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

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# RADIO SERVICE HINTS

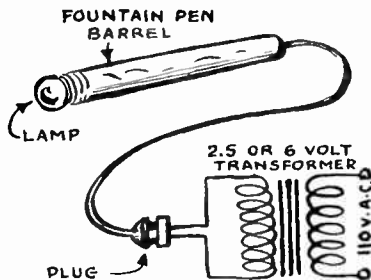
## Practical Suggestions on Solution of Radio Servicing Problems Encountered in Actual Experience by Servicemen Everywhere

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

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 Unpublished items will not be returned.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

### A Handy A. C. Trouble Light

Here is a simple suggestion for a handy trouble light which has been in use at our shop for some time and which the writer believes may interest other service men. It merely consists of a small lamp socket and bulb cemented into one end of an old fountain pen barrel with a 4 ft. length of flexible lamp cord connected to the socket brought out through a hole drilled in the bottom end of the fountain pen barrel.



The cord is provided with a standard cord plug to be inserted in a receptacle which connects to an old filament transformer as shown in the diagram herewith.

The transformer is mounted in a convenient place on the bench so

that the light may be used for inspection work on small set chassis. This light will be found more desirable than the regular battery-type flash light as it can be employed continuously. — *Edgar Boles, Marion, Ill.*

### Rejuvenating Old Volume Controls

This method to renew old carbon type volume controls has proven satisfactory with most all designs of controls, claims the writer.

Remove the carbon element of the control and apply a thin coat of aeroplane "dope" on the contact surface. Before the "dope" has become dry dust the surface with powdered carbon such as used for auto door locks, etc. Blow off surplus carbon powder and apply a thin coat of clear lacquer thinner with a camel's-hair brush. Allow the thinner to dry thoroughly, then check the resistance of the unit with an ohmmeter. If resistance is too low apply the thinner again and rub off some of the carbon with a clean, soft cloth and recheck the resistance until the proper value has been obtained. A little care and patience will pay for the time taken to renew many of the old unused controls lying around service shops. — *Wm. C. Burns, Brooklyn, N. Y.*

## **Gamble Skogmo Model 533 Series B**

This model set seemed inoperative when turned on with no sound coming from the speaker. The writer checked all voltages which seemed O.K., but upon using an ohmmeter to check the capacitor connected across the primary side of the speaker transformer it was discovered that this capacitor was shorted.

The original unit employed in this circuit is a .01 mfd 400 v. rating. It is suggested that the capacitor replaced be a .01 mfd 600 v. tubular paper type unit. — *Arthur H. Steinberg, New Ulm, Minn.*

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## **Metal-Clad Resistor Repair**

Poor contact at a tap on a flat type metal-clad wire-wound resistor can often be corrected by means of a simple operation with a screwdriver.

Since these resistors are usually mounted flat against the chassis with the metal casing riveted to the chassis at both ends, place a screwdriver between the chassis and the resistor at the faulty tap and bend it up. The bent metal resistor casing forces the tap into tight contact with the resistance winding without affecting the rest of the unit in any way.—*L. J. Bittner, Easton, Pa.*

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## **Connecting Heavy-Duty Batteries to Portables**

1.4 volt portable battery radios are not intended for constant service like the regular 1.4 volt farm radios, due to their low battery capacity. However, many of them are used where the owner expects the same long life operation.

One way of getting satisfactory operation from the power pack and that is to replace the usual midjet batteries with the large external A-B pack as used in farm radios.

To convert to the external battery, pick out the filament and high voltage leads and solder into a standard 4-prong AB plug. This is, of course, after having provided necessary cable extension. Care must be taken as an error means a loss of tubes!

Receivers such as Philco's Model 40-81 using 59 volts on plates offer no problem as the only additional change necessary is changing the oscillator tube's screen resistor to 70 M-ohm value to provide correct screen voltage from the 90 volt battery.

In rare cases it may be desirable to change one of three way (A.C.-D.C.-Battery) portables to the above type. The filaments will be found in series using a 6 volt supply. Change the filaments to parallel operation. The method of obtaining bias differs in the series type; therefore care must be taken to return the grid leads correctly. Reference to any 1.4 volt circuit will make this clear.—*Chas. L. Culley, Melville, La.*

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## **Working on Record Changers**

In order to make working on record changers easier, in one end of each of four ten inch lengths of  $\frac{3}{8}$ " metal tubing solder short 10/32 screws and in the other end of each of those lengths solder short  $\frac{3}{4}$ "/20 machine screws. These posts can be screwed into the two sizes of mounting holes most often used in record changers and used to stand the changer on while operating it on the service bench. A small mirror laid on top the bench under the changer will help watching working parts without having to stand on your head.—*Wayne Storch, Beecher, Ill.*



## 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** — Jackson 634 or 636 tube checker. Rider's Manuals 6 to 11 with index. State price and condition. Omar C. Gilkison, Belmont, Ill.

**WANTED** — A complete set of Rider's Manuals. Will pay cash. Will also pay cash for Refrigeration Manuals, tools or parts. Wm. Antoni, 1867 Westwood Ave., Cincinnati, Ohio.

**FOR SALE** — One Echophone receiver model EC-1, used about 6 months, in good condition. Will take \$17 cash. Dyer Matlock, Jr., Box 423, Mt. Pleasant, Tenn.

**SELL OR SWAP** — Bruno Velocity Mike, Kadette Tunemaster, RCA beat freq. osc., Wien bridge audio osc. 20 to 10,000 cycles, Aerovox No. 75 condenser and resistance tester, all new. Want 6 volt bat. eliminator, outboard boat motor or a light tubular 5 ft. fishing rod, True Temper or Heddon. Popma Radio Service, Orange City, Iowa.

**WILL TRADE** new Sylvania tubes, transformers, resistors, condensers, parts, complete or odd radio magazines 1920 on, for usable meters, testers, etc. What have you? Major Fred Kline, Kent, Ohio.

**FOR SALE** — Complete NRI Course, 40 lessons (47 books) cost over \$100 for only \$10. John C. Zihinsky, 629 East Sixth St., South Boston, Mass.

**WANTED** — All wave signal generator. Must be in good condition. State absolute lowest price, as best offer will be accepted without further correspondence. State make, model, condition, calibration accuracy, etc. Albert Fite, State College, New Mexico.

**FOR SALE** — Precision 954 Dynamic Electrometer, E 200 Signal Generator, Cabinet Rack; Solar QCA Condenser Analyzer; Rider's Signal Tracing; RCA Service Manuals; Beitman Radio Diagrams 1926-1938 and 1940; Ghirardi's Troubleshooters Handbook; Emerson Service Notes 1, 2, 3, 4. T. Wojciechowski, 2837 Fulton St., Brooklyn, N. Y.

**SWAP** — Electric record player to attach to radio; single unit Delco 6 tube auto radio; Royal No. 5 typewriter; Philco transitive table radio; opera glasses. Want tube tester, set analyzer, meters. State price of your equipment. D. J. Pettera, Fennimore, Wis.

**WANTED** — Rider's Manuals 5 to 12 inclusive. Good VTVM. Prefer Standard Brand RCA or Clough Bregle or Supreme. Wilcox Auto Electric and Radio Service, Coloma, Mich.

**FOR SALE OR TRADE** — Two 10" and one 14" speakers copper oxide dynamic type, \$2.50 each, 3 for \$5; RK20 tube \$5; 954 (triode) acorn tube \$2; 2MF 2,000 v. D.C. condensers guaranteed \$1. Quiet May Oil Burner (12 years old) and 4 controls \$40. Will trade for 110 v. A.C. 60 cycle gas light plant. Daves, 1418 81st St., Brooklyn, N. Y.

**FOR SALE** — One Alden metal tube test adapter, practically new. Usual list is \$3.85. Postpaid for \$1.25. Chas. L. Cully, Melville, Louisiana.

**FOR SALE** — Supreme Vedolyzer and model 561 combination AF and RF Signal generator. Used less than ten hours. Factory guarantee. \$200 F.O.B. W. E. Gentry, WSB Transmitter, Atlanta, Ga.

*(Continued on page 11)*

# U. S. SIGNAL CORPS NEEDS ENGINEERS

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

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

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

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

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

**DIRECTOR, AIRCRAFT RADIO LABORATORY**  
**Wright Field** **Dayton, Ohio**

# Timely Suggestion to Your Customers on Care of Sets

With the end of radio production at hand, the Consumer Division, Office of Price Administration, issued the following suggestions to the public for the proper care of home radios:

Make sure that the radio is not placed with its back flat against the wall. Tubes, transformers, and resistors heat up, and free circulation of air is required to prevent overheating. Leave an inch or so between the cabinet and wall.

Check the set's electric cord and plug. The plug should fit firmly into the wall socket and the wires leading to it should be intact.

Check connections also on nearby electrical appliances and lamps. Loose connections on nearby gadgets cause static. Sometimes moving a nearby appliance or lamp farther away will help reception.

If the radio crackles, check the aerial and ground wires to determine whether they are broken in any place or are rubbing against other wires or trees or metals.

If you have not set up a ground connection and your radio is raucous, fix one up by connecting a wire from your radio's ground post to a water or steam pipe. Do not use your gas pipe as a ground.

If you have an outside aerial, make sure that it is equipped with a lightning arrester. Even small "static discharges"—not lightning—may ruin a set unless they are by-passed by the arrester.

Check the set's tubes, to see that they fit firmly in their sockets. Occasionally what may seem to be a bad tube is merely a good tube that is fitted loosely into its socket.

Clean the dust out of your set often. A hand vacuum cleaner will help.

If your radio's performance is unsatisfactory and none of these home adjustments help, it's time to call in the repairman.

These points should be observed:

Call in a repairman from a reputable radio dealer—one with which you are acquainted, if possible.

Insist that he fix the set at your home. Reliable service shops have portable testing and repair equipment for home calls.

If the serviceman insists on carrying the set to the shop, persuade him to give you an inventory of the adjustments he thinks will be necessary, and request the return of old parts which he finds necessary to replace.

# PUT THOSE OLD SETS INTO USE AGAIN\*

IN THE past the usual spring cleaning meant merely a general overhaul of equipment, dusting off of benches and shoving a little further back in corners the abandoned trade-ins which every service shop is bound to accumulate in the course of time. But now these trade-ins, unwept, unhonored and unfixd, acquire a hitherto unforeseen importance. For, in the light of the recent order stopping the manufacture of home radios, it is going to be worthwhile to get these castoff sets back into operation.

In some cases this isn't going to be easy; needed parts may be difficult to obtain, the troubles may be hard to find, or the set may have had inherent design faults which caused it to render poor service even when operating normally. Often, on small sets, it won't pay to spend the time and effort necessary to correct major design faults,

type of test equipment is employed, will be baffling to locate. An example of this is found in the Philco 59 and similar models of other manufacture. The chassis forms part of the return circuit for r-f current. Corrosion at the junction of such circuits to the chassis causes a high resistance ground which results in poor sensitivity. In other instances, with different makes, oscillation results due to high resistance contacts developing between the gang condenser rotor contacts and ground. The remedy in the former case is obvious; in the latter instance cleaning with sandpaper (not emery) and increasing the spring tension of the rotor forks will serve to correct the trouble.

Volume controls are best cleaned with carbon tetrachloride (Carbona), and this cleaner may also be employed to advantage on any contacting surface where radio or audio frequencies

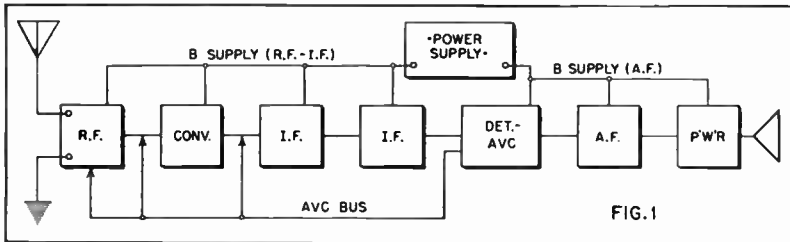


Diagram explaining motor-boating due to avc and plate-voltage changes.

but on the larger console models the fact that the set will not have to compete with new models will enable a sufficient return to be had to compensate for the work necessary to recondition the instrument and improve its performance.

## High-resistance Contacts

Insofar as the smaller sets are concerned, it will often be found that a very thorough cleaning will correct obscure faults which, no matter what

are handled. Often the reduction in noise which results from simply cleaning tube, switch and socket contacts with carbon "tet" is simply amazing.

## Motor-boating

In many of the earlier receivers employing 6A7 or 6A8 pentagrid converters and operating on short-wave as well as broadcast bands, unsatisfactory performance often resulted on short-wave reception due to motor-boating or "flutter," particularly when the gang condenser was tuned to the

\* By John H. Potts in "Radio Service-Dealer."

high-frequency end of the band being used. The trouble is usually most evident when receiving strong signals, and is caused by fluctuations in the supply voltages applied to the converter tube.

Just how this voltage fluctuation results may be understood from a consideration of the block diagram of Fig. 1. When a strong signal is being received, the signal level reaching the second detector is high and the resulting avc voltage is also high. This avc voltage is applied to the r-f, converter and i-f stages of the receiver, increasing the grid bias on each tube and consequently reducing the plate current. This reduction in plate current reduces the drain on the power supply and the power-supply voltage therefore increases. When the power supply voltage is thus raised, all voltages applied to the controlled stages are also increased. Insofar as the r-f and i-f stages are concerned, this is of no importance, but the effect on the pentagrid converter is to change the oscillator voltage and likewise the oscillator frequency. This causes the i-f signal to become momentarily changed from its proper frequency and the i-f voltage reaching the second detector

Various means of correcting this trouble have been employed. Sometimes merely grounding the signal-grid return on the converter, thus removing avc operation from this tube, will do the trick, and this should be tried first. Care should be taken not to ground the avc voltage applied to other tubes.

Another method is to use a 25,000-ohm bleeder across the power-supply output. This tends to stabilize the power-supply voltages by improving the voltage regulation, but should not be done when the power transformer is skimpily designed. It is well to let

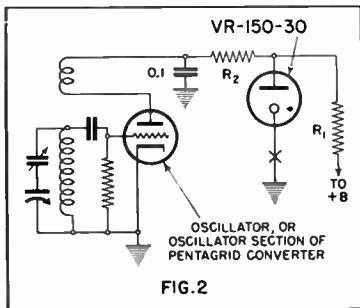


FIG. 2

**Use of voltage regulator for correcting motor-boating.**

and avc is accordingly reduced, lowering the avc voltage and restoring normal operation. Since this cycle of changing voltages, frequency and avc correction does not take place instantaneously, but rather at the time constant of the avc system, "flutter" or motor-boating results.

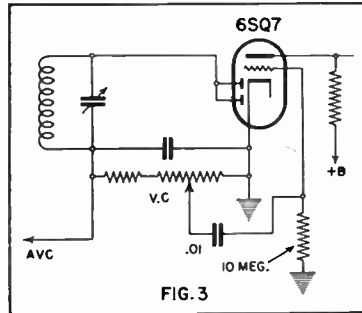


FIG. 3

**Diode current through volume control introduces noise.**

the receiver operate for several hours and note if any excessive heating occurs as a result of the increased power-supply load.

Still another method is to feed the converter tube from a voltage regulator. This method, or a modification in which the voltage regulator is used to control the oscillator voltage when a separate oscillator is employed, is used in some of the finest communication receivers and is recommended when the space and value of the receiver being fixed warrant the extra expense. A suitable circuit is shown in Fig. 2.

In choosing the voltage regulator for this job, the receiver oscillator voltage should be maintained at the voltage normally present when no regulator tube is employed. For this purpose it is possible to select a VR-90, VR-105 or VR-150. If the oscillator voltage is some value other than is supplied by

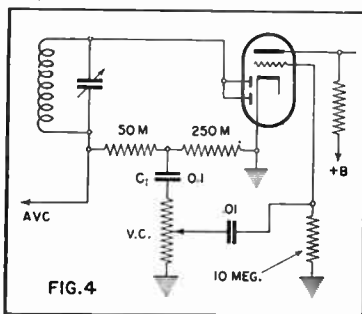


these tubes, a series resistance R2 may be employed to reduce it to the required value. In operation, the resistor R1 should be adjusted until the current through the voltage regulator—as indicated by inserting a milliammeter at x—is about 20 ma, with the oscillator connected and the set operating. The voltage applied to the oscillator will then remain constant to within a few volts as the current in the voltage regulator varies from 5 to 30 ma.

See that no tubes or other heat-producing components are placed close to the oscillator coil. Often changes in temperature thereby occurring cause mysterious cases of fading.

### V-C Replacements

Next to filter condensers, volume-control replacements have long constituted the most frequent cause of unsatisfactory receiver operation. In these days, when volume controls are apt to become scarce, it behooves us to make new ones that are installed last as long as possible. We can do this by choosing the proper type of control and by so using it in the circuit that it will be less likely to become noisy.

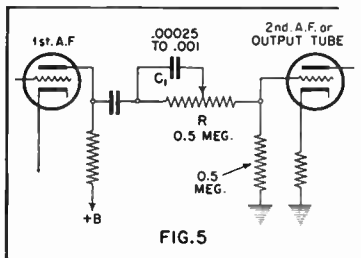


**FIG. 4**  
Method of keeping diode current out of volume-control circuit.

In general, composition (carbon) type volume controls which have abrupt tapers are more likely to become noisy in a short time than those which have more gradual tapers. In selecting the proper control, where several tapers are offered, choose for audio grid work a taper which does not show

too sharp a change at about 65% of rotation. It should be understood, of course, that all controls suitable for audio grid use require a taper which is gradual over the first 65% of rotation and much steeper thereafter, but you will find that there are some tapers which are more abrupt in change of resistance than others. Noise generally develops at the changeover point.

All composition volume controls are more noisy when used in circuits in which direct current is flowing than

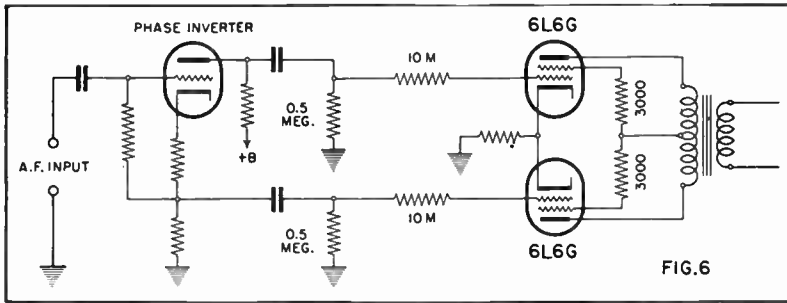


**FIG. 5**  
Simple variable tone control for correcting "boom" in old receivers.

in other circuits. This is rather unfortunate, too, for the popular zero-bias form of operation for detector-a-f stages, as shown in Fig. 3, usually results in the volume control being placed in the diode circuit where the rectified signal voltage is applied across the control. A method of avoiding this, which, it is believed, is unique with the author, is shown in Fig. 4. In addition to isolating the volume control from d.c., the extra condenser C1 serves to double the insulation resistance between the a-f grid and the diode, thus supplying an additional safeguard against leaky condensers. This idea has been used in the past in a-f stages, of course, where no volume control is employed, but where the additional insulation resistance between the plate of the a-f tube and the grid of the succeeding tube is of importance.

### Offsetting "Boom"

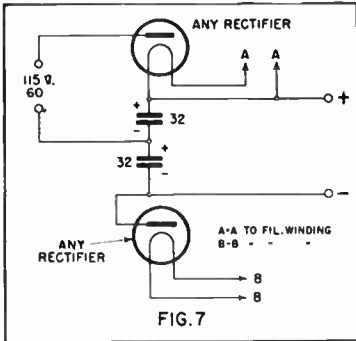
Many of the older receivers suffered from boomy bass, resulting from cabinet resonance, and were further affected by employing tone controls to re-



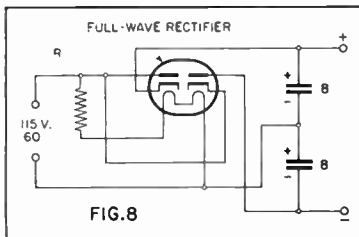
**Grid and screen suppressors in beam-power amplifier to eliminate oscillation at high frequencies.**

duce distortion in the output stage. Both of these effects may be made less objectionable by employing a means of accentuating the higher frequencies

higher frequencies, but becomes increasingly ineffective at the lower frequencies. The high-frequency response is greatest when the condenser shunts the entire control and becomes less as the amount of resistance being shunted is decreased.



**Two voltage-doubler circuits.**



and thus compensating in some degree for the deficiencies present.

A simple circuit which does this is shown in Fig. 5. The small condenser C1 serves to bypass the control, R, for

Methods of applying negative feedback were discussed in the "Portfolio" last month, and it is recommended that they be considered as a means of improving receiver performance. It should be remembered, of course, that some gain is always sacrificed in negative feedback circuits so that it may be necessary to add another audio stage to the receiver to make up for the loss in gain resulting from negative feedback. However, if the feedback is employed simply to compensate for deficiencies in the response characteristic of the amplifier, and is so arranged that the gain in the middle register is not greatly reduced, it may be possible to make use of negative feedback without major changes in the amplifier design.

### Grid Suppressors

In some receivers employing 6L6 or similar beam-power output tubes, short tube life sometimes resulted due to these tubes going into oscillation. A method of preventing this is to incorporate grid suppressors, as shown in Fig. 6. Note that both the screen and control grids employ series resistances. In the screen circuit, omission of the usual bypass condensers will

take care of suppression, but in the control grid circuits, additional resistors should be inserted, as shown. The performance of the stage will in no way be adversely affected by these changes.

Where replacement power transformers are not obtainable, or where the value of the receiver does not warrant the expense of a replacement, it is possible to employ a voltage doubler to advantage.

Two circuits are shown in Figs. 7 and 8. In Fig. 7, a filament transformer is necessary and each rectifier filament must be supplied from a separate winding. However, it is possible with this circuit to employ rectifiers with a high current output rating and thus to handle a greater load than is possible with the circuit of Fig. 8. The circuit of Fig. 7 will supply 200 volts at 100 ma, and that of Fig. 8 will provide 200 volts at 50 ma. If more current output is desired from either circuit, it will be necessary to increase the size of the condensers used.

Particular care should be taken in voltage-doubler applications to make certain that one side of the line supply does not connect to the chassis, and in no case should a ground be connected to the chassis.

## THE RADIO TRADING POST

*(Continued from page 4)*

**WANTED** — 2W3-6L6G and 6B5 tubes, also 500M ohm and 1 meg ohm vol. controls. Write stating quantity for sale, kind, and price. Radilectric Labs., Hudson, Wis.

**FOR SWAP**—For a 2 $\frac{1}{2}$  meter Transceiver; will take 22 cal. Hamilton Bolt Action Rifle, ABC Dark Room Outfit, Electric Shaver and three foot telescope. Frank Witkowski, 32 Daymond St., Trenton, N. J.

**WANTED** — Copy of old Electro Importing Co. and Wm. B. Duck catalog, for cash. Expert Radio Service, 321 Racine St., Janesville, Wis.

**FOR SALE OR TRADE** — 2 SW3, 1 SW5, 1 power supply, 6 pairs coils for these sets. Want oscilloscope, radio physics course, modern radio servicing, vacuum tube voltmeter or what have you. Hi Kwan, 757 E. 20th St., Los Angeles, Cal.

**WANTED** — Good tube tester. Will pay cash. Also consider Riders Manuals 7, 8 or 9 and a good signal generator. Royce Saxton, R 1, Pontiac, Ill.

**WANTED** — New or used oscillograph, complete in good condition. Write, giving full information and cash price wanted. Dell Penman, Hudson, Wis.

**WANTED**—Supreme 585 Draynometer and please state lowest price. Goldstone Radio, 1279 Sheridan Ave., Bronx, N. Y.

**TRADE OR SELL** — Radio test equipment, radio parts, refrigerator tools, Graphic and Graflex cameras and photo equipment, 35mm projectors. Want machinist's tool chest, micrometers and precision measuring tools. Wm. Hansen, R 3, Niles, Mich.

**SWAP** — Misc. radio parts and set, for one World War trench helmet, size 7-8, or fireman's helmet. Wanted by member of volunteer fire department. Will pay part or all cash if necessary. Arthur Bulmer, P. O. Box 36, Sutton, N. H.

**FOR TRADE** — Two Philco 6 tube auto radios, one without control head, used 203A transmitting tube and 10 volt 10 amp filament transformer. Want  $\frac{1}{4}$  or  $\frac{1}{2}$  HP electric motor. Electronics Radio Service, Warfield, Ky.

**WANTED** — 3 inch oscilloscope tube, used, but not too many spots on it. Walter Childress, Rd. 5, Box 377, Ft. Worth, Tex.

**FOR SALE** — Genuine Atwater Kent parts: special coils, transformers, speaker cones, condensers, and resistors. Also dash plates for "A.K." auto radios on early cars. Feil Radio Service, 2860 24th St., San Francisco, Calif.

**WANTED** — One signal generator a.c. type. Kindly state lowest cash price. Earnest J. Mossean, 44 Sargent St., Cohoes, N. Y.

**WANTED**—RME LF-90 frequency inverter. Walter Kryger, 912 W. 151st, East Chicago, Ind.

**HAVE** Skyrider Marine communication receiver. Will sell for cash or photographic equipment. Rolland Radio Service, 1071 53rd St., Brooklyn, N. Y.

**WANTED** — Rider's Manuals. Also modern test equipment. We pay cash. National Sound Equipment Co., 625 Main St., Worcester, Mass.

**SALE OR TRADE** — Test equipment, radio parts, refrigeration tanks and tools, 35mm sound and silent projectors. Graphic and Graflex cameras. Want 16mm or 35mm camera or 16mm sound projector, recorder. Wm. Hansen, R. 3, Niles, Mich.

**WANTED** — Complete set of Rider's Manuals in good condition with indexes and supplements. Low price. Will pay cash. M Winters, 1571 Macombs Road, Bronx, N. Y.

**WANTED** — Mike and 3 speakers for Silvertone amplifier. Also portable radios 3 ways. New or used or midget ohm meter. Nate's Radio Service, 1100 34th St., Denver, Colo.

**TRADE**—Instructograph, spring wind, ten tapes, built in speaker and a.c. oscillator. Want test equipment or what have you of use to a serviceman? Sam's Radio Service, 8707 12th St., Detroit, Mich.

**POSITION WANTED** — Serviceman, 24, single, 4F classification, 7 years experience. Graduate RCA Radio Inst., Chicago, RCA Television, N. Y. Prefer National Defense work. H. Frederman, 1020 Philippien St., Manitowoc, Wis.

**McMurdo Silver Masterpiece V** information wanted. Instruction Book. Service sheet and circuit diagram. Copy November 1936 issue of Radio News. Will pay cash. L. M. Munger, DeKalb, Ill.

**WANTED** — Cash for modern test equipment. State condition, make, and price. A. Owens, Physics Dept., State University, Iowa City, Iowa.

**WANTED** — Two six foot trumpets and two P.M. units, 110 volt. One a.c. generator, 1,000 watt. Longer Radio & Sound Service, Danville, Ill.

**FOR SALE** — New wireless mike No. 5, also R.F. oscillator No. 2. Details of either on request. Harry Kay, Rt. 2, Box 255, Imlay City, Mich.

**SWAP** — Have new de luxe Electri-Craft Casco Hand Grinding Kit with 35 accessories, Webster H.D. record player electric to play through radio, Hamilton Beach Malt Mixer, Royal typewriter. Want good signal generator late model, new type tube tester, resistor and condenser checker, small electric drill, or any late test equipment. Donald Petera, Fennimore, Wis.

**WILL TRADE** for Rider's Manuals new 1941 Packard auto radio and antenna, in sealed carton. List \$59.95. Will pay cash difference for larger set of volumes or good signal generator. Walt Kalemkiewicz, 2322 Geimer, Hamtramck, Mich.

**FOR TRADE** — 1934 Hallicrafters Skyrider A-1 condition. Will answer all letters. Trade for almost anything worth while including S.W. sets, transceivers, testers, etc. John Petser, 41 West 54th St., Bayonne, N. J.

**FOR SALE** — Superior 1280 tube and set tester \$10 money order, or Vibraplex bug key, or late Rider's Manuals. W. S. Crooks, 417 E. Market St., Akron, O.

**FOR SALE OR SWAP** — 74 bound books of an electrical engineering course for a Kodak 35 or similar type in good condition. S. J. Manson, 36 Winston Road, Dorchester, Mass.

**FOR SALE OR TRADE** — NRI service course, radio physics course by Ghirardi, 100 Radiocraft etc. magazines 1936-41, Jewell 199 set analyzer, Superior tube and set tester, Savage model 6A-22 automatic rifle. Want Rider's Manuals 2-12 or cash. Lynn Branson, 525 Homestead St., Peoria, Ill.

**WANTED** — Home recording and playback equipment. Turntable, cutting head, pick-up, phono amplifiers, etc. Cash of 3/4 HP Single Cyl. Maytag Gasoline engine in exchange. Send full details. Calvin Showalter, RFD 3, Box 372, Vienna, Va.

**FOR SALE OR TRADE** — Converter 32 v. d.c.-110 v. a.c., 100 watt capacity. Want typewriter, volt-ohm meter, condenser tester, or enlarger. Complete 40 watt P.A. \$75 cash. Max Shively, 3115 Ingham, Lansing, Mich.

**FOR SALE** — Rider's Manuals 1 to 7 inclusive in perfect order, good as new. Complete \$25 F.O.B. J. E. Wessel & Co., Morrison, Ill.

**FOR SALE** — Experimenter's lot. Send card for list and see what \$5 will buy. Harry Kay, Rt. 2, Box 255, Imlay City, Mich.

**WANTED** — SPDT relays, 6 VDC coils. Shielded wire, microphone and speaker cables, microphone desk banquet stand chrome and black. Federal anti-capacity switches, A1, 4PDT. Phone plugs and jax. 500 ohm line from plate transformers. 500 ohm T pads. Give particulars, condition, lowest cash price. R. H. Coddington, Mapleton, Iowa.

**WANTED** — Late Superior channel analyzer that sells for \$19.75. Will trade Philco table model 38-7 in A-1 playing shape. Cabinet almost like new. Steve Nagy, 1325 Lloyd St., Nanty-Glo, Pa.

**FOR SALE** — Used Spitorf radio parts. Harry J. Shroyer Radio Service, 1015 S. 16th St., St. Joseph, Mo.

**FOR SWAP** — Violin worth \$50 and also case, for a radio analyzer or good 22 cal. rifle. Harry J. Shroyer Radio Service, 1015 S. 16th St., St. Joseph, Mo.

**WANTED** — Triplett model 673 a.c. volt-meter instrument or the meter used in same. Will pay cash. H. C. Sohnlein, 807 25th St., N.W., Canton, Ohio.

**WANTED** — Rider's Radio Manuals 7 to 12 inclusive complete with index. We will pay cash for part or all. State lowest price. Reed's Electric Co., 621 High St., Palo Alto, Calif.

**FOR SALE** — Model 85 PL Supreme tube checker \$15, Philco home recording kit new, \$17.50, Neon Sign with electric clock \$22, new 10" P.M. speakers \$5.95, Zenith Car Radio A-1, \$19.50, Modern Radio Servicing \$5. Anchor Radio Distributing Service Co., 203 Elm St., Ithaca, N. Y.

**FOR SALE** — 1 Rider's Chanalyst \$65; 1 RCA 7 MV 97C Oscillator \$10; 1 Supreme 89 de luxe tube checker \$10; 1 dial jr. tube checker \$35; Rider's Manuals 1 to 11 inc., good condition \$4 each, and other parts. Write for list. Davis Radio Shop, Box 65, Basin, Wyo.

**WANTED** — CRI radio course. Have photographic equipment, camera and projector to trade. C. Brethen, 150 Saranac St., Rochester, N. Y.

**FOR SALE OR TRADE**—W.E. stage speaker unit model 607-A with Jensen 14 in. woofer and Q tweeter built in power supply and filter network. Interested in automatic record player and portable typewriter. All reasonable offers answered. Anthony Farnett, c-o Squier Labs., Ft. Monmouth, Red Bank, N. J.

**SWAP** — 42 reference books on steam and electrical engineering by the ICS staff, in good shape, for telephone type relay, or radio repair parts, equipment, etc. Morton Radio Shop, 1912 Jerome Ave., Grand Rapids, Mich.

**FOR SALE** — 2 Victor Animatograph Sound-on-film 16MM projectors models 40B and 38. Can be had with either 12", 15", or 8" speakers; A-1 condition. Ideal for Drive-In theaters, roadshows, etc. John J. Spankowitz, 239 N. 9th St., Allentown, Pa.

**FOR SALE**—Tubes, condensers, resistors, vacuum controls, transformers, channel analyzer, tube tester model 307, Solor Capacitor analyzer model CB-160, Stancor power pack, de luxe model, bulb type battery charger. Clarence W. Hull, Mineral Springs, Pa.

**WANTED** — Will pay cash for Rider's Manuals 1, 2, 4, 5, 7, 8, and 12, radio books, manuals, course, test equipment, dynamic tube tester, multi-tester, ohmmeter, condenser tester. Kays Radio Service, 319½ Main St., Niagara Falls, N. Y.

**FOR SALE OR TRADE** — 1941 NRI radio course and electrical engineering (10 vols.) published by American Technical Society. Will swap either for Hall-crafter Sky Chief, cash, or what have you. Merle W. Crabb, 522 W College Ave., State College, Pa.

**HELP WANTED** — Experienced home radio and refrigerator service man. State qualifications and situation regarding permanency. Union wages, \$42 per week with company. Davison Service Co., 1905 N. 45th St. Seattle, Wash.

**FOR SALE** — Solar Condenser Tester BQC, a Dependable Volt-Ohm-Meter 446 Model, Superior Tube Tester 1240, CB Oscillator, Modern Radio Servicing and Radio Trouble Shooter's Handbook, Radio Servicing Course, Service Manual of Wiring Diagrams, Radio Servicing by Comparison Method and other books and radio parts. Best offer takes all. Clyde W. Wimer, R.D. 2, Ellwood City, Pa.

**WANTED** — Jensen or Cinaudograph PM speaker, large size. Cash or trade. A. F. Toth, 3608 29th St., Long Island City, N. Y.

**SWAP** — Draftsman will make drawing from sketches for C-D readers. Will accept custom built or homemade experimental radio equipment, or parts, for services. Orthographic projection preferred. Will use any scale desired. Paul Brassard, 16 Cumberland St., Brunswick, Me.

**WANTED** — Rider's Manuals any volumes from 1 to 12. Bertram Radio Shop, P. O. Bldg., Brownsville, Ky.

**FOR SALE** — Clough Brengle, Model 105, one-inch oscilloscope. Has everything a big one has: two built-in amplifiers, nine panel controls, connections for transmitter or sweep frequency oscillator. Complete with instructions, diagram, calibrated screen. Like new. \$25. John T. Frye, 1810 Spear Street, Logansport, Ind.

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

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

**FOR SALE** — Astatic type D-2 crystal microphone. Good frequency response. In perfect condition \$10. Shure microphone floor stand with swivel and couplings for various mikes \$3. Both microphone and stand \$12. Prices F.O.B. Chicago. Paul H. Prokes, 1955 W. Schiller St., Chicago, Ill.

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

**TRADE OR SELL** — Tube checkers, tubes, parts, magazines, firearms, typewriter, motors, meters, elec. cooker, Tools, books, etc. Jack's, 574 E. 35th St., Chicago, Ill.

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

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

**FOR SALE** — Hickock RFO4 Oscilloscope, Hickock Microvolter, Hickock 210X Zero current voltmeter, Hickock 155 Traceometer, Hickock 51X tube checker, Solar Capacitor checker, Wright DeCoster test speaker, Weston 664 AC and capacity meter, Weston 663 volt ohmmeter. Charles G. Peroz, 46 Commonwealth Ave. Ext., Middletown, N. Y.

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

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

**FOR SALE** — Hi standard model C target pistol, with 4 1/2" barrel. Practically new, fired only a few times. New Red Head holster included. Will send express collect \$19.50. Will send subject to inspection if requested. Malcolm D. Burdick, Hampton Station Road, Hampton, Conn.

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

**HAVE** German Folding Fine Camera using 120 film F3.8 lens F.10CM Compur Shutter. Best offer. Want C-D Capacitor analyzer Model BF50 in trade. W. S. Crooks, Gen. Del., Akron, Ohio.

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

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

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

**FOR SALE** — Crosley facsimile reproducer (printer) used only 10 hours. Complete with OZ4 tube, stylus, 1 roll of printing paper. In beautiful walnut cabinet. Requires 8-10 watts audio driving power. Make offer. All letters answered. Thompson Irwin, Jr., 37 Cottage Park Road, Medford, Mass.

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**TRADE** — Two 15 watt PA systems, phono motor, phono oscillator one 2 amp. battery charger, one half amp. battery charger, five 2 amp. tungar bulbs, QST's. Need auto A battery eliminator, tube tester, Rider's Manuals 4 to 12. Stanley, 2748 Meade St., Detroit, Mich.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

**FOR SALE** — Hickok tube tester model ACS1 \$45; Rider's Manuals Vol. 3, 5, 6, 7, 8, A-1 condition \$35; Philco Signal Generator Mod. 016 \$12; and many other tubes, parts, etc. E. R. Service, 950 Michigan Ave., Hammond, Ind.

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

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

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

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

**FOR SALE** — Sell Bliley B-5 7175KC (never used). Mallory Vibrapak No. 554 new. Hytron HY75 never used. QST's 1923-1939, fine condition. Weston meters, transformers, filter condensers. R. V. Osborn, Gen. Del., Stamford, Conn.

**FOR SALE** — Million Signal Generator Model OD cost \$22.50. Cash price \$18. Used 1 week in perfect condition. Westinghouse Bulb charger in perfect working order \$4. Arthur H. Steinberg, 515 1st St., S., New Ulm, Minn.

**WANTED** — Rider's Manuals 10, 11, 12. A. H. Alderson, Spring Hill, W. Va.

**FOR SALE** — One Hickok Tube Checker, counter model No. 46 takes all tubes to 30 volts. Like new with adapters for many new tubes. One Triplett Counter Portable Tube Checker, like new, model No. 430 with Locktal adapter. What do you offer? Leading Radio, 114 E. 3rd St., Mt. Vernon, N. Y.

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

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

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