

# radio service dealer

DECEMBER  
1946



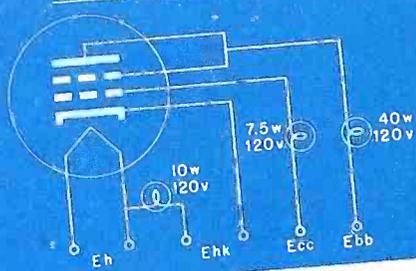
Issue:

MODERNIZING HOME RECEIVERS  
COLLECTION GENERATORS IN TELEVISION  
MINIATURE TUBE GUIDE  
SERVICING PROBLEMS

# MAKING TUBES IS EASY..

*If* YOU  
KNOW  
HOW!

FUNDAMENTAL AGING CIRCUIT

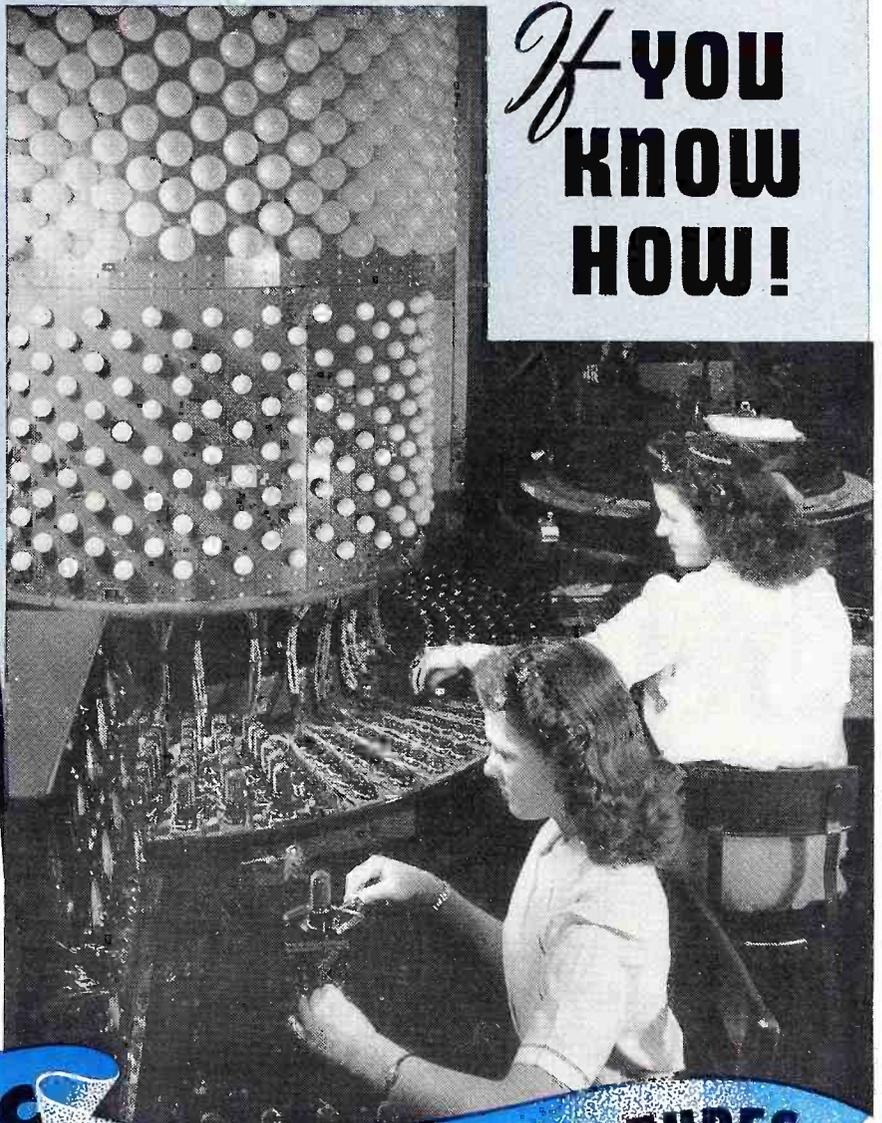


AGING SCHEDULE FOR HYTRON 50L6GT

| Step | Min-utes | Eh a-c | Ehh a-c | Ecc d-c | Ebb d-c |
|------|----------|--------|---------|---------|---------|
| 1    | 5        | 50     | 110     | 0       | 0       |
| 2    | 3        | 70     | 110     | 0       | 0       |
| 3    | 5        | 80     | 110     | 0       | 0       |
| 4    | 3        | 80     | 110     | 0       | 0       |
| 5    | 5        | 70     | 0       | 120     | 120     |
| 6    | 4        | 0      | 0       | 0       | 0       |
| 7    | 5        | 50     | 0       | -10     | 120     |

Electrode potentials are varied as shown in the schedule. Actual voltages at the socket depend on currents drawn through the incandescent lamps used as economical, interchangeable current-limiting resistors.

Operations performed in seven steps are:  
 (1) discovery of heater-cathode shorts  
 (2) beginning of cathode processing to stabilize emission (3) further seasoning and burning off of h-k leakage (4) h-k potential increased to eliminate leakage (5) grid, screen, and plate potentials applied to complete de-gassification (6) cooling off period (7) normal potentials applied to pre-heat for test.



## AUTOMATIC AGING FOR BETTER TUBES

Yes, radio tubes also must be "aged in the wood." Aging activates the cathode under accelerated life conditions, just before test. In the fundamental aging circuit shown, final seasoning and de-gassification stabilize characteristics in accordance with the carefully planned aging schedule.

Formerly tubes were plugged into long aging racks. An operator, equipped with the schedule and a timer, adjusted electrode potentials throughout the aging cycle. The human element resulted in errors of timing and switch manipulation.

Hytron's new automatic aging wheel minimizes human error. A motor drives a mechanically-indexing horizontal wheel on which 30 radial sections of

12 tubes each are slowly rotated. Brushes contacting commutator segments automatically apply electrode potentials. The wheel itself requires no operator. The final basing machine operator feeds the wheel. Tubes already pre-heated are removed by the test operator.

Other features of the aging wheel are elimination of needless handling, fast and steady pacing of the work, easy servicing, and readily interchangeable load lamps.

To you this automatic aging wheel means economical, more uniform tubes with stable electrical characteristics. Again Hytron know-how takes a forward step by making your tubes easier and better.



SPECIALISTS IN RADIO RECEIVING TUBES SINCE 1921

# HYTRON

RADIO AND ELECTRONICS CORP.

MAIN OFFICE: SALEM, MASSACHUSETTS



# Radio Parts are EASY to identify

when you use  
**PHOTOFACT\* FOLDERS**

**PARTS LIST AND DESCRIPTIONS**  
TUBES

| ITEM No. | USE  | DESCRIPTION | MANUFACTURER | TYPE | REPLACEMENT NOTES |
|----------|------|-------------|--------------|------|-------------------|
| 1        | 5Y4  | Rectifier   | GE           | 5Y4  |                   |
| 2        | 6X4  | Rectifier   | GE           | 6X4  |                   |
| 3        | 6AV6 | Detector    | GE           | 6AV6 |                   |
| 4        | 6BE6 | Detector    | GE           | 6BE6 |                   |
| 5        | 6BD6 | Detector    | GE           | 6BD6 |                   |
| 6        | 6BE6 | Detector    | GE           | 6BE6 |                   |
| 7        | 6BE6 | Detector    | GE           | 6BE6 |                   |
| 8        | 6BE6 | Detector    | GE           | 6BE6 |                   |
| 9        | 6BE6 | Detector    | GE           | 6BE6 |                   |
| 10       | 6BE6 | Detector    | GE           | 6BE6 |                   |
| 11       | 6BE6 | Detector    | GE           | 6BE6 |                   |

**CAPACITORS**  
Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No. | RATING |       | REPLACEMENT DATA |                  |                  |                          | IDENTIFICATION CODES AND INSTALLATION NOTES |        |                |
|----------|--------|-------|------------------|------------------|------------------|--------------------------|---|--------|----------------|
|          | CAP.   | VOLT. | SOLAR PART No.   | SPRAGUE PART No. | AEROVOX PART No. | CORNEILL DUBIER PART No. |   |        |                |
| 7(A)     | 40     | 150   | 500256           | FP306*           | DY-40+20-150     | EL-24                    | AF88D                                       | UF3515 | Filter         |
| 8        | 20     | 150   |                  |                  |                  |                          |   |        |                |
| 9        | .2     | 400   | 502158           | TP429            | S-4-2            | TC-2                     | 484-.2                                      | DT4P2  | Line Isolating |
| 10       | .05    | 400   | 502157           | TP426            | S-4-05           | TC-15                    | 484-.05                                     | DT4S5  | Line Filter    |
| 11       | .01    | 400   | 502151           | TP421            | S-4-01           | TC-11                    | 484-.01                                     | DT4S1  | Pr. Amp. Plate |
|          | .004   | 400   | 502156           | TP407            | S-6-004          | TC-24                    | 484-.004                                    | DT6D4  | Audio Coupling |

**CONTROLS**

| ITEM No. | RATING | DESCRIPTION    | MANUFACTURER | TYPE   | REPLACEMENT NOTES |
|----------|--------|----------------|--------------|--------|-------------------|
| 1        |        | Volume Control | GE           | 500256 |                   |
| 2        |        | Tone Control   | GE           | 500256 |                   |
| 3        |        | Volume Control | GE           | 500256 |                   |
| 4        |        | Tone Control   | GE           | 500256 |                   |

**RESISTORS**

| ITEM No. | RATING | DESCRIPTION | MANUFACTURER | TYPE   | REPLACEMENT NOTES |
|----------|--------|-------------|--------------|--------|-------------------|
| 1        |        | Resistor    | GE           | 500256 |                   |
| 2        |        | Resistor    | GE           | 500256 |                   |
| 3        |        | Resistor    | GE           | 500256 |                   |
| 4        |        | Resistor    | GE           | 500256 |                   |



**SIMPLE!** **ACCURATE!** **FAST!**

**CAPACITORS**  
Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

| ITEM No. | RATING |       | REPLACEMENT DATA |                  |                  |                          | IDENTIFICATION CODES AND INSTALLATION NOTES |        |                |
|----------|--------|-------|------------------|------------------|------------------|--------------------------|---|--------|----------------|
|          | CAP.   | VOLT. | SOLAR PART No.   | SPRAGUE PART No. | AEROVOX PART No. | CORNEILL DUBIER PART No. |   |        |                |
| 7(A)     | 40     | 150   | 500256           | FP306*           | DY-40+20-150     | EL-24                    | AF88D                                       | UF3515 | Filter         |
| 8        | 20     | 150   |                  |                  |                  |                          |   |        |                |
| 9        | .2     | 400   | 502158           | TP429            | S-4-2            | TC-2                     | 484-.2                                      | DT4P2  | Line Isolating |
| 10       | .05    | 400   | 502157           | TP426            | S-4-05           | TC-15                    | 484-.05                                     | DT4S5  | Line Filter    |
| 11       | .01    | 400   | 502151           | TP421            | S-4-01           | TC-11                    | 484-.01                                     | DT4S1  | Pr. Amp. Plate |
|          | .004   | 400   | 502156           | TP407            | S-6-004          | TC-24                    | 484-.004                                    | DT6D4  | Audio Coupling |

What's your biggest headache when servicing radios? Identifying parts? With PHOTOFACT FOLDERS it's easy to locate and identify any item you want to find. Just look at the Complete Parts List . . . a list that's keyed to clear chassis photographs and a full page, easy-to-read schematic diagram. For instance, the capacitor listing alone gives complete data on capacity, voltage rating, function, replacement types . . . even includes installation notes.

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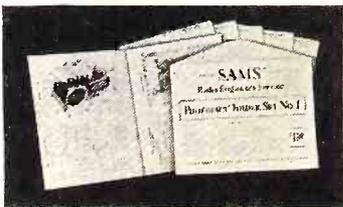
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VOLUME 7 Number 12

December, 1946

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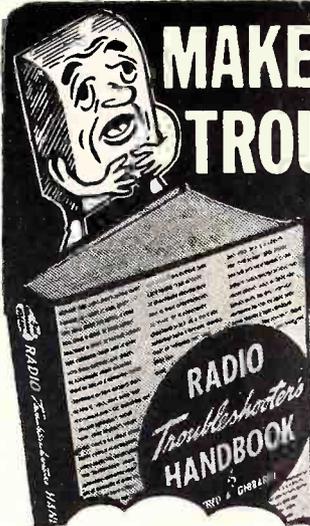
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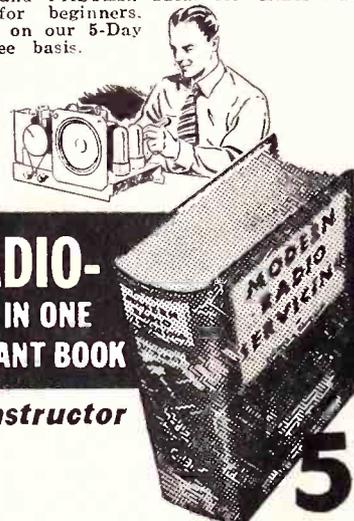
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# with the publisher...

## Television Preparedness

ALTHOUGH over 15,000 television receivers were produced in the final quarter of 1946 the demand far exceeds the supply. In those cities where regular telecasts are scheduled television has really clicked. There is reason to believe that over 200,000 television sets in the \$350-\$400 price class will be sold during 1947 if that many units can be produced.

Telecasting is now limited to very few cities. New video models give an exceptionally fine account of themselves, especially when installed properly. Program weakness is still the sore spot; but this fault is being corrected expeditiously. The main point is this: television is here in a big way and every Service Dealer must immediately prepare himself for the new art regardless of where his business is situated. Don't be complacent because you are located in some section where telecasting is not imminent. Television may get in there sooner than you believed possible, and by not being prepared you may miss a good bet.

When we say prepare immediately for television we mean that you should obtain all the technical knowledge possible about this new art so you will be qualified to install and service all types of video sets. Proper installation is a basic requirement for satisfactory reception, and that leads up to the point of this editorial.

Many Metropolitan New York Radio Service Dealers are perturbed because a leading television manufacturer requires buyers of his sets to have them installed by his own distributors' television service organization. Heretofore this manufacturer's distributors did no retail service work and their present television service departments were especially trained to "round out" the set manufacturer's introductory campaign of television models. The set buyer is told by the Service Dealer from whom he buys his set that he must pay a \$50 installation charge. This charge, it is explained, includes "a guarantee of satisfaction against any contingency," meaning the installation of a dipole, furnishing required amounts of transmission line, and a warranty to repair free or replace without charge any defective part or tube within a one year period after original installation.

We were told the set manufacturer established this "exclusive factory distributor installation program" because he wanted to guarantee set buyers peak efficiency operation and it wasn't assured that this could be accomplished unless technically competent men did the original installation. The policy was not formulated merely to divert installations (and profits accruing therefrom) away from Service Dealers. Now, as other television set manufacturers are about to establish their own policies, we urge them to place no barriers against practising Service Dealers. Instead, they should provide a technical training

course on television, and leave it wide open for their franchised Service Dealers, or independent television installation specialist service organizations to obtain this lucrative business.

Editorially RADIO SERVICE DEALER has already launched an educational series on television for our readers in the hope and expectation that our efforts will help keep the servicing and installation of television sets in the hands of you Service Dealers. You, if technically competent, should be allowed to have your share of television's growth, acceptance, and profits.

## OPA Is Dead

PRICE changes and charges for services and commodities need no longer be submitted to OPA since decontrol of radio if you are a Service Dealer, Retailer or Service Organization. However wholesalers are required to keep on hand for one year after decontrol all records, reports and other documents that they were required to maintain while controls were in effect. Hurrah for the non-existence of OPA's regulations. Now we can run our businesses as conditions require.

## Beware of Overstocking

THERE is taking place a transition in economic conditions. A few weeks ago what was a seller's market is now almost a complete buyer's market. Being overstocked is a risky thing. It's worse than being understocked. Keep your inventories low. Fast turnover, fluid merchandising of "in demand" items, and an aggressive position is required. One does not have to have his store stocked like a warehouse in order to conduct a profitable enterprise. Retailers in the main will find it better to depend upon reliable distributors whose job it is to maintain large stocks for equitable distribution. But paramount is this: as your costs have undoubtedly gone 'way up recently, take inventory now and be sure your markups are properly adjusted. And refigure what basic hourly time charge must now be imposed for services rendered. Offhand we'd guess that your labor costs should now be 60% to 80% higher than they were just one year ago. Don't worry about anyone but yourself but be sure you make a profit on everything you repair or sell. Otherwise you invite a hasty exit from business.

*S. P. Lowan*  
Publisher

# Now . . . sell more RCA flashlight batteries



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will be forcefully reminded when they need fresh batteries, and can serve themselves.

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Engineered for Extra Listening Hours**

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**TUBE DEPARTMENT**

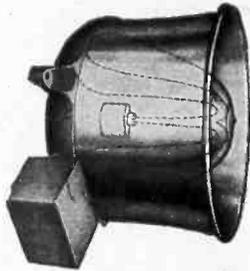
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**HARRISON, N. J.**



# RACON

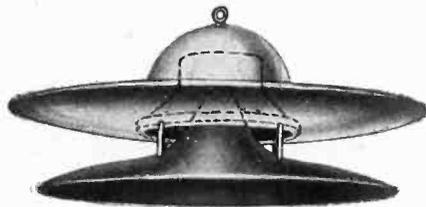
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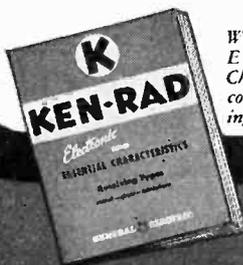
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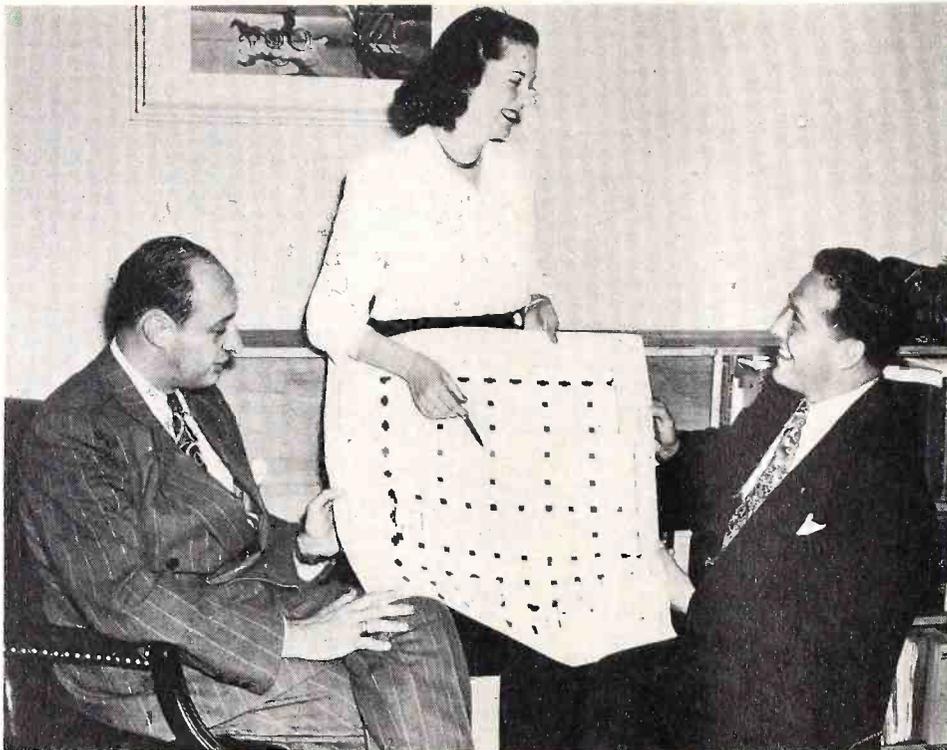
# KEN-RAD

DIVISION OF GENERAL ELECTRIC COMPANY

OWENSBORO, KENTUCKY

# In & Around the Trade

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



Jack Berman (right) of Shure Brothers, show president, and Kenneth C. Prince, manager of the 1947 Radio Parts & Electronic Equipment Show inspect a floor plan of exhibit hall, where record crowds are expected to visit the annual trade show. A drawing for space in the exhibit was held December 4 in the Hotel New Yorker. Gal is Peggy Skeffington, of the show staff, explaining display arrangements to fascinated males. Headquarters: 33 North LaSalle St., Chicago; public relations: R. J. Sherwood, The Hallcrafters Co., 2611 Indiana Ave., Chicago 16.

## Dealers Tour Television Plant

The magnitude of television as an industry was impressed on 250 radio dealers in the Philadelphia region when, as a feature of a recent two-day series of dealer meetings sponsored by Raymond Rosen & Company, RCA Victor home instrument distributor in the region, they toured the television receiver production lines of the RCA Victor plant here.

Thomas F. Joyce, General Manager of Raymond Rosen & Company, presided over the meetings, and Morton Gellard, television sales manager of the Rosen organization, discussed the new receivers. RCA Victor participants included Dan D. Halpin, television receiver sales manager and John C. Marden, home instruments sales promotion manager.

Models shown included two table model television sight-and-sound receivers scheduled to go on sale during 1946, and two console models for distribution by early 1947.

## Needle Promotion

The Aero Needle Company, Chicago, manufacturer of Aeropoint long life phonograph needles, has launched a new and extensive merchandising campaign directed to dealers and their sales people through company distributors in all parts of the United States, according to Burton Browne, president.

He explained that the company will give away thousands of valuable prizes—many of them “hard to get” household articles—on the basis of merit points accumulated through Aeropoint home phonograph needle sales. The company has established its sales bonus program on a generous merit point basis so that attractive prizes may be won with only moderate sales of needles. Since it is a permanent plan, dealers and their sales people can win any number of prizes.

As a part of the immediate planning, distributors' salesmen also are eligible to participate in the prize awards. Until Mid-December, while the campaign is

picking up momentum, they can accumulate merit points toward prizes through sales to dealers.

The company announcement cited the fact that dealers will have the advantage of a phonograph needle line which is described as “the fastest growing” in the matter of sales. To help dealers and their sales staffs in their prize winning efforts, the company is making available a series of specially planned advertising mats for newspaper use, attractive mailing circulars, and distinctive and eye-catching counter displays, and is backing up the campaign with national magazine advertising.

## Establish Servicing Standards

The Proctor Electric Company, Philadelphia, announces the national release of its “customer satisfaction” service policy in printed booklet form. This policy is being effectively carried out by 161 authorized franchised service stations throughout the country, each of which has been chosen to serve a major marketing area and functions under direct Proctor factory supervision.

The policy emphasizes such features as:

1. *Minimum service standards:* a) Appliances normally to be serviced and returned within twenty-four hours. b) Repairs to be made carefully, appliances checked for other possible defects, thoroughly cleaned and tested for satisfactory operation. c) After inspection, appliances to be repolished as nearly as possible to original finish and carefully repacked. d) Appliances again returned because of unsatisfactory servicing to be reserviced without cost to customer. e) On the assumption that “the customer is always right,” doubtful cases to be decided in favor of the customer.

Questionnaire (for report by customer of service irregularities and favorable or unfavorable comment) to be supplied free by Proctor and to be included by service station in each wrapped package.

2. Repairs under guarantee to be made without charge to customers.

3. To standardize costs on repairs beyond the guarantee period Proctor supplies a standard labor schedule showing maximum time required for each repair operation. To figure labor charges such time will be multiplied by the local labor rate.

4. Service stations will maintain a sufficient stock of factory parts to repair all types of company appliances, and to fill parts orders from dealers and distributors at a 25 per cent discount from the prices printed in the company's Service Parts List.

5. Appliances for which repair parts are unavailable will be replaced to the customer at nominal cost. However,

(See page 36)

# SYLVANIA NEWS

## RADIO SERVICE EDITION

DEC.

Prepared by SYLVANIA ELECTRIC PRODUCTS INC., Emporium, Pa.

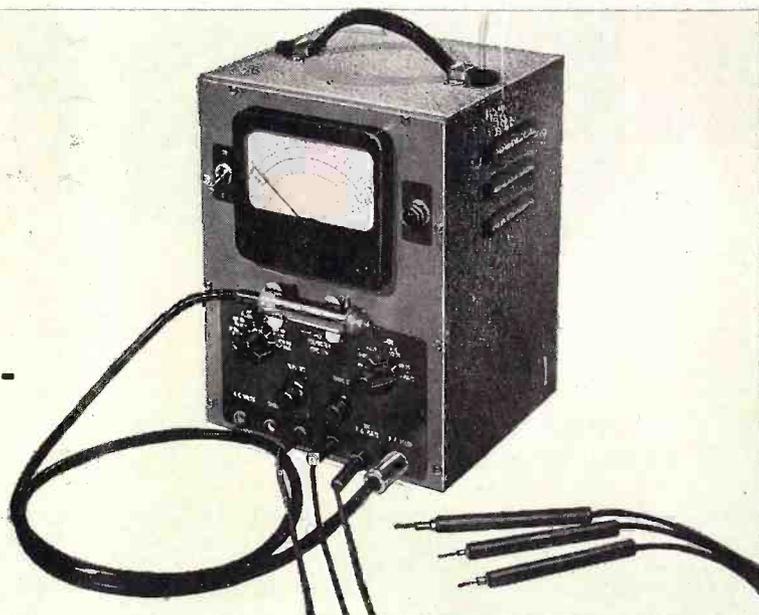
1946

# ONE DEVICE NOW USED BY RADIO SERVICEMEN

## FOR GREAT VARIETY OF TESTS

### Electrical Measurements Made Easy With New Sylvania Unit!

*The*  
**SYLVANIA Poly (MULTI-PURPOSE) Meter**



Radio servicemen now can use the new Sylvania Poly (MULTI-PURPOSE) Meter type 134 to facilitate a multitude of electronic measurements and tests.

This product of Sylvania Research is stabilized against errors due to voltage variations or gas current in tubes. All accessories included. See your Sylvania Distributor.

#### CHARACTERISTICS AND SPECIAL FEATURES

Tests audio, A.C. and R.F. voltages from 20 cps to 300 mc through use of proximity fuze-type tube built into handy probe. Full scale range of 3, 10, 30, 100, 300.

Measures D.C. from .1 to 1,000

volts in full scale ranges of 3, 10, 30, 100, 300, 1,000.

Measures D.C. current from .1 milliampere to 10 amperes in full scale ranges of 3, 10, 30, 100, 300, 1,000 milliamperes and 10 amperes.

Measures resistance from  $\frac{1}{2}$  ohm to 1,000 megohms in full scale ranges of 1,000, 10,000, 100,000 ohms and 1, 10, 1,000 megohms.

#### ACCURACY

D.C. ranges  $\pm 3\%$  of full scale.

A.C. ranges  $\pm 5\%$  of full scale up to 30 volts and  $\pm 7\%$  above 30 volts.

R.F. ranges  $\pm 5\%$  of full scale up to 10 volts;  $\pm 7\%$  from 10-100 volts;  $\pm 10\%$  on 300 volt range.

Ohms  $\pm 6\%$  to the left of  $\frac{1}{2}$  scale;  $\pm 13\%$  to the left of  $\frac{3}{4}$  scale.

Current  $\pm 3\%$  of full scale on all but 10 ampere scale which provides  $\pm 5\%$  of full scale.

#### INPUT IMPEDANCES

R.F. ranges—2.7 megohms resistance shunted by approximately 3 mmf. capacity.

A.C. ranges—2.7 megohms resistance shunted by approximately 40 mmf. capacity.

D.C. ranges—16 megohms resistance.

Remember the Sylvania Poly (MULTI-PURPOSE) Meter type 134 is beautifully styled, compactly designed, and easily read.

# SYLVANIA ELECTRIC

Emporium, Pa.

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



**This Is  
Good  
News!**

... our greatly increased production on Simpson Model 260 makes it available to you NOW at your jobber's

The Simpson 260 is easily the world's most popular set tester for television and radio servicing. You cannot touch its precision, its useful ranges, or its sensitivity in any other instrument selling for the same price or even substantially more.

It has been a long time since we have been able to produce enough 260's to meet the demand, because the 260 has consistently out-sold every other remotely similar test instrument. The reason is simple: it out-performs and out-values them all. Simpson advanced engineering and unyielding standards of quality and precision manufacture enable it to *stay* accurate under conditions ordinary instruments cannot survive.

Incidentally—production on other Simpson instruments is clearing, too. We feel confident that it will not be long before you can buy those Simpson instruments you have waited for.

Ask your jobber for the Simpson 260—he has it now!

**SIMPSON ELECTRIC COMPANY**  
5200-5218 W. Kinzie St., Chicago 44, Ill.

**Simpson**

INSTRUMENTS THAT STAY ACCURATE

**SIMPSON 260, HIGH SENSITIVITY SET TESTER FOR TELEVISION AND RADIO SERVICING**

Ranges to 5000 Volts—Both A.C. and D.C.  
20,000 Ohms per Volt D.C.  
1000 Ohms per Volt A.C.

At 20,000 ohms per volt, this instrument is far more sensitive than any other instrument even approaching its price and quality. The practically negligible current consumption assures remarkably accurate full scale voltage readings. Current readings as low as 1 microampere and up to 500 milliamperes are available.

Resistance readings are equally dependable. Tests up to 10 megohms and as low as 1/2 ohm can be made. With this super sensitive instrument you can measure automatic frequency control diode balancing circuits, grid currents of oscillator tubes and power tube, bias of power detectors, automatic volume control diode currents, rectified radio frequency current, high-mu triode plate voltage and a wide range of unusual conditions which cannot be checked by ordinary servicing instruments. Ranges of Model 260 are shown below.

Price, complete with test leads ..... \$38.95  
Carrying case ..... 5.55

| Volts D.C. (At 20,000 ohms per volt) | Volts A.C. (At 1,000 ohms per volt) | Output  |
|--------------------------------------|-------------------------------------|---------|
| 2.5                                  | 2.5                                 | 2.5 V.  |
| 10                                   | 10                                  | 10 V.   |
| 50                                   | 50                                  | 50 V.   |
| 250                                  | 250                                 | 250 V.  |
| 1000                                 | 1000                                | 1000 V. |
| 5000                                 | 5000                                | 5000 V. |

| Milli-amperes | Micro-amperes | Ohms                               |
|---------------|---------------|------------------------------------|
| D.C.          |               |                                    |
| 10            | 100           | 0-1000 (12 ohms center)            |
| 100           |               | 0-100,000 (1200 ohms center)       |
| 500           |               | 0-10 Megohms (120,000 ohms center) |

(5 Decibel ranges: -10 to +52 DB)

**ASK YOUR JOBBER**

# DON'T MISS THOSE "HIDDEN" PROFITS!

## Profit in Time Discounts

During the depression most dealers were hard pressed to break even, and many were sustaining heavy losses that culminated in bankruptcy. Other dealers were showing modest returns that, in many instances, were traceable entirely to taking every discount available to them. *Discounts, let's be clear, under certain adverse conditions, may mean the difference between success and failure, between profit and loss.* Even where a profit may be had by ignoring discounts, it would seem foolhardy to ignore them. One of the most successful independent dealers I have met has told me that he nets between \$3,000 and \$4,000 a year on discounts, alone! It represents from 12 to 15 percent of his net earnings.

Let's examine this question of discounts realistically. Here is a dealer who, despite difficulties, is showing a decent profit, sufficiently great to permit reasonable personal withdrawals and at the same time leave a reserve. Obsessed by the specter of an approaching old age, however, he is buying gilt-edge securities that drawing all profits out of the business will net him two and one-eighth percent interest yearly. The wisdom of buying such securities in preference to plunging in speculative stocks is not here in question.

The point is that he is siphoning off every available dollar as fast as it comes in; so much so that he is buying from hand-to-mouth, trying to make his business thrive on a starvation diet. Aside from the profit lost on "no sales" because he is chronically out of stock, he is losing heavily on cash discounts that he passes up.

If this dealer were to hold back as little as \$1,000 to give his establishment the working capital it deserves, he would, in the long run, accumulate more — rather than less — of those securities which mean so much to his peace of mind. Why? Because the \$1,000 used as a revolving fund to take discounts would earn far in excess of what it would realize in securities — and with equal safety.

Assume, if you will, that the amount of merchandise purchased each month which is subject to discount — say two percent in thirty days — is \$1,000 monthly. It simply means that by taking these cash discounts, the dealer is earning another \$20 a month or \$240 a year, or at the rate of 24 percent annually on the \$1,000 fund. If this

**Return of competitive conditions will reopen profit opportunities in discounting bills; in quantity buying of fast-moving merchandise. Cost of modernization and new equipment lowered through savings in taxes.**

by HAROLD J. ASHE

Part 2

\$240 is not needed to further augment the revolving fund he can then invest it in securities and, in a little over four years' time, have both his initial revolving fund still intact, but an additional \$1,000 in securities, as well. Such capital has really worked! That's having your cake and eating it, too! Moreover, so long as he keeps his working capital fluid, he can repeat the process indefinitely.

Where can any dealer find both ab-

solute security and a 24 percent return on his investment, save only in his own business? In order to get on a cash discount basis, where working capital is now limited — or non-existent — it may pay the dealer to seek out his banker for a loan with which to discount his bills. At 6 percent interest to the bank, a tidy profit may still be realized by the dealer who zealously takes his cash discounts.

(To be continued)

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## BUYERS MARKET ON WAY

*Based on a talk by John S. Meck, president of the John Meck Industries of Plymouth, Indiana, at a recent luncheon in the Gotham Hotel, New York City.*

**T**HE time has come for the radio industry to do a selling job. The difference between a seller's and a buyer's market is only the difference between having one radio on your shelf for demonstration and future order taking purposes, and having two radios, one of which may be sold.

Consumer resistance is already being felt by other than quality merchandise. The mad rush to buy any kind of merchandise has ended. Retail sales in many lines have already taken a sharp downward drop. This can be attributed to many factors but the point remains that a high volume of dollar volume in the radio industry can result only from selling. The day has ended when it is only necessary to put the merchandise on the counter and have the consumer walk in and buy.

The responsibility lies chiefly with the manufacturer. As his production increases, he must make sure that the jobber and the dealer are doing their best to bring the product to the attention of the consuming public. Advertising will continue to be the main artery through which the manufacturer reaches the sales structure of the industry and it is also the method

through which consumer sales are stimulated. The job is much more difficult than that alone.

A complete public relations job must be done in the radio industry wherever the ultimate radio purchaser comes in contact with it. There are many men working in retail establishments for the first time in their lives who went straight into uniform with no job experience and who now stand across the counter from a potential purchaser with no training in how to create sales.

Training is the answer to this problem, but like all good public relations programs it must start at the top. Management realizes the need to sell. From there on the jobber, the owner of the retail establishment and down through every employee of the store including the man who delivers and installs the set, the message must be driven home that the customer must be satisfied with the radio set and he must be given service and attention from the moment he enters the shop door and from then on.

Perhaps you think the sale is completed when the customer pays his cash or sends in his check for his monthly statement. The sale is never completed. Proper service and attention will bring that same customer back for other purchases, and in later months and years for the miracles that are to come in FM and television, I repeat, as an axiom of selling that a sale is never completed.

# MODERNIZING



Figure 2. Selenium rectifier in typical 3-way set.

# HOME

## Program for additional radio servicing business thru modernizing present sets with new rectifiers.

**W**ITH "Modernize your radio-set" as their slogan, and the installation of the miniature selenium rectifier\* as their basis, servicemen throughout the country are engaged in a successful campaign of modernizing home receivers—successful in terms of dollars and cents. Backed by the fact that this rectifier is being made an advertised feature in at least one 1947 model each of 28 leading home radio brands, the repairmen's offer to bring pre-war models up-to-date is opening up a new source of additional revenue.

Here is an outstanding opportunity to be among the leading radio servicemen in your community. Aided by the attractive merchandizing display provided by Federal, this service offering "tomorrow's performance today" is bringing many dealers a vast amount of

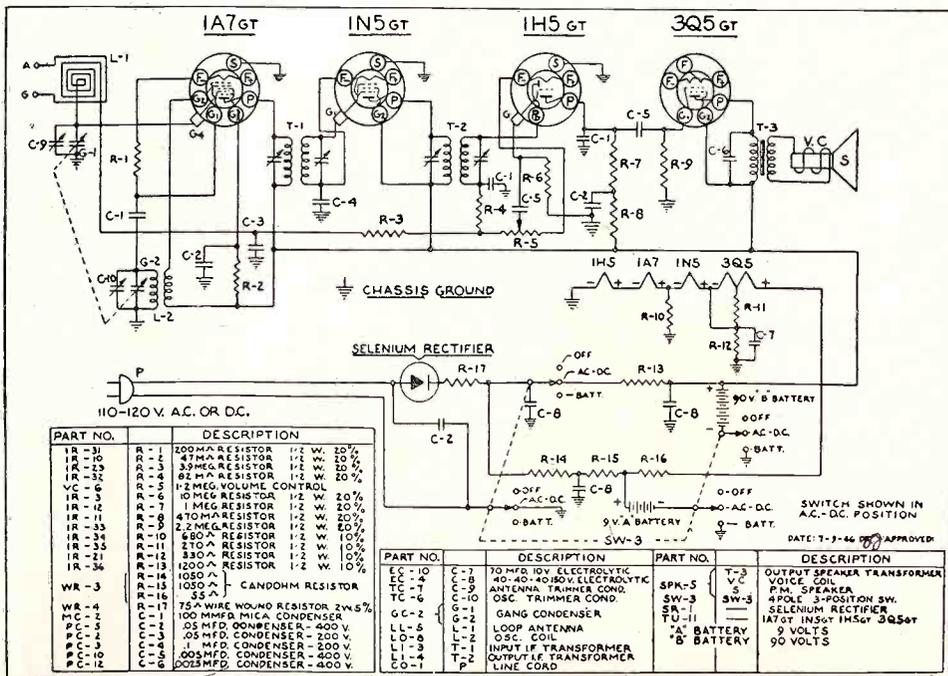
\* Developed by Federal Telephone and Radio Corporation, Newark, N. J.

new business. Every set is a prospect for this service. Sets normally brought in for repair; sets that the owner has almost completely forgotten about and now rediscovered. Even sets in perfectly good operating condition can become a source of extra profit—profit directly attributable to the installation of the selenium rectifier.

This rectifier almost sells itself once the customer becomes acquainted with its advantages. Here are some of its outstanding features in AC-DC portables: Instantaneous starting—the set operates as soon as it is turned on. Increased battery life—since the ambient temperature of the set is reduced by 35° F. Power supply failures are reduced to a minimum due to the long life of the selenium rectifier.

In AC-DC sets installation of this rectifier results in increased audio output due to the higher efficiency of the selenium rectifier as a trouble-free

### Schematic of 1947 Trav-Ler 3-way portable model 5020 with 5 plate selenium rectifier.



# RECEIVERS

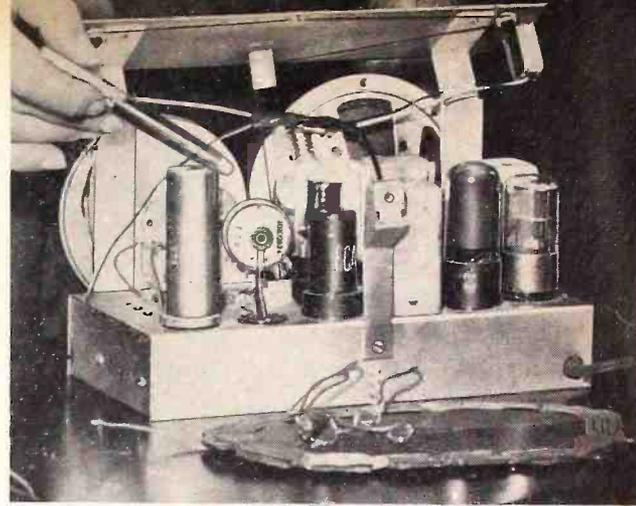


Figure 6. Selenium rectifier in AC-DC table model.

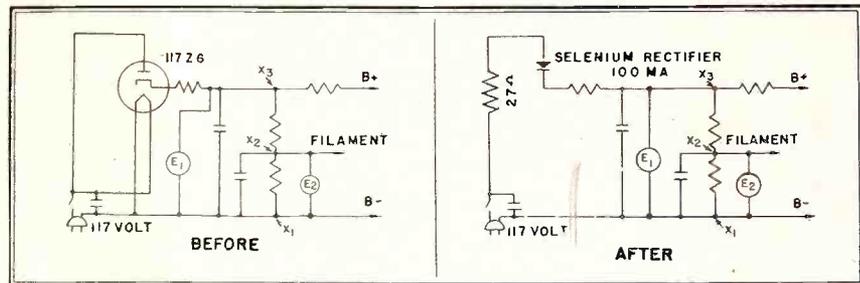
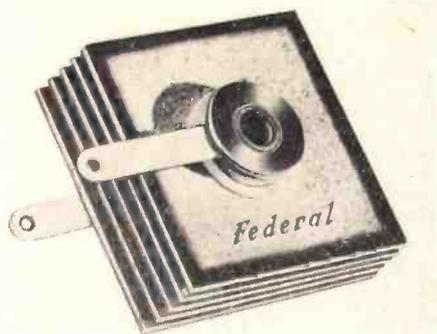


Figure 1. A typical 117Z6 power supply showing the schematic diagram before and after installation of miniature 100 MA selenium rectifier. (Photo at left).

power supply. In every case installation of this rectifier means "customer satisfaction."

Installation of a selenium rectifier is a simple operation which requires not more than ten minutes of the serviceman's time. The procedure for installing can be divided into two general groups: (1.) power supplies using 117Z6 or 117Z3 rectifier (2.) power supplies using 35Z5 rectifier.

In the beginning the general procedure for sets in Group 1 requires six steps. As the repairman makes replacements and becomes familiar with the various types of sets, some of these steps can be eliminated: Until sufficient skill has been acquired however, Federal recommends adherence to the following procedure:

Step 1—Measure  $E_1$  ( $X_3 - X_3$ ) and  $E_2$  ( $X_1 - X_2$ ) with DC voltmeter (1000 ohms per volt) (Fig. 1).

Step 2—Add extension leads to the selenium rectifier. It is recommended

that the positive lead be a red wire for the purpose of distinguishing it from the negative lead, which is usually a yellow or black wire.

Step 3—Solder red lead on cathode (pin 6 in 117Z3 circuits, pin 4 or pin 8, whichever manufacturer has used, in 117Z6 circuits).

Step 4—Solder the yellow lead on end of a 27 ohm, 1 watt resistor.

Step 5—Solder the other end of the resistor to plate (pin 5 in 117Z3 circuits, pin 3 or pin 5, whichever manufacturer has used, in 117Z6 circuits).

Step 6—Note measurements  $E_1$  and  $E_2$  taken previously in Step 1. At this point—with the selenium rectifier in place—the same voltage measurements should be obtained to within 10 per cent. If the desired measurements are not obtained, the resistance in Step 4

should be increased or decreased until the same reading is arrived at. Once the value of this resistance is determined it can be used for any similar type of radio receiver. Fig. 2 shows a typical AC-DC portable fitted with a selenium rectifier.

The general procedure for sets in Group 2 requires the following six steps and gives the serviceman four alternatives (Figs. 3, 4, 5).

Step 1—Add extension leads to the selenium rectifier. It is recommended that the positive lead be a red wire and the negative lead a yellow or black wire, (Alternatives a, b, c, d).

Step 2—Solder positive (red) lead to pin 8 and negative lead (yellow or black) to pin 5. (Alternatives a, b, c, d).

(See page 38)

Figure 3. Typical power supply with rectifier tube.

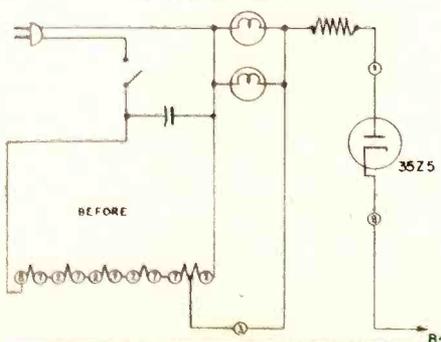
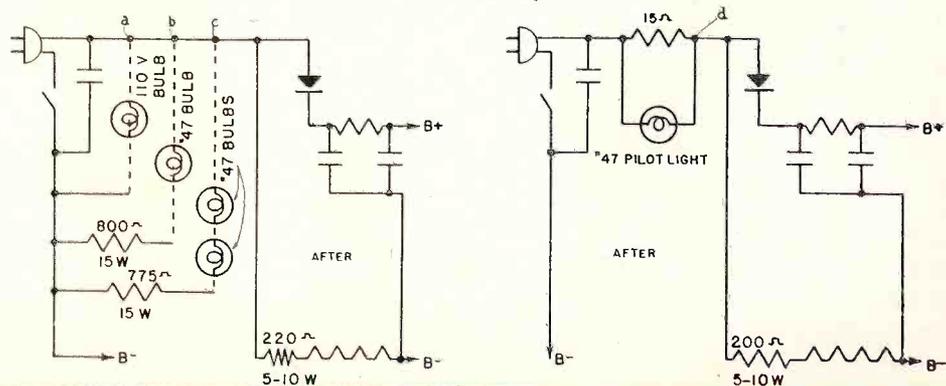


Figure 4 (below, left): Three alternative methods of installing selenium rectifier; in all three methods, pilot light potential is from 110V input. Figure 5 (right): Another alternative method, with 15 ohm resistor for pilot potential and 200 ohm resistor for filament continuity.



# DEFLECTION OPERATORS

**S**INCE man's first try at converting visual intelligence into electrical impulses, which in reality is the basis of television, many different methods and systems have been tried, some of which were ingenious, while others impossible.

The present day system which is universally used is known as scanning, which is a process wherein the image or scene is focused on a mosaic (which is a small square made up of thousands of tiny condensers) located in the camera tube or Iconoscope. A beam of electrons is fired at the mosaic, starting at the upper left hand corner and advancing at a steady rate to the extreme right, at which time the beam is quickly moved back to the left in a fraction of the time it took to move to the right, then the process is repeated. All the time that the beam is moving in a horizontal direction, it is slowly forced downward at a uniform rate, and here too, when the beam reaches the extreme bottom, it is quickly projected back to the top and the entire process is repeated.

When the electron beam hits the individual condensers of the mosaic, it discharges them. The charge on these condensers which are specifically made sensitive to light, had been determined by the amount of light contained in that portion of the image which was projected on it. These discharged pulses are collected in the order in which the electron beam discharges them, and are therefore electrical equivalents to the visual intelligence in front of the iconoscope. The present day process in the United States calls for a horizontal scanning of 525 lines per picture, and

## Explaining Interlaced Horizontal Scanning Process

the transmission of 30 complete pictures per second interlaced.

It has been found that flickering, such as was found in Motion Pictures of a decade ago, can be eliminated by the process of interlaced scanning, whereby every odd line is scanned first, then when the beam comes back to the top of the Mosaic again, every even line is scanned. In order to achieve the 30 complete pictures per second, it is necessary to make 60 of these interlaced scanings per second, because each scanning contains only half of the total visual intelligence.

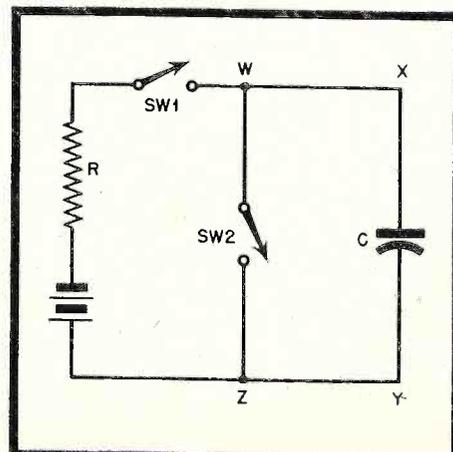
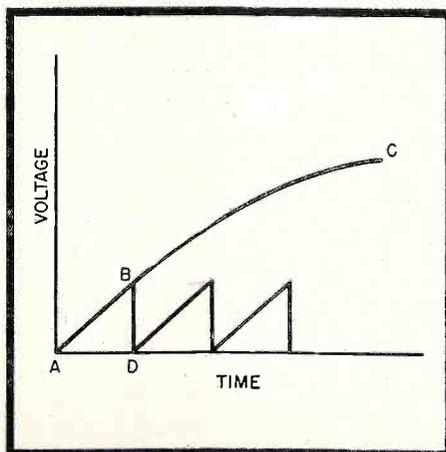
These electrical impulses are now placed on a carrier through the process of amplitude modulation and sent out on the Station's assigned frequency. When the signal is picked up at the receiver, it is amplified, detected, and

finally passed on to the grid of the picture tube or Kinescope. The Kinescope is a large tube which contains primarily an electron gun, and a screen which is made up of a phosphorescent material which glows when hit by an electron beam.

It is now necessary to deflect the beam in the same manner in which it was deflected at the telecasting studio. In order to do this, we need horizontal deflection generators to move the beam back and forth horizontally and vertical deflection generators to move the beam up and down. These generators are often known as sweep oscillators.

The sweep either vertically or horizontally is such as to move slowly in one direction, then quickly return to the approximate starting point; therefore the shape of the deflecting voltage

Figure 1. (left): Voltage rise across a condenser and its use in sawtooth generation. Figure 2. (right): Simple sawtooth generator.



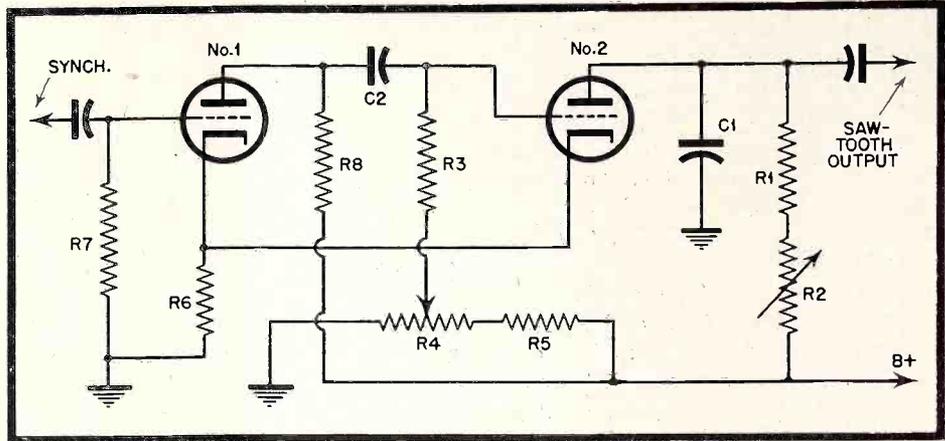
# in TELEVISION

by M. GOTTLIEB

is that of a sawtooth which has a gradual incline, then a steep decline. A voltage sawtooth is formed by making use of a portion of the charging cycle of a condenser (Fig. 1). Since the rise in voltage across a condenser is exponential, and not linear, we make use of the initial part of the charge because that portion is quite linear (portion A-B in Fig. 1).

An analysis of the circuit in Fig. 2 shows the simplest way in which we can generate sawtooth voltages. If we close switch 1, the condenser "C" will start to charge up through resistor "R". The time required for full charge (point "C" in Fig. 1) depends upon the sizes or values of the resistor and condenser. The larger either one or both are, the longer will be the time required to acquire a full charge. After the condenser has been charged up, switch 1 is opened and switch 2 is closed. Because there is no resistance in the circuit w-x-y-z, the condenser will discharge in a very short period of time. If we could open switch 1 after the condenser has charged only to point B in Fig. 1, then the charge will be linear, and if it is discharged now, we have a usable sawtooth voltage. In actual practice, this switching is accomplished by the sawtooth oscillator.

The two most common types of sweep generators are the multivibrator and the blocking oscillator. The multivibrator (Fig. 3) operates on a feedback principle so that only one tube conducts at a time. Assume to start with that



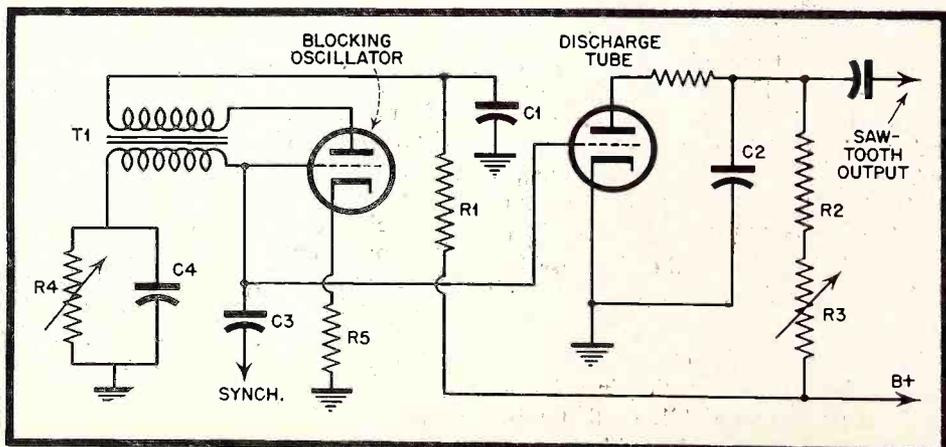
the grid of tube No. 2 is going positive, allowing tube No. 2 to draw more plate current. The increase in plate current flowing through resistor R6 (Cathode bias resistor common to both tubes) increases the bias on tube No. 1, allowing it to conduct less. This decreases the voltage drop across R8, and also increases the plate voltage applied to tube No. 1.

This increased positive plate voltage is coupled through condenser C2 and drives the grid of tube No. 2 still more positive, allowing it to conduct even more. This process occurs instantaneously so as grid No. 2 is driven positive, tube No. 1 is driven to cut-off. The reason that R6 doesn't also cut off tube No. 2 is because of the positive "bias" voltage applied to grid No. 2 across the voltage divider R4 and R5. This positive swing continues 'till tube No. 2 reaches saturation, where any additional positive grid voltage does not increase the tube's plate current, or

until tube No. 1 is cut off, so that the positive swing through condenser C2 stops.

When grid No. 2 stops receiving the positive pulse from tube No. 1, it immediately starts to fall, thereby decreasing the plate current flowing through R6, the negative bias here is also decreased, which in turn now allows tube No. 1 to conduct which also causes the voltage drop across R8 to increase, leaving a smaller amount of positive voltage left on plate No. 1. The decreasing or negative voltage is coupled to Grid No. 2 which accelerates the negative swing and instantaneously drives the tube so far beyond cut-off, that there is a certain time interval during which tube No. 2 is cut off and tube No. 1 draws a steady current. This occurs until the negative charge collected on C2 has leaked off through R3 and tube No. 2 conducts again. As the negative charge leaks off, grid No. 2 goes positive and soon reach a point

Figure 3 (top of page): Multivibrator type of oscillator. Figure 4 (below): Blocking oscillator type of sawtooth generator.



where tube No. 2 can conduct again, and another cycle takes place following the same pattern.

The time that C2 requires to discharge its negative charge depends upon the time constant of C2-R3, this, plus the plate voltage on tube No. 2 determines when tube No. 2 will conduct again.

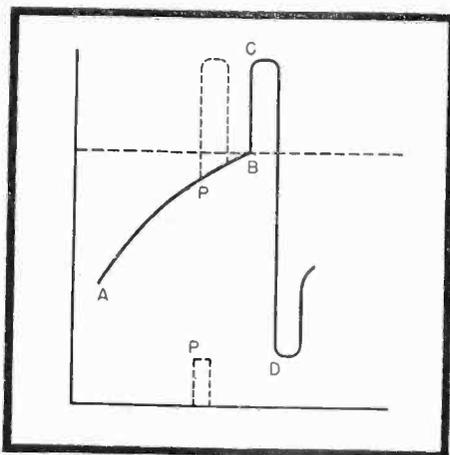
All during the condenser discharge period, condenser C1 has been charging up through resistors R1 and R2. Here too, the amount of charge acquired depends on the time constant C1-R1 and R2 which is made quite long, so that the condenser only has a chance to charge on the linear portion of its curve (to "B" in Fig. 1), and when tube No. 2 conducts, it discharges the condenser rapidly. Thus we have a linear sawtooth voltage which we can use for deflection purposes. By varying R4, we can vary the amount of time required for grid No. 2 to go positive, which controls the conduction of tube No. 2, so varying R4 controls the frequency of our generated sawtooth voltage. By increasing R4, it takes C2 longer to discharge and the sawtooth frequency is lowered.

If we apply a negative pulse to grid No. 1, this will pass on a positive voltage to grid No. 2, and if this voltage were applied about the time that grid No. 2 has almost reached up to cutoff value, the tube will conduct, which causes the condenser C1 to discharge and in effect, the quick discharge is the retrace period on our picture tube. These negative pulses are sent out from the television station on top of the video signal and the receiver separates and then applies them to the deflection generator to keep it in step with the iconoscope at the studio. These are known as synchronous pulses, and are used to synchronize the receiver with the transmitter.

Another common type of sawtooth generator is the Blocking Oscillator, shown in Fig. 4. It is often used to generate the lower frequency vertical sweep.

To analyze this circuit, assume to start with that the grid has gone somewhat positive. This causes an increase of plate current and also a decrease in plate voltage. This negative going voltage is coupled through transformer T1 back to the grid in such a phase as to make the grid even more positive. This feedback action rapidly drives the grid sharply positive, 'till the saturation point is reached, where a further increase in grid voltage will not increase the plate current.

As soon as there is no change in plate current, there is no variation in voltage across the primary of T1, so that this instantaneously causes the grid to start



**Figure 5. Output of waveform of a blocking oscillator with synchronizing pulse.**

going negative. At this point, plate current will decrease, plate voltage will increase, and this, being coupled back to the grid through T1 drives the grid even more negative, this time way beyond cut-off. The tube is now blocked, and stays blocked 'till this negative charge leaks off through resistor R4. Here again the time constant of R4-C4 determines the time required for the charge to leak off, and consequently determines the sawtooth frequency.

A typical waveform produced by a blocking oscillator is shown in Fig. 5. During the time from A to B, condenser C4 is discharging through R4. When it reaches point B, it allows the tube to conduct, which feeds back a voltage to the grid through T1 and rapidly drives the grid positive to point C. The tube has now reached saturation, so that the feedback is reversed

and the grid is driven far negative instantaneously to point D.

A blocking oscillator is a device where the tube conducts only for a short period of time and is cut off for a longer interval, as shown in Fig. 5. These grid pulses from the blocking oscillator are fed directly into a discharge tube by tying both grids together. In the plate circuit of the discharge tube, condenser C2 and resistors R2 and R3 are utilized to produce sawtooth voltages. C2 charges up through R2 and R3, while the tube is cut off; and is discharged through the tube when it conducts. The time constant C4-R4 controls the frequency of the sawtooth, while C2-R2 and R3 control the linearity and amplitude.

To synchronize the blocking oscillator, we can either apply a positive synchronizing pulse to the grid or a negative synchronizing pulse to the cathode. Fig. 5 shows the output waveform of a free running oscillator. If we apply a positive synchronizing pulse at point P, at a time just before the grid voltage reaches the tube's conduction point, the grid is immediately driven to the conduction point and the frequency is now synchronized with that at the television studio.

It is essential that the blocking oscillator's free running frequency be slightly lower than the synchronizing pulse frequency, so that the frequency of the sawtooth output is the same as the synchronizing pulses. If the frequency of the free running oscillator is slightly higher, not every cycle is synchronized because on some cycles the synchronizing pulse occurs after the grid has reached the tube's saturation point.

## PICTURES AND SOUND OVER LIGHT BEAM

That pictures and sound can be transmitted from one point to another over a light beam instead of radio waves, was demonstrated recently before the American Institute of Electrical Engineers by Dr. T. T. Goldsmith, Director of Research of the Allen B. Du Mont Laboratories, Inc. of Passaic, New Jersey. The new invention has been named "photovision" by its inventor, Dr. Allen B. Du Mont.

This not only simplifies the problem of transmitting television programs in short range relays, as from a football field to the main transmitter, but may be used in the place of coaxial cable for inter-city relay. The system operates in light or darkness and without any interference from static or other interference inherent in radio. *It will transmit color pictures as well as black and white images.*

In the opinion of Dr. Goldsmith, the new invention will be a boon to network television broadcasting. "The dev-

elopment of television networks," Dr. Goldsmith told to his audience, "depends almost entirely on coaxial cable to tie stations together in the same manner as telephone lines connect the radio stations of a network. Coaxial cable is tremendously expensive to install and the charge for the use of the line is very heavy. What the charges will be for such lines over long distances has not yet been determined, but that they will be heavy and burdensome to broadcasters there is no doubt,—so much so that television stations in small communities will find this an obstacle to receiving the benefit of television network broadcasting."

In the demonstration, pictures were transmitted on light waves across the lecture hall in the Potomac Power and Light Building, a distance of thirty-five feet, but Dr. Goldsmith explained to the members of the American Institute of Electrical Engineers and representa-

(See page 41)

| Type designation | Description                           | Prototype in larger envelope | Cathode & Ratings |       |       | Base connections | Overall height | Capacitance |     |      | Typical Operation and Characteristics |   |              |  |             |              |                |              |             |              | Type designation |       |       |
|------------------|---------------------------------------|------------------------------|-------------------|-------|-------|------------------|----------------|-------------|-----|------|---------------------------------------|---|--------------|--|-------------|--------------|----------------|--------------|-------------|--------------|------------------|-------|-------|
|                  |                                       |                              | Type              | Volts | Amps  |                  |                | G-P         | G-K | P-K  | Circuit application                   | Applied voltage   | Plate        | Screen                                     | App. Factor | Plate reaso. | Trans. conduc. | Power output | Load reaso. | Cutoff freq. |                  |       |       |
| 042              | Gaseous v. regulator                  | 003/VR150                    | Cold              | --    | --    | 5-B0             | 2 5/8          | --          | --  | --   | Voltage regulator                     | 185 min   | 150 v approx | output through a current range of 5-30 ma. |             |              |                |              |             |              |                  |       | 042   |
| 082              | Gaseous v. regulator                  | 003/VR105                    | Cold              | --    | --    | 5-B0             | 2 5/8          | --          | --  | --   | Voltage regulator                     | 135 min   | 108 v approx | output through a current range of 5-30 ma. |             |              |                |              |             |              |                  |       | 082   |
| 1A3              | VHF diode                             | --                           | Cath.             | 1.4   | 0.15  | 5-AP             | 2 1/8          | --          | --  | 0.4  | H-w rect. or det.                     | Max plate 117 v rms at 0.5 ma d-c output                                    |              |  |             |              |                |              |             |              |                  | 1A3   |       |
| 1L4              | R-f pentode sharp cutoff              | 1N5GT                        | Fil.              | 1.4   | 0.05  | 6-AR             | 2 1/8          | 0.008       | 3.6 | 7.5  | Voltage amplifier                     | 90 90 0 4.5 2 360 350M 1025 -- -- -8  |              |  |             |              |                |              |             |              |                  | 1L4   |       |
| 1R5              | Pentagrid converter                   | 1A7GT                        | Fil.              | 1.7   | 0.05  | 7-AT             | 2 1/8          | 0.4         | 7   | 7    | Converter                             | 90 67.5 0 2.9 1.2 -- 600M 925 -- -- -6                                      |              |  |             |              |                |              |             |              |                  | 1R5   |       |
| 1S4              | Power amp pentode                     | 405GT                        | Fil.              | 1.4   | 0.1   | 7-AV             | 2 1/8          | --          | --  | --   | Power output amp                      | 90 67.5 -7 7.4 1.4 -- 100M 1575 0.27 8000                                   |              |  |             |              |                |              |             |              |                  | 1S4   |       |
| 1S5              | Diode a-f pentode remote cutoff       | --                           | Fil.              | 1.4   | 0.05  | 6-AU             | 2 1/8          | 0.2         | 2.2 | 2.4  | Detector & volt. amp                  | 67.5 67.5 0 1.6 0.4 -- 600M 625 -- -- -15                                   |              |  |             |              |                |              |             |              |                  | 1S5   |       |
| 1T4              | R-f pentode sharp cutoff              | 1P5GT                        | Fil.              | 1.4   | 0.05  | 6-AR             | 2 1/8          | 0.01        | 3.6 | 7.5  | Voltage amplifier                     | 90 67.5 0 3.5 1.4 -- 500M 900 -- -- -10                                     |              |  |             |              |                |              |             |              |                  | 1T4   |       |
| 1U4              | R-f pentode sharp cutoff              | 1N5GT                        | Fil.              | 1.4   | 0.05  | 6-AR             | 2 1/8          | 0.008       | 3.6 | 7.5  | Voltage amplifier                     | 90 67.5 0 3.4 1.5 -- 250M 875 -- -- -16                                     |              |  |             |              |                |              |             |              |                  | 1U4   |       |
| 1U5              | Diode a-f pentode                     | --                           | Fil.              | 1.4   | 0.05  | 6-BW             | 2 1/8          | --          | --  | --   | Detector & volt. amp                  | 67.5 67.5 0 1.6 0.4 -- 600M 625 -- -- -10                                   |              |  |             |              |                |              |             |              |                  | 1U5   |       |
| 1Z2              | H-w rectifier                         | --                           | Fil.              | 1.5   | 0.3   | 7-C0             | 2 1/16         | --          | --  | 0.8  | Rectifier                             | Max plate 1800 v rms; curr. 10 ma peak, 2 ma avg.                           |              |  |             |              |                |              |             |              |                  |       | 1Z2   |
| 2B25             | H-w rectifier                         | --                           | Fil.              | 1.4   | 0.11  | 3-T              | 2 1/8          | --          | --  | --   | Rectifier                             | Max plate 1000 v rms; curr. 9 ma peak, 1.5 ma avg.                          |              |  |             |              |                |              |             |              |                  |       | 2B25  |
| 2C4              | Triode thyratron                      | --                           | Cath.             | 2.5   | 0.6   | 5-A5             | 2 1/8          | --          | --  | --   | Relay service                         | Max plate 350 v inv peak; curr. 22 ma peak, 5 ma avg.                       |              |  |             |              |                |              |             |              |                  |       | 2C4   |
| 2021             | Tetrode thyratron                     | 2050                         | Cath.             | 6.3   | 0.6   | 7-BN             | 2 1/8          | 0.02        | 2.4 | 1.6  | Relay service                         | Max plate 1500 v inv. peak; curr. 500 ma peak, 100 ma avg.                  |              |  |             |              |                |              |             |              |                  |       | 2021  |
| 2E30             | Beam tetrode                          | --                           | Fil.              | 6.0   | 0.7   | 7-C0             | 2 5/8          | 0.5         | 10  | 4.5  | Power amplifier                       | 250 250 -21 10 3 -- 3400 4 4500   |              |  |             |              |                |              |             |              |                  | 2E30  |       |
| 3A4              | Power amp pentode                     | --                           | Fil.              | 1.4   | 0.2   | 7-BB             | 2 1/8          | 0.35        | 4.8 | 4.2  | Power output amp                      | 135 90 -7.5 14.8 2.6 -- 90M 1900 0.6 8000                                   |              |  |             |              |                |              |             |              |                  | 3A4   |       |
| 3A5              | Twin triode                           | --                           | Fil.              | 1.4   | 0.1   | 7-BC             | 2 1/8          | 3.2         | 0.9 | 1    | Voltage amplifier                     | 135 90 -8.4 15.5 2.2 -- 100M 1900 0.7 8000                                  |              |  |             |              |                |              |             |              |                  | 3A5   |       |
| 3Q4              | Power amp pentode                     | 305GT                        | Fil.              | 1.4   | 0.1   | 7-BA             | 2 1/8          | 0.21        | 5.5 | 4    | Power output amp                      | 90 90 -4.5 9.5 2.1 215 100M 2150 0.27 10M                                   |              |  |             |              |                |              |             |              |                  | 3Q4   |       |
| 354              | Power amp pentode                     | 3J5GT                        | Fil.              | 1.4   | 0.1   | 7-BA             | 2 1/8          | --          | --  | --   | Power output amp                      | 90 90 -4.5 7.7 1.7 215 120M 2000 0.24 10M                                   |              |  |             |              |                |              |             |              |                  | 354   |       |
| 3V4              | Power amp pentode                     | 305GT                        | Fil.              | 1.4   | 0.1   | 6-BX             | 2 1/8          | --          | --  | --   | Power output amp                      | 90 90 -4.5 9.5 2.1 -- 100M 2150 0.27 10M                                    |              |  |             |              |                |              |             |              |                  | 3V4   |       |
| 6A5              | R-f pentode sharp cutoff              | 65H7GT                       | Cath.             | 6.3   | 0.3   | 7-B0             | 2 1/8          | 0.025       | 6.5 | 1.8  | Voltage amplifier                     | 250 150 R <sub>h</sub> =200 7 2 -- 800M 9000 -- -- -8                       |              |  |             |              |                |              |             |              |                  | 6A5   |       |
| 6A15             | R-f pentode sharp cutoff              | --                           | Cath.             | 6.3   | 0.175 | 7-B0             | 1 3/4          | 0.02        | 4.1 | 2    | Voltage amplifier                     | 100 100 R <sub>h</sub> =100 5.5 1.6 -- 300M 4750 -- -- -5                   |              |  |             |              |                |              |             |              |                  | 6A15  |       |
| 6A45             | R-f pentode sharp cutoff              | --                           | Cath.             | 6.3   | 0.175 | 7-B0             | 1 3/4          | 0.02        | 4   | 2    | Class AB <sub>1</sub> power amp       | 28 28 R <sub>h</sub> =200 3 1.2 290 90M 2750 -- -- -20M                     |              |  |             |              |                |              |             |              |                  | 6A45  |       |
| 6A46             | R-f pentode sharp cutoff              | --                           | Cath.             | 6.3   | 0.15  | 7-BK             | 2 1/8          | 0.12        | 3.6 | 4.2  | Power output amp                      | 180 75 -7.5 6.1 4.5 -- 690M 5100 -- -- -12                                  |              |  |             |              |                |              |             |              |                  | 6A46  |       |
| 6A46             | Power amp pentode                     | --                           | Cath.             | 6.3   | 0.15  | 7-BK             | 2 1/8          | 0.12        | 3.6 | 4.2  | Power output amp                      | 180 120 R <sub>h</sub> =200 7.5 2.5 1700 340M 5000 -- -- -12                |              |  |             |              |                |              |             |              |                  | 6A46  |       |
| 6A45             | Twin diode                            | 6H6GT                        | Cath.             | 6.3   | 0.3   | 6-BT             | 1 13/16        | --          | --  | 3.2  | F-w discriminator                     | 135 135 -6 -- 11.5 2 360 170M 2100 0.6 12M                                  |              |  |             |              |                |              |             |              |                  | 6A45  |       |
| 6A96             | Quadruple diode                       | --                           | Cath.             | 6.3   | 0.2   | 7-BJ             | 2 1/8          | --          | --  | --   | Rectifier                             | Max plate 150 v rms at 9 ma d-c per plate; peak plate curr. 54 ma max.      |              |  |             |              |                |              |             |              |                  | 6A96  |       |
| 6A06             | Beam tetrode                          | 6V6GT                        | Cath.             | 6.3   | 0.45  | 7-B2             | 2 5/8          | 0.35        | 7.6 | 6    | Power output amp                      | 250 250 -42.5 45 4.5 218 52M 4100 4.5 5000                                  |              |  |             |              |                |              |             |              |                  | 6A06  |       |
| 6A06             | Quinax diode high- $\mu$ triode       | 6T7G                         | Cath.             | 6.3   | 0.15  | 7-BT             | 2 1/8          | 1.8         | 1.7 | 1.5  | Detector & volt. amp                  | 180 180 -8.5 29 3 -- 58M 3700 2 5500  |              |  |             |              |                |              |             |              |                  | 6A06  |       |
| 6A56             | R-f pentode, dual control, sharp c.o. | --                           | Cath.             | 6.3   | 0.175 | 7-CN             | 1 3/4          | 0.02        | 3.9 | 2.8  | Voltage amplifier                     | 250 -- -5 1 -- 70 58M 1200 -- -- -10  |              |  |             |              |                |              |             |              |                  | 6A56  |       |
| 6A76             | Duplex diode high- $\mu$ triode       | 607GT                        | Cath.             | 6.3   | 0.3   | 7-BT             | 2 1/8          | 2.1         | 2.3 | 1.1  | Detector & volt. amp                  | 120 120 -2 5.2 3.5 -- -- 3200 -- -- -10                                     |              |  |             |              |                |              |             |              |                  | 6A76  |       |
| 6A16             | R-f pentode sharp cutoff              | 65H7GT                       | Cath.             | 6.3   | 0.3   | 7-BK             | 2 1/8          | 0.0035      | 5.5 | 5    | Voltage amplifier                     | 250 150 -1 10.8 4.5 -- 2000M 5200 -- -- 6.2                                 |              |  |             |              |                |              |             |              |                  | 6A16  |       |
| 6B46             | R-f pentode remote cutoff             | 65G7GT                       | Cath.             | 6.3   | 0.3   | 7-BK             | 2 1/8          | 0.0035      | 5.5 | 5    | Voltage amplifier                     | 100 100 -1 5.2 2 -- 600M 3900 -- -- 4.2                                     |              |  |             |              |                |              |             |              |                  | 6B46  |       |
| 6B06             | R-f pentode remote cutoff             | 65K7GT                       | Cath.             | 6.3   | 0.3   | 7-CC             | 2 1/8          | 0.004       | 4.3 | 5    | Voltage amplifier                     | 250 100 R <sub>h</sub> =66 11 4.2 -- 1500M 4400 -- -- -20                   |              |  |             |              |                |              |             |              |                  | 6B06  |       |
| 6B66             | Pentagrid converter, remote c.o.      | 65A7GT                       | Cath.             | 6.3   | 0.3   | 7-CH             | 2 1/8          | 0.5         | 7.2 | 8.6  | Converter                             | 100 100 R <sub>h</sub> =68 10.8 4.4 -- 250M 4500 -- -- -20                  |              |  |             |              |                |              |             |              |                  | 6B66  |       |
| 6C4              | Power triode                          | 6J5GT                        | Cath.             | 6.3   | 0.15  | 6-B6             | 2 1/8          | 1.6         | 1.8 | 1.3  | Voltage amplifier                     | 250 -- -8.5 10.5 -- 17 7700 2200 -- -- -35                                  |              |  |             |              |                |              |             |              |                  | 6C4   |       |
| 6D4              | Triode thyratron                      | --                           | Cath.             | 6.3   | 0.25  | 5-AY             | 2 1/8          | --          | --  | --   | Relay service                         | Max plate 320 v inverse peak; curr. 110 ma peak, 25 ma avg.                 |              |  |             |              |                |              |             |              |                  |       | 6D4   |
| 6J4              | Triode uhf grounded grid              | --                           | Cath.             | 6.3   | 0.4   | 7-B0             | 2 1/8          | 4           | 5.5 | 0.24 | Voltage amplifier                     | 100 100 R <sub>h</sub> =100 15 -- 55 4500 12000 -- -- --                    |              |  |             |              |                |              |             |              |                  | 6J4   |       |
| 6J6              | Twin triode                           | --                           | Cath.             | 6.3   | 0.45  | 7-BF             | 2 1/8          | 1.6         | 2.2 | 4    | Voltage amplifier                     | 100 -- R <sub>h</sub> =100 10 -- 55 5000 11000 -- -- --                     |              |  |             |              |                |              |             |              |                  | 6J6   |       |
| 6K4              | Triode uhf                            | --                           | Cath.             | 6.3   | 0.2   | 7-CA             | 1 3/4          | 2.35        | 3.1 | 0.55 | Voltage amplifier                     | 180 -- R <sub>h</sub> =90 8.5 -- 38 7100 5300 -- -- --                      |              |  |             |              |                |              |             |              |                  | 6K4   |       |
| 6K4              | F-w rectifier                         | 6X5GT                        | Cath.             | 6.3   | 0.6   | 5-B5             | 2 5/8          | --          | --  | --   | Rectifier                             | Max plate 450 v rms at 70 ma d-c total output; peak plate curr. 210 ma max. |              |  |             |              |                |              |             |              |                  |       | 6K4   |
| 12A76            | Duplex diode high- $\mu$ triode       | 12Q7GT                       | Cath.             | 12.6  | 0.15  | 7-BT             | 2 1/8          | 2.1         | 2.3 | 1.1  | Detector & volt. amp                  | 250 -- -3 1 -- 70 59M 1200 -- -- -10  |              |  |             |              |                |              |             |              |                  | 12A76 |       |
| 12B46            | R-f pentode remote cutoff             | 12S7GT                       | Cath.             | 12.6  | 0.15  | 7-BK             | 2 1/8          | 0.0035      | 5.5 | 5    | Voltage amplifier                     | 100 100 R <sub>h</sub> =66 11 4.2 -- 1500M 4400 -- -- -20                   |              |  |             |              |                |              |             |              |                  | 12B46 |       |
| 12B06            | R-f pentode remote cutoff             | 12SK7GT                      | Cath.             | 12.6  | 0.15  | 7-CC             | 2 1/8          | 0.004       | 4.3 | 5    | Voltage amplifier                     | 250 100 -3 9 3.5 -- 700M 2000 -- -- -35                                     |              |  |             |              |                |              |             |              |                  | 12B06 |       |
| 12B66            | Pentagrid converter, remote c.o.      | 12SA7GT                      | Cath.             | 12.6  | 0.15  | 7-CH             | 2 1/8          | 0.5         | 7.2 | 8.6  | Converter                             | 100 100 R <sub>h</sub> =68 10.8 4.4 -- 250M 4500 -- -- -20                  |              |  |             |              |                |              |             |              |                  | 12B66 |       |
| 12B86            | Duplex diode low- $\mu$ triode        | 12SR7GT                      | Cath.             | 12.6  | 0.15  | 7-BT             | 2 1/8          | 2           | 1.8 | 1.1  | Detector & volt. amp                  | 250 -- -1.5 2.8 7.3 -- 500M 495 -- -- -30                                   |              |  |             |              |                |              |             |              |                  | 12B86 |       |
| 26A6             | R-f pentode remote cutoff             | --                           | Cath.             | 26.5  | 0.07  | 7-BK             | 2 1/8          | 0.0035      | 6   | 9    | Voltage amplifier                     | 250 100 R <sub>h</sub> =120 10.5 4 -- 1000M 4000 -- -- -25                  |              |  |             |              |                |              |             |              |                  | 26A6  |       |
| 26C6             | Duplex diode low- $\mu$ triode        | --                           | Cath.             | 26.5  | 0.07  | 7-BT             | 2 1/8          | 2           | 1.8 | 1.4  | Detector & volt. amp                  | 26.5 26.5 R <sub>h</sub> =200 1.7 0.7 -- 250M 2000 -- -- -8                 |              |  |             |              |                |              |             |              |                  | 26C6  |       |
| 2606             | Pentagrid converter, remote c.o.      | --                           | Cath.             | 26.5  | 0.07  | 7-CH             | 2 1/8          | 0.5         | 7.5 | 14   | Converter                             | 250 -- R <sub>h</sub> =200 9 5 -- 16 8500 1900 -- -- -30                    |              |  |             |              |                |              |             |              |                  | 2606  |       |
| 35W4             | H-w rectifier                         | 35Z5GT                       | Cath.             | 35    | 0.15  | 5-B0             | 2 5/8          | --          | --  | --   | Rectifier                             | Max plate 117 v rms at 90 ma d-c output; peak plate curr. 600 ma max.       |              |  |             |              |                |              |             |              |                  |       | 35W4  |
| 45Z3             | H-w rectifier                         | --                           | Cath.             | 35    | 0.075 | 5-AM             | 2 1/8          | --          | --  | --   | Rectifier                             | Max plate 125 v rms at 60 ma d-c output; peak plate curr. 390 ma max.       |              |  |             |              |                |              |             |              |                  |       | 45Z3  |
| 50B5             | Beam tetrode                          | 50L6GT                       | Cath.             | 50    | 0.15  | 7-B2             | 2 5/8          | 0.5         | 15  | 6.5  | Power output amp                      | 110 110 -7.5 49 4 -- 14M 7500 119 2500                                      |              |  |             |              |                |              |             |              |                  | 50B5  |       |
| 117Z3            | H-w rectifier                         | 117Z56T                      | Cath.             | 117   | 0.04  | 4-90             | 2 5/8          | --          | --  | --   | Rectifier                             | Max plate 117 v rms at 90 ma d-c output; peak plate curr. 540 ma max.       |              |  |             |              |                |              |             |              |                  |       | 117Z3 |
| 9001             | R-f pentode sharp cutoff              | --                           | Cath.             | 6.3   | 0.15  | 7-B0             | 2 1/8          | 0.01        | 3.6 | 3    | Voltage amplifier                     | 250 100 -5 2 0.7 -- 1500M 1400 -- -- -10                                    |              |  |             |              |                |              |             |              |                  | 9001  |       |
| 9002             | VHF triode                            | --                           | Cath.             | 6.3   | 0.15  | 7-B5             | 2 1/8          | 1.4         | 1.2 | 1.1  | Voltage amplifier                     | 90 90 -3 1.2 0.5 -- 1000M 1100 -- -- -10                                    |              |  |             |              |                |              |             |              |                  | 9002  |       |
| 9003             | R-f pentode remote cutoff             | --                           | Cath.             | 6.3   | 0.15  | 7-B0             | 2 1/8          | 0.01        | 3.6 | 3    | Voltage amplifier                     | 250 -- -7 6.3 -- 25 11400 2200 -- -- -45                                    |              |  |             |              |                |              |             |              |                  | 9003  |       |
| 9006             | UHF diode                             | --                           | Cath.             | 6.3   | 0.15  | 6-BH             | 2 1/8          | --          | --  | 1.4  | H-w rect. or det.                     | Max plate 265 v rms at 5 ma d-c output; peak plate curr. 15 ma max.         |              |  |             |              |                |              |             |              |                  |       | 9006  |

These types frequently used as class C amplifiers or oscillators in low-power transmitters for portable or mobile operation. Data for use in such applications are listed in the Hytron transmitting and special purpose tube catalogs.

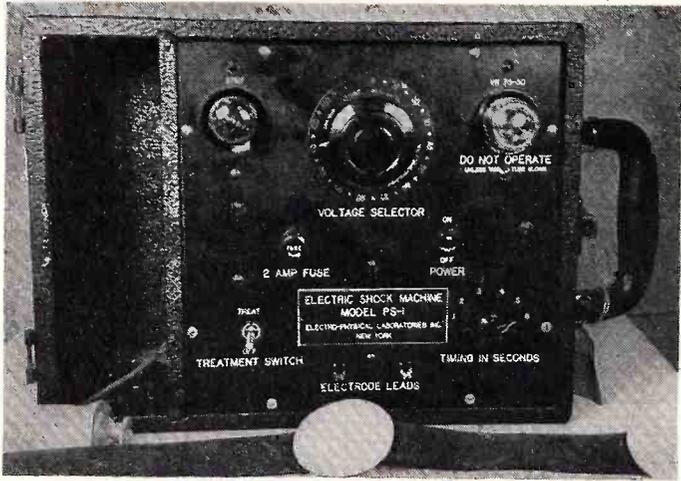


Figure 2. A shock machine used for modern treatment of certain mental disorders. Note the headband with sponge type head electrodes just in front of machine.

# Service Market

**In many towns, physicians are completely without service facilities for their electrotherapy equipment. The repair and maintenance of this equipment offers to the radio serviceman an additional source of business.**

by JACK PACE

**E**LECTROTHERAPY apparatus in general use by physicians includes diathermy, X-ray, shock therapy sets, electrocardiograph, infra-red ray devices, ultra-violet lamps, and, to some extent, electronic stethoscopes. More apparatus is on the way. This equipment is very important to public health and is in need of frequent inspection by qualified electrical men.

The manufacturers of electromedical equipment have no factory service facilities near some towns, and physicians in those places are compelled to do without their instruments while they are being serviced *at the factory*. Brief descriptions of common electromedical instruments follow:

### X-Ray.

A high-voltage apparatus which poses no special problem to the man who is experienced in handling a. c. and d. c. voltages above 1000 v. All of the well-known special precautions must be employed to protect the trouble shooter from high-voltage shock and X-ray burns. The circuit arrangement and theory of an X-ray machine will be found simple by comparison with radio

instruments. *Common troubles are defective tube, shorted or open capacitors, shorted transformers, inoperative timer.*

### Diathermy.

This is the so-called "deep fever" machine. It is, essentially, a simple radio transmitter (usually operated in the medium-power range) in which the patient is inductively- or capacitively-coupled in place of an antenna. Present diathermy machines operate on one of various frequencies in the short-wave spectrum, depending upon who built the machine. Previously, there was little standardization in frequency range. Future models will no doubt be confined to the 27-Mc. band. Present diathermy machines are self-excited oscillators, usually of the simplest design, but new models to come will employ crystal control and will be identical to a multi-stage shortwave transmitter. A large number of the present machines employ unfiltered power supplies, and some even use high-voltage a. c. directly from the power transformer without rectification.

*Common diathermy troubles are defective tubes, open grid resistor, de-*

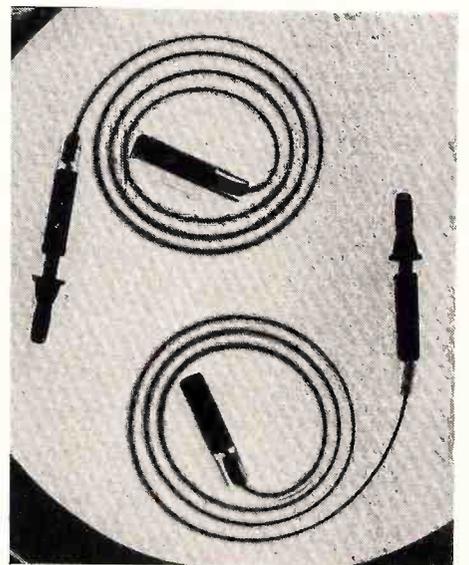


Figure 1. Above is an example of a common trouble in diathermy machines. Two plug-in treatment cords are shown. In this X-ray picture it may be noticed that the stranded wire in the cable at the top is frayed at the point where it enters the plug handle. The entire wire in the cable shown below it is seen to be perfect. This defect led to poor or intermittent heating.

# in INDUSTRIAL ELECTRONICS

## Article 6: Electromedical Equipment

tuned circuits, and broken or burned-open leads. One of the most persistent faults is frayed wires in the flexible cables connecting the treatment pads to the machine. Fig. 1 shows an X-ray view of two of these cables. Notice the frayed wires just inside the plug handle of the cable at top. The stranded wire in the cable below it is seen to be perfect throughout its length.

### Shock Machines.

These lately have been employed in the treatment of certain mental disorders. The shock machine is essentially a source of voltage-regulated a. c. voltage which is applied to the head of the patient. Included in the circuit is an adjustable timer which regulates the shock interval, and a Variac, or similar device, for controlling the strength of the voltage.

Fig. 2 shows the outside appearance of one portable shock machine. Notice, just in front of the machine, the head-band with sponge-type electrodes. Fig. 3 shows the internal construction of this machine.

Troubles are the same that are common to simple a. c. power supplies, gas-tube voltage regulators, and electronic timers.

### Electronic Stethoscope.

This is a midget, portable high-gain amplifier employing sub-miniature tubes and hearing-aid batteries. A tiny microphone, used against the patient's body, serves to pick up diagnostic sounds.

Common troubles are about identical with those that might occur in a hearing aid.

### Encephalograph.

This is the so-called "brain-wave" machine. It is used in the study of certain mental disorders. Essentially, this

is a highly-specialized, wide-range, high-gain amplifier—usually with a recorder. Successful trouble shooting in this instrument requires an extensive knowledge of high-gain and direct-coupled amplifier operation and design, as well as a practical acquaintance with efficient shielding and electrical isolation of such

(See page 39)

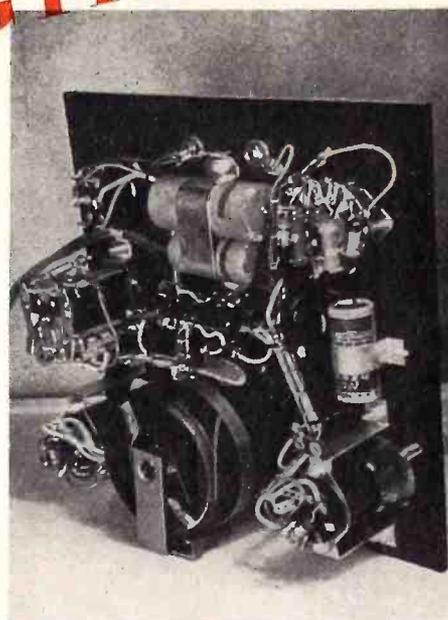


Figure 3. Interior view of the shock machine shown opposite.

## GETTING THE BUSINESS

Most servicemen are sufficiently well trained in radio and electrical theory to learn the circuits and operation of electromedical instruments with little difficulty. Technical information on this subject is to be found in textbooks in public libraries and in the back-number files of such magazines as Review of Scientific Instruments, Proceedings of the Institute of Radio Engineers, and the Journal of the American Medical Association.

The radio serviceman who intends to add this work to his present repair business should try to obtain circuit schematics and other technical data from the various manufacturers whose advertisements may be found in the monthly medical, dental, and osteopathic magazines at the public library or at a doctor's office.

The serviceman already owns the necessary tools and test instruments for shooting trouble in electromedical equipment and for making repairs. Service procedures will not differ basically from those he already employs in radio, amplifier, and home appliance work. Those familiar with amateur radio equipment will find this extra knowledge of short-wave circuits and power oscillators (and possible possession of additional high-frequency test gear) useful in this work.

How the serviceman goes about getting electromedical equipment clients

will depend upon his own ingenuity and business acumen. A good method probably would be to call in person on all of the physicians and hospitals in town, directing their attention to the new service you are prepared to offer them, or to send out neatly-printed and dignified announcements. These may be followed up with seasonal holiday greeting cards, calenders, desk memo pads, or letter openers.

After getting some acceptance, establish yourself among local medical men, the serviceman can approach several manufacturers of electromedical instruments with the proposition that he be appointed factory-authorized service representative exclusively in his town and surrounding communities.

There are two main methods of operating an electromedical service, and these should be outlined to each client at the very outset. One way is to have the doctor call *only* when a repair is needed. This is the way the regular radio service business is operated. The other method is a maintenance proposition. Under this plan, the serviceman would call on each client two or three times a year and give all of his equipment a thorough inspection during those visits, making any adjustments or replacements found necessary. The client might, of course, call him in between trips in the event of sudden trouble.



# Answers

## FM

by JOHN BOWLES

**T**HE technique of servicing FM is a very simple one. There are just a few new methods that need be learned. It should not be a difficult problem for the experienced serviceman.

Special FM servicing equipment is in the engineering stage yet, but will probably be on the market in the near future. In the meantime, the frequency modulated sets that come to the service bench must be repaired satisfactorily.

### Equipment Needed

Most of the present day test equipment can be used in FM servicing. Such equipment as multimeters, tube testers, ohmmeters, etc. are used the same as in AM testing. This is easily understood when one remembers that a frequency modulation set is merely a combination of AM and FM circuits. The same methods are used to test the by-pass condensers, resistors, etc. There are only three new circuits to work with in a FM set—discriminator, limiter, and squelch.

In addition to the regular pieces of test equipment, a frequency modulated signal generator and an oscilloscope would be very useful but not absolutely necessary.

One essential piece of equipment for servicing FM receivers is a good vacuum tube voltmeter with a high resistance input. This type of voltmeter is needed to measure the various operating and control voltages of the automatic volume control, the discriminator output, etc. without overloading the circuits. It is also useful as an output

meter during alignment. As a substitute for an electronic voltmeter, some servicemen use a sensitive voltmeter with a resistance of at least 20,000 ohms per volt.

### Defects Similar to AM

There are not many types of defects found in FM sets that are not common in AM receivers. This is easy to understand when one considers the general similarity of the two systems of reception. For example, the reason for low volume in an FM set may be the same as that for low volume in an AM set. In both, the amplification of a signal depends on the condition of the tubes, the proper voltages, the action of the filter and by-pass units, the coupling condensers and transformers, high resistance joints, faulty speakers, and many other common faults that are known by all servicemen.

There are a few common troubles found in the three circuits in FM which differ from those in the AM receiver. We will discuss those of most frequent occurrence and the best way of correcting them.

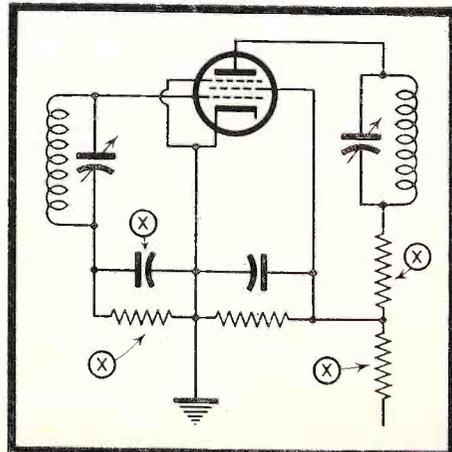
### Interference

If outside interference comes through the receiver fault is probably in the limiter stage. The limiter grid leak, plate drop, or screen grid drop resistor may change value. An open grid leak by-pass condenser will also allow the limiter stage to pass noise pulses. It is best to substitute one of proper value for each suspected unit and give the set a trial.

The annoying interference which is sometimes experienced between two stations on the same carrier wave is no fault of the receiver, especially if the signals are of approximately the same strength. Nothing can be done in the set to correct this condition. However, if the signal of the desired station can be raised to twice the strength of the undesired one, the one wanted will come through and the other will not be heard. This is due to a characteristic of the discriminator. We are more interested in overcoming the interference therefore the reason will not be discussed here.

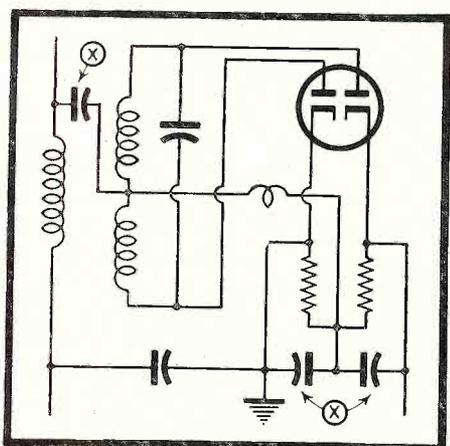
If the two stations are in different directions the interference can be eliminated by using a directional antenna. A dipole antenna with a reflector increases the signal pick-up of the desired station and reduces the signal of the

Figure 1. Points at "x" show most common sources of trouble in limiter stage.



# to

# SERVICING PROBLEMS



**Figure 2.** Noise may be caused by open or shorted blocking condenser between limiter and discriminator, or by open by-pass condenser across discriminator load resistors.

undesired one. Of course, the antenna should be mounted high above surrounding obstacles. It is best to install it so that it may be easily rotated from near the receiver.

### Broad Tuning of IF Stages

Interference between stations of different carrier frequencies is usually caused by incorrect alignment of the receiver. Broad tuning of the IF stages is the most likely source of this trouble. There are three likely reasons for broad tuning of an IF stage.

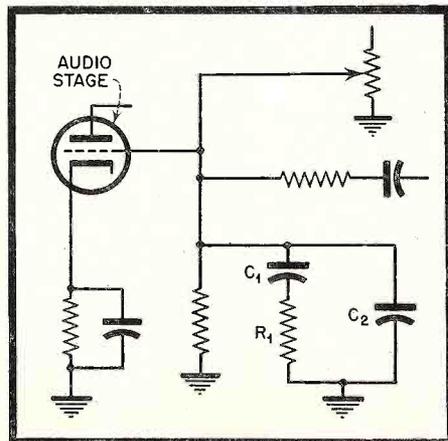
1. It may be due to improperly tuned circuits. The stage may never have been properly aligned, the adjustments may have vibrated from their correct setting, or some component of the circuit may

have changed value.

2. Improper loading of the IF coil caused by a defective loading resistor. Some FM sets do not have IF transformer loading resistors. On some models they are not easily found because they are located inside the shielding can. In order to be sure that the loading resistor is okay its value should be checked against the rated value on the schematic.

3. A defect in the coil itself. There may be shorted turns, or the leads may be shorted to the shielding can. If the coil can not be realigned or seems to vary at different times it should be replaced. When an IF transformer is suspected it should be adjusted to the proper frequency, the set should be moved around considerable and the

**Figure 3.** If the squelch is too fast, increase the capacity of C1. When action is too slow, increase the value of C2.



shielding can shaken roughly, and the stage should be again checked for alignment. It is also a good idea to put the receiver aside or a day or two, if possible, and then recheck the alignment of this stage. If it has changed frequency (See page 37)

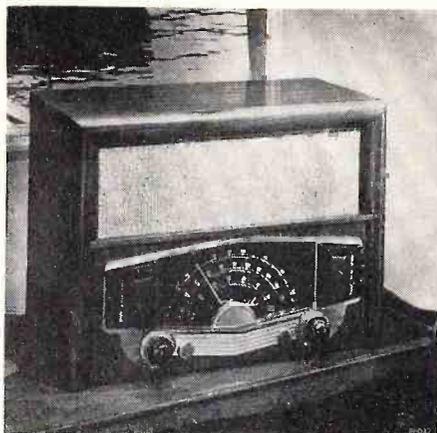
## NEW FM/AM TUNING TUBE FOR SETS AND TESTS

A new design electron-ray indicator tube, Type 6AL7-GT, which provides visual tuning for radio receivers, has been announced by the Tube Division of General Electric Company's Electronics Department. It is available to other radio set manufacturers.

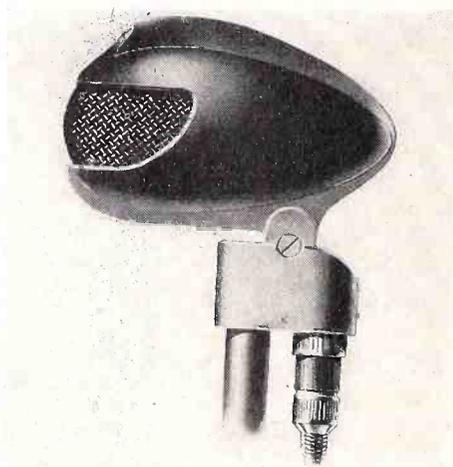
Developed to simplify the problem of precise tuning of FM receivers, the new tube will "build blocks" on its face when installed in late-model radio receivers of all types. It will also be useful to radio amateurs and servicemen as its construction and method of pres-

(See page 40)

# MERCHANDISE



**Zenith Model 8H032:** Armstrong wide band FM reception on the 45 mc band now being used for FM broadcasting and on the new 100 mc band to which FM has been assigned. Also covers standard band, 540-1600 kc. 7 radio tubes, plus 1 rectifier tube; operates on AC only. Built in power-line antenna, picks up FM from electric light lines, eliminates separate dipole. Cabinet satin finish 5-ply walnut veneer. Sells for around \$100 in Zone 1.



## St. Louis Mike

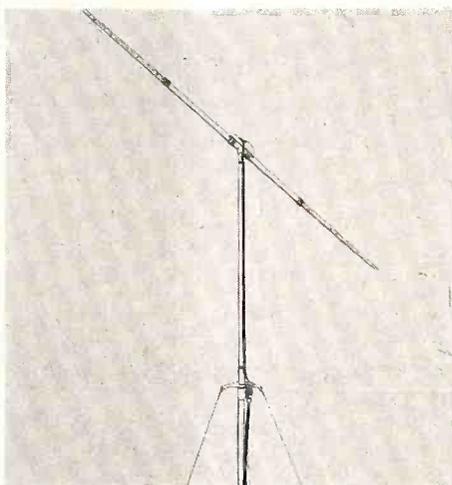
The St. Louis Microphone Co. has added a plastic "Colormike" to its production schedules. It will be available in 5 colors—red, blue, green, yellow and orange.

According to the manufacturers, the new "Colormike" combines the St. Louis unbraekable diaphragm and Alnico V with design in which the rugged plastic case construction allows the free passage of sound from the outside to the inside of the microphone. Variable impedance output permits a choice

of 50, 200, 500 or 50,000 ohms for balanced line output.

Rollins H. Mayer, vice-president and general manager, stated that the microphone will be ready for shipment soon.

For further information, write the Cherry Rivet Company, 231 Winston Street, Los Angeles 13, California.



## Tunable Dipole

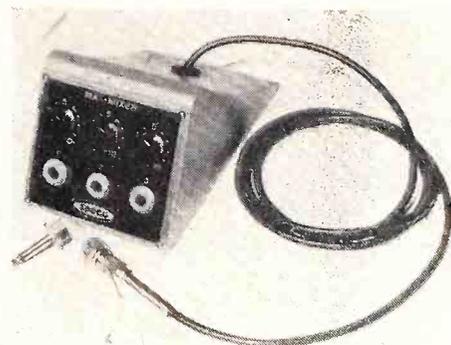
Dipole for television and FM reception (62 mc. to 840 m.) is announced by Kings Electronics, Brooklyn, New York, manufacturers of microphone plugs, jacks, and other electronic equipment. The arms of the dipole are adjustable and can be armonized with the wave length of weak stations. This eliminates ghosts and weak reception on certain stations in low areas.

The adjustable feature of this dipole consists of an U.H.F. element that is calibrated from 1.0 to 21.5 in half-steps. After facing antenna in direction of greatest signal strength, should any weak stations develop, this element can be moved in or out, according to a carefully calculated table, and then locked into position. This setting need be made once only—to boost the weak stations. If the calculations have been carefully and correctly made, no further adjustments should be necessary.

Because of this adjustable element, the Kings Dipole is capable of receiving an extremely broad band of FM and Television frequencies including: Black-and-White, Color and Experimental Television; FM; 1¼ Meter Amateur; Glide Paths; Airport Controls; Fixed and Mobile.

The Dipole comes complete with hard-

ware, straps, guy wires, etc. for setting up. Available to the purchaser, also, are two types of lead-in wire—standard or co-axial. Orders are now being taken for delivery within 4-6 weeks.



## Max-Mixer for P-A

Max-Mixer, a device which enables owners of public address amplifiers to add two additional microphone inputs to any amplifier has been released for sale through radio parts jobbers and musical instrument jobbers and dealers according to Mr. Elmer P. Eldridge, President of Special Products Company. The product enables the plugging of one, two or three microphones into the unit and control their volume by operation of the three volume controls provided.

For complete information address New Products Editor, "Radio Service Dealer," 342 Madison Ave., New York 17, N. Y.



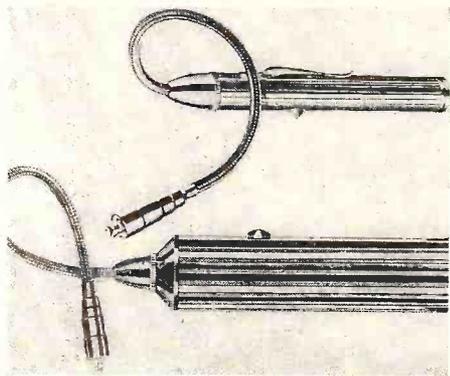
## "Multi-Plug" Box

The new "Multi-Plug" Outlet Box Model 3001-A, contains 8 standard receptacles and solves the problem of coping with an insufficient number of wall outlets. It can be plugged into any

# PRE-VIEWS

convenient wall outlet, AC or DC, 110-125 volts. The item is useful both where an electrical circuit is needed temporarily, as in the case of temporary lighting fixtures, or portable test equipment and where a permanent circuit is needed to allow operation of a number of instruments or machines from a lesser number of available wall outlets. In addition, the boxes can be "pyramided": one can be plugged into another. Two fuses protect the main line against shorts and overloads.

For complete information address New Products Editor, "Radio Service Dealer," 342 Madison Ave., New York 17, N. Y.



## Flashlight for Close Work

Two new models of the flexible tube "Flex-Lite" are announced by the Aero-Motive Manufacturing Company. Both the Junior Deluxe and the Master models have a long flexible tube extension bulb-retainer which replaces the conventional pulp assembly. With this unique, new construction feature, a powerful searching beam of shadowless light can be introduced into heretofore inaccessible areas, it is claimed.

For more information please address New Products Editor, "Radio Service Dealer," 342 Madison Ave., New York 17, N. Y.

## New Electromatic

Styled for a holiday selling feature and timed for immediate delivery, is Electromatic Manufacturing Corporation's new model, a bar-radio. The cabinet is of a new process veneer that will not warp, peel or crack, and legs that are detachable. It comes in a choice of blonde maple or walnut. The hospital-ity-dealing features include 2 decanters, 6 highball glasses, and a glass ice tub with tongs.

The following dealer helps are available for this and other models in the Electromatic line; display cards, envelope stuffers, counter give-aways, streamers, and newspaper mats. No. 609 bar-radio, \$97.95 list in Zone 1; \$102.85 in Zone 2. Dealers' net, \$63.70 with tax; \$57.90 without tax.



## Radio Cement and Solvent Line Redesigned

The JFD Manufacturing Company of Brooklyn, New York, has reorganized its entire line of radio cements, solvents and carbon tetrachloride. In the future, each of these items will come attractively packaged in the four most popular sizes. These are the 4 ounce, the 8 ounce, the 16 ounce, and the 1 gallon sizes. The entire line of radio cements comes with the brush affixed to the metal cap.

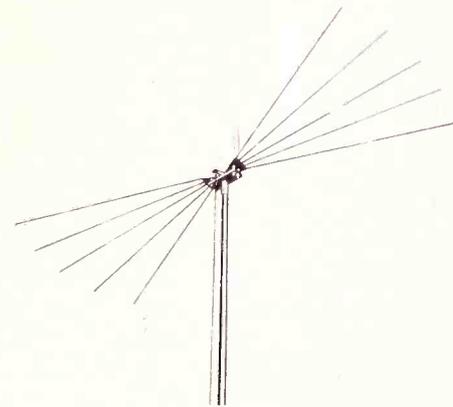


## Transconductance Reading Tube Tester

Micromho (Dynamic mutual conductance) readings and simplified testing—are two of the 20 exclusive features

found in the new model 2425 tube tester. Transconductance readings are made possible through a simple measurement directly proportional to Gm and a properly calibrated measuring instrument. No possibility of grid overloading. "Short" and "open" tests of every tube element. Gas test rounds out full check of all tubes. New Easy-Test Roll Chart also available. (For full discussion, see page 14, September 1946 issue of "Radio Service Dealer.")

Metal case, 10" x 10" x 5 3/4" with tan hammered enamel finish, brown trim. Attached handle for ease in carrying. Removable cover. For counter or portable use. Made by The Triplet Electrical Instrument Co., Bluffton, Ohio.



## "Di-Fan" Antenna

Perfection of "Di-Fan", a new antenna capable of reception on all television and FM channels, is announced by the Andrew Co., Chicago. Two sets of five elements extend in two different directions in a fan-like design. Mounting brackets available for chimney or roof.

## Cherry Rivert Hand Gun

The new G-55 Hand Gun was designed especially for small-quantity users of the larger sizes (3/8", 1/4" and 3/16") of Cherry Blind Rivets (when used with an adapter, it also installs the smaller rivets). The more expensive pneumatic guns are primarily production line tools. But for small-quantity rivet installation, or for field work where air pressure is not available, the hand gun is highly practical.

The G-55 Hand Gun operates on the ratchet principle. It is lightweight and (See page 33)



Outside and inside views of Robinson's corner store.

# DEALER READIES for Servicing "Deal"



**T**he Robinson Electric Store, Broad and Wayne Streets, is a branch of the C. C. Robinson Electric Store of 102 E. Gay Street. Both stores are in Columbus Ohio. Mr. C. C. Robinson is head of the entire organization and is also president of the Electric Dealers of Columbus. The downtown store was started in 1934, and the branch was opened Dec. 1, 1945.

The Robinson Electric Shop on the West Side is not doing any repair work as yet, as it is much too young to have repair-guaranteed-seeking clients. Any customer who might stop in with washer trouble on some machine they may have purchased in former times from the downtown store is referred to that store for service. But Mr. Henry may have a repair service department downstairs some day because there is a room large enough to take care of that detail of the work.

He says, "If I could get the right man, I'd go right now with it." What he expects to do with the service man is as follows: (1) he will give him all the service that comes into the store; (2) he will advertise the department in the Hilltop Record; (3) he will take orders for service to be given on radios and appliances; (4) he will furnish heat, light and power; (5) for these conveniences which Mr. Henry is willing to offer some up and coming service man, all he expects in return is about \$10.00 per week. A serviceman who wants to have a repair haven couldn't even hire a girl for that. All that the management will expect of the serviceman is that he repair their guaranteed service. He will still get all the revenue from pay service that comes in. Mr. Henry has a fine set-up here and some willing young man will fall into a gold mine.

G. E. Appliances are the main offering of this outlet. They feature their refrigerators, ranges, radios and wash-

(See page 46)

"Across-the-board" lines of radios and appliances include Philco, Zenith, RCA Victor, Motorola sets; Bendix, Thor, ABC washers. To come: GE dish-washers, refrigerators, ranges, other kitchen items.

## SERVICE DATA

### FOR STEWART-WARNER MODEL 9000-B

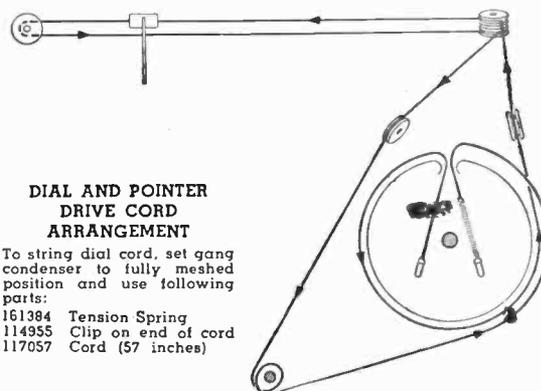
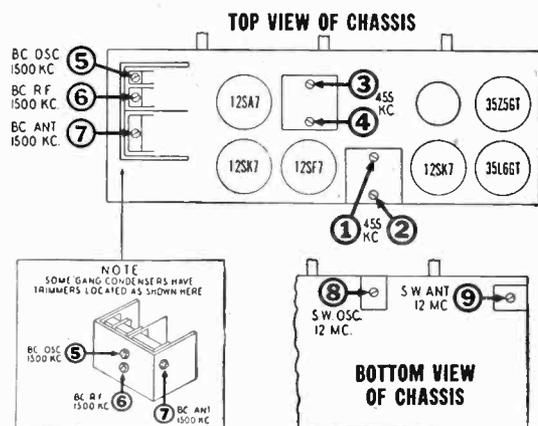
(Schematic and Parts List on page following)

### ALIGNMENT PROCEDURE

1. Remove chassis and loop antenna from cabinet (do not remove loop of wire stapled to cabinet). After chassis has been removed, replace loop antenna in cabinet. Stand the chassis on one end and space it approximately same distance from loop as when installed in cabinet. Then reconnect all leads to loop antenna and to loop of wire stapled on cabinet.
2. Note that there are four calibrating lines stamped into the metal dial frame. When gang condenser is fully meshed, dial pointer should be in the position indicated by first line at the left. If it is set incorrectly, release pointer clip on dial cord and reposition pointer.
3. Connect an output meter across the speaker voice coil or from plate of 35L6GT tube to B— through a .1 Mfd. condenser (see voltage chart for convenient B— connection).
4. Connect ground lead from signal generator to B— through a .25 Mfd. condenser.
5. Set volume control at maximum volume position and use a weak signal from the signal generator.

**IMPORTANT:**—Align this receiver in exactly the order shown below. Broadcast band must be aligned before short wave band.

| DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR | CONNECT HIGH SIDE OF GENERATOR TO   | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POSITION | RECEIVER DIAL SETTING   | TRIMMER NUMBER | TRIMMER DESCRIPTION          | TYPE OF ADJUSTMENT  |
|--|-------------------------------------|----------------------------|----------------------|---|----------------|------------------------------|---|
| 200 MMFD. Mica Condenser                   | Control Grid of 12SA7               | 455 KC                     | Broadcast            | Any point where it does not affect the signal   | 1-2<br>3-4     | 2nd I.F.<br>1st I.F.         | Adjust for maximum output. Then repeat adjustment.  |
| 200 MMFD. Mica Condenser                   | External Antenna Clip on Loop Frame | 1500 KC                    | Broadcast            | Set pointer to 1500 KC reference line stamped into metal dial plate (first line at the right)   | 5              | Broadcast Oscillator (Shunt) | Adjust for maximum output.  |
| 200 MMFD. Mica Condenser                   | External Antenna Clip on Loop Frame | 1500 KC                    | Broadcast            | Tune to 1500 KC generator signal  | 6              | Broadcast R.F.               | Adjust for maximum output.  |
| 200 MMFD. Mica Condenser                   | External Antenna Clip on Loop Frame | 1500 KC                    | Broadcast            | Tune to 1500 KC generator signal  | 7              | Broadcast Antenna            | Adjust for maximum output.  |
| 400 OHM Resistor                           | External Antenna Clip on Loop Frame | 12 MC                      | Short Wave           | Set pointer to 12 MC. Reference line stamped into metal dial plate (second line from the right) | 8              | Short Wave Oscillator        | Adjust to bring in signal. Check to see if proper peak was obtained by tuning in image at approx. 11.1 MC. If image does not appear, realign at 12 MC. with trimmer screw farther out. Recheck image. |
| 400 OHM Resistor                           | External Antenna Clip on Loop Frame | 12 MC                      | Short Wave           | Tune to 12 MC generator signal  | 9              | Short Wave Antenna           | Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained.  |

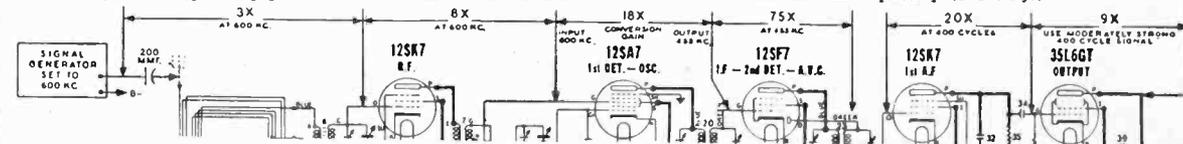


### APPROXIMATE STAGE GAIN DATA

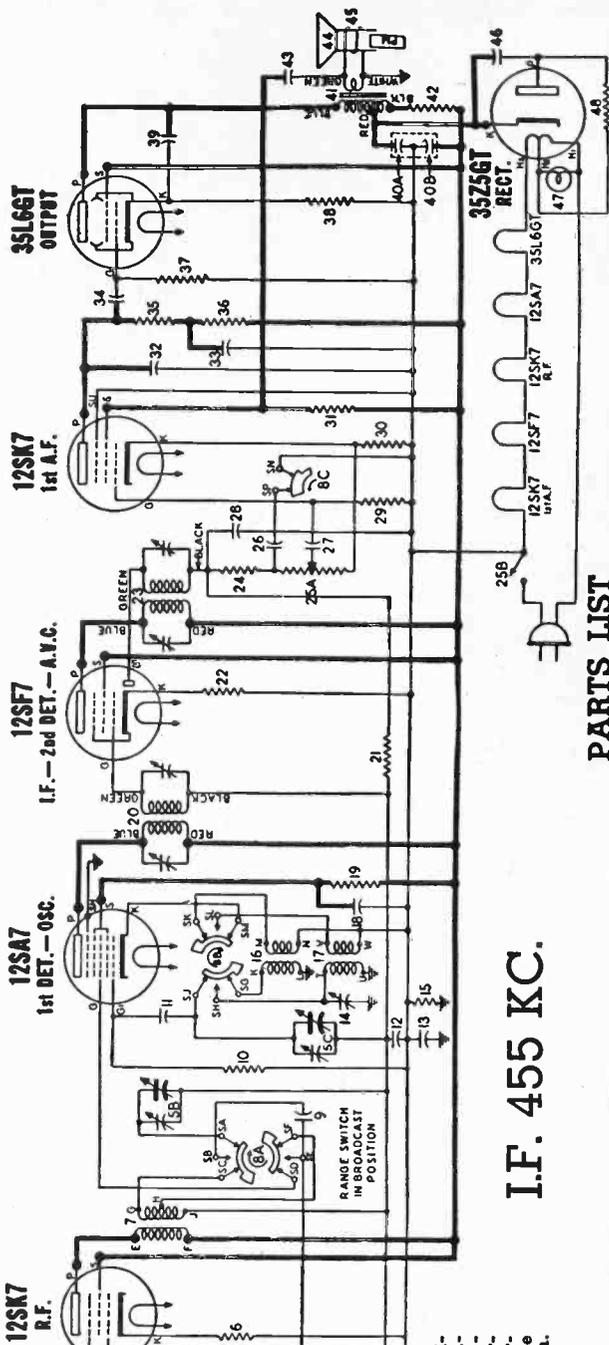
A vacuum tube voltmeter may be used for audio gain measurements. R.F. gains can be measured with a "channel" type instrument containing a tuned and calibrated R.F. amplifier. Observe following precautions:

1. For all gain measurements connect signal generator as shown. Use 600 KC. signal with 400 cycle modulation (use nearby frequency if local station interferes.)
2. For R.F. and I.F. measurements connect negative terminal of a 3 volt battery (two 1½ volt cells in series) to A.V.C. lead and positive terminal to B—. This provides a definite operating point. **IMPORTANT:** Disconnect battery when measuring audio stage gains.
3. Be sure radio is carefully tuned to generator signal (use weak signal for sharp tuning.)
4. When using a "channel" type instrument carefully tune it for maximum output at desired frequency before making measurements.

The R.F. and I.F. stage gains shown below are less than under normal operating conditions due to the use of 3 volts fixed bias in order to establish a definite operating point. Therefore, these values are not intended to indicate the full capability of a stage.



Differences in tube characteristics, tolerance of parts, adjustment of tuned circuits, and variations of line voltage will influence stage gain. Accuracy of measurements is dependent upon careful tuning of receiver to generator signal and experience in using your test equipment. These factors may create considerable variation in gain measurements.



**PARTS LIST**

| DIA-GRAM PART NO. | DESCRIPTION  | LIST PRICE | DIA-GRAM PART NO. | DESCRIPTION                               | LIST PRICE |
|-------------------|--|------------|-------------------|---|------------|
| 3                 | Condenser-trimmer; 25 to 100 Mmfd. . . \$  |            | 4                 | Coil—antenna coupling . . . . .           |            |
| 3A-SB-5C          | Condenser-variable gang (with drum) . . .  |            | 5                 | Coil—B.C. R.F. . . . .                    |            |
| 9                 | Condenser—315 Mmfd. 500 volt . . . . .   |            | 16                | Coil—B.C. oscillator . . . . .            |            |
| 11                | Condenser—mica—50 Mmfd. 500 volt . . . .   |            | 17                | Coil—S.W. oscillator . . . . .            |            |
| 12                | Condenser—1 Mid. 200 volt . . . . .  |            | 20                | Transformer—1st I.F. . . . .              |            |
| 13                | Condenser—2 Mid. 200 volt . . . . .  |            | 23                | Transformer—2nd I.F. . . . .              |            |
| 14                | Condenser-trimmer; 25 to 100 Mmfd. . . .   |            | 41                | Transformer—output for R-500616 spkr. . . |            |
| 18                | Condenser—25 Mfd. 200 volt . . . . .   |            | 502306            | Transformer—output for A-500616 spkr. . . |            |
| 26                | Condenser—.008 Mid. 400 volt . . . . .   |            |                   |   |            |
| 27                | Condenser—.002 Mid. 400 volt . . . . .   |            |                   |   |            |
| 28                | Condenser-mica—110 Mmfd. 500 volt . . . .  |            |                   |   |            |
| 32                | Condenser-mica—110 Mmfd. 500 volt . . . .  |            |                   |   |            |
| 33                | Condenser—.03 Mid. 200 volt . . . . .  |            |                   |   |            |
| 34                | Condenser—.04 Mid. 400 volt . . . . .  |            |                   |   |            |
| 39                | Condenser—.01 Mfd. 400 volt . . . . .  |            |                   |   |            |
| 40A-40B           | Condenser—electrolytic<br>A-40 Mid. 150 volt<br>B-20 Mid. 150 volt<br>Condenser—.02 Mid. 400 volt<br>Condenser—.05 Mid. 400 volt . . . . . |            |                   |   |            |
| 43                |  |            |                   |   |            |
| 46                |  |            |                   |   |            |
| 6                 | Resistor—carbon 390 ohms 1/4 watt . . . . .  |            |                   |   |            |
| 10                | Resistor—carbon 22,000 ohms 1/4 watt . . . .   |            |                   |   |            |
| 15                | Resistor—carbon 220,000 ohms 1/4 watt . . . .  |            |                   |   |            |
| 19                | Resistor—carbon 4700 ohms 1/4 watt . . . . .   |            |                   |   |            |
| 21                | Resistor—carbon 3.3 Meg. 1/4 watt . . . . .  |            |                   |   |            |
| 22                | Resistor—carbon 47 ohms 1/4 watt . . . . .   |            |                   |   |            |
| 24                | Resistor—carbon 47,000 ohms 1/4 watt . . . .   |            |                   |   |            |
| 25A-25B           | Volume control 500,000 ohms (with switch)  |            |                   |   |            |
| 29                | Resistor—carbon 10 Meg. 1/4 watt . . . . .   |            |                   |   |            |
| 30                | Resistor—carbon 220 ohms 1/4 watt . . . . .  |            |                   |   |            |
| 31                | Resistor—carbon 2.2 Meg. 1/4 watt . . . . .  |            |                   |   |            |
| 35-36             | Resistor—carbon 220,000 ohms 1/4 watt . . . .  |            |                   |   |            |
| 37                | Resistor—carbon 470,000 ohms 1/4 watt . . . .  |            |                   |   |            |
| 38                | Resistor—carbon 130 ohms 1/4 watt . . . . .  |            |                   |   |            |
| 42                | Resistor—carbon 1500 ohms 1 watt . . . . .   |            |                   |   |            |
| 44                | Resistor—carbon 33 ohms 1/2 watt . . . . .   |            |                   |   |            |
| 48                |  |            |                   |   |            |
| 1                 | Loop antenna . . . . .   |            |                   |   |            |
| 2                 | Coil—S. W. antenna . . . . .   |            |                   |   |            |

**CONDENSERS**

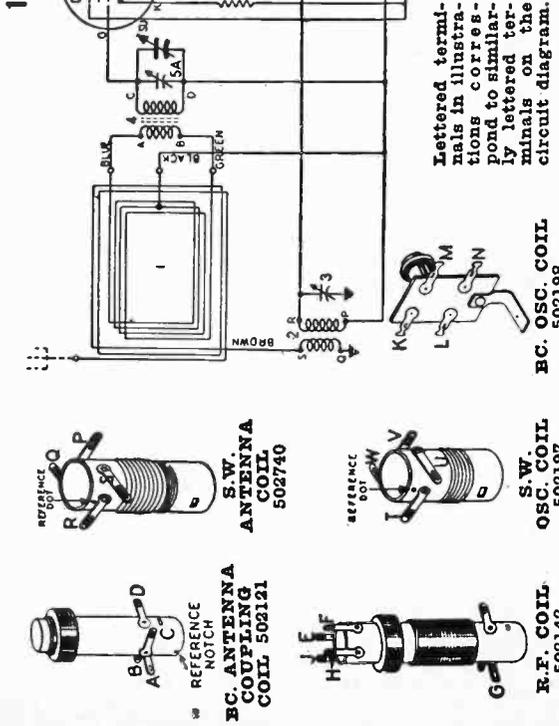
- Condenser-trimmer; 25 to 100 Mmfd. . . \$
- Condenser-variable gang (with drum) . . .
- Condenser—315 Mmfd. 500 volt . . . . .
- Condenser—mica—50 Mmfd. 500 volt . . . .
- Condenser—1 Mid. 200 volt . . . . .
- Condenser—2 Mid. 200 volt . . . . .
- Condenser-trimmer; 25 to 100 Mmfd. . . .
- Condenser—25 Mfd. 200 volt . . . . .
- Condenser—.008 Mid. 400 volt . . . . .
- Condenser—.002 Mid. 400 volt . . . . .
- Condenser-mica—110 Mmfd. 500 volt . . . .
- Condenser-mica—110 Mmfd. 500 volt . . . .
- Condenser—.03 Mid. 200 volt . . . . .
- Condenser—.04 Mid. 400 volt . . . . .
- Condenser—.01 Mfd. 400 volt . . . . .
- Condenser—electrolytic  
A-40 Mid. 150 volt  
B-20 Mid. 150 volt  
Condenser—.02 Mid. 400 volt  
Condenser—.05 Mid. 400 volt . . . . .

**RESISTORS**

- Resistor—carbon 390 ohms 1/4 watt . . . . .
- Resistor—carbon 22,000 ohms 1/4 watt . . . .
- Resistor—carbon 220,000 ohms 1/4 watt . . . .
- Resistor—carbon 4700 ohms 1/4 watt . . . . .
- Resistor—carbon 3.3 Meg. 1/4 watt . . . . .
- Resistor—carbon 47 ohms 1/4 watt . . . . .
- Resistor—carbon 47,000 ohms 1/4 watt . . . .
- Volume control 500,000 ohms (with switch)
- Resistor—carbon 10 Meg. 1/4 watt . . . . .
- Resistor—carbon 220 ohms 1/4 watt . . . . .
- Resistor—carbon 2.2 Meg. 1/4 watt . . . . .
- Resistor—carbon 220,000 ohms 1/4 watt . . . .
- Resistor—carbon 470,000 ohms 1/4 watt . . . .
- Resistor—carbon 130 ohms 1/4 watt . . . . .
- Resistor—carbon 1500 ohms 1 watt . . . . .
- Resistor—carbon 33 ohms 1/2 watt . . . . .

**COILS & TRANSFORMERS**

- Loop antenna . . . . .
- Coil—S. W. antenna . . . . .

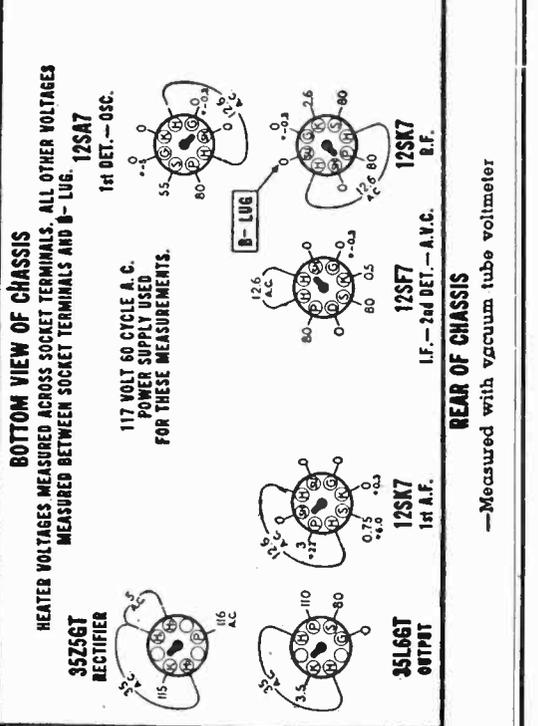


**SOCKET VOLTAGES**

Measured with voltmeter having sensitivity of 1000 ohms per volt except where indicated by (\*).

**VOLUME ON FULL WITH NO SIGNAL**

DIAL TUNED TO 540 KC.



—Measured with vacuum tube voltmeter

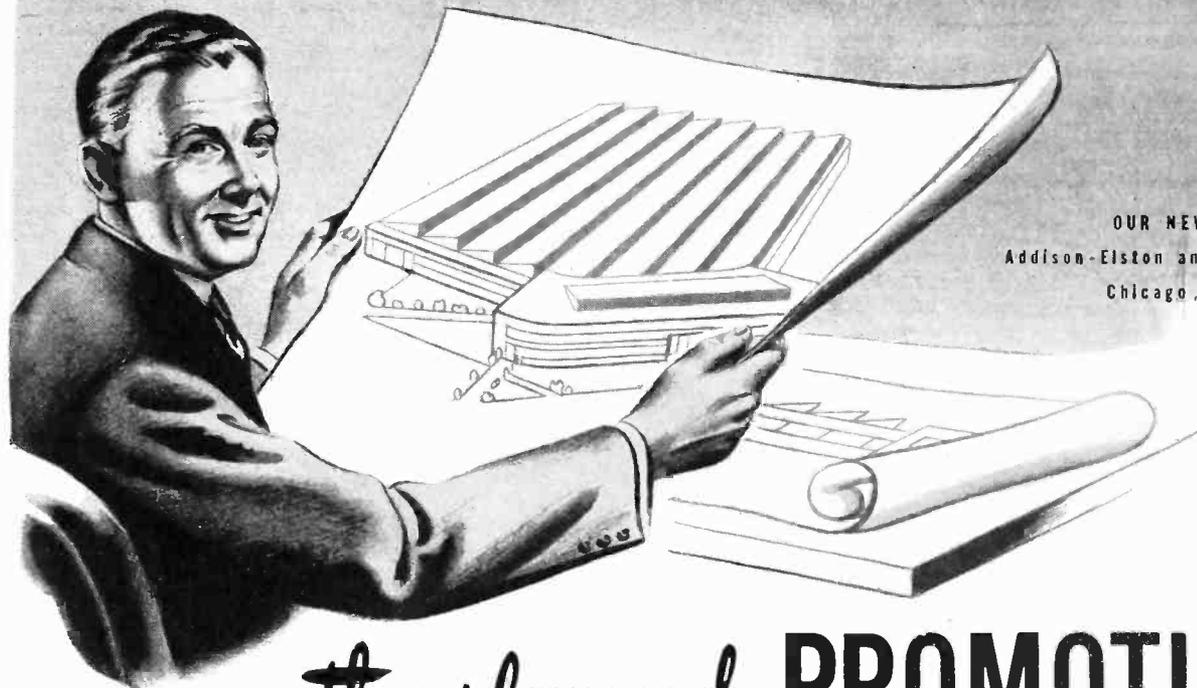
BEAR OF CHASSIS

BEAR DECK FRONT VIEW

BEAR DECK REAR VIEW

Lettered terminals in illustrations correspond to similarly lettered terminals on the circuit diagram.

*the new* **PLANT**  
*the recognized* **PRODUCTS**



OUR NEW HOME  
 Addison - Elston and Kedzie Avenues  
 Chicago, Illinois

*the planned* **PROMOTIONS**  
*that assure you of Sales Leadership*

To serve you better in 1947, we add new streamlined plant facilities. Now, more than ever, you can look to Stancor for the complete selection of Replacement and General Purpose Transformers.

Stancor's highest standard of product performance, advanced designs and universal application will continue to help you sell Stancor easily . . . So will Stancor's selling aids . . . forceful trade paper advertising, colorful window decals, counter cards, complete catalogs and attractive folders.

Yes, Stancor has the PLANT . . . the PRODUCTS . . . and the PROMOTIONS . . . to make profitable, volume selling easy for you in 1947.

**STANCOR**

STANDARD TRANSFORMER CORPORATION

1500 NORTH HALSTED STREET · CHICAGO, ILLINOIS

WINDOW DECALS

COUNTER DISPLAYS

CATALOGS

ADVERTISING



# CIRCUIT COURT

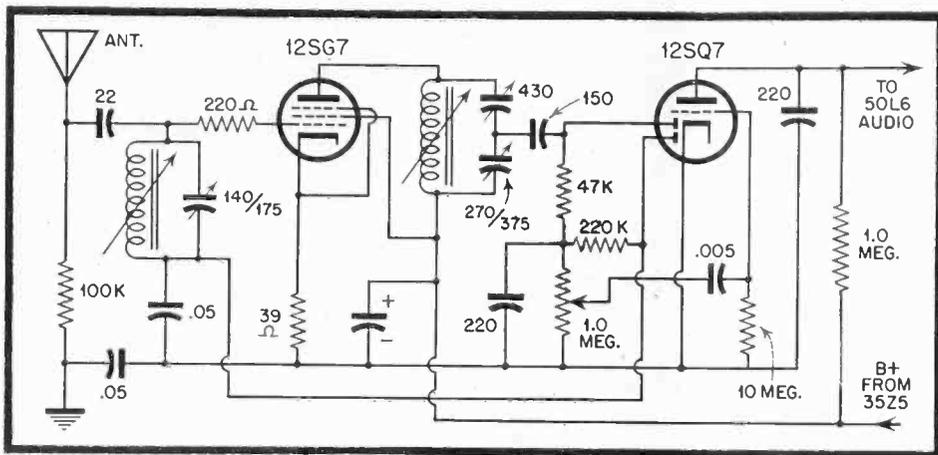


Figure 1. General Electric Model 50.

## GE MODEL 50 CLOCK RADIO

A fine example of simplicity in circuit design is evident in the new GE Model 50 Radio and Clock. A tuned RF circuit is used, with one signal frequency amplifier and diode detector. With the high gain possible in the latest type tubes and iron core coils, this circuit should provide all the sensitivity needed for the local reception which constitutes such a large percentage of the normal listening time.

In Fig. 1 is shown the RF and detector stages, along with the first AF stage. It will be noted that there is no loop, there being provision for an external antenna. Since the rated gain is only 8 from antenna to RF grid, and 50 in the RF stage to the diode plate, it is obvious that the signal needed to operate the set can be regulated by length of antenna employed.

A 22 mmfd. capacitor couples the antenna to the RF grid circuit. The iron core RF and interstage coils are tuned by sliding cores, gauged in the usual manner. It will be noted that there is a 220 ohm resistor in the grid lead of the RF tube. This is probably needed

to assure stability in the high gain RF stage which has both grid and plate circuits tuned by high O coils.

In order to match the high plate impedance of the RF stage to the low impedance of the 12SQ7 diode, there is a capacity type voltage divider across the interstage coil. The 270/375 mmfd. section also serves as the alignment adjustment. A 140/175 mmfd. trimmer is also used across the RF coil.

Rectification takes place at the top diode in the circuit, through the 47K ohm resistor and 220 mmfd. RF by-pass. The audio voltage appearing across the latter and the parallel volume control is applied to the triode section of the 12SQ7, which constitutes the first RF stage.

Note that there is an initial bias on the 12SG7 developed across a 39 ohm resistor in the cathode. No by-pass condenser is needed with such a low value resistor.

Extreme overload action is prevented by connection of the space diode plate to the RF end of the AVC bus. AVC in limited amount is developed across the volume control and applied to the RF stage.

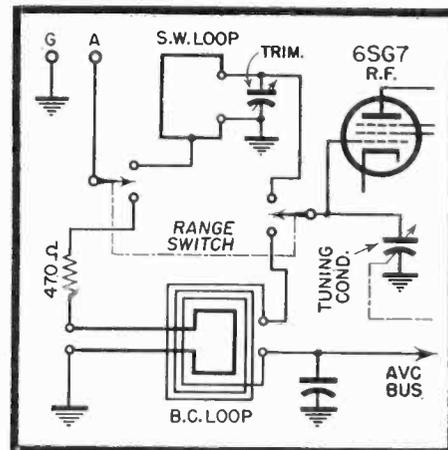


Figure 2. GE Models 326-7.

While the receiver is AC-DC, the clock is only AC so use on DC is not possible. A valuable feature of the manufacturer's service data is a whole page devoted to notes, illustrations and parts list for the clock mechanism.

## GE MODELS 326 AND 327

Several interesting details are to be found in the GE Phono-Radio combinations 326 and 327. These are seven tube, AC instruments with automatic record changers. The broadcast band and one short wave band are covered.

Rather than the more common method of using a loop for broadcast and a coil with antenna terminal for short wave, a separate loop for the latter band is employed. As shown in Fig. 2, it has a tap which is connected to the external antenna post via a section of the range switch. On broadcast, the external antenna terminal is converted to a small loop coupled to the main loop.

It should be noted that AVC voltage is applied to the RF stage on the broadcast band but the SW loop is returned to ground and the stage operated at full gain.

(See page 36)

Figure 3. Schematic of Preamplifier, GE Models 326-7.

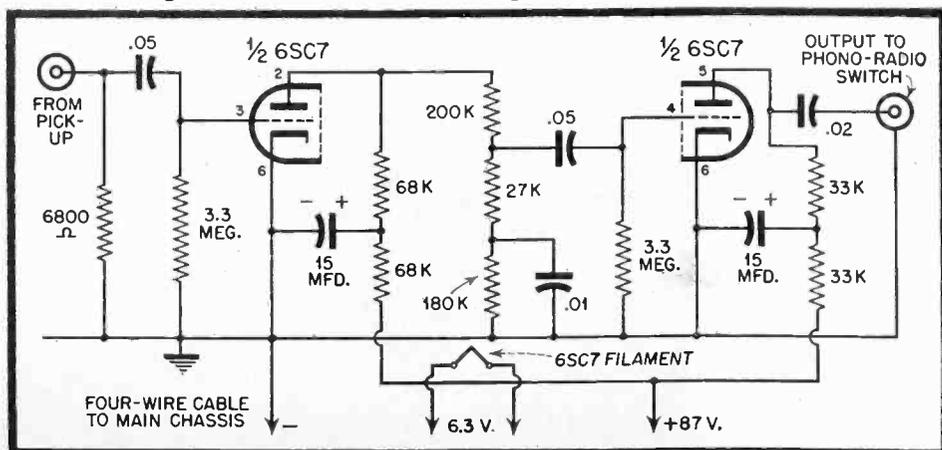
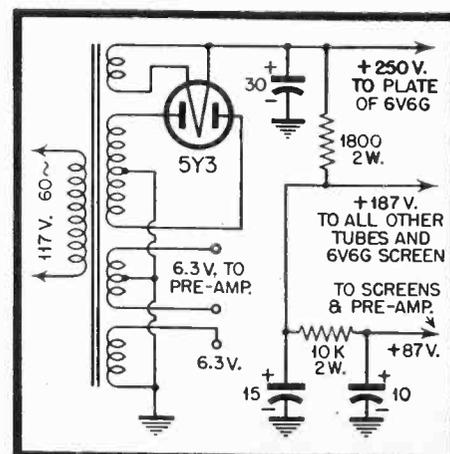


Figure 4.



# SPRAGUE TRADING POST

*is coming Back!*

## Your Own Swap, Buy or Sell Advertisement Run FREE—Send it in today!

Have you any parts or equipment you'd like to trade or sell to some other radio man who could put them to good use?

Are there any hard-to-get items you'd like to buy?

Want to get a radio job — or to hire a helper?

If so, write up your advertisement in brief form, rush it to Sprague. We'll run it **ABSOLUTELY FREE OF CHARGE** in the famous Sprague Trading Post that will start again next month in seven leading radio publications: **RADIO NEWS, RADIO CRAFT, QST, SERVICE, RADIO SERVICE DEALER, RADIO MAINTENANCE** and **RADIO & TELEVISION RETAILING.**

This famous Sprague service needs no introduction. During the war over 12,000 individual free classified advertisements were run for our friends. Everything, from parts and equipment to complete radio shops, was bought, sold and exchanged as a result.

In discontinuing The Sprague Trading Post at the close of the war, we thought there was no longer any need for it. But we were wrong! Hundreds of letters flooding in from all parts of the country tell us so. "*We need this sort of thing now as much as we ever did!*" is the gist of what our service and amateur friends say, "*Start it going again!*"

And so we're doing it! Send in your swap, buy or sell advertisement today!

Sincerely yours,

Harry Kalker  
Sales Manager

**THIS IS THE WAY YOUR  
FREE AD WILL LOOK**

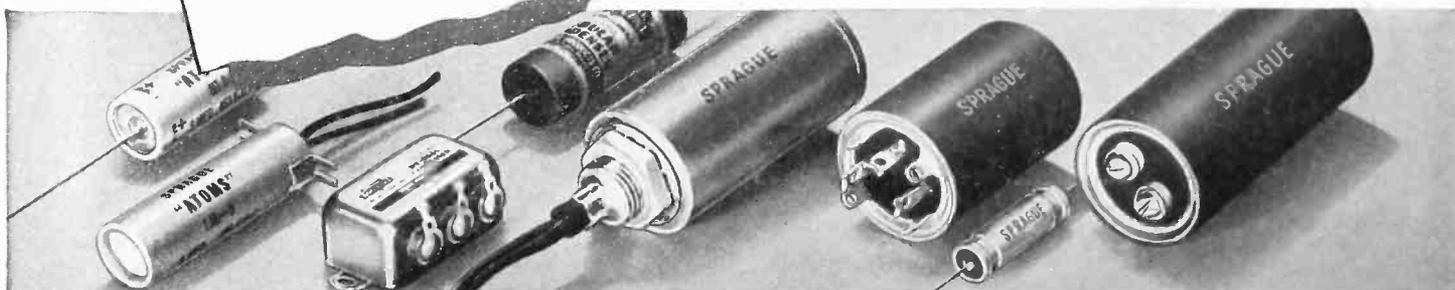
**FOR SALE** — Standard model all-wave signal generator, \$25; modern tube tester with adapters, \$27.50; popular phono motor, \$15; power transformers and other parts. Write for list. **YOUR NAME and ADDRESS HERE.**

**WANTED** — Input i-f transformer and oscillator coil assembly for Model 15 Majestic. Will pay cash or trade. What do you need? **YOUR NAME and ADDRESS HERE.**

**HELP WANTED** — Need radio service man for busy dealer store in small Midwestern city. Well equipped shop. Write giving full details of experience. **YOUR NAME and ADDRESS HERE.**

**INSTRUCTIONS:** Print or type your advertisement **CLEARLY.** Hold it to 40 words or less including name and address. Confine it to radio subjects only. **MAKE IT EASILY UNDERSTANDABLE!** No commercial advertisements are acceptable. Sprague reserves the right to reject any copy that, in our opinion, does not fit in with the spirit of this free service. Your advertisement will be run in the first possible issue of at least one of the seven magazines on our list.

**Write it now. Mail it to  
Dept. RSD-126  
SPRAGUE PRODUCTS COMPANY  
North Adams, Mass.**



**CAPACITORS AND \*KOOLOHM RESISTORS FOR EVERY RADIO SERVICE AND AMATEUR NEED**

\*Trademark Reg. U. S. Pat. Off.

# Shop Notes

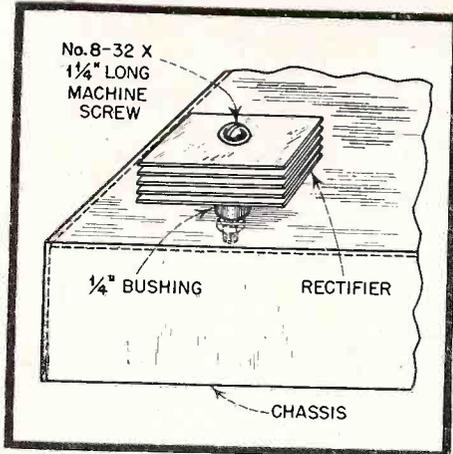


Figure 1

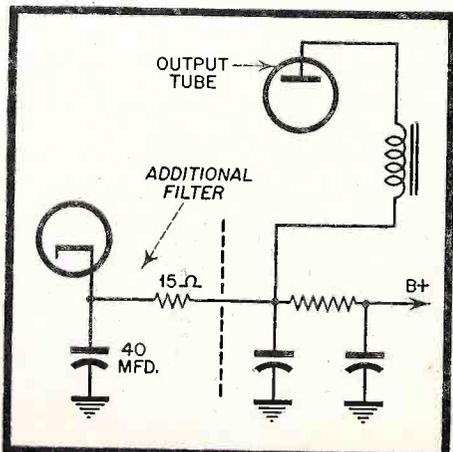
## INSTALLING SELENIUM RECTIFIERS.

The current carrying capacity and overall effectiveness of a selenium rectifier depends, to a large extent, on its operating temperature. It is important that it be mounted in a position that will ensure the maximum radiation of heat. For this reason it is recommended that it be located as far away as possible from heat radiating devices such as tubes. Furthermore, it should be mounted flat on the chassis and separated from it by a 1/4" metal bushing. See Fig. 1. In this manner the heat generated by the rectifier will be dissipated quickly by the chassis. This is in contrast with the upright mounting positions usually indicated.

## REPLACING SPEAKERS IN A.C.-D.C. RECEIVERS.

Servicemen often encounter hum when following the replacing of speakers in A.C. receivers in spite of the fact that the filter circuit components test O.K. This may be due to two reasons. First, if the speaker has been replaced with its own output transformer, the latter may not have sufficient primary induc-

Figure 2



tance to act effectively as a filter choke for the output tube, where the output tube voltage is obtained directly off the rectifier cathode. Second, some speakers respond more readily to the lower frequencies than others. The remedy for this condition is to install an additional filter consisting of a 15 ohm resistor and a 40 mfd. condenser as shown in Fig. 2.

## AUDIO OSCILLATION—ALL RECEIVERS.

A type of audio oscillation that is particularly baffling at first occurs in many commercial receivers after tube changes have been made or during the course of testing for other troubles. This is due to feedback from the grid lead of the first audio tube into other circuits, this lead having been inadvertently shifted from its original position. A slight repositioning of this lead, or better still, enclosing it with the tube in a shield will eliminate this condition.

## CLEANING VARIABLE CONDENSER CONTACTS.

Getting into narrow spaces, such as are found in variable condensers and band switches, in order to clean the contacts and bearings with carbon tetrachloride can be greatly facilitated by cutting up a toothbrush so that one column of bristles remain. It will be found that the bristles are imbedded firmly enough to stand up under considerable pressure.

## DETUNING EFFECT OF V.T.V.M. PROBES.

When making gain measurements with a V.T.V.M. probe it should be borne in mind that some detuning will take place because of the probe capacitance. If the true gain of the stage is to be measured and compared to the manufacturer's data, it is advisable to retune the circuit under test for maximum output while the probe is connected. After

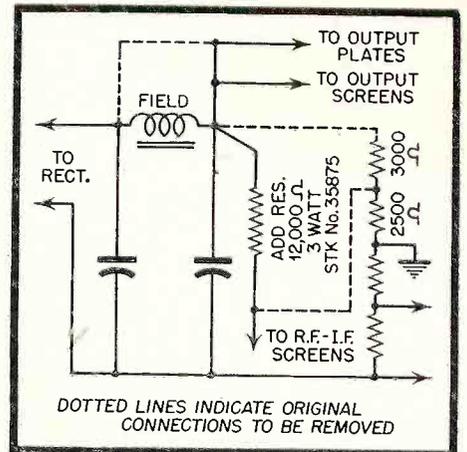


Figure 3

the measurements have been made the receiver should be realigned. The degree of retuning required will depend inversely on the detuning effect of the instrument used. So far, it has been the writer's experience that all V.T.V.M. probes affect the tuning to some extent.

## RECEIVERS WITH LOW OVERALL GAIN

Occasionally, the serviceman comes across a receiver with low overall gain despite the fact that the voltages, components and alignment test O.K. In this case a careful inspection of the coils, R.F. and I.F., for broken strands is in order. Broken strands reduce the gain of coils considerably. They may be checked easily with a good low-ohm reading instrument.

## R.C.A. MODELS U-45, K-105, V-205: BLEEDER RESISTORS.

R.C.A. suggests repairing the above receivers, where the bleeder resistor is defective, in the following manner. Refer to Fig. 3. Procedure:

(a) Disconnect leads attached to 3000 and 2500 ohm sections (leave ground connections intact).

(b) Change output stage plate supply (See page 32)

## THE COVER

Santa Claus will come into many an American home for the first time through the magic electronic waves of television this Christmas.

Here the children of E. Patrick Toal, of General Electric's receiver division, "inspect" the new G.E. model 801 direct-view set in their Westport, Conn., home. Susan and Peggy are seated on the floor, Pat Jr. is held by daddy.





UNCLE



AUNT



GRANDMA



GRANDPA



FATHER



MOTHER



BROTHER



SISTER



NEPHEW



NIECE



SON



DAUGHTER

# What one gift would please them all?

No matter what their tastes . . . their hobbies . . . their likes or dislikes . . . there's *one* gift that will please them, each and every one.

That gift is a United States Savings Bond.

This Christmas, put at least one Savings Bond under the tree for someone you love.

*Contributed by this magazine in co-operation  
with the Magazine Publishers of America as a public service.*



## SHOP NOTES

(from page 30)

from the filter input (rectifier side of speaker field +350) to the filter output (load side of speaker field, +250 volts). This can be done at the speaker plug. Leave the output stage screen lead connected to this same point.

(c) Install a 10,000 or 12,000 ohm, 2 or 3 watt resistor in series between the R.F.-I.F. screen supply lead and the filter output, being sure that the existing 16 mfd. capacitor is connected to the screen side of the resistor.

This modification slightly lowers the

reserve of power output.

### R.C.A. TRK 9-12 AND OTHER RECEIVERS.

#### Television Service Hints

R.C.A. has come through with some excellent television service suggestions which can be readily applied to other makes as well. These suggestions are herewith presented in modified form.

1. Intensely bright round spot, no deflection, cannot be dimmed by brightness control. This indicates lack of deflection

and lack of voltage across brightness control. Check low voltage power supply. If spot is permitted to remain on screen for an appreciable length of time damage will result.

2. Thin vertical line, no horizontal deflection. Check horizontal oscillator and output tubes and circuits.

3. Thin horizontal line, no vertical deflection. Check vertical oscillator and output tubes and circuit.

4. No focus; off value high voltage resistors. In ability to pass through a definite point of focus indicates incorrect voltages which may be caused by off-value resistors in the power unit or a defective Kinescope.

5. Failure to lock-in; synch trouble. If the picture will not lock-in horizontally, or vertically, change the synch tubes and check synch circuit components. Advancing the contrast control too far on a strong signal might cause the picture to "tear" out of horizontal synch.

6. No Picture—Weak Picture. If the station's sound is received, it is an indication that the oscillator and first detector are functioning. Run an R.F. sweep into the antenna and check with a CRO for overall response at the picture 2nd detector load resistor. If there is no response, check the picture, I.F. tubes and circuits. If response at the load resistor is normal, remove the sweep and feed a 10 m.c., 400 cycle modulated signal into the first detector grid. Note the amplitude of the 400 cycle signal at the load resistor, and then shift the CRO back through the video stage to localize the point at which the signal disappears.

#### MOTOROLA MODEL 250.

High-pitched, low-amplitude whistle, particularly when a strong powerful station is tuned in. Replace 600 mfd. condenser connected between grid return of 2nd I.F. transformer and the cathode of the 6Q76T. This condenser, when open, results in poor R.F. by-passing in the detector stage and causes the whistle heard.

#### G.E. MODEL H-87.

Fading and reduction in sensitivity occurring intermittently. The receiver is restored to normal operation when rotating the band switch back and forth, or applying a voltmeter to oscillator or I.F. tube during test. Replacing the .1 mfd. coupling condenser connected between the grid return of the 1st I.F. transformer and the 6SK7 will cure this trouble.

## OUR **GREATEST** ACHIEVEMENT IN 16 YEARS OF SERVICE FOR THE SERVICEMAN

Greatest...  
in  
**SERVICE**

"clarified schematics"  
and a separate  
"How It Works" Book

Greatest...  
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over 120 set  
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Greatest...  
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Nowhere will you find anything to equal Volume XV in completeness and helpfulness. Nowhere will you find the wealth of original material which means a saving of your valuable time—cash in your pocket.

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**RIDER MANUAL**  
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**JOHN F. RIDER PUBLISHER, INC.**

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## MERCHANDISE PRE-VIEWS

(from page 23)

easy to handle. It is 29 inches long, including the pulling head, and weighs 4½ pounds complete with pulling head.

For further information, write the Cherry Rivet Company, 231 Winston Street, Los Angeles 13, Calif.

### New RCA Tubes

Two new tubes—12AU7 and 35B5— are additions to the RCA Miniature Tube Family so widely used in the design of radio and television receivers.

The 12AU7—a companion to miniature series—is a small, twin-triode amplifier having characteristics which are very similar to those of the larger types 6SN7-GT and 12SN7-GT.

It utilizes a new button base with 9 pins on a circle a little larger than that of the regular miniature 7-pin button base in order to provide the required additional base-pin terminals, and a glass bulb (T-6-½) only slightly larger than that (T-5-½) used on the regular miniatures. The 12AU7, therefore, is suitable to include in miniature tube complements whenever equipment design so requires.

Like the larger 6SN7-GT and 12SN7-GT, the 12AU7 is useful in many diversified applications including mixers, oscillators, multivibrators, synchronizing amplifiers, and numerous industrial control devices. In such applications, the 12AU7 can be employed to advantage because of its compact size, its separate terminals for each cathode, its mid-tapped heater to permit operation from either a 6.3- or a 12.6-volt supply, and its economical consumption of heater power.

The miniature beam power amplifier 35B5 is for use in the output stage of ac/dc receivers. Designed with high power sensitivity and high efficiency, the 35B5 is capable of providing relatively high power output (1.5 watts) at the plate and screen voltages available in ac/dc receivers. Within its maximum ratings, the 35B5 is the performance equivalent of the larger type 35L6-GT.

For further information please address New Products Editor, RADIO SERVICE DEALER, 342 Madison Ave., New York 17, N. Y.

### Wire Stripper Kit

The insulation of any wire from size 8 to 30 can be quickly stripped with the new Speedex 733-K Stripper Kit. Its use by electricians, service men, mechanics and factory production workers has become standard practice wherever speed and neat work is essential.

The Speedex comes with seven inter-

changeable blades neatly put up in a permanent steel case small enough to be conveniently carried in a tool box. Manufactured by General Cement Manufacturing Co., 919 Taylor Avenue, Rockford, Ill.

### Capehart and Panamuse Sets

The new line of Capehart and Panamuse by Capehart phonograph-radio instruments, completely re-designed and re-engineered since the end of the war, is announced by I. C. Hunter, manager of the Capehart Sales Division, Farmworth Television & Radio Corporation,

Fort Wayne, Ind.

All models have FM as well as AM radio reception. In addition to the Capehart turn-over record changer, each instrument has plug-in sockets for connecting disc or magnetic recorders, wire or tape, and television sound amplification and reproduction. This changer also will play each record in the stack on one side only, then play the opposite sides of the records as they come up in sequence. Rejecting any record as desired, it holds from three to sixteen records, 10 and 12-inch sizes intermixed. (See page 42)



# MASCO

MARK SIMPSON MANUFACTURING CO., Inc.  
32-28 49th Street, Long Island City 3, N.Y.

SOUND SYSTEMS and Accessories



RAvenswood 8-5810-1-2-3-4

# DISCS "PAY OFF" FOR DEALERS

*Store modernization, displays, promotions among activities*



**Tropicana Record Bar, Columbus, Ohio, is branch of Clintonville Electric Co. Dealer Lloyd Hinton and manager Mike Tatum created sales-begetting interiors and details, including neon-lighted glass turntables for discs.**



## Unique Shop Interior

One of the more auspicious shop openings was that of the Tropicana Record Bar in Columbus, Ohio. The new record shop is a branch store of the Clintonville Electric Shop, owned by Mr. Lloyd Hinton. It is to be managed by Mike Tatum, who doubled in brass as designer for the shop interior.

The Tropicana Record Bar gives the impression of a beach comber's cabin complete in every detail to the weatherbeaten blue and white painted exterior debecked with fish nets, boat oars, ship's lanterns and palm trees. Gaily striped awnings form colorful decoration for the record bar and give intimacy to arrangements of bamboo, rattan, sail cloth and hemp furniture.

Lanterns, vines, rope and nautically designed fabric set the mood throughout the entire shop which is painted in the flaming pink and bright blue of the tropics.

The store is equipped for self-service of Pop records. Slot racks provide display space for 65 albums and 85 singles which are classified as Your Favorites, Continental, Pops, Best Sellers, Orchestration, For Your Collection, Classics and Semi-Classics. Two stationary display tables, one equipped with indirect lighting, give additional space for promotion of special items. A glass turntable with neon tubing underneath for demonstration of RCA Victor's Translucent Deluxe record is recessed in the counter. Four listening booths

tagged for "Classics", "Hep-cats", "Jitter-bugs" and "Recording" answer to the wants of all types of listeners. On either side of the door is a valence inscription "Through These Portals Pass the World's Most Beautifully Recorded Music".

## Open Another Ultra-Modern Store

Stephen and James Saas of Davenport, Iowa, marked their tenth anniversary by opening the second of two ultra-modern retail stores. The first of the stores is a well-established appliance shop in the down town section of Moline, Illinois. The new store in Davenport marks expansion in every line with especial emphasis on records. A two-story and basement building with a 24' x 150' footage, the greater part of the first floor is given over to display of sheet music and records. All records and albums in stock are displayed and classified in A-B-C order by artists and label to enable the customer to do his own selecting from self-service counters especially designed and built for the store. The classical music department is entirely separate from the popular.

Eight double glass booths provide the record browser with the ultimate in relaxed listening. Booths are equipped with enlarged speakers and wired so that the record player, fan and light turn on automatically when the door is closed, insuring soundproof comfort. Messrs. Saas plan to stock a complete line of musical instruments and electrical appliances as soon as they are available. The second floor of the Davenport store is given over to a piano, radio and television salon. Appliances are displayed in attractive "model" kitchens.

## Run Radio Contest

Philadelphia record dealers pegged a first rate promotion of Glenn Miller band releases on the band's appearance, at a central city theatre recently. Prior to and during theatre stint, participating dealers centered display windows with posters tying in play date with available discs.

Two local radio contests arranged by Raymond Rosen, distributors in the area pointed up the promotion. Prizes for contest winners included records autographed by band leader, Beneke, autographed pictures of the maestro and special passes to the band's theatre performance.

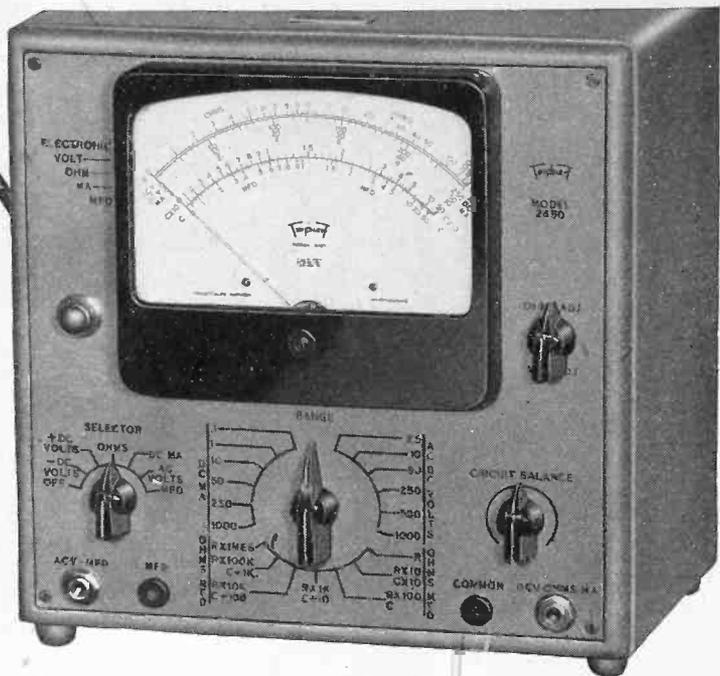
# Model 2450 ELECTRONIC TESTER

★  
**There's never been a tester like this!**

Here's a tester with dual voltage regulation of the power supply DC output (positive and negative), with line variation from 90 to 130 Volts. That means calibration that stays "on the nose"! That means *broadier service* from a tester that looks as good as the vastly improved service it provides. This model includes our Hi-Precision Resistor which outmodes older types.

**HIGHLIGHTS**—42 ranges: DC and AC. Volts: 0-2.5-10-50-250-500-1000 • DC MILLIAMPS: 0-0.1-1.0-10-50-250-1000 • OHMS: 0-1000-10,000-100,000 • MEGOHMS: 0-1-10-100-1000 • CAPACITY IN MFD: 0-.005-.05-.5-5-50 • LOAD IMPEDANCE: 51 megohms on DC Volts • CIRCUIT LOADING: Low frequencies. Circuit loading equal to 8 megohms shunted by 35 mmfd. High frequency circuit loading equal to 8 megohms shunted by 5 mmfd.

*Detailed catalog sheets on request.*



*Precision first  
...to last*

## Triplet

ELECTRICAL INSTRUMENT CO. BLUFFTON, OHIO



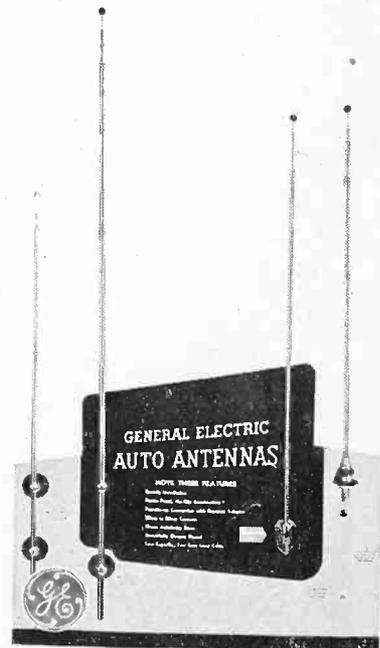
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**P**UT more mileage on your cash register with this distinctive line of auto antennas. They're a hit with the car owner every time he hits the road. Built to pull in programs clearly, they keep noise reception at a low level. Designed to fit every car, these five models are bound to pull in profits for you. It's a self-starter program with plenty of powerful sales follow through. For more information, write: *General Electric Company, Electronics Department SD-6810, Syracuse 1, New York.*



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- Ferrule-set connection with bayonet adapter.
- Rattle-proof, no-slip, fluid type construction.
- High efficiency, low resistant silver to silver contacts.
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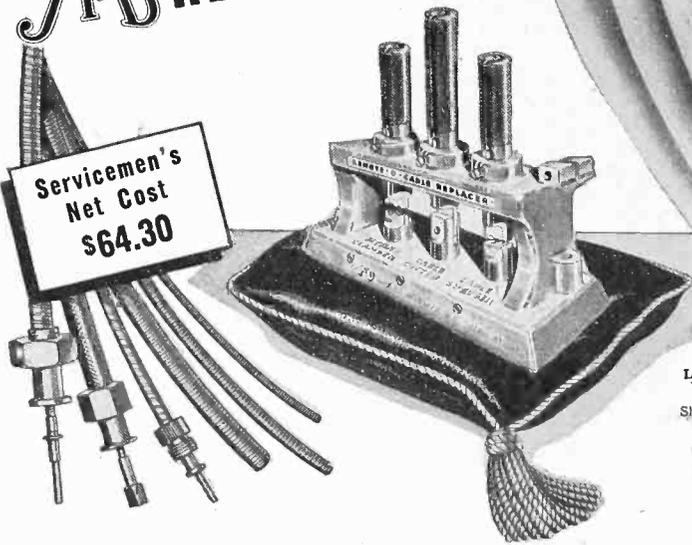
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3. REPLACES OLD FITTINGS ON NEW SHAFTING.
4. CASING GROOVE MAKES CUTTING EASY

J. F. D. MANUFACTURING CO., 4111 FT. HAMILTON PKWAY, B'KLYN, N. Y.

**CIRCUIT COURT**

(from page 28)

Another feature of the GE 326 and 327 sets is the use of a separate small chassis, for the phono pickup. The heater supply for the 6SG7, dual triode, tube is derived from a separate heater winding on the power transformer. The winding has a center tap which connects to ground, in contrast with the more common practice of grounding one side of the heater circuit. This feature provides balanced voltage to the heater and reduces hum in low level stages such as this. The schematic of the pre-amplifier is shown in Fig. 3.

A magnetic pick-up is used, resistance 250 ohms and having very low output, requires high audio gain. Actually four stages are used, two in the 6SG7 pre-amplifier and two in the 6SQ7 and 6V6GT on the main chassis.

Note the low voltage already filtered through two sections of R-C filter in the main chassis, and further smoothed by the large resistors and 15 mfd. electrolytics in the pre-Amplifier. The R-C network in the plate circuit of the first triode provides proper compensation for the pick-up characteristics.

The use of resistance-capacity filter circuits in power supply portions of small receivers, usually AC-DC types, is common practice, but GE is continuing the practice in more elaborate instruments. The values used in the Models 326-327 are shown in Fig. 4. Note high capacitor values.

**IN TRADE**

(from page 8)

parts or replacements for appliances over ten years old may not be available.

6. "Loan" appliances will be made available to service station customers should their repairs involve delay. These may be loaned to any customer regardless of the make of appliance being serviced.

While the rights of the consumer and the retailer have been protected by this service policy, those of the service stations have not been overlooked. They are assured a definite marketing area from which to draw their business. Orders for parts received at the factory will be forwarded to the local service station. Distributors will buy their parts locally too.

Factory training for service station personnel is available for a two-week period without charge, and factory field service engineers will contact them regularly to teach new service techniques and to clarify all servicing problems.

**RAYTHEON**  
 MANUFACTURING COMPANY

*Excellence in Electronics*  
 RADIO RECEIVING TUBE DIVISION  
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"...and put Raytheon tubes in my set please." That's the customer specifying "Raytheon"—a name he knows to be synonymous with quality and dependability. Stock Raytheon tubes to keep your customers happy; to keep your business growing.

## ANSWERS TO FM SERVICING PROBLEMS

(from page 21)

during this treatment, the coil should be replaced.

### Signal Interference

IF signal interference is another complaint you get on FM sets. However, it is not new to you because you have had the same experience with AM receivers. This interference is caused by a harmonic or a fundamental signal at or near the IF peak. Many of the present day sets have wave traps built in to correct this trouble. If there is a wave trap it should be adjusted until the undesired signal is eliminated. If the set has no wave trap one may be installed, or the interference may be eliminated by realigning the complete IF system and discriminator to a new peak, just far enough away from the correct one to eliminate the interference. It is best first to try a peak very little different from the original one. If this does not get rid of the interference, the frequency may be shifted just a small amount more. By trying small amounts like this the peak is not shifted from the original any more than is absolutely necessary.

### Oscillation

Oscillation in the limiter stage causes periodic squealing in the output. This trouble is sometimes caused by an open plate or screen grid by-pass condenser.

When there is squealing or oscillation it is also a good idea to check the IF secondary loading resistors, IF transformer damping resistors, for an open. A change in value of these resistors may also cause trouble. A good ohmmeter may be used to check the value, or a new resistor of the proper value may be substituted.

High resistance joints, anywhere in the set, between the shielding and the chassis may cause occasional oscillation, in extreme cases prolonged oscillation. Resoldering or tightening bolted joints of the shielding usually corrects this trouble.

Faulty by-pass condensers, especially in the plate and screen grid circuits, cause oscillation. This trouble may be located the same as if it were an AM set. The substitution method may be used, or the by-pass condensers, one at a time, may be moved slightly with an orange stick. When the faulty one is found the oscillation may be caused to start or stop at will.

### Noise and Distortion

Noise or distortion in an FM set may be caused by an open or shorted direct current blocking condenser between the limiter and the discriminator. A slight disturbance in the audio may also be noticed when a by-pass condenser

across the load resistors of the discriminator is open.

A hissing noise originating in some tube may be so great that it is annoying. This is especially true of the mixer tube. The trouble is not a set defect but a natural condition. This kind of noise can be overcome by increasing the signal strength. This can best be done by increasing the height of the antenna.

Faulty resistors, coils, tubes, conden-

sers, and other parts may produce noise in an FM set just as they do in AM receivers. But, if the faulty part is ahead of the limiter the trouble might not be noticed in the speaker because of the action of the limiter. Moreover, a disturbing voltage generated by a faulty part in the plate circuit is likely to be transmitted to the audio stages through the common plate leads. These defects may be located and repaired just as those in AM sets.

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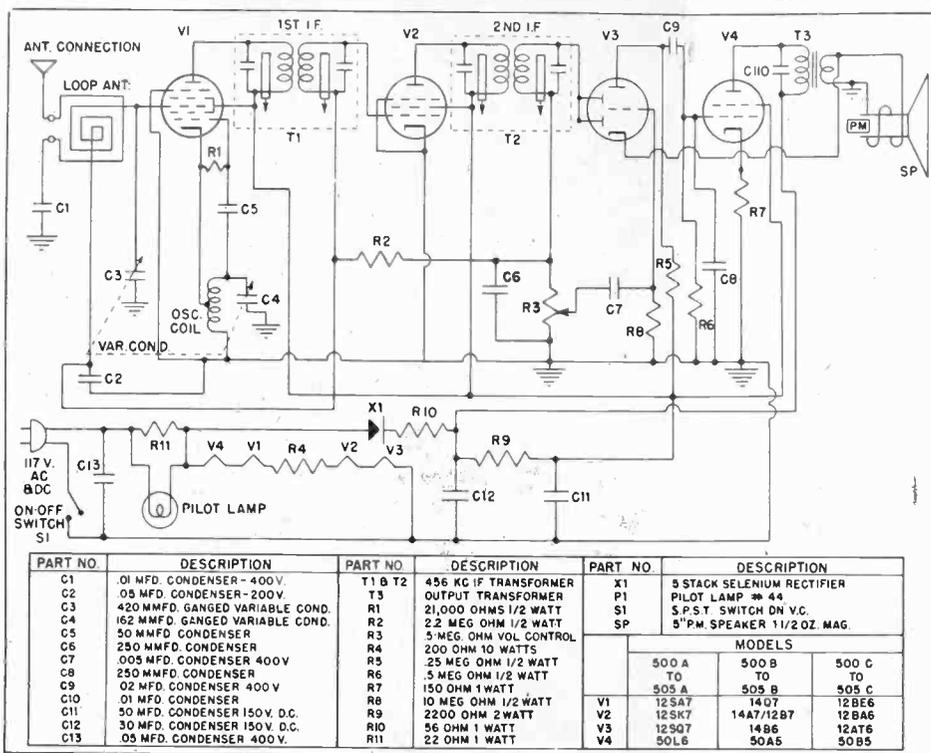
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## MODERNIZING HOME RECEIVERS

(from page 13)



Schematic of 1947 Jewel model 500, with 5-plate miniature selenium rectifier.

Step 3—(Alternatives a, b, c): Place (original pilot light circuit shorted out), a jumper between pin 2 and pin 3 (Alternative d), Place a 15 ohm, 1 watt

resistor between pin 2 and pin 3. If the light obtained is insufficient, increase this resistance to 22 ohms. Do not, in any case, use a higher-valued resistor, otherwise the pilot light will burn out.

Step 4—(Alternatives a, b, c): Solder a 220 ohm, 5 to 10 watt resistor between pins 3 and 7. (Alternative d): Solder a 200 ohm, 5 to 10 watt resistor between pins 3 and 7. This completes the replacement operation for Alternative d.

Step 5—(Alternatives a, b, c): Solder one end of the pilot light to B—. The most convenient location for this operation is the "dead" side of the "on-off" switch. Be certain that the "dead" side is used, otherwise the pilot will be "on" even when the switch is at "off."

Step 6—(Alternative a): Solder the other end of a 110-V bulb to pin 5. (Alternative b): Solder the other end of a #47 (brown bead) bulb to an 800 ohm, 15 watt resistor. Solder the other end of resistor to pin 5. (Alternative c): Solder the two #47 bulbs in series with a 775 ohm, 15 watt resistor and solder the open end of the resistor to pin 5.

The service man should experiment with these various pilot light circuits and determine which one is most suitable for his particular applications. Fig. 6 shows a typical AC-DC radio with a selenium rectifier installed.

Federal's selenium rectifier may be installed in any convenient part of the chassis. The repairman should make (See page 41)

# SILVER "VOMAX"

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Measure every type and kind of voltage in receiver design and servicing. "VOMAX" increases your efficiency and profits by equipping you to measure r.f., i.f., a.f.—actual signal volts—a.v.c., a.f.c., discriminator—a.c. and d.c. volts. Input resistance is so astronomically high you can measure directly even in the highest resistance circuits. "VOMAX" is also your output db. meter; measures direct current up thru 12 Amp. auto set range; resistance up to 2,000 megohms.

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Above: Trav-Ler 3-way portable. Schematic on page 12. Below: Jewel table model. Schematic at top of this page.



## Industrial Electronics

(from page 19)

equipment. The encephalograph is a complicated instrument, but no more complex than a modern all-wave super-heterodyne.

### Cardiograph.

This is another amplifier-recorder instrument, used for heart studies. The remarks regarding the encephalograph apply also to this instrument.

### Light Devices.

These include infra-red and ultra-violet ray lamps. Most lamps used today are of the incandescent or mercury vapor types; however some physicians employ reflector-type carbon arc lamps. Light devices are operated with or without transformers and voltage controls, depending upon their design and manufacture. They are essentially non-electronic devices and their common troubles accordingly are those encountered in ordinary controlled or uncontrolled lighting circuits.

### New Record Changer

An entirely new automatic record changer features the new Zenith radio-phonograph combination that will soon be on the market. The motor is of a new type, 80 per cent more powerful than those previously used. The added power insures constant speed, and does away with the "wows" and tone changes resulting from varying turntable speeds.

Both 10 and 12-inch records can be placed on the spindle at once. The changer has a built-in automatic pilot which adjusts the tone arm as each record drops into playing position. The tone arm is not tied into the mechanism, so accidental stopping or jamming even in the middle of a change cycle will not strip gears, throw it out of adjustment, or otherwise damage any part of the changer.

This Zenith development changes records in less than 3½ seconds. It is radionically controlled to eliminate the "drag" inherent in mechanical gears or plates. A remote control button on the radio panel starts or stops the mechanism, or rejects a record on the turntable when desired. Thus the changer mechanism can remain concealed while playing.

The Silent-Speed Changer was engineered and built to the part of the radio set, rather than a unit just "added on." It has only one spindle, is easy to load and unload.



## PICK-UP

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## Smooth Power

Not a word or a note need be missed when your record players, record-changers or recorders are equipped with *Smooth Power* motors. That's because these units are built for split-second pick-up to full constant speed.

Their quietness and freedom from vibration give smooth performance that will delight your customers. From our complete line of *Smooth Power* phonomotors, recorders and combination record-changer recorders, you can select exactly the right units to match your own fine products.



Model GI-RM4 Smooth Power Recording Motor

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In Canada: International Resistance Co., Ltd., Toronto, Licensee

## FM/AM TUNING TUBE FOR SETS AND TESTS

(from page 21)

entation makes it particularly adaptable for service as a null-indicator in bridge circuits and test equipment.

### Fluorescent Screen

In the new electron-ray tube patterns appear on a fluorescent screen located near the end of the glass bulb. This screen differs considerably from that in

indicator type electron-ray tubes used in AM receivers in the past. The 6AL7-GT employs a translucent screen, or target, consisting of a transparent disc on which the fluorescent material is deposited. The fluorescent pattern can be viewed through the screen.

The translucent-type screen enables all other tube electrodes such as heater,

cathode, deflecting plates, etc., to be behind the target and out of sight. In previous indicator-type electron-ray tubes with reflecting-type targets it has been necessary to locate cathode and deflecting plates in front of the screen, thereby making it necessary to mask out the center of the screen.

Called a unique principle in electron control, the 6AL7-GT's three deflection electrodes are adjacent to the cathode and the cathode-deflection-electrode-assembly is separated from the target by the space-charge grid. These electrodes can effectively control the position of the electron beam on the target because the velocity of the electron is low in the region between the cathode and space-charge grid.

By controlling the bias of the space-charge grid the target current and pattern brightness can be affected. Six volts negative grid bias is sufficient to black-out completely the pattern if the target voltage is less than 315 volts d-c.

### "On-Tune" Images

Original feature of the new 6AL7-GT is that the "on tune" is indicated when two halves of a pattern which appear on the screen at the end of the tubes are aligned. Deviation from the proper tuning condition on one side of resonance will raise one edge of the pattern and deviation on the other side of the resonance will lower the pattern edge.

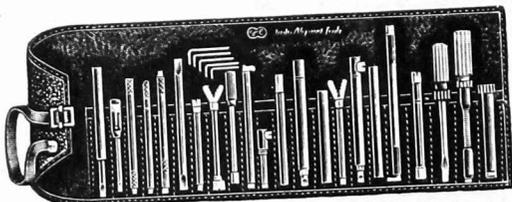
In receivers where squelch voltage is available the pattern can be made to disappear completely between stations thus providing a difference between "on tune" and "between-station" presentation.

Economical to operate since it does not require the use of additional amplifiers, the tube can also be used for AM reception simply by tying all the deflection electrodes together and applying automatic volume control voltage to these electrodes. The presentation in this case is a fluorescent band of light across the face of the tube which reaches a minimum width when the station is properly tuned in.

### U.S. Radio Supply

Mr. R. B. Lachman has recently sold his interest in the R-L Electronic Corp., Chicago, and announces the formation of his own company, U. S. Radio Supply, 5120 Harper Avenue, Chicago, distributors of radio and electronic parts. Mr. Lachman is a graduate of RCA Institute, and has been in the radio field 18 years, including 12 years in the merchandising division of Allied Radio Corp.

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



### G-C PROFESSIONAL ALIGNMENT KIT

Here's a complete Alignment and Neutralizing Kit in handy roll-type leatherette case that contains all the tools necessary to service any set — thirty finely machined tools that will save many man hours and do the job the professional way. The right tool is always at hand.

No. 5024, List Price \$19.95

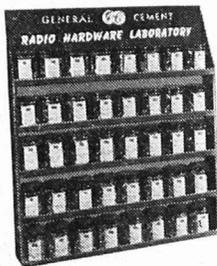
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Convenient steel rack, designed to hang on wall or stand on bench, contains over 2100 essential Electronic Hardware items: packed in 40 clear glass jars with screw caps. Ideal for laboratories, radio service shops, factories, experimental labs, home work shops, etc.

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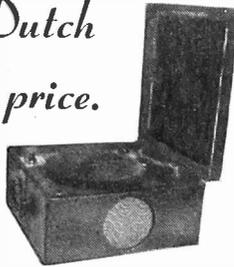
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Complete Kit Including Selenium Rectifier, 12SL7 (Twin Triode), and 2—50B5 tubes.



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The finest high fidelity portable electric player  
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3.8 Watts push-pull output  
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Operation equivalent to 5 tubes  
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Effective Volume & Tone control

#### WHAT YOU GET

Tongue-in-groove wood constructed carrying case finished in alligator leatherette  
110 volt A.C. motor and turntable  
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*All you need is two hours and a soldering iron. Drilled and punched chassis makes assembly quick and easy.*

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For ..... Music Hall Record Player Kits.

Name .....

Address .....

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## Modernize Receivers

(from page 38)

sure, however, that the plates of the rectifier do not come in contact with any of the component parts, otherwise they will short out. When installing the rectifier in the chassis it is advisable to select a cool area, preferably near the RF end of the set and away from dropping resistors. It may be fastened to the chassis by means of a #6 screw inserted through the insulated eyelet located in the center of the rectifier.

## Pictures and Sound

(from page 16)

tives of the Federal Communications Commission who were present that the transmission over the short distance had no significance. In fact, he said the Du Mont company in the near future will make a demonstration in which sound and pictures will be transmitted by light beams over a distance of more than five miles.

### 5,000,000 Times per Second

The transmitter or sending device used in the demonstration was a cathode-ray tube designed so light could be varied 5 million times a second. As the picture signals varied the intensity of this cathode-ray tube, a sensitive photo-electric cell, which acted as a receiver, picked up this energy and converted the fluctuations of light into electric signals. The received picture was no less clear than a signal that has been transmitted by radio waves. (The system is the outgrowth of an invention made by Dr. Du Mont in 1931 for which a patent was issued December 18, 1934).

The equipment demonstrated in Washington illustrated the principles of this new development, and further research promises to make the system applicable to many fields. For example, in the transmission of color television, four color channels may be independently modulated with the red signals, the blue signals, the green signals, and the sound signals for a composite simultaneous color television system. Use of filters at the receiving point allow selective separation of all these signals even though transmitted from a single sending point.

### No Ghosts

Whereas the recently announced all-electronic color television system will operate on so-called ultra high frequencies—about 500,000,000 cycles per second—the transmission of pictures and

(See page 46)



# SENSATIONAL

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## BELL Dual Speed RE-CORD-O-fone DISC RECORDER

Bell Sound lists another "over-the-counter" profit-winner for you the post-war, complete portable Recorder. you have been hoping for. LOOK AT ITS SELLING FEATURES: Records 12 minutes on a 10" disc at 33-1/3 RPM (equal to four 12" commercial records). Copies a 12" commercial record on a 10" blank at 78 RPM. One main control switches instantly for recording direct from radio or another turn-table, microphone and PA system. Immediate playback at either speed. Sloping easy-see control

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## UNIMETER

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

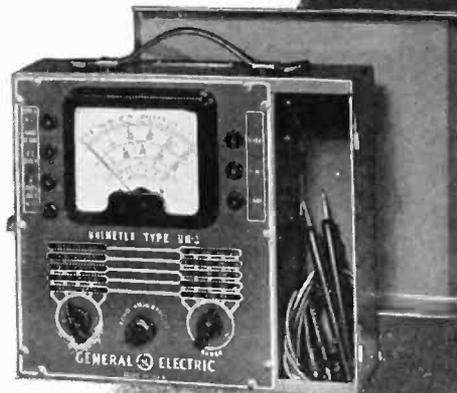
The UM-3 is designed to clearly indicate all the functions which aid in the prevention of application of high voltages when preparing for current or resistance measurements.

Other G-E units for better servicing include: CRO-5A Oscilloscope, PM-17 Electronic Voltmeter, YYW-1 High Voltage Multiplier.

For details write:

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**GENERAL ELECTRIC**

177-E3

**UM-3**

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### CRESCENT AUTOMATIC RECORD CHANGER

Simple, single control, plays ten 12" or twelve 10" records automatically. Rejects any record desired, or permits optional playing of records manually. Only three moving parts while changing. Fast... changes records in 5 seconds. Has self-starting, 78 R.P.M., 110 volt 60 cycle A.C. heavy duty motor. Finished in two-tone brown with attractive plastic trim. Requires only 5 1/4" head room and fits any cabinet with 12 1/2" x 16 1/2" changer area. **\$19.95**  
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### ALNICO V 5" P. M. SPEAKER

New Alnico V magnet provides maximum performance with minimum weight. Normal wattage 3, peak wattage 4 1/2. V.C. impedance 3.2 ohms. depth 2 7/16". **\$1.98**  
5B7009



### 9003 VHF Midget Super Control of 95c Pentode Tube

**HEAVY DUTY LINE FILTER**  
Solar Elim-O-Stat. Completely shielded. Type EN106. **\$1.79**  
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**WIRE STRIPPER**  
Strips wire instantly! Fastens to bench or other support. Wire stripped to any length. Strips wire up to 12MM diam. Each **98¢**  
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2 1/2" flange mounting type. Black dull finish bakelite case. Mtg. Hdwe. included —Large, clearly legible dial calibrations. Either **\$B4122**—0-20 M.A.D.C. or **\$B4116**—0-300 M.A.D.C. **\$3.23**  
Special

### Supreme Model 543B 1000 O. P. V.

**A Sensitive Meter**  
Has pin jack terminals, and includes the following ranges:—0/6/60/600 D.C. M. A., 0/15/150/600/3000 V. A. C. and D.C., 0/2000/200,000 ohms. This meter is convenient to carry. Weighs 28 ozs. Uses full size 3" meter with a rugged, accurate I.M.A. movement. All resistance ranges are operated by batteries furnished with the unit. Bakelite case. Size: 5 7/8" x 2 1/16" x 2 1/8". Shpg. wt. 2 lbs. **\$18.57**  
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PL-68 3-circuit plug supplied. **5B7062**

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C8154

**STANCOR Universal Output Transformer Type A3856.** Primary for all single or push-pull plates. Secondary adjustable from 1 to 30 ohms. Two-inch mounting centers. 4 watts at 35 mils. **\$1.32**  
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## Merchandise Pre-views

(from page 33)

Among the new features of the Capehart changer is a built-in play control which automatically shuts off the entire instrument after any pre-determined number of selections up to 50 have been played.

Also incorporated is a new resistance-type true timbre pickup which exerts a needle pressure of less than one ounce on records. Utilizing a proven electronic principle for the first time, the clear plastic pickup has a long life Pfanstiehl needle. The new tonal system, according to Mr. Hunter, provides superlative tone qualities never before achieved in phonograph-radios. A new and simplified tuning system has been developed, the cycle range has been increased and the electrical circuit system has been re-designed.

Samples of the new Capehart, priced from \$965 up, now are being shipped to dealers throughout the country. As in pre-war years, Capehart once again is producing phonograph-radios in a lower price bracket with the trade name Panamuse by Capehart. Built and designed by Capehart craftsmen, all models of the Panamuse have FM as well as AM radio reception and embody many of the acoustical and engineering principles used in the Capehart.

The Panamuse has a drop-type automatic record changer which holds twelve 10-inch or ten 12-inch records and shuts off the entire instrument after the last record in a stack has been played. Like the Capehart, this phonograph has the electronic true timbre pickup, exerting less than one ounce of pressure on records.

Shipments of the Panamuse by Capehart phonograph-radios, priced from \$534 to \$729, are reaching dealers in limited quantity, and the supply of these instruments will increase steadily during the next few months.

### Record Player By Audar

A portable record player which reproduces with a tonal quality comparable to that of large console-type record players, is announced by Audar, Inc., of Argos, Indiana, according to Eugene Applebaum, general manager of the firm, an affiliate of John Meck Industries of Plymouth, Indiana.

The new portable has a three-tube "Audar" amplifier with broad band bass boost, as well as a separate tone control which boosts the treble. The player also has a 6 1/2 inch dynamic speaker—unusually large for a portable set—and a special lightweight crystal pick-up, designed to reduce record wear. The inclusion of these features, in addition



## Clippard ELECTRONIC VOLT- OHMMETER, MODEL 406

Immediate Delivery

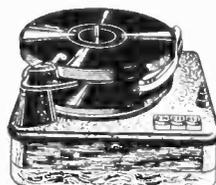
We invite comparison of this instrument with any at any price for appearance, ruggedness, accuracy, stability. 0-1 to 1,000 volts U.H.F., A.C., from jobber D.C. 0-1,000 megohms. or F.O.B. Cin. Pen-type dual diode A.C. probe. No extras to buy. Send for details or order today.

**\$89.50**

CLIPPARD INSTRUMENT LAB., Inc.  
1129 Bank St., Dept. 2, Cincinnati 14, Ohio

## R-L SPECIALS for IMMEDIATE delivery

### WIRELESS PHONOGRAPH WITH AUTOMATIC RECORD CHANGER



No wires to connect. Just plug in and play through radio. 45 minutes of uninterrupted plays of 10 or 12 inch records without reloading. For 110V. 60 cycle operation. Complete with open type walnut veneer cabinet.

Shipping weight 14 1/2 lbs. B6200

Net. each - **\$27.06**

### HAND WOUND PORTABLE PHONOGRAPH

Battery operated amplifier, hand-wind motor. No electric current necessary. Excellent for use at beach, picnic, porch, or wherever electric current is not available. Attractive two-tone leatherette covered case. Size. 14 1/2" x 15 1/2" x 8". Uses Burgess battery pack #6TA60..

B6202 Net - **\$28.44**

#6TA60 Battery Pack - **\$ 3.60**

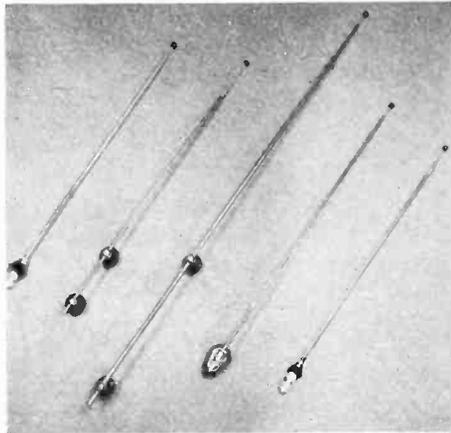


Write for FREE Parts Catalog



731 West Washington Boulevard  
DEPT. S CHICAGO 6, ILLINOIS

to a constant-speed electric phonograph motor, results in extremely smooth record reproduction which completely eliminates the rasping tone and interference common to sets of this type. The carrying-case is constructed of leatherette, and has a lid which may be kept closed while 10-or 12-inch records are being played. This model, designated as Model P-1, operates on 60-cycle alternating current, and is 115 volt.



### G. E. Auto Radio Antennas

A new line of radio antennas for all types of mounting in motor vehicles has been announced by the Specialty Division of the General Electric Company's Electronics Department at Syracuse. Designed for every type of installation and available in sizes ranging from 56 to 100 inches, the new antennas eliminate electrical interference by the use of radar-type shielded leads and connections, according to R. S. Fenton, in charge of sales for the component and universal parts section of the Specialty Division. Angular adjustment and the quickly connected, detachable leads—ferrule tipped with bayonet adaptor—will aid the flexibility and ease of installations of the new antennas, he adds.

The new antennas are made of admiralty brass and chrome plated. They are mounted with ceramic chrome-trimmed stanchions. Silver-to-silver contacts which prevent static due to weather exposed units and poor electrical connections is another feature of the antennas. Further information, including a specifications sheet of the new antennas, is available on request to the Specialty Division, Wolf St. Plant, Syracuse, N. Y.

### Portable Battery Phono

A battery-operated, electrically amplified, portable phonograph (TRELA HW-301,) is offered by Sonata Electronics Corp., 624 South Michigan, Chicago. The model is hand-wound by means of a special disk and plays two records with one winding. Cased in luggage-type cabinet, covered in leatherette, with sturdy handle.

## Automatic Combinations-NOW!

### The New Arnold Shure Automatic Wired Record Player ready for immediate delivery

The Shure automatic record player connects easily to any radio. Its featherweight crystal pickup and quiet, smooth changer action assure high quality playing of ten 12" records or twelve 10" records. Every one of your customers can now own a fine automatic combination at a remarkably low cost.



Shure players are shipped complete with A.C. cord and shielded cable—only 2 wires to connect and it's ready to play.

**Your price only \$21.92 net.**

F.O.B. Chicago, Illinois

OPA Retail Price \$31.30 Zone 1  
OPA Retail Price 33.87 Zone 2

Orders are now being accepted for immediate delivery—no waiting. Terms: 2% check with order. Or 25% deposit, balance express C.O.D.

#### PHONO AMPLIFIERS

1-Tube Phono. Amplifier.....\$2.35 ea.  
3-Tube Phono. Amplifier..... 4.50 ea.

#### PM SPEAKERS

4" Alnico (5) PM Speaker.....\$1.39 ea.  
5" Alnico (5) PM Speaker..... 1.49 ea.  
6" Alnico (5) PM Speaker..... 1.89 ea.

#### TUBULAR ELECTROLYTICS

|                           |                            |
|---------------------------|----------------------------|
| 100-MFD-25 V...\$ .22 ea. | 10-MFD-450 V...\$ .29 ea.  |
| 10-MFD-50 V... .22 ea.    | 16-MFD-450 V... .39 ea.    |
| 20-MFD-150 V... .22 ea.   | 10-10-MFD-450 V... .59 ea. |
| 30-MFD-150 V... .29 ea.   | 20-20-MFD-150 V... .29 ea. |
| 40-MFD-150 V... .39 ea.   | 30-20-MFD-150 V... .39 ea. |
| 50-MFD-150 V... .45 ea.   | 40-30-MFD-150 V... .45 ea. |
| 8-MFD-450 V... .25 ea.    | 50-30-MFD-150 V... .59 ea. |

**HOLLANDER RADIO SUPPLY CO.**  
549 West Randolph Street Chicago 6, Illinois

**SpeedWay**

No. 69 1/4" Drill \$1.80

No. 89 1/2" Drill \$2.95

Each month, more SpeedWay Drills come off the production line; are being shipped each day. But, frankly, though we are beginning to cut into our mountainous pile of back orders, there's a deal of waiting still for a lot of people who are ordering SpeedWay Tools today. However, because they are worth waiting for, we suggest that you place your order now with your local SpeedWay dealer for earliest possible delivery.

**SPEEDWAY MFG. CO.**  
1874 S. 52nd Ave.  
Chicago 50, Ill.  
No. 89 equipped with Snap-Release Chuck  
No. 89-J with Jacob Chuck  
(as illustrated) \$5.00 extra

# -LAKE- Amplifying Systems

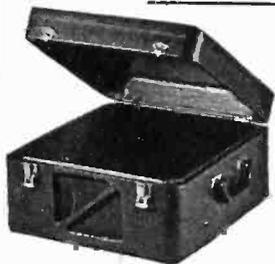


Excellent designed, compact amplifiers, ideal for students, professional entertainers, homes, factories, schools, etc. Perfect for voice, musical instruments, pickups and contact microphones; clear, rich tone; heavy plywood in luxurious leatherette-covered, streamlined portable cabinets.

As listed below:

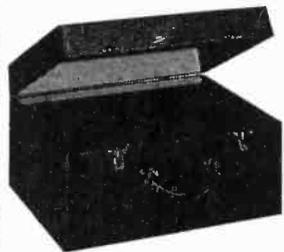
| No.   | Watts | Inputs | List     | Your Cost |
|-------|-------|--------|----------|-----------|
| A16   | 16    | 4      | \$110.00 | \$64.68   |
| A15   | 15    | 3      | 97.50    | 52.86     |
| A12   | 12    | 2      | 87.50    | 51.45     |
| A 8   | 8     | 3      | 87.50    | 44.10     |
| A 6   | 6     | 2      | 75.00    | 35.28     |
| A 5   | 5     | 2      | 60.00    | 44.10     |
| ACDC  | 8     | 3      | 75.00    | 44.10     |
| Model |       |        |          |           |

Hawaiian Electric Guitar—Beautiful black plastic, trimmed with chrome, 23" scale, 4½ octaves of playing range. List—\$50. Your Cost—\$29.40



## DeLuxe PHONO CABINET

Covered in luxurious, genuine brown leatherette, has deluxe brass hardware throughout, made completely of plywood with brown plastic handle, has padded top and bottom. Motor board 14" x 14½". Overall dimensions 16" L. x 15" W. x 8" H. Your net price..... **\$8.95**



Portable Phono-graph Case of sturdy durable plywood, in handsome brown leatherette finish. Inside dimension 16½" long, 14" wide, 9½" high. Has blank motor board. As illustrated. Specially priced at **\$6.95**

Also blank table cabinets of walnut veneer in the following sizes, with speaker opening on left front side: (\*Note: \*7 has center speaker grill.)

|           |         |         |          |
|-----------|---------|---------|----------|
| #1 —8¼"   | L x 5½" | H x 4"  | D \$1.95 |
| #2 —10¼"  | L x 6¾" | H x 5"  | D \$2.75 |
| #3 —13¼"  | L x 7¾" | H x 6¼" | D \$3.25 |
| #7* —10¾" | L x 7"  | H x 5½" | D \$2.50 |

\*Speaker Opening in center of front side.  
All types of radio cabinets and parts are available at Lake's Lower prices. A large stock is listed in our catalog.

## SERVICEMEN and RETAILERS

Write today for our new, illustrated 16-page catalog NR-116. It's free. Get on our mailing list! Write for our special catalog on microphones, amplifiers and sound equipment.

Order from LAKE!  
You'll make no mistake!

Dept. E

**Lake Radio Sales Co.**  
615 W. Randolph Street  
Chicago 6, Ill.

## MISCELLANEOUS

### G-E Ups Park

George B. Park, assistant advertising manager of the General Electric Company's Appliance & Merchandise Department, has been appointed manager of the department's new public relations section, it has been announced by H. L. Andrews, vice president. Mr. Park continues in the advertising position to which he was appointed last year.

### Prepare For Television

Effects of television on construction of future buildings and the preparations necessary for the installation of television in present residences were described to members of the Building Owners and Managers Association of Philadelphia by Dan D. Halpin, RCA Victor Television Receiver Sales Mgr., at a meeting in the Architects Building.

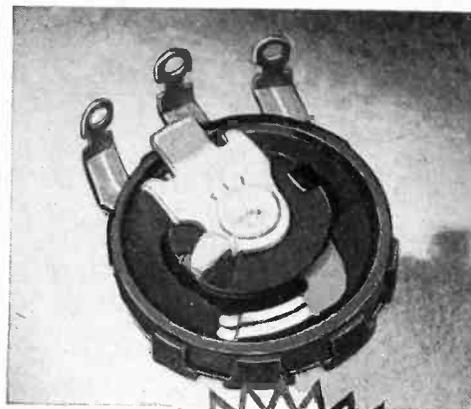
He described RCA Victor's Antenna-plex System, initially installed in the Hotel Pennsylvania and the Hotel New Yorker, New York, as the ideal solution to the problem of multiple dwelling antenna systems for television and FM. This system consists of a sensitive master receiving antenna or series of antenna, so placed as to receive all the programs serving the area. Through a series of distribution boxes, the broadcasts are fed through a single wire to as many outlets as the building owner desires, the various outlets being placed in the separate dwelling units.

Four types of antenna were described and demonstrated by Mr. Halpin during the course of his talk: standard dipole, folded dipole, improved ribbon-line folded dipole, and dipole and reflector.

### Operadio Appoints

Appointment of Fred D. Wilson as general sales manager of Operadio Manufacturing Co. has just been announced by J. McWilliams Stone, president. Mr. Wilson has been associated with the firm for several years, in charge of jobber sales. He has had a broad background of sales experience in nation-wide distribution, and last year, by arrangement with Westinghouse Electric Supply Co., added approximately 100 branches of that company to the list of Operadio distributors. An intensified sales training program to insure an expanded national market is being planned.

Operadio produces loudspeakers for the radio industry, and also markets, through its distributors, the Flexifone intercommunication systems; public address speakers and amplifiers; Plant



Here's the  
**INSIDE  
STORY**

★ Try a Clarostat volume control. You'll be amazed. Here's a replacement control that's got everything—fine performance, dependability, longest life, because:

Time-tested and proven stabilized element. Accurate initial resistance values maintained over long service life. Extreme immunity to humidity, temperature, wear, age.

Resistance element is self-lubricated. Smoothest operation. Special alloy contact.

Dual-finger, ball-point contact arm. Positive contact. Minimized noise level.

Tinned terminals. Solder cannot get inside casing to cause trouble. Protective metal cap. Bakelite casing provides highest leakage resistance.

Again we say, try a Clarostat volume control. Our local jobber has a copy of the latest Clarostat catalog waiting for you. Or write us.



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

### ADDRESS CHANGES—

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

RSD Circulation Dept.

**Cowan Publishing Co.**

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



• Now available in aluminum-can construction—the postwar Aerovox Type PRVC cleat-mounting universal replacement electrolytic. Readily doubles for twist-prong, spade-lug and screw-base types. Insulated positive and negative wire leads. Multiple sections have concentrically-wound sections with common negative. In all popular voltages and capacitances.

• Ask Our Jobber . . .

Ask for Aerovox Type PRVC metal-can cleat-mounting electrolytics. Keep a stock on hand for your rush jobs. Ask for postwar catalog. Or write us.



**FOR RADIO-ELECTRONIC AND INDUSTRIAL APPLICATIONS**

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Export: 13 E. 40th St., New York 16, N. Y. • Cable: 'ARLAB'  
In Canada: AEROVOX CANADA LTD., Hamilton, Ont.

**\$1.00 PAID FOR SHOP NOTES**

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

Broadcaster or factory-paging equipment; and the Explainette sound-slide film projectors.

**Tapes and Splicing Compounds**

A new catalog section on its lines of rubber tapes and splicing compounds has just been published by The B. F. Goodrich Company, Akron, Ohio, and is now available upon request.

Featured is the Two-In-One tape, which weatherseals wire or cable splices in one operation in less than half the time needed for the combined use of friction tape and splicing compound. A single layer provides adequate insulation for lines carrying up to 220 volts, a double layer on lines up to 650 volts. The catalog section outlines other advantages of the product.

**Masco Manager**

Sherman K. Hughes has been appointed general manager of the Mark Simpson Manufacturing Co., Inc., Long Island City, N. Y., New York manufacturers of MASCO Sound Systems.

For many years Mr. Hughes has been associated with the Jensen Manufacturing Co., Chicago, Illinois. The length of his experience, the scope of his operations, the prestige of his reputation and the vast number of his friendships in the field indicate his standing in the industry.

**Masco Price Policy**

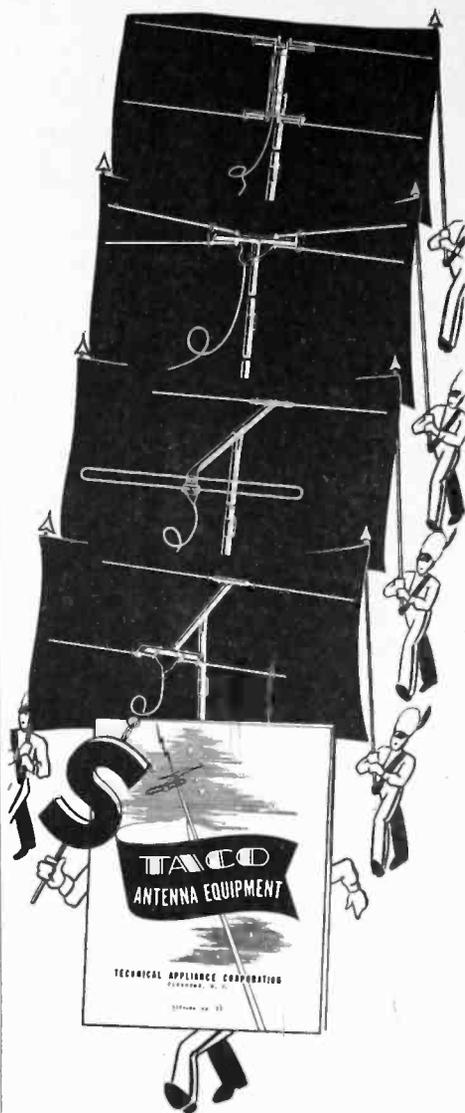
We do not contemplate any change now or in the near future, of any prices on our products, although most of our items have been decontrolled by the Office of Price Administration, state executives of Mark Simpson Manufacturing Co., Inc., Long Island City, N.Y.

The permanence of this policy will be contingent upon the cooperation we receive from our suppliers. We trust they too, will concur with our desire to maintain current prices.

**Video Sets in New Orleans**

The display of a new Farnsworth table model television receiver created great interest at the recent New Orleans Home Appliance Show held there in Municipal Auditorium. Even though the city does not yet have a video station, thousands of persons asked about the operation of the set and how soon it could be purchased.

Visitors also showed considerable interest in new FM receivers. Demand for these sets has accelerated greatly since the recent opening of two FM stations in the city. The new television receiver, radios and phonograph-radios models were displayed at the show by the Interstate Electric Company, local distributor of Farnsworth products.



**More Installations . . .**

**More Sales Dollars . . .**

**More Profits . . .**

★ Those new sets—AM, FM, TELEVISION . . . are no better than the antenna equipment used. Former make-shift jobs simply won't do. Set owners expect, demand and will pay for superlative performance.

And that's where TACO antenna equipment comes in. There's a type for every kind of receiver. Also the TACO Master Antenna System for apartment houses, hotels, hospitals, etc.

**★ Ask Your Jobber . . .**

If you want to make more money, ask your jobber for the latest TACO catalog. Or write us direct. Start handling and installing TACO antenna equipment today—for the best in reception—for better business.



# LOOK AHEAD



"RSD" publishes more authentic articles on new servicing methods and new test equipment than other magazines. Trouble shooting is made easier—time is saved—more jobs can be done at greater profit.

Merchandising guidance is given to Service Dealers—from the 1-man shop owner to the biggest establishment. It's important to know how other successful Service Dealers conduct their business.

Every issue of "RSD" carries Service Data on the popular new radio receivers now being manufactured. These Data Sheets fit into standard manuals—should be kept until new manuals are available—every technician wants this service!

"RSD" carries more advertising from more manufacturers catering to Service Dealers. Subscribe to "RSD" today.

**USE THIS COUPON, RETURN IT WITH YOUR MONEY-ORDER**

12 issues \$2—24 issues \$3 In U.S.A. & Canada. Elsewhere \$3 per year.

**RADIO SERVICE DEALER**  
342 Madison Ave., New York 17, N.Y.

Gentlemen: Send the next ..... issues of RADIO SERVICE DEALER for which \$..... is enclosed.

Name.....

Address.....

City.....

Zone..... State.....

Firm Employed By:.....

Position or Title.....

## Dealer's Service "Deal"

(from page 24)

ers. In addition they sell Bendix, Thor, One Minute, and ABC Washers. Philco, Zenith, RCA Victor and Motorola Radios are stocked. Also, they handle Coroaire Heaters, Sperti Sunlamps, Broilmaster Cooking Units, Gladiron and Ironrite Mangles, Polar Cub Electric Hair Dryers, and Spartan and Fresh'n'd Aire Electric Fans.

The Robinson store is about 115 feet by 40 feet. It is the first of its kind in the city to have satin-finish aluminum background for its outside sign. The large flashy sign over the door attracts many eyes during the day and night. The letters, bolted onto it, stand out boldly. The building in which the store is located formerly was occupied by a unit of a local drug chain. Vacant for three years before Robinson's took it over, the management found it necessary to do quite a bit of cleaning up before opening.

They are preparing for the future when they expect to have a sales force by fixing up their store now to make it more attractive to that organization. Recently, in the basement Mr. Henry installed a locker room with a shower. Upstairs they are going to install an all-electric kitchen in their showroom. It will be 12 feet by 6 feet and contain a G. E. Salvage Disposall and Dishwasher, G. E. Range, G. E. Refrigerator, and G. E. Cabinets. People all the while are converting from gas to electric and the Robinson Electric Company of Columbus, Ohio is eagerly looking forward to that time when manufactured supplies will be greater to serve the greater buying masses.

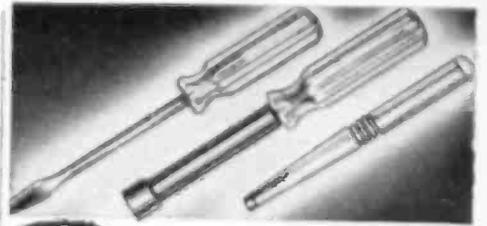
## Pictures and Sound

(from page 41)

sound on light beams would be on 600,000,000,000 cycles per second. By the use of this high intensity energy source, which is capable of modulation both in and out of the visible spectrum, there is an elimination of shadow effects or "ghost images," claims Dr. Goldsmith.

"In addition to the tremendous money saving to television broadcasters resulting from the transmission of programs on light waves instead of coaxial cable," said Dr. Goldsmith, "photovision has another marked advantage. A television image loses about 40% of its definition or sharpness when it is transmitted by coaxial cable; this loss will be very greatly reduced by the new system.

"And then think of the difference in



For

Every  
**RADIO NEED**

there's a fine

**VACO**

Shock-Proof • Break-Proof

Amberyl Plastic Handle

**SCREW DRIVER**

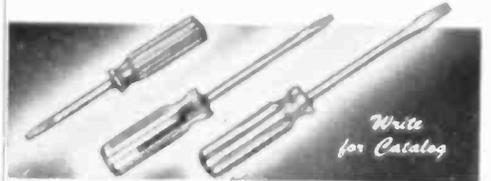
to do the job better!

**173 TYPES**

**VACO**

PRODUCTS CO.

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EQUIPMENT MADE TODAY

**AMERICA'S  
TOP QUALITY  
AMPLIFIER  
WILL GIVE  
YOU  
MORE PROFIT  
PER SALE**

A sound rule for increasing jobber profits will be sent to you upon request. Write for free booklet.



2815 So. Hill Street, Dept. D  
Los Angeles 7, California

the relative costs of the two systems. The coaxial between New York and Washington cost millions to install; a series of relay stations between the two cities for the transmission of pictures and sound over light beams would not exceed \$30,000."

### Fog No Obstacle

While photovision will not work satisfactorily in fog, the audience was told, this was a shortcoming that was to be deemed but a temporary obstacle. Dr. Goldsmith said that by the application of certain developments yet in the laboratory stage, the problem would be overcome.

Another possibility inherent in the new system, Dr. Goldsmith claims, is a method of transmitting television programs from a central transmitter to motion picture theaters for showing on heater television screens. This could be one in complete secrecy, that is, no other person could take the program off the air.

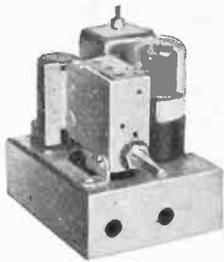
Of interest to the audience was the question posed as to whether the transmission of pictures and sound over light beams comes within the jurisdiction of the Federal Communications Commission. "The Communications Act of 1934, as amended," said Dr. Goldsmith, "seemingly provides for jurisdiction of communication by wire or radio. Transmission over light beams is neither of these, of course, any more than is the transmission of intelligence by heliograph where visible light beams are used." Whether or not photovision came within the purview of the act is unimportant, he said; the point was only of interest in that the framers of the law could not have foreseen the use of light beams for communications.

In addition to Dr. Allen B. Du Mont, inventor of photovision, the following persons connected with the Du Mont company have contributed to its development: Dr. T. T. Goldsmith, director of research; Rudolf Feldt, electronic engineer; Karl Berkley, photologist; Stanley Koch, tube engineer; T. Rutherford, tube engineer; A. Steadman, chemist.

### New Antenna Data

Antenna systems properly geared to new and old radio sets alike, as well as to those FM, facsimile and television receivers now beginning to appear on the post-war market, are included in Taco catalog No. 27 just released by Technical Appliance Corp., 46-06 De Long Street, Flushing, N. Y. The catalog describes, illustrates and lists various noise-reducing and multiple antenna systems, a new store-demonstrating antenna system, transmission lines, couplers, and a variety of dipoles, thereby covering the entire known range of reception needs. A copy of the catalog may be had on request.

## — SET BUILDERS — TWO-TUBE SUPERHET KIT



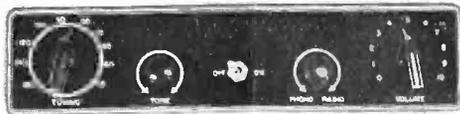
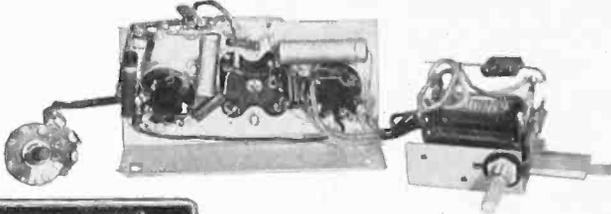
Upright model

Completely wired ready to connect into any AC-DC or 6 volt filament with 125 V or more B supply—plate current drains—2 mls.

High gain and selectivity—plays with 6 ft. of wire—excellent for PA systems, radio tuners and for making combination kits for set builders—tunes police calls.

\$7.95 ea. unwired  
\$9.95 ea. wired

Laydown model where space is essential



Escutcheon plate with knobs as illustrated goes with each unit—wired or unwired.

### CONSISTS OF:

- |                                  |   |                    |
|----------------------------------|---|--------------------|
| 1 312-1 Perm. Tuners.            | 1 111-22312 1/3 W. Carb. Resistor, 22K  | 1 12SA7            |
| 1 322-2 I.F. Coils               | 1 111-33512 1/3 W. Carb. Resistor, 3.3M | 1 12SQ7            |
| 1 263-5034-4 Tub. Cond. .05 mfd. | 1 111-10612 1/3 W. Carb. Resistor, 10M  | 1 Vol. Control     |
| 2 263-1034-5 Tub. Cond. .01 mfd. | 1 111-27412 1/3 W. Carb. Resistor, 270K | 1 phono switch     |
| 1 232-2515-2 Mica Cond. 250 mmf. | 2 558-1 Octal Sockets                   | 1 on-off switch    |
| 1 232-5015-4 Mica Cond. 470 mmf. | 2 727A1 Tube Shields                    | 2 knobs            |
| 1 232-5015-3 Mica Cond. 500 mmf. | 1 571-3 Tube Clips                      | 1 escutcheon plate |
|                                  | 1 Chassis                               |                    |

Quantity unlimited  
20% deposit  
with orders

### UNION Radio Corporation

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A MUST IN EVERY LAB . . .  
ON EVERY SERVICEMAN'S BENCH . . .  
IN EVERY SERVICE KIT . . .

A pocket-size

## OSCILLOSCOPE The POCKETSCOPE



- So **SMALL** in size (4" x 6 3/8" x 10")
- So **LIGHT** in weight (5 3/4 lbs.)
- So **COMPLETE** in performance
- So **INEXPENSIVE** in price
- Plus **WIDE-ANGLE VISION**: on shelf, on floor, on bench
- Plus **RETRACTABLE LIGHT SHIELD**: for increased visibility.

A 2" "pocket-size" 'scope incorporating the cathode ray tube, vertical and horizontal amplifiers, linear time base oscillator, synchronization means and self-contained power supply.

### FOR DELIVERY:

Contact your nearest jobber. If he doesn't have the POCKETSCOPE available, contact us direct.



**WATERMAN PRODUCTS CO.**  
INCORPORATED  
PHILADELPHIA 25, PENNSYLVANIA

## PREPARED ASSORTMENTS GUARANTEED FIRST QUALITY

| Cat No. | Quantity | Description  | Price  |
|---------|----------|--|--------|
| 1001    | 100      | 1/3 Watt Resistors, All Insulated...                                 | \$2.98 |
| 1002    | 100      | 1/2 Watt Resistors, All Insulated...                                 | 3.98   |
| 1003    | 100      | 1 Watt Resistors, All Insulated...                                   | 4.45   |
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| 1030    | 20       | Auto Generator Condensers  | 2.98   |
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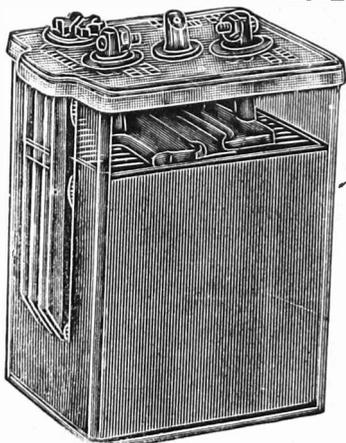
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Mr. Halpin is a past president and director of the American Television Society, a member of the Sales Executives Club of New York and the Western Universities Club, and past president of the Notre Dame Club of New York. He was graduated in 1931 from Notre Dame University, where he managed the late Knute Rockne's last national championship football team of 1930.

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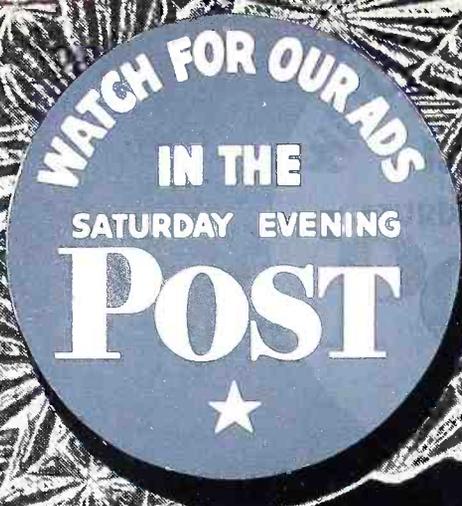
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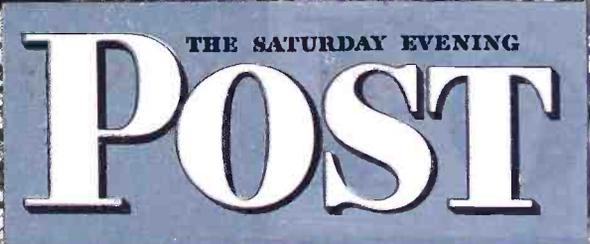




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