THE QUESTION BOX

Conducted by MONROE M. FREEDMAN,

RADIO MECHANICS AND INDUSTRIAL DEPARTMENT, QUEENS VOCATIONAL HIGH SCHOOL

All queries should be accompanied by a fee of 50c to cover research involved. If a schematic or diagram is wanted, please send 75c, to cover circuits up to five tubes; over five tubes, $1.00.

Send the fullest possible details. Give names and MODEL NUMBERS. Include schematics whenever you have such. Serial numbers of radios are useless as a means of identification.

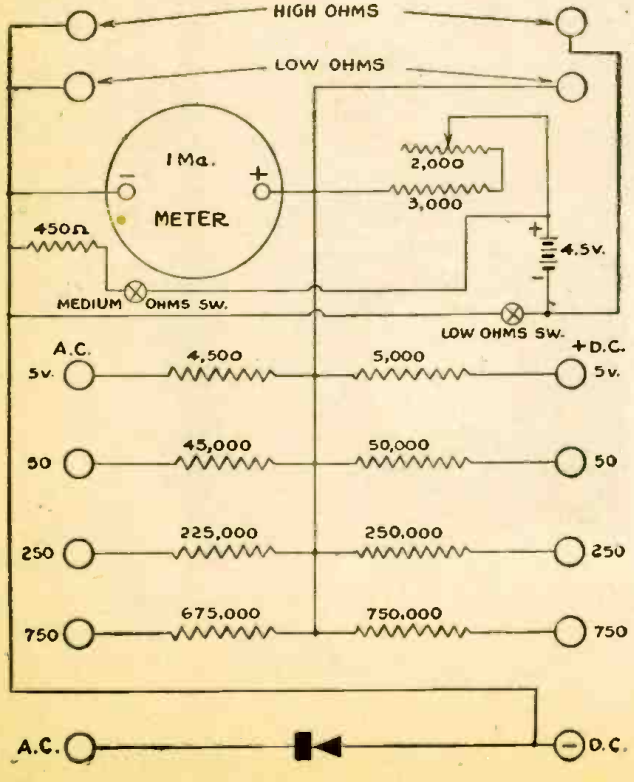
No picture diagrams can be supplied. Back issues: 1944, 25c each; 1943, 30c each; 1942, 35c each; 1941 and earlier, if in stock 50c per copy.

VOLT-OHM MILLIAMMETER

? *I would like to know how to convert my milliammeter into a volt-ohmmeter. It has a 1,000 ohms-per-volt movement. I require ranges of 5, 50, 250 and 750 volts D.C. and A.C. I have a small half-wave meter rectifier for the A.C. My meter has an ohms scale, which reads up to 1,000 ohms.—A.K., Brooklyn, N. Y.*

A. The schematic is given. You will find the 5-volt A.C. scale will not be correct, and your resistor will have to be varied from the original value of 4,500 ohms to allow for the resistance of the rectifier. This changes with the amount of current through it, making correctness at all points on the scale impossible. Common practice is to adjust it for a correct reading at 2.5 volts. On the higher ranges any error introduced by changing rectifier resistance is too slight to be noticeable. A still higher scale may be added by putting a 45-volt battery, a 40,000-ohm fixed and a 10,000-ohm variable resistor in series with the high-ohms terminal.

Your ohms scale is for low-ohm readings. For the two higher ranges, you will either have to mark a new scale on the meter—in the opposite direction—or use a chart, which can be pasted to the instrument. The medium and high scales should fall together, the one being exactly ten times the other.



INTERFERENCE ELIMINATION

? *I have a Kennedy Model 26 T.R.F. receiver. My problem is interference. I cannot separate many stations received on my set. I do not know how to relieve this condition since.*

a. There are no trimmers across variable condensers.

b. There are no slotted end plates on the variable condenser.

c. All tubes are new as well as many parts.

d. The set is completely shielded.

What can be done to reduce this interference?—B. W., Brooklyn, N. Y.

A. Here are some suggestions which will improve your selectivity and relieve the interference in your receiver.

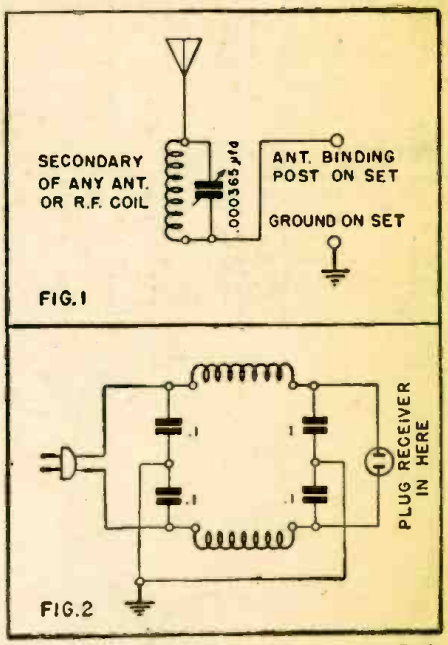
1. Suggest shunting your variable condensers with 30 mmfd. trimmers. Then adjust at the high frequency end of the dial scale when tuned to a weak station in that range of the dial scale.

2. Suggest trying a wave trap which should be adjusted to absorb partly or totally the interfering station. Circuit shown.

3. Suggest shortening your aerial.

4. Suggest changing the direction of your aerial with the "hot end" (point where lead-in is attached to the flat top) away from the broadcast station.

5. A line filter helps once in a while. You may construct one as indicated.



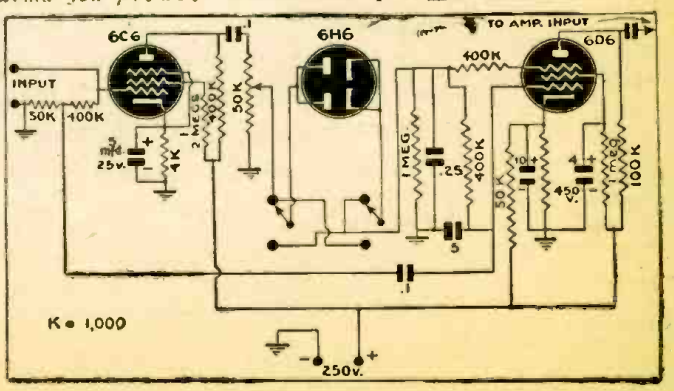
Two methods of interference prevention. Coils in Fig. 2 are half-pound rolls of bell-wire.

VOLUME EXPANDER-COMPRESSOR

? *Please tell me whether or not my volume expander (diagram included) can be used as a volume compressor for making records. I would like to use it between an amplifier with resistance-coupled 6J7 to 6K6 and a carbon mike. If my expander won't work both ways would you please suggest one that will operate with the amplifier. I would especially like to use the 6H6, which I have.—K.H., Portsmouth, Va.*

A. It is not hard to make a volume expander act as a compressor. It increases the grid and suppressor potentials of the amplifier into which it feeds. Reversing the terminals of the 6H6 will cause it to *decrease* the voltages on the screen and suppressor as signals increase.

A double-pole double-throw switch is used to reverse the connections so that your device will work as an expander in one position and a compressor in the other.



Radio-Electronic Circuits

EASILY-BUILT INTERCOM

I wanted an inter-communication device for two-way communication between my study and the kitchen. I tried several circuits, using different tubes and various types of mikes and speakers.

The final circuit, built up out of what materials were available, is installed in a carrying case and works fine business. The main unit is placed in the kitchen and a speaker is put in the study. The switches are all on the main unit. When I get a call from the kitchen, all I have to do is answer back from where I sit without getting up. The volume is more than ample and the quality of voice is clearly understandable.

The diagram is made out in some detail to avoid the necessity of further explanations. There is a little hum, which could be further eliminated if it were troublesome enough, by the addition of more filter capacity. I tried resistance coupling between the two tubes, but that cut down the volume and didn't help the quality at all. The speakers are old-type magnetics.

ROBERT W. L. MARK,
Wellsboro, Penna.

HI-FI FROM OLD PARTS

The high-fidelity phono amplifier was made entirely from parts obtained from a few old broadcast receivers. It has enough gain to work out well with a microphone, too.

The tubes are common types, and can be substituted readily. Thus, a pair of 56's and a 2A5 would give results not much different from those with the tubes given. If you have a later set with 6-volt tubes, you can use a pair of 6C6's and any one of the 6-volt output tubes, such as the 41, 42, 6F6 or 6K6. The rectifier should, however, be one that can deliver at least 125 Ma., for best results.

If your power transformer has no center-tap on the 2.5-volt filament winding, a tapped resistor connected across the 47 filament will work. Use a 20- or 30-ohm center-tapped resistor and connect the 600-ohm cathode-biasing resistor to the center-tap.

GEORGE S. BAHRS,
Burlingame, Calif.

EXPERIMENTERS

Radio-Craft is initiating a plan to overcome the bottlenecks created by the unavailability of many standard types of apparatus. The ingenuity of the American experimenter, technician and mechanic is hereby challenged to replace, rebuild or substitute unrepairable or unobtainable equipment.

Every month one project will be announced for the readers of this page to exercise their brains on. *Radio-Craft* will pay a

FIRST PRIZE OF $5.00

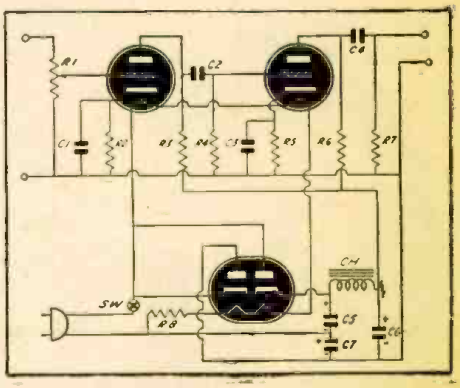
for the best answer and one-year subscriptions for all others published.

PROJECT FOR THE MONTH: Bottleneck No. 2—A simple and easily-constructed all-wave signal generator, accurate enough for fine service work, is needed on many a radioman's bench today. What can YOU do to solve this problem? Let's have circuits, photos and stories.

Suggestions from readers as to other bottlenecks are also welcome. What is your present pressing problem? If you want help with it, tell us so that we can all get to work on it.

A HIGH-GAIN PRE-AMPLIFIER

This is a fine hi-gain (theoretical voltage gain 4900) hi-fidelity voltage amplifier. Its uses are legion. It makes a fine pre-amplifier for PA work or it can be attached to a receiver to build up its output for headphone reception. It can also be used with a relay for photo-electric cell work or for almost anything else you can think of.



The frequency response characteristics are excellent. Response is almost flat from its low frequency cut-off (around 100 cycles) to high frequency cut-off which is well above the audio range. Low frequency cut-off can be raised or lowered by multiplying the values of C2 and C4 by 100 and dividing by the desired cutoff frequency.

For use with a radio receiver to secure increased audio gain the values of C2 and C4 should be changed to .0025 or .002 which gives a low frequency cut-off near 200 cycles. The reason is that due to static crashes, etc., the amplifier may become overloaded and motorboat. Raising the cut-off frequency considerably reduces the chance of motorboating although it does not hurt the fidelity of the amplifier too much.

When receiving voice this loss of fidelity is not objectionable or even noticeable unless one is quite critical. In fact this in many cases is a blessing in disguise since it considerably reduces static which usually is of a fairly low frequency and which is also cut off.

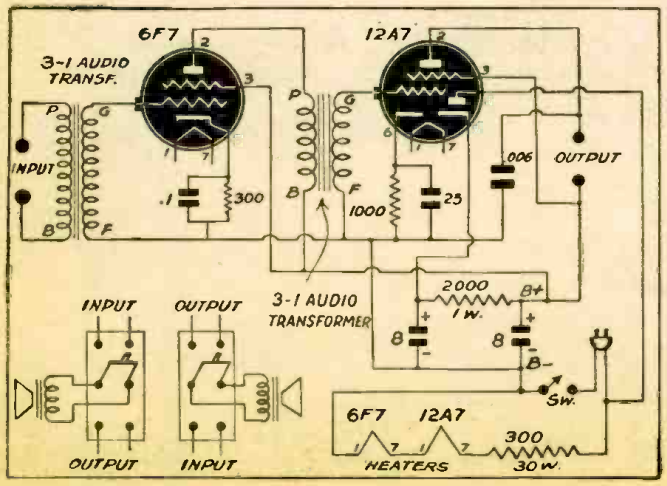
This rig can be built quite cheaply since there are no expensive transformers to buy, and the single choke can be any you have around or even the primary of an old output transformer.

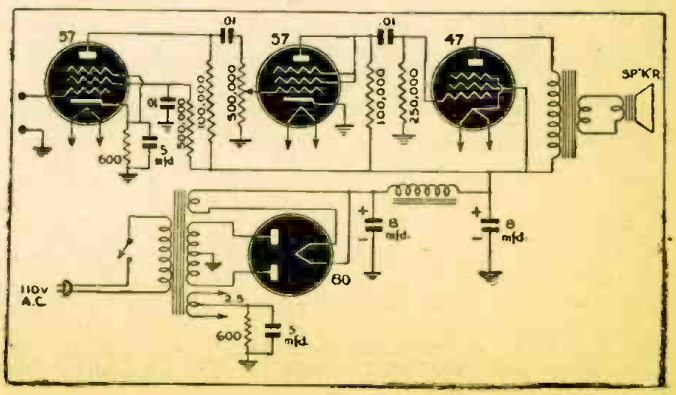
Parts List

R1—.5 Meg Pot	C2—.025 Mfd.
R2—1500 Ohms	C3—5 Mfd. 25 V
R3—.5 Meg	C4—.004 Mfd.
R4—1 Meg	C5—16 Mfd. 450 V
R5—1500 Ohms	C6—8 Mfd. 450 V
R6—.5 Meg	C7—16 Mfd. 450 V
R7—1 Meg	V1—6F5 or 6SF5
R8—260 Ohms (line cord)	V2—6F5 or 6SF5
C1—5 Mfd. 25 V	V3—25Z5 or 25Z6
	CH—A.C.-D.C. choke

All resistors ½-Watt unless otherwise specified.
All condensers 400 Volt unless otherwise specified.

WILLIAM M. LUEBBERT,
Los Angeles, Cal.





Left: The simple intercommunicator described by Mr. Mark. Only the pentode of the 6F7 is used. A 6J7 could be substituted here. Below: A phonograph amplifier easily constructed from old receiver parts. Resistance coupling makes for simplicity and quality.

TRY THIS ONE!

SENSITIVE VOLTAGE DETECTOR

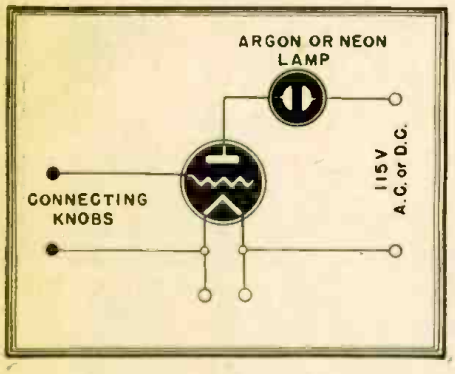
A schematic for this vacuum-tube electroscope is shown here. This device is exceedingly sensitive and it may be used for detecting static and galvanic charges.

In determining the polarity of a static charge the electrified object is brought near the grid lead. If the charge is positive, the argon lamp brightens, if negative, it darkens. The polarity of a cell or battery may thus be found by connecting it in series with the connecting knobs and noting brightness of the lamp.

Many of the gold-leaf experiments work well with this device. Shielding the tube helps to improve its performance.

AVIS SAVATGY,
Kingston, N. Y.

This "floating-grid" voltage detector has been described in *Radio-Craft* before, (Floating-Grid Relay, June, 1943) and, properly made, is a very sensitive device. —*Editor*



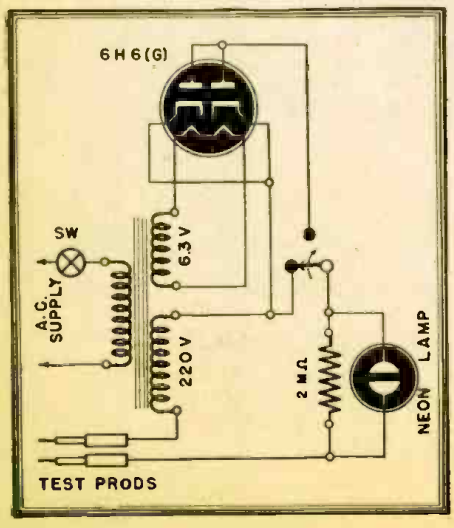
A.C.-D.C. CONDENSER TESTER

The instrument as shown in the diagram will test condensers on either A.C. or D.C.

Electrolytics are tested on D.C. by proper switching. By using A.C. (on other types) it is possible to estimate condenser capacitance by noting the brightness of the neon glow. The greater the capacitance, the greater the glow.

Open condensers show no light. Intermittent ones give an intermittent glow.

E. MENZEL,
Tel-Aviv, Palestine



REMOVING WAX FROM COILS

Many oscillator, I.F. or similar wax-coated coils are easily repaired by the competent technician if the wax coating is first removed in the following simple and effective manner.

Fold three or four layers of ordinary Kleenex or similar absorbent tissue over the coil and press lightly over this with a hot soldering iron. The heat will melt the wax and the tissue will absorb it.

The coil is left practically wax-free for an easy repair job.

MERRITT OBERHOLTZER,
Mifflintown, Penna.

EASILY MADE SOLDER DISPENSER

This pencil-type solder dispenser devised at General Electric's Schenectady Works prevents contamination of solder from handling and dirt. It was made of a piece of methyl methacrylate resin tubing. The brass nozzle is cemented into the body of the tubing with a press fit. Before loading the solder into the dispenser, it is form wound on a drill rod in a bench lathe. The operator pulls the solder from the dispenser with pliers as it is needed.

"PARTY LINE" TESTER

After constructing the "Party Line" unit described by Mr. Lindsay Russell (July issue) I find that it is a "must" for the serviceman's bench, when working with audio stages using transformers.

I use a small speaker field as a pick-up and find it excellent for checking audio amplifiers and receivers. When it is brought close to an audio transformer or output transformer, the signal is audible through the "Party Line" unit, thus making a signal tracer for A.F.

ATKINSON RADIO SERVICE,
Zanesville, Ohio

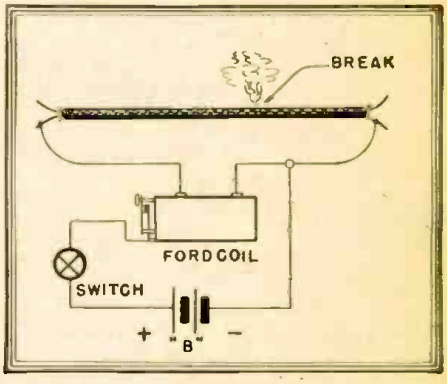
BROKEN WIRE INDICATOR

This is a useful and simple test instrument to have around the home or shop.

Many radios or other electrical appliances are out of order because of broken wires in cloth or rubber covered cables. These breaks may be found by connecting the hot leads from a model T Ford coil to each end of the wire to be tested.

If the wire is broken the break will be indicated by smoke or even a very small flame.

CHARLES MANN,
Rouzerville, Penna.



CLEANING OF DIALS

The old-fashioned black bakelite dials which are about the only type available now may be polished and cleaned up to make an excellent appearance.

First clean them well with good old soap and water, and dry. Next, you will probably notice that the numerals around the edge are dirty and yellow. Take a white crayon and go over all numbers and lines, filling them in. Wipe off the excess with a cloth. The ordinary wax of a white crayon will give as good effects as any other whiting material I have ever tried to use, and does not crack or fall out.

Last of all, to give it a really shiny coat, polish the dial with ordinary furniture wax, after which any radio man would be proud to put it on his panel.

JAMES LONG,
Rennselaer, Ind.

HANDY WIRING AID

A thin piece of Plexiglass 8" x 12" is sandpapered on one side only, or it may be sand-blasted, to give it a rough surface on one side. Now place over the diagram from which you are working, fastening the Plexiglass down with thumb tacks.

The diagram can now be easily read and all you have to do is trace over the part of the circuit already wired, thus showing you what is yet to be done.

The Plexiglass is not easily scratched or damaged, though of course ordinary care must be taken not to mar it, and probably scratches could be sanded or ground out.

The glass may be washed or erased very easily and used over and over. The original diagram will not be soiled or marked up.

R. M. STELLMAKER,
Miami, Fla.