May 15, 1962 B. T. SETCHELL 3,035,210

FLYBACK TRANSFORMER MOUNTINGS

Filed July 11, 1958 2 Sheets-Sheet 1

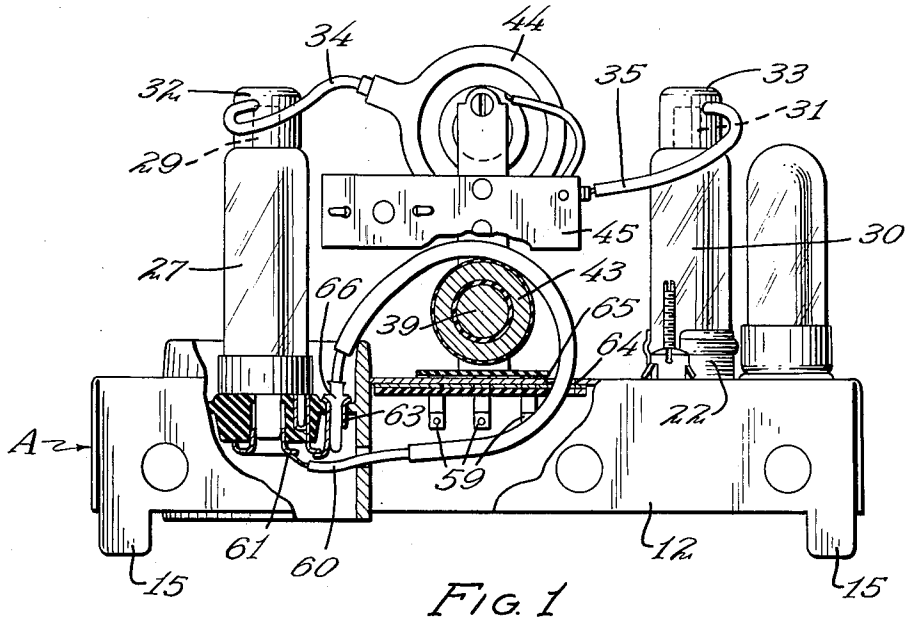


FIG. 1

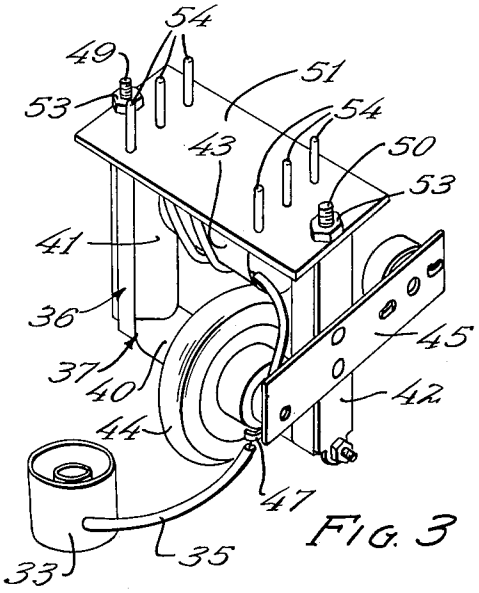


FIG. 3

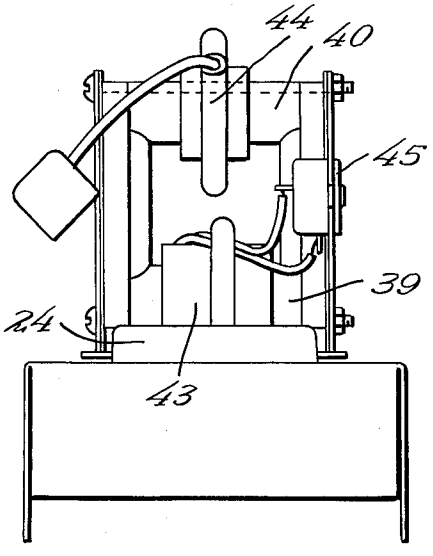


FIG. 2

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FLYBACK TRANSFORMER MOUNTINGS

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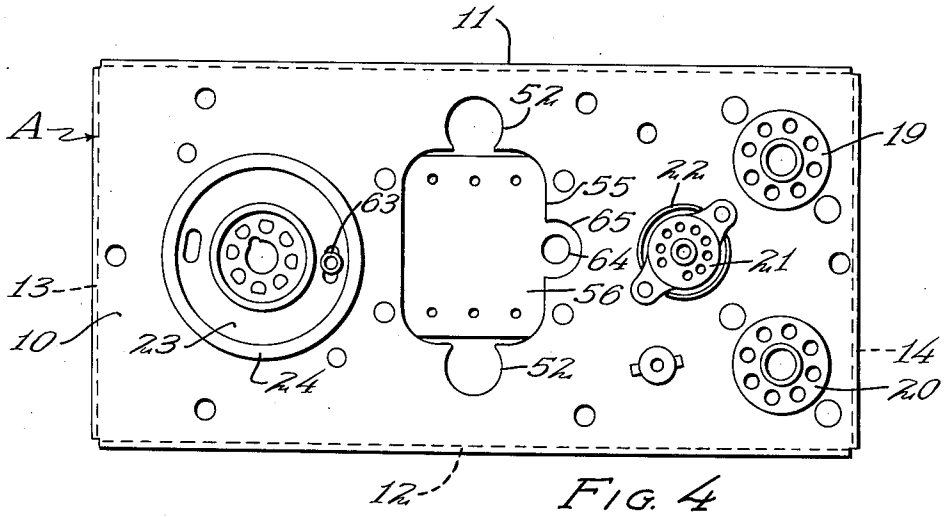


FIG. 4

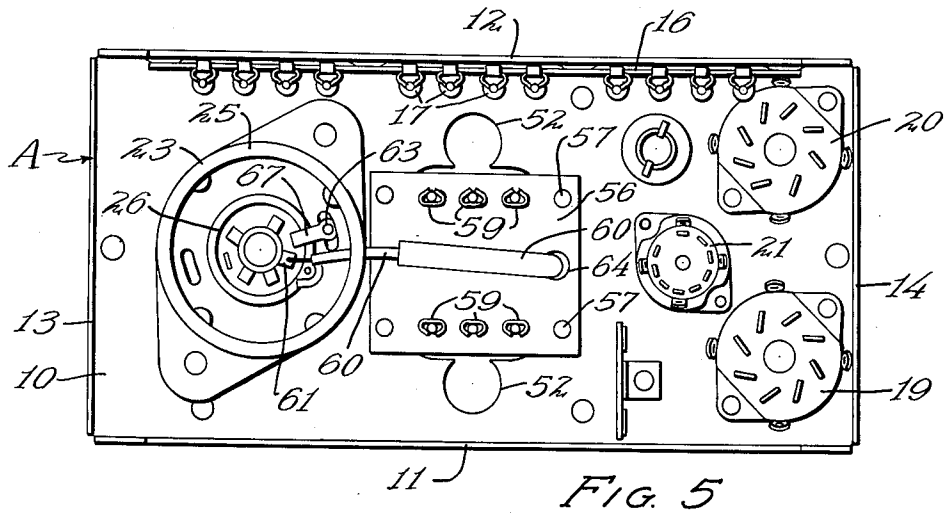


FIG. 5

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FLYBACK TRANSFORMER MOUNTINGS

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This invention relates to an improvement in flyback transformer mountings and deals particularly with a means of supporting a flyback transformer so that it may be readily tested and checked without injury to the transformer.

Flyback transformers of the type usually incorporated in television receiving sets is a delicate piece of equipment which comprises a common source of difficulty. The coils of such transformers are designed to develop perhaps 14,000 or 16,000 volts and as a result can be readily injured particularly in damp or humid weather by the tendency of the current to arc from one part to another. In view of the fact that such transformers are a common source of difficulty, repairmen servicing such sets have a tendency to blame the failure of portions of the transformer to function on the flyback transformer even when this transformer is in perfect operating condition. In view of the fact that these devices are delicate in nature, the removal of the transformer from the receiver chassis often permanently injures the transformer so that it must be discarded even though it was originally in working order. This obviously increases the cost of repairing faulty receiving sets and creates an unnecessary waste of material.

It is an object of the present invention to mount the flyback transformer upon a base which is removably supported upon the receiver chassis or upon a subchassis of the receiver set. As a result, if the transformer is suspected of being faulty and requiring replacement, the entire unit may be detached from the chassis and subjected to the necessary tests to determine whether or not the transformer requires replacement without any injury or damage to the transformer itself. Alternatively, the flyback transformer may be entirely removed from the chassis and replaced by a substitute transformer which is known to be in proper working order to provide a quick check to determine whether or not the transformer is in proper operation.

A feature of the present invention resides in mounting a flyback transformer upon a suitable platform or support, the support being provided with suitable parallel projecting prongs or plugs designed to fit into corresponding sockets mounted upon the chassis. The prongs on the transformer base are connected to the various terminals of the transformer so as to provide the proper current source to the transformer primary. Thus, when the transformer is in place, it may be readily removed from the chassis and replaced by a similar unit to provide a virtually instantaneous check on the flyback transformer and to determine almost immediately whether or not it is operating properly.

A further feature of the present invention resides in the provision of a device of the type described which in preferred form has all of its leads or connections readily detachable. In usual practice, the outputs from the secondary coil of the transformer is connected by heavily insulated conductors to the caps of the adjacent tubes mounted upon the chassis. These caps are readily removable from the tubes and accordingly this portion of the apparatus need not be changed, the disassembly operation including the step of removing the caps from the tubes, and then removing the entire transformer assembly from its mounting upon the chassis or subchassis.

A further feature of the present invention resides in the provision of a simple and effective filament generating coil used for generating filament voltage to one or more of the tubes. The primary of the flyback transformer may be provided with a single coil or single turn encircling the same designed to induce filament current to a vacuum tube. This arrangement requires two additional terminals connected to the ends of the single turn and forming the filament terminals of the tube socket. In order to eliminate the necessity of disconnecting these terminals upon removal of the transformer, I have provided a single turn of wire which is preferably permanently connected to one filament terminal of the tube socket and which is merely looped over the primary coil of the transformer. The other end of this conductor is equipped with a plug designed to removably and detachably engage into a socket electrically connected to the other filament terminal. Thus, the conductor forming the single turn may be merely withdrawn from its socket and swung out of coil encircling position when the flyback transformer is removed.

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 side elevational view of a subchassis of a television set upon which the flyback transformer is mounted, a portion of the chassis and transformer being cut away to better disclose the construction thereof.

FIGURE 2 is an end elevational view of the device shown in FIGURE 1, certain of the tubes having been removed to better disclose the transformer.

FIGURE 3 is a perspective view of the transformer and its support in an inverted position.

FIGURE 4 is a top plan view of the subchassis with the tubes and transformer removed therefrom.

FIGURE 5 is a bottom plan view of the subchassis illustrated in FIGURE 4.

The drawings in the present case illustrate a subchassis designed to fit upon a main television chassis for connection with various other units. The subchassis illustrated comprises the high voltage generating unit which normally includes the flyback transformer. In FIGURE 5 of the drawings, most of the wiring between the various elements has been eliminated to show the relationship of the parts. It will be understood that the tube socket illustrated in FIGURE 5, the flyback transformer sockets, and the series of sockets designed to engage with cooperable plugs on the main chassis are normally connected by conductors in a manner obvious to one skilled in the art and these conductors have been eliminated as they would tend to obscure many of the details of the construction.

As illustrated in the drawings, the subchassis A includes a top mounting panel **10**, parallel side wall panels **11** and **12**, and parallel end wall panels **13** and **14**. One of the side wall panels such as the panel **12** is provided with downwardly projecting ears **15** designed to engage into slots in the main chassis to properly locate the unit A thereupon.

As also indicated in FIGURE 5 of the drawings, the subchassis side wall **12** supports an insulation plate **16** upon which are mounted a series of spaced sockets **17**. These sockets **17** are designed to accommodate cooperable tongs mounted upon the main chassis to project in a suitable direction therefrom to provide a connection between the subchassis A and other components of the television receiving set. Obviously, the position of the sockets and prongs could be reversed without changing the nature of the invention.

The unit A is shown as having a pair of spaced tube sockets **19** and **20** near one end thereof and a third tube socket **21** provided with a shield frame **22** encircling the

same. The other end of the top panel 10 supports a ceramic socket support 23 including an upwardly directed peripheral flange 24 and a downwardly projecting peripheral flange 25. The tube socket 26 which forms a part of the ceramic socket support 23 is designed to support a high voltage tube 27 having a conductive terminal 29 projecting from its upper end. The tube 30 which is supported in the tube socket 21 is also provided with a shield conductor 31 projecting from its upper end. The conductive terminals 29 and 31 are detachably supported insulating caps 32 and 33 respectively having an inner conductive surface in contact with the terminals 29 and 31 and connected by conductors 34 and 35 respectively to portions of the flyback transformer which will be later described.

The flyback transformer is illustrated in general by the numeral 36 and includes a generally rectangular core frame 37 including a lower cross member 39, an upper cross member 40, and right angularly extending connecting portions 41 and 42. The primary coil 43 of the transformer 36 encircles the lower cross member 39 while the transformer secondary 44 normally encircles the upper cross member 40.

A terminal strip 45 of insulating material is mounted upon one of the connecting members 42 to serve as a connecting point for certain of the conductors. The conductor 34 previously described is shown as being directly connected to the transformer secondary 44 while the conductor 35 is connected to other parts of the transformer through a terminal 47 on the terminal strip 45.

The rectangular frame is made of compacted powdered metal or similar material having the proper characteristics for a transformer of this type. The connecting members 41 and 42 are usually at least partially enclosed within an enclosing housing having bolts or studs 49 and 50 projecting downwardly therefrom. These bolts or studs 49 and 50 are designed to extend through a generally rectangular insulation supporting panel 51 to connect the transformer body to the supporting panel. The subchassis panel 10 is provided with suitable apertures 52 extending therethrough through which the bolts or studs and their clamping nuts 53 may extend.

A series of spaced prongs 54 are supported by the supporting panel 51 and extend downwardly therefrom. These prongs 54 are similar to those found on the base of vacuum tubes or other bayonet type connections. As indicated in FIGURE 4 of the drawings, a portion of the chassis panel 10 between the apertures 52 is cut away as indicated at 55 to expose a mounting panel 56 of insulation material riveted or otherwise secured as indicated at 57 to the undersurface of the chassis panel 10. The insulation panel 56 supports a plurality of sockets 59 designed to accommodate the prongs 54 on the supporting panel 51. Accordingly, the transformer may be attached to the subchassis A by merely inserting the various prongs 54 into the sockets 59 which are designed to accommodate the prongs.

Thus, it will be seen that if a television repair man suspects that the flyback transformer is not functioning properly, the entire flyback transformer may be removed from the chassis by merely unplugging the same from the sockets 59, the other connections such as the caps 32 and 33 being removed from the upper ends of the tubes which they are designed to engage. By merely substituting a flyback transformer which is known to be functioning properly for that which is suspected of malfunction, a virtually instantaneous check may be obtained.

In order to provide filament voltage for supplying the tube 27, a heavily insulated conductor 60 is soldered or otherwise connected to a tube socket terminal 61 forming a part of the tube socket 26 which forms one terminal of the heater circuit. A resilient socket 63 similar to the sockets 59 previously described is attached to the

ceramic mounting 23 to extend through the surface thereof with the open end of the socket directed upwardly. The conductor 60 extends through an aperture 64 in the mounting panel 56 and through a larger aperture 65 in the chassis panel 10. The end of the conductor 60 which is not connected to the terminal 62 is provided with a plug or prong 66 which is engageable in the socket 63. Thus, in order to provide heater voltage to the tube 27, it is only necessary to loop the conductor 60 over the primary coil 43 of the flyback transformer and to insert the plug 66 into the socket 63, the socket 63 being connected to the tube socket terminal 67 which comprises the second filament terminal. Sufficient current is induced in the conductor 60 through the single turn to heat the filament of the tube 27.

The construction described has the advantage that the single turn of wire forming the heater circuit need not be formed as part of the transformer. This eliminates undue complication in the transformer and provides a readily detachable connection which serves the intended purpose.

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

I claim:

1. In a television receiving set, a chasis, an insulation member supported by said chassis, a flyback transformer, an insulation member attached to said flyback transformer, a series of conductive prongs connected in parallel relation on one of said members, a series of conductive sockets on the other of said members positioned to accommodate said prongs, whereby said flyback transformer may be detachably supported upon said chassis, a tube socket mounted on said chassis adjacent said insulation member, a socket extending through said chassis adjacent said tube socket, and a conductor connected to a terminal of said tube socket on one side of said chassis, said conductor extending through said chassis, around a portion of said flyback transformer, and engaged in said socket, said socket being electrically connected to another terminal of said tube socket.

2. A flyback transformer mounting for use in conjunction with a television set including a chassis, a flyback transformer having a generally rectangular core detachably connected to said chassis, a primary coil and a secondary coil encircling spaced portions of said core, a tube socket including a series of terminals mounted on said chassis adjoining said core, and a conductor connected to one of said terminals, encircling said primary coil, and being detachably connected to another of said terminals, said conductor being detachably connected to a second tube terminal by means of a plug and socket connection, said socket terminals being beneath said chassis, said conductor extending through said chassis and about said transformer primary, said plug and socket connections extending through said chassis.

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