

The CORNELL-DUBILIER Capacitor



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CORNELL-DUBILIER ELECTRIC CORP.
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RADIO SERVICE HINTS

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 Unpublished items will not be returned.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.

Zenith "Tone Organ"

If Zenith models employing the "tone organ" develop an erratic, double-hump control action, the writer has found that in most every case the trouble was due to a 6J5 tube which became defective. The cure of this, of course, is to replace the tube with a new one of the same type regardless of the fact that the old one may check O.K. on the tube tester. This will clear up this peculiar behavior of the set in most every instance.—*John T. Frye, Logansport, Ind.*

Locating Parts Causing Intermittents

Here is a method of locating a capacitor or other part in a set that has become intermittent.

Feed the total unmodulated signal from the signal generator into the antenna of the set with the volume control on full. Since in this condition all parts of the set become microphonic, all parts of the set can be tapped in order to determine which have a loose connection or are defective. — *Joseph G. Allen, Pawtucket, R. I.*

Circuit Breaker Protects Bench Wiring

A circuit breaker such as used in Ford cars serves as an excellent device to protect service bench wiring against accidental shorts when a storage battery is employed for testing auto radios. These circuit breakers are inexpensive and may be obtained through any Ford service station. It may be necessary to make adjustments in order to allow for variations in current at which contacts will break the circuit.—*Edwin F. Spears, Kalamazoo, Mich.*

Separate Loop for Aligning Work

Many of the newer sets using built-in antennas require the use of a loop to line up the set instead of using direct connection to the oscillator. We have installed a loop of a few turns of wire which is fastened under the work bench. The leads of this loop are brought out to binding posts so that the oscillator can be connected to it. When lining up a set the set is placed in the field of this coil and adjustments made.—*Gilbert Sharick, Princeton, Ill.*

Protect Battery Plug In Portables

For those customers who want to use their portable sets on the electric service line only, it is best to protect the loose battery plug by wrapping a few turns of friction tape around it so as not to short circuit to chassis or other parts of the set.

Before returning the set to a customer also be sure to place corrugated paper board filling in the empty battery compartment of the set to prevent the loose plug from shaking around. — *Sherman Wolf, Boston, Mass.*

Eye Loop for Close Inspection Work

A very handy gadget around the work bench is a jewelers eye glass or "loop." If you wear glasses, the handiest kind is one that hooks over one lens of your glasses.

I use it to examine antenna, oscillator, R.F., I.F., and other coils and parts.

Many times with the use of this glass, I am able to dig out the open end of small wire and repair an open that otherwise could not be located. I also use it to read parts values on small blurred wiring diagrams.—*H. B. Workman, Waverly, Ohio.*

General Electric H-632

The writer encountered trouble with this set on a service call when it was found dead in operation. Upon checking for the most likely causes the ballast tube was defective.

Replace this tube with a new one. KL-45 replaces the original G.E.

BL-42. If possible to repair the tube, by all means, do so. Very often it will be found that connections can be resoldered at the prongs, or an open tube shield can be resoldered and be almost as good as new. — *Stephen M. Skovran, N. S. Pittsburgh, Pa.*

Testing for Shorted Bypass Capacitors

In order to save time and work unsoldering capacitors, a shorted capacitor can be easily determined by using an ohmmeter range that is less than the resistance of the shunt. A 0-10 ohm range will show infinite resistance for good capacitors and zero resistance for shorted capacitors because the shunt resistor has a resistance of more than 10 ohms d.c. —*R. M. Hughes, Claymont, Del.*

Tools for Auto Radio Controls

Quite often customers bring auto radio sets into our shop for repair which they remove from their car and leave the control cable in the car. This of course makes it difficult to work on the set without suitable means of turning the tuning and volume controls.

The writer has made several tools for this purpose from the adapter end pieces of control cables which are available through practically any local jobber. The most popular types are ones with a two prong fork shaped key and a single blade key. These can be soldered on the end of inexpensive screwdrivers and they will be found very useful when working on auto sets.—*Edgar Carnes, South Zanesville, Ohio.*



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.

WILL BUY service business including material and clientel. Will buy Supreme Vedolyzer, Audolyzer Signal Generator. Hickock 555, Weston Oscillator, Rider's Books and Chanalyst. M. Abramovich, 894 Riverside Drive, New York City.

WILL SELL OR EXCHANGE Radio Course, Meissner Analyst, Multitester, Tube Tester, C-B Signal Generator, Rider's Manuals, Radio books, etc. Kay Radio Service, 319 Main St., Niagara Falls, N. Y.

WANTED — Professional Recording Equipment, high fidelity amplifiers, meters, 35 mm. silent motion picture projector straight feed. Obsolete RCA photophone equipment. For Sale or Trade—Meisner 9-1039 recorder—playback motor turntable unit, demonstrator, perfect condition, \$12.50. Alfred B. Werhan, Manlius, N. Y., P. O. Box 142.

WANTED—A set of Rider's Manuals in exchange for a set of Jeff Corydon matched irons, Macgregor driver and spoon and a portable radio. Cyrus B. Witter, 28 Elizabeth Ave., Newark, N. J.

WANTED—Used Kodak 35, prefer f/3.5, range finder, or Kodak Bantam f/4.5 good condition. Have Rider's "Service" Mags. for sale from first copy. Make offer, fine condition, like new. A. Barton, 81 Lawrence St., Hartford, Conn.

FOR SALE—1 GHQ 1/5 H.P. type C gas engine complete with instructions. Will sell for \$3.50 cash or swap. What have you. Nelson K. Stover, 751 Tioga St., York, Pa. W3BBV.

WANTED—Rider's Manuals 7 to 12 inclusive. V. Taverna, 155 Blackford Ave., Port Richmond, Staten Island, N. Y.

WANTED—Complete files of Radio Craft from 1931 to 1942, also want Superior No. 1280 tube-set tester. State prices and condition in first letter. I. W. Stublebine, 238 W. Elm St., Reading, Pa.

SWAP OR SELL—\$50 violin for typewriter, binoculars \$20 or trade for Browning Freq. Meter. Eimac 150T's \$30. Swiss dual speed transcription motor with 16" turntable and 10" Astatic Trutan pick-up for record changer. Edward Materski, 1950 Trowbridge, Hamtramck, Michigan.

FOR SALE—New and used receiving and transmitting parts and equipment. What can you use? Send for list. Want good photo enlarger. Herman Yellin, W2AJL, 351 New Lots Avenue, Brooklyn, N. Y.

WANTED — Hickock tube checker also analyzer, price must be reasonable. R. Miller, 1315 So. Andrews Ave., Ft. Lauderdale, Florida.

WILL TRADE—Complete stock of chemicals of all kinds used for experimental purposes for a signal generator or Superior channel analyzer. Chester T. Martowicz, 116 East 7th Street, New York City.

SELL OR SWAP—Remington Model 24 repeater, 10 shot .22 rifle, double barrel shot gun, both in A-1 condition. Want good short wave receiver, drafting sets, slide rules. What else have you to offer. Oliver F. Klein, c/o OK Radio Service, 2235 N. 39 St., Milwaukee, Wis.

FOR SALE — Hallicrafters SX-24 receiver with cabinet. Perfect condition. Slightly used. Cabinets in perfect condition. Will sell for \$55.00. William Platz, 4354 Viero Ave., Bronx, N. Y.

(Continued on page 9)

SERVICING UNIVERSAL A. C. - D. C. RECEIVERS*

PART II

FILTER CONDENSERS

Filter Condenser Connections. When the filter choke is in the positive side of the power pack circuit, all electrolytic condensers will have a common negative lead. When the filter choke is in the negative side of the circuit, however, the negative side of the input filter condenser does not connect to ground (chassis) and consequently requires a separate lead. In this case

denser lead and determine where it goes in the circuit. By this time you will be able to recognize the type of power pack circuit used. Label each lead on your sketch according to the point to which it connects, and indicate its polarity. Once you recognize the type of circuit used, you will have no difficulty in determining the polarity of any point with respect to the "B—" lead and in drawing the in-

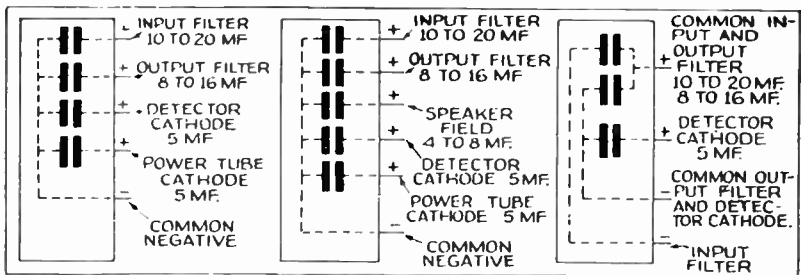


Fig. 7. Typical connections for the electrolytic condenser blocks used in midget A.C.-D.C. sets.

the 2 filter condensers may have a common positive lead, as is the case in Fig. 5.

Failure of filter condensers is quite a common occurrence in universal A.C.-D.C. receivers. Oftentimes there will be no markings whatever on the old condenser block to serve as a guide in ordering a new unit; in a case like this, the following method of reasoning will allow you to order a satisfactory replacement.

Make a sketch of the old condenser block, showing all leads which come out from it. Now trace each con-

tinal connections for the condenser sections. Condenser block sketches for the power pack circuits given previously in this article are shown in Fig. 7.

Here are a few tips toward indentifying the various leads. If the filter choke is in the positive side of the power pack circuit, as evidenced by a direct connection from one of the choke terminals to the cathode or cathodes of the rectifier tube, then all of the filter condensers in the block will have a common negative lead. You can identify this common lead by the fact that it connects to the re-

* By courtesy of "Radio-Television Reference Manual."

ceiver side of the ON-OFF power switch either through the chassis or through a common lead. Once this is done, you can draw in the internal connections of the condenser block just as has been done in Fig. 7.

If the choke is in the negative side of the power pack circuit, as evidenced by the rectifier tube cathode tracing directly to the screen grid of the power tube without encountering any current-limiting or choking devices, you can locate the negative lead for the input filter condenser by the fact that it will be the only filter condenser lead connected to the switch side of the filter choke. Where the loudspeaker field coil gets its current from separate section of the 25Z5 rectifier tube, there will be a condenser across the loudspeaker field coil with its negative lead also connected to the switch. In most cases a single common negative lead is used for both condensers. The positive leads for these condensers are easily identified; the positive lead of the loudspeaker filter condenser will go to that 25Z5 cathode to which the speaker field is also connected, while the positive lead of the input filter condenser will go to the other cathode of the rectifier tube.

Having located the leads and determined the functions of the various sections of the electrolytic filter condenser block, you are ready to place on your sketch the approximate capacity values for each section. Use the following general rules as your guide:

Input Filter Condenser—any value above 10mf., rated at 200 volts D.C. working voltage; Output Filter Condenser—any value between 8 mf. and 16 mf. rated at 200 volts D.C. working voltage; Loudspeaker Field Coil Filter Condenser—between 4 mf. and 8 mf., rated at 200 volts D.C. working voltage; Cathode Bypass Condensers—5 mf., rated at 25 or 35 volts D.C. working voltage.

While condensers smaller than the minimum values given should not be used, the maximum values may be ex-

ceeded without impairing the operating qualities of the receiver. The voltage ratings can likewise be higher than the minimum values given.

Your electrolytic condenser block sketch now gives you the necessary data for ordering a replacement unit. If a unit having the desired internal connections and desired capacities is not available, the next best thing is to order a condenser block having the desired capacities and separate leads for each section. If even this is not available, make up your condenser block from two or more separate electrolytic condenser units having the desired capacity and voltage ratings. When ordering separate units in this way, be sure to check the available space and choose units which are small enough to fit this space.

JUSTIFIED COMPLAINTS

Is the Customer's Complaint Justified? The operating characteristics of a universal A.C.-D.C. or "cigar box" receiver of the T.R.F. variety must be carefully considered before attempting service work, in order to make sure that the customer's complaint is justified. These little receivers are designed primarily for reception of powerful local stations which are spaced well apart in the broadcast band. The receivers have little selectivity, so that local stations which are separated by less than 100 kc. may be expected to interfere with each other. The receivers likewise have poor sensitivity, and the reception of distant or even semi-distant stations will therefore be unreliable. Where the complaint of the customer simply involves one of these factors, no service problem exists. Likewise, good fidelity and freedom from blasting at full volume should not be expected from these receivers, particularly if they employ a magnetic-type loudspeaker. The customer making complaints which involve these factors is asking too much of his receiver and requires a better receiver to meet his needs.

Common Troubles. The simplicity of the circuits used in universal T.R.F. receivers greatly limits the variety of troubles which often may develop. The complaints which will most often be encountered are: set is dead; local signals are weak, hum is excessive; set distorts; oscillation (squealing) exists; set operates intermittently.

Servicing "Dead" Receivers. When the receiver is "dead," determine first of all if the tubes light or warm up. An open-circuit somewhere in the series filament circuit is indicated if they do not. Take out each tube in turn and check its filament prongs with an ohm-meter for continuity or test the tube in a conventional tube tester. If tubes are OK, check the filament voltage-dropping resistor with an ohm-meter. If a ballast tube is used for this purpose, inspect its socket connections in order to determine between which prongs there should be continuity. If a line cord resistor is used check with an ohmmeter between the line cord resistor lead and each prong on the wall socket plug in turn (the plug being removed from its outlet); with the power switch open, or one tube removed, there should be continuity between one of the prongs on the wall plug and the receiver end of the line cord resistor if this resistor is OK. If there is a shunt resistor across the pilot lamp or lamps, check this with the ohmmeter for continuity. Check pilot lamps also for continuity.

If the set is dead but all tubes light up and test OK, use the D.C. voltmeter section of your multimeter to measure the voltage between the common rectifier-tube cathode connection and the tuning condenser frame (this always being at "B—" potential and convenient to reach with a test probe). With the set plugged into an A.C. outlet, you should measure between 90 and 120 volts, while with the set plugged into a D.C. outlet, this voltage may be as low as 85 volts. If no voltage is measured here on D.C., try reversing the position of the line plug; proper polarity must always be observed on D.C.

A low rectifier-tube output voltage on A.C. operation is an indication of defective filter condensers. Check each condenser or condenser section in turn, by disconnecting one of its leads and then checking the condenser for leakage with an ohmmeter. If leakage resistance is lower than the normal value for a condenser of similar size, the condenser is defective and requires replacement. Even if leakage resistance is normal (check the leakage resistance of a new condenser of about the same size for comparison if still uncertain), the condenser may still have deteriorated through drying out of the electrolyte, with a resultant lowering of its capacity. Try new filter condenser at each position in turn, while the old unit is disconnected. Separate 8-mf., 475-volt test condensers should be kept on hand for tests like this on any receiver. If the rectifier-tube output voltage comes up to normal when a new condenser is inserted, this is a sign that the old condenser was defective.

Even when only one section of the old electrolytic filter condenser is bad, a new block should be installed, for there is a good possibility that the other sections of the block will soon fail in a similar manner if left in the receiver. When using a test electrolytic condenser in this manner, you must of course, observe polarity very carefully, for connecting an electrolytic condenser to a voltage source with improper polarity will in most cases ruin it.

If the rectifier tube output voltage of the "dead" receiver is normal check the D.C. voltages between the "B—" point in the circuit and each plate and screen-grid prong of each tube. Repeat this test for the corresponding tube socket lug; failure of the two readings for any one tube electrode to correspond indicates a break between the lug and the tube socket prong connection, making the installation of a new socket necessary.

Improper voltage on any tube electrode will point to the source of trouble. Just as in the case of an

ordinary A.C. receiver. The circuit diagrams in this article will give you an idea as to what voltages to expect; obviously the detector tube plate voltage and the control-grid voltage on the power tube will be quite low due to the high values of resistance in these circuits.

Simple continuity checks of various receiver circuits often prove the speediest way of locating trouble in a "dead" receiver. There should be continuity between the rectifier-tube cathode and the plates, as well as screen-grids, of all other tubes in the receiver, with the exact ohmmeter reading depending upon the sizes of the resistors in the various circuits. There should be continuity from the receiver side of the ON-OFF power switch to the control-grids, as well as the cathodes, of all tubes in signal circuits.

Rotor and stator plates of tuning condensers are sometimes shorted together; inspection will often reveal such a short, but if doubt exists, disconnect the coil lead from the stator of each section and check each section individually with an ohmmeter. There should be no continuity between rotor and stator plates of a section.

To check the bias resistors in the cathode leads of the detector tube and the power tube, first disconnect the electrolytic cathode bypass condensers and then check the resistor with an ohmmeter. These condensers often have sufficient leakage to mask the effect of an open resistor. While making this test, check the leakage resistance of the bypass condenser with the ohmmeter.

Circuit disturbances tests on these receivers are limited to touching the control-grid caps with the finger or removing the caps, for pulling out a tube opens all filament circuits and masks the effect of the test. The above tests should result in location of the trouble in any "dead" universal-type receiver which uses a conventional T.R.F. circuit.

ADDITIONAL DATA

Servicing Weak Receivers. Essentially the same tests are made on a weak receiver as on a dead receiver. In addition, the dynamic loudspeaker field coil and its supply should be checked by applying a screwdriver to a pole piece; absence of pull indicates a defective field coil or no supply voltage to it. The continuity of the aerial should be checked with an ohmmeter, and the trimmer condensers should be readjusted for maximum output. Weak reception can often be cured by moving the control-grid leads around enough to secure a small amount of regeneration.

It is a good idea to check the line voltage in the customer's home when weak reception is the complaint; if this voltage is below normal, report the matter to the local power company. Ordinarily there is nothing you can do to a receiver of this type to offset low line voltage. Excessively high line voltage is not serious in these small receivers, for the tube filaments and the pilot lamps are designed to stand up under all normal fluctuations in line voltage. With D.C. power lines particularly, the line voltage on peak loads may drop to a point where no reception is obtained, and again the trouble is not the fault of the receiver.

Servicing Receivers for Hum. A certain amount of hum is to be expected in any receiver operating from an A.C. line. Many Service Men forget this fundamental fact and spend hours trying to eliminate perfectly normal hum which they observe after correcting the original defect in the receiver. Hum should never be so loud, however, that it becomes annoying when listening to the program from a local station. Excessive hum is often caused by a reduction in capacity of filter condensers, by a heater-to-cathode short in some tube, by an improper connection of a filter condenser, or by an open control-grid return.

Curing Distortion. Improper centering of the loudspeaker voice coil

is common cause of distortion; the usual corrective methods apply here just as in larger receivers. Always try a new output tube when distortion is the complaint, for the great amount of heat dissipated by the heater in this tube often affects other electrodes in the tube.

A leaky coupling condenser between the detector and the grid of the output tube is another likely cause of distortion. If you can measure a D.C. voltage across the grid resistor of the output tube when the positive voltmeter probe is connected to the grid end of the resistor, a leaky coupling condenser is indicated; replace with a 0.05-mf., 600-volt cartridge condenser if you cannot determine the value of the original part. Check the ohms values of the cathode bias resistors, and check cathode bypass condensers for leakage in the manner already described, for these are also possible causes of distortion.

Distortion often occurs when the volume control is turned up too high when tuned to a strong local station; this is a normal condition due to overloading of the receiver stages or of the loudspeaker, and the remedy obviously is for the customer to keep the volume level below the point at which distortion begins.

Curing Oscillation. A certain amount of oscillation is to be expected in these midget receivers when the volume control is advanced to its maximum setting, for the designers of these sets depend to a certain extent upon regeneration for high gain. Oscillation at low volume control settings can be due to open bypass or filter condensers, as well as to failure to use tube shields if they were originally provided. Shielding of the control-grid leads of the R.F. and detector tubes, if these leads are over-exposed, or changing the positions of these leads are likely cures. Connecting the aerial to an external ground is sometimes effective in eliminating oscillations. Cramping the aerial into a small space will often cause circuit oscillation; keep this wire

stretched out to its extreme length. As a last resort, when oscillation cannot be cured in any other way, detune the trimmer condensers until it ceases.

General Suggestions. Unless you are thoroughly familiar with the socket connections of the tubes used in these midget receivers, always have tube base layouts at hand for ready reference. These layouts are particularly helpful when making point-to-point voltage or resistance tests and when locating various parts in the receiver.

THE RADIO TRADING POST

(Continued from page 4)

WANTED—Philco signal generator, Model 088. State condition and lowest price. Miller Radio Service, P.O. Box 104, Sweetser, Ind.

SWAP—Large quantity of chemicals, rubber tubing, glass rods and tubing, horn pan scales, tripods, bunsen burners, condenser, cork and rubber stoppers, 3 ring stand, graduate, etc. Originally cost \$75.00. Want radio testers or short wave set (commercial). Lester Mulvey, 694 Western Ave., Lynn, Mass.

SELL OR SWAP—20 Delco Auto Radio, new and in original cartons, control head panels; assorted for various car dash openings, \$10.00 or will trade for new merchandise, radio appliance or auto parts. Auto-Appliance Supply, Granby, Mo.

SELL—A few never used 3rd edition Mal-lory-Yaxley encyclopedias, postpaid 35c each. Several used 456 K.C. midget I.F. transformers complete. Make offer. Have 3 ft. telescope for sale or trade. Max Shively, 3115 Ingham, Lansing, Mich.

WANTED—Will pay cash for a used Dynamic mutual conductance tube tester in A-1 condition. Send full particulars and lowest asking price in first letter. Leo Kolehmainen, 1426 1/2 Midvale Ave., West Los Angeles, Calif.

WANTED—Books, pamphlets, or any information on the construction of sensitive homemade voltmeters, ammeters, direct reading ohmmeters, etc. Will pay cash for any material used. Write stating what you have and your price. Ervin F. Taylor, R.F.D. No. 2, Steubenville, Ohio.

WANTED—Rider's Manuals 1-12 or 6-12 inc. with supplements, and reasonable price for cash. Edward G. Fox, 1399 Winchester W., Detroit, Mich.

FOR SALE—2 way inter-phone communication system (home made), built in mike and speaker, complete and ready for operation. List price \$25.00, will sell at sacrifice and will answer all letters. Don Stelzner, 3710 Minnehaha Avenue, Minneapolis, Minnesota.

FOR SALE — Riders Manuals 1 and 4, Gernsback Manual No. 7, Superior Tube Tester Model No. 1180S, Transformers, Condensers, Resistors, new parts for old sets. What do you need? Make offer. Lyman's Radio Shop, Williston, Florida.

WANTED — A 34 foot 20 meter Premax Vertical Antenna with base insulator. Late model in good condition preferred. Will pay cash. All mail answered promptly. Carl E. Zander, 3527 Marjorie Way, Sacramento, California.

WANTED — Hickock or Supreme Vacuum Tube Volt Meter, and signal tracing equipment, must be in perfect shape. Will pay cash or have two Macy 6 foot trumpets with Fox units and field supply for part payment. What have you? Fenton Electric Service, Boonville, N. Y.

WANTED—Test equipment, meters, transmitting tubes, etc. Write stating price and condition of equipment to Test Equipment Clearing House, 901 W. Touhy Ave., Park Ridge, Ill.

WANTED—Work as radio and electronic apparatus specialist. Responsibility, production, efficiency, major interest permanency. Radio in all phases, 12 years spare time experience, finished television course in '37. Specialized in all makes. Steady, sober, alert, co-operative, for further info. correspondence answered. Authorized radiotrician. Francis J. Pesarchic, Box 462 A Fairfield Ave., Johnstown, Pa.

FOR SALE — Triplett volt-ohmmeter No. 1200-C; tube tester, No. 1213, point to point tester, No. 1220-C, all in A-1 condition. F. M. Wilson, 310 NE 1st Ave., Mineral Wells, Texas.

FOR SALE—One Clough Brengle signal generator, mod. O.M.A.; one Clough Brengle 3 inch oscillograph, mod. C.R.A. Haven't been used over 25 hours all told, the pair for \$50 cash. Arthur Murray, 2116 North E, Elwood, Indiana.

TRADE — Have electrical engineering course 62 lessons, also Rider's Manuals No. 2, 3, 4, 5 new and index. Want watch makers lathe with chucks, with or without motor, or what have you? W. J. Porter, 198 Durham St., Mt. Airy, N. C.

WANTED — RFO-5 Hickok Oscillograph or 560A Supreme Vedolyzer and 561 Supreme Oscillator. State condition, tubes used and price. O. F. Hamm, 4751 Louisiana Ave., St. Louis, Mo.

FOR SALE—Rider's Manuals 1 to 11 inc., 1 and 2 black, 3 green, balance standard blue. Complete with all supplements, some never opened. Sell for forty-five dollars cash. Also Lafayette model 275A 6 volt 25-35 watt amplifier with Rola 6v. G12 speaker, and Amperite RB-H mic and stand. Sell \$40. Battery Radio Service, 206 Branch Ave., Red Bank, N. J.

WANTED — Capehart or RCA record changer which will play both sides successively, with or without amplifier. State make, model, condition, and price. L. A. Schaffer, 131 N. 24, Camp Hill, Pa.

WANTED — A two tube Kadet radio with white bakelite cabinet and in working order if possible. If not in working order must be repairable. Original set was about five or six years old. Main point is white cabinet and essential mechanical parts. If you have one let me know what you want for it. Libbys Radio Service, 18 Ward St., S. Boston, Mass.

FOR SALE — Triplett V.O.M. and Triplett signal generator, excellent condition, late model. Also lessons, diagrams, tubes and parts. Write for particulars. Arthur W Albee, Oshkosh, Neb.

WANTED — Weston ohm voltmeter No. 663 or Weston analyzer No. 665 in A-1 condition only, no junk. Will pay reasonable price and cash, what have you to offer. Emil Lapiana, 106 East 181st St., Bronx, N. Y.

WANTED — Position in a radio defense factory for young man, ineligible for draft. Graduate of RCA School, but no experience. Willing to learn. Will accept nominal salary, but must have opportunity for advancement. Sidney J. Brass, 560 Beck St., Bronx, N. Y.

WANTED — Small miniature machine lathe in A-1 condition with all attachments you may have. Will pay reasonable price and cash, what have you to offer. Emil Lapiana, 106 E. 181st St., Bronx, N. Y.

FOR SALE OR TRADE — One army communication receiver, one instructograph with oscillator, phone, five tapes and instructions, AC oscillator with speaker in case, misc. radio parts. Want camera, photographic equipment, etc. F. L. Emerson, 7 1/2 N. Second St., Yakima, Wash.

CASH — For Rider's, Hickok, Supreme, Superior, etc., Signal Chasers, V.T. voltmeters or meters. State price, condition and model. The Simplex Shop, Salina, Kan.

WANTED — Any make 12" television receiver, cash, new or used. Also Rider's Manuals 1 to 12 inclusive. M. B. Davis, 807 S. 6th St., Philadelphia, Pa.

WANTED — Books entitled "Wireless Telegraphy" by Zenneck & Seelig, and "Light Waves and Their Uses," by Michelson. State price, condition, and edition of books. Oliver Riddell, 1332 Hood Ave., Chicago, Ill.

FOR SALE — Used parts for all makes and models of radios. Obsolete and scarce parts. Please order by make and model of set and part number. Martin L. Pitts, Terrell, Texas.

FOR SALE — Two Neon Window Signs, four inch letters in red, size approximately 16" x 36", one sign reads "Radio Sales & Service," other sign reads "Electrical Supplies," each sign equipped with heavy duty 110 volt A.C. transformer. Will sell singly or together very reasonable. Write to C. Leslie Purcell, 137 Murray Ave., Goshen, N. Y.

FOR SALE — New Reading Chain Hoists, Spur Gear, Ball Bearing— 3 1/2 ton, 8' lift \$70 each; 2 1 ton, 8' lift \$90 each; 2 2 ton, 9' lift \$140 each; 1 3 ton, 10' lift \$180. - 20% off. 1 1/2 ton (used) Triplex Spur Gear, A-1 \$40 cash. R. Bertolette, 505 Astor St., Norristown, Pa.

WANTED — General Electric Receiver, 1938, with electric tuning and electric clock program preselector for full week programs. Must be electrically and mechanically perfect. State price and condition. Bates Laboratories, 33 Sunset Drive, White Plains, N. Y.

WANTED — Rider's Manuals 1 to 12. Must be in good condition. Any or all with index and supplements. Thos. Squartino, 572 N 7th St., Newark, N. J.

FOR SALE — One rotary converter 120 volt a.c. to 120 volt d.c. at about 2 1/2 amps., almost new. One Martin saxophone (soprano low pitch with case). One 6 volt motor generator to 180 volts at 40 mills. A. W. Kline Radio & Electric Service, 510 S. Hudson, Oklahoma City, Okla.

WANTED — RCA Rider Chanalyst. Must be in good condition. Also a RCA voltmeter, a 912-P Precision portable tube tester 1941 model, and RCA tip file. Paul Copito, 637 21 St., Erie, Pa.

WANTED — Weston meters 301 0-100 mils to 0-500 milamps., and Weston 476 or 425 meters. Also any Weston 528 and 489 meters. Leo F. Kersey, B4, White Sulphur Springs, W. Va.

WANTED — Hickok RFO-5 oscillograph or Clough-Brengle or RCA 3 or 5" models; also floor stands for microphones. State condition and price. Will trade any radio merchandise or pay cash. A. G. Penman, Radio Labs., Hudson, Wis.

CASH — We will pay cash for Rider's Manuals 7 to 12 inclusive if in good condition. We also wish to purchase a Supreme Vedolizer in good condition. All inquiries answered. Moch Radio & Sound Service, 5925 S. Albany Ave., Chicago, Ill.

WILL TRADE—D.C. multimeter, full wave, copper oxide rectifier, Radio Craft magazines and parts for experimenting and set building. Want Service manuals, chemical apparatus or what have you? My list for yours. Floyd Goff, Black Mountain, N. C.

FOR SALE — Hickok tube tester model AC51 \$45; Rider's Manuals Vol. 3, 5, 6, 7, 8, A-1 condition \$35; Philco Signal Generator Mod. 016 \$12; and many other tubes, parts, etc. E. R. Service, 950 Michigan Ave., Hammond, Ind.

SWAP — GTC Porta Power Battery Pack for two volt sets for one that works on 1.4 sets. Philco set tester for sound equipment. Want 6 volt sound system. Less speakers. Shines Radio Shack, 69 West 23rd St., Chattanooga, Tenn.

FOR SALE OR SWAP — Kadette Tunemaster model KRC2 also Penwood Electric Numeral Clock in walnut case, good condition. M. Francis, 1232 E. 75th St., Chicago, Ill.

WANTED — 3' panel type dc voltmeters, 1000 ohms per volt, range 0-50 or 0-300. Also impedance bridge for measurement of inductance, Tobe-Deutschman or similar. Blist. Electrical School, Takoma Park, D. C.

WANTED — RCA TMV-133A Crystal Calibrator. State condition and lowest price. R. Bronson, 142-18-230 Place, Rosedale, N. Y.

CASH — For oscillators and oscillographs. State price, condition, and description. The Simplex Shop, Salina, Kan.

WANTED — Automatic record changing player unit, preferably Garrard or Capehart. Please state model number, condition, and cash price. Dexter Kurs, 4525 45th St., Long Island City, N. Y.

WANTED — Factory built all-wave receiver any make. Age, cabinet or condition no object just so it is complete. Also want testing equipment any description. All letters answered. Glenn Watt, 415 W 1st St., Chanute, Kan.

SELL — Many receiving tubes; condensers, variable and fixed types; tuning forks 60, 256, 320, 384, 512 cps.; GE 1KVA 4400-0-4400v. transformer; telegraph sounders, output trans., etc. No reasonable offer refused. Want meters, acorn tubes, Edison storage cells, 24/1500 v dynamotor, 150w 110v DC to AC 60 cps. converter. Grote Reber, 212 W. Seminary Ave., Wheaton, Ill.

FOR SALE — 1 new Thordarson model T-25W28 Universal 6 volt DC - 110 volt AC amp.; 1 new X-10 Astatic Crystal mike; 1 Atlas large type baffle sound speaker projector; 1 Utah P.M.D. 136 oz. magnet speaker; 1 100' extension speaker cable, plug, and sockets; 1 Warner 3rd hand man. for microphone; 1 new complete auto. top speaker. All merchandise is brand new. Will sell complete outfit at present factory wholesale price. Cash or terms. Berry's Radio Service & Distb. Co., Box 243, Olive Hill, Ky.

WANTED — 30-watt mobile P.A. system complete with two projectors, car platform, etc. A direct drive 78 RPM recording motor. State make, price and condition. Rays Radio Service, 3160 Grayson Ave., Ferndale, Mich.

WANTED — Any or all of Rider's volumes. State lowest price, condition, etc. Radio Service, Pollock, Mo.

WANTED — CRI engineering course, oscilloscope, VOM, marine receiver, and 50-100 watt cw transmitter. Will pay cash. Percy Ott, 507 Juniper St., Quakertown, Pa.

FOR SALE — Triplett tube tester, signal generator, volt-ohm milliammeter, Solar capacitor analyzer. Analyzer parts of all kinds. Meters, speakers, most anything one wants. Rider's Manuals, turntables, pickups. \$200 takes all. Radio and Electric Service, E. V. Coleman, Woonsocket, S. D.

WANTED — 0 to 1 m.a. moving coil type meter. Will buy even if coil is burned out, as long as the meter's resistance was 50 ohms. State price in letter. Arthur Manuel Lee, Gen. Del., Boonville, Mo.

WANTED — Will pay cash for a No. 10 Riders Manual and a 16" 2500 ohm field dynamic speaker that will handle 30 watts. State condition and best cash price. Also interested in testing equipment. Prices must be right. Lovett's Radio Shop, Box 143, Newland, N. C.

SALE OR TRADE — Over 60 Weston and Jewell meters, all ranges. Want camera, .22 repeater rifle or cash. L. Tulaskas, 104 N. Eaton Ave., Indianapolis, Ind.

FOR SALE OR TRADE — Radio and Television Today magazine, from December, 1939, to August, 1941. Also November, 1941, copy. Service magazine from April, 1940, to April, 1942. Make offer. Paul H. Prokes, 1955 W. Schiller St., Chicago, Ill.

FOR SALE—Proceedinas IRE, 1936-1940, in one lot or will sell separately. Also number of technical books on Radio, Sound, Recording, etc. Also Transactions of Society of Motion Picture Engineers, 1921-1941. Norton, P. O. Box 7011, Coral Gables, Fla.

WANTED — A volume of RCA Victor Service Notes for 1929-30. The above is one volume. It must be in good condition and readable. Joseph R. Houston, Box 31, New Florence, Pa.

FOR SALE — Hi standard model C target pistol, with 4½" barrel. Practically new, fired only a few times. New Red Head holster included. Will send express collect \$19.50. Will send subject to inspection if requested. Malcolm D. Burdick, Hampton Station Road, Hampton, Conn.

WANTED — Capacitor-resistance analyzer similar to Solar model CB; also Beat-frequency audio oscillator. Philco, Clough Brengle or similar. Give ranges, condition, shipment F.O.B., best cash price, or what would like in trade. Bob Eubank 1227 Windsor Ave., Richmond, Va.

HAVE — 1 Jewell pattern 88, 0-200 milliammeter; 1 Jewell pattern 78, 0-150 a.c. voltmeter; both 3" bakelite cases. Three Jewell pattern 135, 0-5 d.c.v. "plug in" type; 3 Weston model 506 type L-21, 0-5 v. "plug in" type, 2" metal cases. Want capacitor and resistance bridge analyzer, oscillator, cash or what have you? L. Putnam, Woodward, Iowa.

FOR SALE OR TRADE — Rider's Manuals 1 to 12 with supplements, Triplett meters, tube checker, signal tracer, oscillator, condenser decade box, tubes, speakers, all parts. A.C.-D.C. power drill, assorted tools. Send stamp for list. Al's Radio Service, 460 Atlantic St., Stamford, Conn.

HAVE German Folding Fine Camera using 120 film F3.8 lens F10CM Compur Shutter. Best offer. Want C-D Capacitor analyzer Model BF50 in trade. W. S. Crooks, Gen. Del., Akron, Ohio.

HAVE RCA communication receiver; 7 tubes; Beat Oscil. Want a signal generator or \$35 cash. Also need a filterol adapter for Weston (771) tube checker. Arnold Halpen, Tudor Radio Service, 119 Tudor Pl., Apt. A., Bronx, N. Y.

WANTED — Used communication receiver. Must be in very good working order. State make and model, condition and price. What do you want in swap? Have many parts to trade. Anthony Pusateri, 1101 Fleming St., Coraopolis, Pa.

SWAP — National FBXA and Peak 2 stage pre-selector. Set has crystal filter, air tuned IF and coils, 20, 40, 80 meter coils and 7000-11500 k.c. Peak covers 15-200 with 9 tubes. Rola PM 8 inch speaker. Also pack if desired. Excellent condition. Cost net \$97.50. Want electric drill, capacitor-resistor bridge, camera, V.T.V.M., movie camera, projector, or what have you. Bob Eubank, 1227 Windsor Ave., Richmond, Va.

WANTED — Good short wave receiver, mechanical drawing or drafting set, slide rule, binoculars. Describe fully stating best cash price and what can you use in exchange. Oliver F. Klein, c-o OK Radio Service, 2235 N. 39th St., Milwaukee, Wis.

FOR SALE — Hickock RFO-4 Oscilloscope, Hickock Microvolter, Hickock 210X Zero current voltmeter, Hickock 155 Traceometer, Hickock 51X tube checker, Solar Capacitor checker, Wright DeCoster test speaker, Weston 664 AC and capacity meter, Weston 663 volt ohmmeter. Charles G. Peroz, 46 Commonwealth Ave. Ext., Middletown, N. Y.

FOR SALE OR SWAP — Supreme 85 tube tester, relays, electronic bug, tubes, Western Electric 25B amplifier, 3/4 HP gas motor A-1 shape, T20,825,884 duplicating machine, new Sunbeam shave-master. Want multimeter, oscilloscope, National receiver, good typewriter. R. D. Dawson, 1308 "F", The Dalles, Ore.

WANTED — We are in the market for a complete set of Rider's Service Manuals. Must be in good condition. Will pay cash. Robertson Radio Service, 221 1/2 W. Main St., Greenwood, Ind.

WANTED — New or used self-contained record player and amplifier or wireless record player. Have single tube 50 watt c.w. transmitter, new Taylor TZ40, Bliley crystals for 160, 80, and 40 meter bands, Westinghouse 1/4 HP 110 v. a.c. washing machine motor, and all kinds of camping equipment. John E. Cann, 1607 Terrace Rd., Mt. Washington, Baltimore, Md.

FOR SALE OR SWAP — 5 tube public address system about 9 watts output, homemade job. Robert Roach, 3036 Marcy St., Omaha, Neb.

FOR SALE — Supreme model 339 de luxe analyzer; A-1 condition, portable carrying case; DCV 5-1250, DCMA 5-1250; Ohms 0-2 M. \$17.50 cash. Art Radio Service, 1422 7th Ave., Rock Island, Ill.

SALE OR TRADE — Radio parts and test equipment, refrigerating tools, tanks, Graphic and Graflex cameras and photo equipment. Want slide rules, pocket or small microscope, tool chest, micrometers and precision measuring tools, surface gauge, vernier calipers, etc. Wm. Hansen, Niles, Mich.

WANTED — Weston Model 669 Vacuum Tube Voltmeter and good make of Radio Communication receiver. Best cash price, paid for same. Radio Repair Service, 173 Main St., Mexico, Maine.

WANTED — Vacuum Tube Voltmeter, Signal Tracer, Rider's Manuals, and condenser tester. Will pay cash. Lawrence Chronister, Paola, Kan.

WANTED — One or two 884 Gas Triode tubes. State price and if new or how long used. Would prefer new tubes. George C. Anderson, 2236 Indiana Ave., St. Louis, Mo.

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

TRADE — Have a Clough Brengle 88A VTVM cost \$50. Will trade for Triplett Modulation monitor, Abbott MRT or TR-4, Hallicrafters HT-7, Browning Frequency Meter, or good amateur receiver. Walter Kryger, 912 W 151 St., East Chicago, Ind.

TRADE OR SELL — 1930 Model A Ford cabriolet in good condition all around. Will trade for \$125 worth of equipment. Want Precision or Hickok signal generator or combination tube checker and multi-meter condenser analyzer or 3" oscilloscope or late model a.c.-d.c. communication receiver or Contax camera F.2 lens or cash. R. Dopler, 436 E. 59th St., New York.

FOR SALE OR TRADE — 30 tube Scott Philharmonic with robot control in Waverly Console complete with 15" and 2 tweeter speakers plus extension speakers (T Pad controlled). Scott F.M. Tuner. Scott 23 tube high fidelity set complete in Tasman Console. Also 3 all wave Lincoln de luxe 12 tube high fidelity receivers, 1 complete with Console. Wanted: Noiseless Typewriter, Chanalyst, Signalyst, Volt Ohmst, Jr., 12 Rider's Manuals. Henry Bal, 20 South 13th St., Newark, N. J.

WILL TRADE — Dumont type 164 Cathode Ray Oscilloscope in perfect condition for Hickok Oscilloscope Model RFO or a Hickok Model 155 Traceometer. Must be in good condition. Will add cash if necessary. John Bennett, 184 Midland Ave., Garfield, N. J.

WANTED — Will pay cash for Rider's Manuals 7, 8, 9, 10, 11, 12; Rider chanalyst; late precision tester, 1941, for low price; and a.c. power drill, and tools. Joseph E. Trahan, 45 Dyer St., Danielson, Conn.

WANTED — .22 cal. Winchester rifle. State condition and lowest price. Geo. A. Gould, 1540 E. 24th St., Brooklyn, N. Y.

WANTED — Rider's chanalyst, must be in A-1 shape and cheap for cash. Southern Radio Service, Thomasville, Ga.

FOR SALE OR TRADE — Gardiner-Levering tape sender, type J with fresh rolls tape. Excellent condition. Also 100 l-watt carbon resistors. Want Univex-Mercury F3.5 35mm camera or \$15 cash for above combination. Earl Collins, 114 Carroll St., New Bedford, Mass.

FOR SALE — Brand new rack and panel power supply unit. Has one 1000 v.d.c. 300 m.a. power supply and one 600 v.d.c. 200 m.a. power supply. Highest quality parts throughout, including 866-A rectifiers and C-D capacitors. Must sacrifice at \$60. Will send photos on request. Charles Blockman, 1011 South Ledford St., Harrisburg, Ill.

FOR SALE — Crosley facsimile reproducer (printer) used only 10 hours. Complete with O24 tube, stylus, 1 roll of printing paper. In beautiful walnut cabinet. Requires 8-10 watts audio driving power. Make offer. All letters answered. Thompson Irwin, Jr., 37 Cottage Park Road, Medford, Mass.

WANTED — A good Signal Generator. State price and condition. No junk wanted. Am willing to pay a fair price. Write to Arthur A. Hale, 357 East Park Blvd., Akron, Ohio.

WANTED — Rider's Manual No. 1. Must be complete, clean and cheap. Lee W Nygaard, Box 97, Gillette, Wis.

WANTED — Tubes, parts, transformers, and batteries on consignment from dealers, companies, factories. Good reference. Lee Nordan, Benson, N. C.

WANTED — A complete television set wired or in kit form. Need also a five inch 1802P4 tube and other parts for television. What have you? State condition. Aaron Ignal, 850 E. 156th St., New York, N. Y.

WANTED — Rider's Manuals 1 to 10 incl. in good condition and priced low. Will pay cash. Will answer all letters. C. N. Cheadle, Box 377, Salem, S. Dak.

WANTED — Model 660 R.C.P. electronic multimeter; Simpson rotor dial tester; condenser tester that tests condensers while in set. Cash or will trade. Have radios, console or table models and radio parts. Graham Pickles, Sand Creek, Mich.

WANTED — Milliammeters, v.o.m., Radio Physics Course by Ghirardi or similar books. F. A. Graulich, 323 Palmetto St., Brooklyn, N. Y.

WANTED — Instructograph, with tapes, in good condition or similar code machine. Have Shure Xtal mike, chemical apparatus, etc. All letters answered. Raymond H. Ives, 822 Windsor Ave., Norfolk, Va.

FOR SALE — Knight 4 tube portable battery radio. Requires 3 standard flashlight cells, for the "A" battery and one 45 volt "B" battery. It's a camera type radio, in black bakelite finish. Used only 4 months. Will sell for \$10. Marion Francis, 1232 E. 75th St., Chicago, Ill.

FOR SALE OR TRADE — 1 6 volt, 200 watt lighting plant; 1 Majestic "B" power pack; 1 10" oscillating fan; 1 ultra violet bulb. Want Rider's Manuals 10, 11, and 12. S. T. Smith, 90 Summit St., Manchester, Conn.

WANTED — Vacuum tubes and vacuum tube apparatus made prior to 1919. Also books, periodicals, catalogs, and other advertising literature dealing with vacuum tubes or wireless, published prior to 1919. Will buy or trade. Gerald F. J. Tyne, 191 Claremont Ave., New York City.

FOR SALE — 4 Racon 3 1/2 ft. trumpets; 2 six foot aluminum trumpets; 10 Racon Giant Dynamic units six volt fields; 2 Webster, Racine 50 watt class A amplifiers, rack mounted; 1 20-watt 6 volt mobile amplifier, two mike inputs and phono; 1 six volt General Industry two speed turntable. Rodger Radio Service, Potsdam, N. Y.

SELL OR TRADE — Rex typewriter \$10; R.T.L. tube checker \$4.95; modernizing transformer \$1; N.R.I. Servicing Course \$8; .22 and .38 cal. rifles; 500 radio magazines, radio parts; 5 tube S.W. receiver \$13.50; RCA 500 v-1100 v. transformer \$3; meters \$2.50 each; Roby's Swapmart, 3569 Cottage Grove, Chicago, Ill.

FOR SALE — New GE Model LB530 5 tube, AC and 2 volt, Batt. Portable List \$44.95, \$30.50 takes it. Anchor Distributing, 203 Elm St., Ithaca, N. Y.

WANTED — Cash for Rider Chanalyst; Rider's Manuals 8 to 12; late model Solar or C-D condenser tester and late model oscilloscope. R. B. Jolley, Valdosta, Ga.

FOR SALE OR TRADE — 41 issues "Proceedings of the IRE 1930-35, Journal of the AIEE Jan., 1929, to July, 1931, Radio Craft 1931-1938, and Radio News 1926-36 some complete years. Make offer. H. R. Ringold, 132 N. Doheny Dr., Beverly Hills, Calif.

WANTED — 3' oscilloscope or Supreme Vedolyzer, good condition. Will pay cash. State price. Tone's Radio Service, 126 Fourth Ave., Paterson, N. J.

CASH for 561 Supreme Signal Generator, resistance decade boxes, medical microscope, back issues of Aerovox Research Worker, Jan., Feb., and Mar., 1928, General Radio Experimenter Apr., 1934, Aug., 1935, Sept., 1936. John T. Lipani, 157 Leverett St., Boston, Mass.

SWAP — I want to exchange Motorola call letter books with some dealer who needs letters for his state. All I use are California letters. The remainder of the books are intact. Stan McKay Radio, 2001A Hopkins St., Oakland, Calif.

U. S. SIGNAL CORPS NEEDS ENGINEERS

THE War Department, Aircraft Radio Laboratory at Wright Field, Dayton, Ohio, has a shortage of qualified civilian engineering and inspection personnel. Wright Field is the home of the Materiel Division of the Army Air Corps and there are concentrated all the experimental laboratories which are making such tremendous advances in the development of aircraft and aircraft accessories. The Aircraft Radio Laboratory is responsible for research, development, engineering, and inspection required in the radio field, incident to design, supply, and installation of radio equipment on aircraft.

The basic duties of a radio engineer are to perform or supervise the performance of professional engineering work in design, construction, research, and investigation. Responsibilities and duties are commensurate with the grade.

The Civil Service standards for Junior Radio Engineer, which pays \$2,000 per year, are a degree in electrical engineering from an accredited college. The next higher rating, Assistant Radio Engineer, \$2,600, has requirements of two years of progressive professional experience, plus substituted experiences year for year for college education that is lacking. A college degree, while very desirable, is not essential. A well qualified engineer without a degree is eligible for consideration.

Inspectors of Signal Corps Equipment are required to make inspections and tests of aircraft radio equipment to determine compliance with specifications, etc. This duty is usually performed at the plants of the contracting manufacturers. The salary range is from \$1,620 to \$2,000 per year.

Engineers and service men who are interested in these positions are invited to submit a letter outlining their education and experience directly to:

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