Feb. 25, 1936. O. M. GLUNT 2,031,945

ELECTRICAL DEVICE

Filed June 30, 1933

FIG. 1

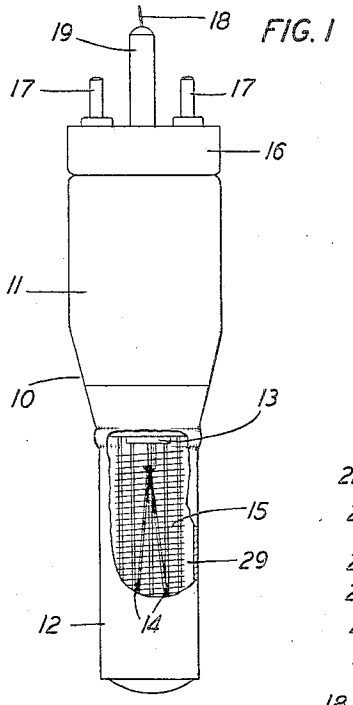
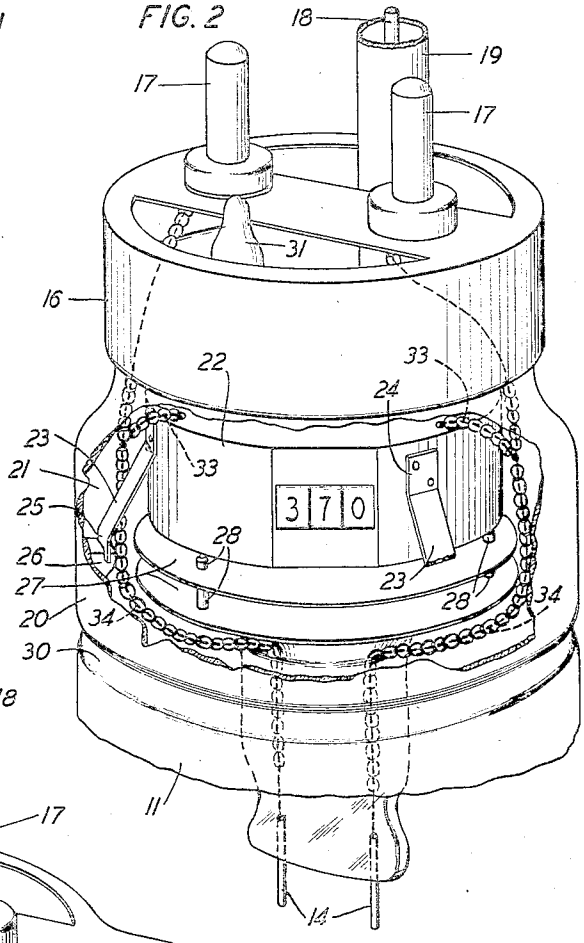


FIG. 2



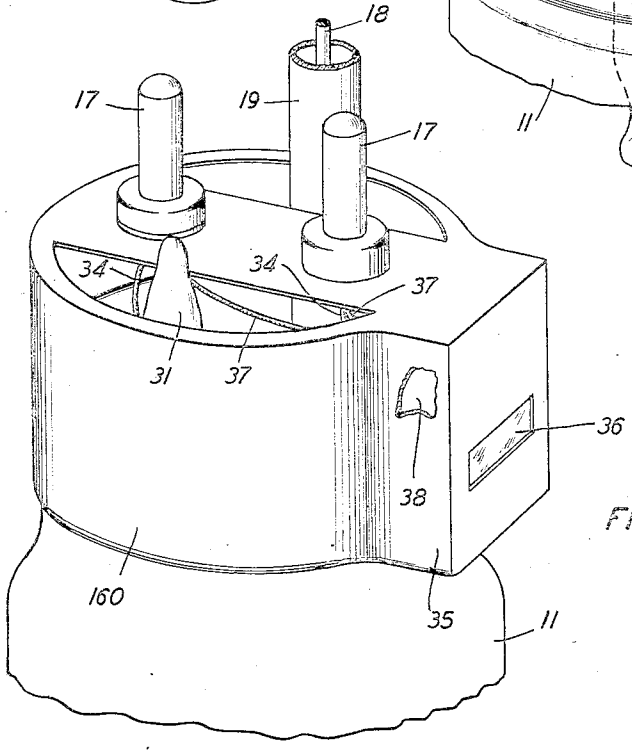


FIG. 3

INVENTOR
O. M. GLUNT

BY
Walter C. Kiesel
ATTORNEY

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ELECTRICAL DEVICE

Omer M. Glunt, Rutherford, N. J., assignor to Bell Telephone Laboratories, Incorporated, New York, N. Y., a corporation of New York

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3 Claims. (Cl. 250—27.5)

This invention relates to electrical devices and more particularly to electron discharge devices capable of handling large amounts of power.

In modern broadcasting transmitters or transoceanic transmitters, the final stage of radio amplification is represented by a bank of a number of high voltage power devices, water-cooled, air-cooled, or otherwise, each having a rating within the range of 10 to 25 kilowatts. A similar bank of devices is necessary for the rectification of the alternating current supply to apply the high voltages to the amplifier. The future development of radio communication may justify the replacement of these banks of devices with one or two high voltage electron discharge devices having the aggregate rating of the single bank of devices. Obviously, a single device of this character will be extremely expensive, and it may prove to be desirable to have an accurate record of the operating life of the device.

The object of this invention is to automatically register the operating life of the device, and to indicate the total time during which the device is in use.

Another object of the invention is to prevent tampering with the registering mechanism so that the indication shown on the register will be a true and accurate measurement of the time during which the device has been in operation.

In accordance with the general aspect of this invention, the objects may be realized by incorporating a time recording device as an integral part of the structure of the high voltage electron discharge device. In one form of the invention, the recording device may be sealed in a compartment joined to the vitreous end of the discharge device. In another form of the invention, the recording device may be made an integral part of the base attached to the vitreous end of the vessel. In each of these forms of the invention, the terminals of the recording device are permanently connected across the filament current conductors to record the time during which the filament is energized and thereby record the operating life of the device.

A more complete understanding of this invention will be derived from the following detailed description with reference to the appended drawing, wherein:

Fig. 1 is a view in elevation of an electron discharge device, with a portion broken away to show the internal electrodes, to which this invention is applicable;

Fig. 2 is an enlarged view in perspective of one end of the device of Fig. 1 illustrating one embodiment of the invention; and

Fig. 3 is a fragmentary enlarged view in perspective of a modified form of one end of the device of Fig. 1 illustrating another embodiment of the invention.

The electron discharge device of Fig. 1 comprises an evacuated enclosing vessel or envelope 10, having a vitreous portion 11, and a metallic portion 12 serving as an anode of the device. Suitably supported within the envelope is a carrier member or block 13 of insulating material from which depend the filament 14 and the grid 15. At the end of the device opposite the anode end is a cylindrical base or collar 16 cemented to the vitreous portion 11 and carrying contacts 17 to provide external connections for the filament. The grid conductor 18 is brought out within a vitreous stem or extension 19.

In Fig. 2, the vitreous portion 11 includes a hollow portion 20 rigidly secured thereto and preferably integral therewith. Within the compartment or chamber 21 of portion 20 is positioned a time metering device 22. This metering device is supported by a plurality of brackets 23, one end 24 of each of which is secured to the meter casing and the other end 25 of each of which engages with a recess formed in an extension 26 which projects from the inner surface of the portion 20. A heat barrier is preferably interposed between the metering device and the heat generating portion of the device 10. This barrier may comprise a plurality of spaced discs 27 of any suitable heat insulating material, for instance, asbestos, which are supported on a surface of the metering device by the members 28. The metering device may be any of the well known types, for instance, of the type in which a synchronous motor through one or more gears operates a numerical counter mechanism reading in units of time, as for example, hours of operation. The chamber 21 need not be evacuated, but is sealed from the enclosure 29 by the vitreous wall 30 and from the atmosphere by the fused tip 31, so that the metering device cannot be tampered with, although its reading may readily be observed through the vitreous portion 20. The metering device is permanently connected through the conductors 33 to the wires 34 connecting the filament 14 with the filament terminals 17. This electrical connection of the filament and meter is made, preferably, within the portion 20.

It is apparent that the arrangement described enables the accurate and automatic registration

of the total time which an electron discharge device is in use and consequently its operating life, which registration cannot be tampered with, without leaving indelible traces of the attempt. A reliable and true record of operating life of the device satisfactory to both the supplier of the device and the user thereof is obtainable.

Another embodiment of this invention is shown by Fig. 3. The base or collar portion **160** is rigidly secured as by cement to the portion **11** and is formed with an integral housing or compartment portion **35** within which an electrical time metering device **38** is positioned and supported. The reading of the metering device is visible through the aperture, opening or window **36** formed in the base. The metering device is connected by conductors or wires **37** to the terminals **17** for the filament wires **34**. The meter may be of the same type as that embodied in the device of Fig. 2, contained in a casing conforming to the interior shape of the portion **35**. As with the arrangement of Fig. 2, the time meter is accessible only by removing or destroying the portion or member containing it.

Although this invention has been disclosed with reference to specific embodiments thereof, it is to be understood, of course, that it is not limited thereto, but that various modifications may be made in its application to other electrical devices and the details of construction without departing from the scope of the invention as defined in the appended claims.

What is claimed is:

1. An electrical device comprising an enclosing vessel, an electrical conductor in said vessel, a collar rigidly secured to the outside of said vessel and supporting a pair of terminals with which said conductor is connected, said collar having a laterally off-set, hollow portion outside of said vessel and having an aperture, and a meter in said hollow portion and connected to said terminals for electrically recording and indicating through said aperture the time during which said conductor has been in use.

2. An electrical device comprising an enclosing vessel, an electrical conductor in said vessel and having leads extending therefrom, a cylindrical collar rigidly secured to the outside of said vessel and having a diametral shelf supporting a pair of terminals for said leads, said collar having a laterally off-set, hollow portion outside of said vessel and having an aperture, and a meter entirely enclosed in said hollow portion and connected to said terminals for electrically recording the time during which said conductor has been in use, such time record being visible through said aperture.

3. An electron discharge device comprising a plurality of electrodes, an enclosing vessel for said electrodes, and a base for said vessel, said base comprising a substantially cylindrical collar having a diametral shelf portion for supporting a pair of terminals for one of said electrodes and a laterally off-set hollow portion adapted to house an electrical recorder.

OMER M. GLUNT.