March 25, 1952 J. L. KISER 2,590,821

POTTED ELECTRICAL SUBASSEMBLY

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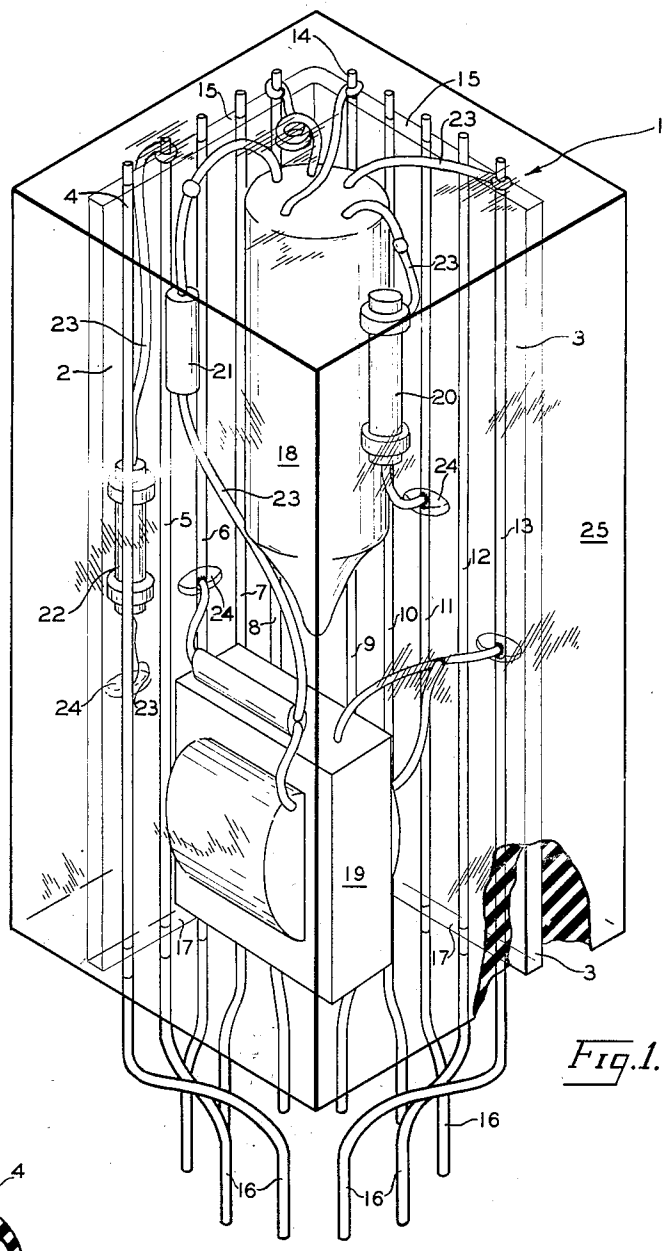


Fig. 1.

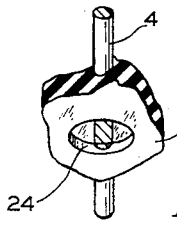


Fig. 2.

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POTTED ELECTRICAL SUBASSEMBLY

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5 Claims. (Cl. 173—324)

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This invention relates generally to devices for facilitating electrical wiring, and more particularly to systems for readily enabling the compact inter-connection of a plurality of radio components in a small volume.

It is a broad object of the present invention to provide a system for facilitating electrical inter-connection of electrical or radio components intended to occupy a small volume.

It is a further broad object of the present invention to provide a novel terminal board for electrical wiring.

Briefly described, my invention comprises a structure fabricated of plastic and containing, embedded therein, a plurality of metallic rods. In one preferred embodiment of the invention the member may be fabricated in the form of a pair of plane sheets occupying mutually perpendicular planes, the metallic rods extending parallel to the line of intersection of the planes. This specific shape may be adopted for purposes of convenience, but does not partake of the essence of the invention, in accordance with which arcuate sheets may be employed, or single plane sheets, or structures of any other desired form or shape which may be convenient for performing a given wiring operation.

The electrical elements which are to be interconnected are secured to the terminal board by being wired to the metallic rods, access to which is provided as required by drilling a small hole through the plastic material to the rod. The ends of the rods may be left uncovered, in forming the plastic about the rods, to provide some terminals accessible without drilling. Each rod, moreover, may be drilled entirely therethrough, to form a pair of electrically isolated collinear rods, if required.

One end of each of the rods may protrude from the plastic material sufficiently to enable forming of the ends to a contour adapted to enable the ends to be inserted in the apertures of a multi-contact plug-in socket, the assembled and pre-wired electrical or radio components providing thus a pre-wired plug-in sub-assembly.

When an entire sub-assembly has been completely wired the terminal board with its assembled components may be potted or cast in plastic material, preferably of the same character as that comprising the terminal board, to protect the wired elements against shock or changes in atmospheric conditions.

The above and still further objects, features and advantages of the present invention will become evident upon consideration of the following detailed description of one specific embodiment thereof, especially when taken in conjunction with the accompanying drawings, wherein:

Figure 1 is a view in perspective illustrating a a complete sub-assembly fabricated in accordance with the invention; and,

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Figure 2 is a fragmentary view illustrating a conductive rod embedded in a plastic sheet having an aperture for permitting access to the rod.

Referring now more specifically to the drawings, and particularly to Figure 1 thereof, the reference numeral 1 identifies a plastic sheet formed of two plane structures 2 and 3 integrally secured together at right angles to one another. Passing through each of the plane structures, and embedded completely therein, are electrically conductive rods numbered 4 to 13, inclusive, ends 14 of each of which protrude slightly from one edge 15 of the plane structures 2 and 3, and the other ends 16 of which protrude extendedly from the opposite edges 17. The ends 16 are then formed, as by means of a suitable die, to a contour adapted to enable the ends 16 to be inserted in the apertures of a multi-contact plug-in socket (not illustrated).

The various electrical elements, such as a miniature electronic valve 18, a transformer 19, and resistors 20, 21, 22 may be electrically connected to the conductive rods 4—13, in a manner determined by the desired inter-connections thereof, by means of leads 23, which may be soldered selectively to the conductive rods via apertures 24 formed by removing the material of the plastic sheet 1 sufficiently to expose a small portion of the rod as desired, or which may be extended to the otherwise exposed end portions 14 of the rods.

Operating potentials may be supplied to the electrical components, as to the electronic valve 18 or to the transformer 19, via certain ones of the rod ends 16, and output signals taken from others of the rod ends 16, as desired, and in accordance with any predetermined wiring plan.

The plastic sheets 2, 3, provide then a rigid support for the electrical elements to be interconnected, and the rods 4—13, inclusive, provide, in effect, rigid bus bars to which connection may be made at any convenient place, the rods being, however, normally insulated. The rods themselves then provide plug-in terminals.

It will be noted that resistor 22 is located exteriorly of the angle formed by the sheets 2 and 3. Any number of electrical elements may be so located, if desired, since the rods 4—13, inclusive, are equally accessible from either side of the sheets 2, 3.

The device of the invention, accordingly provides an extremely efficient device for facilitating wiring of electrical components into a unitary sub-assembly. In practice, and by means of numerous production tests, it has been established that a sub-assembly may be completely wired by utilizing the device of the invention, with greater rapidity and less difficulty of manipulation, and hence with greater economy and less strain on the wiring personnel, than by any other of the many wiring systems, and expedients for facilitating difficult wiring problems, which

were tested. The assembly, when completed, is rigid and provides solid support for the electrical elements interconnected, so that they may be handle without being damaged by slight lack of care and hence without the exercise of extreme and time consuming caution.

After a sub-assembly has been completed it may be potted, or cast, in plastic material 25, which may be of the same character as the material of which the structure 1 is formed, the latter then being substantially invisible within the casting, even if the latter is translucent. The completed casting is substantially impervious to shock, or to variations of atmospheric conditions, besides being extremely compact, and thus lends itself well to miniaturization in the field of radio construction.

Reference is here made to prior application for U. S. Patent, Serial #43,437, filed in the name of Russell E. Cunningham on August 10, 1948, and entitled "Potting of Electrical Components," which disclosed novel methods and expedients relating to the art of potting and casting electrical components within plastic material, without damage to the components or cracking of the plastic. These methods and expedients may be employed in casting of sub-assemblies wired in accordance with the present invention.

While I have described one specific example of my invention, in accordance with the requirements of the statues of the United States relating to Letters Patent, it will be clear that variations of the specific structure and arrangement described and illustrated may be resorted to without departing from the true spirit and scope of the invention.

What I claim and desire to secure by Letters Patent of the United States is:

1. A wired structure comprising a unitary sheet of plastic material, said sheet having a longitudinal bend to provide elements in planes at an angle to one another, said sheet comprising a plurality of metallic rods each comprising an extended portion completely embedded in said sheet and extending parallel to said longitudinal bend, and a further portion extending from said sheet, a plurality of electronic components having leads, a plurality of apertures extending through said plastic material to selected ones of said rods, soldered connections from said leads to said rods via said apertures, and a mass of plastic material enclosing said sheet of plastic material and said electronic components and said soldered connections, and free of said further portions of said rods extending from said sheets.

2. A structure for facilitating wiring of a subassembly suitable for plug-in to a socket, comprising, a sheet of plastic material having a longitudinal dimension, a plurality of metallic rods extending through said plastic material parallel to one another in said longitudinal dimension, an extended portion of each of said rods completely embedded in said plastic material, and an end portion of each of said rods extending from said plastic material, said end portions bent to provide prongs for insertion into said socket, a plurality of electronic components having leads, a plurality of apertures extending through said plastic material to selected ones of said rods, connections from said leads to said rods via said apertures, and a mass of plastic material enclosing said sheet of plastic material and said electronic components and said connections, and free of said end portions of said rods extending from said sheet of plastic material.

3. A potted assembly of electrical components adapted for plug in to a socket having a plurality of apertures, comprising, a sheet of plastic material, having a longitudinal dimension and a transverse dimension and a predetermined thickness, a plurality of electrically conductive rods extending parallel to one another and to said longitudinal dimension, said rods having portions completely embedded within said sheet of plastic material and having ends extending beyond and out of said sheet of plastic material, said ends formed as prongs for plugging into said apertures of said socket, and apertures in said plastic sheet extending each to one of said electrically conductive rods, a plurality of electrical components of diverse nature, means for connecting said electrical components to said rods via said apertures in said plastic sheet, and a mass of nonhygroscopic and relatively shockproof plastic potting material enclosing said sheet of plastic material, and said electrical components, to provide a potted assembly of wired electrical components having prongs for insertion into said socket.

4. A structure for facilitating wiring of a subassembly suitable for plug-in to a multi-prong socket, comprising, a sheet of plastic material having a longitudinal dimension, a plurality of metallic rods having portions embedded in said sheet of plastic material and extending parallel to one another and parallel to said longitudinal direction, said metallic rods each having an end portion extending from said sheet of plastic material, said end portions bent to provide multiple prongs for said multi-prong socket, at least one electrical component having at least one lead, an aperture in said sheet of plastic material extending at least to one of said metallic rods, means for connecting said at least one lead via said aperture to said one of said metallic rods, and a mass of plastic material surrounding said sheet of plastic material and said at least one electrical component and free of said end portions.

5. A wired structure, comprising, a relatively thin sheet of plastic material, a metallic rod extending longitudinally through said sheet of plastic material and embedded therein, an end of said rod extending outside said sheet of plastic material, an opening in said sheet of plastic material exposing said metallic rod, an electrical component connected to said rod via said opening, a mass of plastic material enclosing said sheet of plastic material and said electrical component and exposing said end of said rod.

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