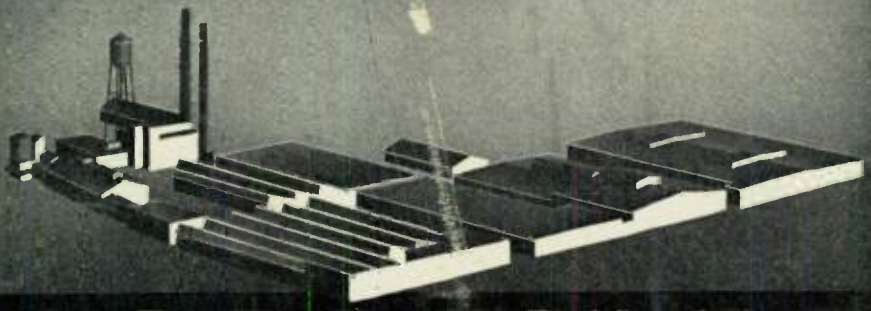
THE C-D CAPACITOR



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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 Unpublished items will not be returned.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.

Radiation Shield for Fluorescent Lighting

In keeping with the modern trend of lighting, many service shops are now using fluorescent lights. This type of lighting, of course, causes objectionable interference, especially when used over the bench where tests have to be made on sets, especially those employing loop aerials.

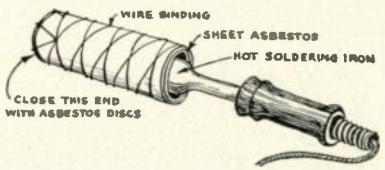
Direct radiation from fluorescent lights can be eliminated by means of covering the opening of the reflector fixture with a thin nickel plated mesh, grounding same together with the entire metal fixture. This diffuses the light nicely and prevents direct radiation to circuits of sets.

A noise filter, such as C-D types IF-6 or IF-24, connected in the line close to the fixture should also be installed for best results. — *Henry Hoffman, Jr., Newark, N. J.*

Hot Soldering Iron Carrier

How often have you waited for a hot soldering iron to cool off so that you could throw it into your bag and hurry on while on an outside job? Well, here's a gadget I find indispensable in my kit of tools which solved this problem.

Make a tubular casing of sheet asbestos by wrapping two layers around your iron. Tie the wrapping with wire, or better still, fit it into a tin baking powder can. Close up one end of the tubular casing with two discs cut from asbestos to



prevent the iron from slipping through.—*Robert J. Oja, Calumet, Mich.*

Zenith 4V-31 Batt. Model

This 6-volt battery table type model may seem dead on the low frequency end of the dial from about 890 kc. down, the trouble being, of course, that the oscillator stops from that point.

The remedy for this condition in this set as well as others of its type is as follows.

Remove the oscillator coil mounted underneath the chassis with two spade lugs. Place a spacer or washers to about 1/8 inch thick on each lug in order to space the coil further away from the chassis. Replace the coil and test for oscillation over complete dial. In some cases it may be necessary to readjust the low frequency padder so as to line up dial readings. —*Berry's Radio Service, Olive Hill, Ky.*

Increasing Sensitivity of Midget AC-DC Receivers

A practical way to increase the sensitivity of many cheaper models of AC-DC sets is to move the antenna coil a trifle closer to the secondary winding. Then by slightly increasing the bypass from the detector plate to chassis, the tone will in many cases show a marked improvement by this change. A readjustment of the balancing condenser on the first section of the tuning gang will of course be necessary for maximum efficiency. — *Milton Bobring, St. Louis, Mo.*

Capacitor Wrench

A $1\frac{5}{32}$ sleeve type spark-plug wrench makes a very handy tool on electrolytic capacitors as it slips on easily in deep chassis.

The writer has been using one of these wrenches for this purpose for a long while and found it proved to be an important time saver, not to mention its convenience for loosening capacitor nuts which are tightly screwed on with shake-proof type lockwashers.—*J. A. Chaney, Rock Hill, S. C.*

A Handy Small Nut Tool

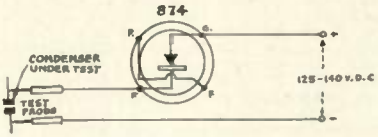
There is one tool which should be included in every serviceman's kit and that is a common ice-pick of the small size variety. This tool not only serves as a scriber and many other uses, but is especially handy for putting small nuts on machine screws under chassis in close places.

Place the small nut on the point of the pick so that it will stick tight. Then place the point of the pick on the center of the screw, push the nut down carefully and turn it with the end of a screwdriver. Simple, isn't it. Yet this simple trick saved me lots of time on many tough jobs.—*C. E. Strauman, Pacific, Mo.*

A Simple Condenser Tester

The accompanying diagram shows a simple condenser test circuit which the writer finds very useful in making quick tests on the bench.

The circuit merely consists of an old 874 type tube connected in the positive lead from a 125-140 volt d.c. power supply.



The test prods are applied across the terminals of the condenser to be tested. If the condenser is O.K. the tube will glow for an instant, then go out. If the condenser is leaky, the tube will light continuously with a faint glow, and if shorted will light continuously with a bright glow. —*Edgar Boles, Marion, Ill.*

RCA BP-55, 56, 85

When everything fails to clear up distortion in these models when operated on a.c., replace the 3,300 ohm resistor R-11 with an 8,000 ohm 1 watt carbon resistor. This may clear up distortion completely. To check for this, turn set on to a.c. position, turn volume up, place voltmeter prod on B plus of set, and it will vary with signal like an output meter when distortion is present.

This was also tried with success on other AC-DC, battery sets where plate and filaments voltage are supplied from a single diode such as 35Z5GT, etc. The resistor should always be connected in plate B plus filter as the increase of resistance does not lower voltage enough to worry about, since the resistor is employed for iscolation.—*Thos. Masteryanni, Indianapolis, Ind.*

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 type battery operated receiver, 1, 2 or 3 tubes. Will pay cash or have many things to offer in trade. What do you want? All letters will be answered. Julius Hardos, 385 Hall Ave., Perth Amboy, N. J.

FOR SALE OR SWAP—Gross 25 watt r.f. unit, Barr transceiver, converter for 2½ meters as shown by me in radio shows, 6-250 volt-50 ma. Gene-motor. Want miniature camera or National Graflex. H. Millen, 40 Wayland St., Boston, Mass.

FOR SALE OR TRADE—New Jannett 32 to 110 volt converter, two 5x7 and one 4x5 cameras complete, like new. North Dixie Repair Shop, 2120 North Dixie, West Palm Beach, Florida.

FOR TRADE—Tubes, transformers, condensers, resistors, etc. Want inexpensive microphones and P. A. equipment. All letters will be answered. Harry Prue, 535 Geneva Ave., Toledo, Ohio.

WILL TRADE—Full course in radio, sound-picture recording and projection, value $165. Want Rider's manuals 8, 9, 10 and 11. Also want analyzer and circuit test set. Alden Foltz, Box 53, Rt. 3, Port Huron, Mich.

FOR SALE—Course in radio training and television by N. R. I., Wash., D. C. Neatly bound in 3 vols. Like new. Price $25.00. Geo. A. Lewis, Storm Lake, Iowa.

WANTED — Old Edison cylinder phonorecords. Will trade latest disc records or will pay cash. State condition and quantity. E. P. Schoeneck, Route 2, Box 16, Wahpeton, N. D.

WILL TRADE—Completely remodeled 1898 Krag 30-40 rifle. New sport stock, micrometer peep sight (Western), 22" barrel in perfect condition. Want Miller high-fidelity tuner or photo enlarger. Roger E. Many, 1101 West Sixth St., Plainfield, N. J.

WANTED—Portable P. A. system (15-20 watts), ¼" electric drill, power tools, test equipment. I have, phono equipment and 1931 model "A" Ford roadster. What do you have to swap? Jims Radio Service, 21 Hillside Terrace, Belmont, Mass.

FOR SALE—R. C. A. Radio, Sound and Television Course, Official Radio Service Handbook (1000 pages), Hawkins' Electrical Guides, Electrical Engineers Pocketbook, and many other text books. Want Gernsback's Refrigeration Service Manuals, Vol. 1 and 2, or other refrigeration or oil-burner manuals, record changer, m. p. projector or what have you? Anthony F. Grimaldi, 133—84th St., Woodhaven, L. I., N. Y.

FOR SALE OR TRADE—4-100 mm.. 3-140 mmf. 1-25 mmf. 1-15 mmf. 1-35 mmf. (receiving) midget tuning condensers; and 1-35 mmf. 1-50 mmf. double spaced x-mitting condensers. All new, never used. Cost $14.00 will sell for $7.00 or trade. What have you. Want mikes & pickups. A. A. Hale, 357 E. Park Blvd., Akron, Ohio.

FOR SALE—Rider's vols. 1, 3, 4, 5, 6, 7 and 8 new—$40.00. Clough-Brengle signal, model OCX, $25.00 new. Supreme set and tube tester model 500, $35.00, Complete I. C. S. Radio Course $20.00. All cash. Chester Drzewiecki, 1356—3rd Ave., Arnold, Pa.

(Continued on page 14)

ANALYZING RADIO NOISES

By the Engineering Department, Cornell-Dubilier Electric Corp.

PART IV

Neon Signs Noises

Neon signs in good working order should not cause radio interference. However, since extremely high voltages are present in this type of equipment, these circuits being frequently exposed to adverse weather, it is almost impossible to maintain this noise-free condition.

The radio interference set up by a neon sign is generally caused by losses in the high voltage circuit. Corona and stray leakages inside the transformer, from the wiring in the secondary circuit, from the insulators and brass tubing, are fundamental causes of radio disturbance.

The whole neon sign installation, including wires and other parts, should be made as compact as possible and placed at a minimum height above ground. Since there is considerable radiation of noise energy from this type of equipment metal shields connected to a good ground should be employed in every possible part of the high voltage circuit.

Application of a filter is recommended to eliminate the conduction of noise energy back through the power line. A filter will not reduce or correct the radiation from the high voltage circuit of the sign and, therefore, should only be used after the circuits have been checked for possible defects and the defective parts repaired or replaced.

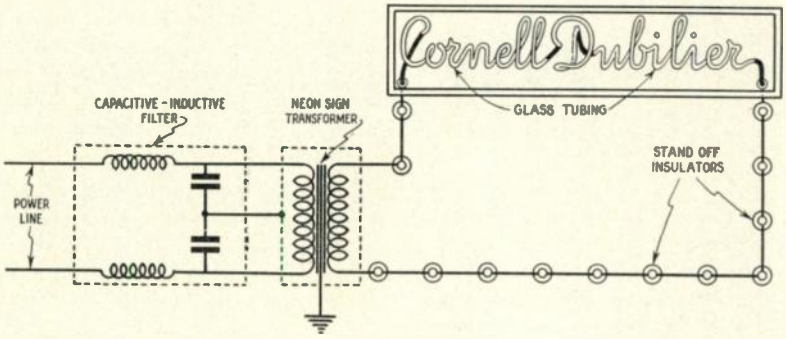


Fig. 16.

The complete high voltage circuit should be examined, the wiring, the insulators and the glass tubing, for possible stray leakages and corona. All glass tubing and insulators should be cleaned, and any cracked or defective parts should be replaced.

Fig. 16 shows a capacitive-inductive filter installed in the primary lead to the neon sign transformer. As stated above this filter is effective only when radiation and re-radiation of noise energy from the sign equipment has been reduced to a negligible factor.

Electro-Medical Apparatus Noises

The radio interference created by diathermy machines, X-ray machines, and similar types of electro-medical apparatus is of unusually high intensity. Complete shielding of the equipment, the patient, and the operator is imperative. This is accomplished by constructing a shielded room or a screened cage of such a size which will permit convenient operation of the equipment, Fig. 17. The high frequency noise energy must be confined to this shielded space.

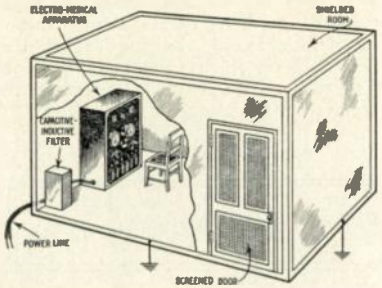


Fig. 17.

The cage may be constructed with galvanized iron screening using an angle iron framework for support. All seams and metal contacts should be securely fastened and soldered. The screen must be continuous over all surfaces of the cage as small openings, breaks or holes will lower the efficiency of the shielding considerably.

An efficient shielded room may be provided by attaching copper sheeting to all walls, the ceiling, and the floor. The seams between the various copper sheets should be soldered completely. To provide adequate ventilation and access to this space, galvanized iron screening mounted on suitable frames may be placed over windows, and the door. These screens must be bonded to the main shielding of the room, although the door may be mounted on hinges and connected to the copper sheeting by means of flexible conductors.

A capacitive-inductive filter should then be installed inside the shielded space in a position which will permit the shortest connection to the electro-medical apparatus, in close contact with the shielding material. Connections to the power line must be made with BX or its equivalent, the total length of which should not exceed a few inches inside the shielded room. The shielding over the line conductors should be securely bonded to the main shielding in the room.

Line connections to the apparatus from the filter should be as short as possible. The frame lead of the filter is connected to a carefully cleaned section of the main housing of the machine.

All wires entering the shielded space must come through a filter installed as just described. Connections for lighting may be made through the load side of the filter.

It is of particular advantage to locate the shielded room in the basement of the building so that a short, low impedance, ground connection which will not radiate noise energy can be effected. Every effort should be made to provide a satisfactory ground which should be connected to as many parts of the room shielding as is practical.

HOW TO RE-SET PUSH-BUTTONS*

Simplified set-up procedure for six basic types of mechanical and electro-mechanical push button systems

THE "big shift" of radio push-buttons will bring into your hands a group of mechanical and electrical tuning systems which you have not worked with for some time. The following diagrams and set-up directions will familiarize you with the popular mechanisms.

Several general rules apply to setting-up of all push-button mechanisms. First, allow the set to warm-up for ten to twenty minutes before making any adjustments. During this time you can clean the chassis and speaker, make a general inspection of the condition of the set and estimate any repair work if it is necessary. If a push-button alignment device is used, allow it to warm-up during the same period.

Using Your Oscillator

Second, be sure the adjustments you make are secure and will not shift during continued use. This means careful re-checking of all set-ups by actually operating the mechanism several times. Screws, knobs, and other adjusting devices should be tight enough to hold their positions.

Where it is necessary to reset push-buttons in advance of the March 29th change-over date, some standard frequency source will be necessary. One method which may be used is that of re-calibrating your signal generator for the broadcast band by beating its signal against the present known frequency broadcast stations which you can receive in your locality. Plot the dial readings of your signal generator against the frequencies of broadcast stations on the largest sheet of cross-sectioned paper you can get. Get as many points as possible as a check. The best time for this will be late in the evening, when with a good receiver, plenty of known frequencies can be logged. Draw straight lines between the successive points where they are only a few kilocycles apart.

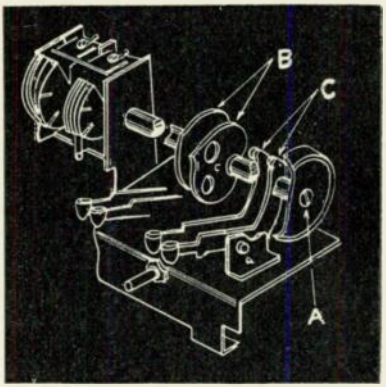


Fig. 1—Cam and lever mechanical system. Loosen cams, press button, tune in station, tighten cam lock.

Your re-calibrated oscillator should then be used to set-up a push-button alignment oscillator which will hold calibration over long periods of time. These are available from several manufacturers. It is important that every means of checking the frequencies should be used. Crystal controlled calibrators which have numerous harmonics will also give a double check, usually at 100 kc. intervals.

Cam and Lever Type

This mechanical type of mechanism is usually found on the smaller table model sets with four buttons. It is characterized by a downward lever type action of the button. The cut-away view Fig. 1 shows the important parts of the tuner. The roller on a push-button lever (C) is pressed against its respective heart-shaped cam

* *By Courtesy of "Radio Today."*

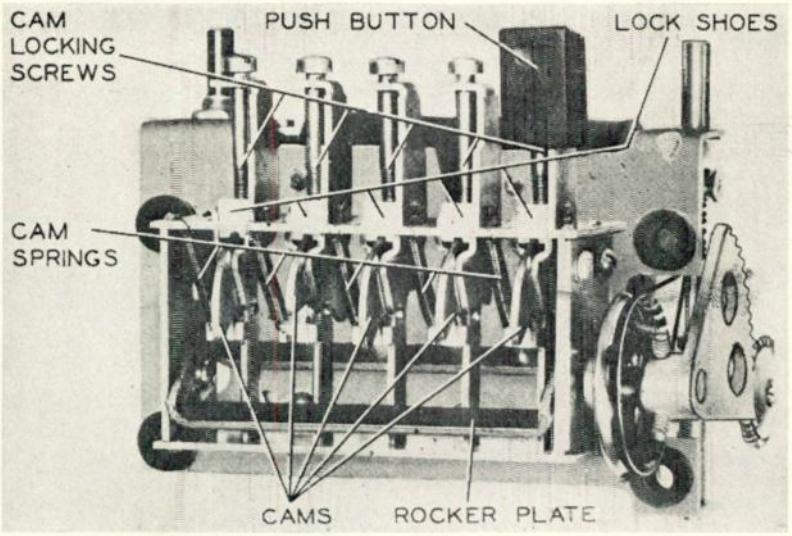


Fig. 2—Rocker-bar mechanical system is adjusted by loosening locking screws a half turn, pressing the push-button and holding it while tuning desired station manually, then locking the cam holding screw. Repeat for other buttons.

(B) when the button is moved downward. The pressure of the roller turns the cam to a "dip" or low point, thus tuning the gang condenser. To set-up these buttons: 1. loosen set screw or locking device on the cam shaft (A). 2. Press down any button for which an adjustment is to be made. 3. Manually tune in station to best position. 4. Set up other buttons in similar manner. 5. Lock cams on shaft.

Some receivers using the cam and lever system use the tuning knob and a gear system to "un-lock" the cams for adjustment. The knob is pressed inward until it engages the releasing mechanism, and is turned to the left until the cams can be adjusted. The station set-up procedure is the same, however. Other variations involve the locking of the cams with special screws or knobs. Another popular type uses a snap-in button in the dial escutcheon to cover a locking screw. Remove the button, and insert a screw driver. Press in, and turn locking screw to left until cams are free for adjustment.

Rocker Bar Type

Another mechanical push-button tuner similar to the cam and lever type uses a rocker bar or plate attached to a sector gear which in turn drives the tuning condenser. Tuning to a particular station is accomplished by pressing firmly on a button which has an arm-type cam attached at a particular angle to the button rod. The cam pressing against the rocker bar tends to align it at the same angle thereby turning the condenser shaft to the predetermined position. See the photo Fig. 2 of a typical mechanism. Springs are used to return the buttons to their normal "out" position after a station has been tuned. No change-over between manual and button tuning is required.

The type of unit shown in Fig. 2 is set-up as follows. 1. Pull the push-botton from the push arm. 2. Loosen the cam locking screw ½-turn. 3. Using the manual tuning, select the desired station carefully. 4. Press in the

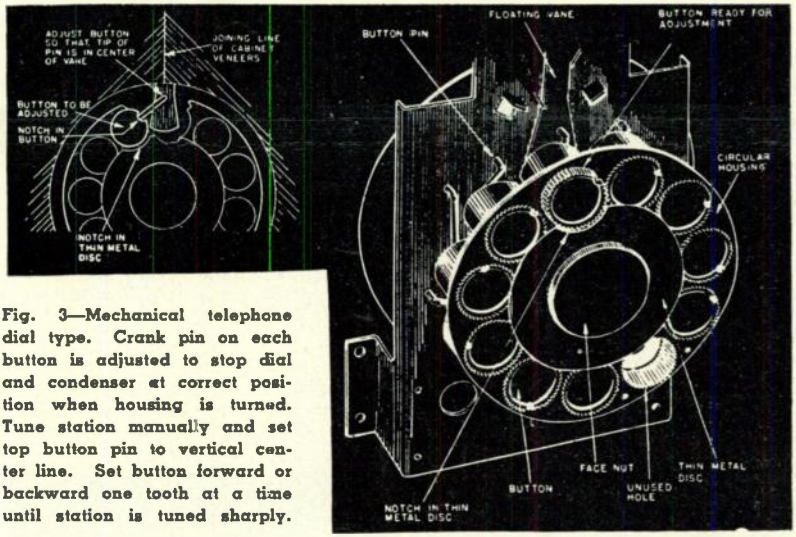


Fig. 3—Mechanical telephone dial type. Crank pin on each button is adjusted to stop dial and condenser at correct position when housing is turned. Tune station manually and set top button pin to vertical center line. Set button forward or backward one tooth at a time until station is tuned sharply.

push arm as far as it will go and accurately re-tune the station. 5. While holding the push-button down, tighten the cam locking screw. 6. Replace push-button knob and proceed to next button for set-up.

Other Rocker Types

Other types of rocker bar assemblies have the cam locking screws integral with the button. The cams are released by turning the buttons counter-clockwise 1½ turns. The set-up is exactly the same as described above. The locking screws on other types are exposed by removing the station name tabs from either the ends of the buttons or the escutcheon plate. Still others are located alongside the push rods and are exposed by removing the button trim plate or escutcheon.

Telephone Dial Types

The revolving telephone dial-type tuner is another mechanical system which uses stopping pins to return the gang condenser to its correct position.

The diagram of Fig. 3 shows a cut-away view of this mechanism. The push-buttons are small spur gears with a crank-shaped pin fastened firmly to the inner end. The plate which holds the push buttons has mating teeth to hold the buttons in a particular position. A metal disc with a curved section cut from it to permit the removal of one button at a time and a clamping nut are the adjusting parts.

When a button is pressed and the dial is rotated in either direction, the bent pin on the back of the depressed button comes to rest against a metal vane which acts as a stop. The gang condenser is attached to the dial mechanism and is turned simultaneously.

To set up the buttons for this mechanism, proceed as follows. 1. Remove the bakelite cover plate by removing the large face nut in the center. 2. Put thin metal disc with circular notch on the hub of the dial and replace the face nut. This notched plate is used only to hold the buttons during set-up. The springs back of the buttons may throw them out of the holding ring unless the set is tilted backward during the removal of the bakelite housing. Notice that one hole is not used in the revolving plate. 3. Select the

button whose frequency range will include that of the station to be reset.

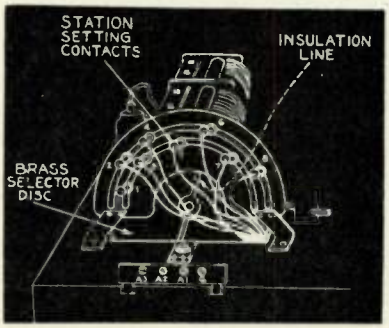


Fig. 4—Electro-mechanical split selector disc types adjusted by moving contact buttons 1, 2, 3, etc.

4. Carefully rotate the thin notched plate after slightly loosening the face nut, until the notch is in line with the button to be adjusted. Hold each button with your finger as the disc is moved by, or the button will spring out and lose its setting. 5. Manually tune the station to be set-up. The button being set-up will be near the top of the housing. 6. Insert button so that the tip of the crank-pin is in line with the center of the metal vane. This is approximately the same as the joint in the cabinet veneer. The large notch in the rim of the button locates the tip of the pin. See Fig. 3. The station must remain perfectly tuned during this operation. 7. Move the notched plate slightly to hold the button just set. 8. Check the set-up by dialing the station in both the clock-

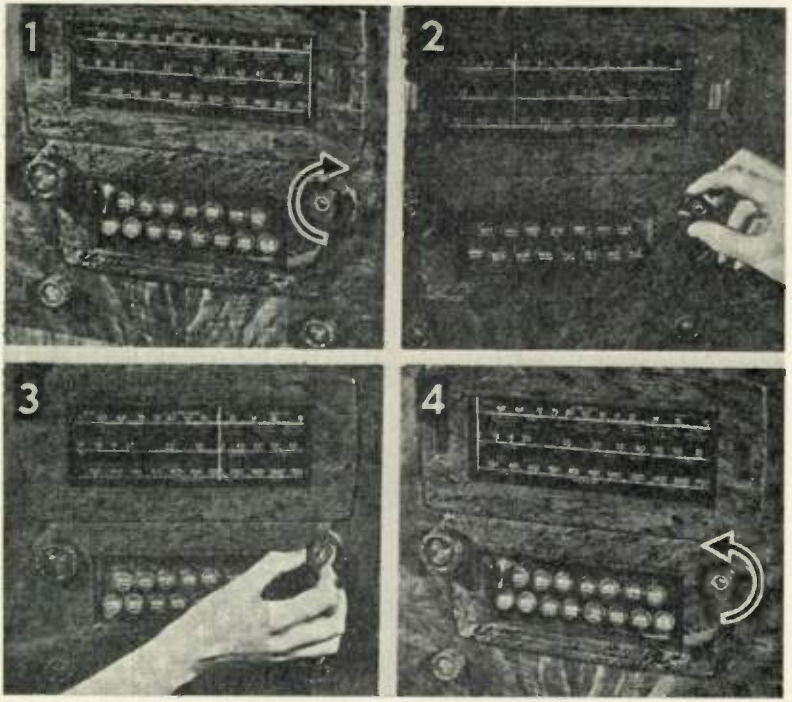


Fig. 5—Four steps in setting-up "magic keyboard." Unlock mechanism, tune station, push knob in, pull out and lock mechanism.

wise and counterclockwise directions. If the station is not sharply tuned-in, carefully move the button one tooth at a time until correct tuning is obtained. 9. Adjust the other buttons in the same manner. 10. Tilt the set backward, carefully remove the notched metal plate and replace the bakelite cover so that the blank space covers the unused hole in the button holder. Care must be used to prevent the buttons from springing out of the housing.

the condenser gang and tuning motor, which is divided into two insulated sections. A group of station contact buttons are adjustable in concentric semi-circular tracks. See Fig. 4 for a layout of this tuner.

To set-up stations proceed as follows. 1. After the set has warmed up, press the "dial tuning" button and manually tune the lowest frequency station to be reset. 2. Hold down the dial tuning button and press the corresponding station button. Both will

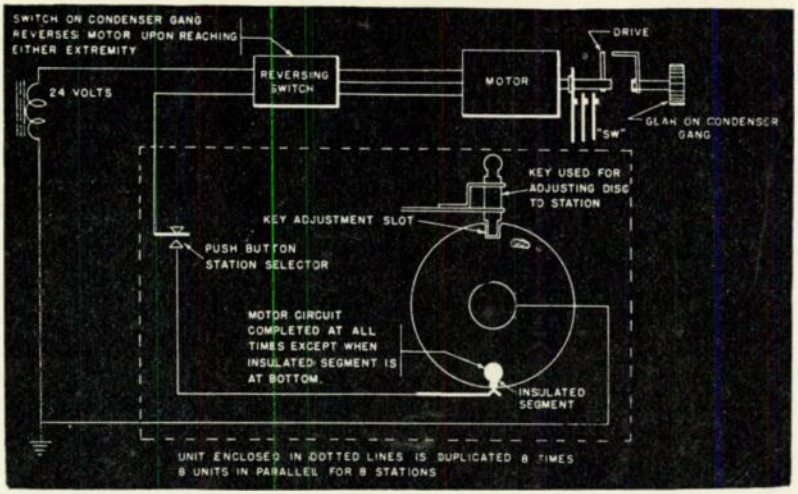


Fig. 6—Notched disc electric type has separate disc for each push-button. To set-up, push button and wait until motor stops; drop key into notch, tune station manually, remove key from notch, continue with other buttons.

Split-Selector Disc Type

Two buttons with extra long crankpins are sometimes used for reaching a particular station. These are used only where the short pins do not reach. It is important that the arm of the pin be either horizontal or pointing at some angle away from the hub (viewed when it has selected a station). This is necessary to prevent interference between the pins and other parts of the mechanism.

Various electrical tuning mechanisms employ a metal disc attached to

remain in. 3. Move the correct contact pin until it is directly on the narrow strip of insulation dividing the metal disc. The center dial lamp will go out when the contact is adjusted correctly. The contact buttons are counted from left to right when facing the back of the set. 4. Press down any other button to release the dial and button just set up. Pressing the button just adjusted will re-tune the station. 5. Proceed with the other buttons in the same manner.

(*Continued on page* 15)

KILLING THE HUM-BUG*

THIS is not intended to be a complete thesis on hum but we do hope to point out many sources of hum and show what can be done about them as far as concerns your daily service work.

The causes of hum may be classified into three groups:

(1) Hum introduced as ripple in the d-c plate and screen supply.
(2) Hum introduced by using a-c on the filaments and heaters.
(3) Hum due to induction, either magnetic or electrostatic.

These divisions are not absolute; some sources of hum belong to two groups. The classification will, however, serve to clarify our story, and we will take them up in order.

B Supply

In the early days of B eliminators, a number of paper condensers were used . . . and a number of chokes. A two-section pi-type filter, consisting of two series chokes (or a dual choke) and three shunt condensers, was generally standard and filters were built more or less according to true low-pass design. The first condenser of the filter net-work was usually a 1- or 2-mfd, three-paper job. Because of the design of the network, this small value did wonders in the reduction of hum, and frequencies above about 50 cycles were fairly well attenuated.

With the appearance of electrolytics, however, the formulae were tossed to the winds and a policy of brute force adopted. This called for plenty of capacity and as much choke as could be afforded. Then came the business of cutting out chokes and using the speaker field coil as a choke. When the field replaced the first choke, there was too much hum; when it replaced the second, there was too much voltage drop on the power stage. But that was when 8-mfd electrolytics constituted a large condenser and hum bucking had not appeared.

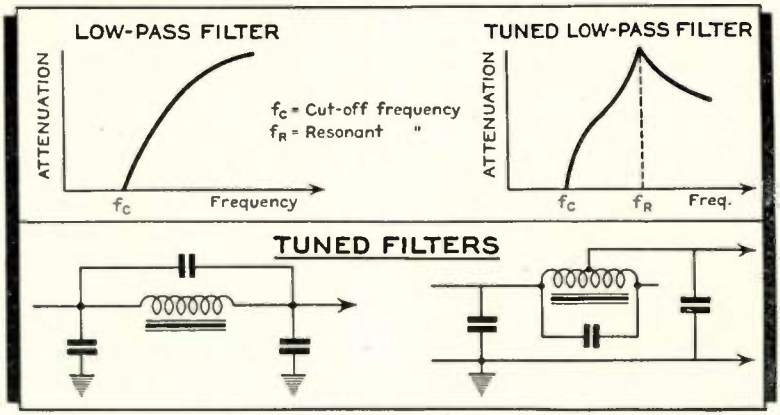


Fig. 1 Before the advent of electrolytic condensers, tuned filters were used extensively. The curve at the right (above) shows the attenuation provided.

* *By Mark Glaser and Edw. M. Glaser in "Service."*

Practically speaking, there is always some ripple in the plate supply but the amount present is purely an economic consideration. Theoretically (at least) the ripple may be reduced to any desired degree.

Tuned Filters

At one time, about ten years ago, tuned filters were much in vogue. These were tuned to a frequency of 120 cycles for a full-wave, 60-cycle rectifier and, for a given load, did a fine job. Fig. 1 shows two types of resonant filters having low-pass action as well. Where Class B or Class AB operation is used in the power stage,

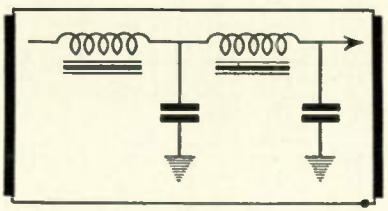


Fig. 2. Choke input is used where good power supply regulation is essential for high quality.

a power supply with good regulation is essential for high quality. This calls for a choke input filter with a minimum of resistance in the transformer and chokes. (See Fig. 2.) The input choke has a considerable amount of a-c flux in its core compared to a choke following a condenser. The a-c field set up may influence magnetically sensitive circuit elements thereby inducing hum while the a-c in the winding puts large stresses in the insulation.

Resistance Filters

Because the market demanded smaller, cheaper and lighter sets, filter chokes were gradually replaced by resistors, in combination with some very clever stunts for minimizing or neutralizing hum. The condenser manufacturers helped this change considerably by introducing very high capacity electrolytics. A typical present-day midget set has a filter about like that in Fig. 3. More sections are often used to isolate an r-f, i-f or audio stage from other stages and, in this case, they are sometimes called decoupling filters as they prevent coupling by a common impedance (usually the last filter condenser) in the plate supply. In high gain amplifiers

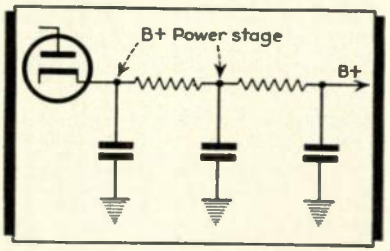


Fig. 3. A typical present day midget receiver employs a one or two section resistance-capacity filter.

of any type this is a necessity to prevent undesirable feedback. Values for the series resistor usually lie between 25,000 and 250,000 ohms

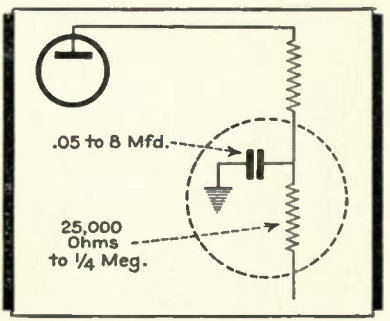


Fig. 4. Resistance-capacity filters are often used on individual stages to prevent coupling by a common impedance in the power supply.

while the shunt condensers range from 0.05 to 8 mfd. (See Fig. 4.)

(To be continued in the next issue of The C-D Capacitor)

THE RADIO TRADING POST

(*Continued from page 4*)

FOR SALE—First ten dollars takes 15" Jensen high fidelity model A-15, 2500 ohm field coil speaker in new condition. Complete with field supply. Both used few hours. Wm. Brown, 2912 Baywater Ave., Far Rockaway, N. Y.

FOR SWAP—Weston tube checker, counter type, checks octal and standard; Supreme Model 85 tube checker; Webster crystal pickup; G. E. crystal pickup; rim drive phono motor. Want crystal head phones, P. A. equipment of all types, a.c. meter of 0-150 (no more, no less on scale). Shine's Radio Shack, 69 W. 23 St., Chattanooga, Tenn.

WANTED—Popular make of tube checker and set analyzer in good condition. Also a signal generator. Kindly mention lowest prices of equipment. Walter J. Zak, P. O. Box 338, Oceanport, N. J.

WANTED—Late type test equipment, 1940 preferred—tube tester, a.f. and r.f. oscillator portable and other types, also manuals, all numbers. Chas. Sandberg, 436 Snediker Ave., Brooklyn, N. Y.

FOR SALE OR TRADE—160 watt 40 c w amateur station and Sky Chief superhet. Whole works for less than half price—$50.00 m.o. F.O.B. or accept Rider's Manuals at half price in trade. No other conditions. No C.O.D. W. Crooks, Route 3, Kent, Ohio.

FOR SWAP—22 cal. Winchester 11 shot rifle in excellent condition for a.c.-d.c. short wave receiver in good condition. Write Harry J. Shrager, 1015 So. 16th St., St. Joseph, Mo.

WANTED—Will buy Rider's manuals Nos. 2, 3, 7, 8, 9, 10, and 11, single volumes or all together. State your lowest price and condition of books. Matt Haligowski, 311 Westmore St., Utica, N. Y.

FOR SALE OR TRADE—Last seven groups of the nine 1940 R.C.A. correspondence course books. Paid $9 per group. Will sell all for $25 or swap for volt ohmmeter and signal generator. Write for list of other stuff. Thos. Crowley, 732 Hancock St., Brooklyn, N. Y.

WANTED—Late Hickok tube tester; Weston vacuum tube voltmeter, model 669; Weston tube tester, model 777. Please state your cash price. Must be in A-1 condition. Radio Repair Service, 173 Main St., Mexico, Maine.

WANTED—A fair size trailer, any condition. Will swap for radio equipment or buy for cash. What do you need? State particulars and price wanted for trailer. M. Budd, 7511 Utricht Ave., Brooklyn, N. Y.

WILL TRADE—A pair of new 500-watt transmitting tubes, sockets, 200-watt class B transformer, 350-watt a.c. generator, complete television power supply and other equipment. Want modern communications receiver. Robt. Mantner, 1011 Neilson Ave., Far Rockaway, L. I., N. Y.

FOR SALE—C-D capacitor bridge model BN, Rider's Vol. 8 manual, "Servicing Receivers by Resistance Measurement," "D.C. Voltage Distribution," Ghirardi's "Radio Trouble-Shooters Handbook." All like new, 5 mos. old. Giving up service work on account of ill health. Make offer. Dean A. Lovell, P. O. Box 21, Waukomis, Okla.

WANTED—Any apparatus manufactured by General Radio, especially variable condensers 500 mmf., or larger, 224 wavemeter, resistance or decade boxes. Any make wheatstone bridge. Mention all particulars and prices. R. N. Eubank, 1227 Winsor Ave., Richmond, Va.

WANTED—Will buy used car radios, also Rider's manuals 1, 2, 5, 7, 8, 10. Must be in good shape. Clarence W. Hull, Mineral Springs, Pa.

FOR SALE—Complete 1940 N.R.I. radio servicing course with all experimental kits and special notes $35.00. Also Triplett model 1175-A portable lab. which includes model 1125-B V.O.M. and model 1151-A all-wave signal generator $25.00. Wm. Greene, 4539 Helen, Dearborn, Mich.

WILL SWAP—Jewell 199 analyzer in good condition for a tube checker of equal value. A. Wallace, Box 466, Barre, Mass.

FOR SALE—Supreme 333 De Luxe Analyzer, new, never used, $25.00; Confidence tube checker, $12.00; Clough-Brengle OC-A signal generator, $15.00; Arc welder, A.C., $20.00; G. E. x-mitter transformer, 250 ma. 110 v. pri., 4000 v. sec., $15.00. H. R. Martin, 6209 Santa Monica Blvd., Hollywood, Calif.

FOR SALE—Rider's manuals, 1 to 7 inclusive. Complete index with vols. All in A1 condition. Best offer takes them. J. E. Longway, 27 Urquhart St., Rumford, Maine.

FOR SALE—A collection of back number radio magazines and publications. What do you need? James A. Long, Box 246, Dudley Rd., Covington, Ky.

FOR TRADE—A. K. Model 49 A.C. table radio, Majestic G-2 dynamic speaker with transformer, Kolster 6-tube battery set, coils and condensers for Philco, No. 5 auto radio. Want set analyzer, tube tester or other test equipment. Irving Stubblebine, 127 Hamilton St., Reading, Pa.

FOR SALE OR SWAP—Confidence "Special" tube tester, Majestic "B" eliminator, W.E. 600A 2-button carbon mike and table stand with 20 ft. cable. Want 12" to 15" Jensen speaker or Rider manuals or tube tester. McKinley's Radio Service, Zebulon, Ga.

FOR SALE—Supreme model 339 analyzer, 1210A Triplett tube tester, in good condition. Also RCA No. 153 oscillator, new. Make offer. H. Ursillo, 85 State St., East Providence, R. I.

FOR SALE—Triplett model 1501 DeLuxe tube tester with volt-ohm scales. 242A tube fifty watter and 800 RCA tube. What am I offered? J. B. Smith, R 1, Box 500, Mt. Holly, N. C.

TRADE OR SALE—Radio City Products tube tester, model 305, counter-type. Want folding Kodak. Curtis & Davis Radio Service, 921 Walnut St., Coffeyville, Kansas.

SELL OR SWAP—New Carter converter, still in factory carton, 6 volts input, output 400 volts at .15 amps, model 415A. Could use good VTVM or cash. Precision Radio Service, Langdon, N. Dak.

WANTED—Good used No. 902 C. R. tube, also a 884 triode, a few dozen S.P.D.T. toggle switches, and some 4-pos. rotary switches. Have many new radio parts such as tubes, power transformers, speakers, etc. Geo. T. Keil, 418½ W. Spring, Freeport, Ill.

HOW TO RE-SET PUSH-BUTTONS

(*Continued from page* 11)

Other Types

The divided selector disc should be adjusted so that the insulation line is horizontal with the dark material at the left end when the condenser is full meshed and viewed from the back of the set. Do this, if necessary, before adjusting the buttons.

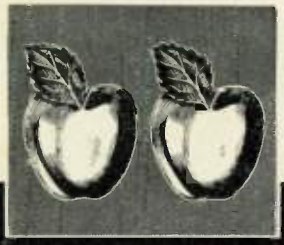
The Stewart-Warner "magic keyboard" mechanism is a combination of electrical and mechanical units. To set-up the buttons, see Fig. 5 and proceed as follows: 1. Remove the tuning knob by pulling it out from the panel and pull out the set-up knob on the same shaft as far as it will go. Rock the knob slightly to engage the gears. Turn the knob clockwise as far as it will go. During this operation, the dial pointer will move to the right and stop. The set-up knob is rotated about ¾ of a turn beyond this point. 2. Push the button that is to be reset, being sure it is all the way in. Using the set-up knob, manually tune the desired station for best reception. This button is set as soon as another button is pressed. Proceed to set the remaining buttons by pressing each down and tuning the desired station. 3. To release the last button pressed, push the set-up knob on the tuning shaft back into the cabinet as far as it will go and then pull it out again, being sure to rock the knob to mesh the gears. 4. To lock the mechanism, turn the set-up knob counterclockwise until a definite stop is reached after the dial pointer moves to the left end of the scale. The set-up knob is pushed back in and the tuning knob replaced. This completes the set-up procedure.

Key and Disc Electric Type

The electric tuning mechanisms which travel to one end of the dial scale and then return to the desired station are usually arranged like the system of Fig. 6.

Set up as follows: 1. Warm-up the set, put the range selector on standard boardcast, and the control knob to "Electric." 2. Press the first button to be set, and wait until the pointer stops. 3. Turn the control knob to "Manual." 4. Put the set-up pin into the adjustment strip above the selector disc corresponding to the particular push-button. Be sure pin is well down into the notch. 5. Tune the receiver carefully to the desired station. 6. Remove the set-up pin. 7. Turn control to "Electric." This button is now properly adjusted and the others may be set-up by holding the correct disc with the pin while tuning the station manually.

The newer types of inductance and capacity trimming units for push-button receivers are simple to re-adjust. The mica trimmers or iron cores are adjusted for best reception on the particular station within their tuning range. The oscillator trimmer is adjusted first, and then the detector and RF trimmers are peaked.



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