



Vol. 11

AUGUST, 1946

No. 8

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

Return Postage Guaranteed

Mr. George M. Beale
130 25th Ave.
San Francisco, Calif.

Sec. 562, P. L. & R.
U. S. POSTAGE
PAID
So. Plainfield, N. J.
Permit No. 1

C-D HELPS THE SERVICEMAN

In the June issue of this publication, we outlined the entire "Let Yourself Grow" sales promotion program—specially designed to help your business grow and keep it growing. In the July issue, we provided explicit instructions on how to benefit most from your free newspaper advertising mats in the "New Radios Need Attention" series. If you missed these valuable issues, write us for them immediately.

sonal integrity. Once told, as a reliable radio serviceman in these ads, your continued success will be assured regardless of new or established competition in your community. Order these free ad mats from your jobber now!

Mat Procedure. See the July issue of "The C-D Capacitor" for complete, simplified details. All phases of



RELIABLE
RADIO
SERVICE

CORNELL-DUBILIER
CD
CAPACITORS

SERVICE
SHOP
IMPRINT

**WE USE ONLY GENUINE CORNELL-DUBILIER
CAPACITOR REPLACEMENTS IN ALL REPAIR WORK**

1204

Now we will discuss two more items in the program: the "Reliable Radio Service" ad mat series and the "Radio Expert" postcard campaign. These are also available to you through your local C-D jobber.

"You Can Depend on Me, Sir"

That's what your ads in this prestige mat series tell your customers. They build confidence in your workmanship, replacement parts, and per-

newspaper mat preparation and placement are thoroughly explained.

Space Cost. Most of the ads in both mat series cost less than the price of a new straw hat. At the rate of 14c per line for a 50,000 circulation newspaper, the mat ads illustrated here would cost: 36 lines x 14c x 2 cols., or \$10.08. Also, by contracting to use a certain amount of bulk space or number of insertions, you can earn space discounts from most newspapers.

RADIO NEED FIXIN'?

here's how much it will cost . . .

When you deal with us, you pay only for the actual number of hours we put in on a job and the replacement parts used. You can be sure of getting expert service and the finest quality of replacements. We use only genuine Cornell-Dubilier capacitors.



SERVICE
SHOP
IMPRINT

HONEST, FAIR DEALING

1205

Calling Cards. These mats can be used to make excellent business cards. Take glossy reprints of the ads to your printer. By ordering a reduced line cut (2" x 3 1/2") and printing in black or color, you will have attractive calling cards for all your personal contacts. Save the cut for future printings.

The Postman Rings Twice At Both Ends

When you mail these clever postcards to your local prospect list, you can expect immediate response by mail, phone, or personal calls from actual customers with radios to repair. This is an economical direct mail

campaign to establish yourself as the most reliable and outstanding radio service expert in your community. The printed, illustrated cards plus imprinting your name and address cost you



Something wrong with the radio? Or maybe you just want a regular 1¢ stamp check up. Make trouble the way We do. A 1¢ service mark at home that will surprise you pleasantly! Let us give you an estimate.

We use only genuine Cornell-Dubilier capacitors in our replacement work.

SERVICE SHOP IMPRINT

nothing. You pay only for the 1¢ stamp affixed to each card. The cards are supplied by your local C-D jobber in minimum quantities of 100 for any particular style.

1 cent Can Earn \$10

These compelling penny postcards root out volume repair work, and every job can mean \$10 or more added to your daily intake. Follow the simple instructions below for profitable results from your postcard mailings.

Mailing List. Compiling a good list is vitally important. Check these



Our accurate test equipment will enable us to analyze and correct any radio difficulty - whether it be loose connection, overloading of diodes, weak vacuum tubes or a completely defective set. We can guarantee our work because we use only the finest made replacement parts. Easy to call. Save time your radio needs servicing or be ready for the regular 1¢ check up. Give us a 1-



We use only genuine Cornell-Dubilier capacitors in our replacement work.

SERVICE SHOP IMPRINT

sources for names and addresses: telephone directory, lists from non-competing stores, milk companies, or newspaper delivery routes. Most cities have "mailing list companies" that provide this information at nominal cost. The best way would be to hire an intelligent school boy to cull the list in a house-to-house canvass of mail boxes. Every six months check your list for changes. Watch for mis-addressed cards and "moved" notices.

Addressing. You can easily address these cards a few at a time in your spare moments. If you wish non-deliverable cards to be returned, write or rubber stamp your return address in the upper left corner of the card's addressing side. For a large list of 1,000 or more, it pays to use a mailing list company (mentioned in paragraph above) or to hire girls on a piecemeal basis through an employment agency.

Timing. Post your mailings to reach prospects on any day but Monday

sure I find trouble
but you need a
radio man

If you are looking for a radio service man you can trust to do a thorough check up job first rate repair - work and charge honest prices, you can count on all makes and models. Next time bring your set to us. You will get expert service and top quality replacement parts.

WE USE ONLY GENUINE CORWELL-DUBILER CAPACITORS IN OUR REPLACEMENT WORK.

SERVICE SHOP IMPRINT

since it is usually a heavy mail day. Stagger each individual mailing over a few days to spread out sales results.

Spacing. Mail the different style postcards about three weeks apart. The cumulative effect will eventually draw all potential customers to your shop.

sure I'm a wizard
but you need a
radio man

Is your radio reception poor? There is only one reason - but that defect may eventually result in expensive repairs. Why not 'phone us now - when a check up home will save you money? We track every job although it were the most important in the shop. Our work is guaranteed! You can be sure of a thoroughly reliable job in limited time.

WE USE ONLY GENUINE CORWELL-DUBILER CAPACITORS IN OUR REPLACEMENT WORK.

SERVICE SHOP IMPRINT

Repetition. Hammer away with these cards on the same mailing list for maximum business returns. When you've used all card styles, allow an interval of no more than five weeks and start the series again. Be sure to omit, of course, all those names that have responded previously.

Follow-Up. Many sales are lost because of delayed follow-up. When a customer answers the card, call on him quickly or arrange an early appointment. Your promptness becomes an important part of your service reputation in the community.

NEXT MONTH — WINDOW DISPLAYS, COUNTER CARDS, DECALS — See the September "Capacitor" for full details of this FREE DISPLAY MATERIAL in the new "Let Yourself Grow" program designed by C-D for servicemen.

Servicing Intermittents*

Locating Defective Tubes. Poor Socket Contacts. Fading Capacitors. Other Trouble-Causing Components.

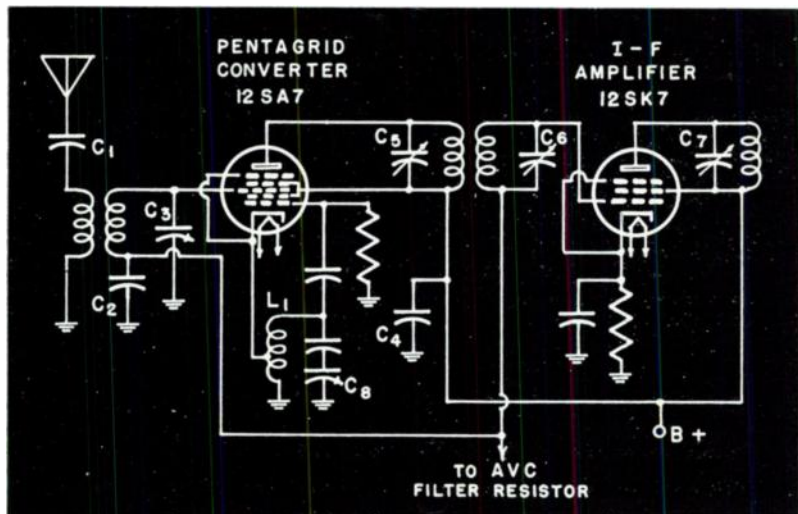
Of all the sets that reach the radio serviceman's workbench, the biggest headache producers are the "intermittents." So much time may be spent in locating the source of trouble, that net profit disappears. Rather than check an intermittently-operating receiver at once, it may prove wiser to wait for the defect to recur, going on to repair other sets in the meantime.

If the radio cuts off completely, the tubes should be carefully inspected. Do all the filaments light? If they don't, one of them may be opening after it heats up. A good way to check for a condition of this sort is to "cook" each tube separately in

the tube-tester. A glance at the tester's fuse lamp every so often will indicate whether the tube filaments are still lit.

Checks should be made for intermittent shorts within a tube. This may be done by tapping the sides of each tube gently with a light mallet, or wooden base of a screwdriver, while the tubes are in the receiver. When the defective tube is tapped, it will often cut off.

In checking for other trouble-spots, tube prongs, grid-caps, and socket contacts should be among the first suspects. In cases where socket contacts have loosened, the vibrations of the speaker may prevent the tube



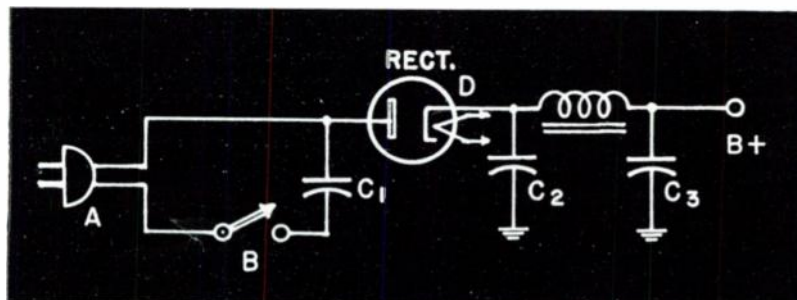
Some common causes of intermittents in the r-f section. Converter tubes like the 12SA7 often become inoperative after playing awhile. C1 may open, resulting in reduced volume and possibly noisy reception. An errant piece of solder may short the plates of C7 to the i-f shield can.

* Courtesy of "Radio & Television Retailing."

pins from making permanent firm connections with the socket. If the plate or screen contacts are loose, the arcing at those points may deposit a coating of carbon on the tube pins that will increase the chances of an intermittent. This carbon deposit may be removed with sandpaper or emery cloth. Loose socket contacts may be pinched together with long-nose pliers for a quick, easy repair.

gang tuner, as well as on the trimmers in other parts of the set, may be examined for breaks and dust.

When the receiver has a band-switch, check to see if any of the contacts are loose or dirty. Dirt and corrosion may be removed with a brush that has been dipped into carbon tet. Tightening loose contacts, however, is not always simple.



Loose connections at A, or oxidized contacts within switch B, may cause intermittent operation as well as noise. A poor rectifier tube (D) may have an abrupt drop in cathode emission, and produce a sudden decrease in volume.

There are a few other areas in which intermittents frequently nest, which should not escape attention. One of these is the gang tuning capacitor, on which peeling of the plating may occur. An easy way to correct this condition is to disconnect the capacitor from the rest of the set, and then hook up the high voltage winding of a power transformer to the rotor and stator terminals. This will usually burn out the peelings. In some cases, however, it may be necessary to scrape them a bit to make sure they are thoroughly clean.

Poor Wiper Contacts

Dirty or corroded wiper contacts on tuning capacitors may also cause trouble. These rods may be cleaned with carbon tet and a rag. When tension is insufficient, they may be bent to make better contact with the tuning capacitor frame.

The insulating material between the plates of the trimmer capacitors on the

Removal of the entire assembly may be necessary to do an effective job.

Intermittents may be due to trouble in the loudspeaker. Voice coil connections frequently come off. Wires attached to speaker plugs often work loose, and produce trouble. Sometimes an off-center voice coil results in the scraping off of the enamel on some of the coil turns. These turns may short intermittently to ground through the pole-piece. To remedy this condition, apply coil dope to the bare wires, and center the assembly with shims.

Volume and tone controls may cause trouble when they become dirty or worn. Wiggling the shafts back and forth, and tapping them lightly with the back of a screwdriver, may bring on any intermittent defects. Replacement of dirty controls is better than cleaning them, in many cases, because repairs often lead to call-backs.

Fading Capacitors

On fading sets, capacitors are the most frequent offenders. Bypass and coupling capacitors in particular, should be carefully checked. Inspection may single out potential trouble-makers. In some cases the wax impregnation may have oozed out of one end of a capacitor; in other cases, the capacitor will be so old and blackened that replacement on general principles is advisable. Wiggling suspect units with fingers or long-nose pliers often helps in detecting defective ones.

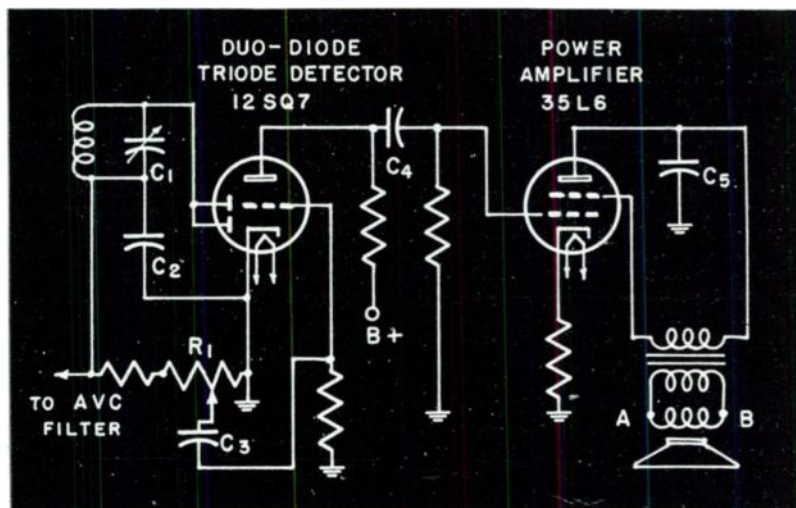
Voltage divider sections may open intermittently. Carbon resistors which have "carbonized" are also sources of trouble to be looked for. Sometimes wire-wound resistors warp and short-circuit to the metal case on which they are mounted, causing the radio to stop playing. This is usually caused by the loosening of the fasteners which hold the resistor to the chassis. When this

occurs, heat causes the resistor to buckle.

Poorly-Connected Coil

The most common cause of intermittent operation of coils is a break in the winding, that alternately heals itself and re-opens, due to temperature changes or mechanical vibration. When disorders of this sort are present in a high voltage primary winding, voltage tests made during the time the defect is present, will usually locate the trouble. When the trouble lies in a secondary, and voltage tests are inadequate, pulling gently on the coil wire near the terminals will often detach a poorly-connected, intermittent-causing wire.

Intermittent jobs need not be total losses. Servicing these sets only when the defect is present, and minimizing the time spent in forcing an "intermittent" to recur, may bring these difficult repairs out of the red.



Fading is often caused by defective volume control, or opens in C3 or C4. A bent i-f can may cause C1 to ground, resulting in inoperation. An open in C5 will produce shrill reception, and possibly a hiss. Voice coil openings will make reception inaudible, or nearly so.

TELEVISION RECEIVER ANTENNAS

PART II

(Continued from June issue)

Antenna Lengths

The length of the dipole used must of necessity be a compromise. That is, if it is expected to pick up three or more television channels with one antenna, some decision must be reached as to what frequency or wavelength to which the antenna will be tuned. Here, the Service Man will have to use his

own judgment. As a specific example of procedure, let us take the New York area, where CBS operates on 54-60 mc, NBC on 66-72 mc, and DuMont on 76-82 mc. Three antennas might be installed with separate leadins and a switching arrangement at the receiver antenna posts, each antenna tuned and directed to its particular station. How-

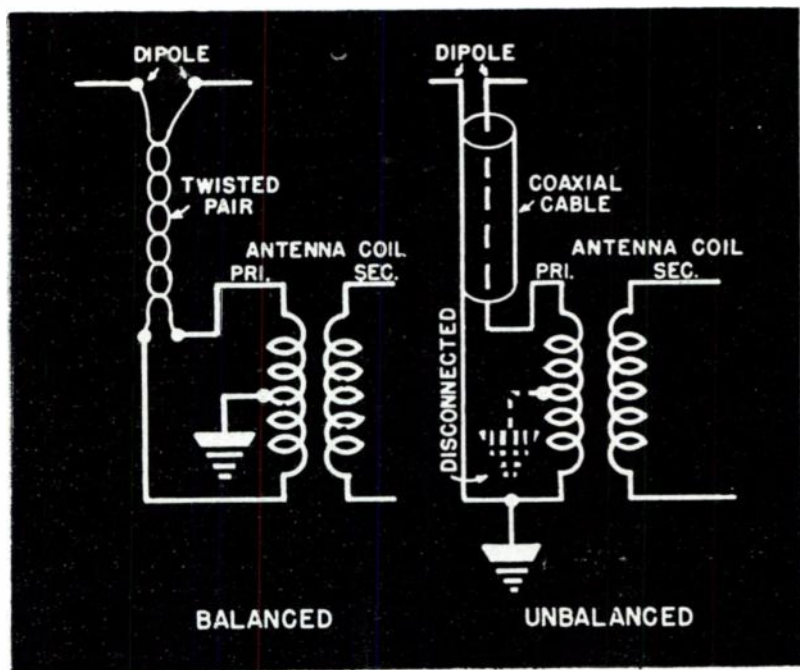


Fig. 5. Where a twisted pair is used for a leadin, the antenna coil primary must be centertapped to ground. If a coaxial transmission line is used, the centertap is removed, and the outside shield of the cable is grounded.

* By R. B. Carwood in "Service" magazine.

ever, this might prove impractical, since seven stations are contemplated in the New York area, with possibly more in the distant future.

It is suggested then, that a preliminary survey be made in the particular location where the antenna is to be installed.

It is first necessary to compute the best antenna length for each station. For the New York stations, the lengths would be:

CBS (55.25 mc, video carrier) . . .
dipole length, 50".

NBC (67.25 mc, video carrier) . . .
dipole length, 41".

DuMont (77.25 mc, video carrier)
. . . dipole length, 36".

The first step in the test requires that a temporary antenna, with adjustable sections, be installed. A chart is then made of the station signal strength, best direction, and best antenna length for each desired signal. Some arbitrary figure may be used for a comparison of the signals, such as the avc voltage in the audio portion of the receiver. The minimum requirement of the video portion of the receiver may be determined by rotating the antenna, noting too the avc voltage at which the picture starts to fade. The signal strength of the three signals can then be compared to determine their relative levels. Once the signal characteristics are determined, the antenna length and direction may then be arranged to favor the weakest signal, yet bring in the others.

Transmission Lines

The next important installation factor is the size and type of transmission line, or leadin. An antenna has a specific impedance at the point at which the leadin is connected. For example, a half-wave antenna's terminal impedance is 70 ohms, a full-wave antenna has a terminal impedance of 150 ohms, etc.

The primary of an antenna coil in a receiver is designed to work out of a given impedance, as established in its design. At broadcast frequencies, the input impedance of the antenna coil

has a fairly broad acceptance, in that it is either a high-impedance type as used in house receivers, or a low-impedance type, as used in auto receivers. However, at the high frequencies, the matching of the antenna to the primary of the antenna coil must follow closer tolerances and practices. Thus, the transmission line becomes a matching device which must match the antenna to the antenna coil. This function becomes a simple one, in that the antenna itself must match the antenna coil in impedance, and the line then becomes a device for connecting the two. All three elements must therefore be of the same impedance.

A mismatch in impedance causes two conditions to arise. First, the signal delivered to the receiver is reduced. Second, mismatch will result in the creation of ghosts in the receiver, due to reflections being set up in the line itself. The impedance match is not critical, but impedance values should be kept within 5%.

The input system of the receiver may be either of the balanced, or unbalanced type, or a combination of both; Figure 5. In the balanced type, a twisted pair of wires of the correct impedance is connected to the two outside ends of a grounded center-tapped primary of the antenna coil. The unbalanced system is used where a coaxial transmission line is used between the antenna and the antenna coil. In the latter case, the grounded center tap is removed, and one end of the antenna coil is grounded. Either system may be used, depending on the installation conditions.

Twisted pairs are used where the leadin lengths are less than 75'. At lengths in excess of 75', the attenuation of the signal in the leadin may cause too great a loss of signal strength, necessitating the use of coaxial cable, which is a more efficient conductor.

The great majority of installations will undoubtedly use a twisted pair, since the cost of the coaxial leadin is quite high. In choosing a twisted pair,

(Continued on page 12)



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 transaction 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.

FOR SALE—Hundreds of new tubes, some critical. Also numerous other parts and supplies. Must sell out to meet hospital bill. All inquiries and order will be appreciated. Edward Howell, Rt. 2, Dillon, S. C.

FOR SALE OR TRADE—Meissner 7 tube Super Broadcast receiver, with front panel and tubes; also 6 watt amplifier with 10" Jensen speaker. Amplifier and speaker in walnut cabinet. Speaker can be used for receiver. Best cash offer or will trade all for Precision E-200 Signal generator. J. Lipiner, 1032 Rutland Rd., Brooklyn 12, N. Y.

WANTED—Electric neon "Radio Service" sign. State price and condition in first letter. Milton Maultasch, 535 Grand St., Brooklyn 11, N. Y.

WANTED—Signal generator, any make, in good condition. Spaulding and Hamilton, 1305 Indiana Ave., Connerville, Ind.

FOR SALE—One RCP V.O.M. model 448, slightly used for \$20. Send money order or check. Radio Clinic and Laboratory, White Oak Rd., Fredericksburg, Va.

WANTED—U.S. or foreign stamps in exchange for new and used radio tubes and parts. State your needs and what stamps you have to trade. H. R. Ringold, 132 N. Doheny Dr., Beverly Hills, Calif.

WANTED—Test equipment of all types. Tube testers, analyzers, signal generators. Describe fully power required (ac, dc, or batt.), condition, range and price. Andy R. Harcar, R.D. 2, Birdsboro, Pa.

FOR SALE—Critical tubes at list. One new 345 Moto-Scoot for \$310. Send \$50 deposit. Scooter painted blue and has grips and mirror. Edward Howell, Rte. 2, Dillon, S. C.

FOR SALE—RCA table model 17 radio, \$12. Zenith table model 705, super-het, \$15. Gernsback Service manual No. 1, \$3. Supreme Circuit manual No. 1, \$1.75. Power packs, \$5. Speakers up to 10", \$2. Tubes for older sets, 25c. Alfred Livingstone, 12-01 Ellis Ave., Fair Lawn, N. J.

WANTED—Several PTs that have 275 volts at 60 mills. Have 2 BH Raytheon 125 mill tubes for swap or sale. Want ac-dc chokes, 200 mills to pass 65 mills. Louis A. Goldstone, 1279 Sheridan Ave., Bronx 56, N. Y.

WILL TRADE—15 jewel Wittnauer wrist watch, cost \$65. Also two pocket size VOM and Solar CB condenser analyzers. What have you? M. J. Gulas, 1216 N. 17th St., Clarksburg, W. Va.

FOR SALE—1 Jensen dynamic model A-12 for \$10. 1 Jensen PM model, 10GS, for \$4. T. Popel 1223 Elm Ave., Brooklyn 30, New York.

WANTED—Wiring diagram for German army portable radio "Luftwaffen-Kolfer K32GWB" Siemens radio. Albert C. Hart, 4848 Linden Ave., Hammond, Ind.

FOR SALE—If you need of hard-to-get radio parts and tubes, let us know. We will be glad to serve you. Customers served from coast to coast daily. Snyder's Radio Service, Box 109, Pitman, Pennsylvania.

FOR SALE—Hearing aid, like new; 5" RCA oscilloscope, like new, \$160, or Dumont 208B, like new. Have many ac and dc meters, many ranges and types. Will trade for test instruments. Ed Vockerth, 1746 N. Campbell, Chicago 47, Illinois.

FOR SALE—Rider Chanalist. All channels working perfect. Complete with cables and instruction book. \$100 takes it. C. Cathey, Box 441, Hamilton, Texas.

WANTED—Quick Check condenser, 12" PM speaker, 20 watt Signal generator, 7" dc volt meter, Keystone 16mm model A-72 projector, multimeter, signal tracer. Will trade 35mm strip film projector, Keystone 16mm motor drive E-38, all in good condition. John Arnold, Box 84, Bluffs, Ill.

FOR SALE—Complete permeability tuning kits with aerial coils for 5 tube superhet radios. Kit contains input and output high fidelity transformers. Cost \$3.85 or will swap for test equipment, power transformers or professional type mandolin or 6 string guitar. Mortimer Anshalt, 501 E. 78th St., New York, N. Y.

WANTED—Bench saw, drill press, drill press vise, arbor press, light sheet metal brake, drawing table. Have Television, U. S. Television and Hallcrafters receivers, several Alliance phono motors, record players, or cash. Jack Gregor, 1470 York Ave., New York 21, N. Y.

WANTED — Sound system and record player for automobile use on 6 volt dc circuit; also 110 volt ac use. Cecil Beeson, Box 101, Hartford City, Ind.

TRADE OR SELL—New \$150 gold Chronometer wrist watch with metal band, 5 hands, 1 large and 2 small dials, 5 scales, records speeds up to 1,000 miles per hour, speeds and distances in kilometers, and stop watch, Swiss made. Will sell or trade for good short wave communication receiver. Describe fully. Oliver F. Klein, 2235 N. 39th St., Milwaukee 5, Wis.

WANTED—German type radio tubes, one of each, DAF-11 and DCH-11 for German Broun portable radio. Name your own price. Pelby's Radio Service, 275 Phillips Ave., New Bedford, Mass.

FOR SALE—Supreme PA and Radio analyzer, model 491. Ranges include capacity decibels, 12 amp, 250 microamp, as well as the usual volts, ohm and milliamp. Instruction book included. Price \$50. J. W. WHITE, JR., 605 McArthur St., Galax, Va.

WANTED—Western Electric 713A receiver with or without W. E. 32A horn. William Yurkowski, 46 Fairmont Ave., Yonkers 2, N. Y.

FOR SALE—National SRR receiver, 5-160 meters, \$5 with instructions; National 5 meter transceiver, \$3; Thordarson 1" scope with 2" magnifier r. A-1 condition, \$15. Come and get it. B. E. Philippson, 2720 N. 76 Court, F.mwood Park, Chicago 35 Ill.

FOR SALE—14 watt Hi-Fi amplifier, new. Also two 35mm movie projectors with Hi-Fi sound custom built Mazda light, spare bulbs, film rewinder, 2,000 ft. magazines, like new. Lester Wykoff, Marmaduke, Ark.

FOR SALE—Hundreds of new tubes in cartons. Also numerous parts and transformers, radios, etc. Selling out. Edward Howell, Rte. 2, Dillon, S. C.

FOR SALE—Complete course in radio television; photo electric cell, public address; will sell for \$35. Walter Fabian, 3129 Elm St., Weirton, W. Va.

SELL OR TRADE—Bausch and Lomb 900 power microscope, 4 lenses, 2 dual lens holders, \$45, or will accept Universal radio tester of equal value. Morris Isaacson, 10 Southard Ave., Oceanside, N. Y.

FOR SALE OR TRADE—New 902 cathode ray tube and ready cut metal panel and case for building scope with 11 controls, both \$10. Hickok tube tester in good condition with AO-2 ma 4" meter. \$15. Want cheap recorder, preferably two speed, without amplifier, mike, speaker, etc. John Thiel, 1003 N. Denver, Tulsa, Okla.

FOR SALE OR TRADE—1-20 horse power electric motor, 110 volt, ac, with fan blade in good condition, for tube tester that will test all tubes including octal and loktal. John Burger, Westphalia, Kansas.

WANTED — Teleplex, Instructograph or Gardener-Levering model S. Will trade for music box, intercom, units, speakers, tubes, etc., or pay cash. Also have antique Grebe receiver in perfect condition. Send for description. G. Samkofsky, 527 Bedford Ave., Brooklyn, N. Y.

POSITION WANTED—High school graduate and member of National Radio Institute desires a position in or around Reading, Pa. Can furnish equipment. Andy R. Harcar, R. D. 2, Birdsboro, Pa.

SELL OR SWAP—Brush PL20 crystal pick-up in original box; never used. Would like play back unit, portable receiver. Carl Kouba, 1109 A Ave., Vinton, Iowa.

FOR SALE—Solar capacitor analyzer, model CE, brand new, \$39. Also Clouge Brengle signal generator, \$25. Modern Method Radio Shop, Glendive, Mont.

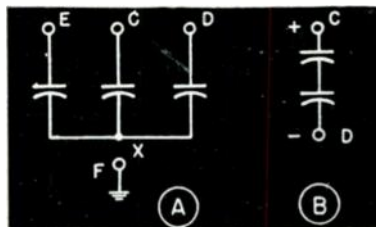
(Continued on page 12)

FILTER CAPACITOR REPAIR

Openings in the common negative of a dual or three-section filter capacitor generally lead to the discarding of the defective unit. Capacitors with this type of defect, however, may often be repaired to function at lower capacitance and higher voltage rating. A repair of this type is not ordinarily recommended. In some cases, though, when specific filter capacitors are hard to get, the repair will produce a unit that will function satisfactorily until a new one is obtained.

Verifying Defect

Consider the defective unit shown in the sketch below at A. The open in the common negative section at



X produces hum, distortion, and decreased volume. You can verify the hypothesis that the open is at X, and not anywhere else, by bridging the defective unit with a new equivalent capacitor. No improvements in symptoms will result, as the feedback in ac from C to D, or from C to E, is not corrected by this bridge.

Suppose we ground lead F to chassis—if it isn't already grounded—and disconnect positive lead E, either cutting it off near its root, or grounding it. By using D as a negative terminal, and C as a positive one, we now have two capacitors in series. The equivalent circuit is shown at B.

The capacitance is reduced to half of the original value (if the capacitors are equal), but the voltage rating is doubled. The remade unit should function fairly well at its new ratings, provided, of course, that it has no other defects. — Radio & Television Retailing.

TELEVISION RECEIVER ANTENNAS

(Continued from page 9)

some investigation will be necessary in order to insure a minimum of loss of signal strength. The insulation used in the twisted pair exerts a great influence on the signal loss. Ordinary twisted wire, such as is used in electrical wiring, even if it is the right impedance, is not recommended, since it absorbs moisture easily, and the insulation is not suitable to high-frequency work. Impregnated types should be used, and their characteristics at high frequencies studied, before a decision is made.

THE RADIO TRADING POST

(Continued from page 11)

WANTED—High grade signal generator; Wheatstone bridge; decade box; shielded ratio box; resistance standards. Also book by Rhodes on Calibration and repair of electrical instruments. Have small ac motor, will sell or trade. Henry Wagner, 4411 Indianapolis Blvd., E. Chicago, Ind.

WANTED—Typewriter, portable noiseless preferred. Will pay cash or swap for new, unused Hallicrafters S41-G or Telicon table model receivers. Also looking for good photo enlarger, 8mm motion picture camera and projector. Gus Jacobson, Room 806, 395 Broadway, New York 13, N. Y.

WANTED—100-1000 kc crystal, combination or either frequency. Will pay cash or swap. Also would like to buy dual speed phono motor. Dore M. Frantz, 1400B Washington St., Amarillo, Texas.

WANTED—U.S. or foreign stamp collection and pair of opera or field glasses. Will trade transmitting and receiving parts, tubes, meters, microphones, etc. Send for list. B. Bernbaum, 5746 N. Park Ave., Philadelphia 41, Pa.

FOR SALE—Radio Tubes at 20 per cent off list price. Send for list and prices to Standard Radio Service, 428 Main and 815 Central, Hamilton, Ohio.

FOR SALE—Model 16 radio tone recorder, with 18 watt amplifier. Records up to 16". Complete with recording level meter and 10" PM speaker in carrying case, \$450. Guaranteed. No COD orders. Gilbert Radio Service, Thomasville, N. C.

FOR SALE—4" PM speakers, \$2. Utah 12" PM speakers, \$7.50. 5 tube push button Master intercom with 4" remote speaker, \$25. Filter chokes, 7hy 60 mil \$1. Solar minicaps 10 mid 40 volts, 30c each. Emco mike floor stand, \$5. Any tube at OPA list. Goodwin Radio Shop, Rankin, Illinois.

WANTED—Late model Farms receivers and battery operated signal generator. All letters answered. Wilbur Montgomery, Langtry, Texas.

FOR SALE—All types of tubes in stock; 10% off list price. Write for catalog. Also accn, hearing aid and diode tubes at 49 cents each. Commercial Radio 36 Brattle St., Boston 8, Mass.

FOR SALE—76 assorted Radio Publications magazines like new. Bargain, \$5. Also have power, output, trans. and choker, very cheap. Selling out excessive parts. A. Palermo, 223 S. Winebiddle Ave., Pittsburgh 24, Pa.

FOR SALE—Portable type tube checker; checks up to 7 prong tubes, \$20. Want E200 Precision signal generator, or other late model. Will also consider Superior 1230 generator. Will pay cash. Also want late Butane gas stove, complete. Send price and description. McKinley's Radio Service, Zebulon, Ga.

FOR SALE OR TRADE—Radio parts and other equipment. State needs and send for list. Daves Sound System, 29 Charles St., Merrick, Long Island, N. Y.

TRADE—Toy 16mm movie projector with about 600 feet of film. Want pistol bugle to be used in scouting. Marvin H. Frankel, 150 New Brunswick Ave., Perth Amboy, N. J.

WILL SWAP—Radio tubes in original cartons for photographic or electric train equipment, or what have you? Send for list of tubes. S. F. Erben, 1384 E. 14 St., Brooklyn 30, N. Y.

SELL OR SWAP—Day-Rad tri-test tube checker with dc volt-ohm meter, \$25, or will trade for a good make, up-to-date tube checker, plus cash. What have you to offer? Lister Radio Service, 2124 Bristol Highway, Kingsport, Tenn.

WILL TRADE—6L6-813 rig one chassis construction, no cabinet, with tubes, but no high voltage supply for 813. Want small transmitter, ready to go, capable of working ten meters. Describe fully. T. C. Fratia, Paxton, Ill.

WANTED—German radio tubes, DCH11, DAF11, DL11, DF11, UY11, AL4, AF7, AB2 and AZ1. Will pay cash. Albert C. Hart, 4848 Linden Ave., Hammond, Ind.

FOR SALE—24 new 3 1/2 ft. Reflex outdoor horns; 24 PAH driver units, new; 2 used 6 ft. University aluminum horns; 1 used RCA 50 watt amplifier; 6 used 40 oz. PM com. speakers. Roy H. Cressman, 338 W. Marshall St., Norristown, Pa.

TRADE—Multimeter, dc Vomashure crystal operadio, handmike and television course for mutual conductance tube tester or Hickok traceometer or chana-lyst. K. H. Stello, Box 1298, Hollywood, California.

WANTED—Late model tube tester and signal generator in good condition. State name, model, price, etc. E. J. Malinowski, 420 Summit St., Joliet, Ill.

WANTED—Any volume of Riders' or Gerns-bock manuals or other manuals you might have. State price of each. John D. Arrington, Box 227, Hogansville, Ga.

WANTED—Radio receiver tubes. Send list of tubes on hand, state price wanted. John D. Arrington, Western Auto Store, Hogansville, Ga.

SWAP—Signal generator, model SG60 for a 5 or 6 watt amplifier with speaker. 2 tubes bad, 6SH7 and 6SN7; never used. Want amplifier for guitar and mike. Will pay postage. Milton Roby, Rt. 1, Box 59, Memphis, Tenn.

WANTED—Complete pair of "Drum Dial Assembly" for a Scott all-wave 12-tube set, 1932, or a pair of brackets with pulley wheels to guide cable on the worm slots. Cable shaft is 4 1/2" long. State price. Edison B. Leeds, 660 Riverside Dr., New York 31, N. Y.

WILL TRADE—Nice 37-10 Philco console radio for SX-25 receiver with speaker. Have all types of tubes at list. Also other components, etc. Edward Howell, Rt. 2, Dillon, S. C.

WANTED—Army BC-342 receiver, or similar but dc powered models convertible to ac. State model, condition and price. Will pay cash. J. L. Mundy, Box 124, Charleston, W. Va.

WANTED—Rider Service Manuals. Will pay cash for any or all numbers. Arthur Cronkite, Box 553, Sidney, N. Y.

FOR SALE—One-sixth and one-quarter hp motors, good condition, \$13 and \$14 each. One sixth and one-quarter hp ac-dc motors, \$16. Want an accoustimotor for a model 70 Motorola auto radio. Paul Capito, 637 W. 21st St., Erie, Pa.

WANTED—For cash, one 3" oscilloscope or 5" if price is not too high. State make condition and price on postal card. A. W. Kline Radio and Electric Service, 510-12 S. Hudson, Oklahoma City 4, Okla.

FOR SALE—1946 Table model radio, 110v ac-dc 5 tube set, \$25.95 postpaid. Also 1946 Battery radio, table model, 5 tube sets. 9 battery pack will be the only battery necessary. Postage will be paid on all sets. 90 day guarantee with every set. Snyder's Radio, Inc., Pitman, Pennsylvania.

FOR SALE—Precision tube tester, model 500; Supreme 333 Deluxe analyzer; Philco model 70 signal generator; volumes 1, 2, 3, 4 and 9 of Riders manuals. Want communications set in good condition. George B. Martin, Box 111, Campbell Hall, N. Y.

FOR SALE—Type 1, 60 Solar condenser checker; Electronic model L-100 VTVM; Dumont 164-2 scope; Jackson signal generator. Wesley C. Noe, 324 N. Bostwick, Charlotte, Mich.

FOR SALE—Microphones, arrometer model 9044, weight 7½ oz., complete with cord and PL68, \$10. each. All new. Also sponge rubber earphone cushions, over-size type, \$1 pair. J. H. Geddes, 48-54 207th St., Bayside, N. Y.

FOR SALE — Webster automatic phono changer unit with records, \$15. 3A autographic Graflex roll film. 7" Goeetz Dogman F4.5 lens with carrying case and Kodak daylight developing box and tank, \$125. Send money order. Will send express collect. H. Leeds, 15 West 15th St., Ocean City, N. J.

FOR SALE—Complete amateur station. 300 watt phone transmitter. Beautiful job, built by manufacturer's design engineer. Worked 16 countries. RME 69 short wave communications receiver, like new. \$375 for all, or will sell transmitter separately. Crum Sound Service, 751 N. Central Ave., Chicago 44, Ill.

FOR SALE—Radios, chassis and speakers. Send for list. Will swap new Majestic PTs for model 380, for small PTs that have 250v 65 mills, using 80 tube. Louis A. Goldstone, 1279 Sheridan Ave., Bronx 56, N. Y.

FOR SALE OR TRADE—Complete Scott FM tuner chassis with Hallicrafters HF FM converter. Tuning range, 41 to 51 mc., and 84 to 111 mc. Chrome chassis, perfect condition. \$65. FOB Chicago. Paul H. Prokes, 9216 S. Menard Ave., Oak Lawn, Ill.

WANTED—Microammeter, 1" or 1½" size, either round or square. Prefer 0-50, 0-100 or 0-200 microamperes range. C. F. Crandell, 3015 Ivandell Ave., Dallas 11, Texas.

FOR SALE—VR150 tubes, \$1. AC voltmeter, dc voltmeter, dc ammeter, G.E. C61 car radio, and other tubes. William Edwards, 2410 Keyway, Baltimore 22, Md.

SELL OR TRADE—Solar CB 1-60 capacitor analyzer; Howard 460 ham set with 650 Preselector; Pontiac '42 deluxe car radio; Triplett 1670 vibrator tester; Jensen KM-121 base reflex speaker; GI-R90L dual-speed record-playback unit. Want Presto or Rek-O-Kut recording unit. Earl D. Kent, 810 E. First St., Emmett, Idaho.

FOR SALE—Supreme model 450 radic tester, standard series, serial 450-172. Also model 303, serial 9052 Daco tube tester. Tests latest type tubes. All A-1 condition. Best offer gets it. O. H. Sandman, 1415 N. Perry St., Peoria 3, Ill.

FOR SALE—Detrola automatic record changer, brand new in factory sealed carton. Plays twelve 10" or ten 12" at one time. Express prepaid for \$19. J. Goldstein, 151-09 34th Ave., Flushing, Long Island, N. Y.

FOR SALE OR SWAP—1945 N.R.I. course complete with experimental kits. What have you to offer? J. W. Acampa, 1655 76 St., Brooklyn 14, N. Y.

FOR SALE—500 gummed stickers, 25c postpaid. Printed to order with your name and address. Very handy for putting on books, packages, folders, etc. Want Rider manuals, any volume. State price and condition. J. T. Cookson, Puxico, Mo.

WANTED—Philco "Beam of Light" record changer. Our shop was burglarized and we wish to replace our customer's loss. Mercury Radio, 217 W. 31st St., Chicago 60, Ill.

FOR SALE—6 Racon 25 watt Giant speaker units, 6 volt field, \$15 each; 1 Racon 10 watt Junior speaker unit, 6 volt field, \$7.50; 3 W.E. 20 watt speaker units, 6 volt field, standard thread, \$12 each. J. J. Stetz, Jr., 43½ Market St., Potsdam, New York.

FOR SALE—1 model 1610 Triplett Robot push button type tube tester, \$20. 1 Triplett audio oscilloscope, 100 to 10,000 cycles, 5-15-5000 ohms output, \$20. 1 Gardiner-Levering model S code sender with tapes, all new, \$15. Edward G. Kertz, Kenosha Police Dept., Kenosha, Wis.

WANTED—Teleplex or Instructograph with code practice oscillator wired for 110 volts. Either motor or spring driven. State price and condition. Charles J. Kukura, Box 91, Genoa, Ill.

FOR SALE—Dumont 5" model 208 cathode ray oscillograph, with one additional 5" tube and a built in CO-AXIAL cable. Price \$200. Sterling Electronics Labs., 151 E. 70th St., New York 21, N. Y.

FOR SALE—National HRO Jr., complete with power supply, 8" speaker in metal cabinet. Receiver in perfect condition. Will accept first reasonable offer. Cloyd's Radio Shop, 454 S. 3rd St., Hamilton, Ohio.

WANTED—Riders manuals 5, 6, 8, 11, 12 and 13. Will accept single volumes or lot. Walter Rozycski, 2133 Superior St., Chicago 12, Ill.

SWAP—Signal Corp W.E.-B.C. 5" cathode ray oscilloscope in A-1 condition. One new Sun-Craft lamp. Would like a portable recorder or RCA chandylst. Chas. S. Alexander, 209 Howard St., New London, Conn.

FOR SALE—Precision series E200 signal generator, designed for servicing by signal substitution, in guaranteed A-1 condition. Looks like new. \$39. Yen Radio Service Lab., 343 Louis St., Rockford, Mich.

WANTED—Home recording unit, dual speed preferred, turntable only or complete. Kelly Johnson, Northwood Iowa.

FOR SALE OR TRADE—Microphone, crystal type, Shure 70H, perfect condition, \$12. Tubes, 242C, two for \$5; 837, two for \$3. All prices FOB Chicago. Paul Prokes, 9216 S. Menard Ave., Oak Lawn, Ill.

FOR SALE—Riders manuals 1, 2 and 3; Henneys Radio Engineering Handbook (1933 edition); Cooke's Mathematics for Electricians and Radiomen (1942 ed.); K and E Paragon drawing set; IRE Proceedings (1939-1942). L. C. Hoelle, 24 W. Housatonic, Pittsfield, Mass.

WANTED—Modernization data for Confidencer "Special" tube tester to test octal, local, etc. Will pay cash. Fred Wittich, 7202 Juniper Valley Rd., Middle Village, N. Y.

WANTED — Instructograph, state price, number of tapes, model and accessories. A. M. Platt, 4102 Bowser St., Dallas 4, Texas.

FOR SALE OR TRADE—New Metropolitan capacity analyzer and signal tracer, model BR 44, \$25; new chassis cradle, \$4; Weston, model 771 Checkmaster tube checker volt and ohm meter, \$15. Will take cash or trade for tube checker in good condition. Nicholas E. Basil, 611 1st Ave., Rock Falls, Ill.

FOR SALE—RCA 67M3 deluxe dual speaker auto radio. Can be readily adapted to late model cars; new deluxe vibroplex in original packing, never used; both for \$50. Milton Wendroff, 1745 E. 16 St., Brooklyn 29, N. Y.

WANTED—41 or 42 tube tester, any name; 3" 1 to 0 milliamper meter; 34 model any make condenser indicator (not a tester) multi meter tester 3" meter or more, resistance readings up to 3 meg.; oscillator, any kind or model that can be used for alignment battery type using 30 tube if good. All equipment in A-1 condition. Give price and details in first letter. Modern Radio Service, 302-B Williamson Dr., Wilmington, N. C.

FOR SALE—Model CE Solar capacitor analyzer, good as new. First \$50 gets it. Smith's Radio Shop, Box 191, Leaksville, N. C.

FOR SALE—Service men, make 110 volt ac fence controller for less than \$2. Easy to sell for \$10. Build in 30 minutes. Send \$1 for plans. Lester Wycoff, Box 133D, Marmaduke, Ark.

WILL BUY—Any make car radios, in working condition or inoperative. Tele-Rad Radio, 9A Grand St. Extension, Brooklyn 11, N. Y.

WANTED — Meissner signal shifter 1941 gray inclosed dial. Thordarson 11M77 mod. transformer, 19P66. Have lots of high power components. What do you need? Also need Shakespeare service reel. M. E. Lawson, 4010 River Drive, Houston 12, Texas.

TRADE—35mm Univex "Mercury" 3.5 lens, 1-1000 sec. T & B, exposure meter, National SW3 complete with tubes, 5 sets coils, National 588C power supply. Want 8mm projector, reflex type camera, test equipment, etc. W. J. Closson, 295 8th St., Troy, N. Y.

WANTED—Radio recording machine, portable or one that can be connected to radio. Describe in detail. Ben Cheskin, 2510 North 32nd St., Philadelphia 32, Pa.

WANTED—a copy of the Official Radio Service Handbook, by J. T. Bernsley. E. P. Riffle, 462 Elm St., Ludlow, Ky.

FOR SALE—Superior model 1030S tube and set tester; 2 Airline 7 tube all-wave model 62-177, 1 table and 1 floor model. Want Super pro or similar, condition not important. Glenn Watt, Chanute, Kansas.

FOR SALE OR TRADE to best offer, Riders' vol. 1; 2 RCA manuals, 1923-28, 1931-32; Gernsback auto radio manual, 1933; Principles of Radio by Henney. Edward Benn, 1360 N.W. 42 St., Miami 37, Fla.

FOR SALE—Muter resistance bridge, model 1200. Range .01 ohm to 11 megohms, \$35. L. R. Battersby, 206 Branch Ave., Red Bank, N. J.

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