

The Significance of Grid Voltage

IN continuing his lectures from 2YA, Saturday, September 29, Mr. W. M. Dawson dealt with the important question of grid voltage. This is constantly referred to through the columns of the "Record," and readers should acquaint themselves with these terms.



WE have noted (said Mr. Dawson, in continuing his lectures from 2YA) that the sole purpose of the filament is to emit a stream of electrons which are minute particles of negative electricity. The plate or anode is positively charged by connecting it to the positive terminal of the B battery (through the 'phones or speaker) in order that it would attract the electrons emitted by the filament. The more positive, or the greater the charge on the plate the more electrons flow across from filament to plate.

The grid is placed between the filament in order to most effectively control the grid. The voltage of this grid battery is varied in successive steps and a plate current reading taken for each and shown on the graph.

This control is effected by changing the charge on the grid: When the grid is made positive the negative electrons are hurried along in their passage to the plate and more get across. When the grid is made negative, numbers of the electrons are repelled back to the

filament (as like charges repel) and fail to reach the plate at all. Remember then that the more positive the grid is made on the plate, the greater the electron flow. This is often spoken of as the plate current or plate "draw." The more negative, that is the less positive the grid or the plate, the smaller the electron or plate current flow. It can be shown in graphical form just how the plate current varies in sympathy with the changes in plate voltage and grid voltage.

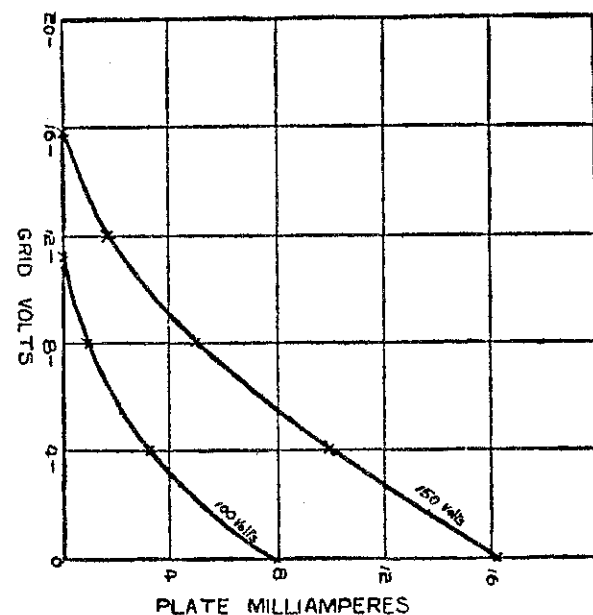
Mr. Dawson then directed listeners to construct a graph which shows at a glance what would need a great amount of time and concentration to obtain from a set of figures.

If a milliammeter is connected in the circuit diagram published in the "Record" of Friday, September 28, and a grid bias (C) battery placed between the terminals marked G.V., the negative being towards the grid, the effect of varying this battery can be readily noticed. The curve appears on this

To commence (continued Mr. Dawson), I will disconnect the grid battery altogether and join the terminals so that the grid is directly connected to the negative end of the filament and therefore at zero potential with respect to it. I make the plate battery 150 volts. Looking at the milliammeter I find that it shows a current of 16 milliamperes, represented on the vertical line of the graph. As there is no voltage on the grid this vertical line from 0 to 16 represents the curve.

The lecturer went on to describe that as grid voltage is applied it is noticed that the reading on the milliammeter decreases until when 16 volts are applied the meter fails to register. When these are graphically represented the result is a curve, as shown in the diagram. It is noticeable that while the top of the curve is almost straight, the bottom is gently cupped.

A SIMILAR graph can be plotted when 100 volts are applied to the plate, it being noticed that when there is no grid bias the meter reads 8 and



fades out when 12 volts are applied.

Any number of curves can be thus constructed, but two will suffice to explain the principal characteristics of the valve.

THE first one of these is the amplification factor. In practically every valve set all the valves but one are there for the purpose of amplifying or magnifying the impulses impressed on them. This amplified impulse is passed on to the next valve to be further amplified. Upon the amount of amplification given by each valve, and the number of amplifying valves used, depends the total amplification of the set, and given a certain input signal the louder the results will be. The amplification factor of a valve is an important one, other factors remaining unchanged, the higher the amplification factor of the valve the louder the signals.

The fact that an increase in plate voltage causes an increase in plate current can be checked. The 100-volt curve crosses the zero grid volts line at 8 milliamperes, while the 150-volt curve crosses at 16 milliamperes. Thus an increase of plate volts of 50 has caused an increase in plate current of 8 milliamperes.

Grid voltage and plate voltage therefore both control plate current and the amplification factor is a measure of the relative effectiveness of the grid and the plate in this control of plate current.

MR. DAWSON will be heard next on October 13, when he will explain the important terms amplification fac-

tor, internal resistance, and slope. A full understanding of these is essential to everyone who wants the best from his set and few are more able than Mr. Dawson to explain their significance.

The graph is the one Mr. Dawson directed listeners to prepare during his lecture on Saturday, September 29. It will be referred to again during his next lecture on October 13.

New Wonder Cell.

May Help Television.

A NEW light cell, which its sponsors assert will greatly aid the realisation of practical radio television, was demonstrated in New York recently by the Radiovision Corporation at 62 West Thirty-ninth Street. The device was said to generate or liberate a greater electric current when exposed to the sun's rays or an artificial light than television photo-electric cells now used by experimenters in America. Considerable electric current was liberated when a lighted match was held nearby.

The device is being tested for other possibilities in fields of research hitherto unexplored. It resembles a large vacuum tube. Inside the glass cover is a greenish fluid and several metallic electrodes.

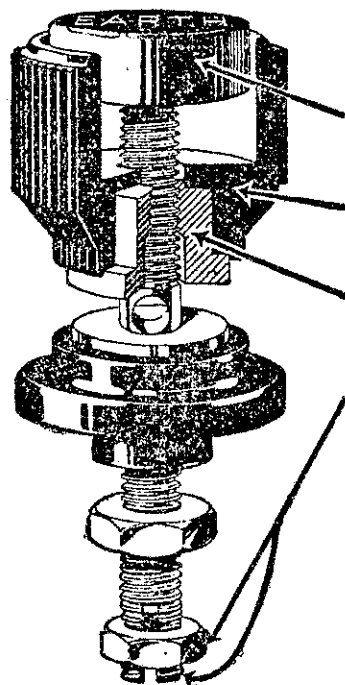
"In addition to other features," said Mr. Edgar H. Felix, vice-president of the company, "it can be utilised to perform such functions about the house as turning on the hot-water heater, starting the furnace or closing the windows at sunrise. However, the real value of the cell lies in its possibilities as an aid to scientific research and experimentation. It can be made to operate as an electrical storage cell, chargeable from a small battery, releasing this energy when wanted by the action of the light falling on its surface."

He said it had been found that the cell, after apparently being discharged or relieved of its collected energy, recovered its full vitality when light was allowed to fall in the opposite plate enclosed in the glass envelope. It also recharges during periods of rest. Cells left overnight, supposedly discharged, have been found recharged in the morning.

The company, which controls the Cooley "Rayfoto" patents, is endeavouring to apply the device to the transmission of pictures by this method. It was said to be capable of giving off "thousandth parts of an ampere" of electric current, whereas only "millionth parts" of an ampere are obtainable from the ordinary photo-electric cell.

7ZL, Hobart, has so far said nothing publicly about its new English electrical pick-up, but listeners-in, without, perhaps, knowing the cause, have noticed a decided improvement in the transmission, particularly of gramophone records. "The new electrical pick-up is of the type used by most of the Australian stations. With the microphone a certain amount of objectionable rush is usually heard during the broadcasting of gramophone music, but that is eliminated by the new pick-up."

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