May 20, 1969 H. E. JOHNSTON ET AL 3,445,803

ELECTRICAL APPARATUS

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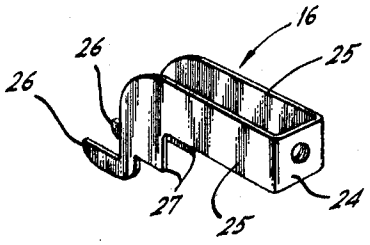


FIG. 1.

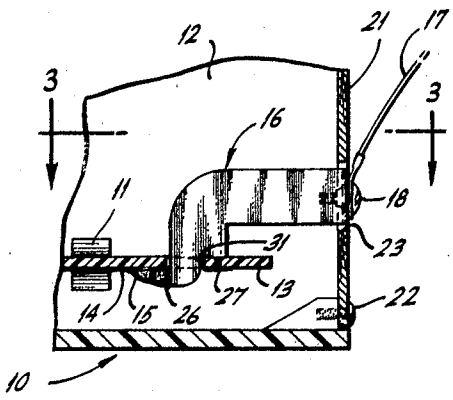


FIG. 2.

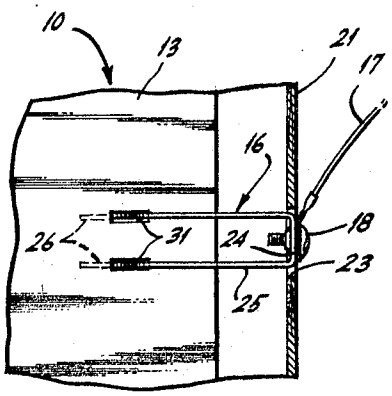


FIG. 3.

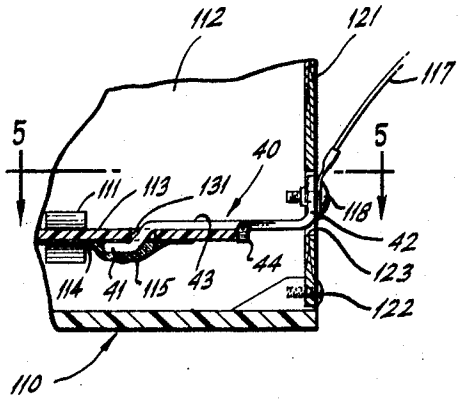


FIG. 4.

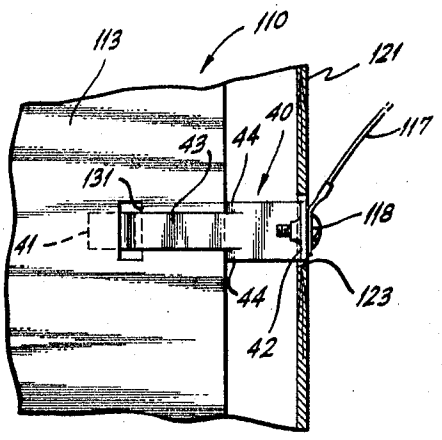


FIG. 5.

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ELECTRICAL APPARATUS

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U.S. Cl. 339—17 2 Claims

ABSTRACT OF THE DISCLOSURE

An antenna connector terminal adapted to be mounted on a radio receiver's printed circuit board, and to be dip soldered directly to a printed conductor on said board. A portion of the terminal extends through an aperture in the receiver's back panel and is provided with a conventional screw fastener for making connection to an antenna lead-in.

Background of the invention

This invention relates to electrical apparatus, and more particularly to improvements in electrical terminal means for printed circuit boards.

In the construction of radio receivers, it is a common practice to make the connection between an antenna and a printed wiring circuit through a terminal affixed to the back panel of cabinet structure housing the receiver. From this terminal there extends a conductor soldered, or otherwise connected, to the printed circuit. Connection to the antenna itself is usually accomplished by screw means threaded into the terminal and securing the antenna lead-in. Such arrangements have proven costly and difficult to assemble due to the need for providing lengths of wire, and terminals therefor, to accommodate attachment and removal of the back panel during both assembly and servicing of the receiver.

The present invention provides improved terminal means for a printed circuitboard eliminating certain of the aforementioned connector elements. The construction of this improved terminal means facilitates its assembly with a printed circuit board.

Summary of the invention

In achievement of the foregoing and other objectives, the invention contemplates provision of a unitary antenna connector terminal adapted to be mounted on the printed circuit panel of a radio receiver, and to be soldered directly to a printed conductor thereon, for example during a dip soldering operation. A projecting portion of the terminal extends through an aperture in the receiver's back panel and is provided with conventional screw fastener means for making connection to an antenna or antenna lead-in.

Advantageously, the unitary, panel-mounted connector terminal of the present invention eliminates the separate screw fastener which is conventionally mounted on the back panel and which must be connected to the printed circuit board by way of a separate, insulated conductor.

Brief description of the drawing

The manner in which the foregoing and other objectives and advantages of the invention may best be achieved will be more clearly understood from a consideration of the following description, taken in light of the accompanying drawing in which:

FIGURE 1 is a perspective view of terminal means embodying constructional features of the invention;

FIGURE 2 is an elevational view, partly in section and with parts broken away, of electronic receiver cabinet structure incorporating the terminal means shown in FIGURE 1, and illustrating additional constructional features of a preferred embodiment of the invention;

FIGURE 3 is a view of apparatus shown in FIGURE 2, looking in the direction of arrows 3—3 applied to FIGURE 2;

FIGURE 4 is a view similar to FIGURE 2, and illustrating a modified embodiment of the invention; and

FIGURE 5 is a view of apparatus shown in FIGURE 4, as seen looking in the direction of arrows 5—5 applied thereto.

Description of the preferred embodiment

With more particular reference to the drawing, and first to FIGURES 1, 2 and 3, electronic receiver cabinet structure designated generally by the numeral **10** includes lug means **11** positioned on side walls **12** and supporting a printed circuit board **13**. The printed circuit includes a number of conductive strips, one of which is seen at **14**, extending across the bottom of board **13**. A terminal **16** for antenna lead-in **17** is both electrically and mechanically connected by solder **15** to strip **14**. It will of course be understood that other receiver components and conductive strips are associated with board **13**, and that a pair of terminals **16** may be used depending upon the type of antenna provided for the receiver illustrated by way of example. However no description of such additional components, strips, and terminals need be undertaken for an understanding of this invention. Cabinet structure **10** further includes a rear cover **21** attached by screws **22**, according to conventional practice. Cover **21** includes an opening **23** through which a threaded portion **24** of terminal **16** is presented for attachment thereto of lead-in **17** by screw **18**.

Terminal **16** further includes a pair of elongate, relatively flat parallel prong portions **25** interconnected by the aforementioned threaded portion **24** extending transversely of the prong portions, portion **24** being also relatively flat and positioned in substantially coplanar relationship with the cover **21**. Preferably each of prong portions **25** is disposed in a vertical plane, and includes a horizontally extending intermediate section from which depends a generally hook-shaped section **26** and an abutment section **27**. Each of sections **26** is disposed in frictional engagement with panel portions adjacent one of a pair of like apertures **31** provided in circuit board **13**. Retention in apertures **31** is such that each section **26** abuttingly engages a printed circuit strip, such as strip **14**, and is solder-connected, permanenlty retaining the terminal. Each section **27** abuttingly engages the upper, insulative portion of board **13**. Frictional retention of the terminal is aided, especially prior to and during a soldering operation, by the inherent resilience of prong portions **25** tending to urge hook-shaped sections laterally into frictional engagement with opposed sides of apertures **31**.

It will be appreciated that the disclosed cantilever support of terminal **16** well away from the edge of the board facilitates movement thereof along conveyor means by which board is presented for handling by automatic machinery. Also the manner of support of terminal **16** makes possible presentation of the threaded portion of the terminal directly into panel opening **23**, without need for intermediate connecting elements. In effect, the antenna lead-in is connected directly to the antenna circuit on the circuit board.

Description of the modified embodiment

A modified embodiment of the invention is illustrated in FIGURES 4 and 5, and compries a terminal **40** pro-

vided with: a bent end portion **41** extending through opening **131** in circuit board **113**; an opposite threaded end portion **42** in aperture **123** of cabinet back panel **121**; and an intermediate portion **43** extending across the upper insulative portion of board **113**. A pair of tabs **44** are downturned from intermediate portion **43** and engage the edge of the board. An antenna lead-in **117** is attached to threaded end portion **42** by a screw **118**, and end portion **41** is connected by solder **115** to circuit **114**. Bent portion **41** and tabs **44** are cooperatively disposed with respect to board **113** to enhance rigidity of terminal **40** both prior to and after solder attachment of the terminal to the board. The above described elements are housed in a cabinet **110**, attachment of panel **121** being effected by screws **122**, and board **113** being supported by lug means **111** on cabinet side walls **112**.

It will be appreciated that the invention affords an economical antenna terminal design that eliminates costly wiring and accommodates attachment of the terminal by either dip or hand soldering techniques.

We claim:

1. In combination, generally rectangular cabinet structure including a pair of planar walls intersecting at a substantially right angle, one of said walls having an opening, a circuit carrying panel supported in spaced confronting adjacency to an interior surface of the other of said walls and having aperture, means adjacent a circuit element thereon, a terminal device providing for electrical connection to said circuit element, and comprising: a generally U-shaped member of electrically

conductive material having free ends of leg portions thereof extending into said panel aperture means for solder connection with said circuit element, the intermediate leg portions of said member extending over an insulative surface of said panel, and electrical connector means carried by the looped end portion of the generally U-shaped member and disposed in registry with said opening in said one wall.

2. The combination according to claim **1**, and further characterized in that said terminal device is flexible and resilient, and the free end portions thereof are resiliently urged away from one another and into abutting engagement with confronting portions of the walls that define said aperture means therein.

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U.S. Cl. X.R.

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