



Vol. 6

JANUARY, 1942

No. 1

CORNELL-DUBILIER ELECTRIC CORP.  
HAMILTON BOULEVARD  
SOUTH PLAINFIELD, N. J.

Leon Miley  
Nine East Orange St.,  
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# RADIO SERVICE HINTS

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## Practical Suggestions on Solution of Radio Servicing Problems Encountered in Actual Experience by Servicemen Everywhere

This section, conducted by our servicemen readers, will be a regular feature of the C-D Capacitor, and is intended to provide other servicemen with helpful notes on testing, locating troubles in specific models of sets, repairing them, or any other suggestions to simplify service work.

Cornell-Dubilier will pay \$2.00 for each hint published in this section. Notes must be limited to 75 words, or less. Any number of hints may be submitted at one time. Unpublished items will not be returned. Be sure to give your name and mailing address. Send hints to: Editor, C-D Capacitor, Cornell-Dubilier Electric Corp., So. Plainfield, N. J.

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### **Eliminating Interference From Ignition**

Many of the most severe cases of ignition noises in auto radio sets reported by the writer have been completely eliminated by shielding the hot wire lead from the fuse holder to the set. The shield of the lead should be well grounded to the metal case of the set.

Always make sure that the aerial lead to the set is also well shielded with braid shielding properly grounded so that there will be no chance of pick-up of impulses from the ignition system of the car.—*Clarence R. Marchbank, Galena, Mo.*

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### **Removing Cone From Speaker Frame**

One of the best solvents for removing speaker cones which are cemented to the frame is acetone. A small bottle of this liquid should be kept in all radio service shops.

The writer has removed the same cone from a speaker as many as three times without injury or warping the cone out of shape.—*Valentine B. Connell, Philadelphia, Pa.*

### **Cleaning Tube Sockets**

An easy way to clean tube sockets which have become clogged with dirt and wax from overheated tubular type capacitors is to apply a hot soldering iron against the side of each prong, and at the same time pass a pipe cleaner through the prong. The pipe cleaner may be bent and doubled in half to clean the larger socket prong holes while the smaller ones can of course be cleaned without doubling the pipe cleaner.—*Wayne Storch, Beecher, Ill.*

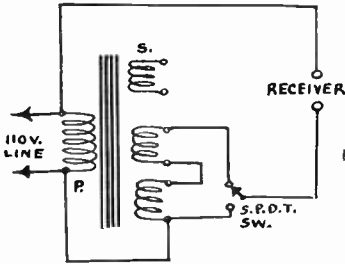
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### **Airline Model 62-307 and 62-407**

In the few sets of this model which have come into our shop for repair it was found that the capacitor C-2, as indicated in the service diagram of this set, would be defective. Consequently, in tracing trouble in this type of set, be sure to check the .1 mid 200 volt capacitor connected to the screen-grid of the 6L7 and 6K7 tubes. Even if this capacitor may seem O.K. it will be well to replace the unit with a 500 volt tubular type capacitor of the same capacity.—*James Linbeck, Glendale, Calif.*

## Line Voltage Set-Up

Here is a circuit for an auto-transformer arrangement to step up line voltage for use in servicing intermittent sets.



Connect the filament windings of an old power transformer in series with the primary winding as shown in the accompanying sketch. A voltmeter test will determine which way each filament winding is connected in order to add its voltage to that of the line voltage. The single pole double throw switch is employed for changing the voltage from the high to the low and vice versa.—*Edwin Johnson, St. Louis, Mo.*

## Wet Electrolytic Capacitor Replacement

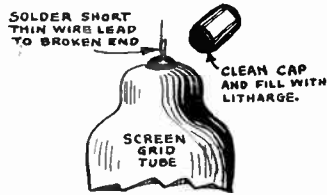
Since wet electrolytic capacitors are seemingly so difficult to obtain during these times of aluminum conservation for defense purposes, the writer has made replacements of all wet types electrolytic capacitors (except those of the voltage regulator type) with tubular type dry electrolytics in the manner as follows:

The electrolyte and complete anode assembly are first removed from the can which is cleaned well. A short brass machine screw and nut is then inserted through a hole in the can to which is soldered the negative lead of a dry electrolytic tubular type capacitor of the same capacity and voltage rating of the wet unit. The positive lead of the capacitor is brought through the insulated rub-

ber bushing for the positive terminal connection. The top cover is then replaced on the can and the completed unit is ready for remounting to replace the original wet unit.—*E. Gagliano, Brooklyn, N. Y.*

## Screen-Grid Tube Repair

In these times when every means must be employed to conserve on materials for national emergency, repairs on radio tube should be made by service men wherever possible. A common fault with screen-grid type tubes is that the caps become loosened. In such cases the writer has repaired all tubes and thus given them a new lease of life.



To repair a loosened screen-grid cap remove the cap carefully with a hot soldering iron. Clean the cap and all parts around the small tip of wire at the top of the tube. If the tip has been broken solder a short length of fine wire to the broken end.

Mix a small quantity of litharge (yellow oxide of lead obtainable at your local druggist) with enough glycerine to form a stiff paste and pack the grid cap with this compound. Press the cap into place and allow to set for twenty-four hours. After the cap has set firmly carefully resolder the fine wire lead which of course should protrude through the small hole at the top of the cap. Care should be taken not to apply an extremely hot soldering iron to the top of the cap too long a time as to open the contact of the soldered wire lead within the cap. — *H. J. Lundmeyer, London, Ark.*



## A Free Market-Place for Buyers, Sellers, and Swappers.

These advertisements are listed FREE of charge to C-D readers so if there is anything you would like to buy or sell; if you wish to obtain a position or if you have a position to offer to C-D readers, just send in your ad.

These columns are open only to those who have a legitimate, WANTED, SELL or SWAP proposition to offer. The Cornell-Dubilier Electric Corp. reserves the right to edit advertisements submitted, and to refuse to run any which may be considered unsuitable. We shall endeavor to restrict the ads to legitimate offers but cannot assume any responsibility for the transactions involved.

Please limit your ad to a maximum of 40 words, including name and address. Advertisements will be run as promptly as space limitations permit.

**WANTED** — Wattmeter, range approx. 40 watts to 250. Please give information regard make, condition, and price. Rudolph N. Feil, 2860 24th St., San Francisco, Calif.

**WILL TRADE** — Brand new Superior Model 1230 Signal Generator for any two Rider's Service Manuals. Roy H. Bender, P. O. Box 53, Manheim, Pa.

**FOR SALE OR TRADE** — RCA TT5 television receiver complete like new, used for floor display only. Ten Kerston dynamic horn units 6-8 volt field, 25 watt peak, extra diaphragm for each unit. Want General Radio Co. laboratory equipment, like decade boxes, bridges, etc. Tony Owsiany, 735 Mills St., Kalamazoo, Mich.

**FOR SALE** — 1940 NRI Radio Television Course. Complete and like new. \$15. John Broderick, 159 High St., Dalton, Mass.

**WANTED** — Rider's Manuals from 8 to 12. Kindly state lowest cash price. Howard W. Hepler, 1706 Piedmont Road, Charleston, W. Va.

**WANTED** — Rider's Manuals and Portable Typewriter. Please state condition and lowest price asked for same. Willard Spaulding, 324 Western, Connersville, Indiana.

**FOR SALE** — Two W. E. camp telephone sets, Signal Corp. 1917, suitable for private party line use. Consists of Hand-Set, crank type ringing magneto and self contained battery cell compartment in 8' x 10' x 5' Oak carrying cases. Operates up to 1,000 yds. on flash cells or more on external battery. Both sets \$10. Joseph Block, 230 East 51st St., Brooklyn, N. Y.

**WANTED** — Communications Receiver. Have A. F. Transformers, headphones, speakers, power supply, 5-tube receiver less tubes, many other radio parts also stamp collection, catalog price \$10. Will also pay \$3 besides. Robert Edwards, P. O. Box 91, Wendover, Utah.

**FOR TRADE** — Violin and case worth \$40 will trade for good A.C. amateur receiver, C.W. transmitter, or recorder. Also have Lincoln De Luxe S.W. 10 chassis less two volt battery tubes and batteries, will trade for code teaching equipment. Charles Keinath, 38 Prospect St., Newark, Ohio.

**FOR SALE** — 20 watt amplifier, 2 12-inch speakers in case, 1 Philco record player, 1 Amperite CHAK mike and stand, cost complete \$167.50, cash price \$75. Will consider 3-inch scope in trade. Ayres Radio Service, 121 Rosemont Dr. Syracuse, N. Y.

**CASH** for Supreme 561 Signal Generator, Medical Microscope, back issues of Electrical Experimenter before 1918, Aerovox Research Worker Jan., Feb., Mar., 1928, General Radio Experimenter, Successful Servicing, C-D Capacitor and IRC Servicer. John T. Lipani, 157 Leve-rett St., Boston, Mass.

**WANTED** — Welding outfit complete with cutting torch and tips. Have heavy duty sewing machine motor will trade. Electronics Radio Service, Warfield, Ky.

**FOR SALE OR TRADE**—One Model "B" Rockola coin photograph in excellent condition. Would make swell record-changing public address system with addition of one speech amplifier tube to take care of mike. \$35. F.O.B. here. Chas. L. Culley, Melville, La.

# CAPACITOR REPLACEMENT\*

**D**ESPITE the best efforts of the manufacturers, it is unavoidable under the pressure of the present emergency that some delay be encountered in supplying even standard types of replacement capacitors. The greatly expanded production facilities that have been provided by some of the manufacturers have scarcely been able to keep pace with growing government and high priority demands and normal business has necessarily suffered somewhat as a result.

Fortunately, from the standpoint of the Service Man, capacitors to meet his requirements are obtainable, even though not always as promptly as he would like. To avoid the hardship of delays it is suggested that he plan his requirements reasonably well in advance, order in adequate quantities and maintain a careful check on his inventories in order that replenishment orders can be placed far enough in advance to insure maintenance of stocks on hand. While this article concerns itself with capacitors, many of the suggestions presented apply to other replacement parts as well.

A definite contribution that every Service Man can make toward minimizing difficulties during the present emergency is the strict avoidance of waste. We know that there are pressing shortages in certain basic materials, such as aluminum, which is so extensively employed in the manufacture of capacitors. Waste which results when a still usable capacitor is discarded because its leakage is slightly high, where a multiple unit is thrown out because one of its sections is broken down, etc., may involve a relatively large volume of aluminum and other materials. It is conceivable that a time may come when there will be limited quantities of these materials

allocated to capacitor manufacturers for other than government products. At such time service jobs which use or discard capacitors unnecessarily will, in effect, be cutting down the supply by just that much.

It goes without saying that this sort of thrift not only helps the national market situation but the individual Service Man as well. A capacitor which demonstrates a leakage value which makes it unsatisfactory for coupling or blocking service may still be entirely satisfactory as a replacement for a defective by-pass unit and will thus save the cost of a new capacitor in this latter job. Or where a single section of a multiple capacitor is shot, the addition of a separate, single capacitor in place of the defective section not only makes for economy of parts cost but avoids the headache of searching the market for an equivalent multiple replacement unit.

To follow this suggestion for conservation requires some form of instrument capable of not only measuring capacity values, but analyzing capacitor characteristics. If such an instrument rendered no other service its use in a thrift campaign might perhaps not be fully justified. It is widely recognized, however, that it can serve many other purposes. To such an extent is this true that capacitor bridges and analyzers have become substantially essential equipment in every well equipped shop and laboratory, especially during the past year or two.

Such an instrument is shown in Fig. 1. It provides direct reading measurements of capacity values from 10 mmfd to 240 mfd for all types of capacitors. Power factor measurements from 0 to 50% are also read directly. Leakage values are indicated by the 6E5 tube.

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\* By S. Gordon Taylor in "Service" Magazine.

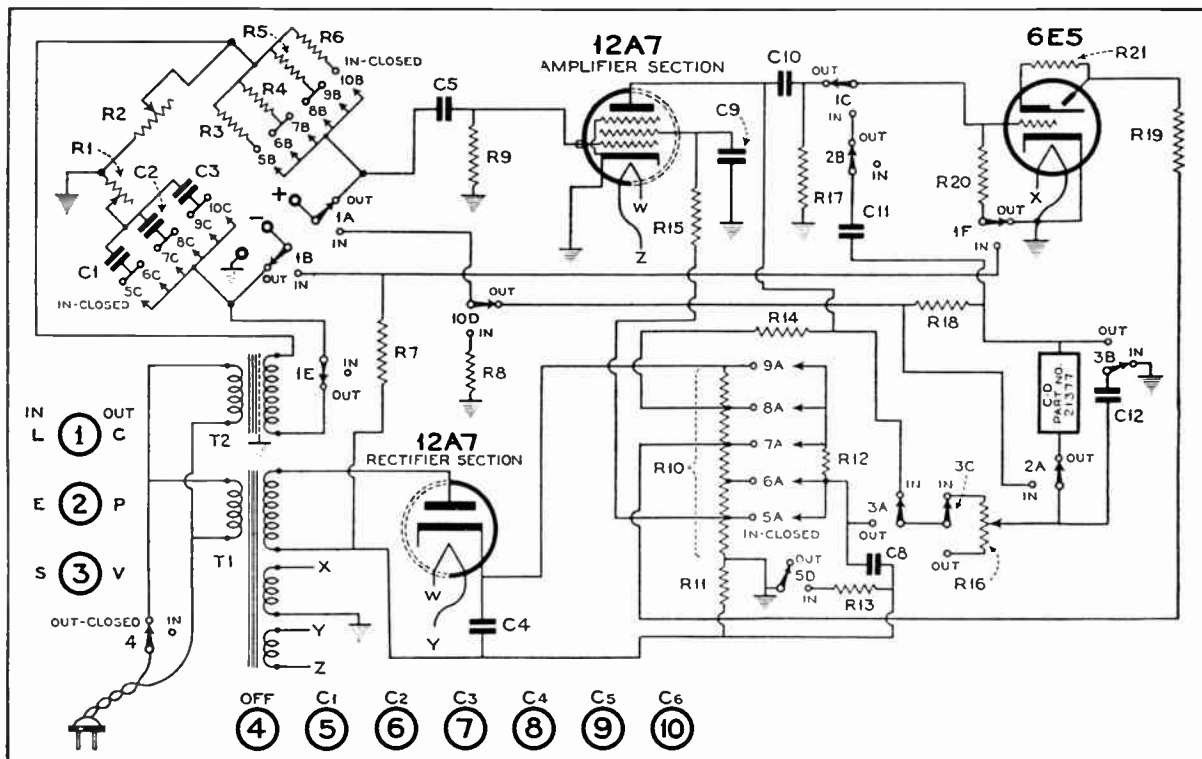


Fig. 1.—A capacitor analyzer will provide information as to the exact value and condition of a capacitor. This information can prove exceptionally helpful in these times.

Shorts and opens of both constant and intermittent types are directly indicated and the instrument may be used for measuring values other than those of capacitor units. Thus insulation resistance of various materials can be measured to 1,500 megohms or higher, capacity between wires of a cable or between transformer windings can be accurately measured, etc. In addition the instrument can be used as a sensitive bridge-balance or output indicator.

Let's go back to the subject of capacitors. An instrument such as this one will provide definite information on the quality of a capacitor under test and thus supply information which will determine whether this capacitor is normal or, if subnormal, whether it is suitable for any use in a radio circuit.

When the Service Man could replenish his capacitor stocks from day to day, or week to week, he didn't have to worry too much about either the variety or quantities he carried on hand. The larger stocks required under present conditions involve careful consideration of these factors, however. Augmented stocks call for increased investment and therefore for careful planning if this investment is to be held to a minimum and the job of stock-keeping made as easy as possible.

One way of keeping the investment down is by avoidance of "exact duplicate" multiple replacement units. These are relatively expensive, and, as suggested above, are seldom required because it is usually only a single section that breaks down and a standard capacitor of suitable value will serve as the repair for this. Another means is to standardize on as few types and sizes as possible. This may not decrease the potential investment greatly, but it does simplify the inventory and reordering jobs.

In the case of electrolytic filter capacitors, for instance, it is often practical to standardize on a single general type. A round cardboard unit with universal means for mounting either

vertically on the chassis, or horizontally under the chassis, will serve as a replacement for can, box and tubular types and is at the same time the least expensive of these types. There are indeed few filter replacement jobs that this type cannot satisfy.

The variety of capacity values and voltage ratings carried can also be minimized by recognition of certain facts. One of these is that filter capacity requirements are not critical as to value, providing only that the replacement capacity be not much lower than the original. Thus where the receiver manufacturer's specifications call for values between 4 and 8 mfd an 8 mfd unit will serve. For values between 8 and 16 mfd a 16 mfd unit will prove satisfactory, etc. Eights and sixteens will also serve where capacities of up to 12 and 24 mfd, respectively, are required. These are points which perhaps call for some explanation.

In filter applications the receiver manufacturer usually employs the lowest practical values of capacity for the sake of economy. It is for this reason that replacement values should never be more than 20% lower than those originally specified. On the other hand a replacement can usually err as much as 100% on the plus side, usually with improved filtering as the result.

Electrolytic capacitors are made with tolerance of 20% to 30%. Actually an 8 mfd replacement unit may show capacity anywhere from minus 20% (6.4 mfd) to plus 30% (10.4 mfd). Because the lowest of these values is only about 60% above 4 mfd, a "low" 8-mfd unit would make a satisfactory replacement where either 4 or 6 mfd units are called for. At the same time a "high" 8-mfd replacement might easily fall within the minus-20% range of a 12-mfd original. Thus a stock of replacement capacitors rated at 8 mfd will likely provide suitable replacements for every value from 4 to 12 mfd. To take advantage of this will, of course, require some means of measuring the actual capacity of the replacement units — classifying them

either by their actual capacities or into groups of "high," "low," and "normal." This is one of the valuable services rendered by an instrument such as the analyzer mentioned above.

The variety of voltage ratings in which filter capacitors are to be carried comes down to a matter of arithmetic. Many Service Men feel that it is simpler to carry filter electrolytics in only two values rather than in all four of the common values, 150, 250, 350, and 450 volts. A replacement 8-mfd unit rated at 450-volts costs perhaps 3c more than one rated at 350 volts. Where voltage values called for are 350 volts the larger unit provides an extra factor of safety and the elimination of a 350-volt stock reduces bookkeeping time and expense.

When it comes to mica and paper capacitors these same ideas can be applied although it must be borne in mind that some of the circuit applications in which these types are employed may be more critical than those for filter electrolytics. But the general line of reasoning presented above for electrolytics will apply to these other types as well, even though in perhaps more limited degree.

It is believed that more thought in the planning and maintenance of replacement stocks will help the Service Man over some of the bumps unavoidably presented by the current market situation.

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## THE RADIO TRADING POST

*(Continued from page 4)*

**FOR SWAP** — One Model 1241 Triplett condenser tester. Excellent condition. What have you? Guarantee to answer all correspondence. Chas. L. Culley, Melville, La.

**FOR SALE**—Weston 772-2 analyzer also model 666-1B socket selector, in A-1 condition, priced low. Jack Levine, 625 Main St., Worcester, Mass.

**WANTED** — Will buy surplus stocks of Radios and allied merchandise from manufacturers, jobbers, and dealers. One item or 1,000. Ship to us. We supply your requirements. Radio Surplus Mart, Sheridan, Pa.

**WANTED**—Rider's Manuals 1 to 12 in good condition with indexes and supplements. Willing to pay good price for good merchandise. Joseph Frank, 1365 Sheridan Ave., Bronx, N. Y.

**WANTED** — Late Radio or Electrical Engineering Course, tube tester, signal generator, VT-VM and screw cutting lathe. Anthony F. Grimaldi, 133-24 84th St., Woodhaven, L. I., N. Y.

**FOR SALE**—New and used receiving and transmitting parts and equipment. What can you use? Send for list. Herman Yellen, 351 New Lots Ave., Brooklyn, N. Y.

**WILL TRADE** — Beetman Wiring Manuals, 2 vol. of 1925-40 popular sets, model gas engine, model steam engine, RCA radio sound and television course. Ten Vol. Hawkins Electrical Guides, photograph and technical books, etc. Anthony F. Grimaldi, 133-24 84th St., Woodhaven, L. I., N. Y.

**WANTED**—Tubes, parts, transformers on consignment from dealers, companies, factories. Good reference. Small Corona typewriter for V.T.V.M. Shines Radio Shack, 69 W. 23 St., Chattanooga, Tenn.

**FOR SALE** — Limited quantity Mallory-Yaxley Encyclopedias 3rd edition, 35c each postpaid. Regular list price \$1.25. Slightly used 40 watt P.A. Excellent condition. 2 P.M. speakers in case and floor stand mike. Complete \$75. Cost over \$125 wholesale. Max Shively, 3115 Ingham, Lansing, Mich.

**WANTED**—All Rider Manuals except 1 and 2. For sale Hickock set analyzer. Make an offer. The Electric Shop, 60 N. Sandusky St., Delaware, Ohio.

**FOR SALE** — Underwood portable typewriter with case in very good condition, interested in 22 cal. rifle, or cash. Best offer takes it. L. Day, 365 Lafayette Ave., Grantwood, N. J.

**FOR SALE OR TRADE**—60 watt final amplifier, 4 channel preamplifier mixer unit, amperite velocity microphone, portable P.A. system. Want good microscope, and showy mineral specimens or gem cutting materials. Will send details to any inquiry. George W. Roper, Public Market Bldg., 13 and J Sts., Sacramento, Calif.

**FOR SALE OR TRADE** — Telephones, parts and equipment, slightly damaged teletype, speakers, Majestic radio, astronomical telescope, receiving tubes, parts, great lengths of two conductor telephone wire. Want Candler System Code Course, will trade or pay cash. Also want pocket V.O.M. meter, cash or trade. Elton Bell, 1408 Walnut, Duncan, Okla.



**FOR SALE**—2 Wright DeCoster 12" dyn., 6 v. field with matching transformers; 1 Rola "G-12" 1000 ohm field; 1 Electro-Voice velocity mike V-3 HIZ; 1 Hickok electronic vibrator tester. All like new, make us an offer. Want 110 v. a.c. power plant, 1200 or 1500 watt; Rider's Manual No. 10. Cash or trade. Radio Doctors, 641 Pierce St., Sandusky, Ohio.

**WANTED** — Photo equipment (particularly a 2" lens), a movie projector (16 mm), enlarger, etc. Also radio equipment as V.T.V.M. late model tube checker, Rider's Manuals 8, 9, 10, 11, and 12. Will buy for cold cash or have other equipment in trade. All mail answered. Edward Connor, 907 Brown St. Wilmington, Del.

**FOR SALE OR TRADE**—Good reconditioned a.c.-d.c. radio, radio tubes, vibrators, transformers, volume controls, other radio parts, also books and magazines on radio and photography. Want miniature camera, like Argus A or A2i. Wayne Storch, Beecher, Ill. W9FOC.

**WANTED** — Good S.W. receiver, slide rule, drafting or mechanical drawing sets. Describe fully stating best cash price. Will swap or sell radio manuals, magazines, new tubes, resistor, meters, auto radios, parts, eliminators, receivers, etc. Oliver F. Klein, 2235 N 39th St. Milwaukee, Wis.

**WANTED**—R.C.A. Review, all issues; Proceedings IRE, 1939, 1940, 1941; 0-1 mil and micro ammeters, all ranges, 3 and 4 inch round, square, or fan type; type A & N National dials; 1 and 2 inch cathode ray tubes. W. Cox, 1915, Newton St., Columbus, Indiana.

**WANTED** — C-D capacitor analyzer model BF50 or equivalent. Must be in first class condition. State minimum price. Ernest B. Slinger, 1575 Philomene, Lincoln Park, Mich.

**FOR SALE**—R.C.A. Television receiver, table model TT5 complete with 17 tubes (uses RCA Kinescope No. 1802-P4). Purchased Dec. 14, 1940, first class condition. Covered by RCA guarantee to make any changes free of charge to correspond with future changes in television standards. Sell—\$58. Will reply to all inquiries. Harold J. Clark, 362 Rock Ave., N. Plainfield, N. J.

**WANTED** — Rider's Manuals 11 and 12, RCA volt ohmmeter Model 165. R. L. Thomas, Box 583, Homer, La.

**WANTED**—Complete radio course of any kind. Please state condition and lowest price. John Hradil, R.D. 2, Avella, Pa.

**WANTED**—Rider's Manuals 2 to 8 inclusive, complete and clean. Price must be very low. Will pay cash. W. R. Fletcher, Ellsworth, Maine.

**POSITION WANTED** — Radio engineer, Broadcast studio control engineer, 16 years experience, college education. Sound recording, radio and development, experimental laboratory, trouble shooter, single, draft exempt. Prefer position as master control supervisor in broadcast station or research engineer in a manufacturing plant. Peter Wise, 1258 Fair Ave., Columbus, Ohio.

**WILL TRADE** — Radio course of 51 lessons with answers by Arthur G. Mohaupt of Radio Training Association of America, Inc., Chicago. Want standard typewriter or what have you. Good condition. Peter J. Jarvis, 4817 S. Elizabeth St., Chicago, Ill.

**FOR SALE OR SWAP**—Eastman model E 16mm. movie camera. Want test equipment. What am I offered. Charles A. Reeves, Radio Station WHUB, Cookeville, Tenn.

**FOR SALE** — Atwater-Kent genuine new parts for older and last models made. Coils, condensers, resistors, belts, dial rubbers, I.F.-R.F. coils, flat, pigtail resistors—limited quantity. Will sell single items or total lot. Radio Parts & Equipment Co., 244 Clinton Ave., N., Rochester, N. Y.

**WANTED**—Rider's Manuals No. 4 to 12. Any or all. A. H. Alderson, Spring Hill, W. Va.

**FOR SWAP**—6-110 v. 30 watt amplifier, 2 PM speakers, 30 watt 110 v. amplifier, L. C. Smith and Royal portable typewriters, auto radios, Zenith portable. Want manuals, radio and electrical books and magazines, drafting set, miniature speed graphic or other photographic equipment. Dee Umberson, Dimmitt, Texas.

**FOR SALE OR SWAP**—Underwood portable typewriter with case in very good condition. Want ham receiver, photo enlarger, or other equipment. J. A. Mc Gregor, 18 Carney Ct., Charlestown, Mass.

**WANTED**—Battery chargers, bulb type, 2 or 6 amp. capacity. Can use large quantity at right price. Also desire late type test equipment, Rider's chanalst, etc. Roger H. Hertel, Wahoo, Neb.

**WANTED**—Modern test equipment. State condition, make, price, etc. I. Levine, 625 Main St., Worcester, Mass.

**WANTED**—A Velocity Electro-Voice microphone that is not in working condition. To be used in photo studio. State price wanted in first letter. John J. Antonio, R.F.D. 1, Elkland, Pa.

*(Continued on page 12)*

# SERVICING CONVERTERS\*

## How to find troubles peculiar to combination Oscillator-Mixer Circuits

SERVICEMEN encounter many receivers today that employ a single tube combining both oscillator and mixer stages in one glass envelope.

Although these produce the same result as separate oscillator and mixer tubes, coupling or injection of the oscillator energy takes place within tube itself and meter readings may be misleading due to the common cathode circuit.

### Typical Circuits

Examples are shown in Figs. 1 and 2, where the oscillator grid leak does not return to ground but to the cathode at point B. Since point A is

oscillator is inoperative. It may simply mean that the negative voltage at point A is not sufficiently great to counterbalance the positive voltage at point B.

The proper check in such circuits is to measure both the cathode voltage and the voltage to point A. If the cathode voltage is plus 3 volts and the voltage from point A to ground is plus 1 volt, the actual voltage across the oscillator grid leak is minus 2 volts and the stage is oscillating.

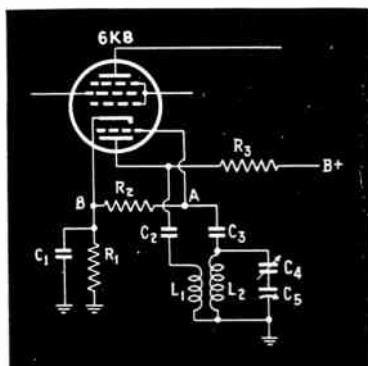


Fig. 1—Parallel feed oscillator using a 6K8 hexode-triode.

positive with respect to ground due to the voltage drop across R1, the fact that the voltage measured at point A is zero or slightly positive does not necessarily indicate that the

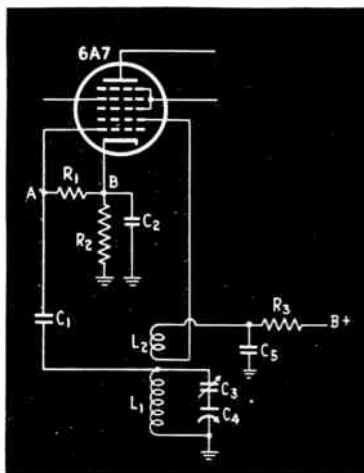


Fig. 2—Popular tickler feedback circuit with 6A7 pentagrid converter.

In Fig. 1, a parallel system is used to feed the oscillator plate. The resistor R3, used for the purpose, serves also to flatten the oscillator output and thereby makes for greater uniformity

\* By John H. Potts in "Radio and Television Retailing."

of operation. If this resistor changes considerably in value, uneven output or "dead" spots at certain portions of the band may result.

In Fig. 3, note that a Hartley circuit is employed. This is emphasized since it seems that many are under the impression that the circuits employed for the 6A7 are equally suitable for the 6SA7. Such is not the case. The tubes are different in that G2 is the anode grid for the 6SA7. The Hartley circuit is particularly suitable for the 6SA7; but not for the 6A7. This is pointed out in order that you may not be tempted to substitute an oscillator coil designed for a 6A7 in a 6A7 circuit, or vice versa.

### Dead Oscillators

No matter what type of circuit is employed, if the oscillator is dead, the set is usually completely inoperative. In some cases, where there is a strong local near the low frequency end of

of a test oscillator to the mixer, either coupling loosely to the signal grid or feeding directly to the oscillator anode grid.

The receiver is then tuned to a strong local and the test oscillator is set to produce a strong, unmodulated signal equal in frequency to that of the station to which the receiver is tuned, plus the intermediate frequency. Thus, if the set is tuned to 600 kc and the i-f is 455 kc, the test oscillator should be adjusted to 1055 kc. If there is nothing else wrong with the set, the station should be heard. This stunt is particularly useful when it is necessary to give estimates.

### Curing Drift

Oscillator drift is a common trouble with older receivers and is usually caused either by changes in the capacity shunting the tuned circuit, or as a result of the effect of temperature changes upon components of the oscillator circuit. For this reason, if it becomes necessary to change the position of the oscillator in any receiver, particular care should be taken to keep the coil and other components well away from any hot objects, such as the rectifier tube, bleeder resistors, etc. Where fixed condensers are employed in the oscillator circuit, the use of temperature-compensated types will improve stability. Never leave a trimmer adjusting screw loose. If it must be turned nearly all the way out to tune, it is best to check the dressing of the leads and shift them so as to minimize the shunt capacity. Often this will permit adding more capacity in the trimmer.

Variation in oscillator voltage may cause frequency instability. This variation in voltage often occurs as a result of poor power supply regulation. When the avc is acting on a strong local signal, the plate current of all tubes under avc control is greatly reduced; consequently the B-supply voltage increases. This increases the voltage applied to the oscillator, resulting in a frequency change. With modern

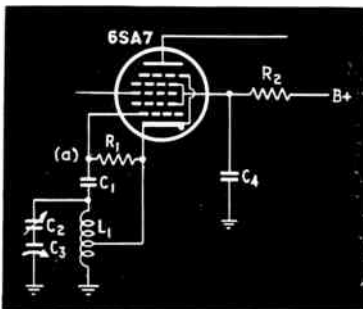


Fig. 3—Hartley oscillator with 6SA7 pentagrid converter.

the dial, it will ride through the i-f and the signal will be heard "all over the dial." This is a common occurrence with ac-dc sets of limited selectivity. When no signal is heard, and the fault is localized to the oscillator, it is frequently advisable to restore operation temporarily by substituting another signal for the dead oscillator. This is done by connecting the output

converter tubes, such as the 6K8 and, to a lesser extent, the 6SA7, the trouble is not so serious, but with some of the older sets the effect may be bad, particularly at the high frequency end of the tuning range. Voltage may be stabilized by employing a regulator tube, and this is the practice in some high grade receivers.

When frequency instability suddenly becomes evident in a receiver which previously performed satisfactorily, the trouble may be due to a decrease in the plate current drawn by one or both power output tubes. Since such receivers often employ no bleeders, the power tube load takes over this function. When the load is reduced, due to a decrease in plate current, arc action causes greater than normal voltage variations, thus affecting the oscillator frequency.

### Replacing Coils

It is frequently possible to substitute an oscillator coil designed for one receiver in that of another, provided the oscillator or converter tube, the intermediate frequency, the tuning range, and the gang condenser capacity are identical. Care should be taken to maintain the same lead length and positioning of parts as was originally employed.

## THE RADIO TRADING POST

*(Continued from page 9)*

**SELL OR TRADE**—A.c. light plant, Harvard Classics, test equipment, Rider's Manuals 1, 2, 3, speakers, parts, Dodge generator G.A. rewound into welder. Want typewriter, wireless phono, camera, drill press. A. R. Kreuzer, Leroy, Mich.

**WANTED**—Rider R.C.A. signalyst, chanalyst, and CE Solar condenser tester, must be in new condition and reasonable. Capitol Radio Service, 637 W. 21 St., Erie, Pa.

**FOR SALE OR TRADE**—Philco home recording attachment model HR-1—\$25.00 value, trade for signal generator in good condition or multimeter of equal value. Want good crystal mike. George Hague, 82 Varley St., Fall River, Mass.

**FOR SALE OR SWAP**—Portable 4 tube record player (new). Kadette Tunemaster (new) Weston 0-20 d.c. mil meter, Weston combination 0-7½ 0-150 d.c. voltmeter, complete genemotor power supply. Want good bicycle, boxing gloves, car radio, or what have you. Taylor's Radio Service, Wellman, Iowa.

**FOR SALE** — 1 Clough Bringle 82 Signal Generator; 1 Supreme 85 PL Tube Tester; 1 Jewel 199 Analyzer. F. E. Flint, P. O. Box 86, Elizabeth, W. Va.

**FOR TRADE**—Latest type Astatic pickup, sapphire needles, turntable and rim-drive motor (enclosed flywheel type). Will swap for flash camera—Brownie or Agfa cadet type or make offer. Harry Gush, 66 Herzl St., Brooklyn, N. Y.

**WANTED** — 1 RMS Electric Clock; 1 Model 070 Philco Signal Generator; 1 Stimson or Tripplett Load Type Battery Tester and Voltmeter; 1 Late Model Westinghouse Battery Charger. F. E. Flint, P. O. Box 86, Elizabeth, W. Va.

**FOR SALE** — Weston counter model 773 type 2 tube checker. Weston model 692 type 1 tube checker. Haukin Electrical Guides—10 books, second edition. Make offer. Want Weston oscillator. John Mitcho, Freeland, Pa.

**WANTED**—Rider's Manuals, any number or group of numbers if in good condition and reasonable. Will answer all letters. Century Radio Service, 10008½ S. Main St., Los Angeles, Calif.

**FOR SALE**—Model CB-1-60 Solar condenser analyzer—\$12.50, model 85PL Supreme tube checker—\$15., Westinghouse motor 1/6, 1725 R.P.M., single phase, reversible rotation with pulley—\$3.25, neon sign with Hammond electric clock—\$22., Jewell model 579 test panel 7, 5 inch meters—\$40. Anchor Radio Distributing Service, 203 Elm St., Ithaca, N. Y.

**WANTED**—Good signal generator for cash. Will sell or trade Wirgin 35 mm. camera, Meyer Goerletz I. 2.9 lens, comput rapid shutter, with case—new. Want other camera. Norman Jacobson, 1117 Gerard Ave., Bronx, N. Y.

**FOR SALE**—HCR or RCH Communication Receiver 7 tube superhet in perfect condition. Will trade for instruments or cash. Desire a signal generator, Arnold Halpen, 119 Tudor Pl., Bronx, N. Y.

**FOR SALE**—Readrite 431 tube tester—\$5.00. Radio-Sound & Television course—complete—\$18.00. Engineering School-built Supreme V.O.M. and output universal trouble tester 5" lan meter, a.c.-d.c. up to 1,250 v. test—\$15.00. Francis J. Pesarchic, Box 462-A Fairfield Ave., Johnstown, Pa.

**WANTED**—All issues of QST for 1939 and 1940, and January to August, 1941. New York offers only desired. Ray Vazquez, 20-40 149 St., Whitestone, L. I., N. Y.

**FOR SALE OR TRADE**—Entirely new Taylor Transmitting Tubes and equipment, Astatic D-104 Crystal Mike, Supreme Model 571 Signal Generator. All new. Want Oscilloscope 2" or larger and Hickok Signal Generator 188-X. Will pay cash. LeVaughn Shipley, 210 E. Choctaw Ave., McAlester, Okla.

**SALE OR TRADE**—1/80 H.P. Ohio, H.D.R., mtd. electric motors, (not toy type). Cost \$5. For fans, aerial rotators, phono, experimental, etc. Swap for? Prepaid in zone 3. A. Penquite, Marshalltown, Iowa.

**WANTED**—Instructograph. Will take best offer for cash. C. T. Herndon, Medical Bldg., Gadsden, Ala.

**FOR SALE**—Complete sales and service business good location opposite post office, no competition. All Rider's manuals, chanalyst, CB oscillator and tube tester, solar condenser analyzer, nice test bench, 150 tubes, resistors, condensers, desk, oil burner, pa 6/110 volt, all nice tools, set of refrigerator tools, gas and drums, gauges, etc. Bottled gas agency, virgin territory, gold mine for hustler. No meddlers. Jack Watt, Supreme Radio Service, Ontonagon, Mich.

**FOR SALE**—Crosley Xercav Hair Growing Machine complete in perfect condition. Best offer takes it. The French Radio Electric Store, 476 Main St., Stamford, Conn.

**WANTED**—All sorts of telephone equipment—ringer boxes, desk stands, handsets, or what have you? State make, condition, price, model No. and ringer impedance if possible. B. Minnich, 1415 E. River Rd., Minneapolis, Minn.

**SWAP**—Supreme 333 de luxe analyzer, C-B model OC oscillator, Confidence tube checker, Rider's Manuals 1 and 2, Proceedings I.R.E. for 1932-33. Want Handee or Duro grinder and accessories and tools, guns, or what have you. G. H. Varney, 4627 Enright Ave., St. Louis, Mo.

**FOR SALE OR TRADE**—Transmitting, receiving, and vibrator power supplies and parts, A & B eliminators, meters (a.c., d.c., r.f.), neon transformers, P. A. and modulator parts, speakers, x-tals, receiving and transmitting tubes, carbon mike, dry disc rectifiers, Kodak (3A). Write for details. A. Zambakian, 1259 Gaylord, Denver, Colo.

**WANTED**—R.C.A. signalist in new condition. State price. Capitol Radio Service, 637 W. 21 St., Erie, Pa.

**WANTED** — Rider's 10, 11, 12, also 1 to 4, and late model signal Generator. Advise best cash price and condition. J. B. Mosley, 1426 North 24th St., Birmingham, Ala.

**WANTED**—Power or hand operated saw filing machines, saw retoucher and saw setters. Will pay cash or have radio and power plant text books to trade. William E. Barrett, 2828 S. Ninth St., Sheboygan, Wis.

**WANTED**—1941 model 912P portable Precision tester in A-1 condition. Capitol Radio Service, 637 W. 21 St., Erie, Pa.

**WANTED**—Rider's Manuals—will pay cash. Al Budin, 11203 Superior Ave., Cleveland, Ohio.

**FOR SALE**—Rider's Manuals 1 to 7, \$35.; Supreme No. 189, all wave signal generator, \$20.; Weston analyzer, modernized for 8 prong tubes both a.c. and d.c., \$20.; solar type No. 6B resistor and condenser checker, \$12.; Million vacuum tube voltmeter model XM, \$15.; mimeograph—legal size, \$25.; set of Philco Manuals. William F. Gibson, 8332 S. Vernon Ave., Chicago, Ill.

**FOR SALE**—Model 830 Triumph oscillograph with built-in Thyron sweep circuit 3" tube like new. Case 14" x 10" x 7½" complete with instructions and cathode ray tube—\$40. R. B. Chase, 9 So. 16, Richmond, Ind.

**SELL OR SWAP**—Auto radios, meters, phono turntables, eliminators, S. W. converters, tubes, speakers, Weston thermo couple, R.F. ammeter, radio manuals, parts, etc. Want mechanical drawing or drafting equipment and slide rules or cash. Oliver F. Klein, 2235 N. 39 St., Milwaukee, Wis.

**TRADE** — Owner Kladaq Radio Laboratories, Established 1920, oldest Ohio parts jobber, will trade new parts, books, etc., for U. S. or foreign stamps, collections, etc. What have you? What do you want? Submit for estimate. Major Fred Kline, Kent, Ohio.

**FOR SALE**—Gernsback Official Radio Service Manuals, volumes 1, 2, 3, 4, and 5. Will sell separately if desired. C. A. Goditus, 358 E. Market St., Wilkes-Barre, Pa.

**FOR SALE OR TRADE**—240 watt phone 340 watt c-w transmitter using 616-807—pair 812's push-pull with cathode modulation in Parmetal rack—\$125. Also First National Radio and Television Course complete \$89.50. Carl Stello, W31VZ, Beltsville, Md.

**WANTED**—High voltage transmitting variable condensers, 2,000-3,000 v., 200-250 mfd. and less. Pay cash. Jack Abramowitz, 2237 62 St., Brooklyn, N. Y.

**FOR SALE** — Leaving for defense work. All radio parts, R.C.A. tubes, standard replacement parts, anything in radio service work, will sell for 50% off and prepay anywhere in U. S. Fesco Radio Service, Paonia, Colo.

**WANTED** — Dual speed, twin turntable, 16" recorder with amplifier and accessories for cash. Advise cost and submit details of same. Paul J. Brooks 230 Branchport Ave., Long Branch, N. J.

**WANTED**—Hickock 177-188 signal generator with or without crystal. Also oscilloscope. Have Contax camera with 1.2 lens, foremanship course, radio supplies. Huntress Radio, 418½ West Spring, Freeport, Ill.

**WANTED**—Superior signal tracer and high imp. mike crystal or velocity. State condition and price. Lovett's Radio Shop, Box 143, Newland, N. C.

**FOR SALE OR SWAP**—Latest model 1240 Superior tube tester. Slightly used. Will trade for cameras or supplies—still or movie. Theo. R. Colvard, Arlington, Kansas.

**WANTED**—2 mike floor stands, 72" high, base weighted to support moderate size velocity mikes without tipping. Prefer chrome or chrome and black, adjustable. Mike thread, 5/8"-27. Can use suspension yoke. Give details and price. R. H. Coddington, Mapleton, Ia.

**WANTED**—Service equipment—3" oscilloscope, tube tester, solar condenser analyzer, chanalyst. Must be in first class condition. State make, model, and price. R. C. Adams, 330 W. 15 St., New York, N. Y.

**WANTED**—Rider's Manuals 4, 6, 7, 8, 9, and 10. Also signal tracer and vacuum tube volt meter. Please state make and price. Have one new Simpson model 27 0-1 milliammeter, d.c., \$4.50 takes it. Andrew A. Holp, 219 E. 32nd St., Lorain, Ohio.

**FOR SALE**—Rider's Manuals 1, 2, 4, 5, 6—\$25. Readrite model 550 oscillator with output meter—\$5., phonograph electric motor and turn table—\$5., Jewel d.c. voltmeter—0-6 volt—\$1.50. Homer Sims, 108 S. Line St., Malden, Mo.

**POSITION WANTED**—Young man, 25, single, college education, desires position in radio laboratory. Amateur and Restricted Phone licenses. At present employed. Good references, can travel. Carl H. Stello, Beltsville, Md.

**FOR SALE**—Recent files of the following magazines: I.R.E. Proceedings, Radio, QST, Radio News, etc. If interested, write Wm. D. Hayes, Box 1433, Oakland, Calif.

**WANTED** — Will pay cash for a volt-ohm milliammeter, also signal generator and a Cornell Capacitor Analyzer. State name, model, and lowest price. Frank Swetlech. RD 1, Sharon, Pa.

**WANTED** — 1½ V. Farm Battery Sets, less batteries. State make, model number, and condition. Will pay cash. Big Sandy Maytag Co., Pikeville, Ky.

**WANTED** — Rider's Manuals, Vol. 7 to 12 inclusive. Metzinger Radio Service, 3018 Avenue B, Council Bluffs, Iowa.

**WANTED**—Rider's Manuals 8, 9, or 10. Reasonably priced, or will trade Astatic crystal pickup model 0-7 for part, or used motor and turntable. Royce Saxton, Pontiac, Ill., Rt. 1.

**POSITION WANTED**—Young man, 30, citizen, married, high school graduate, 10 years experience in radio service, mechanics, wiring, testing, and assembling radios, transmitters, recording amplifiers, and electronic devices. Desires a permanent connection, willing to start in the layout, assembling, or wiring department and work into the engineering and designing departments. Have a practical knowledge of radio construction, theoretical background. All I ask is a chance to show what I can do. Frederic U. Dillon, 1237 N. Fairfax Ave., Hollywood, Calif.

**WANTED**—"Rider's Practical Radio Repairing Hints" and "Radio Service Questions and Answers." Stancor auto radio demonstration pack model 132, modern test equipment and radio course. State condition and price. H. R. Cheesman, 720 Front St., Freeland, Pa.

**FOR SALE** — Brand new Sx-28 Hallcrafters communications receiver. Want Channel analyzer, Supreme, Rimco, or Simpson. Forrest Burnham, Richvale, Calif.

**WILL SWAP**—Simpson 0-1 milliammeter for an ohmmeter, preferably a D'Arsonval type—2½" or less. Dependable tube checker meter will swap for ½ wave copper oxide rectifier. William Halpin, 2753 Fulton St., Brooklyn, N. Y.

**WANTED**—We pay cash for Rider Manuals and test equipment. National Sound Equipment Co., 625 Main St., Worcester, Mass.

**FOR SALE OR TRADE**—New Philco 026 analyzer. Need vacuum tube voltmeter, condenser analyzer, and Rider's No. 6, 7, 8, 9, 10. M. P. Vincent, Box 4192, South Richmond, Va.

**POSITION WANTED**—Serviceman, graduate of Radio School, 14 years experience, prefer location in the west. R. C. Golden, Holly, Colo.

- FOR SALE OR TRADE**—N.R.I. Radio Servicing Course \$8. R.T.L. Tube Checker \$4.50. Triumph No. 420 Tube Checker \$7.50. .22 cal. Winchester, Remington Rifles each \$8.50. .22 cal. Western Automatic Rifle \$10. Meters each \$2.25. Roby's Swapmart, 3569 Cottage Grove, Chicago, Ill.
- FOR SALE** — Rider's Manual Vol. 3, in excellent condition. RCA Radio Service Tips. Complete Diesel Course. Taxidermy Course. Best cash offer takes any or all. All replies answered. Thos. F. Shambach, Jr., Box 103, Middleburg, Pa.
- WANTED** — Radiocraft, Radio News, 1938 to present, other radio magazines like QST, I.R.E. Proceedings, etc., preferably from New Yorker. Have Rider 1 to 4 (new) for trade or sale. Leslie E. Kulberg, Box 85, Fair Haven, N. J.
- SELL OR SWAP**—Complete set of welding and burning torches, auto radios, professional R.C.A. broadcast studio turntable, tubes, transformers, meters, sets, parts, radio magazines, and manuals. Want mechanical drawing or drafting sets, slide rule, art books, good short wave receiver, tungar bulb battery charger, field glasses or binoculars. O. F. Klein, 2235 N. 39 St., Milwaukee, Wis.
- WANTED**—Transmitting tubes, modulation transformers, radio books, compact low or medium power transmitter for phone and C. W. Seymore Hammer, 2090 Morris Ave., Bronx, N. Y.
- FOR SALE OR TRADE**—Rider's Manuals 4, 5, 6, with index, in excellent condition. \$15. takes them, or will trade for a shortwave receiver. C. W. King, Union City, Mich.
- FOR SALE**—Rider chanalyst, Aerovox 95 L.C. checker, Philco 077 oscillator, superior 1280 analyser and tube checker, R.C.A. volt ohmst jr., and 87 issues of Radio-Craft beginning with first issue. Make cash offer. George C. Anderson, 2236 Indiana Ave., St. Louis, Mo.
- FOR SALE**—Clough-Brengle cathode ray oscillograph model CRA with frequency modulated signal generator, model OM-A. All for \$65. cash. Adwin Rusczeck, 36 Christian St., Wallingford, Conn.
- FOR SALE**—Rider's Manuals 1 to 7 inclusive, new condition—\$32. Want photographic equipment such as is used by commercial photographers—lens, view cameras, dryers. H. Millen, 40 Wayland St., Boston, Mass.
- WANTED**—Used B eliminator which will operate from a 6 v. storage battery that will give up to 135 v. B supply or small generator motor which will do the same job. "Popular Science Monthly" from Aug., 1940 to Aug., 1941. Sherman Rice, Mt. Olivet, Ken. (Star Route).
- FOR SALE** — Supreme 599 tube-tester/analyzer new. Supreme 530 2" oscilloscope, Supreme 189 oscillator, Solor CB Condenser Analyzer, and Superior Dynomotor (V.T.V.M.) all OK but Superior (using 5" motor). Lots of manuals. All for \$100 cash plus transportation and other costs. What is offered for Radio Craft from 1934 to 1941? W. G. Eslick, 2825 E. 13th, Wichita, Kan.
- WANTED** — Used portable recorder, any make. Will pay around \$25. Vernon Abrigg, RD 1, Meyer Lake, Canton, O.
- WANTED**—Good camera, preferably 35mm. W. J. Brennan, 352 N. Grove St., East Orange, N. J.
- TRADE OR SELL**—420 Triumph tube tester, R.T.L. tube tester, Remington noiseless portable typewriter, 30-30 Winchester, 22 cal. Remington, 2 short wave receivers—30 meters, parts, magazines, etc. Roby's Swapmart, 3569 Cottage Grove Ave., Chicago, Ill.
- WANTED**—Rider's Manuals 1 to 12, in groups or single, in A-1 condition with index. State lowest cash price. McKinley's Radio Service, Zebulon, Ga.
- FOR TRADE**—Triplett No. 1181A portable lab. and Rola G12 speaker with 1,000 ohm field. Want used record changer. S. Kimbro, 472 10 St., Louisville, Ky.
- WANTED**—Oscilloscope E.F.O., and precision test equipment. State condition and price. Have R.C.A. TR5 television set in perfect condition for swap. L. De Zube, 3900 N. Franklin St., Phila, Pa.
- WANTED**—Model T Ford spark coil in working condition. Will pay cash. George Oxhorn, 509 Belmont Ave., Brooklyn, N. Y.
- WANTED**—Supreme model 551 free point tester or any good free point testers. Must be in good condition, and price reasonable, with instructions for use. George J. Smith, 132 S. 7 St., Steubenville, Ohio.
- FOR SALE OR SWAP**—Complete issues of QST from September, 1930, through June, 1940, all copies in A-1 condition. What am I offered in cash or trade for service manuals. Walter A Seibert, 3 Madison Rd., Scarsdale, N. Y.
- FOR SALE**—Rider's Manuals 1 through 5—\$3.50 each. 502S Supreme tube tester includes multimeter and condenser tester—\$20. Write before sending money. Virgil E. Oliver, 620 N. 20 St., Mattoon, Ill.
- WANTED**—Rider's Manuals 1 to 10 inclusive in perfect condition; also neon sign "Radio Service" without transformer preferred. State condition, size, etc. Will pay cash. M. Vavrek, 3005 Chatham Ave., Cleveland, Ohio.

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