Dec. 16, 1969 C. E. TAYLOR ET AL 3,484,696

DIRECT ANTENNA LEAD CONNECTION FOR A COMMUNICATIONS RECEIVER

Filed March 31, 1967

FIG. 1.

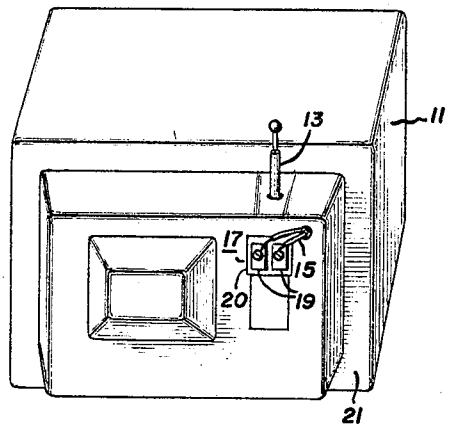


FIG. 2.

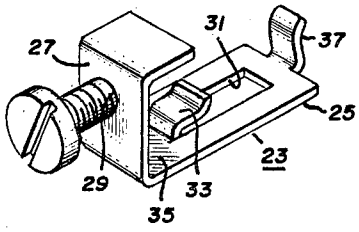


FIG. 3.

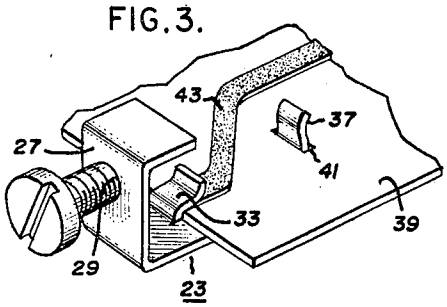


FIG. 4.

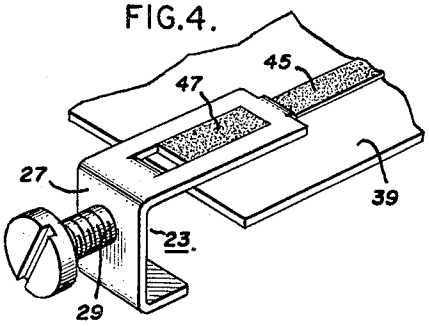
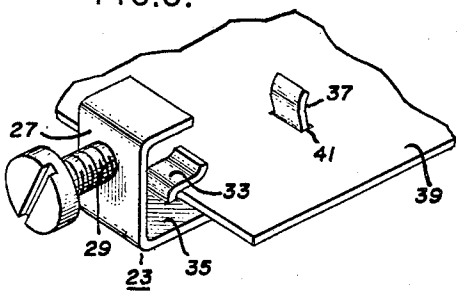


FIG. 5.



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DIRECT ANTENNA LEAD CONNECTION FOR A COMMUNICATIONS RECEIVER

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U.S. Cl. 325—354 15 Claims

ABSTRACT OF THE DISCLOSURE

An antenna lead connection comprises a conductive bracket including a first leg or base portion directly connected to a conductive path on a circuit board and a second leg projection carrying fastening means to be connected to the antenna lead. The fastening means comprises a screw inserted through an aperture in the projection. The projection is exposed through an aperture in the cabinet to allow ease in connection and disconneciton of the antenna lead to the electronic circuitry on the circuit board.

BACKGROUND OF THE INVENTION

This invention relates to an antenna lead connection for a communications receiver; more particularly, it relates to a direct antenna lead connection.

In existing radio and television receiver cabinets, it is the practice to utilize a terminal board on the exterior of the cabinet at which an antenna lead is connected. This terminal board is in turn connected to a twin lead extending to a tuner. Although the system as described has served adequately from a quality of reception standpoint, the terminal board and the twin leads are both relatively expensive in materials as well as installation costs.

With todays trend toward reduced cost in home entertainment receivers, the elimination of the terminal board and the twin leads becomes attractive and the extensive use of circuit boards in these receivers now renders this practicable.

While it is true that the prior art antenna lead connections have been unduly expensive, it is also true that these lead connections have been readily accessible and convenient for connection and disconnection of an antenna carried by the cabinet of the receiver as well as an antenna external to the receiver. However, this accessibility was never achieved at a reduced cost.

SUMMARY OF THE INVENTION

It is therefore an object of this invention to provide a connection between an antenna lead and the electronic circuitry of a communication receiver at a reduced cost.

It is a further object of this invention to provide this cost reduction without sacrificing the accessibility of the terminal to which the antenna is connected.

In accordance with these objects, this invention provides in one embodiment a conductive member exposed at the exterior of a receiver cabinet and extending into the interior thereof wherein it is in direct electrical and mechanical contact with the conductive path of a circuit board. The exposed portion of the conductive member includes fastening means for securing an antenna lead to the conductive member to effect in electrical connection between the antenna and electronic circuitry carried by the circuit board.

BRIEF DESCRIPTION OF THE DRAWING

This specification concludes with claims particularly pointing out and distinctly claiming the subject matter

which is regarded as the invention. The invention may also be understood from the following description taken in connection with the accompanying drawings in which:

FIGURE 1 is a rear perspective view of a receiver cabinet including the exposed portion of an antenna terminal;

FIGURE 2 is a perspective view of the direct antenna terminal connection of the invention including the fastening means as shown in FIGURE 1;

FIGURE 3 is a perspective view of the embodiment of the antenna terminal connection shown in FIGURE 2 in combination with a printed circuit board including a conductive path thereon;

FIGURE 4 is a perspective view of another embodiment of the antenna terminal connection as seen from beneath a printed circuit board including a conductive path; and

FIGURE 5 is a perspective view of the embodiment of FIGURE 4 as seen from above the printed circuit board.

DESCRIPTION OF THE EMBODIMENTS

Although the invention is applicable to any electronic device wherein it is necessary to connect and disconnect an internal or external antenna, the invention is particularly adaptable to a television receiver, as shown in FIGURE 1, wherein a retractable antenna **13** is carried by a cabinet **11**. This receiver configuration is characteristic of many portable receivers well known in the art which provide an antenna lead **15** connected to a terminal means. Since it has been desirable to connect and disconnect the lead **15**, a lead fastening means **17** is provided which traditionally comprises a threaded fastener or screw. Except for the retractable antenna **13**, the received configuration is equally characteristic of nonportable receivers wherein an exposed terminal is provided.

As discussed above, the configuration is that of the prior art and of the invention since the outward appearance of the direct terminal connection disclosed herein is similar to that of the prior art. However, the terminal means of the invention differs considerably in that the lead fastening means **17** includes two rigid conductive members **19** as opposed to the traditional insulative terminal board of the prior art. As shown, the rigid conductive member **19** are exposed at and/or extend through an aperture **20** in the rear **21** of the cabinet **11** although it is readily appreciated that the rigid conductive member may be positioned on any side of the cabinet **11** as has been characteristic of the terminal board of the prior art.

A preferred embodiment of each of the rigid conductive members **19** may be seen by reference to FIGURE 2 wherein a conductive bracket **23** is disclosed comprising a first leg or base portion **25** in perpendicular relationship with a second leg or connective projection **27** serving as the conductive member **19**. In order to secure the antenna lead **15** to the conductive bracket **23**, an aperture **29** is provided in the connective projection in which the lead fastening means **17** is threadedly engaged. An electrical connection is thereby completed through the antenna lead **15** and the conductive bracket **23** which is adapted to receive a circuit board means including electronic circuitry.

In order to receive the circuit board means and maintain a mechanical and electrical contact therewith, the base portion **25** includes an elongated aperture **31** therethrough and a flange **33** extending from the surface of the base portion **25** at one end of the elongated aperture **31**. A portion of the flange **33** extends substantially parallel to the surface **35** so as to form a clamp for restraining the circuit board means in a position parallel to the base portion **25**. In order to more fully restrain the circuit board means inserted in the clamps formed by the sur-

face 35 and the flange 33 of each conductive bracket 23, a normal projection 37 from the surface 35 is provided. As shown, the flange 33 and the projection 37 may be formed from a single metal member so as to more fully reduce the cost of the antenna connection.

The cooperation with a particular circuit board means may best be understood by reference to the alternative embodiments disclosed in FIGURES 3, 4 and 5. As shown in FIGURE 3, a circuit board 39 includes an aperture 41 through which the normal projection 37 is inserted thereby restraining movement of each conductive bracket 23 with respect to the circuit board 39. This restraint allows a foil or conductive path 43, connected to the electronic circuitry including a tuner not shown but carried by an extension of the board 39, to be maintained in electrical contact with the flange 33. As long as the bracket 23 is composed of a resilient material; i.e., steel, the resilience of flange 33 will be sufficient to provide good electrical contact as well as a mechanical clamping action restraining movement of the circuit board 39.

As shown in the alternative embodiment of FIGURE 4, a foil or conductive path 45 connected to the electronic circuitry carried by an extension of the board 39 not shown may be applied simultaneously with a solder connection 47 of the circuit board means in the elongated aperture 31 of the bracket 23. The solder connection 47 may be applied over the conductive path 45 simultaneously with the application of the electronic circuitry through a dip solder process which further reduces the cost of connecting the antenna lead 15 to the electronic circuitry mounted on the board 39. FIGURE 5 reveals the direct contact between the circuit board 39 and the flange 33 of the embodiment shown in FIGURE 4.

As disclosed in FIGURE 1, the television receiver 11 includes an antenna 13 which is electrically connected to the electronic circuitry carried by the board 39 through the terminal means including two brackets 23. It is, of course, readily appreciated as mentioned previously that the terminal means provided by the bracket 23 is readily applicable to a television or radio receiver wherein there is no antenna carried by the receiver but connection to an antenna external to a receiver is desirable. The terminal means disclosed herein is applicable to such a receiver as well as the receiver wherein alternate connections between the internal and external antennas is desirable.

The invention may also be practiced by utilizing four such brackets 23 to accommodate UHF-VHF reception. This would, of course, entail the use of a board including four such conductive paths 43 or 45.

It is also appreciated that the structure of the bracket 23 might vary and still lie within the scope of the invention. In particular, the flange 33 or projection 37 might be eliminated relying solely on the soldered connection 47 for a mechanical as well as an electrical connection. Alternatively, the aperture 31 might be eliminated to rely solely upon the flange 33 and the normal projection 37 for electrical contact and mechanical support for the bracket 23.

Although specific embodiments of the invention have been shown and described, it is not desired that the invention be limited to the particular form shown and described, and it is intended by the appended claims to cover all modifications within the spirit and scope of the invention.

What is claimed and desired to be secured by Letters Patent of the United States is:

1. In an electronic communications receiver comprising a cabinet and electronic circuitry enclosed therein, an improvement in means for connecting an antenna lead to the electronic circuitry, said means comprising:
   (a) a rigid conductive member extending to the exterior of the cabinet,
   (b) the cabinet having an aperture adjacent to the conductive member for exposing the conductive member, and
   (c) a circuit board means carrying the electronic circuitry and including a conductive path, said circuit board means in contact with a portion of said rigid conductive member at said conductive path so as to electrically connect said rigid conductive member to said conductive path.

2. The electronic communications receiver of claim 1 wherein said conductive member extends through the aperture to the exterior of the cabinet.

3. The electric communications receiver of claim 2 wherein the improvement includes lead fastening means mounted on the rigid conductive member adjacent the aperture.

4. An electronic communications receiver comprising a cabinet and electronic circuitry enclosed therein, an improvement in means for connecting an antenna lead to the electronic circuitry, said means comprising:
   (a) a conductive bracket including a base portion, a connective projection, and an antenna fastening means positioned on said connective projection,
   (b) an aperture in the cabinet adjacent said connective projection for exposing the conductive member.
   (c) circuit board means carrying electronic circuitry and including a conductive path connected thereto, said circuit board means and said conductive path parallel to and in contact with said base portion so as to electrically connect the antenna lead to said conductive path.

5. The electronic communications receiver as recited in claim 4 wherein said base portion has an aperture therethrough overlying said conductive path, and said circuit board means includes a soldered connection made in the aperture in said base portion so as to electrically connect said conductive path to said conductive brackets.

6. The electronic communications receiver as recited in claim 5 wherein said base portion includes a flange extending from one surface thereof, said flange including a portion substantially parallel to said base portion so as to form a clamp, said circuit board inserted in the clamp to mechanically secure said circuit board means to said conductive bracket.

7. The electronic communications receiver as recited in claim 6 wherein said base portion includes a projection normally extending from the one surface of said circuit board means, said circuit board means having an aperture therein with said projection extending therethrough in order restrain movement of said circuit board means.

8. The electronic communications receiver in claim 7 wherein said fastening means comprises a threaded fastener inserted through an aperture in said connective projection.

9. The electronic communications receiver in claim 8 wherein the connective projection is external to the cabinet.

10. The electronic communications receiver of claim 9 wherein the improvement comprises a plurality of such conductive brackets and a plurality of such conductive paths.

11. The electronic communications receiver of claim 4 wherein said base portion includes a flange extending from one surface thereof, said flange including a portion substantially parallel to said one surface so as to form a clamp, said circuit board means inserted in said clamp at said conductive path to mechanically and electrically secure said circuit board means to said bracket.

12. The electronic communications receiver as recited in claim 11 wherein said base portion includes a projection normally extending from the one surface, said circuit board including an aperture therein with said normal projection extending therethrough to restrain movement of said circuit board means.

13. The electronic communications receiver as recited in claim 12 wherein said lead fastening means comprises a threaded fastener through an aperture in said connective projection.

14. The electronic communications receiver as recited in claim 13 wherein said connective projection is external to the cabinet.

15. The electronic communications receiver of claim 14 wherein the improvement comprises a plurality of such conductive brackets and a plurality of such conductive paths.

References Cited

UNITED STATES PATENTS

3,346,863	10/1967	Siebold	343—702 X
3,378,806	4/1968	Wilkerson et al.	339—17

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U.S. Cl. X.R.

339—17; 343—702