



RADIO SERVICE NEWS

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MAY, 1936

CAMDEN, NEW JERSEY

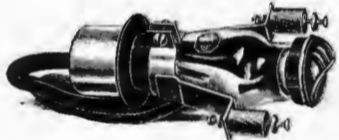
Vol. 2, No. 6

NEW ANTENNA GOES TO 70 M. C.

CATHODE RAY TUNING KIT IS ANNOUNCED

Easily connected to all sets having automatic volume control

A simple kit which enables any competent service engineer to install a Cathode Ray Tuning Indicator ("Magic Eye") on any receiver having automatic volume control, has just been announced by the RCA Parts Division. This kit, which includes a genuine RCA-6E5 Electron Ray Tube, comes complete with all parts necessary to make an installa-



RCA Cathode Ray Kit

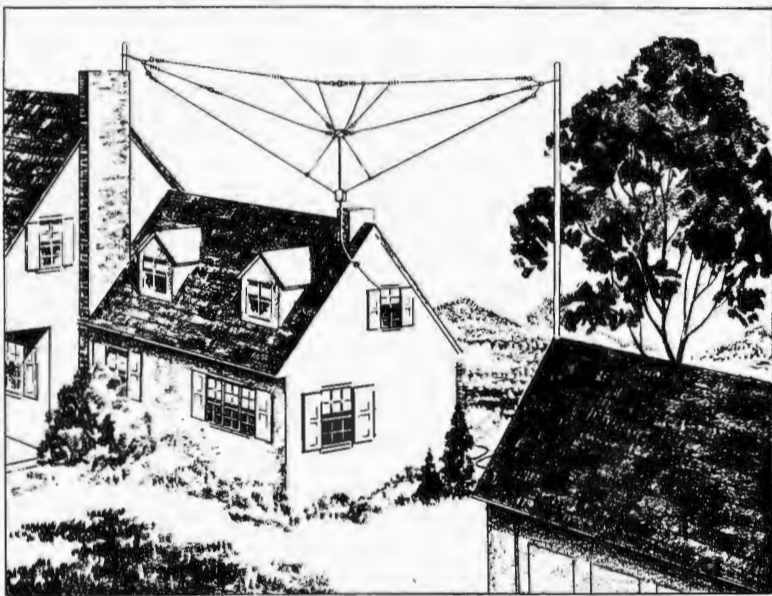
tion on the vast majority of receivers. It is being featured by all RCA Parts Distributors at the List Price of \$3.00 (Stock No. 9688), subject to an unusually attractive discount.

Installation is simple and the instruction sheet which accompanies the kit covers all details thoroughly. The kit contains the following material, all of which is necessary for a complete installation:

- 1 RCA 6E5 Electron Ray Tube
- 1 Socket complete with 24-inch cable
- 1 Socket mounting clamp
- 1 Tube escutcheon
- 2 Mounting bushings
- 2 Mounting screws complete with nuts and washers
- 1 Clamp screw complete with nut and lock washer

As the action of the Electron Ray Tube is dependent on the action of (Continued on Page 6, Column 2)

Only 37 Feet Long



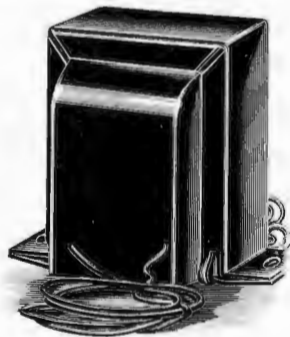
While the new RCA Spiderweb Antenna has a total of six doublets, it is unusually easy to install. Requires only a span of 38 feet with a 12-foot clearance. It comes completely assembled and soldered ready for quick installation, it being necessary to merely supply the necessary supports.

REPLACEMENT TRANSFORMER IS SHIELDED

New interstage audio unit fits all sets

A new RCA Universal Interstage Audio Transformer that fits practically all radio receivers and power amplifiers has just been announced by all RCA Parts Distributors, according to J. A. Milling of the RCA Parts Division. This transformer, says Milling, has both a tapped pri-

mary and secondary and may be used to connect either a single or push-pull stage to both single and



Universal Audio Transformer

push-pull stages. The List Price of this unit is \$2.00 (Stock No. 9632), a remarkable value.

(Continued on Page 2, Column 4)

RCA SPIDER WEB ANTENNA IS UNUSUALLY EASY TO INSTALL

Requires only 38-foot span and clearance of 12 feet— Gives more signals with less noise on all short wave bands

"A transoceanic communications type antenna for the home" aptly describes the new RCA Spider Web Antenna which is now being featured by all RCA Parts Distributors at the net price of \$8.95—completely assembled, ready for installation. This remarkable new antenna greatly helps all-wave radio reception and efficiently covers the enormous frequency range from 140 to 70,000 kc. (2100 to 4 meters). This truly remarkable product of keen antenna engineering is essential to full enjoyment of the modern multi-band radio receiver.

Comes in Two Kits

The new RCA Spider-Web Antenna System is supplied in two kits, both of which are assembled together to form one unit. The Stock No. 9685 Kit contains the necessary parts to cover the frequency range from 140 to 23,000 kc. (12 meters). By adding the Stock No. 9689 Kit,

AUTO RADIOS BOOM SPRING SERVICE WORK

Check-Up Offers Dealers Contact for Flow of New Trade

The tourist season is at hand. Time was when this meant a busy season for the gasoline filling station, tourists' camps and resorts—as it does today—and a slack season for the radio industry.

Now, however, radio has put itself right into the swim of the profitable tourist season with the automobile radio. And aggressive dealers are preparing now to cash in on the auto-radio trade by selling new sets to new owners, replacement sets and service to others.

With this issue of Service News, (Continued on Page 2, Column 2)



Stock No. 9685.

the range is extended to 70,000 kc. (4 meters) with high efficiency on all short-wave bands.

While ease of installation and wide range are highly desirable qualities in the new RCA Spider-Web Antenna, the most outstanding feature is the high signal pickup and the great reduction of noise. Signal pickup on all short-wave bands is infinitely greater than that of any previous RCA Antenna. Noise re- (Continued on Page 6, Column 3)

THE THREE FUNDAMENTALS OF GOOD RECEPTION—An Editorial By F. B. Ostman, Manager, RCA Service Division



F. B. Ostman

To fully enjoy the many radio programs that are available today, the listener must fulfill three important conditions.

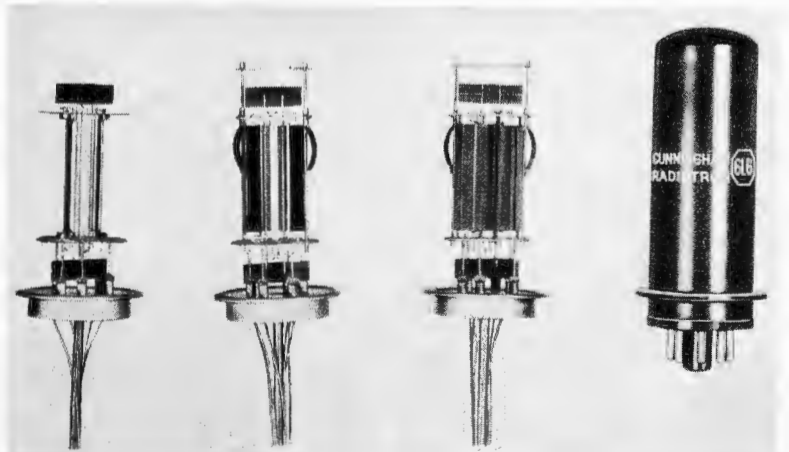
First, he must have a good receiver. Many good receivers of all types and manufacture are now on the market, and the listener's taste in cabinet appearance and his financial circumstances will be the factors in determining the type of receiver that he owns.

Second, his receiver must be properly installed. With the advent of the multi-band, wide-range receiver of today, installation has become a major problem inasmuch as the antenna is a fundamental rather than an incidental problem to good reception.

Third, his receiver must be regularly serviced. The radio receiver that does not deteriorate with use, beginning with the day it leaves the factory, has not yet been built. Conversely, there is no receiver in use today that the service engineer cannot improve by realignment, replacement of worn-out tubes and a general check-up.

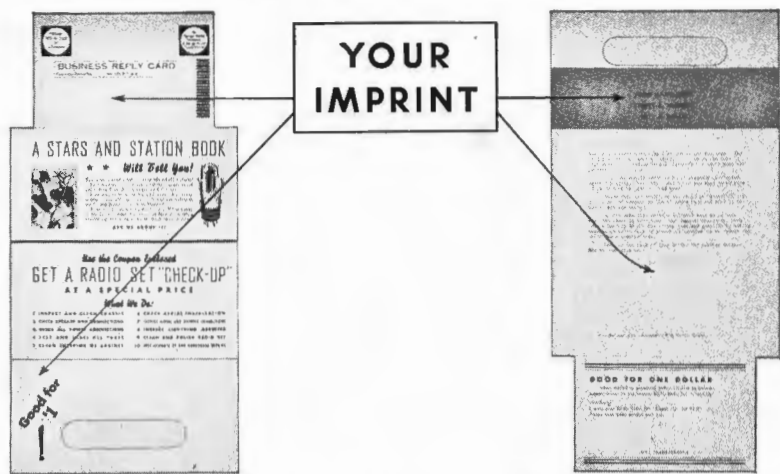
While the first essential of good reception is determined by the listener, the second two are determined almost entirely by the dealer or service engineer. It is up to you to see that every set (Continued on Page 2, Column 4)

Two Give 60 Watts Output!



The new RCA-6L6 Beam Power Amplifier will be one of the important features of the new receivers. Having less distortion than a Triode and greater gain than a Pentode, it fills the need for a high power output tube. See page 2 for details of this remarkable new tube.

Auto Radio "Check-Up" Card



The above card with copy for an automobile radio "check-up" is timely for customers having auto radio sets. It may be ordered direct from RCA Radiotron Division, Camden, N. J., Chicago, Ill., or San Francisco, Calif., imprinted in four places, for \$1.50 per 100 (Card No. 733A). See page 2, column 2, for text of letter.

DEALER LOSSES HEAVY IN FLOOD AREAS OF PENNA.

Rehabilitation Expected to Boom Trade As Dealers Prepare With Fresh Stock

Flood waters that filled cellars and in some cases the ground floors of radio dealers' stores and service shops throughout the flood regions in eastern Pennsylvania, did not damage the courage of the dealers themselves, although thousands of dol-



Hip-boots were in order for this group at J. P. Cauley's store.

lars worth of merchandise — unprotected by insurance — was lost.

As soon as the flood waters receded and cellars were pumped out, dealers took inventory and ordered new stock to cover the losses.

In Plymouth, Pa., a few miles from Wilkes-Barre, where the Susquehanna River overflowed its banks, J. P. Cauley suffered losses amounting to hundreds of dollars worth of parts, tubes and equipment. Fourteen inches of water remained in his showroom for several days. One of his first acts after he could again stand high and dry on the floor of his store was to order five hundred RCA tubes and the Check-Up program.

Suffers Heavy Loss

Ralph Katrosch, proprietor of Home Utilities, Wilkes-Barre, suffered heavy losses when the basement of his store, where the store room and service shops for radio and refrigerators are located, was completely inundated. Within a few days after the cellar was pumped out, one could hardly tell that this store — considered one of the most attractive in Wilkes-Barre — had been damaged at all.

Throughout the territory visited by an RCA representative, dealers' enthusiasm was keen — ready to take the losses and prepare for expected increase in business as the rehabilitation program gets under way. A bigger and better year, not only for the radio business, but for all business is the prediction made freely everywhere.

AUTO RADIOS BOOM SPRING SERVICE WORK

(Continued from Page 1, Column 4)

RCA offers new mediums of pushing and advertising a check-up on auto radios. Dealers taking advantage of this material are in position to greatly extend their service season and make a wealth of extra profits.

The pictorial window poster enclosed with this Service News is devoted to automobile radio check-up. The persuasive copy will remind your customers and prospects that auto radios need attention quite as much as home sets do. The attractive pictures of the most prominent radio stars of the month will undoubtedly cause passers-by by the hundreds to stop—look—and get your story!

The second medium aimed at the auto radio market is a special printing of the Check-Up duplex mailing card. This card compellingly urges a check-up on auto radio, and names you as the organization to do the job. There's high profit in this low-cost mail campaign. Any RCA dealer may order direct from Camden. The price is only \$1.50 a hundred complete with your imprint and special post office mailing permit.

Text of Letter

Dear Radio Listener:
Making old radio sets play like new is our business. And this goes for automobile radios, too. As in the case of home sets, auto radios need a "Check-Up" to avoid more expensive repairs later.

Your automobile radio is built ruggedly — protected against joggling, dirt, etc., but still you want to be sure it is holding up against road wear.

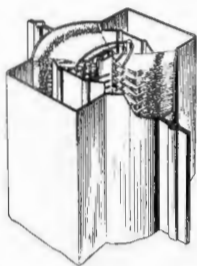
NEW BEAM POWER AMPLIFIER HAS EXTREMELY HIGH OUTPUT

Two RCA-6L6's in Push-Pull Circuit Give Over 35 Watts Output With Less Than 3% Distortion . . . Can Be Driven to 60 Watts

If an engineer were to write his specifications for an ideal power amplifier tube, he probably would not specify as good an output tube as the new RCA-6L6 All-Metal Power Amplifier. This remarkable new tube, which has been under development for a number of years, has characteristics seemingly impossible of achievement. Higher gain than a pentode, quality equal to, or better than, that of the best triode, and operating efficiency as high as 45%, including filament power, make this tube ideal for high quality receiver design.

Uses Directed Electron Beam

The distinctive features of the new RCA-6L6 have been made possible by the application of fundamentally new design principles involving the use of directed electron beams. The beams of high electron density are



View of Internal Elements of RCA-6L6

produced by constraining the electrons with potential fields set up by the tube electrodes arranged to give the desired effects.

Direct features provided by this arrangement are that the screen does not absorb appreciable power and that efficient suppressor action is supplied by space-charge effects produced between the screen and the plate. Resulting features are high power-handling ability, high efficiency, and high power sensitivity. Furthermore, large power out-

put is obtainable without any grid current flowing in the input circuit.

Drive your car around to our shop, or better, fill in your name and address on the attached card and mail it to us — no postage needed. At the same time perhaps you will want us to look over the radio in your home. Our regular charge for such "Check-Ups" is \$2.50 — but saving time and gasoline by making several calls in your neighborhood enables us to reduce the price for a limited time.

Look on the back of this folder for further details. May we hear from you?

Very truly yours,

N. B. — We use and recommend RCA Radio Tubes.

put is obtainable without any grid current flowing in the input circuit.

Minimizes Harmonics

In the design of the 6L6, the second-harmonic distortion is high in order to minimize third and higher-order harmonics. Experience has shown that second harmonics are far less objectionable in the audio-frequency output than harmonics of higher order. The second harmonics can easily be eliminated by the use of push-pull circuits, while in single-tube, resistance-coupled circuits, they can be made small by generating out-of-phase second harmonics in the pre-amplifier.

Because of the high power sensitivity of the 6L6, it is practical to use circuits which avoid the troublesome effects of loudspeaker resonance and variable impedance. In such circuits, the 6L6 not only maintains its high efficiency, but also provides power sensitivity and stability equal to or better than that of a triode.

Typical operation for Class AB2 Amplifier Using Two RCA-6L6 Tubes

	Self Bias	Fixed Bias	
Heater Voltage	6.3	6.3	Volts
Plate Voltage	400	400	Volts
Screen Voltage	250	300	Volts
D-C Grid Voltage	-20	-25	Volts
Peak A-F Grid-to-Grid Voltage	57	80	Volts
Zero-Signal D-C Plate Current	88	102	Milliamperes
Max.-Signal D-C Plate Current	168	230	Milliamperes
Zero-Signal D-C Screen Current	4	6	Milliamperes
Max.-Signal D-C Screen Current	13	20	Milliamperes
Load Resistance (Plate to plate)	6000	3800	Ohms
Peak Grid-Input Power	180	350	Milliwatts
Max.-Signal Power Output	40	60	Watts

REPLACEMENT TRANSFORMER IS SHIELDED

(Continued from Page 1, Column 2)

By using a silicon steel core, the frequency range of the new RCA Universal Audio Transformer extends from 30 to 10,000 cycles with very little attenuation at each end. It is designed to work from the plate circuits of general purpose triodes, such as the O1A, 26, 27, 30, 37, 55, 56, 76, 85, 6C5 and others. The secondary, of course, may be connected to any single or push-pull

Assn. Head Lauds Check-Up Drive



E. Donald Tolles, Managing Director of the National Electrical Wholesalers Association, hands the RCA Check-Up Sales Promotional campaign a bouquet — a bouquet that counts, when Mr. Tolles' position and wide experience in the field are taken into consideration.

"The plan of encouraging a check-up of radio sets in the field is bound to be of immense benefit to distributor and dealer alike. It is a real business builder, simple and proven — any intelligent dealer will appreciate that.

"The wholesaler who promotes this plan among his dealers should see the way paved for increased business in many lines of merchandise. The thousands of contacts which this plan brings to dealers will lead to sales of refrigerators, washing machines, radio sets, etc. Thus, by means of establishing this all-important contact with the market, wholesalers will not only improve their radio business from dealers but may reasonably expect an increase in their general line of appliances."

stage, regardless of the tube characteristics. The overall ratio is 1 to 3 and the maximum plate current of the primary winding should be held to 10 milliamperes.

Complete shielding prevents hum pickup on the windings such as vacuum occurs in high gain stages. Vacuum wax impregnation avoids possibilities of climatic conditions causing premature failure, while six long leads make connections easy to make in any circuit.

By designing this transformer to fit practically all applications, RCA has again given the service engineer a unit whereby he is assured of always having the proper part but requiring the investment of but one part. RCA Parts Distributors are now featuring this money-saving item and are prepared to make immediate delivery.

The Three Fundamentals of Good Reception —An Editorial

(Continued from Page 1, Column 1)

is properly installed with the proper antenna, and that every customer is made aware of the need for good service. Very few listeners are aware of the gradual decline that takes place in receiver performance. Because this is true, it is absolutely essential that the service engineer do a good job of selling the need for a periodic check-up.

The RCA Check-Up Plan is designed to help the service engineer get the all-important contact with set owners — the contact that with a minimum of selling effort almost inevitably results in a substantial amount of service work, plus profitable merchandise sales. That it accomplishes this result in a simple and effective manner is amply proven by the success that thousands of service engineers are enjoying through its use.

RCA Service Convention Display



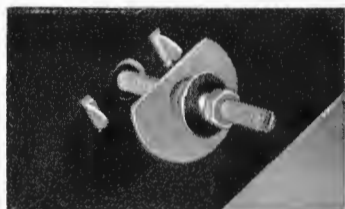
The above display was shown at the Chicago Convention of the I.R.S.M., March 25-27, at the Minneapolis Convention of the National Radio Service Association, April 5, 6 and 7, and will be shown at the Galveston Convention of the National Radio Service Association, May 24. A feature of these conventions was their announcement over the RCA Magic Key Program on Sunday, April 4, over NBC-WJZ coast-to-coast hookup.

THREE NEW RCA VICTOR AUTO SETS HAVE UNIQUE FEATURES

Easy Installation, Custom-Built Dash Control Units at No Extra Cost and Remarkable Power Insure Popularity With Public and Service Engineers

The recent announcement of three new RCA Victor auto radios opens a new avenue of profitable merchandising to Service Engineers. These new models for 1937, designated 5M, 6M and 6M2, are compact, correctly-styled and handsomely-finished units that represent the very latest in authentic electrical, mechanical and artistic design.

An inspection of these popular new models proves that the design



Stud for Single Hole Mounting

engineers created them with the Service Engineer in mind! A single



Model 6M2



Models 5M and 6M

stud, with two prongs to prevent the receiver from slipping or turning on the fire wall of the car, completes the mounting requirement. Custom-Built Dash Control Units, beautifully designed to correspond with other dash appointments of the prospect's car, may be fitted to practically all cars without drilling, filing or cutting the instrument panel. These individualized controls are available at no additional cost.

Metal Tubes Used

RCA metal tubes are universally used in the new auto receivers, and they are replaceable without removing the set from the car, as is also the "Powertron" vibrator unit. Battery polarity may be quickly adjusted by reversing the Powertron which is clearly marked positive and negative. The power connection is simplified by the use of a bayonet-type socket with self-contained fuse. The three-gang condenser is floated in rubber, and its positive action is

controlled by a worm-gear drive. Trimmer adjustments are surprisingly accessible, being mounted on top of each condenser, and in specifying magnetite core transformers, RCA Victor Engineers made certain that these new models would be brilliantly selective!

A heavy metal shield, separating the power compartment from the receiver, is built into all RCA Victor Auto radios. Four filters are also used to insure perfect reception and to protect the receiving circuit from all types of interference—no spark plug suppressors being required. The front cover is easily removable; it is fastened to the case with a snap button—no screws to remove, lose or replace. The massive, rigidly-constructed chassis is housed in a compact case which fits all cars. It is 10 1/16 in. long, 7 in. high and 7 1/8 in. wide. All accessories required for a complete installation are included with each receiver. The tuning range is from 540 to 1,600 kilocycles. Prices vary with the added features and the resultant improvement in reception. List prices

for these new RCA Victor auto radios are:

- 5M (Superheterodyne, single unit, 5 tubes) \$39.95
 - 6M (Superheterodyne, single unit, 6 tubes) \$49.95
 - 6M2 (Superheterodyne, De-Luxe two unit receiver, 6 tubes) \$54.95
- All prices f.o.b., Camden, N. J. Prices subject to change without notice.

Have High Output

The six-tube receivers (6M and 6M2) have an output of nine watts and the five tube model, of four watts. The nine-watt output of 6M and 6M2 is greater than most home radios while the 5M has an exceptionally large output for its price class.

In each of the three new RCA Victor Auto Radios, provision has been made for an additional speaker which may be installed at a small extra cost. The installation of

SERVICE MEN'S WEEK TO BE LAST IN MAY

RCA Will Be Host to Many Distributors' Service Engineers

To better acquaint the public with the work of the radio service engineer, the last week in May has been set aside for national observance as "National Radio Service Week," according to W. H. Warmington, President of the National Radio Service Association. That the radio service engineer is an indispensable link between the manufacturer of radio equipment and the ultimate consumer is universally recognized by all reputable companies today, and during "National Radio Service Week" public attention will be directed toward him and the important part he plays in our complex modern civilization.

To further observance of this week, a large window streamer and several sample check-up items are being enclosed with this issue of Service News.

Camden Meeting

RCA will participate by inviting the Managers of the Radio Service Departments of its various Distributors to Camden, N. J., for a week's inspection and instruction, in the huge plant there. According to F. B. Ostman, Manager of the RCA Service Division, the week will be a most interesting and instructive one and will include visits to the Tube Manufacturing Plant at Harrison, N. J., and to the famous theatres and broadcasting studios at Radio City in New York. The program will include talks by RCA executives on important and timely subjects, together with technical talks by RCA engineers.

Features of the new instrument line will receive special consideration. Also it is quite likely other very timely subjects will be discussed by RCA executives and engineers.

Service engineers everywhere should cooperate in this national movement to make the most of the opportunities "Radio Service Men's Week" offers.

such a speaker, either overhead or in the rear of the front seat, accomplishes a more even distribution of sound, assuring maximum radio enjoyment.

Model 6M2 has an eight-inch Electro-Dynamic Speaker and an Acoustic Equalizer. By mounting the speaker flush with the fire-wall of the car and drilling six additional holes to relieve speaker "back-pressure," a surprising improvement in tone quality results. This Acoustic



All Parts Accessible

Equalizer permits the 6M2 Auto receiver to rival a fine home radio in tone quality.

Definitely improved in durability and the quality of performance, each of the new RCA Victor Auto Radios represents a marked advance toward perfection in auto radio reception. The new five and six tube receivers are technically equivalent to sets of seven and eight single-purpose tubes.

The sales possibilities created by the introduction of these new sets are virtually unlimited. More than 21,524,000 passenger automobiles alone are in operation in the United States today. Of these, only 3,700,000 are equipped with radios. Tremendous profit opportunities lie in the development of this market!

Lucky James Melton



One of the advantages of being a radio and screen star is to receive a little attention from the famous Ziegfeld Follies girls like James Melton above. And one of the advantages of the RCA Radio "Check-Up" is to enable all listeners to hear the many popular stars on the air just like being in the studio.

Inlantenna Under-Car Aerial Now Sold By RCA Distributors

High Pickup Efficiency and Weather-proof Construction Feature New Easily Installed Car Antenna

A new auto antenna, that can be easily installed under both running boards of all cars, is now being announced by all RCA Parts Distributors. This new aerial—called the Inlantenna—consists of a continuous weather-proof cable and all necessary fittings to provide a high efficiency weather-proof antenna for all car installations. Grueling tests on automotive proving grounds and by leading radio manufacturers have proven that the Inlantenna's rubber coating is impervious to water, gravel and all road tars and oils. In ability to pick up weak radio signals it excels any other under-car antenna, a desirable feature in locations remote from stations.

Easily Installed

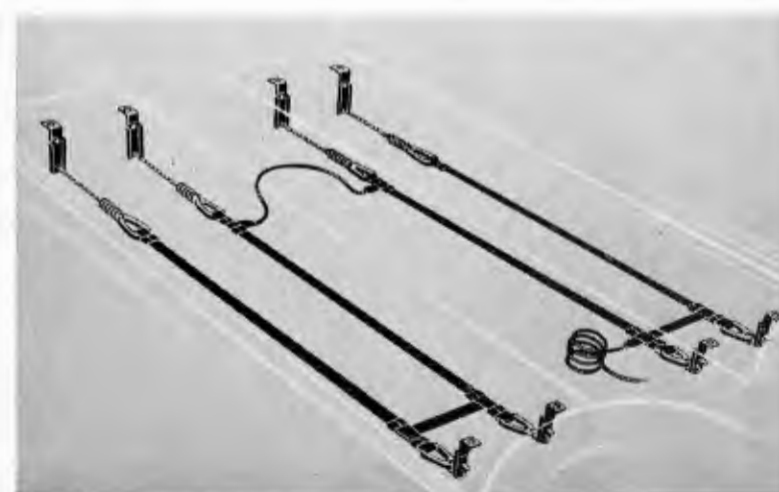
The Inlantenna is unusually easy to install, there being no holes to drill, and its adjustable brackets fit practically any under-car construction. A sturdy adjustable chain furnishes accurate length and a positive lock. It is installed from 2 to 4 inches below the running boards and is practically non-directional in pickup.

The List Price of the universal type Inlantenna, RCA Stock No. 12322, which fits all cars except Oldsmobile, is \$5.50. The special Oldsmobile type, RCA Stock No. 12328, is listed at \$6.00. These unique auto antennas may be obtained through all RCA Parts Distributors.

Public Service Tie-In

That the electric light and utility companies realize the value of promoting better radio reception as exemplified by the RCA Check-Up, is shown by the above signs on Newark, N.J., buses of the Public Service Company of New Jersey.

New Running Board Antenna



For locations where signals are weak and roof antennas are not available, the new Inlantenna is ideal. It is easy to install, gives excellent pickup and is entirely weather-proof. RCA Parts Distributors are now featuring this new antenna at a special price to service engineers.

Code Interference Reduced By Use Of RCA Wave Traps

Engineer explains how to avoid poor tracking of oscillator by using series and parallel wave-trap circuits.

With the advent of intermediate amplifiers that are tuned in the region of code services, the use of a wave trap in locations close to transmitting stations is frequently required. On receivers that do not include r-f stages, a properly operated wave trap is often imperative to good reception. In this article Mr. Goodman explains the relation of the wave trap to the receiver and how to get the most efficient results from its use.

By A. GOODMAN, Service Division, RCA Manufacturing Company, Inc.

A subject which seems to be generally misunderstood by service engineers is the elimination of code interference. Some service engineers change the i-f frequency either above or below the value specified by the manufacturer and, while this will reduce interference, it will also cause incorrect oscillator tracking in each tuning band, thus reducing the selectivity and sensitivity of the receiver at certain frequencies.

A. Goodman

A better method for elimination of code interference is by the use of a wave trap in the antenna circuit to reduce the interfering signal voltage to a minimum and prevent it from entering the receiver circuits. In order to give you a better understanding of why a wave trap is preferred for this purpose, we shall show what happens when the intermediate frequency is changed. When a receiver is aligned at 600 kc. and 1400 kc. we know that at these two points the tracking between the r-f circuits and the oscillator circuit is correct. While it is possible to obtain accurate tracking

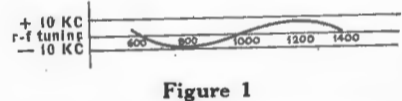


Figure 1

at every frequency point between 600 kc. and 1400 kc. this is not usually done because of increase in cost of receiver manufacture. Ordinarily the circuits will track at only one frequency between 600 kc. and 1400 kc., at approximately 1000 kc.

R-F Tuning Can Vary

From experience we know that the r-f tuning can vary by approximately ± 10 kc. from the incoming signal without any appreciable effect on selectivity and sensitivity. Actually a compromise must be reached between accuracy of tracking and cost, and in receivers on the market today the r-f tuning varies approximately as shown in Figure 1. In this figure the horizontal axis represents carrier frequencies in kc.

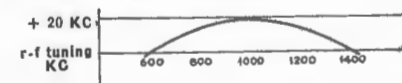
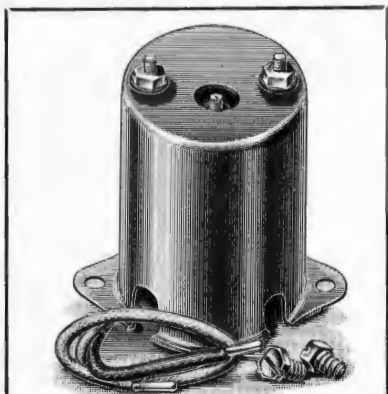


Figure 2

while the vertical axis represents the r-f tuning variation from the incoming signal. With the receiver aligned at 600 kc. and 1400 kc. it can be seen that at three points only in the broadcast band is the r-f stage tuned exactly to the incoming signal. At other points the r-f tuning varies up to 10 kc. on either side of the incoming signal.

Now suppose there is an inter-



Stock No. 11479
List Price, \$1.02

fering code signal at 460 kc. and the intermediate frequency is adjusted to 430 kc and the receiver aligned at both 600 kc. and 1400 kc. using this i-f value. There would only be two points in the broadcast band where the tracking would be correct; at 600 kc. and 1400 kc., as shown in Figure 2.

At any other carrier frequency and especially in the vicinity of

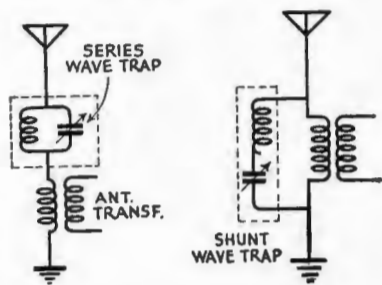


Figure 3 Figure 4

1000 kc. the r-f tuning would be off by approximately 20 kc. which would appreciably affect the selectivity and sensitivity. From the foregoing analysis it can be seen that changing the intermediate frequency to any appreciable extent is definitely detrimental. It is better practice to employ a wave trap arrangement than to experiment re-aligning the i-f circuits to a different frequency and resetting the oscillator for this new intermediate frequency.

Two Types of Traps

There are two types of wave trap circuits which have practical application; the series type and the shunt type. The series type is simply a parallel resonant circuit, tuned to the interfering frequency, inserted in series with the antenna circuit as shown in Figure 3. From our knowledge of tuned circuits we know that a capacitor and inductance connected in parallel and tuned to resonance at some particular frequency will offer a very high impedance to that frequency, thus suppressing the interfering signal.

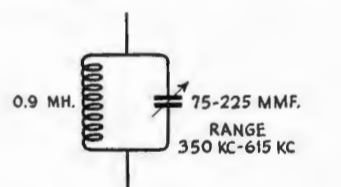


Figure 5

The shunt type trap consists of a series resonant circuit, tuned to the interfering signal, connected in parallel with the primary of the antenna transformer as shown in Figure 4. A capacitor and inductance connected in series and tuned to resonance offers an extremely low impedance path to the resonant frequency.

Thus the interfering signal is bypassed to ground and does not enter the antenna coil.

In general it is recommended that the shunt type wave trap Stock No. 11649 be used for eliminating code interference in preference to the series type. This is because the shunt type is a low impedance device, while the series type is a high impedance device and greater care must be observed in locating the latter type on the chassis to avoid coupling between it and the r-f or i-f circuits. In severe cases of interference the use of the series trap Stock No. 11479 in addition to the shunt type will prove effective. Figure 5 shows a schematic diagram of this trap.

Mounts on Top of Chassis

The shunt trap Stock No. 11649 is designed for mounting on top of the chassis, and has a tuning range of approximately 435 kc. to 620 kc. The schematic diagram is shown in Figure 6. Note that a 22 mmfd. capacitor is connected across the in-

Musical Quality Plus



One of the advantages of owning the new RCA Victor Model C11-1 is the remarkable fidelity of tone achieved through its new circuit design. Including the famous RCA Magic Brain, Magic Eye and Metal Tubes, this model is enjoying wide popularity as a musical instrument of quality.

ductance and a 4700 ohm resistor is shunted across the whole circuit. Curve A Figure 7 shows approximately the voltage developed across the antenna primary coil at various carrier frequencies. Suppose a shunt wave trap consisting of a series-

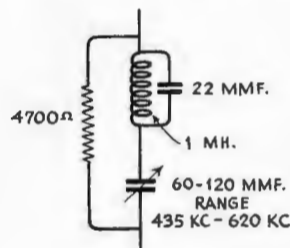


Figure 6

connected capacitor and inductance is tuned to a signal of 460 kc. then the voltage curve would be as indicated by Curve B.

The voltage curve is attenuated at 460 kc. but there is an anti-resonant rise in voltage at the low frequency end as indicated in the figure. This would cause the receiver to be misaligned at these frequencies. The 22 mmf. capacitor is shunted across the inductance in the wave trap to reduce the frequency spread of this peak and the 4700 ohm resistor is shunted across the entire

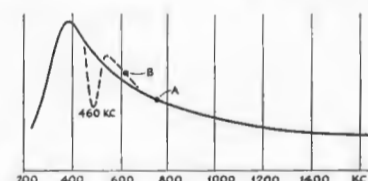


Figure 7

tuned circuit to reduce the height of the peak. The voltage curve obtained with the Stock No. 11649 trap is shown in Figure 8. From this curve it is evident that the only effect which the trap has is the suppression of the interfering signal. It does not appreciably affect the performance of the receiver in any of the tuning bands.

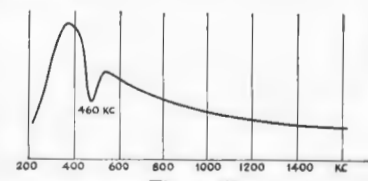
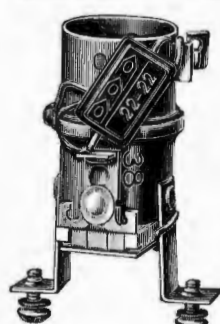


Figure 8



Stock No. 11649
List Price, \$1.15

RCA Check-Up Swamps Shop, Says Dealer

Dealer Overwhelmed With Results of Mailing

By W. D. EVANS, JR.
RCA Radiotron, Seattle District

Vern L. Wenger placed all his golden eggs in one basket. That is, he mailed his whole thousand RCA



V. L. Wenger

Check-Up Duplex cards in one mailbox, at the same time, and the 'more than fifty immed'iate returns converted his shop into such a whirl of activity that it made a beehive look as if it were

home by comparison.

Vern L. Wenger is an RCA Radio Tube Dealer of 312 S. W. Adler Street, Portland, Ore. He went for the Check-Up Plan with both feet and 1000 Duplex Cards. Then the addressees went for him—or came right back at him. Mr. Wenger's shop does work and makes deliveries promptly, and is used to moving right along, but it never functioned more rapidly and busily than immediately following the Check-Up mailing.

No wonder Mr. Wenger enthuses: "For direct results, this was the most effective advertising I've ever used." No wonder, either, that he added "Send me another thousand Duplex cards"—or that he arranged at once to tie up with RCA Check-Up ads.

Mr. Wenger's experience, plus that of score upon score, and hundred upon hundred, of other dealers, proves two things: (1) That there is a lot of potential radio service business around, and customers need only an incentive to stop "putting the work off till tomorrow"—and (2) That the Check-Up Campaign is an ideal incentive to get ailing radio and radio-doctor together. These two things can be proved—and proved to your profit!

Announce Two New RCA All-Metal Tubes

RCA 6R7 and 6X5 Added to RCA Metal Tube Line

The addition of two new types, one a duplex diode triode and the other a full-wave rectifier for automobile receivers, now brings the line of RCA All-Metal Tubes to a total of 14 different types. These new tubes help round out the RCA All-Metal Tube line for both home and automobile receivers, which now includes all those required for practically any application.

RCA 6R7

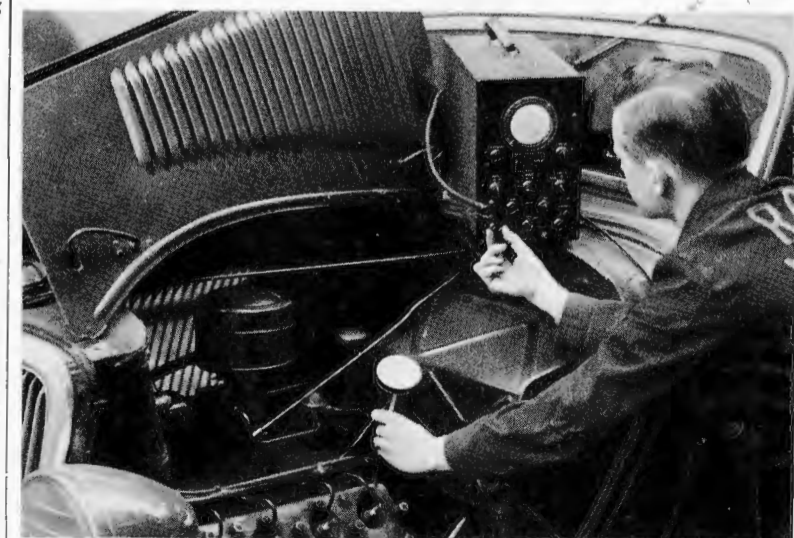
The new duplex diode triode, known as the RCA 6R7, is usually used as a combined detector, automatic volume control and audio amplifier. The tentative characteristics are as follows:

- Heater Voltage (A.C. or D.C.) 6.3 Volts
- Heater Current 0.3 Ampere
- Grid-Plate Capacitance 2.5 Mmf.
- Grid-Cathode Capacitance 5.5



Plate-Cathode Capacitance 4.0
Maximum Overall Length 3-1/8"
Maximum Diameter	.. 1-5/16"
Triode Unit—As Class A Amplifier	
Plate Voltage	.. 250 max. Volts
Grid Voltage	.. -9 Volts
Amplification Factor 16
Plate Resistance	8500 Ohms
Mutual Conductance	. 1900 Micromhos
Plate Current	.. 9.5 Milliamperes
Load Resistance	.. 10000 Ohms
Undistorted Power Output	280 Milliwatts
The two diode plates are placed around a cathode, the sleeve of	
(Continued on Page 6, Column 3)	

"Sees" Vibration with New Pickup



E. A. Rosenblatt of the RCA Service Division in Camden, N.J., is "looking over" his Ford V-8 by means of the new RCA Vibration Pickup and the RCA Cathode Ray Oscillograph. These instruments permit a visual inspection of any recurrent electrical or mechanical vibration phenomena over wide ranges of frequency.

Service Tips



Now you can win your choice of a handsome pigskin wallet or an RCA Service Engineer's Pencil 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.

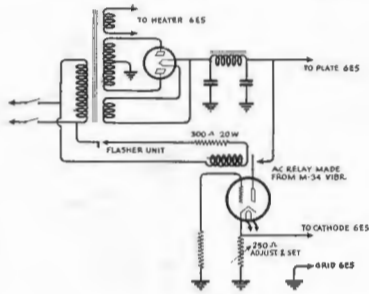
Needle Chatter

Complaints from Duo owners that sound coming from the pickup itself was objectionable, both when the instrument lid was up or down, have been eliminated by lining the pickup cover with turntable felt which prevents the mechanical transmission of sound through or by the pickup cover. As an additional precaution a small pad of turntable felt was used to fill the pocket between the sides of the horseshoe magnet.

Joe Havorka,
RCA Victor Distributing Corp.,
111 N. Canal St.,
Chicago, Ill.

Magic Eye Display

A simple circuit which gives a working display of the famous RCA Magic Eye was recently worked out by the Leo J. Meyberg Company of Los Angeles, Calif. Through an opening cut in one of the standard



Magic Brain display figures, the Magic Eye was inserted so as to appear as an eye in the figure. By means of the circuit shown, the eye is caused to continuously open and close, thereby attracting considerable attention.

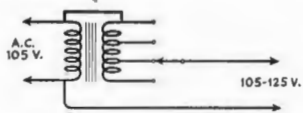
RCA Victor Model M-34

I've found that, after all else has failed to remove motor noise from RCA Victor Model M-34 Radio, by bonding the tuning shaft cable to frame of set I have stopped the cause of intermittent motor noise. This cable and yoke are attached by set screw. This depends on an off-set shoulder screw through rubber bushings to align tuning shaft and to ground cable to chassis. After rust or corrosion takes place the set becomes noisy.

Don L. Crawford,
Hollywood,
Florida.

Low Line Voltage

The following diagram shows a simple means whereby any alternating current line may be raised 5, 10 or more volts in a very inexpensive manner. The transformer may be any bell ringing toy, charger or



transformer that has a secondary voltage equal to the increase desired. The secondary is merely hooked in series with the line and the voltage adds to that originally obtained. (Be sure this is in phase, as it will also cancel by a similar voltage. Proper phasing is obtained by reversing the connections of the secondary.) The voltage requirements of the transformer are merely those that the additional voltage would impose on the line.

Morris Simon, Manager,
Lincoln Auto Equipment
Co., Inc.,
61 West Main Street,
Waterbury, Conn.

Connecting Output Transformer

It is sometimes hard to tell in what way an output transformer of the Universal type should be connected, due to the varying impedances of loudspeaker voice coils and output tubes. An accurate way is to feed an oscillator into the set

and connect an output meter to the voice coil. The combination of primary or secondary that gives the highest reading on the meter is the best match. Of course, the volume control must remain constant while the various terminals are tried.

Buhel Buckingham,
S-O-S Radio Service,
2817 Lyndale Avenue So.,
Minneapolis, Minn.

Tone Improvement

Some users of the RCA Victor Model D22-1 may wish a quality change to make reproduction of records more brilliant. The removal of the blue and yellow wires on the input pack (terminal Nos. 4 and 9) will increase the treble response greatly, and will result in smoother volume control action.

H. F. Hanthorn,
42 E. Centre St.,
Woodbury, N. J.

Aligning Crystal I-F Receivers

An application of the RCA Service Oscillator for aligning receivers having a crystal intermediate stage is done in the following manner. Plug the crystal that is built into the receiver across the tuning circuit of the test oscillator. Also plug a milliammeter in the oscillator tube plate circuit. Then by tuning the oscillator to resonance with the crystal a definite change in plate current will be noted. The frequency of the oscillator is then exactly that required for the alignment of the i-f stages and should be connected to the receiver in the usual manner. This set-up provides the only means whereby proper alignment of the intermediate stages of the various types of amateur receivers using crystals can be obtained.

Harold Johnson,
Harty & Young, Inc.,
203 Ann Street,
Hartford, Conn.

Auto Radio Noise

When a continuous noise occurs that cannot be easily located, be sure to check the brake linings of the car. If one is badly worn or a rivet is scraping on the brake drum, this noise will occur. The only remedy I have found for this is a new brake lining.

W. R. Foster, Jr.,
139 Herman Ave.,
Lemoyne, Pa.

Second Set Connection

That upstairs midget on the second floor may be easily connected to that new all-wave antenna installation without upsetting the functioning of the all-wave set by the following connections. Slide about 18 to 30 inches of braided shielding over the twisted pair of the transmission line. Make a connection to this shielding and use it as the antenna lead-in. If shielding is not available, heavy foil may be wrapped over the twisted pair and covered with tape for weather proofing. As many as three of these capacity taps have been tried with no more than the normal set interference.

E. C. Douglass,
5508 Montrose Ave.,
Altoona, Pa.

General Electric Models A-63 and A-65

Low sensitivity on all bands on numerous occasions is due to an open C-26 4 mfg. 450 volt section in the dry electrolytic capacitor pack (Stock No. RC-507). This is the section connected to red wire lead, which connects to oscillator coil primary winding B plus lug and chassis.

Homer F. Saville, Mgr.,
Saville Radio Laboratories,
503 W. Main St.,
Blanchester, Ohio.

RCA Universal Bridge

The RCA Universal Bridge, in addition to its usual uses, has been found useful as a source of audio signal for investigation of audio circuits of receivers, amplifiers, etc. By connecting the test leads to a phone plug, inserted in the phone jack of the Bridge, and by varying the balancing control, the 1,000 cycle output voltage may be adjusted to suit the requirements of the job.

Everette V. Gilchrist,
Hales-Mullaly, Inc.,
1-7 N. E. Sixth St.,
Oklahoma City, Okla.

Philco Model No. 630

A loud hum was noticed when the set was turned on. I found the trouble was due to wires of voice coil to hum bucking coil. After reversing the coil and changing the wires around, the trouble disappeared.

Robert Kara,
Greenpoint Vulcanizing Co.,
79 Meeker Ave.,
Brooklyn, N. Y.

AC-DC Receiver Tester

To quickly locate an open circuit in ac-dc receivers, a handy tester is a small neon light in a bakelite case with two rubber covered probes. These are made under several trade names and are used by electricians for line testing. They are inexpensive and small enough to carry in your pocket.

Method of Testing

One probe to negative, which is usually the chassis. The other probe to be moved as follows:

1. To the high side of the line cord, then to the filament resistor that is wound in the cord. (If a ballast tube is used, move probe to each live prong on the ballast tube.) This checks the cord and filament resistor for continuity.
2. One probe to negative and move the other probe to each filament prong of the tubes, starting at the 25Z5 to the 43, and then on through the 6.3-volt tubes. This step checks the continuity of the tube filaments.
3. One probe to the high side of the line cord, the other probe to each contact of the dial lights, if they are 6-volt lights and are insulated from the chassis, or to the live side of the bulbs if they are 110-volt lights. This checks the continuity of the bulb filaments.

The cord should be plugged into the line and the switch turned on for all of these tests.

The first point at which the neon bulb does not glow is the open tube, light or resistance, as the case may be. Elapsed time for this test is about one minute which is much quicker than removing each tube and dial light for individual tests.

R. G. Murray,
137 Wrentham Street,
Dorchester, Mass.

AC-DC Improvement

A good many cheap AC-DC sets are now being turned out minus a filter choke, a 500 to 3000-ohm carbon resistor being used instead to help filter the B supply for the r.f. and detector. The plate supply is fed from one side of the 25Z5, while the B supply to the output tube is fed from the other side of the rectifier, filtered by only a condenser.

Remove filter resistor, join cathodes of 25Z5, insert 350 to 500-ohm choke and feed B supply to all tubes through choke. By-pass choke on both sides by 8 mfd. condenser.

This change will improve tone of set, save a number of replacement condensers and make a happy customer.

M. Jacobson,
1485 E. 23rd St.,
Brooklyn, N. Y.

Lucky Girl



Presenting the famous Lucky Strike Girl, whose face you have seen many times, even if you have yet to hear her voice over a microphone. Here she is giving the studio audience a preview of her hit-of-the-month costume for April.

SIX PACKETS ADDED TO RCA SERVICE FILE

Many New Models Covered In Packets 6 to 11 Now Ready

With the recent announcement of six new RCA Service Tip Packets (Nos. 6 to 11), a total of 420 RCA Service Tip Cards are now available to all owners of the RCA Radio Service Tip File. RCA Parts and Radiotron Distributors are in a position to supplement the initial 200 cards in the Tip File by 220 more, thus bringing the total available cards to 420 plus those added by the individual owners. These Service Tips cover 50 different makes of receivers. There are less than 60 cards on RCA Victor instruments.

Selected Tips

The Packets contain the selected Service Tips that have been submitted by the readers of RCA Radio Service News and the owners of the RCA Tip File. They cover tough, time-consuming service problems, supplying inestimable aid to the man in need. Users of the Tip File are benefiting from the experience and knowledge of hundreds of practicing engineers. And as more tips are added to these files, the more valuable they become—a real gold mine of information. One of the six packets will be supplied free with each purchase of RCA Parts totaling \$5.00, or of RCA Radio Tubes totaling \$10.00.

RCA Radiotron and RCA Parts Distributors are still featuring this time-saving Service Tip File on two attractive offers, either of which gives you the complete equipment for less than the price of the metal cabinet alone.

ENGINEER SEES NEW USES FOR OSCILLOGRAPH

Better pickup and commutator adjustments are easily made

That the RCA Cathode Ray Oscillograph is one of the most versatile of test instruments is once more amply demonstrated by an application recently devised by H. F. Hanthorn of the RCA Service Division. This instrument, which includes a linear horizontal sweep oscillator and vertical and horizontal amplifiers, is featured by all RCA Parts Distributors, many of whom offer liberal easy payment plans.

Adjusting Magnetic Pickup

The following method is recommended as an unusually accurate means of centering the armature of magnetic pickups.

The vertical terminals of the RCA Cathode Ray Oscillograph are connected to the output terminals of the pickup input transformer (for high impedance pickups, directly across the pickup terminals). A constant frequency record of approximately 1000 cycles per second is played in the conventional way with a good needle, and the resulting image is observed on the oscillograph screen.

If the pickup is not operating properly, the positive and negative alternations of the sine wave will not appear symmetrical. When the armature is "off center" one side of the cycle will be flattened, resulting in distorted reproduction.

If the pickup is gently pushed on one side or the other while playing, the proper adjustment can be found.

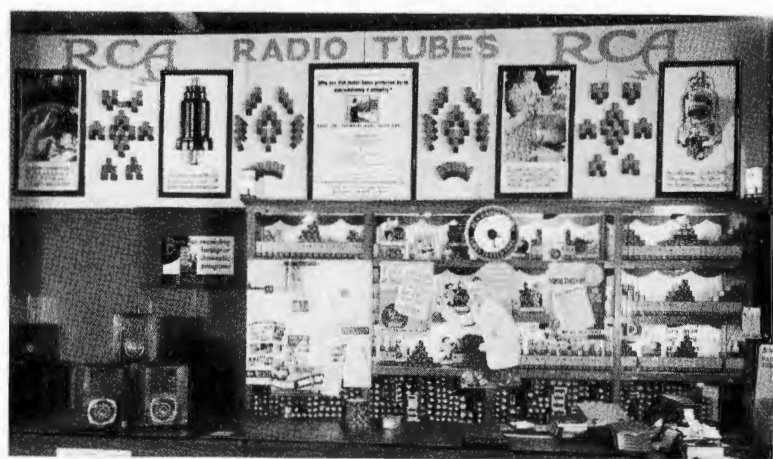
Adjusting Generator and Dynamotor Brushes

Quite often very peculiar noises arise from faulty brushes and pressure adjustments on small dynamotors and generators. Connection of the vertical terminals of the RCA Oscillograph across the high voltage output of the generator (while properly loaded), makes it possible to see the actual output wave.

The output of a d-c generator should be practically a straight line with a slight commutator ripple. When brushes are chattering or too loose, the output wave form is very distorted and makes a very pronounced image on the screen. An open or shorted coil or commutator bar on the armature can be located very quickly with this method.

This oscillographic function can be applied to any type of d-c machine, large or small, and is but one of the many uses of this remarkable service instrument, both for radio, mechanical and electrical work. Progressive service engineers find it ideal for all radio service work.

"-- It Pays To Sell RCA Radio Tubes"



Milton Auster, President, Federated Purchaser, Inc., New York distributor, believes what he says, and judging from this picture, he acts accordingly. This attractive RCA Radio Tube display illustrates Mr. Auster's belief that "advertising displays . . . sales helps furnished by RCA are helpful to our dealers and servicemen . . ." Mr. Auster has gone on record with "it pays to sell RCA tubes."

Free Service Sales Aids



A generous supply of the above selling helps will be mailed free to any service engineer or radio dealer who promptly sends his request to RCA Radiotron, Camden, N. J.; Dallas, Tex.; Chicago, Ill.; or San Francisco, Calif. These helps have proven to be real business-getters and are ideal for envelope stuffers or direct mail. Sorry, no imprints.

30-10,000 Cycles Is Range Of New RCA Transformer

Low Response Improved With Parallel Feed

One of the important features of the new RCA Universal Audio Transformers is their wide frequency range, it being fairly flat

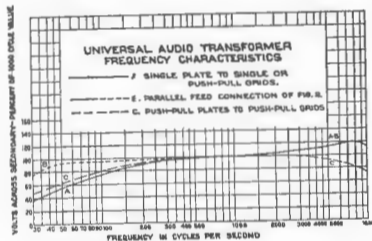


Figure 1

from 30 to 10,000 cycles. This enables service engineers to use this unit in the finest of receivers, as the range is considerably in excess of the widest receiver now in use. The exact characteristics are shown in Figure 1, for the various tubes and types of coupling that may be used.

It will be noted that the response at the lower frequencies, when the transformer is operating from a single plate, is greatly improved by

connecting as shown in Figure 2. This is a parallel feed circuit, by means of which the D.C. is blocked out of the primary winding and the curve B (Figure 1) is obtained. A similar improvement in low frequency response, without any reduction in gain, may be obtained

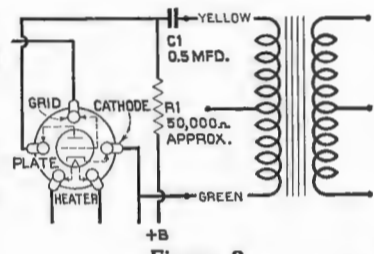


Figure 2

by replacing resistor R-1 with a reactor having an inductance of at least 100 henries.

Figure 3 shows the connections to the various windings and taps. Long leads greatly facilitate the ease with which connections may be made. Other important features are the complete shielding for avoid-

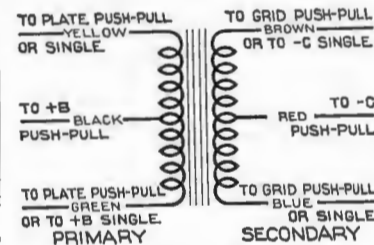


Figure 3

ing hum or extraneous pickup and simple mounting lugs which are adaptable to any style chassis.

SPIDER-WEB ANTENNA IS ANNOUNCED

(Continued from Page 1, Column 5)

duction is great, and the performance of practically any short-wave receiver is vastly improved.

Double-Action Reception

The action of the new antenna is that of an efficient T-type antenna of greater pickup than the span length would indicate, over the range from 140 to 4,000 kc. Above 4,000 kc. the operation automatically changes to that of an efficient multiple doublet all the way to 70,000 kc., with the high pickup and great noise reduction of such an antenna. Because of the addition of sufficient legs to the doublet arrangement, all the short-wave bands are covered by a special leg resonating at the particular band, thus greatly improving reception over single or double-doublet antennas.

While the RCA Spider-Web Antenna is just being introduced to the radio trade, field testing has been carried out for more than a year. Even during the severe winter of 1935-36, this antenna was able to withstand the gales and ice formations that brought many other antennas down. The top legs are of 7-strand No. 22 wire and a truss is formed by the several legs, giving the entire assembly great mechanical strength.

Read the technical details on page 7, then recommend this remarkable new antenna to your customers.

New "Mike"



The new RCA Junior Velocity Microphone (MI-4010A) is ideal for P.A. and amateur work. It has all the good qualities that have made RCA Velocity Microphones standard in the world's finest broadcasting stations. The frequency range extends from 50 to 10,000 cycles and the average operating level is minus 68 db. RCA Commercial Sound Distributors are featuring this instrument at the low list price of \$43.50, subject to an unusually attractive discount to service engineers and radio dealers. Write for descriptive folder to Dept. S.N., RCA Manufacturing Co., Camden, N. J.

MILLING HEADS PARTS; ALLEN GETS NEW POST

New Advertising Duties for Finn and Stevens

Appointment of J. A. (Shine) Milling to be in charge of RCA Parts Sales was recently announced by E. N. Deacon, General Sales Manager of the Radiotron and Parts Divisions. Milling succeeds G. P. Allen, whose experience and ability won for him the important post of directing factory contact with automobile manufacturers on both parts and instruments.



J. A. Milling

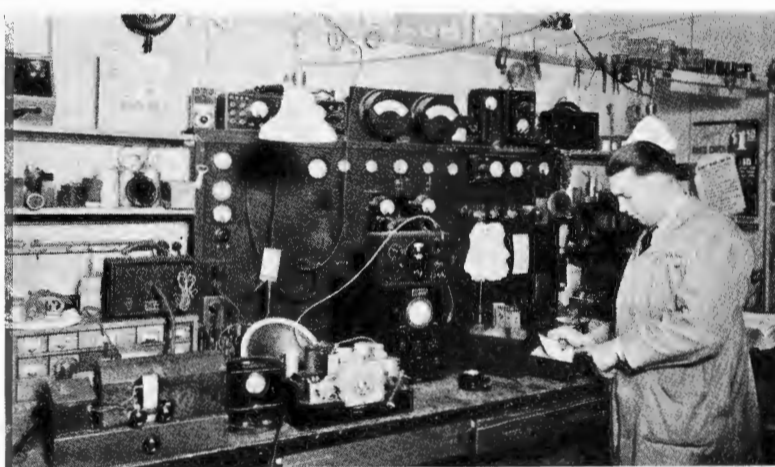
"Shine" Milling is so well known as to scarcely need introduction to the parts and tube trade. One of the most sought-after members of the Radiotron Division, which he joined in 1930, Shine has chalked up an excellent sales record, as well as acquired a host of warm friends in half a dozen key territories. In addition he has lent his talents to advertising, and more recently was the Parts Representative in the Southeast, where outstanding work merited his promotion.

Simultaneously with the change, D. J. (Dave) Finn was placed in charge of both Parts and Tube (Radiotron) advertising by T. F. Joyce, General Advertising and Sales Promotion Manager. F. P. (Steve) Stevens, whose pioneering work in the field of parts promotion has won the admiration of his associates and the trade, was given the important responsibility of supervising advertising and promotion of RCA Photophone.



D. J. Finn

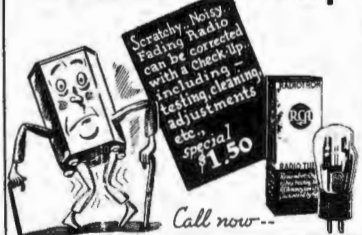
Name These RCA Products



Here's a busy man in a shop that certainly looks like business. "Pete" Peterson is shown at the work-bench of his store, Klear Tone Radio Service, Seattle, and Pete wants to know if Service News readers can name all the RCA products shown in the picture. Some are partially obscure—so adjust your specs and let's see if you can pick 'em all out. The first ten who send in the correct number will get a prize from RCA—a copy of Riders' Auto Manual—free of charge. Send your answer to the editor, RCA Service News, Camden, N. J.

Lantern Slides

IS YOUR RADIO FEEBLE?



SLIDE 918 YOUR IMPRINT HERE

RADIO NOISY?



Our RCA Cathode-Ray Oscillograph... the X-Ray of Radio... sees the trouble. Ask us for our special \$2.50 10-point Check-Up for... \$1.50

SLIDE 917 YOUR IMPRINT HERE

The above lantern slides make it possible for all radio dealers and service engineers to advertise the "Check-Up" and the Oscillograph in their local movie houses. Order direct from Camden, N. J. The price is 30c. each. Specify Slide Number.

CATHODE RAY TUNING KIT IS ANNOUNCED

(Continued from Page 1, Column 1)

the automatic volume control circuit, it is necessary that the receiver be equipped with this feature.

Service engineers will find the RCA Cathode Ray Tuning Kit an ideal item to carry and show to all customers at the time other work is being done. Because of the voluminous national advertising behind the famous RCA Victor Magic Eye, merely calling a customer's attention to the feature frequently results in a sale and installation on the spot.

Not only may the RCA Cathode Ray Tuning Kit be sold as an accessory, but it is an ideal item to use as a leader for the Check-Up Campaign. Many dealers and service engineers are advertising a special price on the combination of the Check-Up and the installation of the RCA Cathode Ray Tuning Indicator. Such an offer has large possibilities for additional tube and parts business. RCA Parts Distributors are ready to make immediate deliveries on this important accessory. Stock No. 9688, List Price \$3.00.

ANNOUNCE TWO NEW RCA ALL-METAL TUBES

(Continued from Page 4, Column 5)

which is common to the triode unit. Each diode plate has its own base pin.

RCA 6X5

The new full-wave rectifier RCA 6X5 is intended for use in automobile receivers using a storage battery for heater supply or in a-c receivers having proper design characteristics. The tentative characteristics follow: Heater Voltage (A.C. or D.C.) 6.3 Volts; Heater Current 0.6 Ampere; A-C Plate Voltage per plate (RMS) 350 max. Volts; Peak Inverse Voltage 1250 max. Volts; D-C Output Current 75 max. Milliamperes; Maximum Overall Length 3-1/4"; Maximum Diameter 1-5/16"; Base Small Octal 6-Pin



While these new RCA All-Metal Tubes are similar in general design characteristics to tubes of other types, nevertheless their construction in metal gives certain important operating characteristics that are not obtainable in any other manner.

I have been running the above ad, which only costs 48¢, in our local paper for some time. Everywhere I go people comment on it, which shows that it is being read.

Al Robinson, 806 Limekiln Pike, North Hills, Pa.

All Types in RCA Tube Display



A feature of the RCA Display Room at Camden, N. J., is the complete display of all RCA Tubes. These vary from the small acorn type receiving tubes, shown at the right, to the large water-cooled transmitting tube, shown at the left.

Wide Range Of New Antenna Is Difficult Engineering Feat

Efficient Design Required for Antenna to Meet Requirements of Modern Multi-Band Receivers—Easily Installed In Small Space

The design of an easily installed home antenna to cover the extremely wide frequency range of modern multi-band radio receivers is a development problem of major proportions. Mr. J. E. Albright of the RCA Engineering Dept., who did considerable work on the new RCA Spiderweb Antenna, describes in the following article how these various problems were overcome.

By J. E. Albright, RCA Engineering Department

The RCA Spiderweb Antenna, Stock No. 9685, with its accessory kit, Stock No. 9689, is designed to answer the demand for a small, easily installed, superior performing antenna which will effectively pass signals in the range of 140 to 70,000 kilocycles.

Receivers that extend below the broadcast band to 70 k.c. and above the band to 70 m.c., have created a demand for a more efficient antenna that will effectively pass signals at these frequencies. The RCA Spiderweb Antenna System is designed primarily to meet this demand for a truly "All Wave" antenna which perfectly matches the coverage of our RCA Victor and other wide range receivers.

J. E. Albright

Doublets Efficient Collectors
It is well known that half-wave doublets at or near resonance are the most efficient collectors of short-wave signals. Obviously, if several doublets of different lengths are connected to the same transmission line without any one harming the

utilization of the space and so that the overlapping of two adjacent dipoles will hold up the intermediate frequencies between bands, thus giving practically uniformly high performance over the entire range (5 to 70 megacycles) covered by the dipole antennae.

When receiving signals in the range of 140 to 5000 kilocycles, the whole network functions as a single unit.

The main Spiderweb Kit, Stock No. 9685, as furnished, includes the three dipoles "A-B," "C-D" and "E-F" completely assembled as shown in Figure 3, ready to be

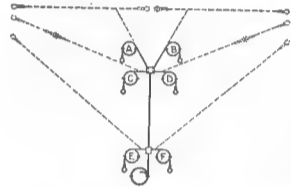


Figure 3

unwound and erected as shown by the solid lines in Figure 1. It will effectively pass signals in the frequency range of 140 to 23,000 kilocycles. The two doublets, "G-H" equipped with loading coils and "K-L," shown dotted in Figure 1, are furnished complete ready to assemble to the main network in the RCA Spiderweb Accessory Kit, Stock No. 9689. With this pair of dipoles attached to the main network full coverage is obtained, 140 to 70,000 kilocycles. Connections of the accessory kit are shown in Figure 6.

A feature of importance incorporated in this design is superior noise reduction on those bands affected mostly by man-made interference, namely the "C" and "D" bands (6,000 to 70,000 kilocycles). Within these bands the intercepted signals are usually quite weak and man-made interference is generally the strongest and most localized. The noise reduction is obtained by erecting the Spiderweb Multiple Dipole Antenna remotely to the source of greatest interference and coupling it to the receiver through a balanced non-pickup transmission



Figure 4

line. The transmission line has been carefully chosen, as in our previous designs. Seventy-five feet of line is assembled to the network. In case additional line is required, 45-foot units are available, which may be added. These units must not be cut, as the line terminates at the receiver in a carefully designed transformer which is matched to the line impedance.

Receiver Coupling Transformer

The receiver coupling transformer in outward appearance is almost identical to the one used in the De Luxe World-Wide Antenna Sys-

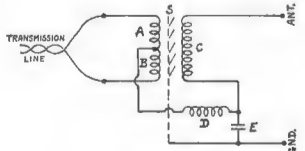


Figure 5

tem. Internally it is quite different, as shown in Figure No. 4. In this design the primary (line winding) consists of two interwound sections ("A" and "B" Figure 5), thus giving a perfect balance when coupled

to the line. Better efficiency with superior shielding against any capacity pickup whatsoever is obtained in this new design. It is very important to note that the noise-elimination feature of the system depends largely on the design of the transformer. The purpose of this transformer is to eliminate interference signals that come down each side of the transmission line in phase, and to pass on to the receiver the "Out of Phase" entertainment signals from the dipoles. Refer to Figure 5 and assume that the same voltage is set up in each branch of the transmission line, as is always the case when any signal whatsoever is picked up directly by the line. This voltage will cause current to pass down both sides of the line through coils "A" and "B" to grounded shield "S" by capacity coupling.

Note that the flux of coil "A" cancels that of coil "B," since the voltage applied to the two ends of coils "A" and "B" from the transmission line are in phase. These coils are interwound so as to make this cancellation more nearly complete. Since the resultant flux is zero, there can be no voltages set up in the secondary winding coil "C" by induction. Any possibility of voltage being induced in coil "C," due to capacity coupling, is eliminated by the electrostatic shield "S."

Signal Voltage Not Cancelled

Signal frequencies from 5 to 70 megacycles are picked up by the various dipoles and fed to the transmission line out of phase as the branches of the dipoles are one-quarter wavelength long. In other words, a signal within these limits of frequency will produce at any given instant a positive voltage in one of the branches of a doublet and, at the same instant, produce a negative voltage in the other branch.

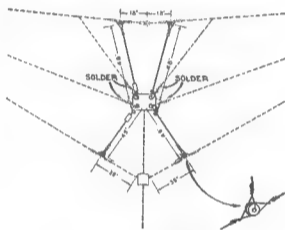


Figure 6

These voltages impressed on the transmission line will cause current

to flow down one side and up the other. Coils "A" and "B" are aiding for these currents, and the total flux of these coils induces a voltage in the secondary winding coil "C" which is connected to the input terminals of the receiver through series condenser "E."

Signals of lower frequencies than about 5 megacycles are impressed on the antenna network as a whole and follow down the transmission line in phase. They pass through windings "A," "B" and "D" and appear across condenser "E" and feed to the input of the receiver through the series winding "C."

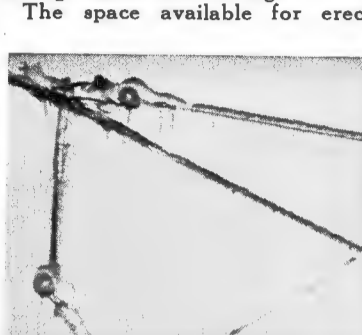


Figure 7

ing an antenna in the open is usually restricted in densely populated areas. This is particularly true in regards to the antenna length. It is relatively easy to design an antenna of reduced size to meet this condition, but to obtain high signal pickup efficiency along with reduced size is not so easy. This problem is solved by the RCA Spiderweb Antenna System, which employs three small resonant dipoles in the "C" band and two in the "D" band. These dipoles form the spiderweb network shown in Figure 1, previously described in detail. This antenna is small in size, having a span of only 37 feet and a height of approximately 11 feet. Even though it is unusually small in size, it has exceptionally high pickup. The whole network requires supports only at its extremities the same as the simplest "L" or "T" type antenna.

Great Mechanical Strength

The new kit is also designed to obtain the greatest possible mechanical strength with a minimum of material. The three main supporting dipoles run the full span, terminating in a specially designed

Soloist Now



Tall and lovely Jane Pickens, of the famous Pickens Sisters, is now winning added fame as soloist on the Texaco Program, Tuesdays, 9:30 p.m., E.S.T., over an NBC network.

"spreader." The spreader is also an equalizing lever that properly distributes the load to the various wires. A test model of this antenna was used by the RCA Engineering Department during the past winter. The illustration, Figure 7, from an actual photograph of an equalizer and wires at that point after a cold, rainy winter night shows the extent to which ice accumulates on the various parts of an antenna and, also, shows the importance of proper equalization and mechanical strength.

The time required to erect an RCA Spiderweb Antenna has been reduced to a minimum, as all the wire lengths are carefully measured and soldered in place at the factory. Wires that are to be connected to the spreaders are terminated with a soldered loop at the proper length. Specially designed hooks, very easy to install, are furnished for making these connections. The main network is carefully packed so that it can be readily laid out as shown in Figure 3, after which each of the coils is unwound, as shown by the dotted lines, and fastened to their respective places, as shown in Figure 1.

It is the belief of the designers that this new RCA "All Wave" antenna is the first to be offered to the public that combines all the objectives set forth.

Convention Ads For Service Engineers

MAT NO. 268

Be prepared for the CAMPAIGN!

Get your radio in shape now for the most exciting political broadcasts in years! Then you won't have to miss a single word. Act at once. Get the special Check-Up offer. Includes complete cleaning and inspection of set-aerial, ground and speaker. Plus an accurate test for faulty tubes and other possible troubles. This service complete, \$1.50, plus small cost of tubes or parts, if needed, to make radio good as new. Call us at once!

RCA

DEALER IMPRINT

MAT NO. 266

A Radio MAGICIAN!

We can make radio troubles disappear like magic. It's positively amazing how we can bring back the original tone, volume, sensitivity, and end hum, buzz, noise, crackles, erratic reception. Here's the first step: Ask us for a Check-Up, including cleaning, tightening, inspection and testing of everything. Costs \$1.50. Bargain! And tubes or parts, if required, are sold today at low prices also. Phone us now!

RCA

DEALER IMPRINT

DON'T MISS ELECTION RETURNS!

Election returns will make you miss them. Get your radio in tip-top shape now. Call us for a Check-Up. Includes cleaning; tightening all parts-aerial, ground, speaker. Plus an accurate test for additional trouble. Call us at once. Cost is only \$1.50. If tubes or parts have to be installed to bring back your radio's original pep and power, they will cost little. Phone us NOW.

RCA

DEALER IMPRINT

WE RECOMMEND RCA RADIO TUBES

MAT NO. 269

Listen to Convention Broadcasts!

Now's the time to put your radio in perfect condition, so you can listen to every thrilling word. And here's the best and cheapest way to do it: First, accept our Check-Up offer, which includes cleaning and tightening of entire set-aerial, ground and speaker, plus an accurate test for defective parts and tubes. All for \$1.50. Second, if tubes or parts are needed to make your radio play like new, have them put in—they will cost little. Call us at once!

RCA

DEALER IMPRINT

WE RECOMMEND RCA RADIO TUBES

MAT NO. 267

Mats for the above ads are available to all radio service engineers and dealers. They tie in with the national conventions which will prove a boon to radio service and tube sales for weeks in advance. Order direct from Camden, N. J., specifying number of mat desired. All mats are for 2 columns, 3 3/4 inches long.

1935 SERVICE NOTES ISSUED IN BOOK FORM

Additional Technical and Tube Data Included

The (long awaited) bound volume of RCA Victor Service Notes for 1935 is now ready for service engineers everywhere, according to F. B. Ostman, Service Division Manager. Delayed because of the large number of models included, this book covers all RCA Victor receivers manufactured during 1935 and brings the total of bound volumes on RCA, RCA Victor and Victor Talking Machine Company models to six. These books, which are available at all RCA Parts Distributors, have the low net price of \$1.00 each, f.o.b. Camden, N. J., and are a necessity for all practicing service engineers.

RCA Victor Bound Volumes of Service Notes contain complete dia-



Six Volumes Cover All Models From 1923 to 1936

grams of all RCA Victor receivers, and in addition such valuable service data as aligning instructions, voltage readings, lists of replacement parts and every detail necessary to properly service this equipment, much of which is not available from any other source.

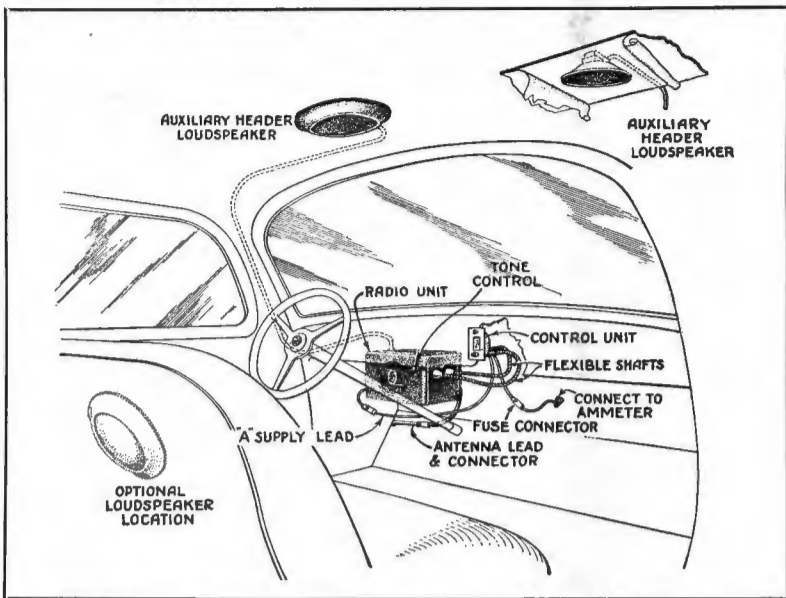
A feature of the 1935 volume is the arrangement of schematic and wiring diagrams so that those pertaining to a particular chassis face each other from opposite pages, thus making it unnecessary for the reader to turn pages when checking from one set to the other. Other valuable technical data: decibel charts, bull's eye socket voltage charts, technical definitions, Radiotron tube data, methods for servicing receivers and many others.

Grid Cap Shield

The RCA Stock No. 12110 Grid Cap Shield, List Price \$0.14, is ideal for that high gain receiver using metal tubes having exposed grid caps. It fits snugly over the dome of all-metal tubes and makes a neat, efficient job. See it at your RCA Parts Distributors.



Speaker Easy To Install



The new RCA Header Speaker is easily installed in many locations about a car. Helps make the old set sound a lot better, too. Stock No. 9700, List Price \$4.75, consists of the speaker unit for a concealed installation. Stock No. 9701, the ring bracket assembly makes an ideal installation for practically any car.

ROOF SPEAKER ADDED TO LINE OF AUTO PARTS

New Unit Is Used With All Car Sets

The addition of a new universal-mounting roof header speaker to the RCA Auto Radio Accessory line gives service engineers an opportunity to sell and install an auxiliary speaker with every auto radio installation. Such a speaker gives greatly improved sound distribution than a speaker attached to the fire wall.

Stock No. 9700, List Price \$4.75, consists of the complete speaker unit, a 90-inch speaker cord with a three-prong plug at one end and individual pins on the other end, and the necessary clamps, carriage bolts, wing nuts and a metal screen. This speaker is for installation in recent model cars, such as the Ford, in which provision is made in the front part of the roof for a speaker unit.

In General Motors cars, the header installation requires the Stock No. 9700 Loudspeaker Unit and the Stock No. 9701 Ring Accessory Kit for mounting. This kit contains a dome-shaped metal grille (which fits flush with the top), grille cloth, a mounting ring and three mounting springs and screws, and has a List Price of \$1.50.

For installing the RCA Header Speaker in conjunction with a two-unit auto radio receiver, such as the RCA 6M2, a special cable is required (Stock No. 9703—List Price \$1.50).

NEW BINDER NOW READY FOR RCA "NEWS"

Completion of arrangements by the RCA Parts Division with the Federbush Company, 91 Seventh Avenue, New York City, now makes it possible for all service engineers to keep their valuable copies of RCA Radio Service News for ready reference. Through special purchase arrangements, it is possible to offer this handsome binder to you for \$1.25 each, including gold-stamped title. For an additional 25c your name will be added, also in gold.

This new binder holds 20 issues by means of unique binding strips which permit insertion or removal of any copy without disturbing other copies. The cover is made of soft leather-like material that is flexible and permits the book to open flat for easy reading.

Old Copies Available

While many service engineers have saved their copies of RCA Radio Service News and will continue to do so in the future, there are perhaps some who have not. To help these men keep their binders complete, RCA will supply at 10 cents per copy, any request for old issues, Vol. 1, Nos. 4, 5, 6 and 8, and Vol. 2, Nos. 1, 2, 3, 4, and 5. [Other back issues are out of stock and it is impossible to fill requests for them.]

Place your order for the RCA Radio Service News Binder direct with the Federbush Company, 91 Seventh Avenue, New York City, enclosing your remittance. All orders, including those imprinted, will be filled promptly.

PARDON US

In the March issue of RCA Radio Service News, a slight error occurred in the story on the capacity-operated relay, by F. H. Shepard, Jr. It was stated in the story that the output of the oscillator rises when one's hand is brought up to the antenna. A correct description of the circuit's operation follows:

The circuit operates on the change in output of an oscillator caused by a change in the oscillator's feed-back capacitance when a hand is brought up to the antenna. The triode section of the 6Q7 is the oscillator. Feed-back is controlled by the capacitance between antenna and ground; when a hand is brought close to the antenna and this capacitance is increased, the output of the oscillator falls. The diode section of the 6Q7 rectifies the oscillator's output and applies to the grid of the 25A6 a d-c voltage whose magnitude depends on the strength of oscillation. When the oscillations are full strength, a negative bias is applied to the grid of the 25A6 which makes the plate current of the 25A6 small. When the strength of oscillations is diminished by the effect of hand capacitance, the voltage applied to the grid of the 25A6 is less negative. Hence, when a hand is brought up to the antenna, the plate current of the 25A6 rises sufficiently to operate

SELLING TIPS

Selling Tips are our readers' contributions for selling their services or products. All readers of RCA Radio Service News are invited to submit their ideas for increasing business. All Selling Tips printed will win one of the new RCA Service Engineer's Pencils. Let's have yours.

Free Auto Lock

Whenever I install or repair an auto set, I ask the owner if I may install an Auto Radio Lock on his set free of charge. I keep the key to the lock on file. Whenever he needs service on his radio, he must come to me for it. If he wants me to take the lock off, I do it with a smile to show that he is not obligated. This also assures me that the set has not been tampered with.

This idea has resulted in the sale of many locks, as many of my customers buy the lock if they go away on a long trip. In my experience I have found that once the lock is installed it usually results in a sale.

Sidney Lieberman,
Theda Radio & Electrical Service,
2324-65th Street,
Brooklyn, N. Y.

RCA Decalomania

The use of RCA decal No. 694 in the rear window of service men's autos keeps the motoring public "RCA Radio Tube minded," and also distinguishes the RCA Radiotron service man on the road. I have done 1,400 miles in the past several weeks with one in the rear window of my Ford Tudor, and have carried the RCA emblem far and wide over the highways of New Jersey. An example of what it does is the fact that I picked myself up four jobs on auto radios, one Sunday afternoon while parked at a small airport in northern New Jersey. You are always sure of a job and inquiries concerning radio troubles when parked at a place, such as an airport, road stand, garage, etc.

Frank H. Perry,
139 Lily Street,
Paterson, N. J.

Accessory Sales

When calling on any Check-Up job, be sure to take along the following articles. You will be surprised how easy it is to sell one or more of these items on every job:

- Pilot lights
- 20 and 40 watt colored lamps
- Lead-in wire
- Extension cords
- Spring action male plugs
- Three-way electrical outlets
- Noise eliminators

Alex Brzuch, Service Mgr.
Martin's Tire & Accessory Shop,
2639 E. Forest Ave.
Detroit, Mich.

Card System

We have a master card system set-up which contains nearly four thousand cards. We use a marker system so that we can phone back to the service customer a week after the job has been done to find out if the set is operating O.K. We also

ARTHURS RADIO CO.	
Name	Phone No.
Address	Cr. Rating
Make of Set	Wgt. or
Model No.	Serial No.
Purchased from	New Used
Date of Purchase	Price
Type of Tubes Used	
No. of Tubes	
Remarks	

use a marker for follow-up on all service operations where it looks like we could sell a new radio.

Three service mailings of advertising per year are sent to this list of service customers. In our business we have found that our advertising dollar goes farther when spent in this manner.

The sale of at least one hundred new sets a year can be traced di-

rectly to direct mail advertising on service.

the relay which controls the display. In addition to the foregoing explanation, Mr. Shepard has pointed out that since the RCA-6R7 has been announced, use of that tube will give better and more stable operation than the 6Q7. No circuit changes are required.

rectly to direct mail advertising on service.

L. J. Arthurs,
Arthurs Radio Company,
102 Third Avenue, S.E.,
Cedar Rapids, Iowa.

I have shown here a stamp which I place on every set I service.

Set Fixed Price \$
Trouble
Tubes Replaced
Set Guaranteed Days
Guarantee Expires
This stamp saves lots of arguments and loss of customers. I find it very effective and helpful.

S. Horowitz,
419 Porter St.,
Philadelphia, Pa.

Completion Notice

The following stamp has been used for some time with good results for the farm trade. It tends to



eliminate the charge accounts as well as being an ideal notification of completed repairs. It is filled in on the typewriter and pasted on a Government penny postcard.

Radio Service Company,
366 South Street,
Tracy, Minn.

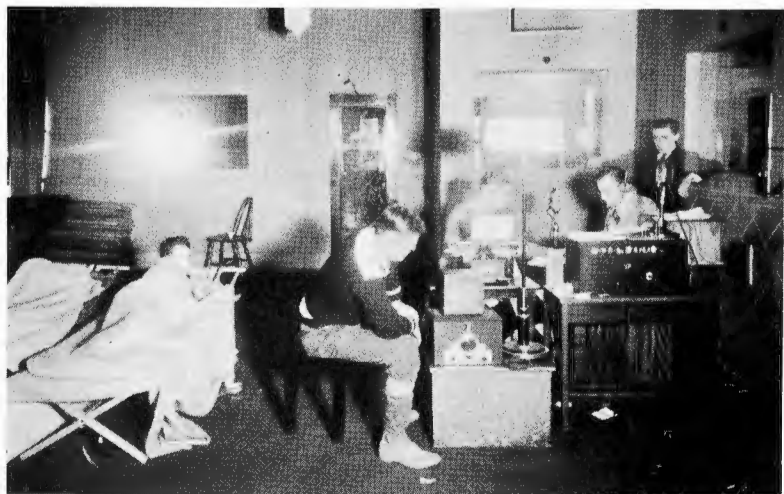
Local Ad

The following copy made up in an ad inserted in your local newspaper will bring in no end of new business. "REWARD \$10.00. I will pay any one the sum of \$10.00 for any set manufactured since 1928 by a reputable manufacturer that I cannot repair."

By inserting an ad of the above description I have found that I have been swamped with work. It makes people, who have been disgusted with sets they have taken elsewhere to have repaired, bring them to me. It also gives people confidence in you, because they know that one would not insert such an ad if he were not able to back it up. It is my advice to the radio profession that one be well versed in the subject of radio technique and be well equipped, such as the RCA Oscillograph, Oscillator, Sweep Unit, Bridge, etc., because you will have sets brought to you that will make you wonder if they can really be fixed.

R. A. Bromley,
Box 123,
Hamlin, W. Va.

Reporting Flood Disaster



The RCA ACR-136 Amateur Communications Receiver played an important part in many amateur radio stations that carried the burden of communications during the recent flood disasters. The above photo shows H. S. Palmer, engineer for Radio Station WRAC at Williamsport, Pa., conversing with Al Glaes, W8AUK, of Williamsport, during the height of the flood conditions, with the aid of an ACR-136. This particular receiver was in continuous operation for over 150 hours, a tribute to its design and the sturdy construction of its RCA Tubes.

Holds 20 Copies



The above binder is now available to all radio service engineers to preserve their copies of RCA Radio Service News. The price is only \$1.25 postpaid; imprinted with your name in gold letters, \$1.50 postpaid.