



# Capacitor



Vol. 9

MAY, 1944

No. 5

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

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

FOR VICTORY

BUY  
UNITED  
STATES  
WAR  
BONDS  
AND  
STAMPS

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

# WANTED: Signal Corps Equipment

You may have Radio-Amateur and Photographic equipment that is urgently needed by the Army Signal Corps. The Army will buy the following from private individuals.

Radio: Standard and commercial built short wave transmitters (such as Hallicrafters HT-1, etc.; Temco and Collins Model 32 and 30) and Standard and commercial built short wave receivers (such as Hallicrafter, National, RCA, RME, Hammarlund or Howard); AC and DC Voltmeters, Ammeters, Milliammeters, Radio Frequency Meters and Volt-ohm, milliammeters; Oscilloscopes, 2-3 inch; Audio sig. gen. 30-15,000 cycles; RF sig. gen. 15-215 megacycles; late model Tube Checkers, and other test equipment.

Photographic: 35 MM Motion Picture Cameras (such as Mitchell (all models), Bell & Howell - Standard Professional, Akeley-Professional (all models) and Eyemo (all models) Bell & Howell Mfg.), etc., and 16 MM Motion Picture Cameras (such as Cine-Kodak Special, Magazine Cine-Kodak, Filmo 70.D or Filmo Auto Master); Tripods; Lenses, all types for 35mm and 16mm equipment; Exposure Meters; and Cameras (such as Speed Graphic 4" x 5", and Speed Graphic 2 $\frac{1}{4}$ " x 3 $\frac{1}{4}$ " with or without flash synchronizers) and Leica Model III (F) or 11B (C), or equal; Range Finders; Pack Adaptors and Cut Film Holders.

If you have this type of equipment, you can assist the war effort materially by selling it to the Army. Write to:

**EMERGENCY RELIEF SECTION  
PHILADELPHIA SIGNAL CORPS PROCUREMENT DISTRICT  
5000 WISSAHICKON AVENUE, PHILADELPHIA, PA.**

briefly describing the equipment you have and stating the price at which you can offer each item, FOB Philadelphia. Do not ship any material without specific directions from that office.

Price consideration is based upon your net cost less reasonable depreciation for use, age, and condition of equipment. Inasmuch as all equipment is being purchased FOB Philadelphia, cost of packing and shipping can be shown separately so that an allowance for the costs can be made when material is accepted.

# SUBSTITUTE TUBES\*

## Circuit Changes to Use Available Tube Types in Converter and Second Detector Position

Tubes are holding up the delivery of the greatest part of sets being fixed. Until critical types become available in volume, it is necessary to use substitute types—or let the set remain dead. In some instances, this means rewiring, and/or changing sockets. Adapters can do the job nicely.

Any wiring changes should be accompanied by (1) a circuit diagram placed in the set or (2) a notice with a warning that certain changes have been made, and your name and address. For one thing this will help to bring the set back to you for further repairs.

In every case, it is important that you explain that it is necessary to substitute a tube and that changes will be made.

### Replacing 12A8

Referring to Fig. 1, the circuit shows the 12A8 original base diagram and conventional converter. R1 and C1 are not always in the original wiring, but the great majority of receivers using this tube contain both of these parts, R1 averaging about 20M and C1 about 0.01 mfd. In changing to the 12SJ7 or 12SK7, as shown in Fig. 2, it is recommended that this simple changeover be used on sets with an antenna coil and short antenna, rather than sets with a loop. Experience shows much better performance with the former, although in an emergency the changeover can be made with loop sets. The receiver becomes a strictly local set with this changeover. Change wires in the following order:

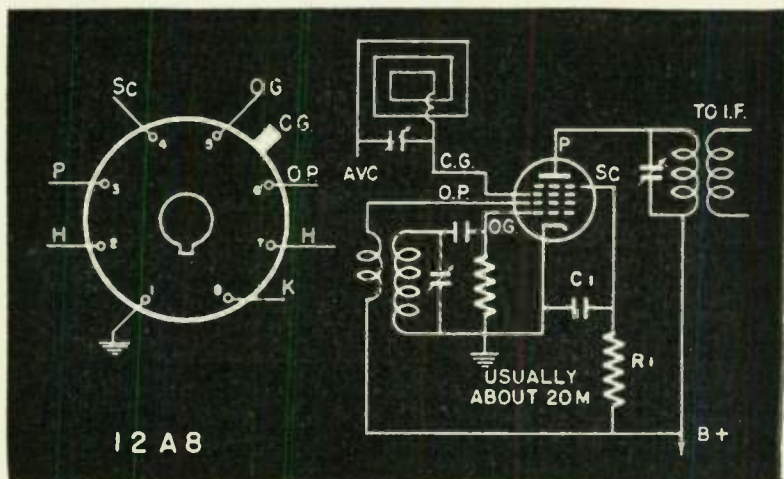


Fig. 1—Conventional 12A8 converter circuit using tickler feedback oscillator and loop RF coil.

\* Courtesy "Radio Retailing Today."

(1) Connections to socket pins 1, 2, 6, and 7 are left alone. (2) Lift leads from No. 4 and connect B plus

otherwise, a desensitizing negative voltage will be fed back along this bus to the IF stages.

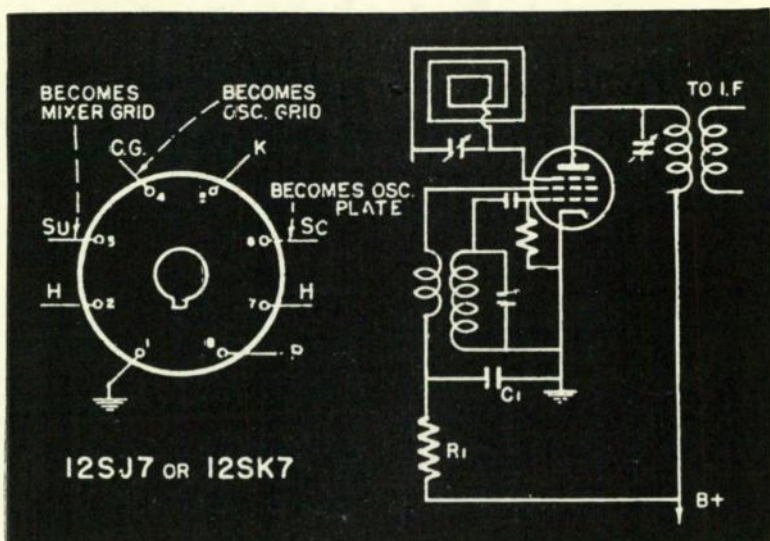


Fig. 2—Changeover circuit using 12SK7 or 12SJ7 to replace 12A8. Sensitivity is considerably reduced with this circuit.

end of oscillator plate coil, cutting off original B plus lead. (3) Move leads from No. 5 to No. 4. (4) Move leads from No. 8 to No. 5. (5) Move lead from No. 3 to No. 8. (6) If possible, remove grid cap lead from top of tuning gang section and connect between bottom of stator and lug 3 on socket. Otherwise, cut off grid cap and extend lead to reach lug 3. (7) Realign.

The changeover for the 12A8 to 12SJ7 or 12SK7 shown in Fig. 3 is a little more complicated, but will give better performance than Fig. 2 with less converter hiss. Here the mixer plate also becomes the oscillator plate, and the suppressor becomes the oscillator grid. Two new parts are required, a 1.2 meg 1/2 watt resistor, and an 0.01 mfd capacitor. The AVC bus is disconnected as shown,

(1) Connections to socket pins 1, 2, and 7 remain the same. (2) Lift IF plate coil lead from lug 3 and connect to B plus end of oscillator plate coil, cutting off original B plus lead. (3) Move lead from lug 5 to No. 3 just vacated. (4) Move leads (cathode) from lug 8 to No. 5. (5) Move lead from lug 6 to No. 8. (6) Move screen leads from lug 4 to No. 6. (7) Cut off control grid cap and connect to lug 4. (8) Realign. Notice that grid leak does not return to cathode, but to circuit ground, unless no cathode resistor is incorporated in original circuit.

#### Circuits for 12SA7

A simple changeover, similar to that used in Fig. 2, can be used in changing the 12SA7 to 12SJ7 or (Continued on page 7)



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

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

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

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

**WANTED**—Any one of the following output transformers, Thordarson T-15S92, Kenyon 416, UTC LS 6L1. Must be in A-1 condition. C. L. Goebel, 221 W. 233 St., N. Y. 63, N. Y.

**FOR SALE**—Readrite Model 700 set analyzer, 1 Grebe B & C, 1 Rauland All American B supply only, 1 Dumont "A" 6 v. rectifier weak, all socket power. Reasonable, what am I offered. T. D. Addario, 13545—117 St., Ozone Park 15, New York.

**TRADE**—35mm Univex Mercury, 3.5 lens, 1/1000 sec. T. & B., for Reflex type with similar lens, test equipment, Rider's Manuals, or make offer. W. J. Closson, 295—8th Street, Troy, N. Y.

**WANTED** — Sig. generator, 35L6, 12SA7, 35Z5, 117L7 tubes, high voltage power transformers. **TRADE or SALE**—PR 60 w. amp., less speakers and mike \$65.00, Model 856 Atwater Kent 6 tube, all wave set, \$15.00. Walter Keith Radio Service, 137 E. 12 St. So., R. 3, Newton, Iowa.

**FOR SALE**—6.00x16 or 5.50x17 new material endless, cord and composition tire liners, \$2.95 each or two for \$5. Auto & Appliance Supply, Main and Newton Sts., Grandby, Mo.

**FOR SALE**—All f.o.b. N.Y.C. Hickok R.F.O. 5 3" scope \$170.00. R.M.E. 69 with D. B. 20 and speaker, mounted rack panel, \$225.00. Webster, 3 post auto. changer, new \$85.00. Garrard R.C.11 ac-dc, auto. changer, used, perfect, \$75.00. Inter. com. Dictograph Co., desk type master and 8 private phones \$175. Write do not call. Sterling Electronic Labs., 521 W. 131 St., New York City.

**FOR SALE**—Condenser, resistor, substitution tester, Supreme Model 596, cost \$10.86, will sell for \$5. Walter Kryger, 912 W. 151 St., E. Chicago, Indiana.

**FOR SALE**—Need a volt-ohm-meter? One dollar will bring you diagrams for an accurate sensitive VOM that uses no meter, can be built less than \$5. Two voltage and 2 or 3 resistance scales give you complete servicing coverage. L. D. Harmon, 4208 53 Ave., Bladensburg, Md.

**WANTED**—Tubes 117P7, 2XD, 12SF7, 3A8, 3Q5, 1A7, 1H5, 1N5, 12SA7, 12SK7, 50L6, 35Z5, also want ASDC VOM, state model and price. V. J. Balcar, 506 W. 44th St., Austin 22, Texas.

**TRADE**—Foth-Derby candid camera, F 2.5, Compu shutter 1/500 to 1/10 sec. Filter and zipper case, 16 or 8 exposures 127 film, fast. **WANT**—8mm movie camera, good sig. generator, cap. resist. bridge, pocket multi-meter, good test equipment. R. N. Eubank, 1227 Windsor Ave., Richmond 22, Va.

**WANTED**—One 12SA7GT or G, one 12SK-7GT or G radio tubes. Cash or trade slightly used 6FB metal tubes. Cecil Mick, 1029 S. Ledford St., Harrisburg, Ill.

**FOR SALE**—Sylvania 14B8 tubes in sealed cartons \$1.95 ea. Substitute for 12SA7 with adapters or change socket. Will sell any quantity, check or money order. Leading Radio Service, 114E Third St., Mt. Vernon, N. Y. Tel. Mt. V. 8-2066.

**WANTED**—Rider's Manuals 8 to 13. State condition and lowest cash price or what you want in trade. Troch, 413 Hummel Ave., Lemoyne, Pa.

**FOR SALE**—\$20.00 takes first 5 Rider's Manuals, just like new. Grillo Radio Shop, Milford, Mass.

**WANTED**—G. I., Meisner or similar recorder, with or without amp. and mike. All replies answered. F. A. Friswold, 17408 Dartmouth Ave., Cleveland 11, O.

**FOR SALE**—Dumont 148 5" scope. Perfect, \$95, Carron Model CCA audio osc., like new, \$30, Hickok Model OAZ freq. mod. \$5. Remington 12 ga. Model 11, auto shotgun, good shape, \$50. Trade 117P7 tubes for 50Y6 or 50L6 tubes. Popma Radio Service, Orange City, Iowa.

**WANTED**—Readrite No. 710-A, 720-A, 430, Dependable 304, Superior 1240, 1250, 1280. I. W. Stubblebine, 238 W. Elm St., Reading, Pa.

**SALE OR TRADE**—60 w. Thordardson amp. 3 mike and 2 phone inputs, comp. and exp., treble and bass controls, like new. Will sell or trade for smaller amplifiers. Longer Radio & Sound, 43 N. Hazel St., Danville, Ill.

**SALE OR TRADE**—John Meck tube tester, A-1. Tests all tubes to last type of locals, 1LA6, etc. Sell or trade for small P.A. system. Longer Radio & Sound, 43 N. Hazel St., Danville, Ill.

**SALE—OR TRADE**—500 new tubes in original cartons, 24A, 6FSGT, 6Q7G, 7B9, 7B6, 12Q7G, 39, 76, 77, 84. Trade for 1A7, 1N5, 1H5, 6A7, 6A8, 12SA7, 35L6, 35Z5, 80. Longer Radio & Sound, 43 N. Hazel St., Danville, Ill.

**WANTED**—Any late model multimeter, also other small test equipment in good condition. R. M. Heintz, 2 Gray Gardens East, Cambridge, Mass.

**FOR SALE**—Stancor Pack, 12v. at 15 amps., list \$25, sell \$8. Meter 2 1/2" 0-50 amps., \$2.50; Triplett ac meter in VOM case, \$2.50. Magnetic pick-up heads RCA and Phonovox, 50c. Jeff transformer with switch, 5 1/2 to 13 1/2 v. ac, \$1.50. W. F. Onder, Rt. 1, Box 389, Kimmswick, Missouri.

**FOR SALE**—Simpson model 125 0-100 ma. \$5.35 ea., 1 Simpson, mod. 127, 0-50 ma., \$5.35, 1 Simpson mod. 27, 0-50 ma., \$6.35, all new. 2 National R154 rf chokes, \$2.25 ea., 1 used Astatic, mod. D104 crystal mike, \$14.75. Fred Craven, 2216 So 7th St., Philadelphia 48, Pa.

**FOR SALE**—80 coils, new and used: osc. ant., rf, if; \$10 ppd.; 11 speaker field coils, new and used \$6 ppd.; 60 mica cond. and 50 radio knobs, new and used \$5 ppd.; Merriam Webster, International Dictionary, 2nd edit., \$17.50, good condition. T. Wojciechowski, 2837 Fulton St., Brooklyn, N. Y.

**WILL TRADE**—2 complete sets Lionel freight trains "00" gauge 2 rail with transformers, valued at \$150.00. Want console radio phon., or large radio, camera with film, or what have you. Wilbur F. Cosby, 612 So. 14th St., Boise, Idaho.

**FOR SALE**—One 6 v. charging resistor working from 32 v. dc. One 1939 Plymouth or Dodge Motorola control head. **WANTED**—0-1 milliammeter of any type, or VOM any type. Oscar's Radio Service, Merrill, Iowa.

**WANTED**—One Howard or Hallicrafter communications receiver; also code training set, Teleplex or similar, with variable speed. M. E. Noyes, Beidler Road, Willoughby, Ohio.

**WANTED**—Signal generator, phono motors and pickups from old RCA, GE or Atwater-Kent radios, quantity used records for sale, or swap late titles from juke boxes. M. Gurlin, Haddon Ave., West Berlin, N. J.

**FOR SALE**—One highboy radio, Brunswick, in good shape, portable volt meter, portable tube checker, RCA, volt meter, Triplett. Write for full particulars. Joe Freed, 2427 Webster Ave., Bronx, New York City. Tel. Fordham 7-4791.

**FOR SALE**—Most all types radio tubes, many hard to get. By-pass condensers, specify caps. wanted. 1 Precision up-to-date counter model tube tester, 1 Supreme mod. 91 radio analyzer, J. Chornuk, c/o Schwarz, 614 Third Ave., New York, N. Y.

**SWAP**—Solar condenser checker and Readrite tube checker, for Rider's Manuals, Nos. 10, 11, 12, 13, or Simpson mod. 320 set tester or good signal generator. Whitman Radio Service, Dysart, Iowa.

**WANTED**—Output transformer, Thordardson T-15S90, UTC LS-54 or PA-15. V. R. Parker, R.F.D., Lunenburg, Mass.

**FOR SALE**—Practically new model 1280 Superior Instrument Co. tube tester, which also tests ac-dc voltages, currents, capacities, resistances, decibels and watts, \$25. Also Crosley Xervac, \$50. Miller Electric Service, Ellenville, N. Y.

**FOR SALE**—Sheet music, make offer. 1100 copies McKinley edit., 891 Superior edit., 258 edit. Beautiful, 50 Superior edit. duets, etc. Becker's, 801 Dempster St., Evanston, Ill.

**FOR SALE**—Simpson model 222 tube tester in portable case. Factory re-conditioned to test 117 v. tubes, \$25.00. L. R. Battersby, 206 Branch Ave., Red Bank, N. J.

(Continued on page 10)



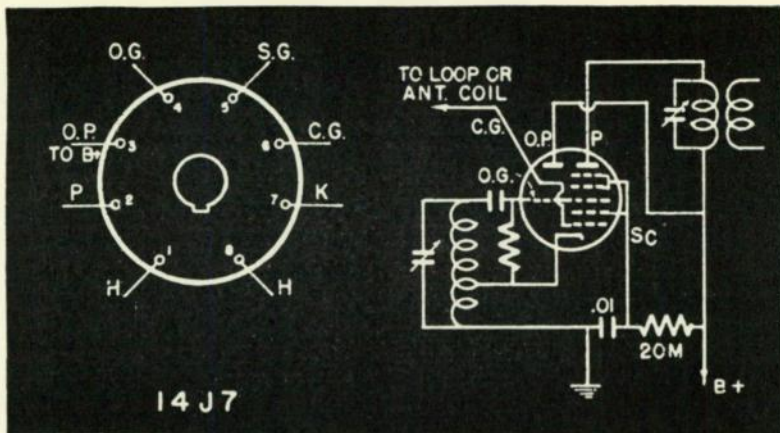


Fig. 4—A 12SA7 may be replaced by 14J7. Above circuit for Hartley type oscillators. The 12A8 can also be replaced by this tube.

placed by the 7C6, which has the same filament drain in a series string, but insert a 50—ohm 2-watt resistor between the heater and the next tube in line.

Type 75 tubes are very scarce in most parts of the country. This can be replaced by the 6Q7GT or 6Q7G,

whichever is available, by changing the socket to octal and rewiring, following the base diagrams for the two tubes. The 7C6 can be used for either one of the above if they are operated from a transformer and NOT in a series string because of the different current taken by the 7C6. However,

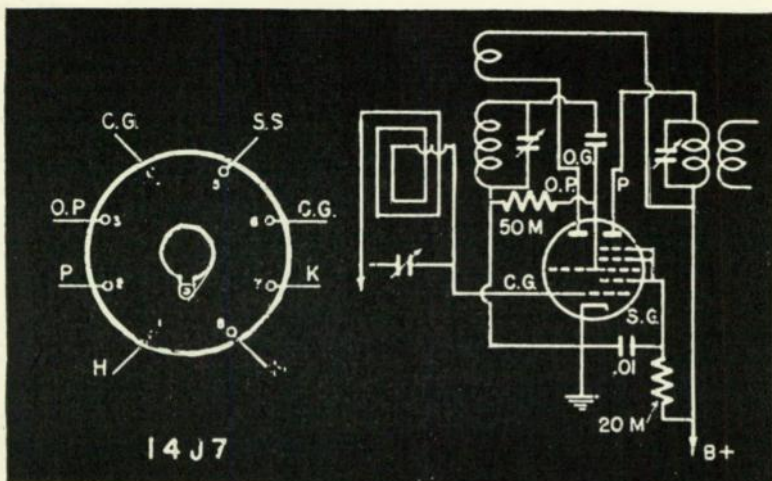


Fig. 5—Tickler type oscillator coil should be connected as above to change from 12SA7 and 12A8 to 14J7. Use 75 M oscillator grid resistor.



the 6Q7 and 75 are interchangeable, if receiver is rewired, whether in series or parallel operation.

### Factors in Frequency Stability of Local Oscillators

Space-charge coupling between signal and oscillator grids is very much less in hexode than in heptode type frequency changers. The use of a neutralizing capacitance about 1  $\mu\text{mF}$  may be used in the latter case.

Stray capacitance coupling between the signal and oscillator grids must be avoided if the tuning of the signal circuit is not appreciably to affect the oscillator operation on the short wave ranges.

### Oscillator Stability

The following summarizes the steps which may be taken to increase the frequency stability of the oscillator.

1. A tube having a high  $G_m$  and high  $R_p$  is required.

2. Grid current should be as low as possible, i.e., a high grid self-bias resistance, provided "squegging" is not experienced, and feedback coupling only just sufficient to sustain oscillation at the required amplitude are necessary.

3. The coil resistance should be as low as possible.

4. The L/C ratio is required to be low so that variations of stray capacitance and load reflected from the frequency changer have less effect. Too low a value, however, makes oscillation difficult. Except in band-spread receivers with fixed signal tuning, and push-button operated receivers, the values of L and C are fixed by ganging considerations, and little control is possible.

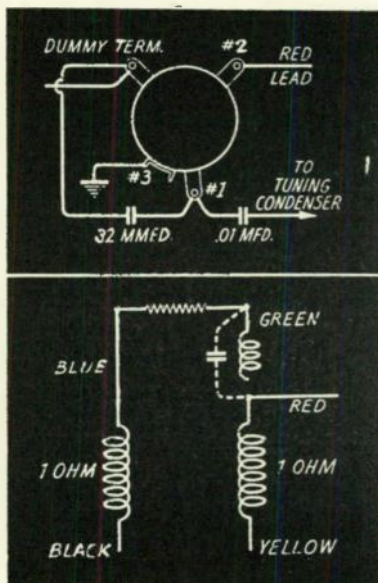
5. The use of a phase-correcting reactance is not feasible as it is only suitable for fixed-frequency operation.

6. The feedback coupling, if a coil, should have the smallest value of coil inductance with maximum value of mutual inductance coupling to the tuned LC circuit.

7. The tuned circuit should be loosely coupled to the tube, i.e., the tube should be connected across a part of the tuning inductance, and tuned anode is preferable to tuned grid because space-charge capacitance changes are greatest at the grid electrode.

The B+ supply should be adequately decoupled and smoothed. The possibility of audio-frequency feedback from the power output stage may be reduced by a push-pull audio-output connection.

9. Temperature-frequency variations are reduced by mounting inductances and capacitances away from such sources of heat as the power transformer, the power output and rectifier tubes. Low-loss coil formers of ceramic material are to be recommended. Different rates of radial and axial expansion for the coil are a possible means of reducing the temperature effect. High-loss insulators must be avoided as these almost always have high positive temperature



coefficients. Rigid mechanical construction of coils, variable capacitors, range switches and wiring is very necessary.

10. Compensation by a capacitance having a negative temperature coefficient may be provided.

11. Humidity effects demand the use of non-hygroscopic insulating material, waxes, and varnish.

12. The optimum oscillator voltage required by the frequency changer should be as low as possible, as this allows loose coupling to and reduces the load reflected from the frequency changer into oscillator tuned circuit.

13. A frequency correcting device may be connected to the oscillator in order to introduce additional reactance in parallel with the LC circuit as the frequency tends to vary from

its correct setting. The magnitude of the reactance is determined by the amount of error, and high initial frequency errors may be reduced to quite small values. Thus an uncorrected oscillator frequency error of 20 kc/s can be reduced to a final error of only about 200 c.p.s.

This material on oscillator stability is from "Radio Receiver Design," a new book published by John Wiley & Sons, N. Y.

### Replacement Oscillator Coils

Oscillator coil used in RCA 45E is an alternate for No. 35116 in 45X1 and 45X2, using connections in upper diagram. Oscillator coil RCA No. 38338 is replacement for 34443. Green lead is capacitor winding and if not used, should be replaced by 50 $\mu$ f shown dotted.

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## THE RADIO TRADING POST

(Continued from page 6)

**WANTED** — Information or schematic for series 700 Soundview Marine receiver, mod. 7C15 32v.; electric fan, 110v, 60 cycle, nationally-advertised make in A-1 condition. Radio equipment to trade or cash. Raymond H. Ives, R.T. 1/c, Radio Lab., Bldg. 813, U.S.C.G. Receiving Station, Berkley, Norfolk 6, Va.

**FOR SALE**—IRC analyzer, fuses, instructions, in factory carton; W. E. E-1 handset; one complete series N.R.I. experimental radio kit; one 0-50 v. dc voltmeter and one 0-5 ma dc milliammeter Readrite. Trade or cash. Raymond H. Ives, R.T. 1/c, Radio Lab., Bldg. 813, U.S.C.G. Receiving Station, Berkley, Norfolk 6, Va.

**FOR SALE**—Hobart battery charger, constant potential, 300 amp. 7 $\frac{1}{2}$  and 15 v., 1750 rpm, 3 phase ac, 220 volt, complete with panel, meters, rheostat and switches. Used very little. Kinnaman Electrical Service, 107 S. Wood Street, Fostoria, Ohio.

**FOR SALE**—1 mod. 669 Weston vac. tube volt meter, latest type 2 with monitoring jack, perfect \$50; 1 Peerless Wheatstone bridge, No. 2766, coil accuracy 1/10 of 1 per cent, perfect, \$25; 1 Coolidge X-ray tube, G.E. No. 23606, \$5. Gilbert McQuate, 325 Cleveland Ave., Ashland, O.

**WANTED**—1 mod. 9600 RCA Universal ac bridge. Will pay cash. Gilbert McQuate, 325 Cleveland Ave., Ashland, O.

**TRADE**—1 Hallicrafters Sky Champion S-20 receiver, with tubes, like new. Only interested in trade for Colt .45 cal. army type automatic, must be good. S. E. Pence, 629 N. Front St., Wheeling, West Virginia.

**FOR SALE**—250 w. transmitter (two 805s), 6-15 w. portable-mobile transmitters, Browning freq. meter mod. S-1, 200 ft. co-axial cable, Motorola P69-17 receiver, RCA 30-40 mc. police receiver, crystals, mikes, etc. Carson A. Andrick, 1357 Adams St., N.E., Washington 18, D. C.

**FOR SALE**—Triumph mod. 430 tube checker little used, push buttons, roll chart, eight sockets. Will check octals, loktals, and all large tubes. \$45. Times Radio, 732 E. 105 St., Cleveland 8, Ohio.

**FOR SALE**—26 new tubes, etc. 3 7A7, 3 7B7, 3 7C7, 3 6SD7, 6 6Y6, 2 6F6, 3 6K6. List \$37.50. 3 new vibrators, 2 Delco part 7238829, 1 Mallory 901M, 1 heavy duty Green Flyer phono. motor with turn table, used, A-1 shape. \$35 for the lot. F. E. Hamula, 711 N. Penn. Ave., Lansing 6, Mich.

**SALE OR TRADE**—1 42" Sears wood lathe, 1 tool grinder, no wheels, 1 3/4" line shaft and hangers, 7 ft., 1 1/2" line shaft and hangers, 5 ft., 1 Pioneer gene motor 6 v., 1 Campbell X-ray machine (old type). Need Rider's Manuals 3 to 12 inclusive. Clifford D. Lessig, 24 Eighth St., Frenchtown, N. J.

**WANTED**—Glass scale to fit United American Bosch model 680 or chassis regardless of condition. State price. Acme Radio Co., 189 Valley St., N. Tarrytown, N. Y.

**FOR SALE**—Stancor mod. 415 PA amp., hi-fi 3 input channels, 4, 8, 15, 250, 500 ohms output to PM speakers or line. Peak limiting amplifier. Gray crackle case. 15-20 w. output, 50-15000 cps, 1 1/2 db, with tubes, perfect, \$50 f.o.b. Minneapolis. Cecil R. Malmgren, 2924 Alabama Ave., St. Louis Park, Minneapolis 16, Minn.

**FOR SALE**—Hallicrafters transmitter, 40, 20, 10 meter bands, band switching, like new, complete with tubes and one xtal covering three bands. \$135.00 includes packing. V. P. Terullo, 43 Robbles Ave., San Francisco, Calif.

**FOR SALE**—R.M.E. 69 receiver with D. B. 20 and speaker. Mounted on a gray rack panel, 19"x16", in one unit. \$225 F.O.B. N. Y. C. Write do not call. Sterling Electronic Labs, 521 W. 131 St., New York City.

**FOR SALE**—32 v.d.c., adjustable speed, G. I. Flyer phono motor, heavy duty, less T.T. Also have standard 6 ft. Par metal relay rack for 19" panels. Make offer. C. W. Schechter, Scenic Drive, R. No. 2, Muskegon, Mich.

**WANTED**—0-1 milliammeter, 14 in. 25 watt speaker and good carbon mike.  
**FOR SALE**—1936 model "Sky-Buddy," fair condition. John E. Thiel, 742 No. Denver, Tulsa, Okla.

**FOR SALE**—Solar cond. tester, model 9C \$10.00. Superior Inst. sig. gen., model 1230 \$15.00. Draft, postal order or express. R. A. Reid, Parkersburg, Iowa.

**WILL TRADE**—New Bosch amplifier, never unpacked, with tubes. Good foundation for phone amplifier. Want direct reading a.c. oscillator, VOM, or what have you. George C. Elwood, 90 Ocean View Ave., Santa Cruz, California.

**WANTED**—All kinds of radio test equipment, analyzers, etc., tools and magazines. Quote what you have to sell and best cash prices. H. B. Howell, Anna, Texas.

**WANTED**—Complete set Rider's Manuals, must be in perfect condition. Southern Radio Service, Thomasville, Georgia.

**FOR SALE OR TRADE**—One new ac-dc wireless, phono-oscillator. Uses one 37 and one 6A7 tube. Want construction kits, meters, and test equipment. Geo. Heard, 26 N. Bellevue, Memphis 4, Tenn.

**FOR SALE**—New Independent lathe chucks. 4 jaw. Cash. 5 18", \$73.60 ea. 5 16", \$55.80 ea., 4 14", \$43.45 ea., 5 12", \$38.30 ea., 3 10", \$33.45 ea. R. Bertolette, 628 Astor St., Norristown, Pa.

**SELL OR TRADE**—1 RCA phono oscillator, new, unused; 1 15", 20 w. dynamic speaker, with power pack and 500 ohm output trans. Want tubes or small ohm meter. What have you, what do you want? John Arnold, Bluffs, Ill.

**FOR SALE**—9 tube Hallicrafters Super-Skyrider in good shape, complete with crystal filter, tubes and built in spkr. Set is about 1937 model. What am I offered? A. Ignal, 850 E. 156th St., New York 55, N. Y.

**WANTED**—Good radio man, with either military exemption or disability discharge, a golden opportunity to right man. Southern Radio Service, 124 E. Jackson St., Thomasville, Ga.

**FOR SALE**—2 3 1/2 ft. Racon horns, 2 Racon baby horns, 2 Y adapters, 1 unit feeds 2 horns; 1 ABC Unacometer tube tester, 1 genemotor, 6 v. input, 300 v. 100 m.a. output. Make an offer. Geo. S. Oakford, 19 Greenwich St., Hempstead, N. Y.

**FOR SALE OR EXCHANGE**—17 watt P. A. system, two enclosed speakers, 1 floor stand, 1 desk stand Webster mod. 417, almost new. 1 G.E. Tungar double charger for batteries, 1 Flexograph to make your own letters and advertising material. Arlington Radio Service, 158 Jamaica Ave., Brooklyn, N. Y.

**FOR SALE**—RCA type 955 acorn tube, brand new \$2.58. Also 6A7, 25Z5; 25Z6; 75; 6Q7GT; 6SK7GT/G; 26; 12F5GT; 1C5GT/G; 1R5; 80. Want new 6, 12 or 32 v. vibrator transformer. Robert Freed, 1140 Fifth Avenue, New York 28, N. Y.

**FOR SALE**—Power level meter, Weston, model 695, 2 in. C.R. oscillograph, RCA, 151-2. Supreme radio analyzer, model 339. August Friel, 35 Humbert Street, Princeton, N. J.

**WANTED**—1 boom mike stand or boom attachment; P.A. equipment, turntables, receiving tubes, small radios, 33/78 turntable. Ed Monahan, Shawomet, Rhode Island.

**WANTED**—50L6 6T16 or any other hard to get types of radio tubes. Will pay cash or swap with other parts. Jack Rudie, 4725 28th Ave. South, Minneapolis 6, Minn.

**TRADE**—3 tube ac-dc short wave receiver, 6 plug-in coils, 15-550 meters, for Hallicrafter "Sky Buddy" or Howard 35A. Will pay difference in cash.

**WANTED**—Triplet 666 or 666H pocket multimeter. State condition, age, and price. Manuel A. Perry, 39 Winter St., Wakefield, R. I.

**FOR SALE OR TRADE**—Model K Code Master Oscillator, Electro Bug Jr. telegraph key, Teleplex code machine, 4 tapes, microphone stand, Model K portable Presto recorder and play back, Collins 32B phone and C.W. transmitter, complete 1922 to 1939 Q.S.T. magazines in leather binders. V. Howerdal, 102 Hancock Ave., Jersey City, N. J.

**FOR SALE**—1 Wells Gardner recorder and play back unit with pre amplifier built in, suit case type, cash or trade for good test equipment. Recorder new, A-1 condition. Lovett's Radio Shop, P. O. Box 143, Newland, N. C.

**WANTED**—Will pay new price for Superior utility tester with good meter. E. L. Russell, Colfax, Ill.

**FOR SALE**—Philco car radio, model 818, 6 tubes, twin speaker, universal tuning head, fit any car. A-1 condition, slightly used. Price \$25.00. M. Francis, 1232 E. 75th St., Chicago 19, Ill.

**FOR SALE**—Complete radio engineering library and I.R.E. copies for 1939-43 complete. F. E. Herman, 4820 W. Hutchinson St., Chicago, Illinois.

**WANTED**—Buy a .303 Savage rifle in good condition. Have many tubes in 1½ v. d.c. and 2½ v. a.c. to sell or trade. Roberts Radio Service, St. Louis, Michigan.

**WANTED**—All kinds of radio equipment, also Rider's Manuals tools and tubes. State price and condition. Gilbert Radio Shop, 1296 Sheridan Ave., Bronx 56, New York.

**FOR SALE OR TRADE**—Triplet free point tester, Model 1220-B and Jewell 199 Analyzer. Want fishing and photographic equipment, or radio parts. Joe's Radio, 2224 W. Belden Ave., Chicago 47, Ill.

**FOR SALE OR TRADE**—One Howard No. 437-1 Amperite mike with acoustic compensator, one Amperite contact mike. 5" and 12" P.M. speakers. Lots of Jewell, Weston and Hickok meters. Interested in South Bend, or similar metal bench lathe or 5 h.p. garden tractor. George Foster, Rt. 1, Burghill, Ohio.

**FOR SALE**—Keuffel & Esser 7 instrument drawing set; square type instruments; catalog number, Anvil N 999. Dexter Kurs, 4525 45 St., Long Island City 4, N. Y.

**WANTED**—Pocket type VOM. Describe fully. State price. H. C. Dexter, P.O. Box 262, Princeton, N. J.

**FOR SALE**—Kolster console radio K-45, almost new, push button and remote cable, list \$600, give offer. Halson and Philco table models, 5 and 6 tube. Want Riders Manuals, 1 to 8. Louis A. Goldstone, 1279 Sheridan Ave., Bronx 56, New York City.

**FOR SALE**—1 Garrard magnetic pick-up \$7.50, 1 Racine Webster mag. \$4.50, 1 Amertran D-11 audio \$8.00, W.E. 4-A pickup, arm, scratch filter and all wiring diagrams, curves, equalizer \$10.00. Lots of used tubes, metals and glass for sale. Write for list. Herman Mc-Masters, 1800 S. 26th St., Terre Haute, Ind.

**TRADE**—2 Triplett meters, Model 221, 0-250 mils, 0-100 mils, brand new. Green Flyer turntable, model A, new. 5 each 6SC7, 6SQ7, 6x5, 6K7, 6L6; 3 2A4G, 2 2051, 1 954, 1 955 in original cartons, new. Want—3 or 5 in. oscillograph and RCA Volt-hyst in new condition. Will pay difference. Henry Kadas, 763 Blair Ave., St. Paul, Minn.

**FOR SALE**—Series 910 Ser. No. 9975 Precision tube checker, A-1 condition, \$26.00. ATR 32 v.d.c. to 110 v.a.c. inverter, 100 w. cap., slightly used \$10.50. C. R. Crever, St. Joseph, Minn.

**ROTARY CONVERTER**—Janette Type CA-20, 115 v.d.c. 2 amps. 110 v.a.c. 1 amp. Highest cash offer takes it or what have you to swap? Courtney Electric Co., 5104 Germantown Ave., Philadelphia 44, Pa.

**WANTED**—20 new or good used 50L6GT radio tubes. Can use 35L6GT type also. Send me your price. Clyde W. Wimer, Ellwood City, Pa., R. D. No. 2.

**WANTED**—Riders Manuals, 7 to 12 incl. with index. State price and condition. Clyde W. Wimer, Ellwood City, Pa., R. D. No. 2.

**FOR SALE OR TRADE**—QST more or less complete from Oct. 1919, some issues missing. "R9" Dec. 1933-Dec. 1935, "Radio" Dec. 33-May 1940, some 1941. Radio News, Pop. Science, etc. Chas. F. Lohner, 157 Logan St., Bedford, O.

**SELL OR SWAP**—Merriam-Webster 3000 page complete Dictionary, with reference history of the world; also J. H. Morecroft's "Elements of Radio Communication." Cash or swap for 8mm movie projector, late model. Ted Gasiarowski, 209 Giffin Ave., Mt. Oliver 10, Pa.

**WANTED**—Wattmeter or appliance tester. State range, make, and price. Brook's Electric Shop, Twin Bridges, Montana.

**WANTED TO BUY**—Used recorder cutting head with mounting, state make and price. Need tubes and good tube tester, state price and make. John M. Moore, 80 N. Cleveland St., Memphis, Tenn.

**FOR SALE**—Used radio equipment including Weston meters, test equipment, books. Send for list. Want Riders Manuals, vols. 8 to 13. C. F. McCracken, Hughes Park, Bridgeport, Pa.

**WANTED** — Electrical and radio books and magazines. Must be cheap and in good condition. State title, author, edition. John A. Seaman, Gentry, Ark.

**FOR SALE**—One model 400-B Supreme Diagonometer, complete, with carrying case, \$45; one batt. operated oscillator, aluminum case, built up with Natl. vernier cond. and dial, \$10; Riders Manuals, vols. 2, 3. T. C. Raynes, Box 239, Oxford, Kansas.

**WANTED**—Recording equipment with extra tunable, complete or in part. Good signal generator and any type modern shop equipment. State make, model, lowest cash price first letter. Logan Radio Shop, 1759 Logan Ave., San Diego, Calif.

**WANTED** — Latest model tube tester, meters and tubes: 12SK7, 12SA7, 12SQ7, 12SR7, 80, 35S5, 45S5, 12K7, etc. Homer Mays, 507 Shady St., Fort Worth, Tex.

**TRADE**—DM-36 converter gray, like new, made by RME, works with any receiver that tunes to 10,000 kc. Scale has 28 to 30 and 56 to 60 megacycles. Want Meissner deluxe signal shifter. Elmer Shafer, 2889 E. 116th, Cleveland, Ohio.

**WANTED**—Will pay from \$2 to \$3 for crystal or magnetic pickup, with or without needle. Elton Wolff, R. 2, Box 45 A, Wishek, N. Dak.

**FOR SALE** — Pr. 8 power binoculars (French), Model 91 Supreme analyzer, Model 85 Supreme tube tester with all adapters, Supreme pocket meter Model T MV-97-A RCA signal generator, Vols. 1, 2, 3, Riders Manuals. F. R. Magee, R. F. D. 2, Greenwich, N. Y.

**WANTED**—Will pay cash for a good tube tester, signal generator or condenser tester. George Piherny, 3415 31 Ave., Astoria, N. Y.

**WANTED**—One Hickok 510X tube and set tester or one of the following: Precision 920C, Radio City 802, Supreme 599. High price paid. Chester C. Manho, 20413 Marx, Detroit 3, Mich.

**FOR SALE**—Mallory 4 amp. dry charger, new rectifier \$12; RCA station allocator, new \$20; G.M. Delco auto radio for 1937 Oldsmobile \$20. Paul Capito, 637 W. 21 St., Erie, Pa.

**FOR SALE**—Selenium rectifiers new 2½ amp. 50 v, maximum load, easily rebuilt for other current or voltage requirements, bargain. M. C. Bursma, 105 Avondale, Jackson, Mich.

**WANTED FOR CASH**—Riders Manuals 1 to 13, Superior utility tester, also any good condenser analyzer. State price. Must be in A-1 condition. All inquiries answered. H. Ilderton, 945 Madison St., Albany 6, California.

**FOR SALE OR TRADE** — Tube testers, Weston 676, Superior 1280; Superior signal generator, 1230, Triplett free point tester 1220, 199 Jewell portable analyzer, has 2 3' meters, also tubes, and radio parts, speakers. WANT—outboard motor, 1.5 to 5 h.p., or fishing equipment. Joe Svantek, 2224 W. Belden Ave., Chicago 47, Ill.

**SWAP**—A complete DeForrest Radio and Electrical Course and Television Course for a late NRI Course, or what have you. Must be complete. Have 0-5 Triplett m.a. meter in new condition. Want 35Z5 and 35L6 tubes. John R. Naples, 87 Tod Lane, Youngstown, Ohio.

**FOR SALE** — 100 Dumore fractional h.p. motors with gear reduction 60/1 ratio. Originally made for aircraft equipment, 24 volts dc type. Will sell in any quantity. N. K. Stover, 1357 Hill St., York, Pennsylvania.

**FOR SALE**—1 Webster 78 rpm recorder and playback chassis in aeroplaneluggage type case, crystal cutter, featherweight crystal pickup, all new \$40.00. 1 Radex loop for use on signal generator, new \$3.50, 1 American D7T mike \$12.50. Myron E. Kluge, 1913 Montrose St., Los Angeles 26, Calif.

**FOR SALE**—Howard 450A communications receiver, 13 tubes, 550 kc to 68 mc. (including 5 meter band using separate di-pole) matching enclosed P.M. speaker, has crystal filter, signal "R" meter, B.F.O., etc. Excellent condition and performance. Best offer takes it C.O.D. L. F. Carini, 246 Wolcott Hill Rd., Wethersfield 9, Conn.

**FOR SALE**—Ghirardi's Radio Physics \$4; Triplett 1210A tube tester, panel worn, \$13.50; used and new chokes, radio parts and magazines. T. Wojciechowski, 2837 Fulton St., Brooklyn 7, N. Y.

**FOR SALE** — Set signal tracing probes, Sterling 0-10 ma, 2 filter chokes, 350 ma, 3 tube wireless mike, Detroita radio, auto radio, combination, etc. Want Keystone projector 82 or 75. Harry Kay, Rt. 2, Box 255, Imlay City, Mich.

**FOR SALE**—Rider's Chanalyst, complete, like new, \$100. Rider's Manuals, 1-12 inc., like new, \$90. Cash only. Edgar Dragon, Hotel Osmund, Melrose 76, Mass.

**WANTED**—Used Instructograph or Teleplex with tapes and instructions. State condition and price wanted. Have 17 Wabash No. 0 photoflash bulbs, cash or what have you. Jos. R. Kukura, P. O. Box 91, Genoa, Ill.

**WANTED**—One late model tube tester, one voltohmmeter, no special make, list price first letter. Burkitt's Service Station, Inc., 112 Meacham Avenue, Park Ridge, Ill.

**WANTED**—Will pay cash for copy of revised instruction booklet on Simpson Model 220 Rotoranger, this tube and set serviced modernized to check banam and 117 V tubes. P. P. Miglin, 846 West Drive Woodruff Place, Indianapolis 1, Ind.

**WANT**—Condenser and filter block, part no. 3887 for Majestic radio, model 20, either new or used, must be in good condition, state price. Albert Bellfuss Radio Service, Route 1, Box 404, Harms Road, Glenview, Ill.

**WANTED** — Dynamic condenser tester, Solar model QCA or CE or Aerovox 95, also beat frequency oscillator. Phone Crawford 3571, address 1548 S. Christiana Ave., Chicago, Ill. Philip D. Padva.

**WANTED**—Dynamotor input 6 v., output 400 v. at 200 ma. State make, condition and price. T. Clarke, 609 Birch St., Fall River, Mass.

**WANTED**—We are in urgent need of a Hallicrafter "Sky Champion" S-20R. Will pay immediate cash. Please contact Paul Kuzmak, 67 Buckland Road, Wethersfield 9, Conn.

**WANTED**—Garrard BBC turntable; plate transformer 500 v. or more, 200 ma; filter chokes 200 ma or more; permanent point pick-ups or heads only. A. H. Taylor, Sound Div., Naval Research Lab., Washington, D. C.

**FOR SALE**—One OCA Clough Brengle signal generator, one Superior 1230 signal generator, Meissner Analyst 10-1154. All these instruments are in perfect condition, perfect calibration. J. F. Martin, 142 Ralph Avenue, Brooklyn 33, N. Y.

**FOR SALE OR TRADE** — Modern Radio Servicing, 2nd edit. Radio Trouble Shooters Handbook, 1st edit. M-Y Encyclopedia, all for \$5, or trade for set of short wave coils, 4 prong, 140 mmfd. cond., or other short wave parts. H. R. Lauffer, R. D. No. 1, Export, Pa.

**WANTED**—Audax microdyne relayed flux type magnetic pickup head. Advise output impedance, description and price. R. L. Brackett, P. O. Box 733, Opa Locka, Fla.

**CASH WAITING**—For a 110 v Victrola playing arm. James Wilson, 437 Arleth St., Terre Haute, Ind.

**WANT** — Tube checker, tube tester, new Imperial tube tester, model 200; model 310 tube tester series 3 and 4. Sound and test equipment, radio parts, Triplett model 1213 1612 and Superior model 1240 tube tester, Philco tube tester. Burkitt's Service Station, Inc., 112 Meacham Ave., Park Ridge, Ill.

**FOR SALE**—1940 little used SX24 the Hallicrafters famous communication receiver, \$75.00 cash F.O.B. or half cash balance C.O.D. Fred W. Rudolph Service, Stryker, Ohio.

**FOR SALE**—Tubes, old and new, Send card for numbers and price. 2SA6, 27, 37, 199 and 99, etc. Taubers Radio Shop, 516 S. Cicero Ave., Chicago, Ill.

**WANTED**—Inexpensive .22 cal. bolt action rifle. Charles Carlton, Jr., 156 Mitchell Court, Rantoul, Illinois.

**FOR SALE OR TRADE**—Comet Pro beat osc. short wave receiver, Amperite ribbon mike, Underwood Standard portable typewriter, 2 v. 8 tube farm radio, late model, size 3/4 child's ice skates. H. B. Losey, 102 Hancock Ave., Jersey City, N. J.

**WANTED**—Rider's Manuals, vols. 3 thru 12, in good condition. Peter F. Stefank, 216 Springfield St., Chicopee, Mass.

**WANTED**—Reflex camera, as Wirgin, Argollex, etc. Must be in good condition. Have brand new Superior tube checker, many tubes, new filters, also cash. Gerald Samkofsky, 527 Bedford Ave., Brooklyn, N. Y.

**SWAP**—Aerovox 95 L.C. checker for Sprague Telomike standard. Louis Bauernfeind, Box 125, Hortonville, Wis.

**WILL PAY** for instruction book and tube chart or a copy of same for a Confidence special tube tester made by Apparatus Design Co. Fred Wittich, 7202 Juniper Valley Rd., Middle Village, N. Y.

**SALE OR TRADE**—Brand new Thordardson transformers, single secondary 24 volts 4 amps., some at 30 v. 2 amps. Want meters any condition. Rider's Manuals, 117L7 GT tubes. H. Klein, 1710 W. 2 Street, Brooklyn, N. Y.

**WANTED**—ac dc VOM. Prefer one that also measures mfd. Describe instrument fully. Robert L. Wesson, D-81/2 11th St., Trion, Ga.

**WILL SWAP**—Vibroplex original "bug" for a small candid camera using 35mm or roll film. Irvin A. Weinman, 25 South Mills St., Madison, Wis.

**WANTED**—Superior utility tester. Will trade complete new phono motor turntable, pickup, also table model radio in playing condition minus cabinet. Write list small parts. Geo. H. Hague, 6 Carver St., Fall River, Mass.

**WILL SWAP**—One pair homing pigeons for one 1A7GT, 1HS5GT or 12SA7 or any 12 volt series tube. You pay special low express charge on birds. Chas. L. Culley, Melville, Louisiana.

**WILL SWAP** — Copies of ARRL, defense edition "Amateur Handbook," "Learning the Radiotelegraph Code," "Course in Radio Fundamentals" and "License Manuals." Have big stock, what have you? Chas. L. Culley, Melville, La.

**NEED TUBES**—Use available tubes thru adapters. Build your own in 15 mins. for 10¢ each. Send for instructions on substitution for practically any tube. Hundreds listed. Post paid for \$1.00. C. E. Ranniger, Gowrie, Iowa.

**WANTED**—Signal generator, must be in good condition, send full particulars. Also want Precision 845 VOM. S. G. Hernandez, 120 S. Alazan St., San Antonio, Texas.

**WANTED**—One Aerovox, Model No. 95, L/C checker. Wire price and condition Standard Piezo Company, Carlisle, Pa.

**FOR SALE OR SWAP**—Have new Model 666-H Triplet ac-dc VOM and Silver-tone tube tester, will sell for best offer, or will swap for good communications receiver or 8 mm. projector. Paul B. Kuzmak, 67 Buckland Road, Wethersfield 9, Conn.

**SWAP** — Royal portable typewriter, in brand-new condition. Trade for good radio test. instrument. Only good instrument wanted. Superior Film Service, 126 Fourth Ave., Paterson 4, N. J.

**WANTED**—A multimeter or volt-ohmmeter in good condition, popular make. Also NRI course late issue. Will swap for or cash. Have sports equipment and one 0-10 dc milliammeter, radio parts, tubes 26, 27, 45, 80, 1A7GT. Charles Lentz, 2300 Bronx Park E., Bronx 67, New York.

**FIRST CLASS Licensed Radio Engineer** desires position in B.C. station in New England, age 31, draft 4F. Commercial operator since 1930, ham since 1928. Desire post with responsibilities. \$50 week minimum. Bernard Seamon, Wiscasset, Maine.

**WANTED**—All purpose set tester and analyzer, 920C, 920PM, or Precision model 844L. Will trade for movie camera 16mm Kodak, or a 16mm Kodak projector, all automatic threader, like new. If swap not desired, give cash price. M. J. Difini, Executive Division, General Post Office, Brooklyn 1, N. Y.

**WILL BUY**—Good signal generator, ac operated, or a MRI (mf. by Readrite) battery operated s.g. and multitester combination. T. H. Clark, 1821 N. Carline St., Baltimore 13, Md.

**FOR SALE**—Jewell No. 198 set analyzer (no case) ac and dc mill. meter \$11; Jewell 135 v. dc meter, Thordarson No. 70R21 power transformer (new). Books all new, The Meter at Work, Rider, Radio Physics Course, Ghirardi, Modern Radio Servicing, Ghirardi, Audel's Radioman's Guide, Corona Typewriter No. 3, case, \$5.50. William Rasmussen, 91-37 184th St., Jamaica 3, New York.

**FOR SALE** — New Shure 70H mike and cord \$15.50 post paid or will trade for hand printing press. Campbell Radio Service, Ann Arbor 6, Mich.

**SELL OR SWAP**—Teletype code practice set, variable speed, ac motor, Cutting Head, phones, key, 30 rolls, some uncut in leatherette case, \$40.00. Want ac generator, gas driven 250 w. or over, must be A-1. J. Starr's Electric Radio Shop, 16 Grove St., White Plains, N. Y.

**FOR SALE OR TRADE** — Oscilloscope, model airplane engines, radio tubes and other parts also 1 new 10" motor scooter wheel and tire. Franks Radio Lab., New London, Iowa.

**WANTED** — Timing condenser gang complete for both Majestic models 70-61 please state condition and price. Art. Comstock, 108 Main St., Winsted, Conn.

**WILL PAY CASH**—For Gernsback Radio Circuit Manuals before 1941, prefer Vol. 7 especially. Also want Riders Manuals 7, 8, 9, 10, 11, give prices, and must be in good condition, write at once. W. S. Crooks, P.O. Box 94, Kent, Ohio.

**WANTED**—G. E. JFM-90 FM converter; Hallicrafter's S-29 communications receiver, radio test equipment. George G. Chandler, Assoc. Eng. U.S.N., P.O. Box 73, Back Bay Sta., Boston 17, Mass.

**WANTED**—Used record recorder in good condition with blanks, a.c. voltage meter for cash or trade books, stamps, magazines, radio parts, etc. Joseph Mayer, 556 Vineyard St., Bethlehem, Pa.

**WANTED**—Radio receiving tubes, all types, advise best discount off list. Can use P.A. and sound equipment. Radion Co., 148-29 Jamaica Ave., Jamaica 2, N. Y.

**WANTED** — Portable typewriter, camera and camera equipment (still and motion), record player, binoculars. **SWAP**—New, hard to get tubes, for other new, hard to get tubes. Also have new RCA Jr. recorder. Al's Radio Service, 14 N. Milton Ave., Baltimore 24, Md.

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