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P. W. WILLANS

THERMIONIC VALVE CIRCUITS

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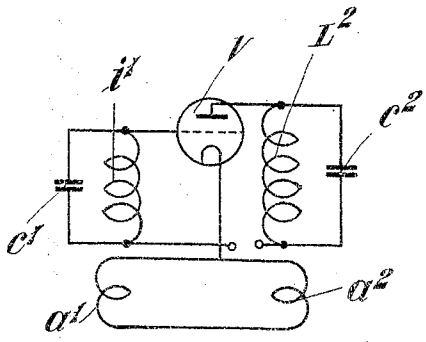

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UNITED STATES PATENT OFFICE.

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THERMIONIC VALVE CIRCUITS.

Application filed October 27, 1926, Serial No. 144,553, and in Great Britain July 2, 1925.

This invention relates to thermionic valve circuits.

It is well known that if two oscillatory circuits are associated with a valve, with their respective inductances located in mutually inductive relationship, regenerative effects occur in general owing to the electromagnetic coupling between the said inductances. In order to ensure stability therefore it has been the usual practice to avoid such electromagnetic coupling by arranging the said inductances in noninductive relationship. This is not always convenient however. For example the known methods of screening the inductances or orientating them in a specific manner may be inconvenient from the point of view of design. Furthermore it may be desirable to determine the orientation of the inductances in accordance with other considerations, as for example the elimination of electromagnetic coupling between remote elements of an amplifier.

In accordance with the present invention the inductances are located in mutually inductive relationship and means are provided for neutralizing for a considerable range of wave length the electromotive force induced in either circuit by the other as a result of the said mutually inductive relationship.

The said means comprise means for impressing an electromotive force on either circuit as a result of the current flowing in the other, which electromotive force is of such a value as to neutralize the said electromotive force induced as a result of said mutually inductive relationship.

An embodiment of the invention will now be described with reference to the accompanying drawing, which is a diagrammatic illustration of the relevant part of a valve circuit system in accordance with the invention.

In the arrangement shown two auxiliary inductances a^1 and a^2 are connected together in a closed circuit and are respectively located in inductive relationship with the inductance L^1 and L^2. The values, directions of windings etc. are so selected that each inductance L^1 or L^2 induces an electromotive force in the other, through the medium of said auxiliary inductances, which electromotive force is equal and opposite to that which the same inductance induces in the said other by virtue of its direct inductive relationship therewith. Preferably the said closed circuit with the auxiliary inductances on it is electrically connected, as shown, to the valve filament. This stabilizes the said circuit and prevents capacity coupling between the same and the grid circuit.

I am aware that it is common practice to provide means for neutralizing the capacity coupling between two oscillatory circuits associated with a thermionic valve. Said means however can operate to neutralize the magnetic coupling between said circuits for one specific wave length only.

I am also aware that it has been proposed in valve circuits having tuned anode and grid circuits to connect an inductance in series in the anode circuit, which inductance is coupled to the grid circuit in such a sense as to produce a reversed reaction effect. In my opinion however this arrangement produces a damping effect upon the grid circuit and not a magnetic neutralizing effect.

What I claim and desire to secure by Letters Patent is:—

A thermionic valve system comprising a valve having grid, filament and plate electrodes, an input circuit disposed between said grid and filament electrodes, an output circuit included between said plate and filament electrodes, independent inductances for tuning each of said circuits, an auxiliary circuit including separate inductance elements in series, one of said elements being coupled to one of said aforementioned inductances and the other of said elements being coupled to the other of said aforementioned independent inductances, and a connection from said auxiliary circuit to said filament electrode, said inductances being related for neutralizing for a considerable range of wave length the electromotive force induced in either of said input or output circuits by mutual inductive relationship of said independent inductances.

In witness whereof I affix my signature.

PETER WILLIAM WILLANS.