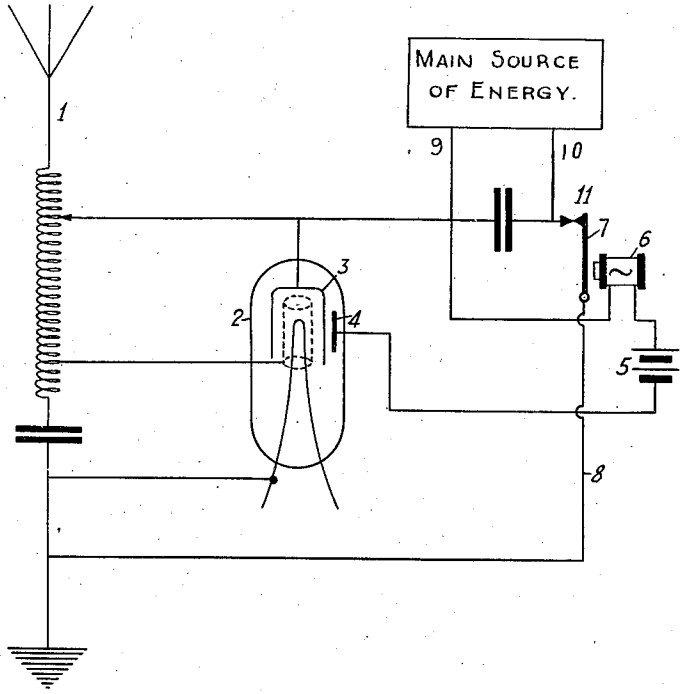
June 17, 1930. A. MEISSNER 1,763,805

ARRANGEMENT FOR PROTECTING VACUUM TUBES

Filed Nov. 14, 1922



Inventor
ALEXANDER MEISSNER
By his Attorney Ira J. Adams

Patented June 17, 1930

1,763,805

UNITED STATES PATENT OFFICE

ALEXANDER MEISSNER, OF BERLIN, GERMANY, ASSIGNOR TO GESELLSCHAFT FÜR DRAHTLOSE TELEGRAPHIE M. B. H. HALLESCHES, OF BERLIN, GERMANY, A CORPORATION OF GERMANY

ARRANGEMENT FOR PROTECTING VACUUM TUBES

Application filed November 14, 1922, Serial No. 600,846, and in Germany November 14, 1921.

For the economical operation of large transmitting tubes, it is necessary that they be adjusted to a favorable operating range and that the individual tubes be so proportioned that this operating range is constantly maintained. It is necessary for this purpose to prevent the rising of the anode current to a point where it over-heats the anode plates. Usually the anode plates show scarcely any signs of glowing or are brought just to a red glow because otherwise the generator tubes would be endangered.

The object of the present invention is to prevent the over-loading of tubes, particularly transmitting tubes. This is accomplished by providing a current path between the anode of a tube and a special auxiliary electrode. A relay may be inserted in the circuit which includes this path, the relay being actuated when, upon the over-heating of the anode, a heavy stream of electrons flows from the anode plate to the auxiliary electrode and thereby causes a current to be generated that energizes the relay. The relay may then cause cutting in of the necessary resistance, disconnection of the individual circuits or the like to prevent over-loading of the tube.

The single figure of the drawing is a diagrammatic representation of a circuit arrangement embodying the present invention.

In said figure the generator tube 2 which is coupled with the antenna 1 includes near its anode 3 an auxiliary anode 4 which is connected with a relay 6 through a battery 5. The other end of the relay 6 is connected with the anode 3, and the armature 7 of the relay is grounded through a wire 8. The battery 5 is not absolutely necessary, but on the contrary, any other suitable current source may be provided in its stead, e. g. the alternating current used for feeding the cathode generator may be used after rectification. The main battery or rectifier is connected to the binding posts 9 and 10.

The operation is as follows:

When the main anode 3 carries the normal load so that it does not glow, no current flows through the relay 6. If however, due to any operation, e. g. detuning of the antenna 1 with respect to the oscillating circuit, the anode coupling is disturbed or the operating condition is otherwise unbalanced, resulting in glowing of the anode 3, electrons will be emitted by this anode and absorbed by the auxiliary anode 4. The anode 3 under such conditions operates as a cathode in the relay circuit. Therefore, current flows through the relay 6 which is closely dependent on the temperature of the anode. As a result of this the contacts 11 of the relay are separated, whereupon the main anode current is interrupted and the over-loading and destruction of the tube 2 prevented.

Obviously, the invention is subject to modifications of widely varying character. For instance, it is not necessary that the main current be entirely interrupted, it being sufficient that under the control of the auxiliary anode 4, the heating or the anode potential is directly or indirectly affected.

Having described my invention, what I claim is:

1. A circuit arrangement comprising a three-electrode vacuum tube, an anode, a grid and a filament in said tube, circuits comprising the above-named electrodes, a fourth electrode mounted in the tube, a circuit including said last-named electrode and said anode and through which current may be set up upon overheating of the anode, and means operable by the last-mentioned circuit for controlling the main anode current.

2. A circuit arrangement comprising a three-electrode vacuum tube, an anode, a grid and a filament in said tube, circuits comprising the above-named electrodes, a fourth electrode mounted in the tube, a normally inoperative circuit including said last-named electrode and said anode and through which current may be set up upon overheating of the anode and means in said last-mentioned circuit for limiting the current in the main anode circuit to prevent over-heating of the anode.

3. In combination, a thermionic tube having an anode and cathode, means whereby a current may flow through said anode and cathode, and means dependent upon the elec-

tron-emitting property of said anode for limiting the said current.

4. In combination, a thermionic tube having an anode and a cathode, means whereby current may flow through said anode and cathode, and means including an auxiliary electrode adapted to control said current when said anode is overheated.

5. In combination, a thermionic tube having an anode, a grid and a cathode, means for impressing a variable potential on said grid, means whereby current may flow through said anode and cathode, an auxiliary electrode, a circuit connecting said anode and auxiliary electrode, and current limiting means associated with said circuit for controlling said current and adapted to be actuated by current flowing in said circuit.

6. In combination, a thermionic tube having three associated electrodes, an anode circuit having a source of anode potential and a pair of relatively movable contacts, a fourth electrode, an auxiliary circuit including said anode, said fourth electrode, a source of current, and an electro-magnetic means for controlling said contacts, said latter means being actuated by a flow of current in said auxiliary circuit.

7. In combination, an electron discharge device comprising an anode and cathode, a circuit for maintaining a potential difference between the anode and cathode and means dependent on the electron emitting property of said anode for interrupting said circuit.

8. In an electric discharge device, a circuit including a cathode and an electrode normally an anode, a second circuit including said electrode and a relay, said electrode upon reaching a predetermined temperature operating as a cathode in the second circuit to cause operation of the relay.

ALEXANDER MEISSNER.