

# Westinghouse Superheterodyne No. WR-5

**E**LECTRICAL details of the Westinghouse superheterodyne, WR-5, response curves on which were given on page 69 of the September, 1930, issue of this magazine, may be found in the schematic diagram, Figure 2, at the bottom of this page.

As will be seen the antenna is coupled to a tuned link circuit by means of a high inductance concentrated coil connected from antenna to ground. The inductance is of sufficient value that variations in the antenna system have little effect on tuning of this circuit.

The tuned circuit consists of a coil and condenser which tunes exactly with the tuned r.f. and first detector. There is no amplification gain in this circuit, it being merely a selection circuit, whose purpose is to eliminate any cross-modulation from stations to which the set is not tuned, or heterodyne whistles as far as possible, and to improve the selectivity of the receiver.

A tuned radio frequency stage follows which uses a 224, this stage giving about the same amplification as obtained from two r.f. stages of an average good receiver. The output of this stage is coupled capacitatively to the grid circuit of the first detector, or mixing tube by means of a small condenser. The plate circuit of the r.f. stage has a high inductance coil which provides a high impedance into which it is necessary to have the tube work in order to get good amplification.

Output of the oscillator is inductively coupled to the grid circuit of the first detector. The oscillator is grid tuned, uses a 227, and has a closely coupled plate coil which gives sufficient feedback to provide stable operation. The grid circuit is so designed that by means

of a correct combination of capacity and inductance a constant frequency difference between the oscillator and the tuned r.f. stages throughout the range is maintained.

First detector is tuned by one of the sections of the gang condenser to the signal frequency. In the grid circuit is the incoming signal frequency and the oscillator signal, the latter being 175 kilocycles different from the former. First detector is biased to operate as a plate rectification detector, and its purpose is to extract the beat frequency produced by combining the signal and oscillator frequencies. The beat frequency, 175 kc, appears in the plate circuit of the first detector, which is accurately tuned to 175 kc.

The next two circuits are the first and second intermediate stages which give a high degree of amplification, the grids and plates of both stages as well

as the plate circuit of the first detector and the grid circuit of the second detector are tuned to 175 kc.

Two resistances are arranged for connecting to the first i.f. transformer, the connection or disconnection of which constitutes the action of the local-distant switch. At the local position a 40,000 ohm resistor is connected across the primary of this transformer and a 500 ohm resistor in series with the secondary and one side of the tuning condenser. The effect of these resistors is to decrease the sensitivity, broaden the selectivity and thus improve the fidelity of the set. At the distant position the resistance is out of both circuits and the original sensitivity and selectivity is obtained. After the high amplification of the intermediate stages the signal appears in the grid circuit of the second detector.

## Westinghouse Model WR-5

Tube Type	Position in Set	A Volts	B Volts	C Volts	Cathode Volts	Screen Volts	Normal Plate M. A.	Screen Grid Current Change
224	1 R.F.	2.2	240	2.2	34	80	3.2	.5
227	Osc.	2.2	60	—	22	—	6.5	—
224	1 Det.	2.2	230	9.5	25	72	.25	.1
224	1 I.F.	2.2	240	2.2	34	78	4.0	.5
224	2 I.F.	2.2	240	4.2	31.5	78	1.6	.5
227	2 Det.	2.2	212	22	12	—	.25	—
245	P.P.	2.2	200	19*	—	—	25.0	—
245	P.P.	2.2	200	19*	—	—	25.0	—
280	Rect.	5.0	—	—	—	—	—	—

Line voltage. Volume control maximum.

\*Not true reading due to resistor in circuit.

Fig. 1. Voltages and current values of the tubes in the WR-5 are those shown in this table as taken with a Weston set tester

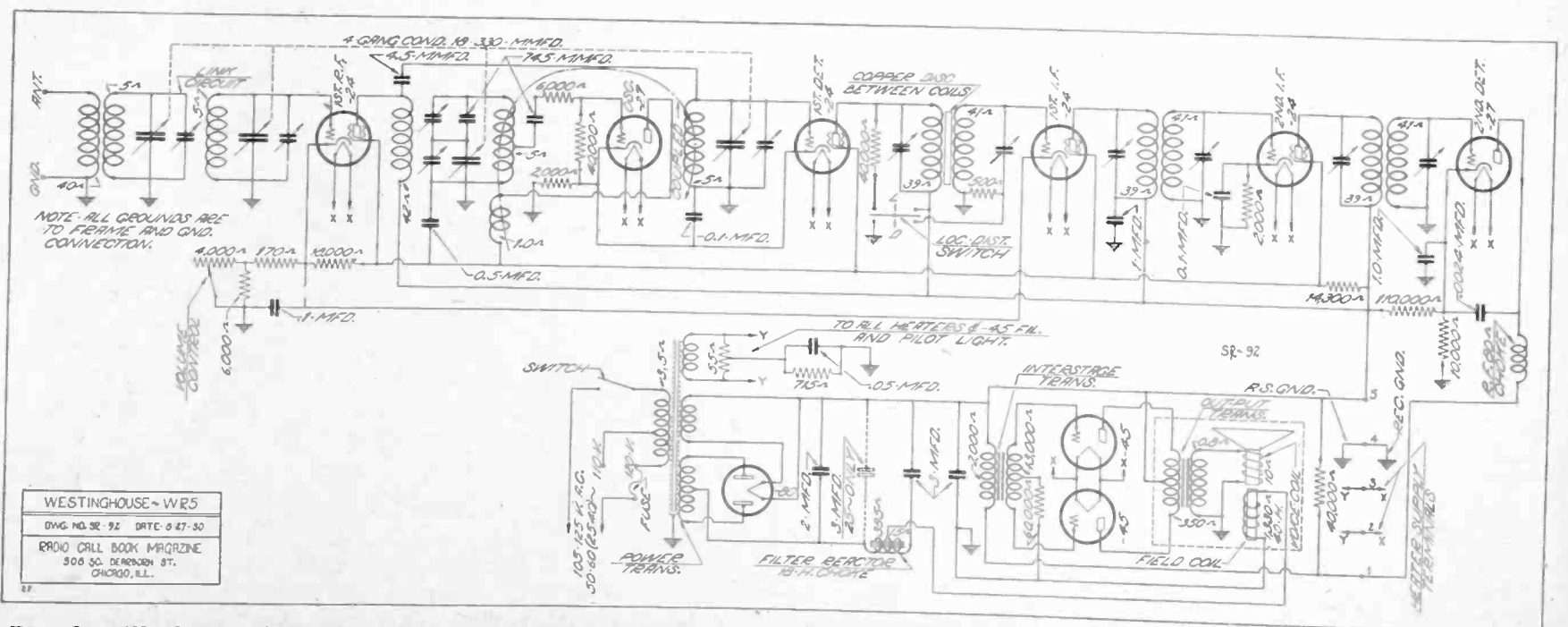


Fig. 2. All electrical details of the Westinghouse WR-5 receiver and power supply are given in this schematic diagram