

Jan. 5, 1937.

H. G. ARLT

2,066,511

WIRING DEVICE

Filed July 20, 1935

2 Sheets-Sheet 1

FIG. 1

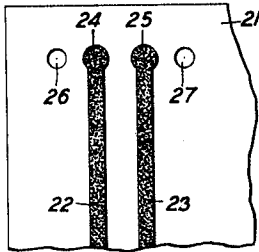


FIG. 2

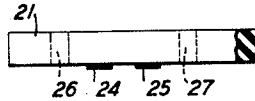


FIG. 3

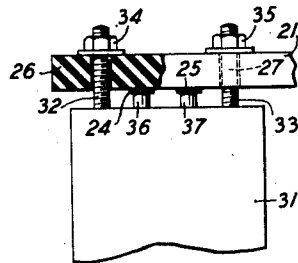


FIG. 4

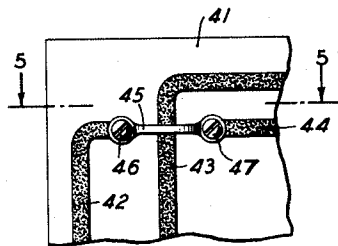


FIG. 5

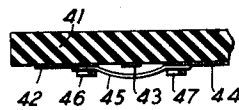


FIG. 6

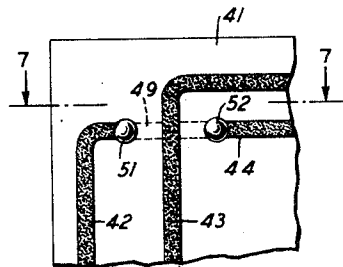


FIG. 7

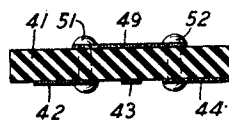


FIG. 8

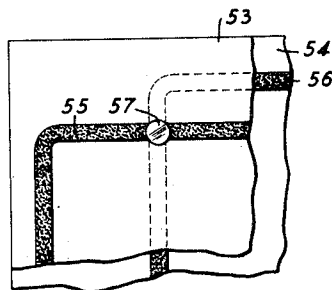
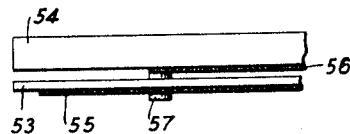


FIG. 9



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FIG. 10

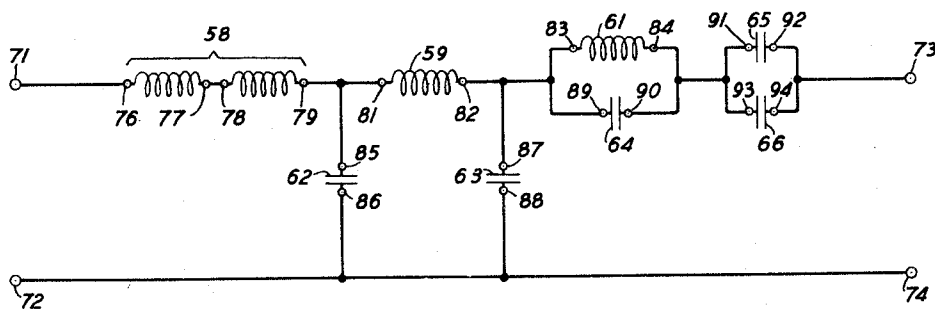


FIG. 11

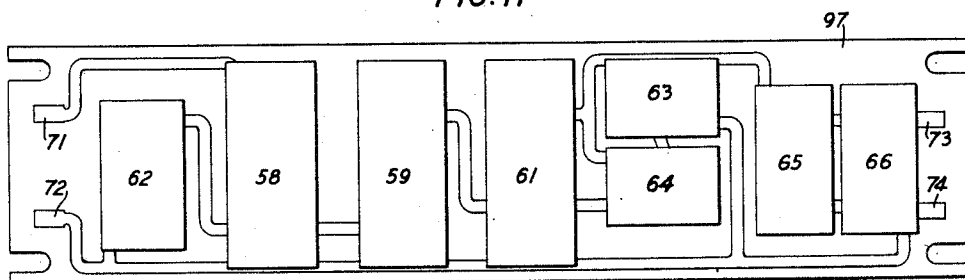
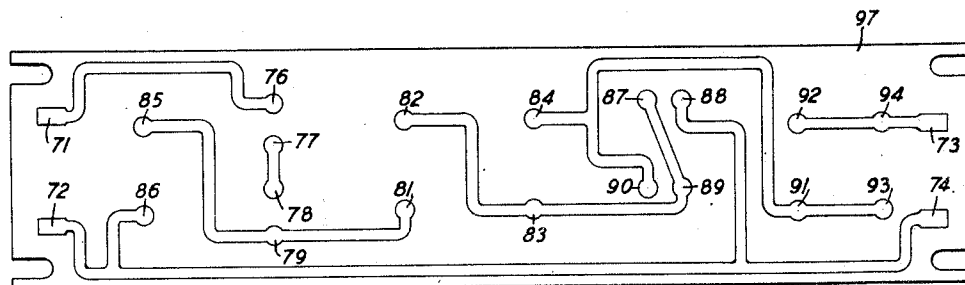


FIG. 12



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UNITED STATES PATENT OFFICE

2,066,511

WIRING DEVICE

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Application July 20, 1935, Serial No. 32,353

1 Claim. (Cl. 175—298)

This invention relates to a multiple wiring device for connecting the terminals of electrical apparatus. The device is particularly adaptable for use in connecting the terminals of apparatus of the type mounted in groups on insulating panels.

An object of the invention is to facilitate the interconnection of the terminals of electrical apparatus.

Another object of the invention is to eliminate the use of solder devices, binding posts and other similar connecting means heretofore utilized for connecting electrical apparatus.

It is common practice in the telephone and radio arts and, indeed, in the electrical industry generally, to mount a plurality of electrical apparatus units on a common panel, the terminals of said units being interconnected in accordance with a predetermined circuit layout by means of wires or bus-bars usually attached to said terminals by connecting screws or by soldered connections. Considerable time is required for positioning and attaching the connecting wires and, unless the connections to the terminals are carefully made, "loose connections" are apt to result after a short period of use. Again, it is often necessary to remove one or more of the units from the assembly for inspection, adjustment or replacement which of course necessitates the removal of a number of connecting screws or the destruction of soldered connections.

According to a feature of the present invention, the use of connecting wires, as the term is ordinarily understood, is eliminated, the terminals being interconnected by conductive strips affixed directly to the mounting panel in accordance with a predetermined circuit layout or diagram. The use of connecting screws, soldered connections and the like is also eliminated, the terminals of the apparatus being brought into direct contact with the proper conductive strip or strips when the apparatus unit is mounted in its preassigned space on the panel.

In accordance with a specific embodiment of the invention conductive strips are applied to an insulating panel by the spraying process commonly known as the Schoop's process. The strips are applied in accordance with a predetermined pattern or layout conforming to the circuit in which the connected apparatus is to function. The panel is provided with mounting holes for each apparatus unit, these holes also being located in accordance with a predetermined layout. Terminals are provided on each apparatus unit, so located that, when the unit is mounted in its

preassigned space on the panel, the terminals are brought into direct contact with the proper conductive strip or strips on the panel.

The arrangement contemplated by the invention is particularly adaptable to mass production, i. e. instances where a large number of assemblies wired in the same manner are to be produced. In such a case a stencil is usually prepared in accordance with the layout desired and utilized during the spraying to facilitate application of the strips in the proper manner.

A complete understanding of the invention and of the various features thereof may be gained from a consideration of the following detailed description in connection with the annexed drawings in which:

Fig. 1 is a front elevation of a portion of a mounting panel provided with connecting strips of the nature contemplated by the invention;

Fig. 2 is a plan view of the portion of the panel shown in Fig. 1;

Fig. 3 is a view similar to that of Fig. 2, an apparatus unit being shown mounted on the panel;

Fig. 4 is a front elevation of a portion of a mounting panel showing a method of bridging one conductive strip over an intervening strip;

Fig. 5 is a sectional view taken on line 5—5 of Fig. 4;

Fig. 6 is a front elevation of a portion of a mounting panel showing another method of carrying one conductive strip past an intervening strip;

Fig. 7 is a sectional view taken on line 7—7 of Fig. 6;

Fig. 8 is a front elevation of a portion of an assembly comprising two superimposed panels, a connecting strip of the nature contemplated by the invention being provided on each panel, the two strips being connected by means of the rivet shown;

Fig. 9 is a plan view of the portion of the assembly shown in Fig. 8;

Fig. 10 is a circuit diagram of an electric wave filter;

Fig. 11 is a front elevation of a panel upon which are mounted the apparatus units utilized in the filter shown in Fig. 10; and

Fig. 12 is a front elevation of the panel shown in Fig. 11, the apparatus units being omitted to show more clearly the arrangement of the connecting strips.

Referring now to the drawings, there is shown in Fig. 1, a portion of an insulating panel 21 upon which are provided two conductive strips 22 and

23. These strips are preferably applied to the panel by spraying metallic particles thereon in accordance with the process commonly referred to as "Schooping". (The "Schooping" process is well-known and need not be here described. For a description of the process reference may be made to M. U. Schoop United States Patents 1,128,058 and 1,133,507 issued February 9, 1915, and March 30, 1915, respectively.) The strips are provided with enlarged end portions 24 and 25 the purpose of which will be apparent from the subsequent description. Mounting holes 26 and 27 are provided in the panel, these holes, as well as the conductive strips, being located on the panel in accordance with a predetermined layout. The layout, in turn, is patterned in accordance with the electrical circuit in which the apparatus mounted on the panel is intended to function.

20 Referring now to Fig. 3, an apparatus unit 31, which may be, for example, a resistance, is shown mounted on panel 21, mounting bolts 32 and 33 passing through holes 26 and 27 and being held in place by nuts 34 and 35. Apparatus unit 31 is provided with terminals 36 and 37 so located that, when the unit is mounted in place on the panel as shown, the terminals are brought into firm contact with enlarged portions 24 and 25, respectively, of the connecting strips.

30 It will be apparent from the above that the terminals 36 and 37 of apparatus unit 31 have been electrically connected to conductive strips 22 and 23, respectively, merely through the step of mounting the unit in its preassigned space on the panel. The manner in which the conductive strips are utilized in interconnecting a plurality of apparatus units and in making connections to external circuit terminals will be described later on when reference is made to Figs. 10 to 12.

40 Referring now to Figs. 4 and 5, a section of a panel 41 is shown upon which are provided three conductive strips 42, 43, and 44. It is assumed that it is desired to electrically join strips 42 and 44, no connection to be made, however, to the intervening strip 43. To accomplish this a bowed bridging member 45 of conductive material is utilized, one end of the bridging member being electrically connected to strip 42 by screw 46 and the other end being connected to strip 44 by screw 47. The curvature of member 45 is such that it passes over conductive strip 43 without making contact therewith.

55 Referring now to Figs. 6 and 7 an alternative method of joining strips 42 and 44 without making contact with the intervening strip 43 is shown. In accordance with this arrangement a short conductive strip 49 is affixed to the rear of the panel, conductive rivets 51 and 52 which pass through the panel being utilized to electrically connect strip 49 to strips 42 and 44.

60 In certain instances it may be found desirable to utilize a plurality of mounting panels superimposed one on the other, each of the panels being provided with suitable connecting strips. Such an arrangement, comprising two superimposed panels 53 and 54, is disclosed in Figs. 8 and 9, the panels being provided with respective connecting strips 55 and 56. A conductive rivet 57 is shown in position to electrically interconnect strips 55 and 56.

70 Referring now to Fig. 10 an electrical wave filter is shown which may be designed, for example, in accordance with the principles set forth in G. A. Campbell United States Patents 1,227,113

and 1,493,600 issued, respectively, May 22, 1917, and May 13, 1924. As shown the filter comprises inductances 58, 59 and 61 and condensers 62, 63, 64, 65 and 66. Terminals 71, 72, 73 and 74 are provided for connections to the external circuits.

Inductance 58 is provided with terminals 76, 77, 78 and 79, inductance 59 with terminals 81 and 82 and inductance 61 with terminals 83 and 84 while condenser 62 is provided with terminals 85 and 86, condenser 63 with terminals 87 and 88, condenser 64 with terminals 89 and 90, condenser 65 with terminals 91 and 92 and condenser 66 with terminals 93 and 94.

Fig. 11 shows in a somewhat schematic manner the arrangement on mounting panel 97 of the inductances and condensers utilized in the filter shown in Fig. 10.

It will be understood that each of the apparatus units is provided with terminals similar to terminals 36 and 37 of unit 31 (Fig. 3) and that the terminals are so located that, when the various units are mounted on the panel as shown in Fig. 11, contact is made with the proper conductive strips.

The layout of the conductive strips and the arrangement of the terminals necessary for properly interconnecting the inductances and condensers comprising the filter are shown in Fig. 12.

It is believed that the advantages of the present invention will be apparent from the above description as illustration has been made of the manner in which interconnection of apparatus units comprising complicated electrical circuits such as wave filters may be accomplished without the use of soldered connections, binding posts or other types of connecting means heretofore utilized. In accordance with the invention, connection of the units is, as pointed out above, brought about as the units are mounted in their respective preassigned locations on the panel. Application of the conductive strips by spraying is an economical method, readily adaptable to mass production and productive of a smooth even coating of the type necessary for satisfactory contacts.

While certain embodiments of the invention have been selected for detailed description, the invention is not of course limited in its application to the embodiments described. These embodiments should be taken as illustrative of the invention rather than restrictive thereof.

What is claimed is:

A multiple wiring device comprising an insulating support, a plurality of conductive members sprayed on one side of said insulating support in accordance with a predetermined layout the direction of certain of said conductive members for a part of their length being such with respect to the direction of certain of the others of said conductive members for a part of their length that the paths of said first-mentioned conductive members intersect the paths of said last-mentioned conductive members, and means for preventing electrical contact between said conductive members at the points of intersection of said paths, said means comprising a conductive member sprayed on the other side of said insulating support and means extending through said insulating support for electrically connecting the conductive member sprayed on said other side of said support to certain of the conductive members sprayed on the first-mentioned side of said support.

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