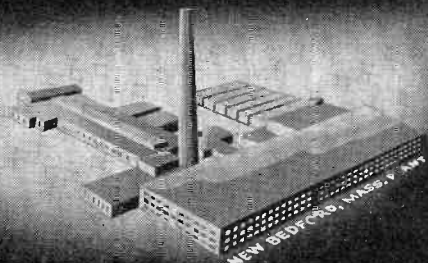
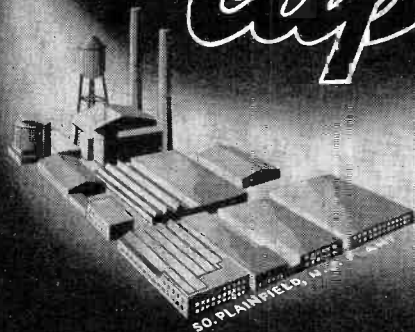


The CORNELL-DUBILIER Capacitor



Vol. 9

DECEMBER, 1944

No. 12

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

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HUNDREDS of Dubilier mica and paper capacitors made over a decade ago and more, are still giving efficient and reliable service in radio and electronic equipment. These capacitors are as good today as the day they were made. We are collecting case histories of such units.

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

FOR SALE—Radio tubes, 12SK7, 12SQ7, 80, 6SK7, 6SA7, and others. Also parts, instruments, etc. Send for list. John Trowbridge, Dept C-D, 793½ Parnell, Chicago 20, Ill.

WANTED—Good tube tester, also volt meter. State price. W. J. Zahard, 3982 E. 123 St., Cleveland 5, Ohio.

WANTED—Testing equipment, late model preferred. State make, model and price. W. B. Golden, 1017 Wadsworth St., Decatur, Ala.

FOR SALE—Small lot of tubes in sealed cartons. OPA list; will sell the entire group only. 5Z3, 6A7, 6D6, 6K7, 6Q7, 6V6, 80, 6SQ7, 6SJ7, 6X5. Success Radio Service, 122 Motor Ave., Salt Lake City, Utah.

WANTED — Late mod. signal generator and tube tester. State description, model and price. Bill Corner, 111E. Garden St., Pensacola, Fla.

WANTED—For cash or trade. Solar mod. CE, QCA, or BQC cond-tester. Superior channel analyzer. Have Webber mod. 20 oscillator, Philco 088 sig. gen. both all wave and battery power. Gernsbach vols. 1 and 2 radio manuals. Ray Parker, Kingman, Kans.

WANTED—Supreme tube and set tester 504; Triplett signal generator 1632, Precision 920P; RCA test oscillator 167; Radio City signal generator 702 and Weston 774, 778 or 776. State condition and price. Cash waiting. Louis Fialkoff, 143-48 41st Ave., Flushing, L. I., N. Y.

FOR SALE — Capehart DeLuxe Record Changer, Jensen HF-18 speaker (in original case), 2A3 amplifier, RCA signal generator, and vacuum tube voltmeter. Donald R. Barber, 422 N. Wayne St., Piqua, Ohio.

WANTED—Keystone projector mod 82 or 75. Also sound head for 16mm films. Will buy Dodge 12v generator. Harry Kay, Rt. 2, Box 255, Imlay City, Mich.

WANTED — Radio test equipment, sig. gen., set analyzer, tube tester, multi-meter or ohm meter for shop use. H. D. Gregory, 1157 So. Diamond St., Jacksonville, Ill.

FOR SALE OR TRADE—Rider Manual 4 in good condition. WANT Rider 2 and 13. Gerber Radio Repair, Box 112, Kamrar, Iowa.

FOR SALE—Supreme mod 45 tube tester, \$10. RCA mod. TMV 122B oscillograph, 3", \$75 This equipment in excellent condition. Ralph Hunter, 12 North St., Catskill, N. Y.

FOR SALE OR TRADE—Astatic FP-38 high-fidelity pickup, like new. \$8.50 cash, or new 902 cathode ray tube wanted. Myron B. Reynolds, Metcalf Research Lab., Brown University, Providence 12, R. I.

FOR SALE—Two type WE212d tubes, used, but in fine condition. Will trade for or buy the following: Audak D38H pickup head or 0-200 micro amp meter or more sensitive movement. A/S A. Garcia, USNR V-12, Co. 5, P12, Albuquerque, New Mexico.

WANTED — Will pay any reasonable amount for octal tube and local tube charts for use with C. W. Burton model 20 direct reading tube tester. Charles Stuart, 4444 N. Sheridan Rd., Chicago 40, Ill.

WANTED—2 broadcast band coils for HRO receiver. State condition and price. Karl L. Wagner, 3130 Cottage Grove Ave., Des Moines, Iowa.

WANTED—Good signal tracer like RCA Chanalyst or Vedolyzer; good signal generator (all wave) and a good set and tube tester. All must be late models and in good shape. A. Peart, 23 Ivy St., Newark 6, N. J.

WANTED—Riders Manuals 1 to 12. Will pay cash or trade. Also want sound equipment, radio tubes and parts. Mackey's Radio and Record Shop, 307 N. Spring St., Tupelo, Miss.

SWAP—Echophone EC-1 almost new for 16mm projector or 8mm projector, or what have you. Jean Andiaud, 452 E. 182nd St., New York, N. Y.

WANTED—Nilson & Hornung Correspondence course in radio. Advise price, edition and number of booklets. H. P. Geise, 33-08 84th St., Jackson Heights, N.Y.

WANTED — Short wave communication receiver. Colt 45 automatic or revolver—38 second choice. Cash. Lt. C. R. Leutz, Jr., USMCR., VMTD-3, 3rd MAW, FMF c/o FPO, San Francisco, Calif.

FOR SALE—Supreme Vedolyzer 560A and Supreme signal generator mod. 561. Very little used. Both for \$225. Stanley Wand. 937 Vine St., Camden, N. J.

FOR SALE — Test instruments, supplies and tubes. Here are a few: 6SA7, 6SK7, 80, 12SK7, 12SQ7, etc. John Trowbridge, Dept. C-D., 7936 Parnell, Chicago 20, Ill.

FOR SALE OR TRADE—Carter 400v 250 m.a. from 6v genemotor; Pioneer 300v 100 m.a. from 6v gen-e-motor; Four Jensen 12" PM 12C in Parabolic Baffles. Dumont 164 oscilloscope. WANT—Supreme 582A sig. gen.; audio oscillator. Henry's Radio, 410 Thames St., Newport, R. I.

FOR SALE—RCA Midget radio, 5 tubes, 12v, 50L6OP, extra fine cabinet, \$15.00 5 tube table radio, 47 output, needs repair, \$5.00. Will trade 6A7, 12A, 1A, 10 tubes in cartons for other numbers, or sell at low price. Wanted—Ammeter 0-5v, DC. W. F. Onder, Rt. 1, Box 389, Kimmiswick, Mo.

FOR SALE — Large quantity 1/2w Ohio insulated resistors, practically all values, \$2.50 per 100 postpaid. Send cash with order. A. H. Ferris, 2025 So. Figueroa, Los Angeles 7, Calif.

WANTED—FM tuner or complete receiver in good condition. Will pay any reasonable price. Also have a Hallicrafter 5x28 for sale. Best offer accepted. J. E. Duff, RD 2, Canton, Ohio.

WANTED—Four each of: 1A7GT, 1N5GT, 1H5GT, 1LA6, 1LC6, 1LE3, 1T5GT, 1V, 6A7, 6A8GT, 7A8, 12A8GT, 12K7GT, 12SA7GT/G, 12SK7GT/G, 12Z3, 25B8GT, G, 25L6GT/G, 25Z5, 25Z6GT/G, 35A5, 35L6GT/G, 35Z4GT, 35Z5GT/G, 35Z6G, 45Z3, 45Z5GT, 50L6GT, 50Y6GT/G, 70L7GT, 11L7GT, 11P7GT, 11Z6GT/G, 43, 75. General Appliance Repairs, 643 N. E. 1st Ave., Miami, Fla.

WANTED—Stancor Auto radio test and demonstration pack, or similar unit. AVAILABLE — wood letters for radio service signs, shaped and cut to suit any need. Radio Service, 24 8th St. Frenchtown, N. J.

FOR SALE OR TRADE—Small quantity tubes. Also Ultra-high frequency transceiver and 80 ft. No. 14 wire. Would like to sell as one lot for \$50 or trade for Hallicrafters SX-25 Super Defiant, S22R Skyriider Marine, or similar communications receiver, plus cash balance. Dean O. Buchanan, 50 North University, Blackfoot, Idaho.

WANTED—1, 2, 5 and 6 Riders Manuals; mod. 164E 3" oscillograph (Dumont); mod. 920P or 920CP precision tube and set tester. New or new condition. Vital Radio Service, 209 Linden St., Camden, N. J.

WANTED—Riders Manuals 6 to 13, also phono motor and pickup. Cash for same. Lyle C. Newell, 113 E. Arrow Wood Lane, Oak Ridge, Tenn.

FOR SALE — Lafayette 18-24w deluxe mobile amplifier mod. 422, in orig. carton, \$50. Instructions included. L. R. Battersby, 206 Branch Ave., Red Bank, N. J.

FOR SALE—Pilot Super Wasp receiver; plug-in coils 500-14 meters; National Velvet B pack, tubes, diagram, Teleplex code mach, hand wound, 4 Morse tapes; Jewell voltmeter, DC .3, 3, 30 150v .3, 3.5, 35, 350 amps. Leads. L. L. Creighton, 433 E. Bellevue Ave., San Mateo, Calif.

WANTED — Late mod. tube tester in good condition. Give description and price. George Murakami, 3303B, Newell, Calif.

(Continued on page 10)

CLEARING THAT INTERMITTENT*

**Repairing Those Intermittent Radio Receivers Can Be Simplified
By Following the Proper Techniques Described Herein.**

Intermittents, it has been truly said, are the serviceman's Nemesis. In spite of the advances made in servicing techniques, especially the introduction of cathode-ray tubes and "signal chasers," this type of trouble still wastes more of his time than all others put together. Wartime lack of signal-tracing instruments has aggravated the serviceman's difficulties. So has the scarcity of tubes, which often bars the old technique of inserting a whole new set while checking over a receiver.

An "intermittent" is that type of defect that causes a set, otherwise normal, to stop playing suddenly, or to drop greatly in volume. Turning it off and on again, jarring or tapping it, or occasionally simply switching a light on or off in the room, is often sufficient to start it playing again. Here is the main problem posed by the intermittent: When the serviceman attempts to localize the trouble, the set springs back to normal as soon as he places the test prods across a suspected circuit. He cannot find the trouble in a set which has nothing wrong with it!

The cause of intermittent cut-off or volume drop is almost invariably a poor contact which becomes an absolute open because of a sudden surge or change in the amount of current flowing through it. There are slight variations; a tube-shield which makes intermittent contact with the chassis may send the receiver into oscillation and thus cut off reception, but the underlying principle is the same even in this case. Such poor contacts may appear anywhere in the set, and in any component. The trouble-making spot may be in the antenna-coil or voice-coil, or anywhere between.

Circuits carrying only r.f. currents are the playgrounds of the intermittent. Poor contacts in the path of direct currents often show up through creating high resistance, burn out, or tend to weld themselves (though certain low-wattage resistors give rise to beautiful intermittents). They also are detected more readily by test instruments in such circuits. In the r.f. leads, the very minuteness of the currents prevents any breakdown or self-healing effects.

The r.f. bypass condenser is the most common hideout of the intermittent, though poorly soldered connections and poor friction contacts run it a close second. Such contacts often are found in variable condensers and tube prongs. Intermittent opens or poor contacts in the r.f. transformer secondaries and variations in the high frequency resistance of filter condensers, all have been found guilty of "killing the signal." The rule is that no part of the set can be free from suspicion, from power pack to cathode resistor, and from antenna to loud speaker.

Another intermittent—or semi-intermittent—is worth noting. This shows up after the set has been playing for some time and does not respond to the usual switching or shaking, but disappears after the set has been turned off for a while. It is obviously caused by heat, and is easier to find, as the set will remain out of commission while tests are made on it in the "live" condition. It is mentioned only to point out that many true intermittents are also "thermals," but such small ones that they may cool immediately when the set goes out of action, and be ready for the slightest surge to put them back to work again. Indeed, the ac-

* By Y. Gabin in "Radio News."

tion is sometimes automatic, and the set goes on and off periodically. The author remembers one old '27 tube whose filament used to open after it had been playing a few minutes. After the first cut-off, it would open and close at regular 30-second intervals, with wierd effects on the program. The trouble, of course, made itself known at once, and the tube was long kept in the shop as a curiosity.

Servicemen have three standard methods of attacking intermittents. The oldest and crudest is to go through the set, checking all suspicious parts by removing or replacing, and playing the receiver for long periods to make sure a cure is effected. This is a time-wasting and unsure procedure, but has a few very good features. In certain models, bypass condensers are notorious as the cause of intermittent fading, and it has been common practice to replace all the fixed condensers before even starting to search for the trouble. Nowadays it may not be practical to replace condensers in such a wholesale manner, but it is often worth-while to disconnect bypasses till one is found which produces the intermittent when removed from the circuit. Replacement with a new condenser and playing the set for several hours may prove the trouble to have been cured.

The second good point to pick up from the old hit-or-miss method is that of "sweating" all the soldered joints in a receiver, especially those which carry r.f. only. This, and cleaning all socket contacts (note that occasionally the trouble is inside the tube prong itself), will put a surprising number of intermittent receivers back into operation again.

Method No. 2 is signal-chasing. This is the only really efficient system, especially if used in conjunction with one of those multichannel analyzers with a flock of self-locking electron-ray indicators. Such instruments are rare indeed today, and the serviceman may be compelled to build his own tracer. Almost any old superheterodyne may be used for this purpose,

though one with an "eye-tube" may be used as a two-channel indicator.

The old set is broken into as indicated in Fig. 3, either with switches or closed-circuit jacks, to accommodate the "hot" test lead. The "cold" one is attached to the chassis. The set should be one with a 455-kc. i.f. and should be of the a.c. type. Sets connected directly to the line are not adapted to signal-tracing, as there is a possibility of grounding them through the test prods unless special precaution is taken. The test prods should be specially built, at least for the r.f. circuit, as is shown in Fig. 3. The small condenser may be made simply by twisting two lengths of enamel-insulated wire together for a short distance. The a.f. prod may be an ordinary test prod, though the one shown will not load the circuit to which it is applied, sometimes an important point to remember in tracing intermittents.

It may be necessary to connect a 1-megohm, or smaller, resistor between grid and ground of the i.f. stage, if the tracer shows any tendency to oscillate. Slight retrimming of this stage is also often necessary to compensate for the leads, and, of course, to adapt the tracer to various i.f.'s from 445 to 470. Values of parts are given, in case the serviceman wishes to modify slightly the set used as a tracer, but he is warned that building such a tracer from the ground up is a waste of time. Use a junked set from the shop!

It is hardly necessary to outline the methods of signal tracing; plenty has been written on that subject. Suffice it to say that an input to lead 1 can be used to check the performance of any r.f. circuit (point A in Fig. 1); lead 2, the converter output and i.f. input or output (points B, C, D, and E); lead 3, the i.f. output (point F or any strong r.f. signal, no tuning required); lead 4, weak audio signals (point G); and lead 5, strong a.f. signals (points H, I, J, and K).

A simpler type of signal tracer is one that has only the detector and audio stages (sometimes with a resistance-coupled r.f. stage as well). Such

Test
Receiver
of Interm.

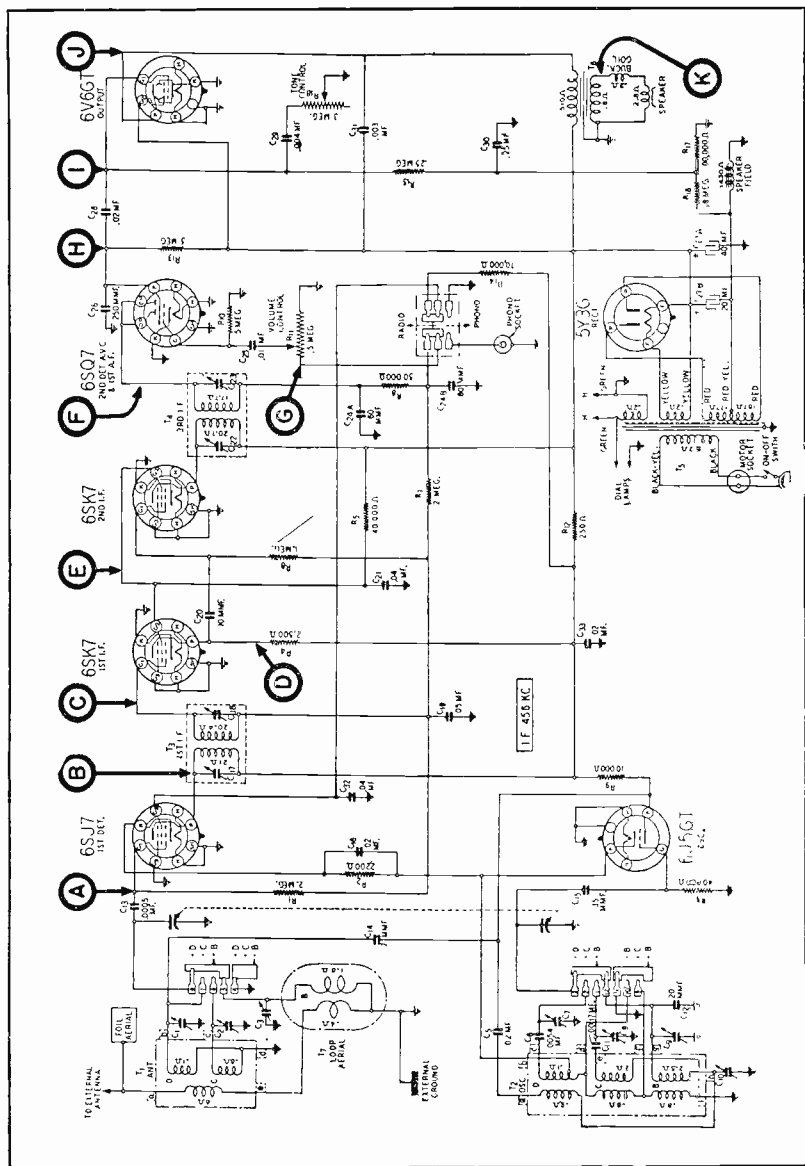


Fig. 1. Diagram of a Wells Gardner Model 7A68-2 radio receiver, used to illustrate the various test-prod connections to be made on any similar unit, in order to simplify the serviceman's problem in locating the source of trouble.

tracers usually are not oversensitive, but are rigged up very easily from any type of old receiver, and require no tuning. The prod is simply applied to r.f. leads of any frequency, the signal being rectified and amplified in the tracer. A second prod is required for audio signals.

Used to detect intermittents, the signal tracer is hooked up across that part of the receiver under test. If a tracer with an eye-tube is available, lead 4 may be hooked in at point G of Fig. 1. The eye will remain closed and signals will come from speakers of both the set under test and the signal tracer. A failure of the signal appearing in the output of the set under test, accompanied by an opening of the eye, indicates trouble before the detector. Cessation of sound from the speaker with the eye remaining closed shows that the intermittent is in the a.f. circuits. Should this be the case, the hot prod is attached to the grid of the output tube (point I), and the set played till it again fails. Should the speaker of the tracer continue to play, the trouble is obviously in the output circuits of the receiver, and points J and K should be tried next. If both speakers stop, the signal-tracer lead may be moved back to the grid circuit of the preceding tube, point G, and the process repeated.

The same method is used in the i.f. and r.f. circuits, should the trouble be located before the detector. Using leads 3, 2, or 1, the faulty stage is located. Once the trouble is localized within the narrowest possible limits, the quick cure is to replace all condensers and resistors which might cause the trouble, sweat all joints and brighten all contacts.

Even when using signal tracing, much time may be wasted and equipment tied up in some obstinate cases. Sets have been known to play eight hours per day for two or three days without giving any evidence of fading, and to continue for a day or two in the owner's home before starting to fade again. In some cases this is due to different conditions in the home and shop. For this reason it is always well

to check on the voltage at the home location, and to ask if the fading occurs more often at a given time of day—often a valuable clue to voltage conditions. If a set refuses to "intermit" it is often a good idea to put a box over it and let it get a few degrees warmer than the surrounding air. Perhaps taking it out of the cabinet will improve conditions.

The third method of attacking intermittents—little used in the past—is to increase the line voltage to a point where faulty components are likely to break down under d.c. over-

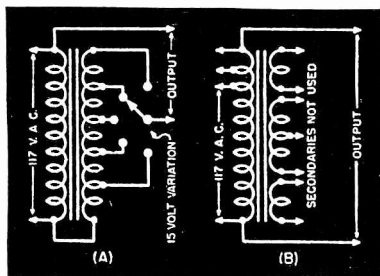


Fig. 2. Many intermittents may be located easily by operating the receiver at a line voltage higher than specified. A higher line voltage can be obtained by connecting two transformers, as shown.

loads or heavier r.f. surges. One of the weaknesses of this system is that it is quite useless against such defects as a poor antenna-coil connection, and little better for pure r.f. circuits in other parts of the set. Where r.f. is superimposed on d.c., it may work well.

The serious fault of this method is that it makes a complete breakdown out of an intermittent. In many cases there have been disagreements between servicemen and owners over estimates, the owner preferring to take his set back rather than have it repaired. Naturally, he insisted on getting it in the same condition as it was when he let it go to the shop. One bad experience with this technically excellent, but commercially embarrassing servicing method was too much for the serviceman.

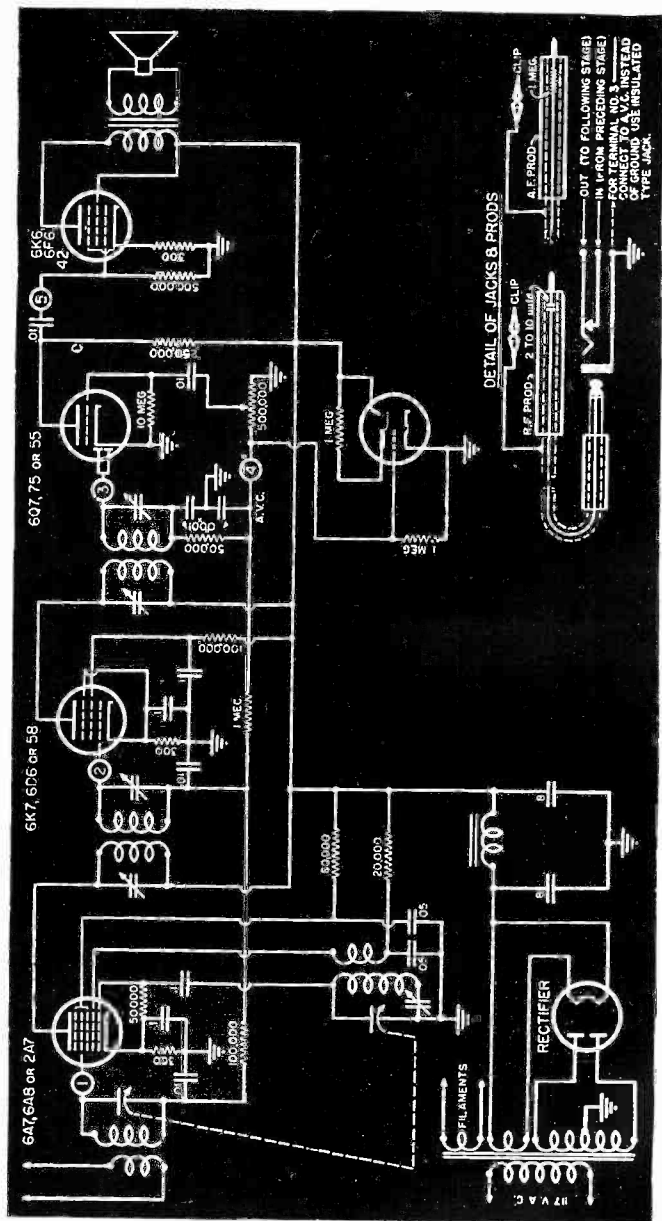


Fig. 3. Wiring diagram of a simplified channel analyzer, which may be used if a professional type is not available. This unit may be constructed from one of those old receivers on hand by adding the closed circuit jacks shown to accommodate the test lead. Special test prods are suggested in the diagram for use with this instrument.

Now that the market is more in his favor, he can be a little bolder and explain the situation to his customer. In most cases, if he stresses the saving of time and money the method involves he will get a go-ahead signal. Neither is there now any necessity for the check-and-estimate method in the case of intermittents. The serviceman can make an estimate sufficient to cover the case before running any tests.

The apparatus used in the over-voltage test is simple. An old toy transformer, with taps up to 15 volts, is sufficient; circuit is shown in Fig. 2. Often a variable-primary transformer may be found in an old receiver. The 117-volt line may then be connected across the 100-volt tap and the set across the 120-volt tap, giving a 20% increase in voltage. Just to make the test more gruesome, a sign flasher may be inserted in series with the primary. A fuse just big enough to carry the current used by the set should in all cases be used. There is no reason why breakdown of a bypass condenser should be followed by burn-out of a filter choke or rectifier tube.

To repair an intermittent receiver in the shortest possible time, a judi-

cious combination of all three methods is advisable. First, put in a set of new tubes, if possible. Then turn the chassis over and sweat any suspicious joints—or all joints carrying r.f. only. If the set is one in which fading is often traced to certain bypass condensers, these also should be replaced. Many servicemen replace the a.v.c. condensers in practically all old sets at this point, just as a matter of principle. This is often worth doing, for very often "fading" is a fade in reverse—a leaky a.v.c. condenser takes the bias off the controlled tubes, and the volume is turned down accordingly. As soon as the intermittent condenser functions properly, the a.v.c. goes on with a bang, and the volume drops, often below the audibility level.

The receiver may then be played on the bench, while the serviceman goes about his regular work. If it still fades, it may be given an hour's run at a voltage of 130 or higher. Then if nothing happens, the signal tracer should be called into play. The proper combination of all available methods will conquer the intermittent with no serious loss of that now more-than-ever valuable commodity, time.

THE RADIO TRADING POST

(Continued from page 4)

FOR SALE—Teleplex Jr code mach. with 5 tapes in carrying case, \$5.00. Philco Auto radio in good condition for Ford 1939. Make offer. Norman P. Eisnor, 129 Summer St., Somerville 43, Mass.

FOR SALE OR TRADE—Camera, 35mm Argus A-2, case and accessories. **WANTED** — 35mm Argus C-2 or 3, Leica or Kodak 35mm cameras, pocket VOM, NRI tester. Pvt. Sterling W. Reed, 116th AAF-BU, Section T, AAB, Fort Dix, N. J.

FOR SALE — Test instruments: Supreme mod. 550 radio tester, DeLuxe series, late mod. Superior dynamometer all voltage tester 6½ dial. Supreme mod 506 tube tester. All sold for best offer, F.O.B. Rydholm Radio Service, 309 Main St., Sauk Centre, Minn.

TRADE—Volland Analytical Balance enclosed in glass case 10½x16¾"; 8-string banjo and fibre case. Radio text books; Jewell 74-0-15 VAC meters for S. W. receivers, test equipment, meters, new tubes or what. Describe fully. Roby's Swapmart, 820 E. 61st St., Chicago, Ill.

FOR SALE—Model 321 Triplett comb. AC-DC test from 15 to 750 volts; OHM meter test from 1500w to 1.5; Megohm signal generator. Gus J. Scuto, 25 Newberry St., Lawrence, Mass.

TRADE—6AG7, 5V4, 5U4, 5Z3, 807, 1V, 6A6, 6V6, meter-tested perfect, not boxed. **WANT** Astatic phono pickup, phono turntable (GI) and camera (2A Anastigmat or similar.) C. Wachspress, 7815 68th Rd., Middle Village, N. Y.

FOR SALE—Weston exposure meter, Cine mod. 819, with leather pouch and neckband, very little used. Original cost \$24., or will trade as part payment on any test instrument except VOM meter or oscillator. P. K. Kallmeyer, 1511 145 Place, Whitestone, L. I., N. Y.

SWAP—\$150 RCA mod. FAX-2A Facsimile Broadcast receiver in A1 condition for late mod. Royal or Corona port. type-writer in similar condition. Robert Stevens, 536 Johnson Court, Canton, Ill.

WANTED—New or used RCA TT5 5" television table receiver. Must be ready to operate with operating booklets. State price. H. M. Bentham, Jr., 16 Wakefield Place, Caldwell, N. J.

WANTED—Cash paid for new or used power shifters 1½ or 2 volt from 110 AC. Tubes for swap—(no cash.) 01A, 6SC7, 6K5, 14R7, 6SQ7, 1T4, 1S5, 5Y4. Waters Radio Service, Box 12, Oneida, Tenn.

WANTED—Small table receivers. Need not be in working order, but all parts must be intact. Write stating make, model, condition, etc. O'Brien's Radio, 609 W 1st, Fulton, N.Y.

FOR SALE—At OPA list price: 1A4, 1C5, 1E7G, 1LB4, 1LH4, 1N6G, 3Q5, 5V4, 6A6, 6A8M, 6B4G, 6C5, 6K7M, 6N7, 6SA7, 6R7M, 6SK7, 6V6, 12A5, 12SK7, 25L6, 35Z3, 45, 53, 75, 80, 81, 82, 84, 117L7, and 117Z6. Guaranteed. Sold in lot only. Goodwin Radio Shop, Rankin, Ill.

WANTED—Television equipment, receivers transmitters, cathode ray tubes, conoscopes, etc. Will pay good prices. Send description and price. P. O. Gorgenson, 1437 W. 41st Ave., Vancouver, B. C., Canada.

FOR SALE—Supreme 592-593 multimeter and analyzer; RCA Auto radio 67M3 (dual speaker); Weston 682 tube checker; Supreme 189 signal generator; 3 7" PM speakers; Astatic pickup; turntable in carrying case. 2 6v-180v dynamos; homemade ham receiver with coils and speaker; Hammerlund Cornet receiver Milton Wendroff, S1/c USN, 1745 E 16th St., Brooklyn 29, N. Y.

FOR SALE—RCA 150 oscillator and 151 scope. Instructograph, Jr., Riders from 3 to 9, Radio News magazines, June 36 to date. QST January '39 to December '41. Centralab Standard controls and switches. Heavy duty mike stand, wood lathe. Howard Abernathy, Batavia, Ia.

FOR SALE—100w transmitter parts including power supply, tubes, coils and crystals. Also a monitor. Also 2-10 tubes and 2-100mfd. Hammerlund variable condensers for sale. Bou Radio Service 3131 N. Percy St., Phila. 33, Penn.

FOR SALE OR TRADE—RCA Voltomyst, Jr.; Leeds and Northrup fault finder wheatstone bridge; 0-1mil. Triplett meter 301 type; Shure Unidyne RDA 55 mike. Want small screw cutting lathe, 35mm camera or audio oscillator. John North, 140 Sheridan Blvd., Inwood, L. I., N. Y.

FOR SALE—Custom built remote broadcast amplifier, 3 position mixer, low impedance inputs 4 stages, volume indicator, key switches for 150 or 500v output, key switch to change from one telephone to another. Originally built for a Mutual station, \$60. WMPJ, 37-61 103rd St., Corona, N. Y.

FOR SALE—New HY615 and 9002 radiotubes. Fox Sound equip. Co., 435 So 5th St., Richmond, Ind.

FOR SALE—Meissner 5-band coil assembly 13-7617, for 280 Mmfd condenser Brand new \$30. prepcid. Roy Y. Nakano, 7113B, Tule Lake Center, Newell, Calif.

WANTED—54Z3, new or good used, or will swap any of the following for same 12B8, 32A6x5, 12SA7, 35L7, 6SC7, 6L6, or any one pair. Arthur A. Hale, 357 East Park Blvd., Akron 5, Ohio.

FOR SALE—Hydraulic Absorption Dynamometer also 8-wheel electrically operated Locomotive Crane, standard gauge R.R. tracks—both like new. Wt. of Dynamometer, 1200 lbs. Wt. of Crane, 145,000 lbs. Price of Crane \$17,000. Price of Dynamometer \$750. Maurice S. Indursky Rm. 2202. Hotel Paris, 97th St. and West End Ave., New York, N. Y.

FOR SALE—RCA Victor R32; RCA AC46 RCA 2 DC chassis; GE table mod. K32 and speaker; Majestic 370 table mod. and speaker; Majestic 90B and 90 speaker; Fada chassis; Baldwin chassis. Philco mod. 111 Superhet and speaker. Louis A. Goldstone, 1279 Sheridan Ave., Bronx 56, New York.

FOR SALE—Anso Memo Camera 35MM with case; Eastman Folding 3A post card size camera; electric hair clippers; Colemont Paris binoculars prism 8 power with case. Make offer or will trade for testing equipment or short-wave receiver. Glenn Watt, Chanute, Kans.

WANTED—For cash new sealed in cartons 12v or higher volt tubes. State price and quantity. **Leading Radio Service**, 114 East Third St., Mt. Vernon, N. Y.

WANTED—For cash: Riders vols 6, 10, 11, 13; must be in perfect condition. Also looking for good output meter. **Gilbert Radio Shop**, 1296 Sheridan Ave., Bronx 56, N. Y.

FOR SALE—Two type 34, two type 30 and one type 19 tubes. New. W. Freising, 1702 6th St., Rensselaer, N. Y.

FOR SALE—Tube kits, all new in sealed cartons. Each kit contains 5Y3GT, 6V6GT (2) 5U4G, 45, 80, 6H6GT, 6D6, 84, 1R5 or 1T4, 1F6 or 89, 79 or 14AF7, 12SK7GT, 12SL7 or 12SC7, (2) 6L6GT, 6E6 or 6D7, 6SK7GT 6FSGT, 26. 30% off OPA list. Send check or money order to **Stein Radio**, 7 Monroe St., Mt. Vernon, N. Y.

WANTED—Radio tubes, parts, any surplus radio stock you have. Will buy test equipment if reasonable. **Best Radio Shop**, 3349 Fulton Rd., Cleveland 9, O.

FOR SALE—National N C 100x5 communications receiver with general coverage coils including broadcast band up to 10 meters. with crystal filter and Rola G12 Hi-Fi speaker. In excellent condition. \$150.00. F. Craven, 2216 So. 7th St., Philadelphia 48, Pa.

FOR SALE—30 asst. output and input transformers p.p. and single, some new in original cartons, all good sizes. Best offer takes lot. Two 220v line 6.3v, 5.0v, 650v, 70 mil. X'formers. One 32v to 110 volt rot. converter, several 6v vib. packs with vibrators. All types of miniature tubes. List price. **Radio Labs**, Hudson, Wis.

WANTED—New or used test equipment in good shape. Also first 13 vols of Riders manual. Also tube tester, cond. tester, oscillator, volt meter, good paint gum. Also standard tubes. Will pay cash. **Ellison Radio Service**, 211 West Main St., Sedalia, Mo.

WANTED—Photo items, tank, printer, enlarger, exposure meter, tripod, 8MM projector, plate and film cameras, tilt-tops, photo books, lenses, flashgun—Trade for AC tubes, AC-DC filters, cabinets, and cash. **Gerald Samkofsky**, 527 Bedford Ave., Brooklyn, N. Y.

WANTED—25Z5s or 50L6s or 12SA7 or small radio, portable or table model. J Musu, 206 E 40 St., New York, N. Y.

WANTED — Superior 1230 or Precision E200 signal generator or other make. Quote price and condition. Also want Riders Manuals. J. Erichowsky, 501 E. 11 st., New York, N. Y.

FOR SALE—Howard 435A com. receiver, used 2 months. RCA 6 tube super P.A. tuner, \$25. Super P.A. tuner, working order, \$18. G.I. port. record changer with asiatic pickup, \$25. Will accept 1A7, 50L6, 35L6, 7A8, sealed, as part payment. B. M. Kates, Woodbridge, N. Y.

WANTED—585 Supreme Diagonometer tester, Riders Manuals 1 to 8; Drophead port. Singer or other good make sewing mach; port. Royal typewriter; signal generators; massage vibrators; Hanovia Luxor S ultra violet generators; Diathermy or S. W. machines. Louis A. Goldstone, 1279 Sheridan Ave., Bronx 56, New York.

WANTED—70L7GT and 25B8GT radio tubes Wilson Chastain, 928 Broad St., Nashville 3, Tenn.

FOR SALE — Westinghouse 3-in. panel instruments, 0-500 milliamperes DC, 0-3 amps. AC, 0-250v AC, \$12. ea. GE 6 lb. pull 1 1/4 in. stroke 110v AC solenoid, \$15. Advance series 300 time delay relay, \$10. Galanty, 287 Conklin, Hillside, N. j.

TRADE—22 H & R Sportsman, .22 Remington Target Master, both in Al shape, 8 boxes .22 cartridges S.H.P., 4' steel casting rod, Akron reel, 10 casting baits. WANT model makers metal lathe, spindle shaper, jointer, drill press, wood lathe, jig saw. G. E. Pilgrim. Box 514, Forest City, N. Carolina.

WANTED—Supreme 570 signal gen. and 592 multimeter in good condition. State price. Thos. D'Addario, 13545 117 St., Ozone Park 16, N. Y.

WANTED—"Fisher" or equivalent mineral detector radio outfit commonly called Treasure locator radio. Earl Heiser, 122 Whitefield Ave., Ocean Grove, N. J.

WANTED — Supreme 546 oscilloscope, vedolizer, 571 or 561 oscillators, Triplett 1200E VOM and Dumont 'scope, late model. State price and condition. Leonard D. Chioma, 24 Central Ave., Tarrytown, N. Y.

WANTED—885s, 884s, or 2051s, new or used also full or half wave copper oxide meter rectifiers. Cash or swap. Z. T. Bogar, Rt. 1, Box 286, Laurel, Md.

WANTED—RCA Junior Voltahymst type 165A. Your price for one in factory-sealed carton. Wm. Dressler, 2030 71st St., Brooklyn 4, N. Y.

WANTED—Riders Manuals 4 and 5 only. Must be 100% O.K. Have many tubes for swap or cash. Millhurst Radio, Freehold, N. J.

WANTED — RCA Rider Chanalyst or Meissner Analyst, new or used. Also signal generator. Robert Vannini, 80 Norman St., Springfield, Mass.

WANTED—Tone Arm for R.C.A. Viscaloid pickup stock 34710 (U110); bridge copper oxide rectifier for 0-1 Millimeter, Weston 3" 0-150 millimeter; Weston 3" 0-1 millimeter; R. F. Triple choke for Aetna 6 tube all-wave radio; Philco 116X chassis. Murray J. Douglas, W6CUG, Concord, Calif.

WANTED—Back issues, all years of C-D Capacitor, The Aerovox Research Worker, RCA Radio Service News. State price. Wm. Dressler, 2030 71st St., Brooklyn 4, N. Y.

FOR SALE OR SWAP—Sonotone bone contact hearing aid with meter to test batteries. Working cond. Needs batteries. Sell for \$35. cash or swap for any of the following: Radio test equipment, cathode ray tubes 5 in. or larger, television parts or kits, high voltage power transformers, G. I. Recorder, record changer, F. U. Dillion, 1200 North Olive Drive, Hollywood 46, Calif.

WANTED — Triplett Modulation Monitor 1696A Hallicrafters HT7 frequency standard. R.M.E. LF90 inverter. Meissner DeLux signal shifter. Abbott TR4. 300w class B multi match modulation transformer and driver transformer to match. Please state age, model, condition and price. Walter Kryger, 912 W. 151 St., East Chicago, Ind.

WANTED—110v AC generator to mount on Ford V8 Motor. State price and condition. Don Leibbrand Radio Service, Scobey, Mont.

FOR SALE—100 new tubes, sealed in cartons at OPA list; 200 good tested used tubes at 30% off OPA list. What do you need? H. Mason Radio, 114 E. 3rd St., Mt. Vernon, N. Y.

FOR SALE—Jackson oscilloscope model 523, excellent condition. Wm. A. Conklin, 70 Community Drive, Cranston 5, R. I.

WANTED—Old radio receivers built after 1930, such as Philco, RCA Victor, etc., (no Atwater-Kent or Majestics). Will accept whether working or not. State price. Don Anderson, 917 East Kemp Ave., Watertown, S. Dak.

WANTED—Late model tube checker in good condition, also 0-1 millimeter of reliable make also small electric drill. Cash on description. Charles Lentz, 2300 Bronx Park East, Bronx 67, N. Y.

POSITION WANTED — Young man, 21, with 4 years electrical-radio training and still taking N.R.I. radio course, wants position in radio repair work, within N. Y. City. Salary open. F. Teicher, 717 E. 175 St., New York 57, N. Y.

FOR SALE—Western Electric radio, small console battery set, complete with tubes and batteries, \$20. Also hearing aid, \$10. Also recorder and playback unit, brand new. Taubers Radio Shop, 516 So. Cicero Ave., Chicago, Ill.

WANTED—Late model tube tester that will test loktals, VOM. Also voltmeter in good condition. Write complete description and price. Paul W. White, Kingsport, Tenn.

FOR SALE OR TRADE—Jackson 580 Dynamic analyzer; OSC mod. 540; oscilloscope 3" CE solar condenser analyzer with VTVM, Xtal standard 100,600 kc and 2000 kc. Tmvy RCA freq. mod. **WANTED**—200 or 300w phone xmitter. Com. short wave receiver 5x16-5x28, RMC 69; Hickok mod. 155 traceometer or RCA Rider "Chanalyst." Gerald Hess Radio Service, Moravia, N. Y.

SWAP—35MM movie proj.; 16MM proj.; Midas 9 1/2 MM camera-proj.; several radios, RCA service course; pipe stock and die; QST and other magazines; meters, photo enlarger and other equipment; rotary converter. **WANT**—Lighting plant; gas refrigerator; electric sewing machine; power cultivator; 35MM still camera; exposure meter. Joseph Leeb, 1380 Merriam Ave., Bronx 52, N. Y.

TRADE—Wireless phono oscillator, h. f. buzzer and key, sports glasses, ice and roller skates, box camera. **WANT** tubes, parts, harmonica. J. M. Kilroy, 9 Christopher St., Dorchester 22, Mass.

WANTED—For cash—Good 3" Cathode ray oscillograph. Prefer Dumont 164E; Also mod. 188X Hickok signal generator or other good used. Arthur Frank, 101 Becker St., Syracuse 8, N. Y.

FOR SALE—Set of Riders Manuals, like new with original boxes. Vols. 1 to 5 abridged and 6 to 13 with index, etc. Also Riders Record Changer. Mrs. Wm. C. Exelhy, 1204 W. Allegheny, Austin, Minn.

WANTED—Volt-Ohm-Milliammeter, Triplett 1200A, or 666, or any pocket type. State condition and price. Tony's Radio, 5211 Southwest, St. Louis, Mo.

WANTED—Any quantity new 1A7, 7A8, 7B7, 12A8, 12K7, 12SA7, 12SK7, 12SQ7, 35Z3, 25Z5, 25Z6, 35L6, 50L6, 47, 6Q7G, 6R7G. Send list Eugene Kurseth, 822 Sixth Ave. South, St. James, Minn.

WANTED—Late model tube tester (roll chart preferred), good signal generator, set of Rider Manuals, VOM, and what have you. Everett L. Sawyer, 521 Grinnell St., Key West, Florida.

WANTED—RCA Chanalyst in good condition. Will pay cash. John Grabowski, 6647 Clayton St., Detroit 10, Mich.

FOR SALE—Many new tubes—24A, 6L7, 85, 7C5, 6N6G, etc. Weston 0-20 mil. DC meter, many parts. Do not ask for list unless interested. Frank's Radio Lab., New London, Iowa.

FOR SALE—Triplett mod. 1601 analyzer. DeLuxe set tester in new condition, \$65. Also Solar condenser tester and capacitor-analyzer in new condition, mod. CB 160, \$35. James Covington, 249 W. 131 St., New York 27, N. Y.

FOR SALE—Million mod. SY signalizer, like new, \$35. 2v 135B supply and 1½v 90B supply ac power packs, new, \$13.50 ea. 140w ¾ tip Drake soldering iron, never used, list \$7.50. Will ship C.O.D. A. B. Eatherly, 1504 Bernard Ave., Nashville 4, Tenn.

FOR SALE—Back numbers of radio and mechanical magazines, Radio Craft, Radio News, Short Wave Craft, Popular Mechanics, Popular Science, etc. Also radio and electrical books. Aubrey Edgerton, 116 West 6th Ave., Houston 7, Texas.

WANTED—All kinds of radio test equipment, analyzers, etc. Quote what you have to sell and price. Mercury Appliance Co., 6501 18th Ave., Brooklyn, N. Y.

WANTED—Rider Chanalyst. Will pay \$100. if in A-1 condition. E. A. Redmon, Ellinwood, Kansas.

WANTED—Outboard motor about 10hp. or larger, not particular of condition. Will pay cash or trade Riders Manuals. Give make, year and condition. Also Neptune 10A10 outboard for parts. Ward McDonald, Grampian, Pa.

WANTED—Radio City tube and set tester, mod. 804 or equivalent. Also port. type Radio City multitester, mod. 446AP, or anything with similar ranges, especially Simpson mod. 215 and AF and RF signal generators. Glenn Zimmerman, Box 77, Barton, Wis.

FOR SALE—Gardiner rosin core solder, round on 1 lb. spools, ¼" thick. Have 13 spools. Will trade for 12v tubes in original cartons. Guaranteed Radio Service, 2451 So. Kedzie Ave., Chicago 23, Ill.

FOR SALE—Tubes—12A6 can be used as substitute for 35L6, 50L6, 35A5, and others, complete with 10w resistor, \$2. Also other tubes, power transformers, volume controls, etc. Sid Diamond, 238½ W. 70th St., Los Angeles 3, Calif.

WANTED — For cash, cameras, small radios, photographic accessories, meters, record players, odd clocks such as china, cuckoo, mantel, chimes, ship clocks, brass, etc. Gerald Samokotsky, 527 Bedford Ave., Brooklyn, N. Y.

FOR SALE—Camera Kodak Special 616, f4.5 speeds 1 sec. to 1/400, delayed action, like new; camera case; sunshade; red filter; yellow filter; Orange filter; X1 green filter; B green filter, all new. \$50. takes all. Rasmussen Radio, 91-37 184th St., Jamaica 3, N. Y.

FOR SALE OR TRADE—Superior model 1230 signal generator, never used but a few times, \$12.50 cash or will swap for hard to get tubes up to the value of same, net. L. E. Heath, Ellerson, Va.

FOR SALE—RCA Model 154 beat frequency oscillator. New six months ago and in perfect condition. \$50. Fox Sound Equipment Co., 435 So. 5th St., Richmond, Ind.

FOR SALE — Set signal training probes, auto radio, phono radio comb., S and D. B. mikes, radio mags., books, etc. Send for list. Harry Kay, Rt. 2, Box 255, Imlay City, Mich.

NEEDED—For school training class. Meissner F. M. Tuning assembly and I. F. coils for same. Send description and price. Fred Rouse, 5 Euclid Ave., Cortland, N. Y.

FOR SALE—Heavy duty rectifier pack mfg. by Todd Transformer Corp., uses 4-5 amp. tungars, compl. with tubes, delivers up to 10 amps. 110v DC. Cost \$150. Wt. 100 lbs. \$35. takes it. Joseph Block, 108 E. 51st St., Brooklyn 3, N. Y.

FOR SALE—Three Turner mod. 33D Dynamic Mikes, \$21.50 ea. Four Heavy duty floor type Mike stands, \$14. ea. Three E12P Utah 12" PM speakers, 20 oz. mag. \$11.60 ea. Three G12P Utah 12" PM speakers, 46 oz. mag. \$20. John J. Spankowitz, 239 No. 9th St., Allentown, Pa.

WILL SELL — RCA phono-oscillator with small mike, complete schematic and wiring diagrams included; range 900-1200 kilocycles. Used about 10 hours. Will sell for \$5.00. F. J. Timka, Jr., 1211 Park Ave., Rochester, N. Y.

WANTED—Late model tube tester, sig gen., voltohmmeter, condenser tester; also 2-speed recorder and playback, and Rider's Manuals. Lew's Radio Service, 233 S. Conn. Ave., Atlantic City, N. J.

FOR SALE—Stancor A pack, new, Master, \$50; Remington rifle, new condition, \$20.00, pump action .22 cartridge. 1/4 h.p. G.E. electric motor, A-1, \$10.00; Philco 1941 auto radio, new, \$45.00. Paul Capito, 637 W. 21 St., Erie, Pa.

WANTED—Precision 920P tube and set tester or Supreme 504A tube and set tester, Hickok 188X signal generator or Hickok 510X tube set tester. Will pay cash or trade new Rider's Manuals, 7, 8, 9, 10, 11, 12 and cash. Leon S. Schall, 160 Abbott St., Plains, Pa.

Important Notice to C-D Capacitor Users

When ordering urgently needed replacements, either A.C. Electrolytics for motor-starting purposes, or A.C. Dykano! Units for split-phase motor use or D.C. Dry Electrolytics for Radio Set Repairs, please bear in mind that your exact requirements may not be available, in your jobber's stock, at this time, so be sure to state whether or not you will accept a similarly rated unit electrically, but slightly different in size physically. This situation will exist until after the National Emergency, as you may not be able to furnish proper priority rating to obtain items not in stock and which have to be fabricated.

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