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CATHODE-RAY TUBE EQUIPMENT

2,548,572

Filed Nov. 19, 1948

2 Sheets-Sheet 1

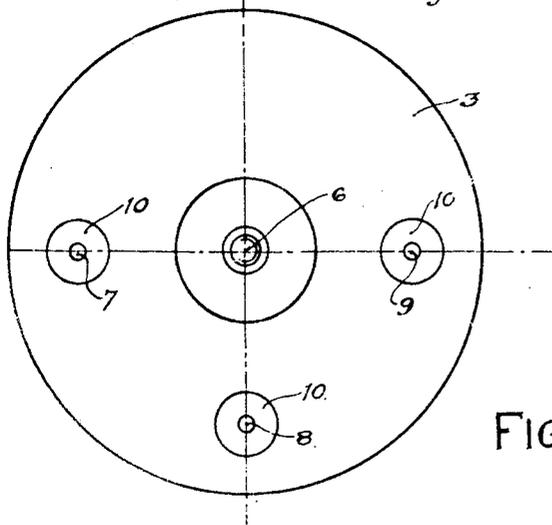
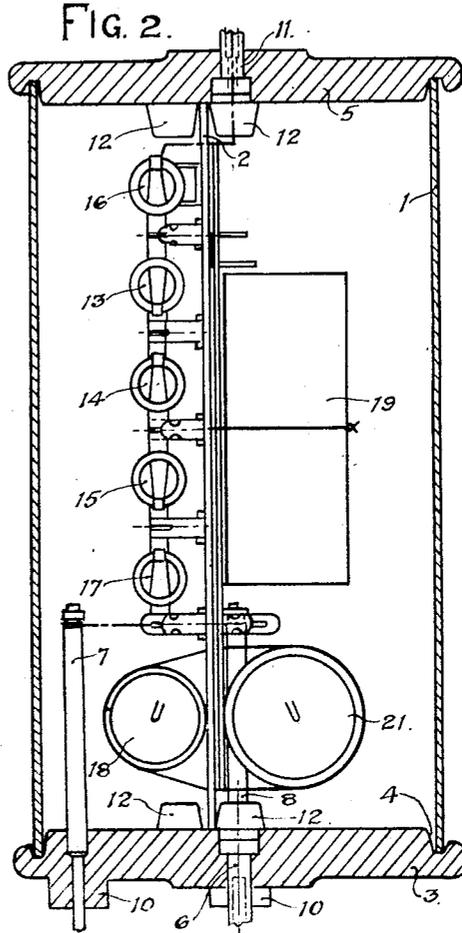
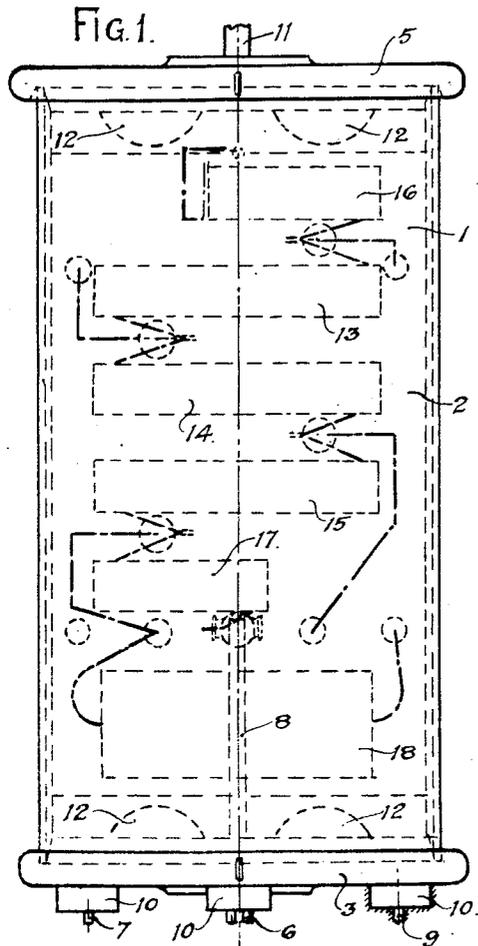


FIG. 3.

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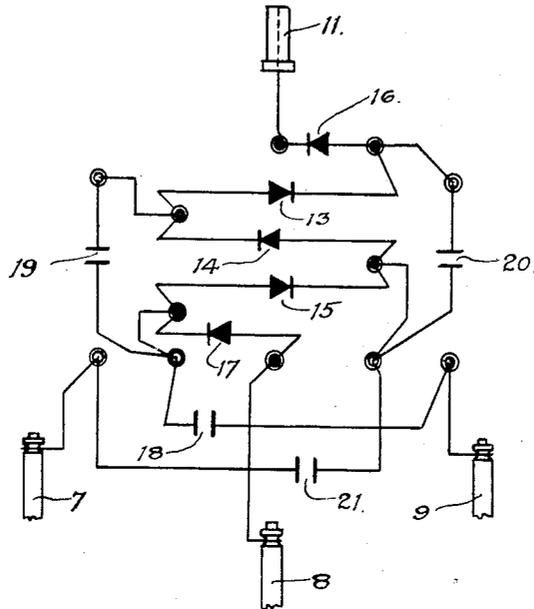


FIG. 4.

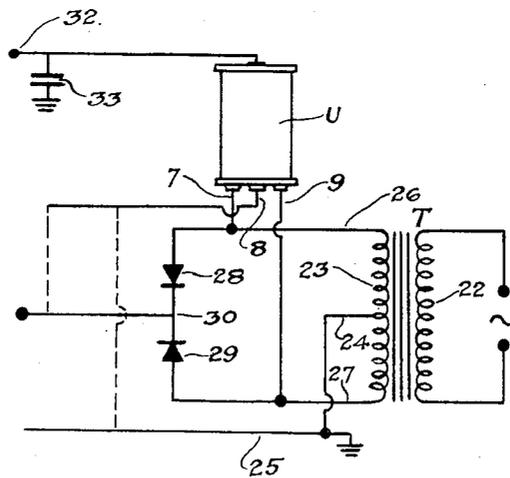


FIG. 5.

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UNITED STATES PATENT OFFICE

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CATHODE-RAY TUBE EQUIPMENT

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Application November 19, 1948, Serial No. 61,003
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4 Claims. (Cl. 321—15)

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This invention relates to cathode ray tube equipments of the kind comprising thermionic valves the anode circuits of which require to be supplied with uni-directional current at a relatively high voltage (hereinafter referred to as the H. T. voltage) derived from a source of alternating current at a lower, usually a commercial supply circuit voltage, together with a cathode ray tube for which a considerably higher uni-directional voltage is required.

The invention has for its object to provide an improved equipment of this character in which the cathode ray tube voltage (hereinafter referred to as the E. H. T. voltage) is derived from a unit device adapted to be directly connected to the centre-tapped transformer and rectifier system usually embodied in the equipment and serving to provide the thermionic valve anode voltage from any convenient alternating current supply circuit.

The invention thus enables the E. H. T. voltage required to be derived from a device forming a compact self-contained unit capable of being either incorporated in cathode ray tube apparatus during construction or readily added to existing apparatus to replace other arrangements for obtaining an E. H. T. voltage.

The invention is illustrated by way of example in the accompanying drawings Figure 1 of which is a view in front elevation of a unit device constructed in accordance with one form of the invention, Figure 2 being a view thereof in sectional side elevation and Figure 3 is a plan view from below of the device. Figure 4 is a diagram, showing the internal connections of the unit device illustrated in Figures 1, 2 and 3 and Figure 5 is a diagram showing the unit device connected in a simple form of cathode ray tube supply equipment.

Referring now to Figures 1, 2 and 3 of the drawings it will be seen that the unit device therein shown comprises a cylindrical casing 1 composed of insulating material containing a cascade multiplier system of the kind described in our co-pending application No. 61,002 the elements of which are mounted on a suitable panel 2 also composed of insulating material.

The casing 1 is provided with a lower end cap 3 constituted by a disc of insulating material having an annular groove 4 within is cemented the lower edge of the casing 1.

The upper end of the casing 1 is closed by an upper end cap 5 similar to the end cap 3 and similarly secured to the upper edge of the casing 1.

The lower end cap is provided with a central

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bolt 6 for securing the unit device to the chassis of a cathode ray tube apparatus and three terminal posts 7, 8, 9 are mounted in bosses or studs 10, the upper end cap 5 being provided with a single central terminal post or bolt 11.

The panel 2 is secured in position within the unit device when assembled by internal pairs of lugs 12 on the inner faces of each of the end caps 3 and 5.

The cascade multiplier system comprises three main rectifier units 13, 14, 15 and two half-section rectifier units 16, 17 mounted on one face of the panel 2 together with a condenser 18 as shown in dotted lines in Figure 1 and in full lines in Figure 2.

On the opposite face of the panel 2, three condensers 19, 20 and 21 are mounted, the circuit connections of the rectifiers and condensers to one another and to the terminal posts being as shown in Figure 4.

The rectifiers 13, 14, 15, 16 and 17 may each comprise a series or column of rectifier elements of the well known selenium type assembled in an insulating cylindrical casing and each of the condensers 18, 19, 20 and 21 may be of the known wrapped metal foil type suitably insulated. The invention is however not limited to any particular type or construction of these elements of the unit device.

Referring now to Figure 5, the cathode ray tube supply equipment shown comprises the usual transformer T, the primary winding 22 of which is indicated as supplied with alternating current from a supply circuit mains, the secondary winding 23 of the transformer T having a centre tap 24 connected to the earthed conductor 25 of the cathode ray tube apparatus. Across the outer terminals 26, 27 of the transformer winding 23 a pair of oppositely arranged series connected rectifiers 28, 29 is connected, the point 30 of series connection of the rectifiers 28, 29 being connected to an H. T. terminal 31.

The portion of the apparatus so far described constitutes a usual H. T. supply system for the anode circuits of the thermionic valves.

The unit device of the invention already described is indicated at U and its terminal posts 7 and 9 are connected to the terminals 26, 27 respectively of the transformer winding 23. The terminal post 11 of the unit device is connected to an E. H. T. terminal 32 which is earthed through a reservoir condenser 33 as shown and the terminal post 8 of the unit device is connected alternatively (as shown in dotted lines) to the earthed conductor 25 or to the H. T. terminal

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31. In the former case the E. H. T. voltage to earth will be that developed by the cascade multiplier system of the unit device while in the latter case the E. H. T. voltage to earth will be the sum of the voltage developed by the multiplier system and the H. T. voltage at the terminal 31.

In an alternative construction to that above described with reference to Figures 1, 2 and 3 of the drawings the upper and lower end caps may each be composed of metal and spun over the upper and lower edges respectively to form a seal, the central bolt 6 being hollow and provided with an internal insulating sleeve or bushing through which insulated conductors corresponding to the terminal posts 7, 8, and 9 pass. The upper end cap is similarly provided with a central insulating sleeve or bushing through which an insulated conductor corresponding to the terminal post 11 passes.

In a still further construction embodying the invention the elements of the cascade multiplier system may be mounted on a suitable insulating support so as to constitute the unit device which is mounted on the chassis of the equipment and enclosed in a casing which also encloses other high tension elements of the equipment.

The invention is, however, not limited to the particular construction form of the unit device above described and illustrated nor to the utilisation of any particular form of connection of cascade multiplier system.

Having thus described our invention, what we claim is:

1. For a cathode ray tube equipment, such as a television receiver, having thermionic valves the anode circuits of which are supplied with uni-directional current of relatively high voltage from an alternating current source of lower voltage through a centre-tapped transformer and rectifier system, a self-contained unit device for producing a considerably higher uni-directional voltage from the centre-tapped transformer, comprising in combination, a panel; a plurality of dry surface contact rectifiers and condensers inter-connected to form a cascade voltage multiplier system and mounted on said panel; a tubular casing surrounding said panel; end plates closing the ends of said casing, respectively; means associated with said end plates for supporting said panel; and means for connecting said voltage multiplier system to the transformer and rectifier system.

2. For a cathode ray tube equipment, such as a television receiver, having thermionic valves the anode circuits of which are supplied with uni-directional current of relatively high voltage from an alternating current source of lower voltage through a centre-tapped transformer and rectifier system, a self-contained unit device for producing a considerably higher uni-directional voltage from the centre-tapped transformer, comprising in combination, a panel; a plurality of dry surface contact rectifiers and condensers inter-connected to form a cascade voltage multiplier system and mounted on said panel; a tubular casing surrounding said panel; end plates closing the ends of said casing, respectively; grooves in the inner surfaces of said end plates, respectively, the ends of said tubular casing fitting into said

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grooves, respectively, and being cemented to same; means associated with said end plates for supporting said panel; and means for connecting said voltage multiplier system to the transformer and rectifier system.

3. For a cathode ray tube equipment, such as a television receiver, having thermionic valves the anode circuits of which are supplied with uni-directional current of relatively high voltage from an alternating current source of lower voltage through a centre-tapped transformer and rectifier system, a self-contained unit device for producing a considerably higher uni-directional voltage from the centre-tapped transformer, comprising in combination, a panel of insulating material; a plurality of dry surface contact rectifiers mounted upon one side of said panel; a plurality of condensers mounted upon the other side of said panel; inter-connections between said rectifiers and said condensers forming a cascade voltage multiplier system; a cylindrical casing of insulating material surrounding said panel; end plates consisting of insulating material and closing the ends of said casing, respectively, and supporting said panel; terminals for connecting said voltage multiplier system to the transformer and rectifier system; and at least one bolt extending through one of said end plates for securing the self-contained unit device to a support in the cathode ray tube equipment.

4. For a cathode ray tube equipment, such as a television receiver, having thermionic valves the anode circuits of which are supplied with uni-directional current of relatively high voltage from an alternating current source of lower voltage through a centre-tapped transformer and rectifier system, a self-contained unit device for producing a considerably higher uni-directional voltage from the centre-tapped transformer, comprising in combination, a panel of insulating material; a plurality of dry surface contact rectifiers mounted upon one side of said panel; a plurality of condensers mounted upon the other side of said panel; interconnections between said rectifiers and said condensers forming a cascade voltage multiplier system; a cylindrical casing of insulating material surrounding said panel; end plates consisting of insulating material and closing the ends of said casing, respectively, and supporting said panel; annular grooves in one face of each of said end plates, respectively, the ends of said cylindrical casing fitting into said grooves, respectively, and being cemented to same; terminals for connecting said voltage multiplier system to the transformer and rectifier system; and at least one bolt extending through one of said end plates for securing the self-contained unit device to a support in the cathode ray tube equipment.

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LESLIE HURST PETER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,243,941	Bouwers	June 3, 1941

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