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THYRATRONS

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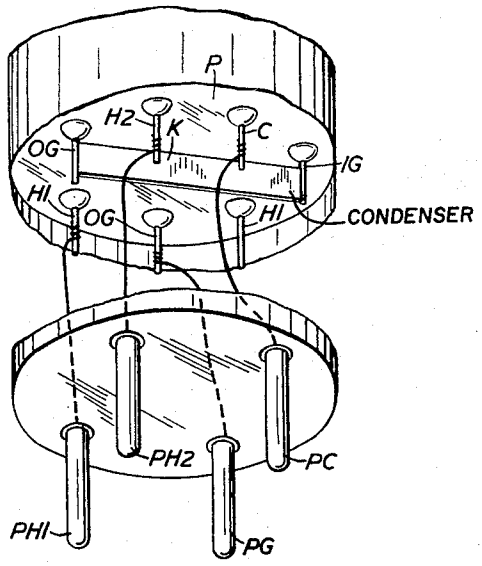

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THYRATRONS

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This invention relates to thyratrons and more specifically to thyratron tetrodes.

Thyratron triodes are in extremely common use in many forms of electronic apparatus, the conventional form of thyratron triode having, of course, a gas filled envelope with a single grid situated between cathode and anode. However, in many cases, the gas tetrode, that is to say a tube having two successive grids, usually termed the inner and outer grids, between the cathode and anode, gives improved performance as compared to the triode and in particular a lower time "jitter," a lower anode delay time and a lower anode delay time drift as well as requiring a lower grid firing voltage. It therefore follows that, in many forms of apparatus designed to employ gas triodes, improved results can be obtained by substituting gas tetrodes for the triodes. It is, however, often practically difficult to substitute tetrodes for triodes because of the changes required in the connections and in the tube holders.

The object of the present invention is to provide improved tetrode thyratrons so constructed and arranged that they may be used to replace triode thyratrons without any changes (other than mere replacement of one tube by another) in the apparatus—not even change of the tube holders being necessary.

According to this invention a thyratron tetrode is provided with a base having only four connector pins which are so positioned as to be adapted to plug into the four connection sockets of a normal thyratron valve holder, the two pins positioned to enter the two heater connection sockets and the pin positioned to enter the control grid connection socket of said holder being respectively connected within the tube base to the ends of the heater and to one of the two grids of the tetrode and the other grid of said tetrode being connected to said one grid through a coupling condenser housed in said base.

In a preferred construction the outer grid of the tetrode is connected directly through a connection in the base to the pin which is positioned to enter the control grid connection socket of the holder and the condenser in the base connects the inner and outer grids of the tetrode together.

The condenser may conveniently be of the flat strip type and may be fixed and connected directly between two of the normally provided connector leads coming through the footstep of the tetrode, one being an inner grid lead and the other an outer grid lead.

The invention is illustrated in the accompanying drawing which shows in schematic perspective view, and so far as is necessary for an understanding of the invention, one embodiment thereof. The drawing shows the construction of the base of a thyratron tetrode in accordance with this invention, the said construction being broken away to show the internal base connections and the remainder of the tube above the base being omitted since it is of normal construction forming no part of this invention.

Referring to the drawing, the tetrode proper is of

usual form and construction with a pinch or footstep P through which, in the example illustrated, there projects seven connector leads and supports making connection with various parts of the electrode system within the envelope. These leads are the leads H1 both of which make connection to one end of the cathode heater and both of which are also connected (usually internally in the tube) to the cathode thereof; the lead H2 which makes connection to the other end of the cathode heater; the lead C which connects with the cathode of the tube; the lead IG which connects to the inner grid; and the leads OG both of which connect to the outer grid. The leads serve also in the usual way to provide mechanical support for the electrode system within the tube envelope which is why in some cases—in the case of the leads H1 and the leads OG—they are duplicated.

The tube is provided with a base having only four connection pins which are arranged in the patter or distribution at present standard for thyratron triodes so that the said pins will plug directly into the sockets of a standard thyratron triode holder. The four pins are marked PC, PG, PH1 and PH2, and are positioned so as respectively to plug into the cathode socket, grid socket and the two heater connection sockets of a standard thyratron holder. Internally within the valve base direct connections are made between the heater connection H1 and the heater pin PH1 the heater connection H2 and the heater pin PH2, the cathode connection C and the cathode pin PC, and the outer grid connection OG and the grid pin PG. A condenser K, preferably as shown of the metal strip type, is soldered at its end terminals between the outer grid connection OG and the inner grid connector IG so that these two grids inside the tetrode envelope are directly coupled by the condenser.

It will be seen that the illustrated arrangement, though actually a hydrogen tetrode thyratron, has a base with pins like that of a hydrogen triode thyratron, and may be plugged directly into the sockets of a triode holder in substitution for a triode without requiring any other changes whatever in the apparatus of which it will then form part.

We claim:

1. A thyratron tetrode including an envelope enclosing tube electrodes including a first and a second grid, a sleeve-like holder for said envelope, a footstep associated with said holder, a multiplicity of connector leads depending from said footstep within said sleeve-like holder and connected to respective ones of said electrodes, a base spaced below said footstep and carried by said sleeve-like holder, connection pins carried by said base and depending downwardly therefrom, the number of connection pins on said base being less than the number of said connector leads on said footstep, connections extending from the connector leads on said footstep to the connection pins on said base through the space intervening between said footstep and said base and a condenser located beneath said footstep and supported by and electrically connected between the connector leads to said grids and depending from said footstep, said condenser extending through the space beneath said footstep and above said base.

2. A thyratron tetrode as set forth in claim 1 wherein said condenser is relatively flat and is disposed in a plane extending substantially normal to the plane of said footstep and substantially diametrically across the center thereof.

3. An electron tube having a plurality of electrodes therein including a pair of grids, comprising an envelope and a base, a footstep at one end of said envelope and between said envelope and said base, a plurality of connecting pins extending through said footstep and defining connections to each of said electrodes, a plurality of pins

extending from said base, the number of said last-mentioned plurality of pins being less than the number of first-mentioned plurality of pins, means connecting one of said pins which depends from said base to one of said pins on said footstep, and capacitor means connecting one of said grid connecting pins to the other of said grid connecting pins, whereby all of the electrodes are electrically connected to the plurality of pins mounted on said base.

4. An electron tube according to claim 3, wherein said pair of grids include an inner and outer grid and wherein

said capacitor means defines an electrical coupling between said inner and outer grids.

5. An electron tube as defined in claim 4, wherein said capacitor means is a flat strip-type capacitor.

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