July 4, 1933. E. KARPLUS 1,916,224

SELF CONTAINED OSCILLATOR TUBE

Filed Dec. 9, 1929

Fig. 1

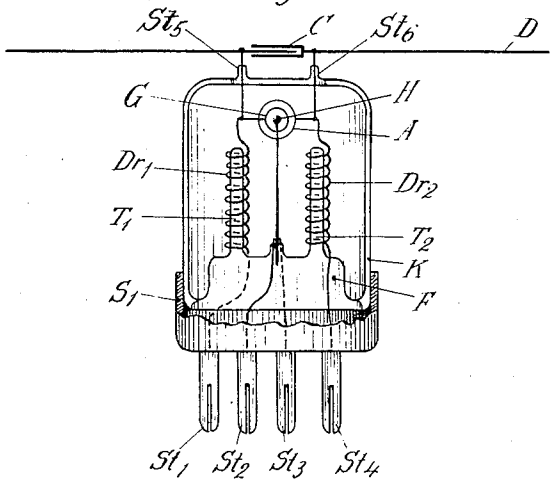
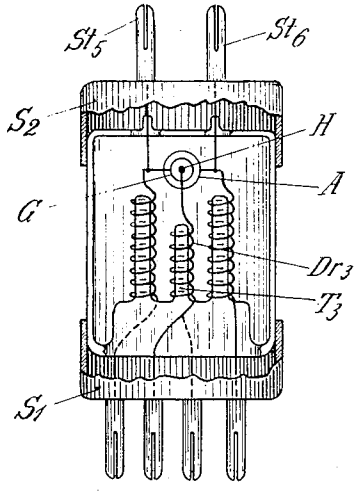


Fig. 2



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UNITED STATES PATENT OFFICE

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SELF-CONTAINED OSCILLATOR TUBE

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For the production of short waves, particularly ultra-short waves it has been suggested to arrange the oscillatory circuits between the electrodes within the tube, in order to reduce them to such an extent, that the required short waves may be produced. As is known the oscillatory circuits will shrink together to short connections between the various electrodes during the production of waves having a length of a few centimetres. In order to withhold the high frequency from the leads supplying the current, which will supply the necessary voltages, choke coils are employed with known arrangements, which are arranged outside of the tube. Through this the usefulness of the said arrangement will suffer heavily, since on the one hand the said choke coils can be arranged only with difficulty externally of the tube, and on the other hand the point of connection of the choke coils, which naturally must be as close as possible to the point of supply of current in the oscillatory circuit, remains at a greater distance from the oscillatory circuit, since the oscillatory circuits for constructional reasons must possess a certain distance from the glass wall of the tube. These connections between the point of connection of the supply of voltage and the beginning of the choke coil under circumstances may be subjected to oscillations of their own and thus act on the entire oscillation proceedings in a manner not desired.

The inconveniences referred to may be avoided in that the voltage requisite for the working is supplied by way of the choke coils, carried by the supports fused into the glass base. By this means the choke coils are located inside of the tube and on the other hand the point of supply of the voltage is almost united with the end of the choke coils.

A mode of execution of the device according to the invention is shown is in the drawing by way of example.

Figure 1 shows a tube according to the invention and

Figure 2 is a modified form thereof in elevation.

In the example shown in Figure 1 two glass rods T_1 and T_2 are fused to the glass stem F. The said rods carry two choke coils Dr_1 and Dr_2, which serve for supplying the grid voltage and the anode pressure respectively. At the ends of the choke coils towards the oscillatory side are arranged the anode A and the grid G respectively. By a corresponding constructional formation of the end of the choke coil it is possible, that both the grid and the anode are directly carried by the said choke coils or their glass rods respectively. In this manner the provision of special supports for the electrodes can be dispensed with. The heating wire H is carried in the example shown in Figure 1 by supporting elements as such are customary in the manufacture of tubes of this kind, while in the example illustrated in Figure 2 also in the heating circuit choke coils Dr_3 on rods T_3 respectively are arranged.

The supply of the voltages proper is effected by way of plug-pins St_1 to St_4 secured in known manner to the base S_1 of the tube. The oscillations of high frequency produced are passed by way of outgoing leads St_5 and St_6 in the glass wall to an antenna D. In the centre of said antenna a capacity C may be inserted, which may be formed for instance by a small metal pipe and a pin having an intermediate layer of mica. In the modification illustrated in Figure 2 there is likewise provided at the upper end of the tube a base S_2, carrying plug pins St_5 and St_6 to which the circuit of the antenna may be connected.

By the separation of the supply circuits represented in the examples on the one hand, which are connected by way of pins St_1 to St_4, and the useful circuit on the other hand, a complete separation of the circuits having a low frequency or being under continuous current respectively from the circuits of the highest frequency is effected. Just this separation is of the highest importance in the production of ultra-short waves, since the reactions of the circuits upon each other might easily cause disturbances and they will interfere with the production of short waves at all.

By forming the connection points of the antenna into plug-pins of known type as rep-

resented in Figure 2, it is possible to easily exchange the tube. This is a requirement, which may be of importance, for instance, in duplex transmission, where a certain secrecy is required.

It is thus possible for instance to fit a main transmitting apparatus with a plurality of such tubes, which are exchanged each time, when the main transmitting apparatus is in touch with another station of a plurality of stations. The rest of the smaller stations will then not be in the position to listen to the message, since it is impossible on account of the minuteness of the waves to adjust the apparatus to the wave-length requisite for listening to the message without constructional changes in the tube proper. By the arrangement of the capacity of the antenna merely a slight alteration of the wave length can be effected, which lies within the limits determined by differences in the production of the tubes. If however, in principle different tubes are employed for the transmission of messages between two stations, that is to say if their electrodes or the leads of the electrodes are chosen of different size, it is impossible for a third station to share in the transmission.

Tubes according to this invention may for instance very easily be employed with reflecting arrangements, such as mirrors and the like, in that the base S_1 is introduced into a socket secured to the mirror while the antenna is secured to the pins St_5, St_6. In this instance the height of the tube will determine the distance of the antenna from its reflecting surface. In this manner an exceedingly simple device is obtained, having only a few separate parts.

I claim:

1. An electronic tube comprising a plurality of electrodes within an envelope, current supply leads for said electrodes, and choke coils within the envelope connected in series with two of said leads and high frequency output leads connected to two of the electrodes having leads in series with choke coils.

2. An electronic tube comprising an envelope, a plurality of electrodes therein, current supply leads for said electrodes, a stem within the envelope provided with inwardly extending supports, high frequency choke coils carried by said supports and connected in series with said electrodes, and high frequency output leads connected to said electrodes.

3. An electronic tube comprising a plurality of electrodes within an envelope, current supply leads for said electrodes, choke coils within the envelope connected in series with said leads, and high frequency output leads connected to said electrodes, said high frequency and said current supply leads passing through said envelope at opposite extremities thereof.

4. An electronic tube comprising a plurality of electrodes within an envelope, current supply leads for said electrodes, choke coils within the envelope connected in series with two of said leads, and high frequency output leads connected to two of said electrodes, said high frequency leads being connected to the same electrodes to which the current supply leads containing choke coils are connected.

5. An electronic tube comprising an envelope having terminals at opposite ends thereof, a plurality of electrodes within the envelope, current supply leads connecting the electrodes and the terminals at one end, high frequency output leads connecting the electrodes to the terminals at the other end, and high frequency choke coils within the envelope connected in series with the current supply leads.

6. An electronic tube comprising an envelope having terminals at opposite ends thereof and containing a cathode, an anode, and a grid, current supply leads connecting the cathode, anode and grid to the terminals at one end of the envelope, high frequency output leads connecting the anode and grid to the terminals at the other end of the envelope, and a high frequency choke coil within the envelope for each electrode connected in series with the respective current supply leads.

7. An electronic tube according to claim 6 including a stem within the envelope having inwardly projecting arms fused thereto on which the respective choke coils are wound.

8. An electronic tube according to claim 5 wherein a stem within the envelope has inwardly projecting arms fused thereto on which the respective choke coils are wound.

In testimony whereof I have affixed my signature.

EDUARD KARPLUS.