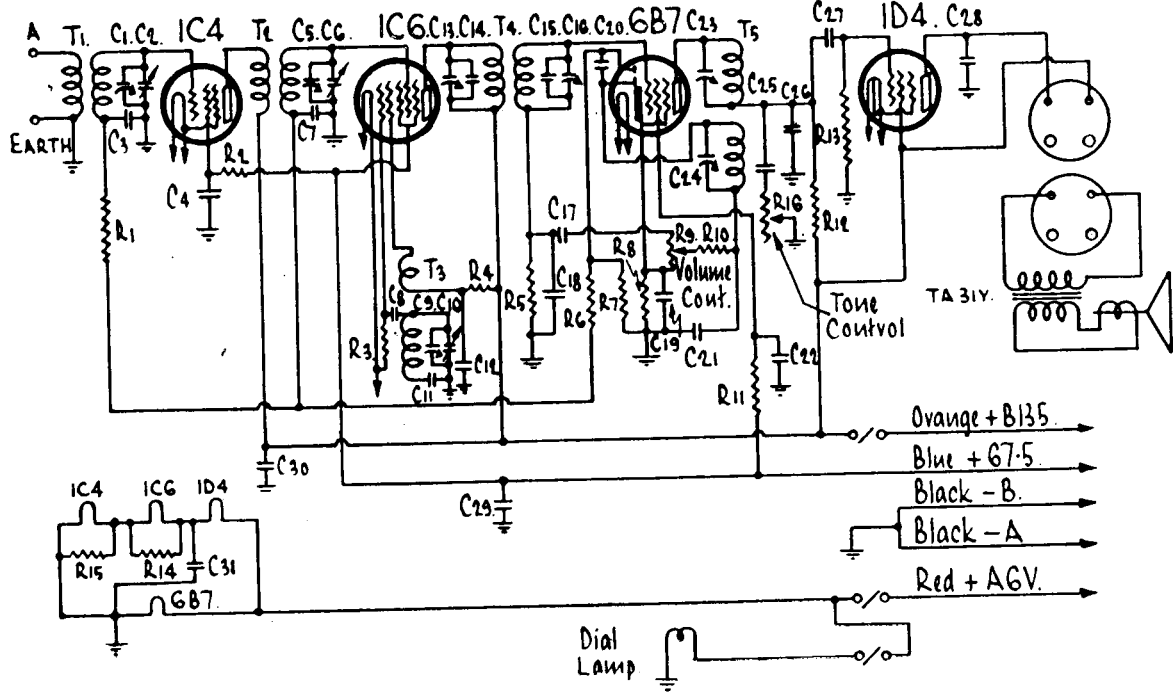
volts operation, respectively.

"Radiola" Battery-Operated Broadcast Model 156



Fundamental circuit diagram of Radiola "156." In the actual production models of this receiver a variation from the above will be found in that the lead between C26 and the top end of R13 is broken by a switch. Also, instead of going to the 1D4 screen lead and high-tension as shown, is taken direct to the battery side of the high-tension switch. The top end of R13 is still connected direct to C27, so the new arrangement ensures that a steady potential is applied to C27 under all conditions. The circuit between R12 and C26 is closed when the set is switched on. Further details will be found in the text on page 315.

Radiola Model 156

(Circuit Diagram will be found on page 314.)

Radiola Model "156" is a four-valve, broadcast coverage, receiver designed for operation from a six-volt accumulator and three 45-volt "B" batteries. This receiver is housed in a console-type cabinet and uses an eight-inch permanent-magnet, loudspeaker. Four controls are fitted to this receiver altogether. One of these is the battery switch (dealt with below), and the other three are for tuning, volume, and tone (continuous); in that order, from right to left.

The circuit employed is rather unusual in that a six-volt valve (type 6B7) is used as a reflexed I.F. and A.F. amplifier, with three valves of the two-volt type performing the rest of the functions. Series wiring is used for the filaments of the two-volt valves and their bias is obtained from the voltage drop across the filament network. Biasing for the reflexed valve is of the cathode resistor type. It should be noted that resistors are shunted across the filaments of the R.F. and mixer valves in order to equalise the drain.

Before proceeding to detail the valve functions and operating conditions, it is of interest to note the special switching arrangement which is used with this receiver. Inspection of the circuit will show that the plate load resistor for the 6B7 is permanently connected to the "live" side of the high-tension switch, while the other end of this resistor goes direct to the 1D4 grid coupling condenser. Connection to the 6B7 plate is made through a switch.

The object of this is to eliminate the "switching-on" surge of voltage which occurs in battery receivers and sometimes causes damage to the output valve. As can be seen, the arrangement ensures that the D.C. potential applied to the coupling condenser is always constant and no "surge" can occur. The switch in the lead to the 6B7 plate ensures that leakage is reduced to an absolute minimum.

The complete battery switch has three positions. In the first position, all sections are open and the receiver is "off"; in the second position all sections are closed and the entire receiver, including dial lamps, is "on." The third position opens the dial lamp circuit, but leaves the others closed, thus permitting use of the receiver with the dial lamps extinguished.

OPERATING VOLTAGES.

The following measurements were taken with a "1,000 ohms per volt" meter between the socket contact indicated and chassis. The receiver was detuned from any signal and all controls were set at their maximum (clockwise) position.

1C4, R.F. Amplifier: Plate, 135 v.; screen, 30 v.; grid, zero; late current, 1.0 mA.

1C6, Frequency Converter: Plate, 135 v., screen, 67.5 v.; grid, —2 v., plate murrent, 2.0 mA.; osc. plate voltage, 70 v.; osc. plate current, 1.5 v.

6B7, 175 KC. I.F. Amplifier, Detector, A.V.C. Rectifier, and Audio Amplifier: Plate, 60 v.; screen, 30 v.; cathode, 1 v.; plate current, 0.5 mA.

1D4, Output Pentode: Plate, 125 v.; screen, 135 v.; grid, —4 v.; plate current, 6.0 mA.

COMPONENT VALUES.

COILS.

T1 (P.N. 1560)—Aerial coil; **T2** (P.N. 1564)—R.F. coil; **T3** (P.N. 1562)—Oscillator coil; **T4** (P.N. 1534)—1st I.F. transformer; **T5** (P.N. 1536)—2nd I.F. transformer.

RESISTORS.

R1, R2, R12—100,000 ohms, 1/3 watt: **R3**—60,000 ohms, 1/3 watt; **R4**—50,000 ohms, 1/3 watt: **R6, R7**—1½ megohms, 1/3 watt; **R8**—2,000 ohms, 1/3 watt; **R9** (P.N. 1668)—300,000 ohms volume control; **R10**—300,000 ohms, 1/3 watt; **R11**—250,000 ohms, 1 watt; **R14, R15**—16 ohms. wire wound; **R16** (P.N. 1668)—300,000 ohms tone control.. **NOTE:** The volume control and tone control are identical in construction.

CONDENSERS.

C1, C5, C9, C13, C16, C24—10/50 mmfd. mica trimmers; **C2, C6, C10** (combined P.N. 1515)—sections of tuning gang; **C3, C7, C17, C27**—0.05 mfd. paper; **C4, C12, C22, C29**—0.1 mfd. paper; **C8**—50 mmfd. mica; **C11**—1050 mmfd. fixed mica padder; **C14, C15**—85 mmfd. mica; **C18, C21**—200 mmfd. mica; **C19**—5.0 mfd., 25 volt electrolytic; **C20, C26**—700 mmfd. mica; **C23**—30/70 mmfd. mica condenser and trimmer; **C25, C28**—0.005 mfd. paper; **C30, C31**—0.5 mfd. paper.