

# RADIO CORPORATION of AMERICA

## RADIOTRON U. V. 201



A NEW AMPLIFIER OF THE PLIOTRON TYPE  
FOR  
AMATEUR AND EXPERIMENTAL WIRELESS STATIONS

**C**OMPLEX amplifying circuits for the magnification of radio and tone frequency currents require an amplifying Vacuum Tube of *rigid* operating characteristics. There is an increasing demand among radio experimenters for a vacuum tube amplifier which will magnify the telephone currents in a radio receiving set and which can be shifted from one socket to another in a cascade outfit without loss of signal audibility. Moreover, the amplifier must be free from the tube "noises" accompanying the use of improperly designed vacuum tubes.

*RADIOTRON U. V. 201*, the second of the new series of Vacuum Tubes designed by the engineers of the Research Laboratory of the General Electric Company for the Radio Corporation, possesses the qualifications outlined above and it should be a part of every experimental radio receiving station. U. V. 201 may be used as a *detector*, or as a *tone frequency or radio frequency amplifier*.

In cascade radio frequency amplifying circuits, U. V. 201 can be adjusted to magnify without distortion. The use of such circuits is on the increase in amateur stations, particularly where long distance communication is desired on short wave lengths (200 meters or less).

As a *detector* the best results are secured from *Radiotron U. V. 201* with a *grid condenser* of approximately .0001 mfd. capacity and with a shunt GRID LEAK of  $\frac{1}{2}$  to 2 megohms, according to the type of circuit employed.

The normal plate voltage of Radiotron U. V. 201 is 40 volts, although increasing amplifications can be obtained at plate voltages up to 100. At 40 volts on the plate, the amplification constant varies from 6.5 to 8; at 100 volts on the plate, from 8 to 10. The output impedance varies from 15,000 ohms to 25,000 ohms at 40 volts on the plate, and from 10,000 to 15,000 with 100 volts on the plate.

The normal *filament current* for RADIOTRON U. V. 201 is approximately 1 ampere. The filament is designed for connection to the terminals of a 6-volt storage battery with a standard filament rheostat in series.

To obtain maximum amplification with U. V. 201 means should be supplied for placing negative potentials on the grid, although good amplification may be secured without any special provision for such potentials. The requisite negative grid potential for the use of U. V. 201 in *amplification circuits* can be secured by connecting a standard "C" battery of two or three volts in the grid circuit, shunted by a 200 to 400 ohm potentiometer, or by placing a 2 ohm resistance in series with the negative terminal of the filament and connecting the "low" potential" terminal of the tuner secondary to include this resistance in the grid circuit. The latter method usually provides the requisite grid potential results, but the proper value for maximum amplification is generally best found by trial and experiment, with a variable source of e.m.f. supplied locally.

### IMPORTANT FACTS CONCERNING RADIOTRON U. V. 201

The Radio Corporation's gas content detector and amplifier tube, RADIOTRON U. V. 200, is in itself an excellent tone frequency amplifier, but it does not give the "power" amplifications obtainable from the Corporation's SPECIAL AMPLIFIER TUBE RADIOTRON U. V. 201. Thus, for devices requiring a considerable amount of energy for their

operation, such as loud speaking telephones, Radiotron U. V. 201 should be used rather than RADIOTRON U. V. 200.

RADIOTRON U. V. 201 is, of course, applicable to all types of radio receiving circuits now in use among amateurs. Certain circuits in which U. V. 201 is especially desirable are depicted in Figures 1, 2, 3 and 4.

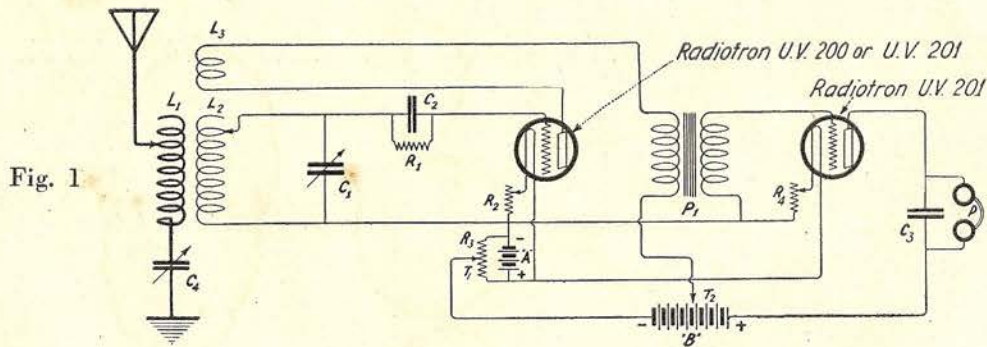


Fig. 1

### DETECTOR AND ONE-STAGE AMPLIFIER CIRCUIT

Figure 1 represents a detector and one stage amplifier circuit in which *one U. V. 200* or *one U. V. 201* tube is used for *detection* and one *U. V. 201* as a *tone frequency amplifier*. Many experimenters prefer *U. V. 200* as the detector, as it gives somewhat greater sensitivity than *U. V. 201* when used for the same purpose, but *U. V. 200* requires a closer adjustment of the filament current and plate voltage than *U. V. 201* for maximum signal audibility.

An explanation of the notations on the diagram follows:

- L-1, primary coil of tuning transformer.
- L-2, secondary coil-tuning transformer.
- L-3, tickler coil for regenerative amplification.
- C-1, secondary variable condenser.
- C-2, grid condenser (.00025 mfd. for *U. V. 200* and .0001 mfd. for *U. V. 201*).
- C-3, telephone condenser (variable preferably).
- C-4, antenna series condenser.
- R-1, Radio Corporation's standard grid leak from  $\frac{1}{2}$  to 2 megohms).
- R-2, R-4, filament rheostats (6 to 10 ohms).
- R-3, Radio Corporation's special "A" battery potentiometer (500 to 200 ohms).
- P-1, tone frequency amplifying transformer.
- P, head telephones.
- A, 6-volt storage battery.
- B, two standard plate batteries giving 40 volts.
- T-2, tap on the plate battery for applying from 16 to 22½ volts on the plate circuit for *U. V. 200*, if used.

NOTE:—If RADIOTRON *U. V. 201* is used as the detector, the tap T-2 should be set to impress the full voltage of the plate battery on the plate circuit of the detector tube. For the use of *U. V. 200* as a detector, the tap T-2 should be set at approximately 18 volts and the contact on the "A" battery potentiometer set at the position giving the loudest signals. If single cell variations of the plate voltage are obtainable, good results can be obtained without the "A" battery potentiometer. This potentiometer is not necessary when *U. V. 200* is used as a detector.

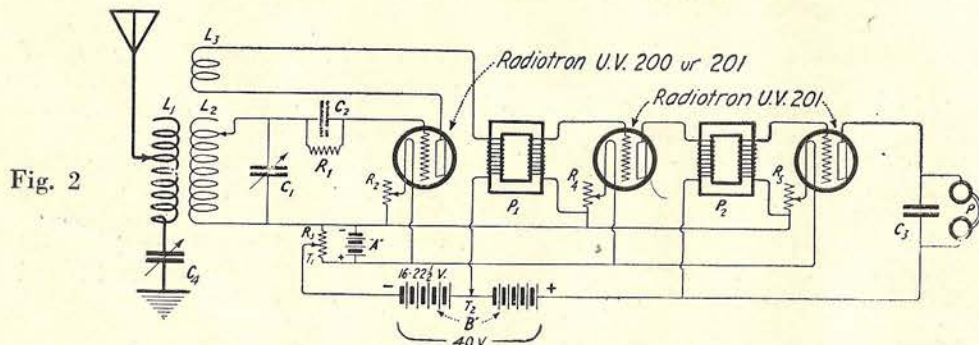


Fig. 2

### DETECTOR AND TWO-STAGE AMPLIFIER CIRCUIT

An extension of the circuit in Figure 1 is given in Figure 2. This shows a detector and two additional tubes for tone frequency amplification.

If RADIOTRON U. V. 201 is used throughout the circuit of Figure 2, the plate circuits of all three tubes may be energized at voltages from 40 to 100 volts. If RADIOTRON U. V. 200 is used as the detector, the tap T-2 should be set at approximately 18 volts. The "A" battery potentiometer R-3 may be dispensed with when RADIOTRON U. V. 201 is used as a detector as well as an amplifier, as mentioned above.

Tone frequency amplifying transformers are indicated at P-1 and P-2. Separate filament rheostats are shown for each tube, but if U. V. 201 is used for detection and for amplification, many amateurs will operate the filaments of all tubes through a single filament rheostat of the proper current carrying capacity.

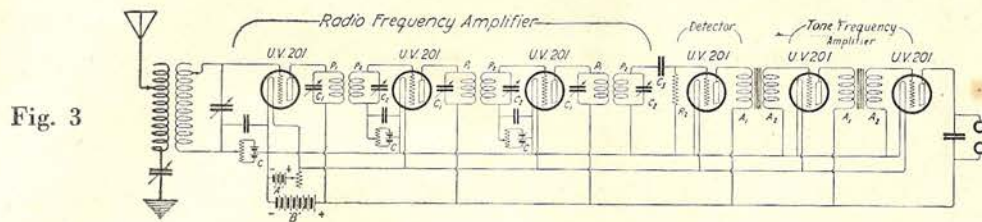


Fig. 3

### CIRCUIT FOR RADIO AND TONE FREQUENCY AMPLIFICATION AND DETECTION

Figure 3 indicates a complex detection and amplification circuit in which U. V. 201 will be found desirable. This circuit is made up first of three stages of radio frequency amplification, followed by one detector tube and two stages of tone frequency amplification.

In the radio frequency group, P-1, C-1 constitute the tuned primaries of radio frequency transformers, and P-2, C-2, the tuned secondaries, through which amplified radio frequency currents are impressed upon the grids of successive tubes. Negative grid potentials for distortionless amplification are obtained by the use of a "C" battery of 1 to 10 volts, shunted by a suitable potentiometer. The radio frequency currents in the grid circuit are by-passed around the potentiometer by a shunt condenser.

The grid condenser C-3 in series with the grid of the fourth tube (assisted by the GRID LEAK R-2) rectifies the amplified incoming radio frequency currents, and the output currents of the fourth or detector tube are further amplified by two stages of tone frequency amplification.

RADIOTRON U. V. 201 should be used throughout the circuit of Figure 3.

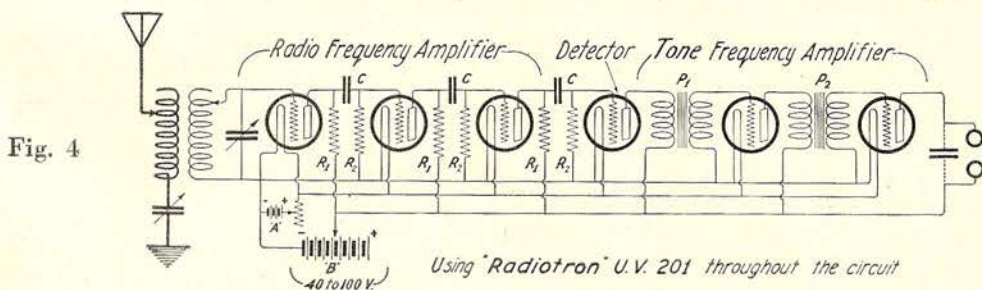


Fig. 4

### RESISTANCE-COUPLED AMPLIFIER CIRCUIT

Figure 4 illustrates a resistance-coupled amplification circuit in which there are three stages of radio frequency amplification, the fourth tube being used as a detector. The tone frequency output of the detector tube is in turn amplified by two additional tubes in cascade.

For radio frequency amplification R-1 represents a coupling resistance of  $\frac{1}{2}$  megohm (The Radio Corporation's standard grid leak resistance may be used for this purpose.) R-2 indicates a GRID LEAK of approximately 2 megohms. P-1 and P-2 are suitable intervalve tone frequency transformers. A is a 6-volt storage battery of suitable current output, and B a plate battery providing from 40 to 100 volts for the plate. If a single filament

rheostat such as R-4 is employed to control the filament current of all the tubes, the precaution should be taken to secure a rheostat of suitable current carrying capacity, allowing approximately 1 ampere for each tube.

There are numerous other circuits in which RADIOTRON U. V. 201 may be used with marked results.

NOTE:—The Radio Corporation has in manufacture a new Amplifying Transformer designed specifically to fit the output circuit of RADIOTRON U. V. 201. The transformer incorporates certain novel features of construction and gives an over-all efficiency not yet approached by any other type. It is a device of superior workmanship and it is not to be confounded with intervalve transformers designed only to be sold at a cheap price. Delivery date will be announced later.

RADIOTRON U. V. 201, in addition to its usefulness to the experimental wireless station, is also recommended for experimental investigations in the laboratories of High Schools, Colleges, Universities and for general instructional purposes.

#### ACCESSORIES

The Radio Corporation has in process of manufacture a number of ACCESSORIES pertaining to the practical use of Vacuum Tubes. These include special "A" battery potentiometers, filament rheostats, new forms of vacuum tube sockets, grid condensers of novel design, and many other devices which for obvious reasons cannot be announced at this time.

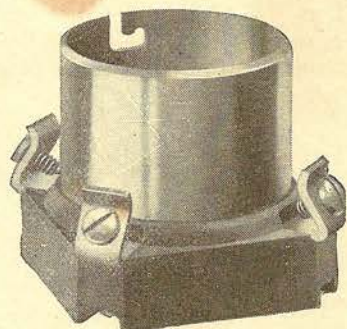
High grade workmanship characterizes the accessories. They are built for those who want the best at moderate cost.

New Amplifying Transformers for tubes are in manufacture. These incorporate unusual features of design and give amplifications markedly above those obtained from existing types. We have some surprises in store for Experimenters.

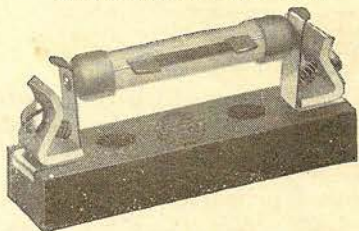
#### LIST PRICES

RADIOTRON U. V. 201, Pliotron amplifier . . . . .	\$6.50
RADIOTRON U. V. 200, gas content detector . . . . .	5.00
R. C. STANDARD VACUUM TUBE SOCKET . . . . .	1.50
R. C. STANDARD GRID LEAKS, 30 values (from ½ to 6 megohms) each mounted . . . . .	1.25
R. C. GRID LEAK UNIT only . . . . .	.75
R. C. GRID LEAK MOUNTING . . . . .	.50
TONE-FREQUENCY INTERVALVE TRANSFORMER . . . . .	7.50

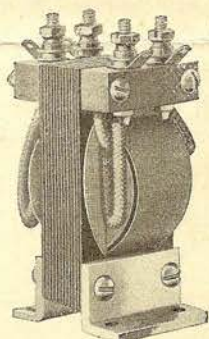
Watch current Radio magazines and Electrical Merchandise papers for future announcements concerning new developments.



Standard Vacuum Tube Socket



Standard Grid Leak



Intervalve Transformer

SALES DIVISION—COMMERCIAL DEPARTMENT

RADIO CORPORATION of AMERICA

233 Broadway

New York City

PURCHASERS OF THE RADIO CORPORATION'S AMATEUR AND EXPERIMENTAL DEVICES ARE REQUESTED TO PLACE THEIR ORDERS THROUGH THEIR LOCAL DEALERS. IN THE EVENT THAT THERE IS NO DEALER IN YOUR LOCALITY, WE WILL PUT YOU IN TOUCH WITH THE NEAREST ONE.

If you have not already seen our special bulletin for *Radiotron U. V. 200*, the gas content detector, ask your Dealer for it or write us direct.

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