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THERMIONIC REGULATOR.

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1,426,751.

Patented Aug. 22, 1922.

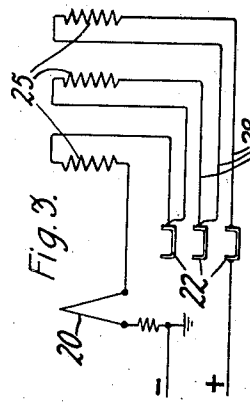


Fig. 3.

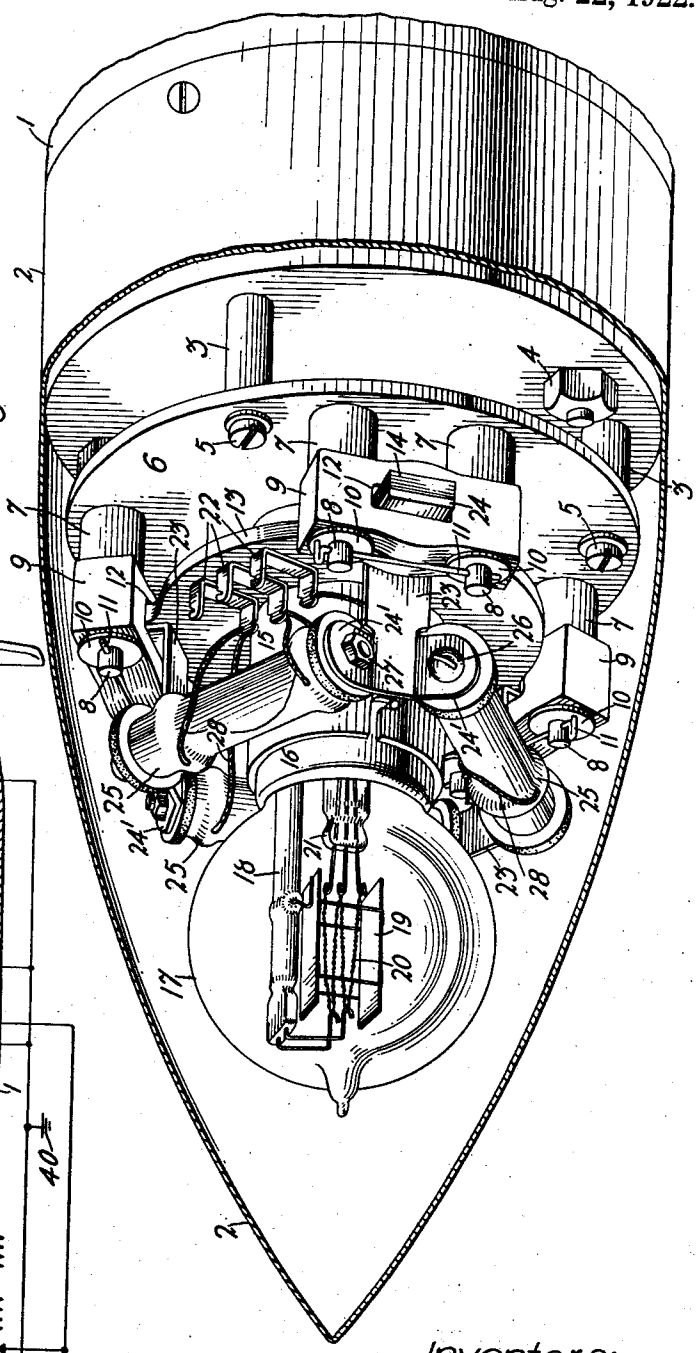


Fig. 1.

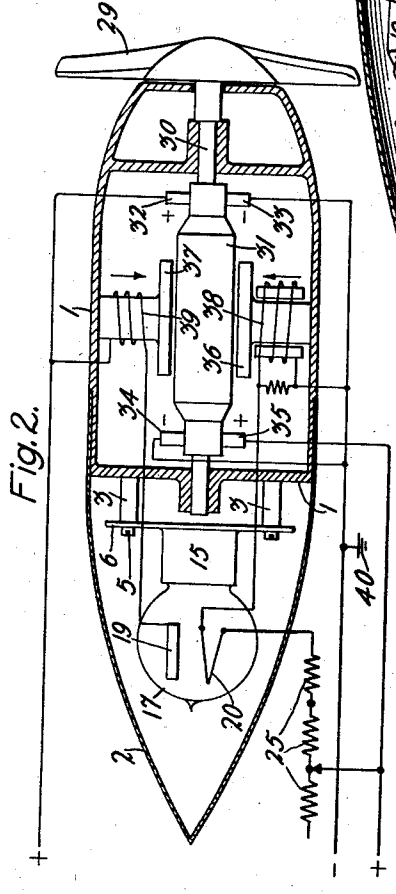


Fig. 2.

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PHILIP K. McGALL, OF WEST ORANGE, NEW JERSEY, AND HARRY R. MENEFEE, OF NEW YORK, N. Y., ASSIGNORS TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

THERMIONIC REGULATOR.

1,426,751. Specification of Letters Patent. Patented Aug. 22, 1922.

Application filed August 13, 1919. Serial No. 317,240.

To all whom it may concern:

Be it known that we, PHILIP K. McGALL and HARRY R. MENEFEE, citizens of the United States, residing at West Orange, in the county of Essex, State of New Jersey, and New York, in the county of New York, State of New York, respectively, have invented certain new and useful Improvements in Thermionic Regulators, of which the following is a full, clear, concise, and exact description.

This invention relates to regulators and has particular reference to a therionic regulator of the vacuum tube type.

An object of this invention is to provide a compact and unitary mounting for the regulator in close association with the machine, one or more of whose characteristics is to be regulated.

A further object is to provide a unitary and compact mounting for a vacuum tube regulator with its associated mechanisms in close proximity to an electrical generator, the characteristics of which are to be regulated.

The invention in general comprises a support rigidly spaced from the rear end of a small electrical generator, which is preferably of the wind-driven type, such as have been used on aeroplanes for signaling purposes, and which are of the general type shown and described in a copending application to H. M. Stoller, Serial No. 244,636, filed July 12, 1918, entitled Electrical Regulator. Adjacent to this rigid support is placed a vacuum tube regulator and its accompanying socket structure. Between the socket plate and the rigid plate member are provided resilient supporting means whereby the vibration of the generator is transmitted to a minimum degree to the regulator itself. The vacuum tube mounting is also provided with a plurality of supports whereby resistance plugs may be conveniently located thereon and connected to the circuit wires in any suitable manner. The resistance plugs are adapted to be inserted in circuit with the main field winding of the generator so as to alter the voltage to be regulated by a known amount. The weight of these plugs also aids in damping the vibration of the thermionic unit to which they are attached.

The invention is illustrated in the drawing, of which Fig. 1 shows a perspective view of the rear end of the wind-driven generator, with the regulator unit placed adjacent thereto, within the stream-line casing which fits over the rear end of the generator; Fig. 2 is a diagrammatic representation of the electrical circuits involved; and Fig. 3 is a diagrammatic representation of the circuit arrangements for the voltage adjusting resistances.

The invention comprises a generator frame 1 over the rear end of which is fitted a stream-line sloping casing 2 and which is attached thereto in any suitable manner. Extending from the rear face of the generator frame 1 are a plurality of studs 3, only two of which are shown. These studs are provided at their upper ends with screw threaded bolts 5 adapted to pass through apertures in a support or plate 6 and extend into suitable threaded apertures in the upper end of studs 3, whereby the plate 6 is rigidly positioned and spaced with respect to the rear end of the generator frame 1. Extending from the plate 6 in pairs are a plurality of studs 7, each of which has a reduced outer portion 8 over each pair of which portions 8 a block of sponge rubber 9 is adapted to fit. This resilient sponge rubber block 9 is held on to the studs 7 by means of washers 10 and pins 11 as shown. Each of the blocks 9 is provided with a central rectangular opening 12. A plate 13 is spaced parallel and adjacent to the plate 6 and has a plurality of horizontally extending ear portions 14, which are adapted to project through the apertures 12 in the blocks 9 of sponge rubber. On the plate 13 is mounted a vacuum tube socket of any suitable type into which the base 16 of an evacuated vessel or vacuum tube 17 is adapted to fit. This evacuated vessel 17 is provided in a preferred form with a glass stem 18 from which are supported a plate 19 and a filament 20. The lower ends of the electrodes 19 and 20 are connected to suitable lead wires in a stem 21, these lead wires being connected in a well known manner to external terminals.

Adjacent to the socket 15 on plate 13 is a plurality of terminal clips 22. Placed adjacent to ears 14 of the plate 13 are a plurality of upright standards 23 having horizontal extending portions 24, which extend through the apertures 12 in the rubber

blocks 9 and have obliquely and horizontally extending ear portions 24' at their other ends. Between the ear portions 24' a plurality of resistance plugs or coils 25 are placed and are positioned therebetween by means of threaded bolts 26 and nuts 27. The wires 28 within these resistance plugs 25 are extended therefrom to the terminals 22 and are connected thereto in a manner later to be described.

In Fig. 2 there is shown a wind-driven propeller 29 adapted to drive shaft 30 to which the armature 31 is connected. This armature is provided with two separate windings, one of which is tapped out through brushes 32 and 33 and constitutes a high voltage winding and the other of which is tapped out through brushes 34 and 35 and constitutes a low voltage winding. Adjacent to the armature are field poles 36 and 37 on which a main field winding 38 and a differential field winding 39 respectively are wound. The differential field winding 39 is connected at one end to the positive side of the high voltage line and at the other end to the plate electrode 19 of the vacuum tube 17. One end of the main field winding 38 is connected to the negative side of the high voltage line and the other end is connected to one terminal of the filament electrode 20 of the vacuum tube 17. The other side of the filament electrode 20 is connected to the resistances 25 which are connected in series and therethrough to the positive side of the low voltage line. The negative line of the system is grounded as shown at 40.

In Fig. 3 there is represented more in detail, the particular manner in which the resistances 25 are connected in circuit with the apparatus. One side of the filament 20 is shown connected to a ground and the negative wire of the system, the other side of the filament 20 is shown connected to one of the resistances 25, the other end of which is shown connected to one of the terminal clips 22. This clip in turn is connected to one end of another resistance 25, the other end of which is connected to the next terminal clip 22. This second clip in turn is connected to one end of a third resistance, the other end of which is connected to a third terminal clip 22. The positive side of the low voltage line is shown connected to one of the terminal clips 22. An object of so connecting the resistances to the terminal clips, however, is to provide means whereby the circuit wire may be connected with one or more of the resistances in series with the main field winding. Consequently, it is within the spirit of this invention to connect the positive lead wire to any one of the terminal clips 22. By inserting resistance in series with the main field winding it is apparent that we thereby provide means whereby the voltage at which the regulator will act may be substantially of a predetermined value.

What is claimed is:

1. In combination, a dynamo electric machine and a vacuum tube in circuit therewith and mounted in line with the axis of rotation thereof.

2. In combination, a dynamo electric machine and a vacuum tube in circuit therewith, a stream line casing for said machine at one end thereof, said vacuum tube device being located within said casing and in line with the axis of rotation of said machine.

3. In a device of the character described, a support, a standard, means for resiliently mounting the standard on said support, a vacuum tube mounted on said standard, and damping means symmetrically disposed around said vacuum tube and carried by said standard.

4. A device of the character described comprising a support, a standard, means for resiliently mounting said standard on said support, a vacuum tube mounted on said standard, resistance plugs mounted on said standard, said plugs being symmetrically disposed with respect to the axis of the tube, and electrical connections between said plugs and one electrode of said tube.

5. A regulator for a dynamo electric machine comprising a plate adapted to be rigidly attached to one end of said machine, a plurality of pairs of posts projecting from said plate, resilient block members carried by said pairs of posts, said block members having apertures therein, a second plate having projecting ear portions, said ear portions being arranged in the apertures of said block members and a thermionic device mounted on said second plate.

6. A mounting for a thermionic device comprising a base plate on which said device is mounted, said base plate having projecting ear portions, a plurality of blocks of resilient material having apertures into which said ear portions extend, and a rigid plate to which said blocks are attached.

7. A device of the character described comprising a base plate, a plurality of supporting clips on said base plate, a plurality of resistance plugs mounted on said clips, and a plurality of terminals mounted on said base plate and adapted to be connected to said resistance plugs.

8. A mounting for a thermionic device comprising a rigid support, a plurality of blocks of resilient material mounted on said support and having apertures therein, a thermionic device, a plate on which said thermionic device is mounted, said base plate having a plurality of ear portions, a plurality of clips mounted on said base plate and having ear portions abutting the ear portions on said base plate, a plurality of re-

sistance plugs supported by said clips, the ear portions of the said base plate and said clips adapted to extend through the apertures in said resilient blocks.

9. In combination, a dynamo electric machine, a regulator therefor mounted on one end of said machine in line with the axis of rotation thereof and a casing carried by said dynamo electric machine and enclosing said regulator.

10. In combination, a dynamo electric machine, a controller therefor mounted on one end of said machine in line with the axis of rotation thereof and a stream line casing carried by said machine and enclosing said controller.

In witness whereof, we hereunto subscribe our names this 9th day of August, A. D. 1919.

PHILIP K. McGALL.
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