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S. LOEWE ET AL
INDIRECTLY HEATED CATHODE

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Fig. 1.

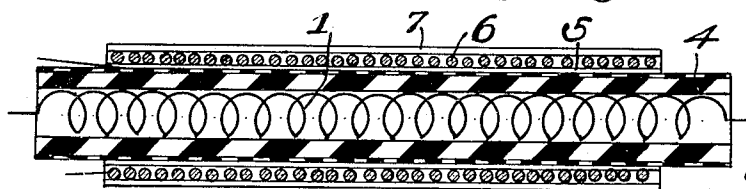
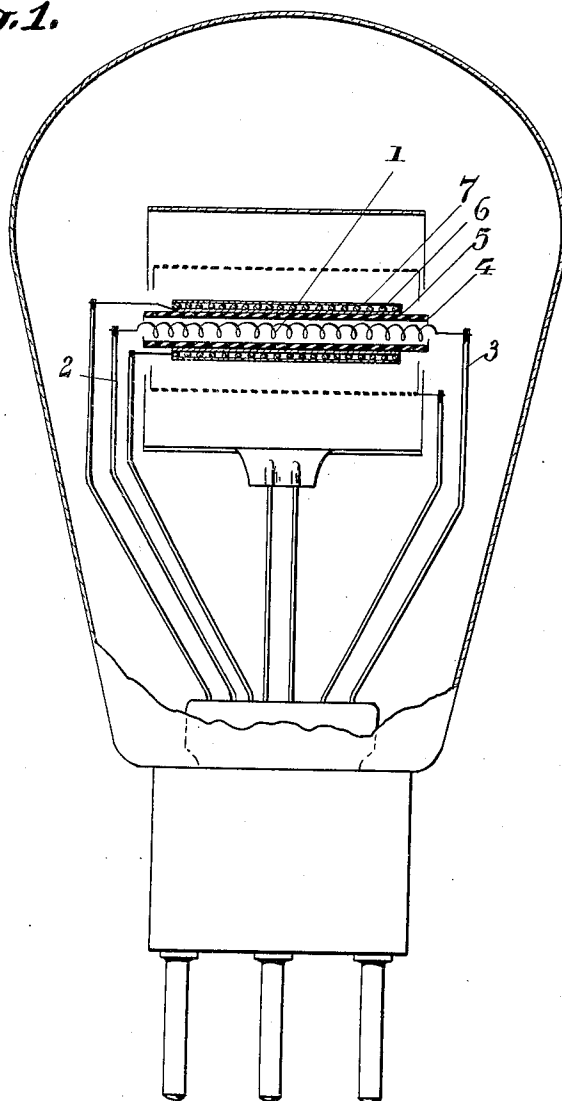


Fig. 2.

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INDIRECTLY HEATED CATHODE

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In Germany April 29, 1930

2 Claims. (Cl. 250—27.5)

The object of this invention is to produce electron valves with indirectly heated cathodes, the emissive layer of which is produced according to the known metal-vapour-process.

The invention will be more fully understood from the appended drawing, whereof

Fig. 1 shows an electron valve with an indirectly heated cathode according to the invention, and

Fig. 2 shows the cathode according to the invention on a larger scale.

In the case of indirectly heated electronic valves, the incandescent member 1, which serves for heating purposes and which is tensioned between the supports 2 and 3, is required to be made longer than any other part of the amplifier system, and more particularly longer than the insulation tube 4, which acts as the carrier for the equipotential cathode and which is shown in cross-section in the drawing. This tube in turn must be longer than the actual equipotential cathode 6, which is wound upon the same preferably with the interposition of a metallic tube 5, composed for example of tungsten wire. The highly incandescent parts of the heating element 1, consisting of metal, and also the two ends of the incandescent member 4 and more particularly the metallic base of the actual cathode 6 are coated with an emissive layer 7 by means of the vapour process. In such cathodes this layer causes a passage of current from the filament 1, which is usually traversed by alternating current, to the parts 5 and 6, resulting in a whistling or humming noise in association with valves fitted with cathodes of this description.

The emissive layer on the parts 1, 4 and 5, or on any one of these parts, moreover adversely affects the properties of the valve by reason of the fact that undesirable electrons pass from the edge portions of these parts to the anode, and are modulated by the grid only in inefficient manner.

This difficulty is overcome according to the invention by avoiding the formation of emissive coatings on the parts 4 and 5. The metallic base 5 is made merely of the same length as the cathode

surface 6 intended for the emission. On the other hand the surface of the tube 4, and if necessary the remaining end portions of the metallic base 5, are coated with a rough, non-conductive material 8, such for example as zirconium oxide, which gives no essential emission even when covered with a thin layer of barium, containing if desired a trace of binding agent, such as water-glass. The emissive layer 7 of the highly emissive, vaporizable metal is only on the surface of said equipotential cathode, a cathode is thus produced in which the emission is confined to the desired range represented by the surface 6. In consequence, the valves produced according to the invention do not disclose any tendency to whistle or hum.

We claim:

1. In an electron discharge device an indirectly heated cathode consisting of a heating body, an insulation tube surrounding said heating body, a metallic member on the surface of said insulation tube, said metallic member being shorter than said insulation tube, an equipotential cathode being of the same length as said metallic base and surrounding the metallic member, and an emissive layer of a highly emissive vaporizable metal merely on the surface of said equipotential metallic cathode, the ends of said insulation tube projecting from said metallic base being coated with zircon oxide.

2. In an electron discharge device an indirectly heated cathode consisting of a heating body, an insulation tube surrounding said heating body, a metallic member on the surface of said insulation tube, said metallic member being shorter than said insulation tube, an equipotential cathode, consisting of a spiral wire, being of the same length as said metallic base and surrounding the metallic member, and an emissive layer of a highly emissive vaporizable metal merely on the surface of said equipotential metallic cathode.

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