Feb. 6, 1923. 1,444,438.

W. C. WHITE.

ELECTRODE STRUCTURE.

FILED AUG. 7, 1918.

Fig. 1.

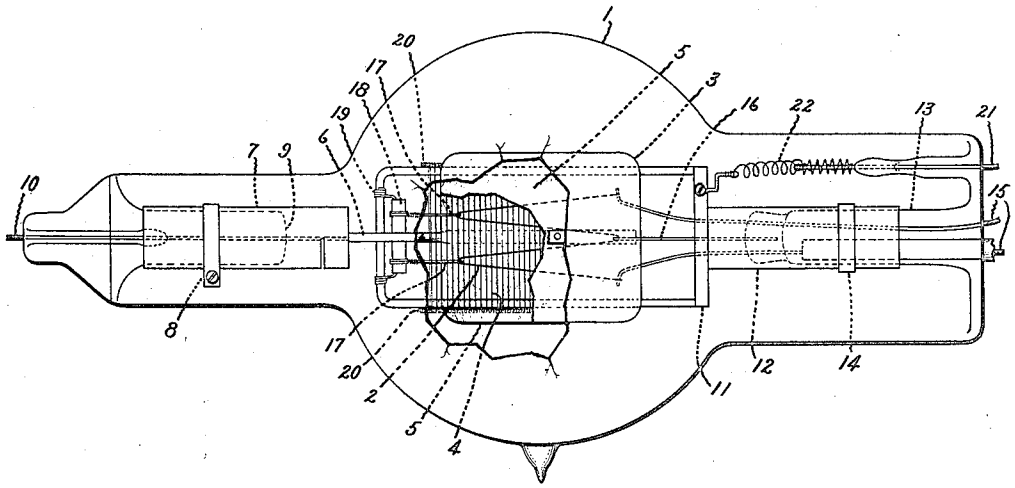
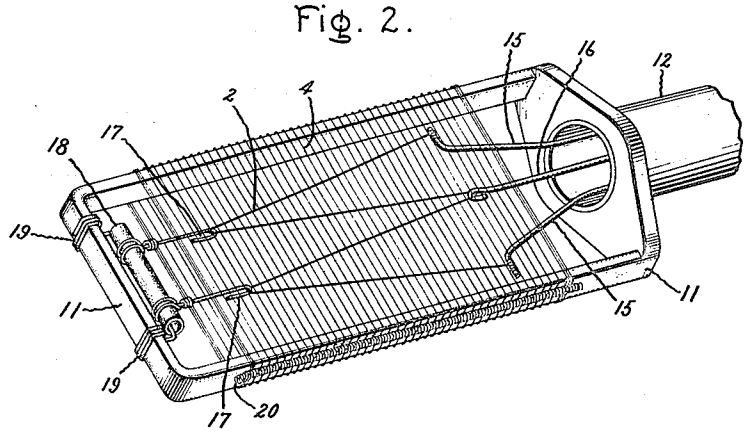


Fig. 2.



Inventor:
William C. White,
by Albert G. Davis
His Attorney.

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UNITED STATES PATENT OFFICE.

WILLIAM C. WHITE, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRODE STRUCTURE.

Application filed August 7, 1918. Serial No. 248,672.

To all whom it may concern:

Be it known, that I, WILLIAM C. WHITE, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented certain new and useful Improvements in Electrode Structures, of which the following is a specification.

My present invention may be applied to electron discharge relays or amplifiers of the pliotron type and particularly to the construction of grids for such devices.

In apparatus of the type mentioned which comprises an evacuated vessel containing an incandescent cathode, an anode and a grid electrode interposed between the cathode and anode, it has been customary to form the grid by winding a plurality of closely adjacent turns of fine wire about a supporting framework. Difficulty has been experienced in the construction and operation of such apparatus by reason of the fact that the turns of wire are apt to become loosened by reason of the unequal expansion and contraction of the wire and the framework. As a result the spacing between the turns may be changed and in some cases the wire may move so as to come in contact with other parts of the device.

The object of my invention is to overcome the above-mentioned difficulty and provide a simple and efficient construction in which the grid wires will always be retained in their proper position upon the supporting framework and the desired spacing between turns will be maintained.

In carrying my invention into effect I place along each side of the framework over which the wire is wound a closely coiled spiral of fine wire. When the grid is wound on the framework each turn slips between two adjacent coils of the spiral and one or more of the coils of the spiral will be interposed between adjacent turns of the grid wire. By reason of this fact it will not be possible for the turns of the grid wire to move appreciably with respect to one another even though they may become somewhat loosened on the framework.

My invention will best be understood by reference to the following description taken in connection with the accompanying drawing in which Fig. 1 is a plan view of a pliotron in which my invention is incorporated, with some of the parts broken away, and Fig. 2 is an enlarged view of the grid structure.

As shown in the drawing the complete device comprises an evacuated receptacle 1 having enclosed therein a W-shaped filament or cathode 2, an anode 3 and a grid 4. The anode comprises two plates 5 of tungsten or molybdenum which are secured in parallel relation to each other by means of a forked rod 6. This rod is secured to a split cylinder 7 and the whole anode structure is securely held in place by means of a clamping band 8 which clamps the cylinder 7 to the projection 9 on the inside of the receptacle. A leading-in conductor 10 which is sealed into the wall of the receptacle 1 serves to carry current from the anode.

The rectangular metal framework 11 serves as a support for the grid 4 and the cathode 2. This framework is secured to the split cylindrical member 12 and the whole structure is held in position between the plates 5 of the anode by clamping the cylindrical member 12 to the projection 13 on the inside of the receptacle by means of a clamping band 14. Leading-in conductors 15 for supplying current to the cathode are sealed into the end of the projection 13 and a support 16 for the central point of the cathode is also embedded in the end of the projection 13. The cathode is further supported by the hooks 17 which are insulated from the framework 11 by attaching them to an insulating tube 18; this insulating tube in turn is secured to the framework 11 by a wire 19 in the manner indicated.

The grid is made up of a large number of turns of fine wire wound around the framework 11 as indicated. Upon each side of this framework over which the grid wire passes I provide closely coiled spirals of fine wire 20 as indicated. Each turn of the grid wire slips between two adjacent turns of this spiral and one or more turns of the spiral are interposed between adjacent turns of the grid wire. It will be apparent that with this construction even though the grid wire may expand so as to become somewhat loose upon the framework 11 adjacent turns of the grid wire cannot come in contact with one another and hence the desired spacing of the turns will always be maintained. Leading-in conductor 21 which is sealed into the wall of receptacle 1 is connected to the grid struc-

ture by means of a flexible conductor 22 which is secured to the framework 11 in the manner indicated.

While I have shown and described a single structure in which my invention is employed I do not wish to be limited to the exact structure illustrated as it will be apparent that many changes may be made in the precise manner in which it is applied and in the apparatus in which it is used without departing from the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States, is:

1. An electrode structure comprising a rigid supporting framework of conducting material, a plurality of turns of wire wound around and embracing said framework closely adjacent to one another and a closely coiled spiral of wire extending along said framework in such a way that at least one turn of said spiral is interposed between every adjacent pair of turns of wire which is wound around the framework.

2. An electrode structure comprising a rectangular supporting framework, a plurality of closely adjacent turns of wire wound around and directly supported by the two sides of said framework and a closely coiled spiral of wire extending along and engaging each side of said framework in such a way that each of the turns of wire wound around said framework is interposed between two adjacent turns of the spiral.

3. A grid electrode for an electron discharge device made up of a plurality of turns of wire wound around and embracing a rigid supporting framework and a closely coiled spiral of wire extending along said framework in such a manner that at least one turn of said spiral is interposed between every adjacent pair of turns of the grid wire.

4. A grid electrode for an electron discharge device made up of a plurality of turns of wire wound back and forth between and embracing two rigid sides of a rectangular framework, and a closely coiled spiral of wire extending along each side of the framework in such a way that each of the turns of the grid wire is interposed between the adjacent turns of the spiral.

5. A grid electrode for an electron discharge device made up of a plurality of turns of wire wound around and in electrical contact with a supporting framework of conducting material, and a closely coiled spiral of wire extending along and in contact with said framework in such a manner that at least one turn of said spiral is interposed between every adjacent pair of turns of the grid wire.

In witness whereof, I have hereunto set my hand this 5th day of August, 1918.

WILLIAM C. WHITE.