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C. MacGREGOR

2,253,131

COMBINED ALTERNATING-CURRENT-DIRECT-CURRENT TRANSFORMER

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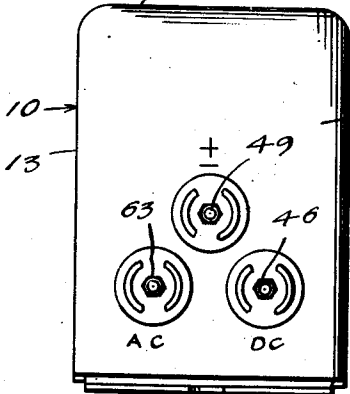
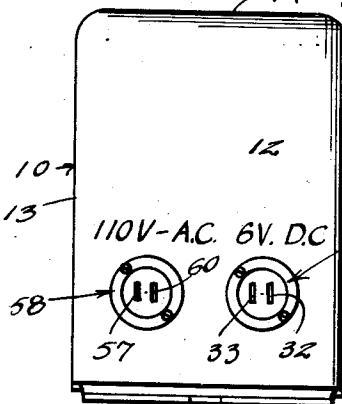
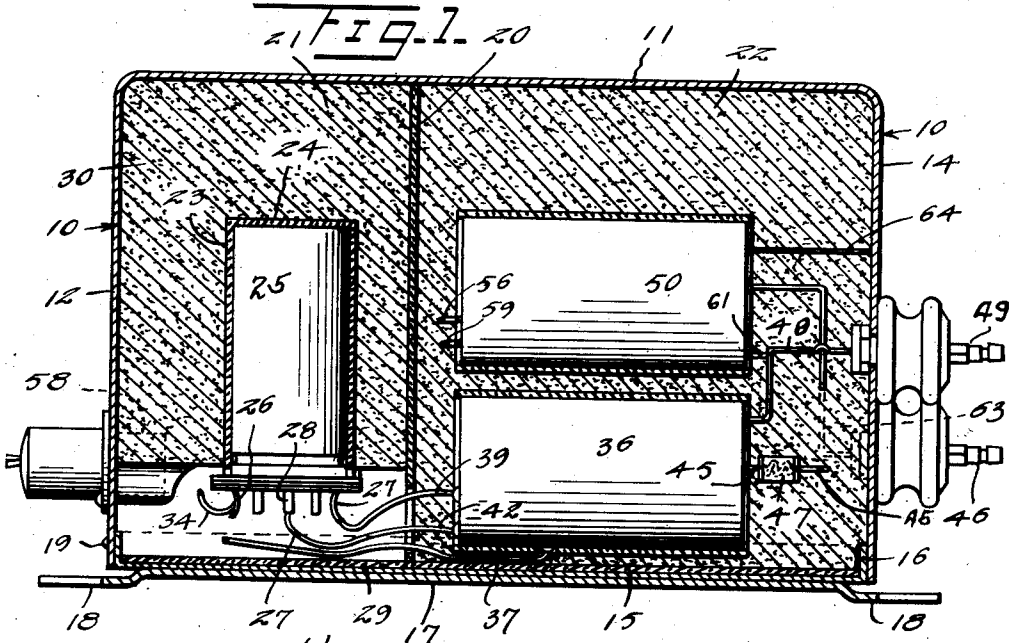


FIG. 2.

FIG. 4.

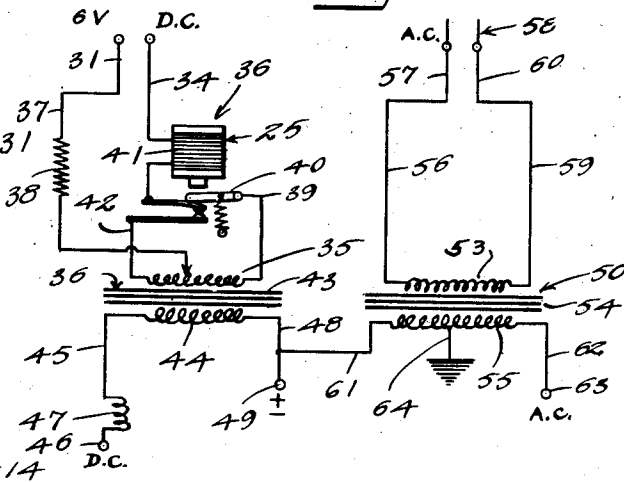


FIG. 3.

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COMBINED ALTERNATING-CURRENT-DIRECT-CURRENT TRANSFORMER

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1 Claim. (Cl. 171-97)

This invention relates to electrical discharge devices and more particularly to a combination direct current and alternating current transformer structure for use with gaseous discharge tubes.

An object of this invention is to provide a combination transformer structure which may be connected either to a direct current or alternating current source of supply for providing the desired high voltage necessary to actuate gaseous discharge tubes.

Another object of this invention is to provide a structure of this kind wherein the direct current side thereof may be connected to a conventional 6-volt battery and which is so constructed that there will be a very small drain on the battery while at the same time providing sufficient alternating current on the outlet side thereof for actuating the desired length of tubing containing an illuminable gas.

A further object of this invention is to provide a combination of this kind which is adapted to be compactly mounted in a housing and which includes a vibrator or interrupter formed of the cartridge type so that in the event the vibrator or interrupter becomes disabled, the vibrator or interrupter may be readily removed without disturbing the elements mounted in the housing and which are adapted to be embedded in an insulating structure.

A further object of this invention is to provide a combination AC and DC transformer structure which is so constructed that gaseous tubes may be illuminated from a conventional motor vehicle battery without causing an undue drain on the battery or if desired, may be connected to alternating current having 110 voltage capacity.

A still further object of this invention is to provide a combination of this type which will permit the user thereof to connect the input side thereof to either a 6-volt battery or ordinary house current so that gaseous tubes may be illuminated at points where house current is not available or where it is not desired to run special wires for operating an interrupter or transformer structure from the house current.

To the above objects and to others which may hereinafter appear, the invention consists of the novel construction, combination and arrangement of parts as will be more specifically referred to and illustrated in the accompanying drawing, wherein is shown an embodiment of the invention, but it is to be understood that changes, variations and modifications may be resorted to

which fall within the scope of the invention as claimed.

In the drawing:

Figure 1 is a longitudinal section partly in detail of a combined A. C.-D. C. transformer structure constructed according to an embodiment of this invention,

Figure 2 is a detail end elevation of the input end of the device,

Figure 3 is a detail end elevation of the output end of the device, and

Figure 4 is a diagrammatic view of the electric circuits embodied in this invention.

Referring to the drawing, the numeral 10 designates generally a housing structure of substantially rectangular configuration which comprises a top wall 11, side walls 13 and end walls 12 and 14. A bottom plate 15 provided with upturned marginal flanges 16 is adapted to engage in the lower end of the housing 10 and a lower plate 17 is secured to the bottom 15 and at each end thereof extends outwardly beyond the end walls 12 and 14 as at 18. The extensions 18 provide a means whereby the housing 10 may be firmly secured to a suitable support. The bottom 15 is secured with the flanges 16 thereof extending interiorly of the housing 10 by means of fastening members 19 in the form of screws or the like.

The housing 10 on the interior thereof is provided with a partition or inner wall 20 dividing the interior of the housing 10 into a vibrator chamber 21 and a transformer chamber 22. A cylindrical casing 23 is disposed within the chamber 21 being provided with an upper end wall 24. The lower end of the casing 23 is open and a vibrator member generally designated as 25 is removably mounted in the housing 23. The vibrator 25 is constructed in the form similar to that disclosed in Patent No. 1,943,240 which issued January 9, 1934, and is what is known as the cartridge type of vibrator. The vibrator 25 is provided with terminals 26, 27 and 28 which are adapted to project downwardly below the casing 23 and an insulated member 29 is disposed in the lower portion of the chamber and is adapted to insulate the lower ends of the terminals from the bottom wall 15. The chamber 21 about the housing 23 is adapted to be filled with an insulating material 30 in the form of tar, pitch, or other suitable insulating compound which may be made liquid under heat and which is adapted to harden so as to firmly hold the housing 23 in the desired position within the chamber 21.

A socket 31 is secured to the end wall 12 of the housing 10 and includes terminals 32 and 33.

The terminal 32 is adapted to be connected as by a wire 34 to the terminal 26 of the vibrator 25 and the terminal 33 is adapted to be connected to substantially the center of a primary coil 35 of a transformer 36 by means of a wire 37. A resistant element 38 of suitable capacity is interposed in the wire 37. The transformer 36 is positioned in the chamber 22 and one end of the primary coil 35 is connected as by a wire 39 to the terminal 27 which is connected to the vibrator element or armature 40. The wire 34 is connected to one side of the coil 41 of the vibrator member 25 and the opposite end of the coil 41 is connected by a wire 42 to the opposite end of the primary coil 35.

The transformer 36 is provided with an iron core 43 and is also provided with a secondary coil 44. One end of the secondary coil 44 is connected to one side 46 of an output plug by means of a wire 45 and a high frequency choke coil 47 is interposed in the wire 45 between the terminal 46 and the adjacent end of the secondary coil 44. The opposite end of the secondary coil 44 is connected as by a wire 48 to a second output terminal 49.

A second transformer 50 is disposed in the chamber 22 and may be positioned above the transformer 36. The interior of the chamber 22 may be filled by insulated material 52 similar to the material 30. The transformer 50 comprises a primary coil 53, an iron core 54 and a secondary coil 55. One end of the primary coil 53 is connected by means of a wire 56 to one terminal 57 or an input socket 58. The other side of the coil 53 is connected by a wire 59 to a second terminal 60 carried by the input plug or socket 58. The wires 56 and 59 extend through the partition 20 into the vibrator chamber 21 and the input plug or socket 58 is mounted in the wall 12.

The secondary coil 55 is connected at one end by means of a wire 61 to the wire 48 and the opposite end of the secondary coil 55 is connected by means of a wire 62 to an output terminal 63. By connecting one side of the secondary 55 to the wire 48, the output terminal 49 forms a common terminal for the transformers 36 and 50. The secondary 55 at substantially the center thereof is connected by means of a wire 64 to the ground.

In the use and operation of this combination transformer structure where it is desired to use a storage battery having an output of 6-volts for

operating gaseous discharge tubes, the input member 31 is connected by suitable wires or plugs to the terminals of the storage battery. The current from the storage battery will actuate the vibrator member 25 which is connected to the primary 35 of the transformer 36 and the voltage from the 6-volt battery will then be stepped up to a voltage sufficient to actuate the gaseous tube. By providing the resistance 38 in the wire 37 the vibrator 35 will operate under a small drain from the source of D. C. current supply. This is due in part by connecting the wire 37 to the coil 35 at substantially the center thereof. The output terminals 45 and 49 may be connected to the terminals of the gaseous tube and under experiment it has been found that the voltage derived from the transformer 36 will be sufficient to illuminate a considerable length of gaseous tubing.

Where an alternating current of 110 volts is available, the input member 58 may be connected to the source of alternating current supply. The current will then pass through the transformer 50 to the common output terminal 49 and to the terminal 63.

What I claim is:

A step-up transformer structure comprising a housing, formed of a pair of side walls, a top wall, a pair of end walls, and a removable bottom wall, a partition between said side walls and engaging said top and bottom walls to thereby divide said housing into a transformer chamber and a vibrator chamber, a pair of transformers in said transformer chamber, a sealing compound enclosing said transformers, a vibrator casing in said vibrator chamber and having an open end spaced from and confronting said bottom wall, a sealing compound in said vibrator chamber, said latter sealing compound being spaced from said bottom wall and flush with the lower open end of said casing, a vibrator structure in said casing and including a plurality of terminals projecting into the space between said latter sealing compound and said bottom wall, input terminals carried by one end wall and connected to said vibrator terminals and to the input sides of said transformers, and output terminals carried by the other end wall and connected to the output sides of said transformers, one of said output terminals being common to both of said transformers.

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