

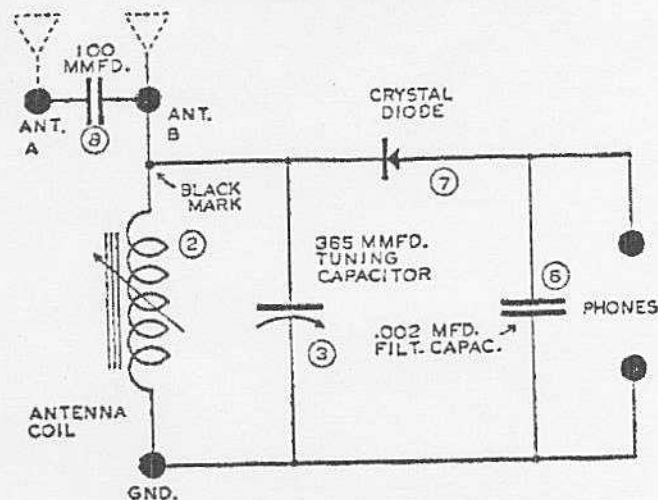
RADIO RECEIVER WITH CRYSTAL-DIODE DETECTOR FOR BROADCAST FREQUENCIES

chapter under section entitled "How to Build a Radio Receiver with Transistor Detector." See also the soldering instructions in Chapter Thirteen. Be careful not to lay the soldering iron on anything which it will burn. Remember to disconnect the iron as soon as you are through using it.

The Vari-Loopstick Antenna Coil. There are several different loopstick antenna coils listed in electronics catalogs and it is necessary to buy the right one to use in assembling the radio receiver with crystal-diode detector.

All the loopsticks specified in the list of parts and materials have been tested in building models for this book. These loopsticks have a "Q" or quality factor of at least 250 microhenries. By adjusting the ferrite core and tuning with a standard 365 mmfd. tuning capacitor any frequency over the entire broadcast band from 540 to 1600 kc can be tuned in on the receiver.

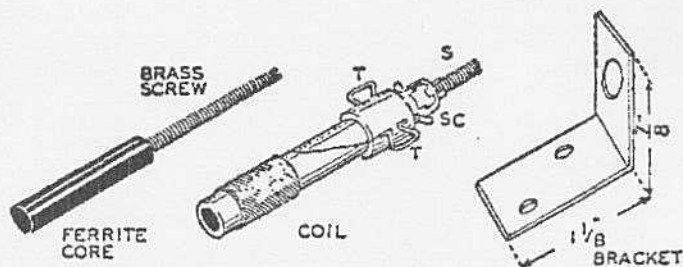
The correct loopstick to use in assembling the receiver with crystal-diode detector consists of an insulating tube about 2 inches long and $\frac{3}{32}$ inch in outside diameter. A small coil of fabric-insulated wire is wound on one end of the tube. The ends



SCHEMATIC CIRCUIT DIAGRAM OF RECEIVER WITH CRYSTAL DIODE

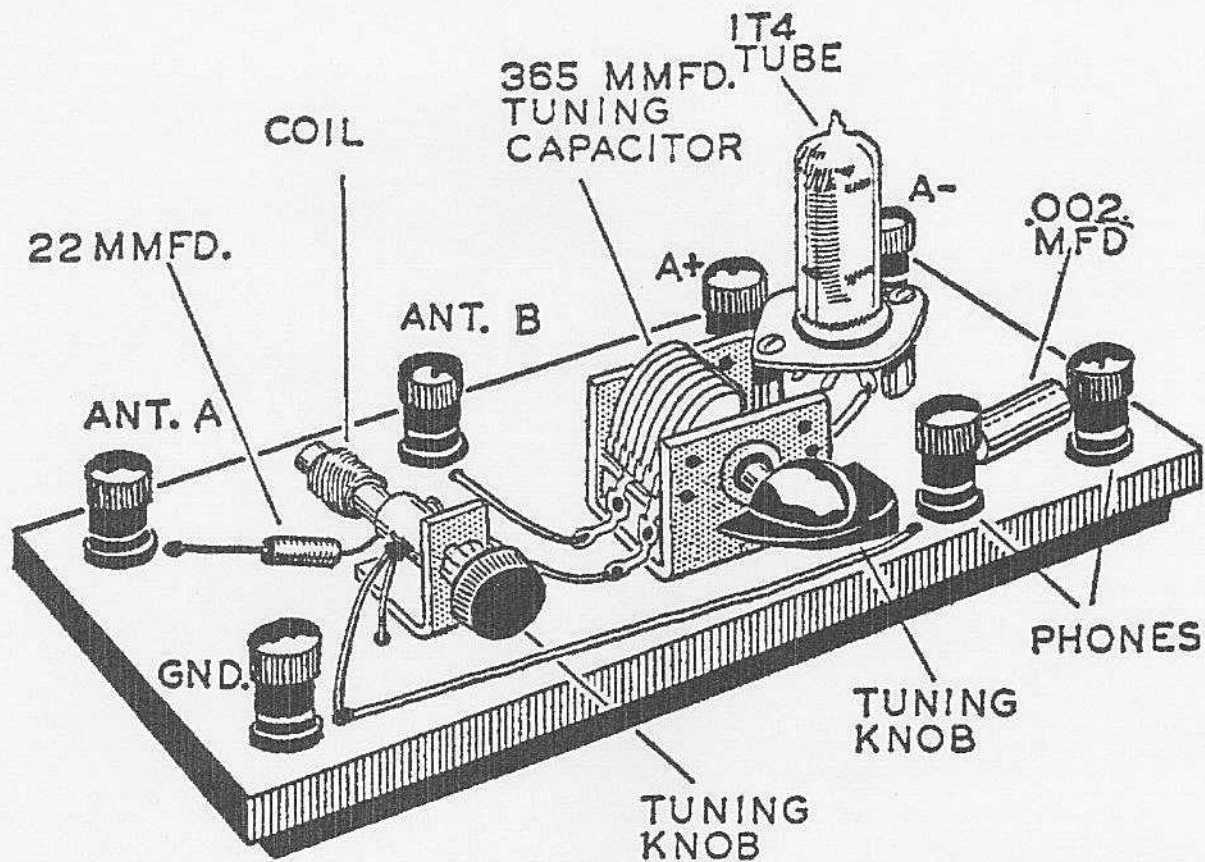
of the coil are connected to two metal terminals at the opposite end of the tube. There may be also a coil consisting of 12 to 14 turns of enameled wire loosely wound around the tube with one end connected to one of the metal terminals. This enameled wire coil is not to be made any part of the receiver circuit and should be removed. The core of the loopstick is a ferrite rod about $1\frac{1}{2}$ inches x $\frac{1}{4}$ inch. A $\frac{3}{32}$ -inch or $\frac{1}{8}$ -inch diameter threaded brass rod is attached to the core. The end of the rod is slotted so that a screwdriver can be used to turn it and change the position of the core relative to the coil. The most convenient way to tune the loop is to attach a small knob to the end of the screw and turn the latter with the knob instead of a screwdriver.

A metal bracket 2 inches long is supplied with each loopstick. The bracket should be bent at right angles 1 inch from one end and fastened to the base with two $\frac{3}{8}$ -inch round head brass screws. The loopstick is fitted at one end with a single-hole,

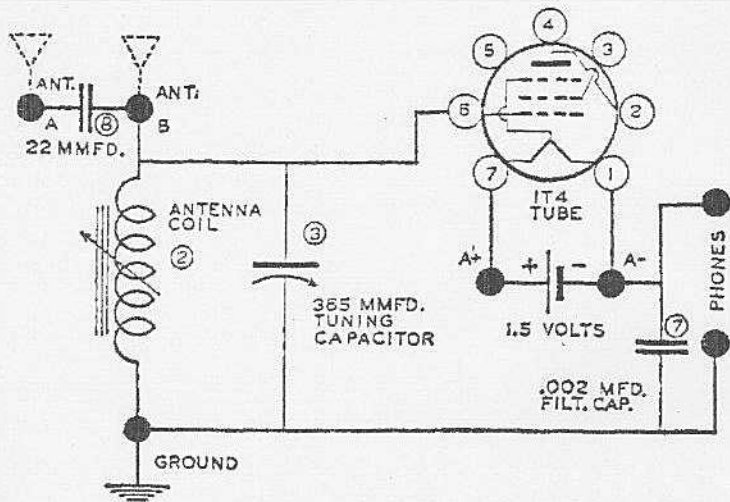


A VARI-LOOPSTICK ANTENNA COIL WITH MOUNTING BRACKET

T and T are terminals. S is the core-adjusting screw and SD identifies one of the spring clamps which holds the coil in place when it is pushed in the large hole in the bracket.



RADIO RECEIVER WITH VACUUM-TUBE-DIODE DETECTOR



SCHEMATIC CIRCUIT DIAGRAM OF RECEIVER WITH VACUUM-TUBE-DIODE DETECTOR

produces the valve action. The electrons move in one direction only—from the filament to the positively charged No. 1 grid.

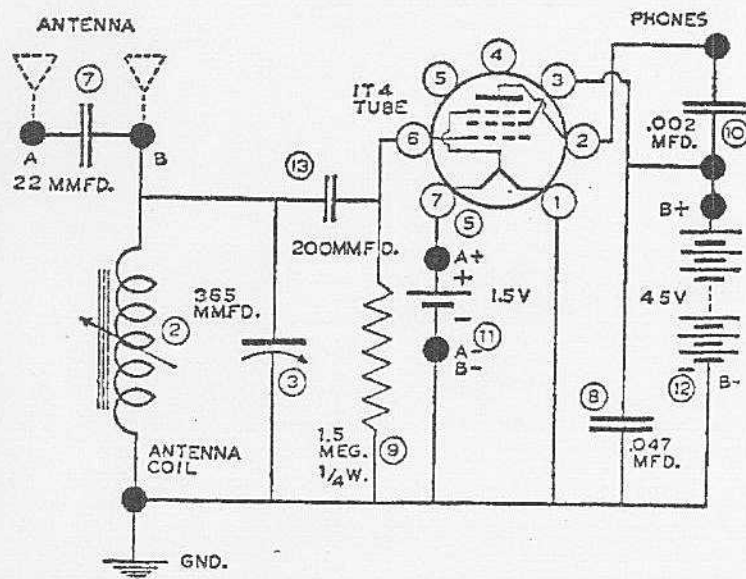
In a diode made expressly for use as a detector, the positively charged electrode would be a plate instead of a grid but in a IT4 a grid serves very well as a substitute for a plate.

HOW TO BUILD A RADIO RECEIVER WITH A GRID-LEAK DETECTOR

A receiver with a "grid-leak" detector amplifies signals as well as detects them. It will receive weak stations much better than any of the two preceding receivers described in this chapter. The schematic diagram shows the IT4 type tube connected as a pentode and operating as a grid-leak detector. An explana-

tion of how the pentode performs in this circuit requires a brief review of some facts about vacuum tubes.

A DIODE tube has two elements, a cathode and a plate. The cathode is a producer of electrons which pass across the space between it and the plate when the plate is positive. When a third element called a grid, usually a spiral of fine wire surrounding the cathode, is placed between the cathode and plate, the tube becomes a TRIODE. Electrons produced by the cathode and traveling toward the positive plate must pass between the grid wires. Increasing the positive voltage on the plate increases the number of electrons reaching the plate. A positive voltage on the grid will also increase the number of electrons reaching the plate. But a negative voltage on the grid



CIRCUIT DIAGRAM OF RADIO RECEIVER WITH GRID-LEAK DETECTOR