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B. T. SETCHELL
HIGH VOLTAGE TRANSFORMER ASSEMBLIES

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2 Sheets-Sheet 1

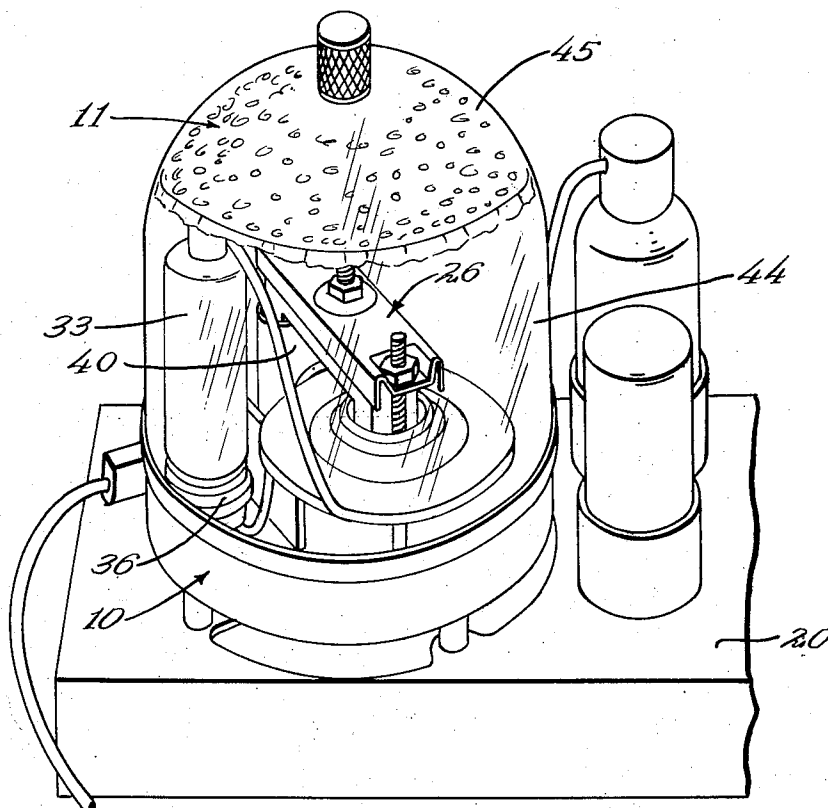


Fig. 1

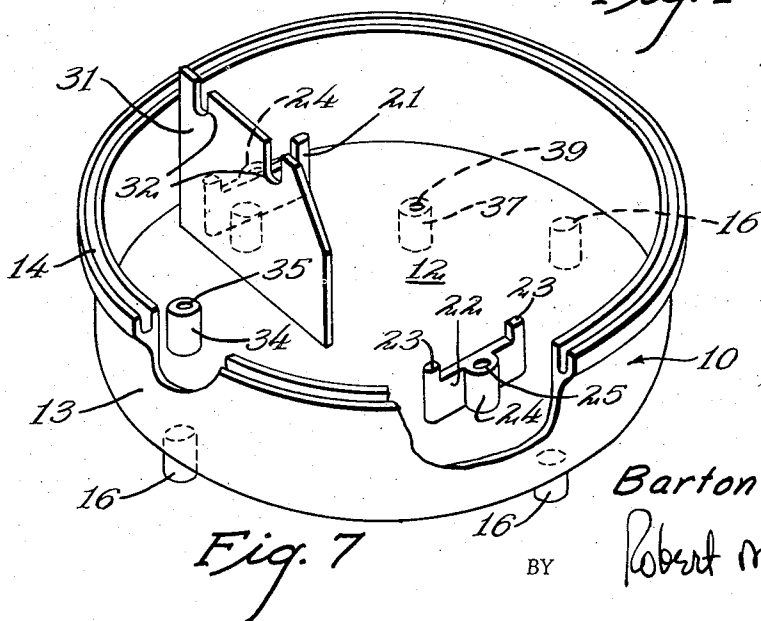


Fig. 7

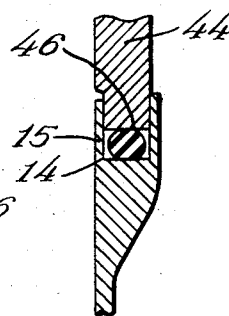


Fig. 6

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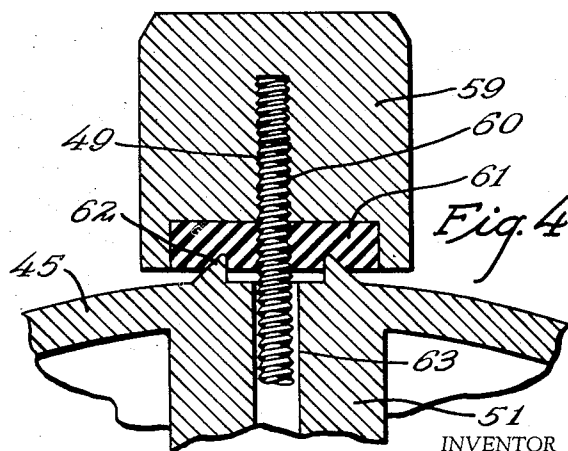
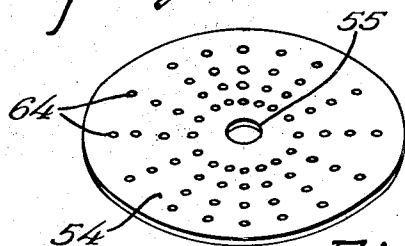
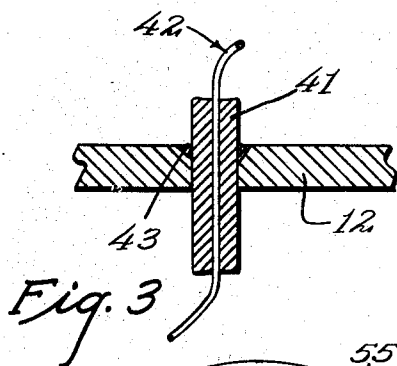
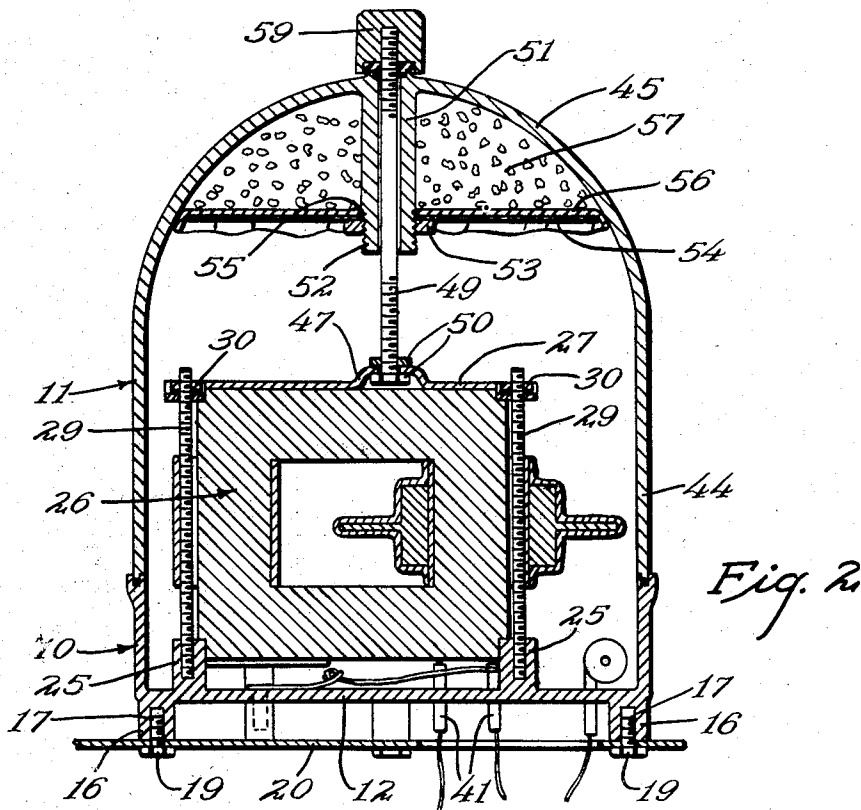
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HIGH VOLTAGE TRANSFORMER ASSEMBLIES

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2 Sheets-Sheet 2



Barton T. Setchell

Fig. 5 BY Robert M. Dunning ATTORNEY

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2,858,356

HIGH VOLTAGE TRANSFORMER ASSEMBLIES

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5 Claims. (Cl. 174—52)

This invention relates to an improvement in high voltage transformer assemblies and deals particularly with a sealed unit designed to serve as a horizontal output transformer assembly in a television receiver.

Considerable difficulty has been experienced in high voltage transformer assemblies in radio receiving sets due to the corona effect between high voltage terminals. It has been found that in damp and humid weather and in damp climates, arcing often occurs between various components of the transformer assembly. Attempts have been made to correct this difficulty by spacing the high voltage components and separating them physically either by space or by solid insulation. However, in damp weather the changes in temperature of the component parts create a tendency for moisture to condense thereupon, decreasing the resistance to flash over or corona effects.

A feature of the present invention lies in the provision of a sealed unit which includes the elements of the high frequency transformer assembly. This sealed unit preferably encloses the horizontal output or fly back transformer, the high voltage filter capacitor and the rectifier socket. These parts are enclosed in such a way that they are spaced by air and at the same time are free of the normal tendency for moisture to condense thereupon because of changes of temperature and humidity.

An added feature of the present invention lies in the provision of a high voltage transformer assembly which includes a hermetically sealed compartment including a desiccant which tends to remove moisture from the air within the sealed compartment. This material simplifies the assembly problem of the unit as it permits the units to be sealed in humid weather as well as in a dry atmosphere. The material is also advantageous in removing moisture from the unit in the event the seal is broken for purpose of repair or replacement of some of the component parts.

An added feature of the present invention resides in the provision of a compartment which is hermetically sealed and through which the necessary connecting wires may extend. The unit is provided with apertures through which the connecting elements extend. The connectors are hermetically sealed to the receptacle so that air will not enter or leave the compartment about the conductors.

A further feature of the present invention resides in the particular arrangement of the parts and of the compartment itself. The desiccant is supported upon a foraminous platform covered by a porous cover which acts to support the desiccant without preventing the flow of air. The desiccant is supported above the components at the top of the hermetically sealed chamber and have been found to function within a relatively short period of time to withdraw a high percentage of the moisture from the enclosed air. Tests conducted with units sealed in humid weather show that when the units are originally sealed, arcing or leakage between the terminals may occur. However, upon the functioning of the unit for a period of one or

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two hours, the leakage decreases and finally ceases entirely.

These and other objects and novel features of the present invention will be more clearly and fully set forth in the following specification and claims.

In the drawings forming a part of the specification:

Figure 1 is a perspective view of a high voltage transformer assembly showing the general arrangement thereof.

Figure 2 is a sectional view through the assembly showing the arrangement of parts.

Figure 3 is a sectional view through one of the conductors extending into the unit.

Figure 4 is an enlarged view of the upper extremity of the unit showing the seal employed at this point.

Figure 5 is a perspective view of the foraminous platform on which the desiccant is supported.

Figure 6 is an enlarged sectional detail through the seal between the two main parts of the enclosure.

Figure 7 is a perspective view of the base portion of the enclosure, parts of the wall thereof being broken away to disclose otherwise hidden parts.

The high voltage transformer assembly is mounted within a hermetically sealed chamber which includes a pan shaped bottom section illustrated in general by the numeral 10 and a dome shaped top section indicated in general by the numeral 11. Both sections may be formed of transparent plastic so that the interior of the chamber is visible to permit inspection of the contents or, if preferred, the plastic may be opaque.

The bottom section 10 is constructed as best illustrated in Figures 2 and 7 of the drawings. The section includes a circular bottom wall 12, and a generally cylindrical side wall 13 integral with and extending upwardly from the marginal edges of the bottom wall 12. The upper surface of the side wall 13 is provided with a circular groove 14 which is shown in section in Figure 6 of the drawings. The groove 14 is designed to accommodate a sealing ring 15 of rubber or other compressible sealing material.

The bottom wall 12 is supported by four angularly spaced legs 16 which are integral with the bottom panel 12 and which project downwardly therefrom. The legs 16 are provided with threaded sockets in their lower extremities, the sockets being indicated at 17 in Figure 2 of the drawings. These threaded sockets are designed to accommodate mounting screws 19 for securing the chamber to the surface of the metallic chassis 20.

A pair of parallel supporting walls 21 and 22 project upwardly in parallel spaced relation from the bottom wall 12. These supporting walls are provided with upwardly extending projections 23 at opposite ends of each wall. A boss 24 is integral with each wall and includes an upwardly opening socket 25 which is internally threaded to accommodate a clamping bolt. The walls 21 and 22 are designed to support the high voltage transformer sometimes called the fly-back transformer or auto-transformer.

As indicated in Figure 2 of the drawings the high voltage transformer is a generally rectangular structure indicated in general by the numeral 26. A clamping plate 27 overlies the upper surface of the transformer and is held in place by studs 29 which extend into the threaded sockets 25 and are held upright thereby. Clamping nuts 30 are provided above the clamping plate 27 to hold this plate and the transformer in its proper location.

A partition wall 31 extends upwardly from the bottom plate 12 at generally right angles to the parallel plates 21 and 22 and laterally spaced therefrom. The partition wall is provided with notches 32 in its upper extremity for accommodating lead wires. The partition wall forms a physical barrier between the high voltage transformer and the tube socket of the high voltage rectifier tube 33.

As indicated in Figure 7 of the drawings a lug or boss 34 extends upwardly from the base plate 12 on the opposite side of the partition wall 31 from the transformer supporting walls. The boss 34 is provided with an upwardly opening internally threaded socket 35 for accommodating a clamping bolt which extends through the high voltage rectifier tube socket 36. The clamping bolt extends centrally through the tube socket 36 to hold this support in place with the connection terminals directed downwardly. The socket 36 supports the high voltage rectifier tube 33.

A downwardly directed lug 37 extends downwardly from the bottom panel 12 on the opposite side of the fly-back transformer from the partition wall 31. This support is provided with an internally threaded socket 39 for accommodating the downwardly projecting threaded support of a high voltage filter capacitor shown in Figure 1 at 40. Thus the high voltage transformer, the rectifier tube and its socket, and the high voltage filter capacitor are all supported entirely within the chamber and do not extend therefrom.

A series of tubes such as 41 encircle conductors such as 42 and are sealed relative thereto. These tubes 41 extend through the bottom panel 12 and are sealed as indicated at 43 with respect to the bottom panel. As a result the leads which extend from the exterior to the interior of the chamber are hermetically sealed to prevent any passage of air into or out of the chamber.

The upper portion 11 of the chamber is provided with a substantially cylindrical side wall portion 44 and a curved dome top 45. The grooved upper portion of the lower section 10 is increased in thickness so that the groove 14 is of proper size to snugly accommodate the reduced thickness lower end 46 of the cylindrical wall 44. Thus a firm seal is provided between the two parts of the chamber which is increased in effectiveness by the clamping means which will be later described.

A portion of the clamping plate 27 is off-set or bulged upwardly as indicated at 47 to accommodate the lower end of a threaded post 49. Clamping nuts 50 engage the bulged portion of the clamping member 27 to hold the post 49 in an upright position. A sleeve 51 extends downwardly from the upper extremity of the dome 45 axially thereof. The sleeve 51 is externally threaded at its lower end as indicated at 52 to accommodate a nut 53. A foraminous disc 54 of Bakelite or other suitable material is held with its marginal edges in close proximity with the dome 45. The disc 54 is provided with a central aperture 55 to encircle the sleeve 51. The nut 53 holds the disc 54 in its elevated position. A disc 56 of filter paper or other suitable porous material overlies the disc 54. Crystals of silica gel 57 or other suitable desiccant is supported by the disc 54.

The threaded post 49 extends through the sleeve 51 and projects above the dome 45. A thumb nut 59 is internally threaded as indicated at 60 and is provided with a disc 61 of rubber or suitable resilient sealing material. The dome 45 is provided with an upwardly directed ring 62 of small diameter encircling the sleeve opening 63. As the thumb nut 59 is threaded onto the upper end of the threaded post 49 the sealing disc 61 engages against this ring 62 to form a tight seal between the nut and the dome.

The foraminous disc 54 is shown in Figure 5 of the drawings, the openings 64 therethrough forming a plurality of passages through which air may circulate.

The apparatus is assembled as illustrated and described, the tube socket 36 with its rectifier tube 33, the high voltage filter capacitor 40 and the fly-back transformer being mounted upon the base portion 10 of the housing and entirely above the same. The component parts are connected to leads which extend through the sleeves 41, the conductors being sealed relative to the sleeves and the sleeves being sealed relative to the compartment bottom. When all of the parts have been properly

mounted the top part 11 of the housing is threaded over the post 49, the lower marginal edge engaging in the groove 14. The clamping nut 59 is then applied to the upper end of the post 49 to clamp the two parts of the housing together. Prior to the assembly the dome portion 11 is inverted and the desiccant 57 is placed therein. The disc 54 and cover 56 are placed in inverted position to overlie the desiccant and the nut 53 is threaded onto the sleeve 51. When inverted the desiccant is thus supported on the upper extremity of the housing.

Tests have shown that even when the high voltage transformer unit has been assembled under conditions of high humidity, the desiccant such as silica gel will soon dry the air and prevent leakage between the various terminals of the component parts. Even when leakage occurred at the completion of the assembly, this leakage disappeared after the air became dry. The quantity of desiccant is sufficient to permit the upper portion 11 of the compartment to be removed and replaced several times.

In accordance with the patent statutes I have described the principles of construction and operation of my high voltage transformer unit, and while I have endeavored to set forth the best embodiment thereof I desire to have it understood that obvious changes may be made within the scope of the following claims without departing from the spirit of the invention.

I claim:

1. A high voltage transformer assembly including a hermetically sealed housing including a lower recessed section and an upper dome shaped section, sealing means between said sections, a pair of treaded members having their lower ends anchored to the bottom of said lower section, a high voltage transformer disposed between said threaded members, a clamping plate secured to the upper ends of said threaded members and engaging the top of said transformer, a third threaded member having its lower end anchored to said clamping plate and its upper end extending through an aperture in the upper section, a nut member threadedly received on the upper end of said third threaded member, and sealing means between said nut member and the upper section, whereby tightening of said nut member will compress both sealing means and urge said sections toward each other.

2. A high voltage transformer assembly including a hermetically sealed housing including a lower recessed section and an upper dome shaped section provided with an integral reentrant tubular boss threaded externally at its free end, sealing means between said sections, a pair of threaded members having their lower ends anchored to the bottom of said lower section, a high voltage transformer disposed between said threaded members, a clamping plate secured to the upper ends of said threaded members and engaging the top of said transformer, a third threaded member passing through said tubular boss having its lower end anchored to said clamping plate and its upper end extending through an aperture in the upper section, a nut member threadedly received on the upper end of said third threaded member, sealing means between said nut member and the upper section whereby tightening of said nut member will compress both sealing means and urge said sections toward each other, a foraminous disc member circumscribing said tubular boss, a nut member threadedly received on the threaded end of said boss, and desiccant material stored between said disc and the underside of said dome.

3. A high voltage transformer enclosure including a base of non conductive material, a dome of non conductive material having its lower edge in sealed relation to said base, a sleeve extending downwardly from the top of said dome, a shelf encircling said sleeve and marginally engaging said dome, a desiccant on said shelf, means on said sleeve supporting said shelf, and dome clamping means extending through said sleeve and connected to said base.

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4. The structure of claim 3 and in which the shelf is foraminous.

5. The structure of claim 3 and in which the shelf is foraminous, and including a porous filter paper overlying said shelf supporting said desiccant.

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