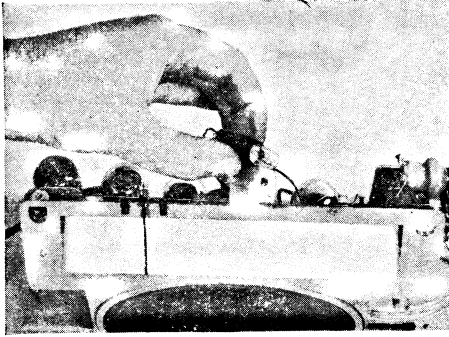
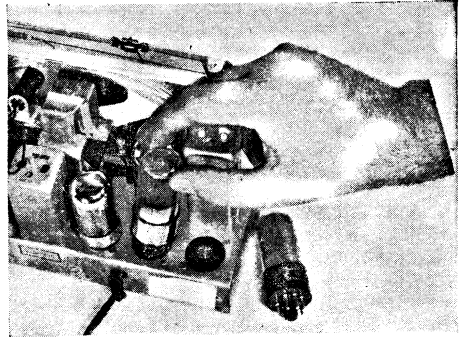


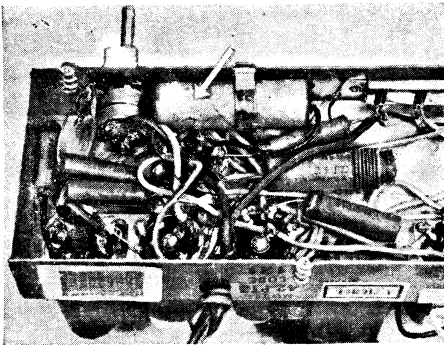
# Servicing Your Radio



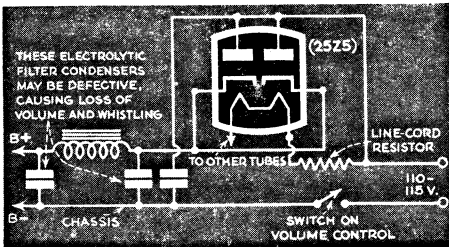
**CHANGING PILOT LIGHTS** is a simple operation in servicing a small A.C.-D.C. receiver, but be sure that you disconnect the radio at the wall socket—don't just turn off the switch. A serious short can occur if the pilot-light bracket and holder drop on the tuning condenser or chassis.



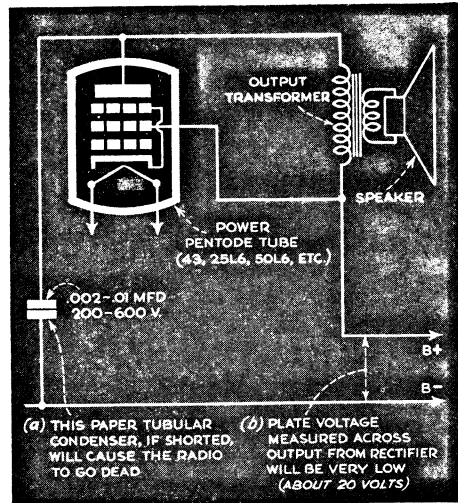
**INCREASED HEATER VOLTAGE** may be necessary if the rectifier tube burns out quickly on an A.C.-D.C. radio having a new high-voltage heater tube and no line-cord resistor. Try replacing the 35Z5-GT/G rectifier tube with a 45-volt rectifier, such as a 42Z5-GT/G, to increase the heater voltage to 120 volts.



**SQUEALING AND WHISTLING** that make it impossible to tune in a station clearly on a small A.C.-D.C. receiver may mean failure of one or both of the filter condensers shown in the photograph above and the diagram below. The noise is usually accompanied by a noticeable loss in volume. If defective, the condensers must be replaced.



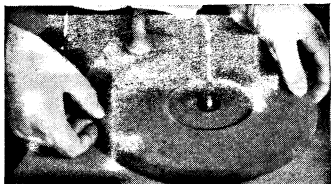
**THE PAPER TUBULAR CONDENSER** connected between the power pentode tube and chassis, as shown in the diagram below, may be shorted if an A.C.-D.C. radio has gone dead except for the heater glow inside its tubes. This is especially true if, upon testing, the D.C. voltage to the tubes shows only about 20 volts. Remove the power pentode tube (a 43, 25L6, 50L6, or similar tube) from its socket, and test the condenser by placing an ohmmeter across it. If the needle on the meter swings over, the condenser is shorted and a new one must be installed.



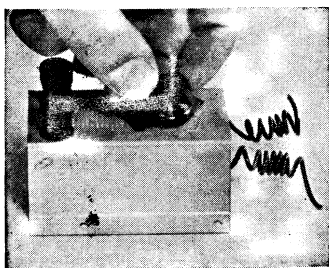
# Servicing Your Radio-

SOME of the most annoying experiences with old-model receivers or new models that have been in use for some time are caused by humming. This can be traced to several sources, most of them within the scope of the amateur repair man. Among

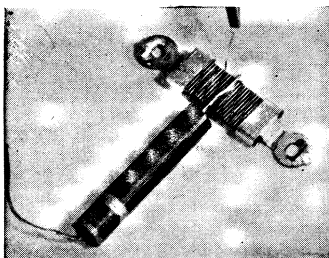
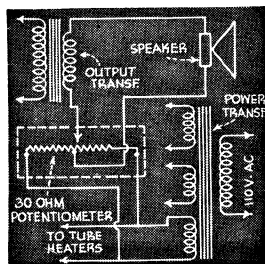
the most frequent are hum in the phonograph of a combination set or in an older-type electrodynamic speaker, or that caused by a broken filament resistor, weak or gassy tube, or faulty electrolytic condenser. The pictures below illustrate the cures.



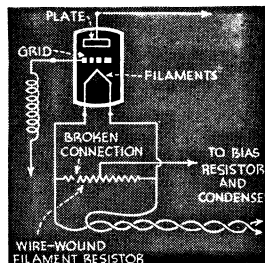
WHEN the hum occurs in the speaker only when the phonograph is being used, ground the pick-up arm and motor frame to the radio chassis, both leads from the pick-up being grounded with braided shield covering. If the hum persists, a 1/16" metal plate, 8" to 12" in diameter, will act as a magnetic shield if screwed to the motor board between the motor and turntable.



SHOULD an old-type electrodynamic speaker lack a "hum-bucking" winding on the voice coil, connect a 30-ohm, 10-watt, center-tapped potentiometer across the power transformer's 2.5-volt or 6.3-volt heater winding in series with the voice-coil winding. A short, soldered wire serves as a center tap.

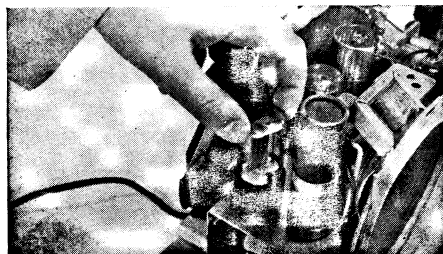


FILAMENT resistors, used in earlier models before indirectly heated tubes were perfected, must be replaced if they are broken. They are connected across the filaments of RF and other tubes to supply grid bias current and balance out hum from the power transformer's AC filament winding.

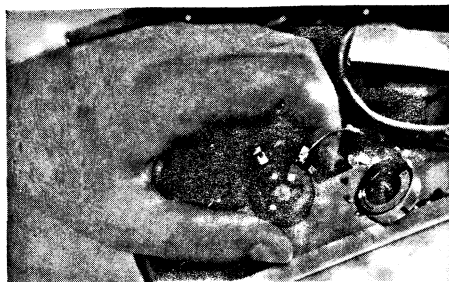


Often hum can be corrected by replacing a weak or gassy rectifier tube. If hum increases after the set has been on for a while, a power tube may be at fault, especially an old 47 power pentode tube

Electrolytic condensers go bad for many reasons—they may have open or short circuits, or the wet type may dry out and lose effective capacity. In any case, the best bet is to get a new condenser



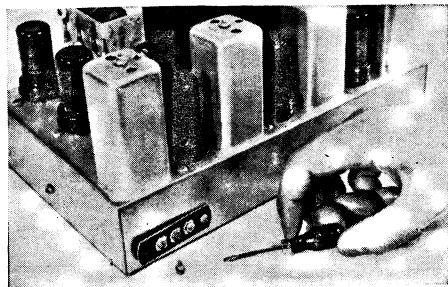
# Servicing Your Radio



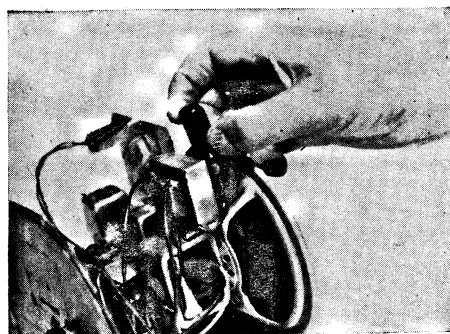
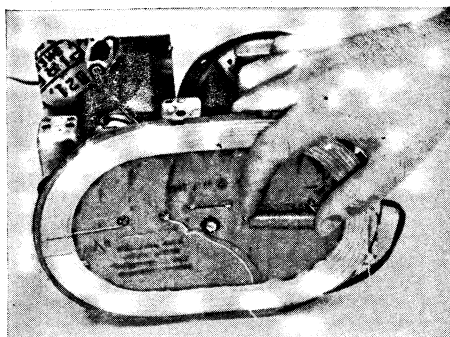
**NOISY VOLUME CONTROL** caused by the graphite wearing down or becoming coated with a hard film during the constant traction of the moving arm may be easily adjusted. Worn graphite can be restored with a dab of special liquid graphite lubricator. Film may be scraped away with a small screwdriver. Do not use a knife—it is too sharp—and do not scrape too hard.

**SHOULD A SPEAKER GIVE NO SOUND** even when the tubes light and test O. K. on the meter, the primary and secondary windings on the output transformer also test O. K., and each circuit is receiving the correct "B" voltage, it is a safe bet that the voice-coil winding is burned out. However, before cutting out the cone, make sure that the short pieces of stranded wire connecting the voice coil to the lugs on the speaker frame have not become corroded or disconnected. These are simple things which have happened in more than one receiver, and it saves needless trouble to inspect them.

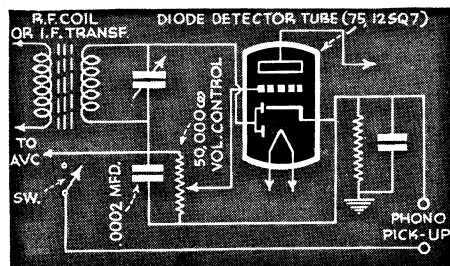
**CONNECTING A PHONOGRAPH PICKUP** to the detector stage of a radio receiver—an easy matter with the old receivers where the detector stage usually was a pentode—is a much more difficult operation with the newer models where the detector tube usually is a diode plus a high-mu triode or pentode.



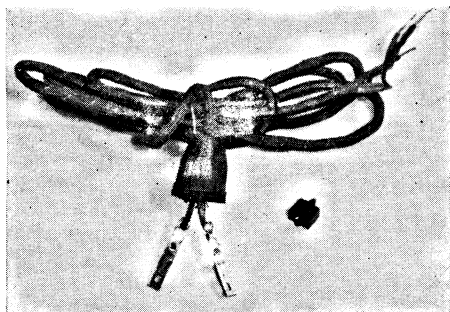
**WHEN TUNING-STAGE ALIGNMENT**, especially at the upper end of the dial, is not possible with a receiver using a loop antenna, reception may be improved in some cases by connecting a fixed condenser (.002 to .02 mfd.) across the loop antenna and ground, or by shorting the two.



By following carefully the diagram of the simple circuit given below, the amateur serviceman should be able to make the proper connection without too much trouble. This diagram will serve for any of the newer sets, and a connection thus made should give excellent phono reception.

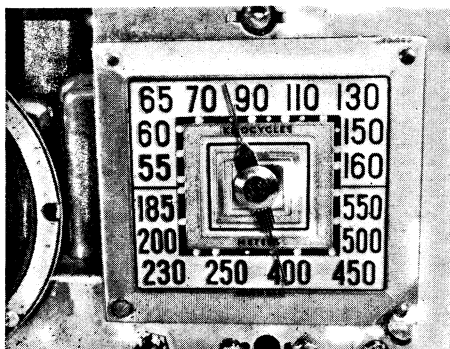
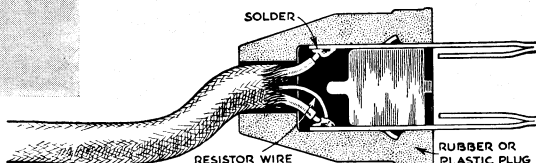


# Servicing Your Radio



Yanking on a line cord often causes a break in the resistor wire. To avoid this, grasp the plug when removing it

**LINE-CORD BREAKS**, which occur most frequently in the built-in resistor in a cord of the type shown at the left, may be the reason a receiver goes dead. It is advisable to check this resistor if tests show that all the tubes are good. Sometimes it is possible to solder the thin resistor wire back to the prong, as shown in the sketch; if not, the whole line cord must be replaced.

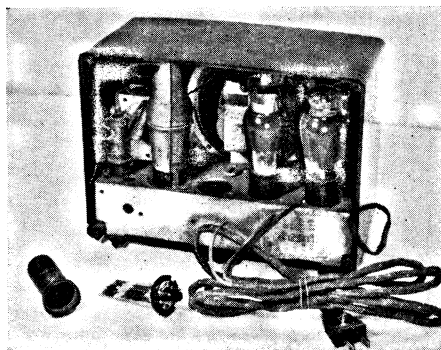
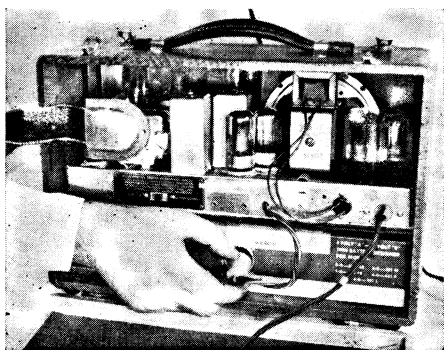


**SOME TYPES OF DIAL POINTERS** can be repaired easily with common liquid cement. If one cannot be set on the proper station indicator because it has come loose from the center plastic piece to which it was attached, remove the chassis from the cabinet and apply the cement as indicated in the drawing below. Best results can be obtained by removing the pointer assembly from the dial face and laying it flat, as shown. This will keep excess cement from spotting the dial face should any drip off the pointer during the application.

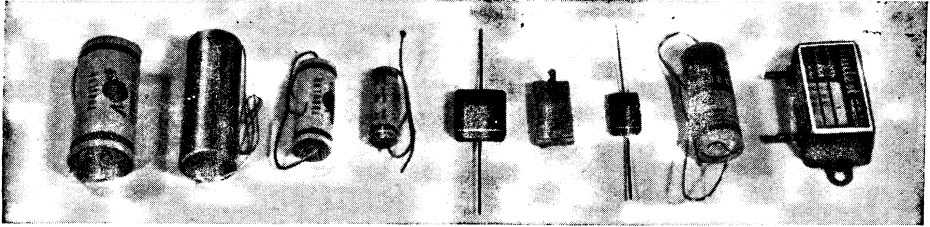


**IF BATTERY OPERATION** on a three-way portable is fuzzy, but reception is satisfactory on both A.C. and D.C., replacement of the battery pack is usually necessary. "B" batteries showing 75 volts on a meter have been known to have such high internal resistance that the voltage to plates and screens was reduced to as little as 35 volts.

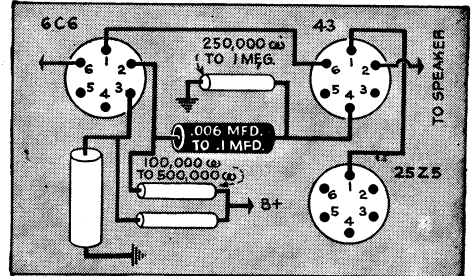
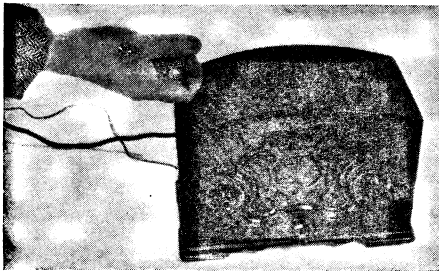
**BURNED-OUT BALLAST TUBES** need not put a receiver out of service permanently even if the tubes cannot readily be replaced with new ones. Satisfactory results can be obtained by removing the old line cord from the set and substituting a new line cord having a built-in resistor of a resistance value matching the tube heaters.



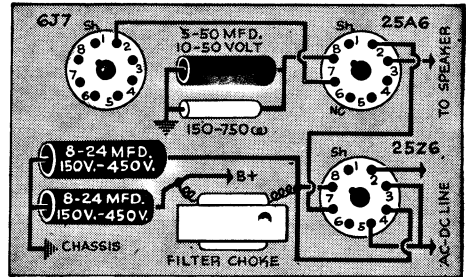
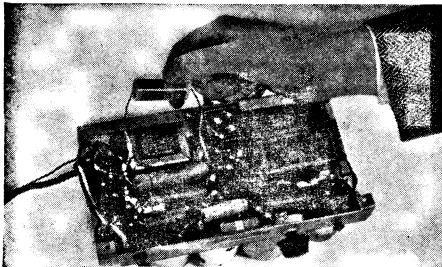
# Servicing Your Radio



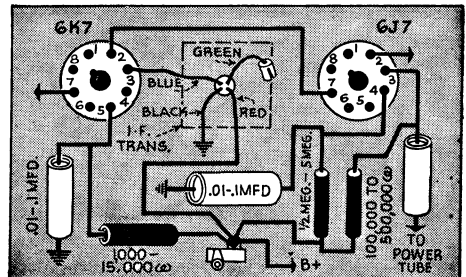
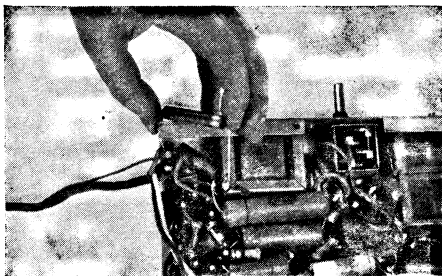
**FIXED CONDENSERS.** Nine types commonly used, left to right: .5-mfd. paper condenser; 8-mfd. midget electrolytic condenser; two (.05 and .02-mfd.) small paper condensers; three mica condensers (.002, .00075 and .0001-mfd.); a 50-volt, 25-mfd. electrolytic condenser; and a 1-mfd. paper condenser in a steel shell



**IF RECEPTION STOPS** suddenly and resumes when the cabinet is knocked, the cause may be a loose connection or a bum tube. Or it may be a bad audio coupling condenser. This looks like the .05 or .02 paper tubular shown above. Diagram shows location. Before replacing, connect an .05 across it for a test



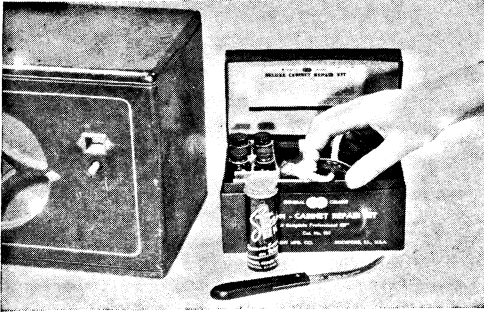
**HUMMING** is usually due to a faulty electrolytic condenser like the 50-volt, 25-mfd. shown above, across the power-tube bias resistor, or one like the 8-mfd., in the filter circuit. Connect an 8-mfd., 450-volt condenser across each electrolytic condenser in the set until the faulty one is found, and replace it



**FADE-OUT** experienced on many old sets is due to a fixed carbon resistor that has become crystallized. It usually can be recognized by a coating on its surface. If not, try connecting a 50,000-ohm, 2-watt resistor across each carbon resistor in the B+ circuit. If playing resumes, replace with one of correct value



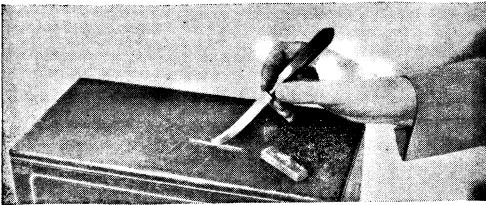
# Servicing Your Radio



You can get a repair kit for fixing up your old cabinet

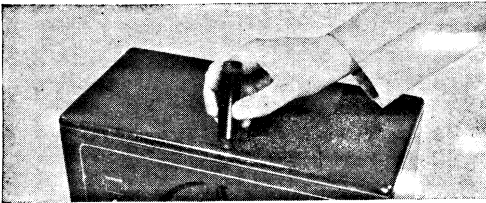
**M**ANY radio cabinets today are in sad need of repair. The old finish has peeled off in places, nicks have been made in the wood, and maybe a few scratches have appeared.

Various kits are now on the market which will enable even an inexperienced person to patch up anything from a small scratch to a bad dent. First take the spatula which comes with the kit and heat it over the alcohol lamp. With the heated spatula melt a shellac stick cement to the proper shade and color into the hole, scratch, or dent. Once the imperfection is filled, it is smoothed off as well as possible with the spatula. The high spots are scraped off with a razor blade or sandpaper, and then rubbed down with fine steel wool and polished. Care should be taken not to injure the surrounding finish. Always make sure the spatula is clean and *never* use matches or a candle to melt the shellac stick.



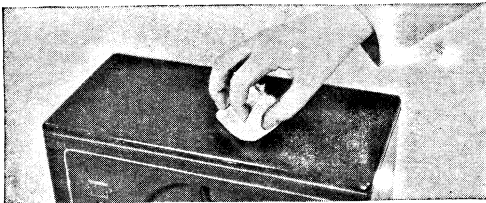
Deep scratches and dents are filled with stick shellac

For slight faults and scratches on the cabinet, you can use a special scratch remover and polishing liquid. This usually is made up into a convenient applicator with a felt brush at one end. Touch the injured spot with the brush and the mark disappears.



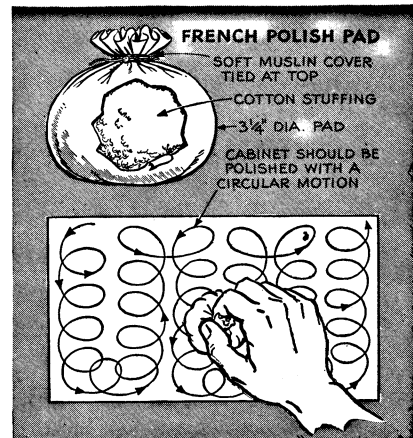
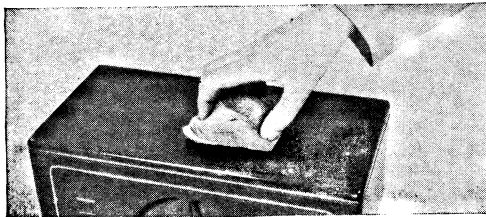
... while slight ones are removed by a special polish

Synthetic materials now on the market make French polishing a simple matter. A small additional amount of the liquid is placed on a pad already saturated with the French polish and rubbed over the surface of the cabinet with a circular motion until a high gloss is obtained. Fine steel wool, lightly used, will tone down the gloss.



French polishing can be done with new synthetic materials

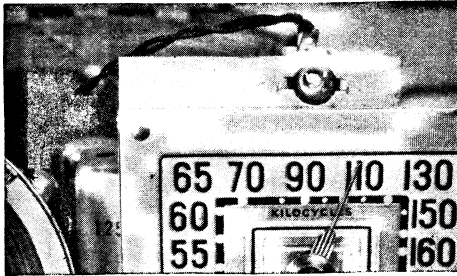
... and rubbing with fine steel wool gives a satiny finish



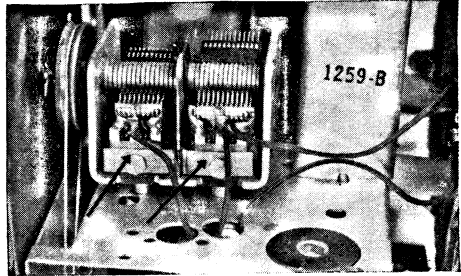
# Servicing Your Radio

**O**FTEN minor adjustments that can be made at home will correct radio-receiver difficulties or give additional reception to an old set. Below are methods for

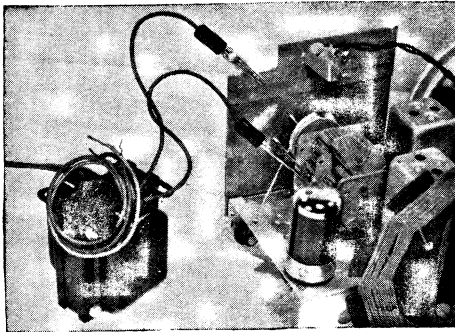
detecting a faulty heater in the power pentode tube, extending reception at the upper end of the dial, eliminating noise in a new condenser, altering a midget filter circuit.



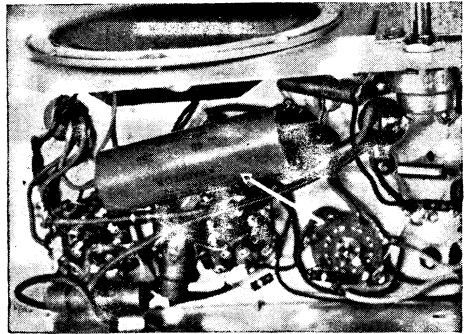
**REPLACE THE POWER PENTODE TUBE** if the pilot light goes on and then immediately goes off again each time the receiver is turned on. The trouble is a faulty heater in the 50L6GT tube. It makes proper connection inside the tube when cold, but when it warms up the contact is broken.



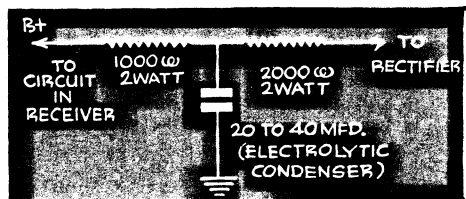
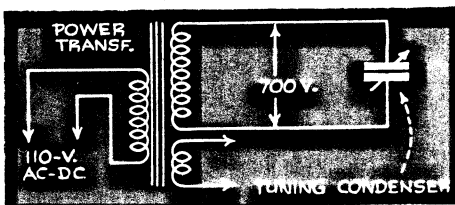
**1,600-KC. STATIONS CAN BE BROUGHT IN** on an old AC-DC midget set by readjusting the trimmer on the oscillator tuning condenser. The capacity is reduced a sixteenth of a turn at a time by loosening the nut shown at left above. Then loosen the nut on the other condenser to increase volume.



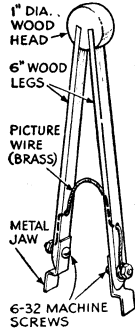
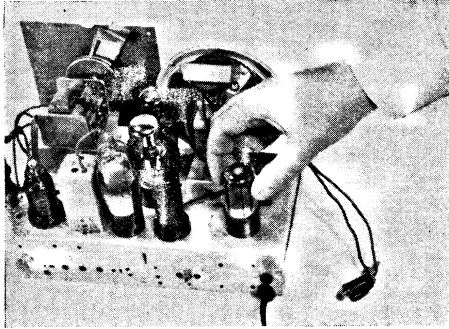
**NOISY TUNING IN THE LATEST RADIOS** may be caused by filings between plates of the oscillator tuning condenser. These may be burned out by connecting the secondary of a 700-volt power transformer across the condenser, as shown above and in the diagram. Be sure to disconnect the house current and the grid connection to the oscillator unit.



**THIS SIMPLIFIED FILTER CIRCUIT** for a midget AC-DC receiver uses only one electrolytic condenser, and may prove worth substituting when servicing a filter circuit that contains two or more electrolytic condensers if replacements for these condensers are hard to obtain. The diagram below shows how the substitute wiring is done.

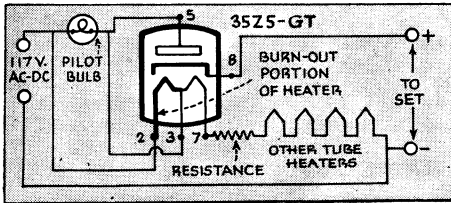
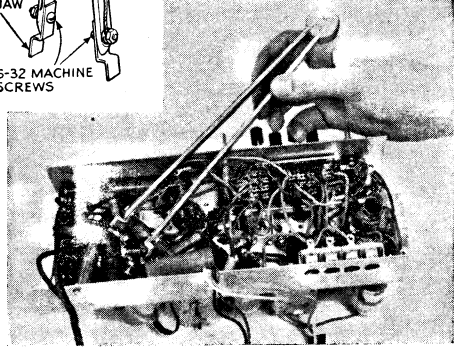


# Servicing Your Radio

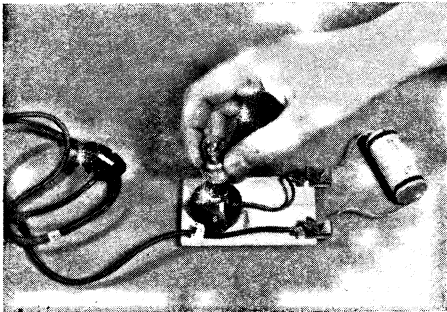


**WORK CAN BE SPEEDED UP** in servicing old radios with this gadget made from wooden photo tongs, such as is used on wet prints. Switch on the receiver and begin shorting the different fixed resistors. When the defective one is shorted, reception improves.

**SOME SERVICEMEN HAVE TROUBLE** with the AC-DC receivers that use the 35Z5-GT rectifier tube. This is shown by the pilot bulb blowing out when a new tube is inserted and the set is switched on. When these blowouts occur, the section of the tube's heater—just across the pilot bulb—is defective. As the set is switched on, the pilot bulb carries the load and, of course, blows out. The remedy is to replace the 35Z5-GT.

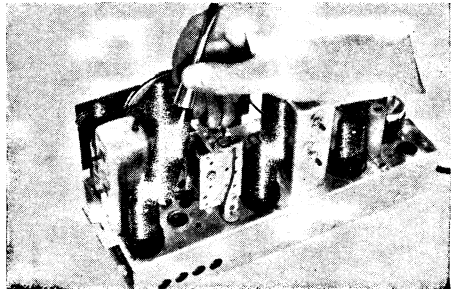


**WPB HAS REDUCED TUBE TYPES** by some 349 varieties, because they made up only about 1% of the total yearly sales. Smaller GT tubes will replace the larger G types, without loss in output. Sets formerly using a 25Z6-G, or a 25Z6-GT, will now obtain identical results with the 25Z6-GT/G tube.



**INTERMITTENT AND FADING RECEPTION** on some AC-DC receivers and phone combinations is caused by faulty construction of new single-ended tubes, without grid caps. To test for this trouble, tap all tubes with a wooden screwdriver handle, as shown below, and the defective one will induce static. It should be replaced.

**A HANDY DEVICE TO HAVE** on the workbench is this homemade neon condenser tester. It will work with either paper tubular or mica condensers of any capacity. If the condenser being tested is good, the neon will flash once. But if the condenser is leaky or shorted the neon will glow and sputter, showing it should be replaced. Tester works on DC or 90-v. battery.



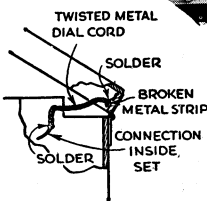


# Servicing Your Radio

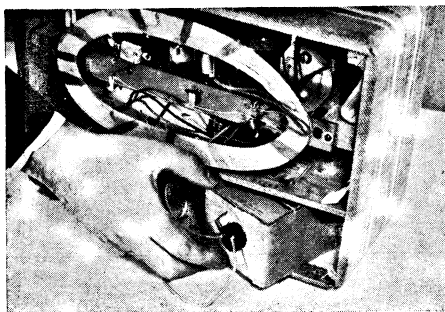
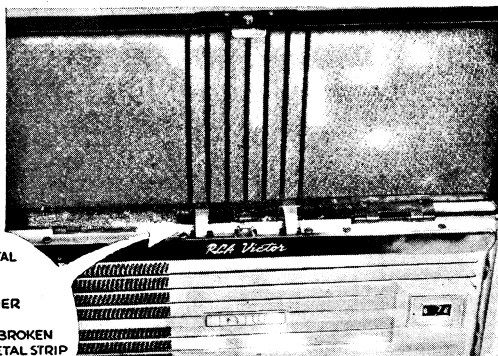


**TESTS ON BATTERIES** from a portable receiver should always be made with a voltmeter—it is the only testing instrument that will show accurately the effective voltage of a battery. It is risky business to use any other device, including a flashlight bulb or an ammeter, since many of them are likely to affect the life of a battery materially. An ammeter—especially bad to use for this purpose—has a low resistance and will short a battery when placed across it. Invariably it will also give a high reading even when a battery is badly run down.

**STRIPS CONNECTING THE LOOP ANTENNA** inside the cover of some midget portable receivers are likely to wear and break off near the hinge as a result of frequent opening and closing of the lid. When such a break occurs, reception stops. These metal strips can be repaired, however, with short lengths of twisted metal cord like that used in repairing radio dials. Remove the broken part of the original metal strips at their connection with the two wires inside the set; then solder one end of the cord to each of these wires, and solder the other end to that portion of the strips connected to the antenna.

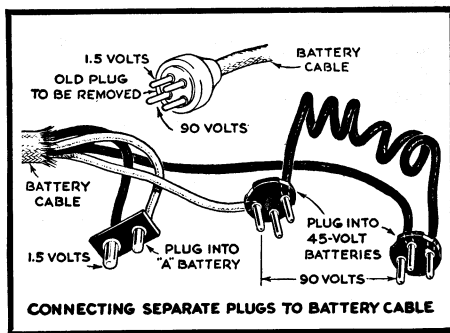


Where a loop-antenna connection is likely to break, Repair it as shown at the left



**BATTERIES THAT DO NOT FIT TIGHTLY** in their compartment will not knock about if wrapped in corrugated cardboard. A round hole cut in one piece of the material will permit insertion of the battery plug. To conserve your battery, turn off the receiver when it is not in actual use. If you have a three-way set, use electric current when possible. Batteries kept outside the case at 60-degree temperature may last 18 months.

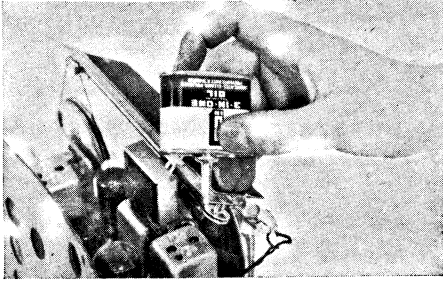
**THREE SEPARATE PLUGS** can be substituted for a single battery-pack plug, as shown in the drawing below, to permit use of separate "A" and "B" batteries with a portable if a battery pack cannot be obtained. In removing any plug from a battery, always grasp the plug itself. Never tug on the wire, for this may pull the insulation back, and a short caused by wires touching can render a battery useless in 15 minutes.



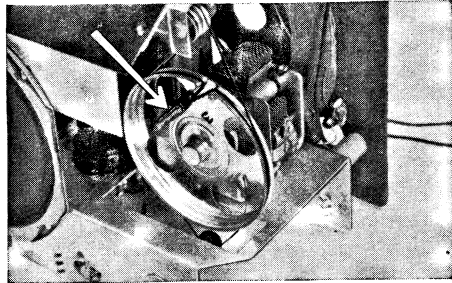
# Servicing Your Radio

**D**IAL troubles often can be corrected easily. Many of the older AC-DC midsets have a direct-drive dial, in which the tuning knob is mounted right on the shaft of the tuning condenser. The only thing that can go wrong with this type is a loosening of the

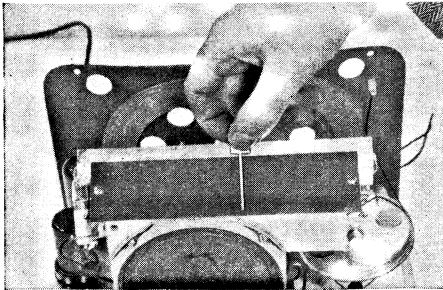
knob; which is remedied by tightening the set screw. Slightly more complicated are the friction drives using a belt or cord. The photographs below show various troubles encountered on these sets, and how they can be eliminated.



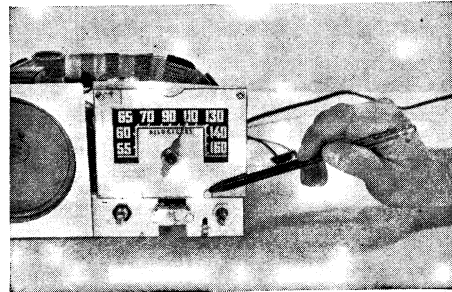
A squeaky slide-rule dial is remedied easily by a little oil on the wheels over which the dial cord runs. Oil very lightly with a light lubricant, being careful not to get any oil on the cord itself



In some friction-drive dials, the cord is kept taut by a spring behind the dial plate as shown above. To tighten the cord, it is necessary only to remove the spring and make another knot in the drive cord



If the pointer is not calibrated properly with the frequency marks on the dial, it is an easy matter to move it to the correct position. Once it is set properly for one station, it will be correct for all



To get at a spring behind the dial plate as shown in the photograph above, it is necessary to take off the plate. To do this, loosen the two hex nuts indicated by the pencil in this illustration

A slipping belt, when it is not too serious, can be remedied by applying a special wax obtainable in stick form. Rubbed lightly on the belt as shown, it usually is found to give a smoother-working dial

If moving plates touch fixed plates in a tuning condenser, loud static is produced whenever the dial is touched. On most condensers this can be corrected by adjusting with a screw and lock nut

