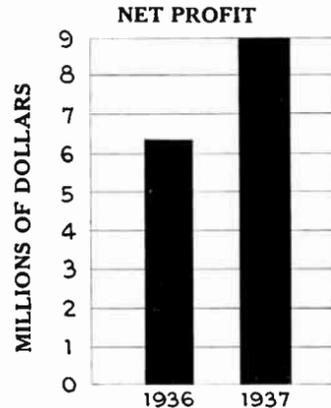
"The Cowlenna, at \$3.65 list, and the Rodenna, at \$2.75 list, also make very attractive installations. For the owner that wants an antenna that's out of sight and out of mind because it's highly efficient, the Di-Pole at \$2.60 continues to be the best buy.

One dealer wrote us that he got some good advertising—and some business—by mounting a sign run-

## RCA SALES UP 11 MILLION, REPORT SHOWS

### Company Moves Ahead with Better Earnings for 1937

The confidence placed in RCA by its customers, distributors, and dealers, as well as the hearty acceptance of the newest thing in radio—Electric Tuning—were responsible for an increased sales volume of over \$11,000,000. This is reflected in both the 11% increase in gross income and 46% increase in profits



reported in the annual statement of the Radio Corporation of America. The increase in net profits is largely a reflection of more efficient operation, both from the standpoint of distribution of its products and introduction of products having greater public acceptance.

Smart dealers can read between the lines of the RCA Annual Report and find this their opportunity to make more profits, because only as their dealers prosper can RCA prosper.

ning lengthwise on the top of his car and right behind his Monogram



Cowlenna

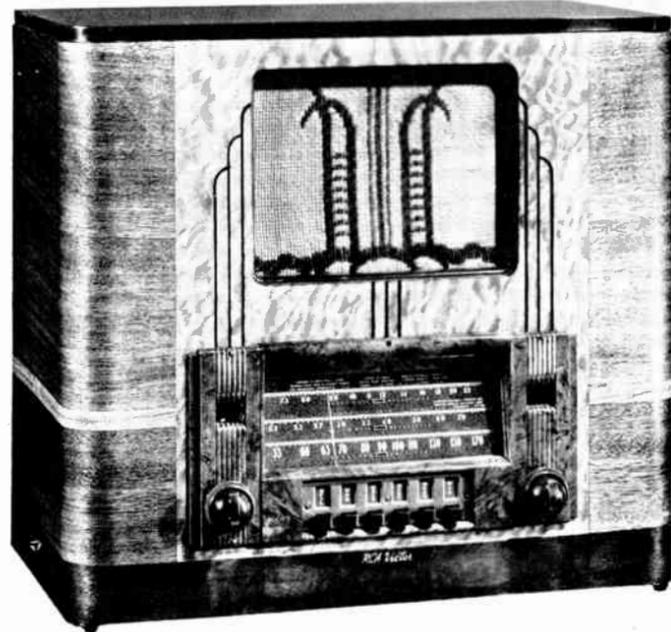
Antenna. The sign read, 'An antenna like this on your car, \$6.00. Not a bad idea, is it?'

## Silas Egglemud



"Is the boss dumb! I told him I'd fixed the trimmers and he said it served the dirty gyps right."

## Console Features In Table Model



Electric Tuning, automatic volume control, and the easily-read Straight Line Dial are only a few of the features of RCA Victor's new Model 87T-2 shown above. It brings reliable electric tuning with automatic volume control to the low price field

# SHOP NOTES

FROM RCA SERVICE DIVISION

To keep the readers of Radio Service News posted on the latest changes in and additions to RCA Products and technical literature, the RCA Service Division will report changes in this column from time to time.

To get the most benefit from this column it is recommended that the readers of RCA Radio Service News transfer these changes and additions directly to their Service Notes on the particular model. By doing this, you are assured of always having the latest information handy.

## Special Advantages of Stock No. 9812 Magic Wave Antenna

The characteristic band-pass action of the Magic Wave Antenna between 500 kc and 23,000 kc, and its ability to isolate coupling between the receiver power supply and antenna, render the system particularly useful in localities where certain unusual interference problems may exist. Types of interference in this category that may be reduced through use of the Magic Wave Antenna are as follows:

(1) **Cross Modulation**—Abnormal r-f signals from local stations may often times be present on the power circuits to which the receiver is attached, and will be introduced by mutual coupling through the antenna capacitance to the receiver input, causing stray modulation effects. Since the Magic Wave Antenna is designed so as to efficiently eliminate capacity coupling between the receiver and transmission line, and between the transmission circuit and the antenna transformer primary, the unwanted signal from the power circuit is eliminated. The ground lead of the antenna coupling transformer must be kept to a minimum length, in severe cases of this interference. The addition of a power circuit filter, with a separate and short return to a good ground will provide additional improvement where needed.

(2) **Long Wave Code**—Coastal communication stations operating at frequencies near to the I-F of the particular receiver involved will be definitely attenuated by the Magic Wave Antenna. The amount of reduction on signals in the i-f range, 450-470 kc amounting to approximately 6 to 1. Where the antenna is used as a means of minimizing this type of interference, the standard 60 foot section supplied, should not be lengthened. Further improvement, in extreme cases, is of course obtainable with standard RCA Wave Traps.

(3) **Image Response**—Signal frequencies above 23,000 kc can not readily cause image response on "C" band where the Magic Wave Antenna is used, due to the high frequency cut-off of the system and resultant attenuation in that range.

(4) **General**—Installations of broadcast receivers on shipboard can be benefited by use of the Magic Wave Antenna, in that cross-modulation and shock excitation effects of the ship's transmitters operating at 500 kc and below, will be suppressed.

Due to an intermediate band-elimination range of the Magic Wave System between approximately 2000 kc and 4000 kc; image and cross modulation interference from stations within this range can, in many cases, be corrected by employing this antenna alone.

## Stock No. 11218 Driver Transformer

Replacement units of stock No. 11218 driver transformer have been recently modified in construction, so that the primary d-c resistance now equals 1350 ohms, and the total secondary resistance equals 2000 ohms. These same units also have an extra lead, which is color coded RED-GREEN. This lead has a definite purpose in reversing any electrolysis that may occur in high humidity regions, so that the life of the transformer is prolonged. The extra lead is internally connected to the core of the transformer, and should be connected externally, during installation of the unit, to the GREEN primary lead or to a point of plus "B" potential.

## Lack of Sensitivity—Model 85T1

Resistor R-13, which forms part of the divider system supplying residual bias to the first detector and I-F stages, must be of the correct value. In receivers where sensitivity is poor, variation of value of this part should be checked as a likely cause. If measurement apparatus available does not extend to 6.8 megohms, the resistor should be replaced with a standard stock No.

14661 unit. Removing R-13 from the circuit entirely will be permissible where a slight excess of sensitivity can be tolerated.

## Phonograph Turntable—Models U-107 and U-109

Replacement turntables Stock No. 14759 have heretofore been shipped less the flexible damper part. This part will be packed with the turntable in the future, and will also be available separately as stock No. 14762.

## Replacement Governor—Model 7U2 Motor

Where it is necessary to repair the motor on Model 7U2 due to a faulty governor mechanism, part No. 11703—Governor, may be used for replacement.

## Dial Drive Slippage—Model ACR-111

Slipping of the dial drive mechanisms, on any instruments so affected, may be centered either in the friction drive disc assembly or in the idler of the belt system. The recommended methods of repair are:

(1) Install new stock No. 14453 friction drive disc tension spring. The later springs of this type have a fewer number of turns and are of different hardness. Excessive grease on the friction disc will accentuate slippage, hence it should be carefully cleaned with carbon tetrachloride or equivalent.

(2) The idler gear spring should be replaced, using stock No. 14450. This spring has been modified to have 30 turns instead of the original 43. Reduction of the number of turns, as indicated, will of course be satisfactory where replacements are not readily available. The idler should be carefully examined to certify that it is not binding on its bushing.

## Trip Pawl Assembly—Models U-107 and U-109

The stock No. 6503 trip pawl assembly is incorrectly specified for the record changing mechanism of Models U-107 and U-109. The correct assembly is stocked as No. 30624.

## Clutch Pin on Electric Tuning Motors

The small clutch pin, which is fitted to the end of electric tuning motor shaft, and engages with the gear mechanism may be obtained separately as a replacement by ordering stock No. 30252. Five pins are supplied in each package.

## Turntable Plate—10-Inch Type

The turntable plate used on Models 5U, 7U, D 7-7, R-95 and R-93-2 is carried in stock less rotor ring laminations as Stock #13956. This plate is thus available for replacement purposes on assemblies #11737, #11738, #11739, #12048, #12049 and #13084. The importance of exact centering of the rotor laminations in respect to the spindle and stator should not be overlooked in exchanging these turntables.

## Model 15K Cabinet—Veneer Lifting

Cabinets of this type, on which the veneer is blistering or lifting away from the solid wood core on the left or right pilasters, should be turned over to a competent local cabinet maker and refinisher for repair. Satisfactory and permanent correction may be effected by the following method:—

- (1) Split the blister along the grain of the veneer with a sharp knife so as to form an opening which will allow insertion of glue.
- (2) Fill the cavity formed behind the loose veneer with a reliable furniture glue—animal type.
- (3) Rub the blistered veneer with a smooth object (head of hammer) until glue has become solidly set.
- (4) Sand down the repaired spot—if necessary—and refinish.

## CBS Star



Pauline Winslow appears frequently on CBS programs from the West Coast—and why shouldn't she? She starred on the CBS "Big Town" program, 8:00 to 8:30 P. M. Tuesdays

# Receiver 155 Now Sold for Only \$44.50

## New Low Price Offers Real Bargain for Amateur Operators

The popular RCA Amateur Receiver ACR-155 can now be obtained from RCA Amateur distributors for only \$44.50! Never before has a receiver with so many valuable features been offered at such a low price, according to E. Braddock, in charge of sales of RCA Amateur receivers.

The following brief summary of the refinements found in the ACR-155 indicates why this instrument made such a hit with amateur operators at its previous price of \$74.50. And it should be remembered that the new price of \$44.50 even includes tubes.

The ACR-155 is superheterodyne with a tuning range of 520 to 22,000 KC. employing nine metal tubes with a stage of r-f amplification for added gain and image suppression—a separate oscillator and separate first detector tube to assure a good frequency conversion factor over the entire tuning range—one stage of i-f amplification with magnetite-core transformer to give selectivity and high gain—diode detection with automatic volume control at will—an audio driver stage ahead of the audio power tube which furnishes 4.5 watts maximum output to the speaker—power supply mounted on chassis.

### Operating Convenience

As for operating features: An easy-to-read dial scale system for both the "band set" or main tuning and the "calibration spread." An individually calibrated main tuning scale appears in the dial aperture for each tuning range thereby avoiding confusion in determining to what part of the frequency spectrum one is listening. A 100-1 ratio tuning mechanism attached to the tuning control gives the "hand spread" required for communication service as well as making it easier to tune in all other signals. The tuning control has a large size knob which allows for greater hand movement in making close tuning adjustments—a real asset for extended periods of listening. The crank handle on the knob permits rapid frequency change within the tuning range. Other controls are as follows: sensitivity control, helpful in reducing background noises when tuning between stations and also to prevent "blocking" by strong c.w. telegraph signals; audio volume control; heterodyne or beat oscillator control for c.w. telegraph reception or as an

# Extensive Tube Advertising Plans Outlined By D. J. Finn

## Broadcasting Featured in 1938 Promotional Program; Dealer Tie-In Material Available

Plenty of sales ammunition and advertising support for RCA Radio Tube dealers is assured by the program already mapped out at tube headquarters, according to D. J. Finn, Radiotron Advertising Manager.

"During 1938 the RCA radio tube promotional program will feature many new and attractive sales plans designed especially to create more interest in the facilities that the radio service dealer has to offer," said D. J. Finn in discussing the advertising and promotional plans for this year.



D. J. Finn

Arrangements have already been made to Radiotron distributors enabling them to make available to their dealers more promotional material on attractive terms. The tried and proven Check-Up idea that sends customers into stores and service shops for the standard ten-point Check-Up will be featured again this year.

### Contest First Feature

"The first feature of the new RCA radio tube promotional program is the 'Modernization Contest.' [Details concerning this contest, together with the valuable prizes being offered, can be found in this issue on pages 1 and 8.]

### Tie-In with National Advertising

"Spot announcements are being arranged for the Magic Key program, which can be heard on the NBC chain every Sunday afternoon at 2 o'clock. In addition, all RCA Victor ads in The Saturday Evening Post, Colliers, as well as hundreds of newspapers will carry a 'plug' for RCA Radio Tubes.

### Material for Dealers

"And there is plenty of material

aid in tuning weak modulated signals; beat oscillator switch; power and standby switch, the latter for use during transmission periods; tuning-range selector; tone control, and jack for attaching headphones. A six-inch loudspeaker is mounted in the cabinet with provision for mounting a second loudspeaker to be attached to monitoring equipment.

The chassis is housed in a metal cabinet of pleasing design which is finished with a crinkled two-tone gray lacquer. The cabinet size is 24 7/8" long x 10 7/8" high x 12 3/8" deep and is fully ventilated. The complete receiver weighs 48 lbs.

Now is the time to see your RCA Amateur Equipment Distributor to get an ACR-155 for your radio station, short wave listening-den, service shop, or wherever receiving equipment having professional appearance and performance at low cost is desired. A postal card addressed to Amateur Radio Section, RCA Manufacturing Co., Inc., Camden, N. J., will bring additional information and the name of your distributor.

for dealers to use in tying in with our new 1938 program. This material is shown in a new sales promotion material catalog, form No. 2934, which dealers may obtain from their local distributors or by writing directly to us.

"Especially I wish to point out the importance of signing up at once for the 1938 RCA Radiotron Window Display Service. Dealers who subscribed for this service in 1937 know just how valuable and effective it is. The 1938 service is equally good and can be obtained this year from your local distributor. Get your order in at once and let this striking window trim go to work for you.

### Mat Catalog

"Also available to dealers, free upon request, is a new mat catalog showing proofs of all the ad mats available for dealer use. A wide selection, ranging from one column by two inches to two columns by six inches, is included. Many of the ads feature the ten-point check-up, a never-failing business-getter. These mats are given free to dealers. To obtain the mat catalog, ask for form No. 2759.

### Two Other Programs

"Two additional programs available to Radiotron dealers will soon be announced. These programs," says Finn, "are the most sensational ever offered RCA radio tube dealers and will be announced March 1."

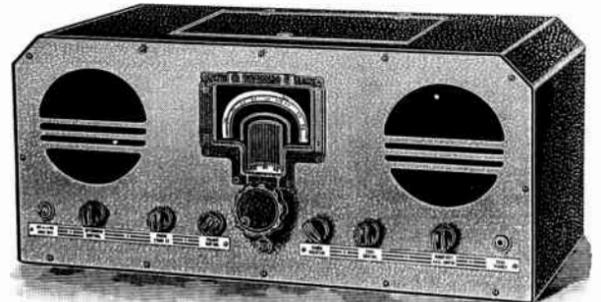
# Ten New Tubes Listed By RCA

Ten new RCA radio tubes, many of which are already in service in apparatus now on the market, have been announced to the trade by L. W. Teegarden, RCA radio tube executive. These tubes are intended for use in radio receiving sets and other apparatus designed to use them.

Deliveries on orders for the new tubes are already being made to the wholesale trade. The ten new types are listed and described as follows:

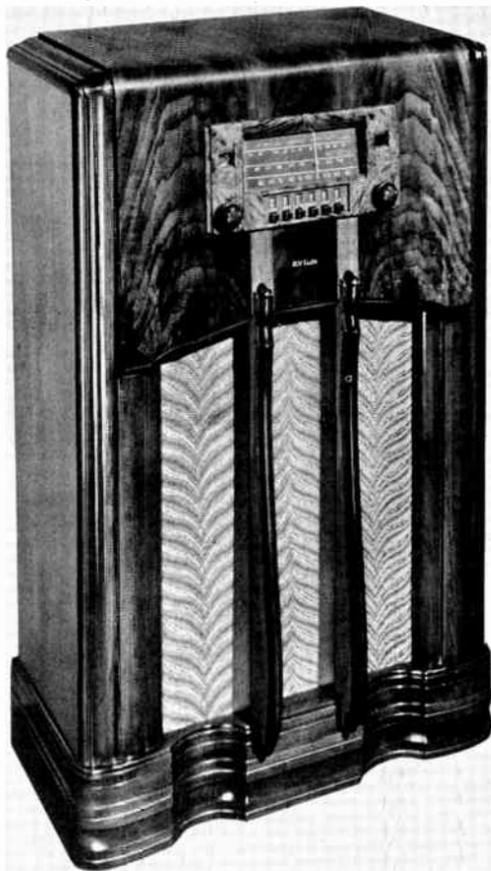
Type	Description	List Price
1G5-G	Power Amplifier Pentode... 2.0-volt filament	\$2.00
6AC5-G	High-Mu Power Amplifier Triode.....	1.10
6C8-G	Twin Triode Amplifier.....	1.50
6F8-G	Twin Triode Amplifier.....	1.50
6G6-G	Power Amplifier Pentode... 6.3-volt heater	2.25
6U7-G	Triple-Grid Super-Control Amplifier.....	1.35
6Z7-G	Twin Triode Power Amplifier.....	1.75
6ZY5-G	Full-Wave High-Vacuum Rectifier.....	1.50
25A7-G	Pentode—Rectifier..... 25.0-volt heater	2.25
6V6	Beam Power Amplifier..... 6.3-volt heater	1.75

## Ham Bargain



Probably never before has an amateur receiver with so many desirable features as the ACR-155 been offered at so low a price. RCA Amateur distributors now feature this instrument at only \$44.50, with tubes.

## Sensational Value



Priced to retail at well under a hundred dollars, this new, seven-tube, RCA Victor Model 87K-2 was acclaimed a sensational value at a recent meeting of RCA Victor distributors. Never before has RCA Victor offered electric tuning at so low a price.

## ELECTRIC TUNING IN MODEL 87K-1

By W. P. Maginnis  
R. C. A. Victor Engineering Department

The new model 87K-1 and 87K-2 are seven tube superheterodynes incorporating push-button tuning for six pre-selected stations in the broadcast band. In all other respects the receiver is a conventional three band receiver and covers frequency ranges of 540 kc to 1720 kc and 2300 kc to 22,000 kc. The extreme counterclockwise position of the range switch is the electric tuning position. Since the design of the push-button circuit was the major problem in the design of the receiver, it will be the purpose in this article to outline the problems which arose during the development of these circuits and to describe briefly the solution found for each of them.



W. P. Maginnis

Push-button tuning, as used in this chassis, had to be accomplished without the use of automatic frequency control. It was, therefore, necessary to develop an oscillator having very good stability with respect to line voltage changes and wide variations in temperature and humidity. It was also necessary to provide a simple method for setting the oscillator frequency. The receiver input circuit also was to be tuned by the simplest possible method and had to be reasonably stable to insure good sensitivity and signal-to-noise ratio.

### Three Frequency Ranges

The tuning range covered by the push-button circuits is 540 kc to 1550 kc. It is obvious that no simple and cheap method is available which would permit the antenna coil to be tuned continuously through this whole range. The determination of a suitable set of frequency ranges was, therefore, the first step taken in the design of the electrical tuning system.

Investigation of the stable capacity range of mica compression trimmers indicated that a frequency range of 1.8 to 1 could be covered in the antenna circuit with good stability. This gave the following ranges for three sizes of trimmers:

- 1—540 kc to 980 kc
- 2—680 kc to 1220 kc
- 3—860 kc to 1550 kc

### Station Frequencies Studied

A considerable amount of data has been accumulated by the Service Division concerning the most important broadcasting stations in the large centers of population in this country. Last year, the Service Division submitted a questionnaire to our distributors and dealers which asked them to list the eight most important stations in their territories in the order of their importance. When the proposed ranges for the push-button receiver, as listed above, were checked against the lists of stations supplied by the

field organization, it was found that they could be expected to satisfy the large majority of listeners in metropolitan areas.

The actual tuning ranges of the antenna circuits, as the receiver is being manufactured, are considerably larger than those listed, but the circuits are most stable when tuned within the ranges noted above. Two stations are available in each of the three tuning ranges. The trimmers are of the dual type with two units mounted on a single ceramic base.

### Oscillator Circuit Problems

In the design of the oscillator circuit, several problems arose in connection with frequency stability. The design of a circuit which would be reasonably stable with changes in line voltage was not difficult. No great trouble was experienced

in realizing a frequency shift of less than two hundred cycles per second for line voltage variations of plus or minus twenty volts from the nominal of 115 volts. The circuit used in the receiver is shown in Figure 1. Coil "A" is the oscillator tickler coil for operation on the standard A band or on electric tuning. Coil "B" is closely coupled to "A" and is connected through the push-button switch to the oscillator coils used on electric tuning. S<sub>1</sub>, S<sub>2</sub>, S<sub>3</sub>—are the push-button switches connecting the pre-tuned oscillator coils to the oscillator circuit. The inductance of Coil "B" was made as small as possible without seriously affecting the inductance range of the low frequency push-button oscillator coils. In the final design of the 87K1, this inductance is about ten times the maximum inductance of the oscillator coil. The capacitor "C" is a temperature compensated unit which will be described later.

It is well known that in a conventional oscillator circuit using the more common materials in the component parts, the oscillator frequency will decrease with an increase in ambient temperature. In the circuit described above, this frequency shift is due to two factors. The first is the increase of dielectric constant of the insulating materials with a rise in temperature. These materials are bakelite which is used in the switches, tube sockets, and coil forms and wax and enamel which are used in the coils. It has been pointed out by J. M. Miller in "Electronics" for November 1937 that these poorer dielectrics have a

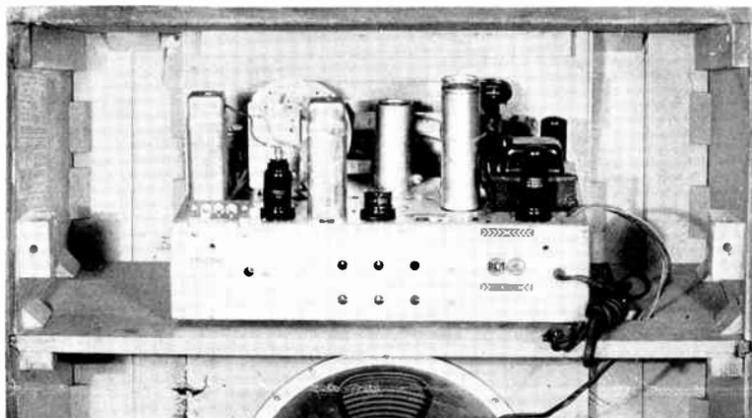
about 140 uuf it was necessary to use a temperature compensated condenser, the capacity of which would be reduced by .9 uuf for a rise in temperature of 30° C. The use of this type of capacitor reduced the thermal drift in the oscillator circuit to less than one kilocycle for a change of 30° C. in ambient temperature. This is considered satisfactory.

This condenser is made by placing two condensers in parallel. One unit has a negative capacity change of two per cent for a thirty degree rise in temperature. The other unit has a positive capacity change of .36 per cent for the same rise in temperature. This is accomplished by use of a different dielectric material in this second condenser. Since the total nominal capacity is 100 uuf the first unit has a capacity of about 55 uuf and the second unit a capacity of about 45 uuf to produce the required loss in capacity. The units have proven to be quite stable and the temperature compensation is very reliable.

### Rigid Mountings For Coils

The mechanical design of the oscillator coil assembly provides a rigid mounting for the coils. This is extremely important if stable operation is to be realized. The coil forms are mounted by pressing them on knurled brass bushings which are staked into a rigid base plate.

Three different types of oscillator coils are used in pairs. The nominal frequency ranges of the oscillator coil are considerably larger than those of the antenna circuit



Chassis of Model 87K-1

rather high positive temperature coefficient of dielectric constant.

### Magnetite Coils

The second factor influencing the oscillator frequency is the motion within the coil of the magnetite plug due to thermal expansion of the brass stud on which the plug is moulded. This results in a change in coil inductance which, in this design, is in the positive direction.

to take advantage of the full range of the antenna trimmers rather than only the nominal range. The oscillator ranges are listed below. These are signal frequencies tuned by the oscillator and not oscillator frequencies, which are 460 kc higher.

- 1—540 kc to 1160 kc
- 2—600 kc to 1265 kc
- 3—765 kc to 1550 kc

The low frequency end of the broadcast band has been favored in these ranges, a procedure which is justified by the Service Division data previously referred to.

The push-button oscillator coils are solenoids wound on RCA Bakelized Tubing with a 3/64" wall thickness. The coil form is quite

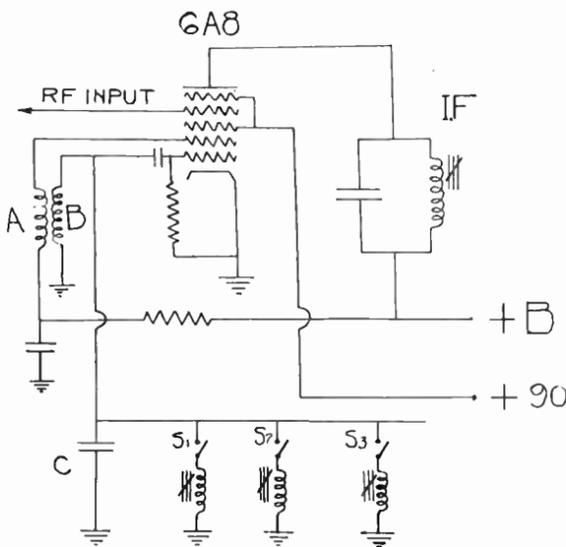


Figure 1

The two factors affecting the frequency are therefore additive.

Heat runs were made on a complete receiver chassis using a fixed capacitor in the oscillator tank circuit which was known to have a negligible amount of change in capacity with variation in temperature. The ambient temperature was varied between 30° C. and 60° C. These runs showed an average shift in oscillator frequency of about 4.5 kc. The shift was reasonably constant over the broadcast band because the shift due to the magnetite plugs was most pronounced at the low frequency end of the band where the plugs were pushed well into the coil. This tends to compensate for the larger frequency shift occurring at the high frequency end of the band due to simple capacity change.

Since the total circuit capacity is

## New Window Displays for Tube Dealers

(Continued from Page 1, Column 3)

display, whether a tube window exclusively or a combination of radio and tubes. This display is not seasonal, but can be used throughout the year.

### Football Broadcasts Listed

"Then, when fall brings both the biggest radio selling season and football, too, there is the football display unit of the service. For this year we have designed a display which should be of interest to the thousands of prospective customers passing our dealer's locations daily. At the top of the display is a pad of ten separate sheets, each sheet listing the major football games throughout the country, together with the radio stations or network over which they will be broadcast. Simply by tearing off each sheet a complete schedule of ten weeks can be shown. This unit should be in every dealer's window or door at football season.

### Special Streamers Again

"Besides the major units of the service, there will be the special window streamers just as in past years. Most dealers are familiar with the World Series score sheet window hangers as an example of special streamers we issue for big sporting events.

"In addition, subscribers to the service will get at least six of the famous radio stars window streamers, and surveys have shown that these pictorial news sheets stop a large percentage of passers-by.

"Thus the 1938 radio tube window display service is just what most dealers need to make their windows produce business. Dealers who want to take advantage of this service should see their distributors at once.

rigid and the dielectric properties are comparable with bakelite. The solenoid winding was chosen because it has a large range of inductance due to the close spacing between the wire and the magnetite plug. Also, it requires a large motion of the plug to tune through the inductance range, a fact which makes it relatively insensitive to small longitudinal movements of the core. The winding is wax impregnated.

### Adjustments Accessible

The inductance adjustments for the push-button oscillator coils are readily accessible through numbered holes in the rear apron of the chassis. Antenna trimmer adjustments are made through correspondingly numbered holes in the top of the chassis. The use of the Magic Eye in tuning these circuits to the desired station makes the set up of the push buttons a relatively simple procedure.

## METAL TUBES FOR G TYPES

By the RCA Radiotron Engineering Dept.

Metal receiving tubes have now been available for nearly three years. During this period they have progressed from the pioneering stage where their prices were higher than standard glass types to the present stage where prices on many metal types are the same or lower than corresponding glass types and where the new manufacturing technique provides new standards of tube performance.

This progress has been observed by alert radio men who have reported instances where metal tubes did the job better or made a difficult job practical.

Such experiences are always of interest to servicemen in pointing ways in which servicing can be expedited and better performance given to the customer.

### Eliminates Birdies

In pernickety receivers, have you tried metal types such as the 6J5, 6J7, 6K7, 6L7, and 6A8 in place of corresponding G types? It is surprising how often the improved shielding of the metal types cleans up those birdies that just won't go away when glass types are used. Metal types have almost ideal shielding which is free from the poor contact difficulties experienced with old glass tube shields and caused by corrosion and warping. Another feature of these metal tubes is their

freedom from bulb effects which may cause static-like noises or reduced gain in high-gain circuits. The metal envelope, because it is a conductor, prevents the accumulation of charges which in a glass type collect on the bulb envelope. It is these charges that cause the trouble either by discharging at audio frequencies or by decreasing the plate resistance.

Likewise, have you tried substituting the 6J5, 6H6, and 6F5 in place of the corresponding G type used in an audio circuit? The metal type being shorter and more compact is less prone to microphonic troubles.

Although differences in performance between metal and G type power tubes may seem unlikely, we have found that the metal types such as 6F6 and 6L6 are less subject to an effect known as bulb rattle. Noise of this nature is caused by the movement of a loose mica insulator against the glass bulb. This effect is not common to metal types partly because of their shorter mounts, but more particularly because the interior diameter of metal shells can be held to very close tolerances.

### Have Inherent Advantages

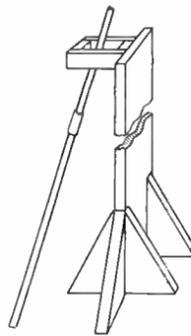
Structurally, as has already been mentioned, metal tubes have certain (Continued on Page 5, Column 5)

# Service Tips



Now you can win your choice of a handsome RCA Service Engineer's Pencil or any volume of RCA Victor Service Notes by sending tips to RCA Radio Service News, Camden, New Jersey . . . Service Tips must be acceptable for either RCA Radio Service News or the RCA Radio Service Tip File. . . . All tips become the property of RCA to be used as they see fit. . . . Service Tips are our readers' ideas, not ours. While RCA Radio Service News believes they are worthwhile, we cannot be responsible for results.

## Antenna Mast Holder



When erecting tall masts or poles of either wood or steel on the level ground or on roofs I find the following device very useful. Take a 2 x 12 and nail an opening made of 2 x 4 approximately six inches square on one end of the 2 x 12. Then anchor the 2 x 12 securely with the square on top. One man may now put the pole or pipe through the hole and raise it with ease. Where pipe is used lengths may be screwed on as the pipe is raised.

E. Moennig  
General Radio Service  
1203 Eckart St.  
Fort Wayne, Ind.

## Noisy Ball Bearing Condensers

On some Philco models and others as well that use ball bearings on the verneir drive of the variable condensers, a scratching noise develops after the radio is in use for one year.

Remedy: Wash the ball bearing with denatured alcohol. For a permanent repair, solder a piece of old phosphor-bronze dial cable to the drive shaft (the one the knob is on) and the other end to the chassis.

R. C. Irons  
554 Brunswick St.  
San Francisco, Calif.

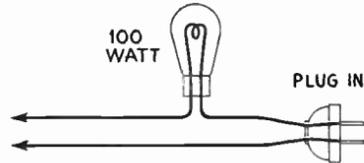
## Grunow 11G—Set Dead

Check for screen voltage on 6K7 i-f tubes. Several sets of this model have been found to have a .1 mfd. 200 volt screen bypass condenser shorted. Replacement with a .1 mfd. condenser of 600 volts rating will correct this condition. This condenser will be found connected from the screen of the first i-f tube to ground.

Horace H. Koepke  
Junction City, Kans.

## Testing AC/DC Radios

We always test all AC/DC radios in series with a 100-watt lamp. This keeps shorted sets from blowing



fuses. After repair, the set is checked in the same way.  
Ben Wolf,  
372 Tremont St.,  
Boston, Mass.

## Inlantenna

I recently installed a 67M2 auto radio in a Lafayette 400 car. I had a great deal of trouble in eliminating the ignition noise. After trying everything to eliminate the noise, I got to the fact that it came in through the aerial. In checking up on the aerial, which is the Inlantenna, I found that my helper had put the lead that connects the two aerials together through a hole in the chassis over the end resting on the transmission shaft housing. I disconnected and dropped the connecting lead, and the noise disappeared.

Lucien Lesaffre,  
103 Marble Ave.,  
Lawrence, Mass.

## Running Board Antenna Noise

On Chrysler built cars and some others such as Terraplane and Nash, motor noise is very often objectionable when a running board antenna such as Inlantenna is used. On investigation I found that the antenna itself did not pick up this noise if it was kept as far as possible

to the rear of the running board. However, there is about eight inches of unshielded lead-in connecting on to the antenna proper, and it is this portion of the antenna which is picking up the noise. By slipping shielding on this portion of the lead-in and grounding it on the shield of the lead, this difficulty is overcome. So by taking these two precautions, (1) keep the antenna as far back on the running board as possible, and (2) shield the antenna end of the lead-in, most motor noise cases will be eliminated.

C. K. Allen  
1700 7th Ave.  
Beaver Falls, Pa.

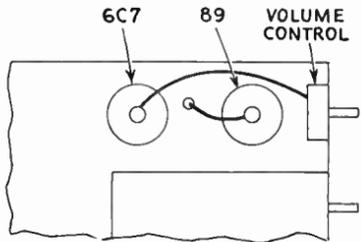
## Ford-Philco Model N

To eliminate excessive chassis noise pick-up, remove the small r-f choke, which is located in the power supply compartment, and replace it in series with the line, within the r-f coil compartment.

Norman E. Nelson  
Mayville, No. Dak.

## Majestic 66 Auto-Set

When working on this set do not replace the grid caps on the 89 output tube and the 6C7 first audio stage in the wrong order. Unless this is guarded against it is the most



natural result since these grid leads must be crossed for proper connection.

Otherwise the 1st A.F. stage will be cut out causing very weak response with everything apparently in good order.

The diagram (top view) shows this arrangement.

Geo. H. Koether, Jr.  
Sevrna Park P. O.  
Round Bay, Md.

## 32 Volt Service

We have a rather extensive battery charging service, and have found it a simple matter to operate a 32 volt radio in our repair shops by having a cord running to our charging line.

All that is necessary when we wish to operate a 32 volt radio, is to check the number of batteries on the charging line, and either add to or subtract from the number to get the required voltage.

Frank McQueen  
807 Schilling Ave.  
Hiawatha, Kansas

## Soldering To Alloy Chassis

Here is an idea that has been helping me for years. When soldering to an alloy metal chassis, use a 50-50 mixture of rosin-core solder and Kester aluminum solder. Puddle the two together on the chassis with your soldering iron. You will find that the mixture runs very freely and permits a good, neat-appearing and permanent joint to be made at any point on the chassis.

J. F. Intiso  
1730 Fillmore St.  
Bronx, N. Y.

## RCA R-50

Would not play with type 27 a-v-c tube in the socket, although tube tested normal and replacement with new tubes would still result in no reception. With this tube withdrawn, reception would be normal. When measuring voltages at this socket, found grid to be -15 volts, with respect to ground, and cathode -71 volts with respect to ground. Without tube in socket, plate voltage was 0, but with tube in socket, plate voltage was approximately same as cathode voltage. While

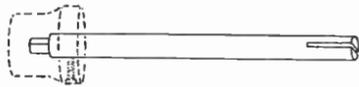
the cathode voltage should have been approximately -20 volts, no explanation was found for this discrepancy. This trouble was cured by substituting a 300,000 ohm resistor for the 40,000 ohm resistor (in the power pack) in series between filament of the 27 a-v-c tube and the filter choke.

George Kinkade  
Elk Mills, Maryland

## Auto Radio Gadget

It is not always convenient to remove the matched dash plate, dial head, and control cables when removing an auto radio from the car for repairs. The gadget shown below not only saves time but also leaves the instrument panel intact with no gaping holes while the radio is out of the car.

After disconnecting the control cables from the set end and removing the set, use this tool for varying the controls. The tool is made from 1/4" stock with any set screw



type knob. One end of the rod is slotted for 1/2" with a hacksaw; the other end is filed square. The knob may be used at either end depending on the type of fittings of the radio. For radios having slotted internal fittings, a small screw driver is used. Of course this method cannot be used when the volume control is mounted on the dash plate.

Harry Goldstein  
AAA Radio Service  
1750 University Avenue  
Bronx, N. Y.

## Noisy Tuning, Bosch 48A and 48AA

Oscillation and noisy tuning in these radios may be caused by a poor ground of the shield on the variometer. Cleaning of rim contacts with sandpaper effects only a temporary cure. A permanent job is done by drilling two small holes through cap and base where they overlap—about 1 1/2" apart—and driving in two self-tapping screws.

Al Lustig  
6120 19th Avenue  
Brooklyn, N. Y.

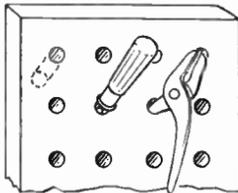
## GE K-63, RCA R-73

Set came in with complaint "dead". Check shows no plate voltage on r-f and i-f plates. It was not a filter condenser, as is usually the case, but was due to a shorted plate lead on the last i-f transformer. This lead was of soft rubber covered wire, and had been clamped tightly underneath the i-f shield can, effectively grounding the high voltage to the chassis. The remedy is obvious, although I replaced the damaged plate lead with a length of laquered wire. This short is rather hard to locate, as you must remove the i-f transformer to even see the wire.

Noel L. Havermale  
Gem Radio Service  
612 So. 20th St.  
Quincy, Illinois

## Convenient Tool Holder

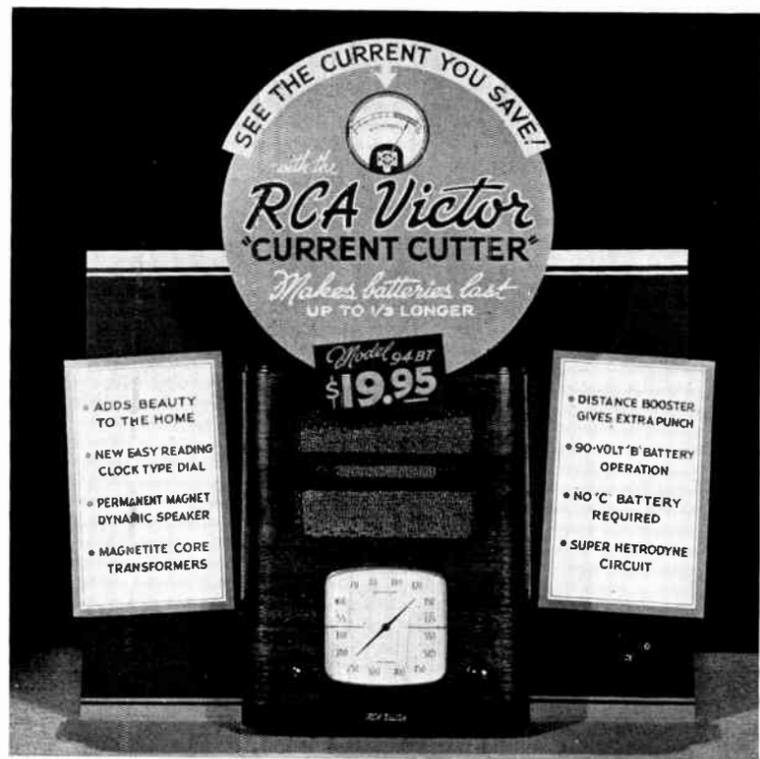
A tool holder such as the one shown below is a great convenience in the shop. It is handier than a long rack or a drawer. Use a 2"



x 12" board about two feet long. Bore 1/2-inch holes downward at an angle. Mount the board at the most-used section of the work bench.

Joseph M. Norman  
Memphis, Texas

## Metered Display



This novel display does more than tell 'em. It shows 'em—just how much current is saved by the new RCA Victor Farm Radios. A real milliammeter, optional with the display at 60c extra, can be built into the display to measure the current drain when the radio is operating

## Big Prizes For Letters About Metal Tube Jobs

(Continued from Page 1, Column 5)  
tuition fee of \$140.00.

The Radio Operating course—regular tuition fee of \$100.  
or—The Radio Service course—regular tuition fee of \$81.

A booklet describing these courses may be had by writing to RCA Institutes, Inc., 75 Varick Street, New York City. This second-prize can be substituted by any three pieces of test equipment as listed under the first prize.

The third prize is a choice of any two RCA service instruments listed under the first prize. The value of this prize is approximately \$120.00, depending upon the instruments chosen.

The fourth and fifth prizes are each one of the sensational new No. 153 test oscillators valued \$29.95 each.

### \$5.00 for Letters Published

After the first five major prizes, \$5.00 will be paid for each contest letter considered interesting and useful enough for publication in RCA Radio Service News, and that isn't all! Those letters considered acceptable but which are not published in RCA Radio Service News will win one of the unique RCA cigarette lighters—thus every contestant is more than likely to win something and everyone is eligible for one of the major prizes or a \$5.00 reward for a few minutes work.

### Contest Rules

The rules of the contest are simple. Here's how to compete for the prizes and at the same time do some profitable business—

1. Go out and sell at least one "G" type to metal changeover job.

2. Write a letter to the RCA Modernization Contest Manager, RCA Manufacturing Company, Inc., Camden, New Jersey, covering two points:

1st, the technical aspects of the job  
2nd, the means or methods used to sell it.

The letter should tell how a particular job was sold or what method you have found best in bringing in changeover jobs in general. It might be direct mail campaigns, personal solicitation, newspaper advertising or a window display—tell about it. Then tell the make and model of radio. You can enter the contest right away by obtaining an entry blank from your local Radiotron distributor. In any case, be sure your entry is postmarked not later than midnight, June 15, 1938.

## Metal Tubes For G-Types

(Continued from Page 4, Column 5)

inherent advantages as compared with G types. Less known but very important is the fact that the metal construction permits the use of a special gettering method which provides a degree of vacuum hitherto not attainable with receiving tube types. This method, known as the "Batalum" getter method employs a small tantalum coil connected between shell and grounding pin of the tube. By applying current to the coil, the getter contained on the coil can be flashed to just the right amount to obtain optimum results. This method is not practical with tubes of glass construction.

The substitution of metal tubes for G types is an easy job for the serviceman. Questions of realignment of trimmers are everyday matters for the serviceman. He has the knowledge to determine what adjustments are required to give optimum results on a changeover. Some suggestions along this line, however, may prove helpful.

### Necessary to Check Grounding-pin

In sets equipped with G types, it is necessary to see that the grounding-pin terminal of the socket is grounded. In some sets, the grounding-pin terminal may be found to have been used as a terminal for some circuit connection not at ground potential. If such is the case, the connection should be anchored by some other method. After making any changes, the set should be checked for alignment.

Metal tubes are useful to the serviceman because they make service problems easier and save time on the job. They require no shielding and they minimize noise and microphonics. Metal tubes are not subject to glass breakage and they withstand great shock. They are small and sturdy and have eye appeal. Service men who keep a stock of metal tubes on hand find them indispensable in service work. They mean less inventory and faster turnover.

Prizes will be awarded and announced in later issues of Service News.

### No Fancy Writing

Entries will be judged for selling ingenuity, not for literary merit. You don't have to be a polished writer to win a prize. Just tell in your own words how you sold a changeover job. All decisions will be made by members of the RCA Radiotron and Engineering Depts., and such decisions will be final.

All entries become the property of the RCA Manufacturing Company to be used as they see fit.

## \$10.00 IN PRIZES — \$10.00

Win Real Money With Your

### SELLING TIPS

Now your best sales producing idea may easily make you an extra profit. For the three Sales Tips which, in the opinion of the Judges, are the best of those submitted and published in the next issue, \$10.00 in prizes will be awarded: first prize, \$5.00; second prize, \$3.00; third prize, \$2.00. All other tips published will win an RCA Service Engineers Pencil as usual.

Sales Tips may be any idea, method, plan, or device that actually produced worthwhile business for you. It might be a method of approach or of getting the order in personal selling, a plan for getting prospects, a direct mail campaign or a window display.

Send your idea to Sales Tips Editor, RCA Radio Service News, Camden, New Jersey. Describe your idea concisely but completely. Tell what was done and the results. Send any samples of material, photographs, diagrams, that might illustrate the idea and be suitable for publication. For instance, in telling about a direct mail campaign, send a sample of the mailing pieces, tell how many were sent and to what kind of mailing list, give the number of replies traced directly to the campaign, and the volume of business resulting.

All Tips submitted become the property of RCA to be used as they see fit. All decisions will be made by the RCA Mfg. Co. and such decisions will be final.

#### New Dial Plates

When a receiver is brought in on which the cabinet has been marred around the outside of the knobs, by long fingernails etc., you will find that people are quite willing to make the extra investment to have small etched metal dial name plates put on to cover up the marred surface. Not only is it easy to sell them, but their friends will bring their receivers in for the 10-point check-up specifying that you put them on.

Frank Fruehauf  
De Hayes Fruehauf Lab.  
5109 Audubon Avenue  
Detroit, Michigan

#### Sells Tubes and Service

In my store I have a variety of used radios that use almost all the popular types of tubes. When a customer brings a tube in to be tested, I let him listen to a radio employing that type, then remove the tube known to be good and substitute the customer's tube. If the tube is defective, the customer is convinced and readily buys a new one. If the tube is OK, the customer realizes that his radio should be checked—and it is then much easier to get your price.

Mrs. Joseph Cherry  
496 Central Avenue  
Brooklyn, N. Y.

## NBC Vocalist



As pleasing to the eye as she is to the ear is lovely Yvonne King, a songstress who is well liked by radio listeners who tune in the NBC-Blue network at 9 P. M. Tuesdays

## Franchise Plan Adopted for Sound Dealers

(Continued from Page 1, Column 4)

chandise, such as the inexpensive remote mixing unit and the spectacular new 100-watt speaker, will give our Authorized Dealers valuable opportunities to develop a real business. Special selling plans, unlike anything heretofore available in the industry, have also been prepared.

"Obviously the RCA Commercial Sound franchise will be much sought after. Dealers who are interested should consult with their nearest RCA Commercial Sound distributor or write direct to RCA Commercial Sound Section, Camden, N. J."

## New Oscillator, A-C Operated, Lists At \$29.95

(Continued from Page 1, Column 1)

control of output from zero to 0.25 volts.

- Internal Modulation of 30% at approximately 400 cycles. Jack provided for external amplitude modulation. Modulation characteristics essentially flat up to 8000 cycles.
- External Freq. Mod. Jack provided for use with sweep condenser for visual IF alignment.
- 400 cycle output of 8 volts available for audio circuit testing.
- All metal tubes.

#### Electrical Specifications

Power Supply Rating  
Voltage ..... 110-120 volts  
Frequency ..... 50-60 cycles



Courtesy Larry Smith, Box 65, Dallas, Texas

Power Consumption . . . . . 30 watt  
Fuse Protection . . . . . 1/2 ampere  
Range & Application  
R. F. Frequency,  
100 KC-30,000 KC  
No. of Bands . . . . . 6  
Audio Modulation Freq.  
Approx. 400 cycles  
R. F. Output  
Low . . . . . 0.02 volt max.  
Med. . . . . 0.25 volt max.  
High . . . . . 1.0 volt max.  
Minimum Signal . . . . . 2 Microvolts  
Leakage . . . . . Negligible  
Output Impedance  
Low . . . . . 10 ohms  
Med. . . . . 750 ohms  
High . . . . . 4000 ohms

Tube Complement  
RCA-5W4 . . . . . Rectifier  
RCA 6C5 . . . . . Audio Oscillator  
RCA 6J7 . . . . . RF Oscillator

Dial Scale  
Full vision Airplane Type 6 1/2 in. dia. over 50 inches scale calibration.

Calibration accuracy . . . . . 2%  
Dimensions  
13 3/4" x 9 1/4" x 6 1/2" deep.

Finish  
Blue-Gray wrinkle.

Weight  
12 1/2 lbs.

#### New Available

Shipments of this remarkable new service instrument have been made to RCA Parts distributors, who are glad to demonstrate it.

## Record Breaker



Col. Alexander P. de Seversky is shown seated in the RCA-equipped Seversky plane in which he recently established a new New York-Havana record. Of American airports and airplanes, a majority use RCA radio equipment

## Ordering Tip

When ordering RCA Radiotron Sales Promotional material, always place your order through RCA Radiotron distributor. This is the tip of L. W. Teegarden, RCA Radiotron Sales Manager.

"Many of our distributors order some items in quantity, thereby saving transportation costs and enabling them to give fast service. Also, we have made arrangements whereby distributors can offer material on attractive terms, although the regular price prevails when ordered direct from the factory by retailers. My tip is: Order through your distributor."

## Aviation Radio Guide Book Is Issued By RCA

Gives Compass Bearings And Other Data For Aerial Navigation

A handy little book, containing a mine of valuable aerial navigation information, has been made available to professional and sportsmen pilots by the Aviation Radio Section of the RCA Manufacturing Company.

Its 132 pages are full of useful information and data for planning flights, and for "blind" instrument flying. Compiled after nearly a year of effort and with the wholehearted cooperation of more than 600 radio broadcasting stations, the book has data on aircraft radio, radio-compass flying, obtaining true bearings of broadcast stations from nearest airports, distances from airports, obstruction lighting, height of towers, radio call letters and the frequencies of transmitting stations. The stations are listed alphabetically by state and city.

More than a dozen pages are devoted to an up-to-the-minute kilocycle index of United States broadcasting stations listed by frequencies.

While intended primarily for aviators, the new aviation radio book will also be of interest to many others in the radio and aviation fields. A limited number of copies are available at 25 cents each from the Aviation Radio Section of the RCA Manufacturing Company, at Camden, New Jersey.

## Transmitting Tube Manual

Now amateurs and others have a treatise on transmitting tubes as complete and interesting as the well-known RC-13



Manual on receiving tubes. Technical Manual TT3, a new 192-page book entitled "Air-Cooled Transmitting Tubes," is now available through RCA Amateur Tube distributors or direct from Commercial Engineering Section, RCA Mfg. Co., Inc., Harrison, N. J., at 25¢ a copy. The book gives complete technical data on all RCA air-cooled transmitting tubes, plus a wealth of general tube information. Characteristics, maximum ratings for various uses, and socket connections are given for each tube, with charts and an illustration of the tube. In addition, more than 80 pages are devoted to discussion of tube design, materials, circuits, formulas.

## Bearings



This guide book gives the compass bearings of all American broadcasting stations from the nearest airport, and a wealth of other information helpful to aerial navigators and airport officials



### Executives of Tube & Parts Dept. Named

News of interest to the radio trade was contained in the recent announcement by George K. Throckmorton, President of RCA Manufacturing Company, that Eugene N. Deacon, formerly manager of the RCA Radio Tube and Parts Division, has been assigned new duties in connection with market research and analysis. The six departments of the RCA Radio Tube & Parts Division will be under the direct supervision of Vance Woodcox, Vice-President in charge of Package Goods Sales. The departmental managers are as follows:

- J. T. Bray, Export Sales
- Meade Brunet, Equipment Tube Sales
- J. A. Milling, Radio Parts Sales
- D. Y. Smith, Power Tube Sales
- L. W. Teegarden, Renewal Tube Sales
- L. S. Thees, Tube Parts & Machinery.

### REMOTE ELECTRIC MIXING WITH SOUND AMPLIFICATION SYSTEMS

By W. L. ROTHENBERGER  
Manager, RCA Commercial Sound Department



Ever since sound amplification systems came into widespread use there has been a need for an inexpensive yet efficient means of "mixing" the output of two or more microphones so that their combined output through the amplifying system would produce the effect desired.

Mixers are used to provide a musical background for speech, to fade from speech to music, to achieve the proper balance of sound from an orchestra, and in many other situations where it is necessary to combine the pickup of several microphones. Devices for this purpose have been available for years, but they were elaborate, expensive and entailed great complications in the wiring systems.

It was not until 1937 that a simple and inexpensive mixer became available when RCA introduced a mixer that was low enough in price to be a part of the sound systems in general use, that did not require trained operators, and that was highly efficient. This development offers great opportunities to all who are commercially interested in sound systems. They can now offer their customers a far more versatile and useful sound equipment that will produce the results their customers want but which heretofore they have been unable to afford.

#### Not Electronic System

The RCA Commercial Sound Mixer is not an electronic mixing system but is an electric volume control system which overcomes all the obstacles previously encountered in electronic mixing systems and in low or high level input mixing systems. It makes it possible to control volume very conveniently without distortion.

### Mobile Television Outfit



Typical of RCA's leadership in the development of television is this television transmitter caravan which will be used in New York in 1938. Note the iconoscope camera and antenna on the roofs of the cars. This equipment will transmit by ultra-short wave to the Empire State Building atop which is the main transmitter used in RCA's television broadcasts

# MODERNIZATION CONTEST

## NOTHING TO BUY! NO LABELS TO SAVE! NO PUZZLE TO WORK!



### IT'S EASY TO WIN!

#### RULES OF CONTEST

1. Go out and sell at least one G-type to metal-tube modernization job.
2. Write a letter to Modernization Contest Manager, RCA Manufacturing Company, Inc., Camden, N. J. In your letter tell how you sold the particular job or what methods you find best for bringing in modernization jobs in general. It might be a direct mail campaign, personal solicitation, window display, etc. Give the details briefly. Tell what you did and how much business it produced.
3. Get your letter in to the Contest Manager not later than June 15, 1938. Prize winners will be announced in the July issue of RCA Radio Service News.
4. All entries become the property of RCA to be used as they see fit. All decisions will be made by the RCA Manufacturing Company and such decisions will be final.

**FIRST PRIZE** is this wonderful assortment of scientific RCA Test Instruments, or your choice of any other five RCA Test Instruments shown in Catalog (except 9" Oscillograph), plus the small bench tools shown in picture. Value, if instruments shown are chosen. **\$254**

**SECOND PRIZE** is your choice of any Home Study Course offered by RCA Institutes, the nation's oldest radio school. Value, if Radio and Sound Course is chosen. **\$140**

**THIRD PRIZE** is your choice of any two RCA Test Instruments (except 9" Oscillograph). You might choose the No. 9545 Oscillograph (3" screen) \$63.95, and the No. 9633 Beat Frequency Oscillator \$64.50, making the total value of this prize over. **\$128**



**FOURTH and FIFTH PRIZES** are each one of the remarkable new RCA Test Oscillators No. 153, shown. Value **\$29.95**

#### \$5.00 CASH AWARDS

will be made for every entry considered interesting and useful enough for publication in RCA Radio Service News.

**PLUS** one of these unique RCA Radiotron Cigarette Lighters for other entries considered acceptable and of merit by the judges. Your entry does not have to be published for you to win a prize!



#### TUBE DATA

Nine popular types of all metal tubes are replacements for corresponding "C" types so far as general characteristics and bases are concerned. To obtain the improved performance from the better shielding and sturdier construction of the metal tube, all that is necessary is to slip the metal tube into the socket. In radio frequency sections of the receiver it may be necessary to make minor adjustments.

- These interchangeable types are as follows:
- 6A8G-6A8
  - 6L6G-6L6
  - 6L7G-6L7
  - 6F6G-6F6
  - 6J5G-6J5
  - 6F5G-6F5
  - 6H6G-6H6
  - 6J7G-6J7
  - 6K7G-6K7

Equivalent values in any RCA merchandise may be substituted for the first five prizes

In developing this system, many years of research and development were made not only on circuits but also on tubes and control parts. Special tubes had to be developed, special pads designed and special circuits developed. The system had to be one which would give a smooth control of the volume without any noise or "plops" at any point of the potentiometer. As finally released to the public, the system did not have the customary volume control in the audio circuit. It was thus unnecessary to have preamplifiers ahead of the mixer system, but all the benefits of a high level mixer were retained. The change in volume is obtained by varying the voltages on the bias of the input tube. This arrangement insures operation along the straight portion of the dynamic characteristic of the tube for all settings of the gain control and thus effects a smooth control of the gain. Also, no distortion is encountered when using this method since the signal always operates into the tube with a linear grid voltage plate characteristic. Another advantage from this type of system is its extremely low insertion loss.

#### Simple Wiring

The new RCA electric mixing controls have been used a thousand feet from the amplifier with unchanged characteristics. On these tests #18 unshielded cable was used. Thus you can see that the wiring necessary for this type of a system is very simple. The cable, being of a standard type, it can be easily obtained. Installation is easily made. As the voltage is low, Underwriters are not particularly interested in these low voltage circuits and a great number of circuits can be run in one conduit. It has also been found that it is not necessary to use shielded cable on these runs as it is only a voltage change which is made.

Each mixer pad requires three wires in order to function properly. It is recommended that #18 wire be used due to the fact that this wire is practically universally obtainable and the drop in voltage would be very small. Wherever two or more control pads are used, one wire can be made common for the ground return thus eliminating one wire for each additional volume control. For instance, a two pad control unit will require only five wires and a four pad control unit will require only nine wires.

#### Compact Unit

Due to the compactness of the remote mixers, a great deal of flexibility can be had. The unit can be attached to the orchestra conductor's stand, or to a microphone stand as desired. The attractive housings are of chromium plate so that they match microphone stands and instrument equipment of the modern trend. A portable cord can be run from the unit to the amplifiers.

Where an installation is to be made permanent, more than one remote mixing outlet can be provided. For instance, in locations such as football fields, baseball fields, hockey rinks or auditoriums, mixer outlets can be paralleled to different locations. As the scene of activity

varies, the mixer and microphones can be moved to these areas and announcements and control of volume had from those points. There is also another advantage. Extra input stages can be added to the system and emergency announcements can be made from the box-office or from the director's office or any other location where a remote mixer station is wired in or an outlet is provided together with a microphone outlet.

#### Useful In Schools

For school installations, this system will find many applications. An input stage can be wired together with its control to the gymnasium, music room or auditorium and a portable mixer together with a microphone can be taken to these locations and the system operated from these points. It is also possible to give the same flexibility to the Superintendent or Principal and he can control the volume and make announcements from his location.

In night clubs there will be a great demand for this type of installation, due to the fact that the master of ceremonies can control the volume from his location, or it can be controlled by the head waiter from a remote location in the night club. When the master of ceremonies or his troupe is through with the microphone, the volume can be cut down, making it possible to pick up any floor noises or any conversation between him and his troupe.

#### For Orchestra Leaders

The flexibility desired by orchestra leaders can be had in that different microphones can be placed throughout the orchestra. The soloist can step to the nearest microphone and the leader can raise the volume on that particular microphone so that the soloist will be heard above the other instruments, or, if a singer, her voice will be heard above the sounds emanating from the orchestra. He can also fade one in and fade the other out as he desires to have certain passages brought out by different instruments.

### Valuable



The attractive decalcomania shown above is the symbol of a valuable franchise for which applications are now being received under the new RCA Authorized Commercial Sound Dealer Plan