

July 25, 1961

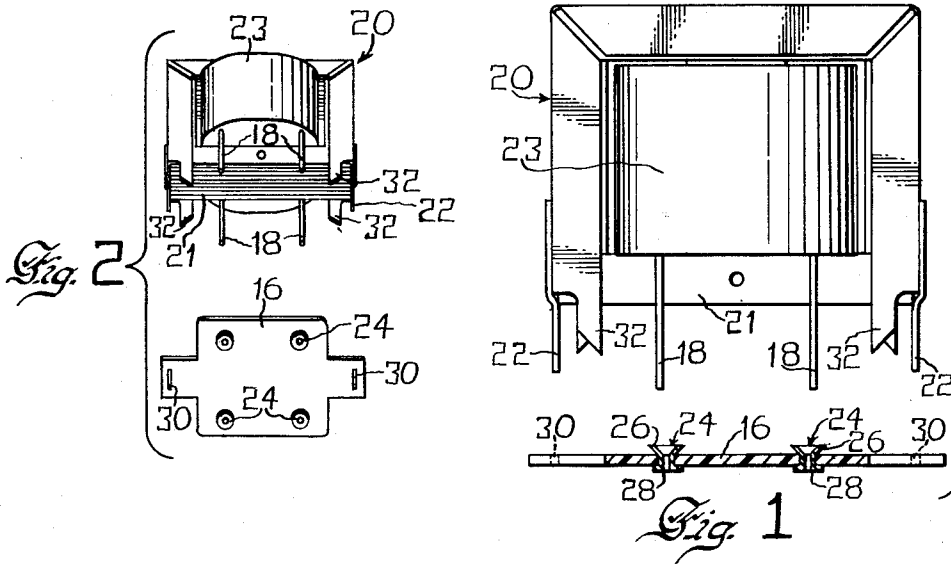
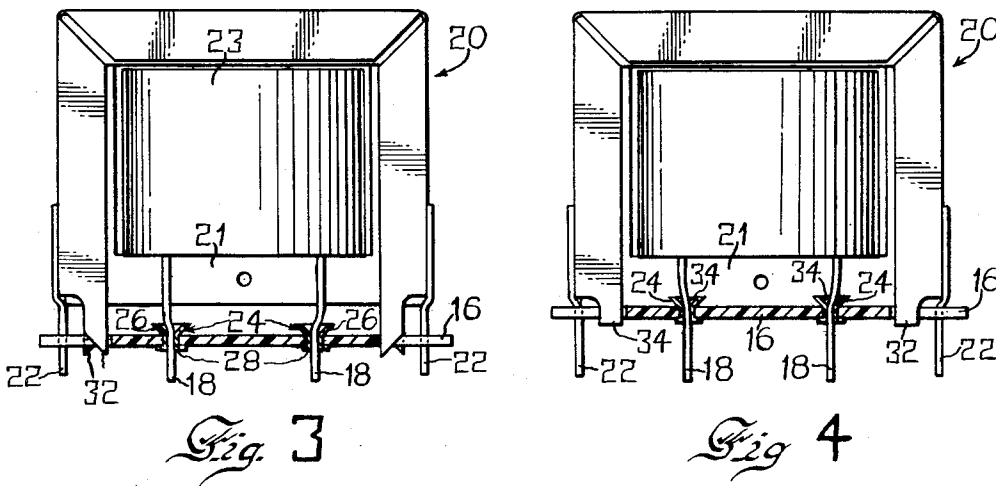
A. ROSS ET AL

2,993,262

METHOD OF ALIGNING TERMINAL LEADS

Filed July 2, 1956

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

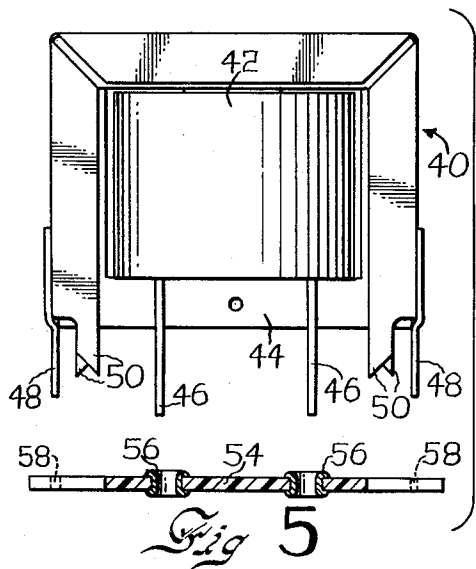


Fig. 5

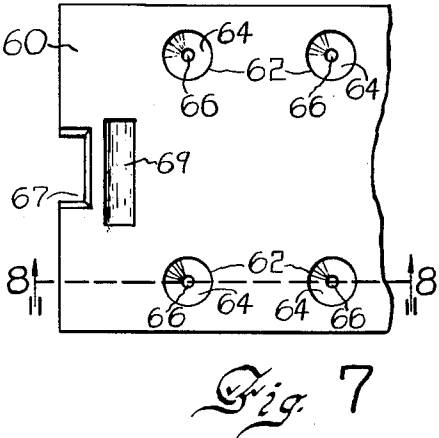


Fig. 7

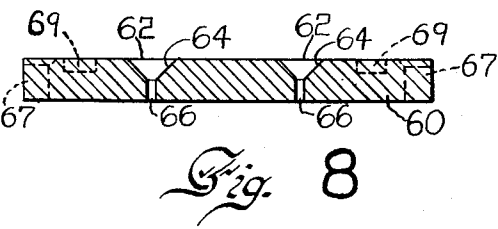


Fig. 8

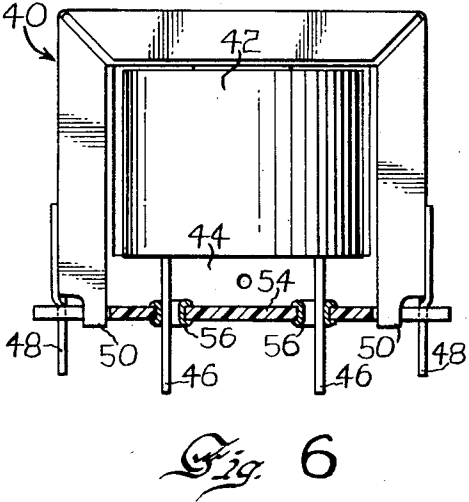


Fig. 6

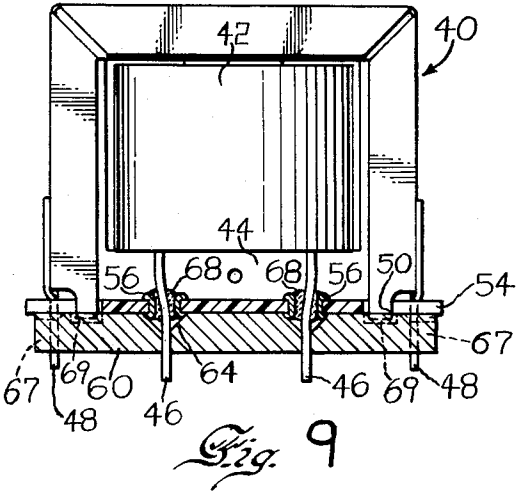


Fig. 9

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3 Sheets-Sheet 3

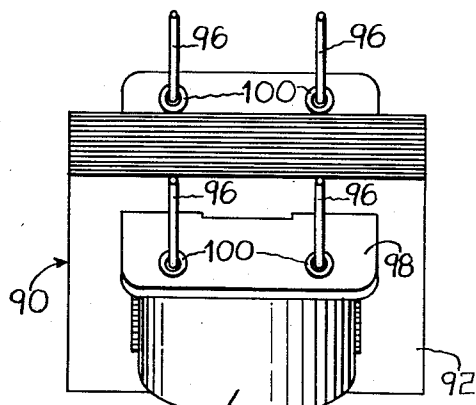


Fig. 9

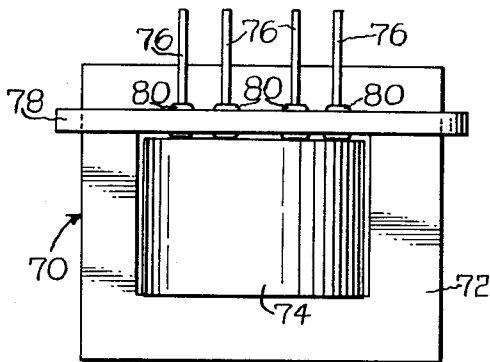


Fig. 12

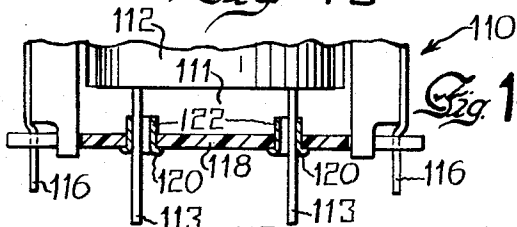


Fig. 14

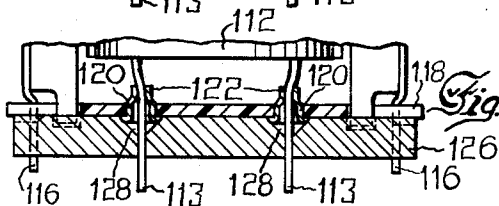


Fig. 15

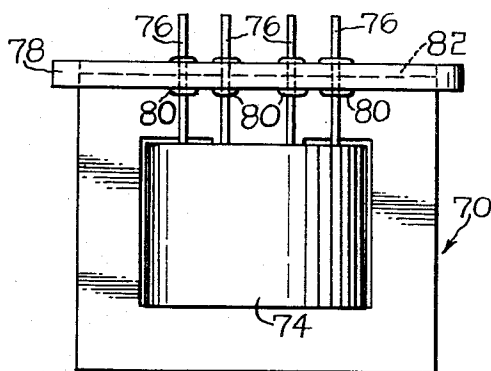


Fig. 11

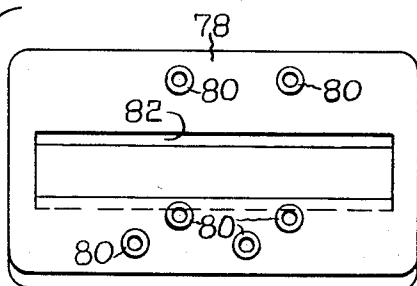


Fig. 10

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2,993,262

METHOD OF ALIGNING TERMINAL LEADS

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Filed July 2, 1956, Ser. No. 595,379

11 Claims. (Cl. 29—155.5)

This invention relates to means and method of aligning a plurality of elongate members. This invention relates more particularly to a means and method of aligning conductor members. The invention relates still more particularly to a means and method of aligning electrical conductors of an electrical device. The invention relates still more particularly to a means and method of aligning electrical terminals of windings of small electrical transformers. However, the invention is not so limited in that the invention is applicable for aligning and locating numerous types of elements.

Present day electrical panels and connection boards have the electrical devices attached thereto after the connection circuits and leads of the board or panel are completed.

In some panels and boards the leads and wires connecting various devices of the panel are assembled and attached to the panel. In other panels and boards the leads connecting the various devices are printed upon the panel. However, regardless of the system used for applying connection leads which connect between devices of a panel, the terminals of the connection leads are positioned prior to the mounting of the electrical devices upon the panel or board. Therefore, the positions of the terminals of the electrical devices to be mounted upon such panels and boards is predetermined and must be accurate and precise so that the terminals of the panel connection leads may be readily attached to the terminals of the electrical devices.

In regard to electrical transformers which are attached to such panels, numerous problems exist in positioning and forming the terminals or terminal leads. The terminal leads of the transformers are usually only approximately positioned during assembly and must be formed and aligned as desired after the coil and core of the transformer are assembled. Furthermore, the terminals are somewhat flexible and may be deformed during handling procedures before the devices are mounted. It is therefore desirable to apply some type of terminal connector plate or board to the transformer to correctly position the terminals and to rigidly maintain the terminals in desired positions.

Attempts have been made to use terminal connector boards with small apertures for accurately positioning the terminals of small transformers. However, it has been found that it is necessary to have very small apertures in the boards in order to obtain accurate spacing of the terminals. Therefore, it is extremely difficult to move the transformer terminals through the apertures of these connector plates. Thus, the process of attaching a connector plate to a transformer has been somewhat tedious and time consuming. Furthermore, it has been found that during the process of inserting the terminal leads through the small apertures for accurate positioning of the terminals, such severe bending of some of the terminals has been necessary that the terminals or the connections to the windings have been damaged. Also, with such connector boards, objectionable longitudinal stresses are transmitted to the fragile internal coil connections.

It is an object of this invention to provide a means and method of accurately and easily aligning and positioning electrical conductor members of electrical devices.

It is another object of this invention to provide a

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method of simultaneously, accurately and precisely aligning all of the terminals of an electrical transformer.

It is another object of this invention to provide such means and method of aligning electrical conductor members which method may be readily carried out in a production line manner or in an automation procedure.

It is another object of this invention to provide means for accurately and precisely positioning terminal leads of a transformer so that the transformer may be mounted and connected by automatically operating machinery.

It is another object of this invention to provide a means and method of forming terminal leads of a transformer which method eliminates the possibility of transmission of objectionable mechanical stresses from the terminal to the coil.

Another object of this invention is to provide means for increasing the rigidity of terminals of transformers.

Other objects and advantages reside in the construction of parts, the combination thereof, the mode of operation, and the method of manufacture, as will become more apparent from the following description.

In the drawings:

FIGURE 1 is a side elevational view showing a typical transformer, the terminal connector leads of which may be readily and accurately positioned by the means and method of this invention. FIGURE 1 also shows, in section, an aligning plate which is used in connection with this invention.

FIGURE 2 is a perspective view on a somewhat reduced scale of the transformer and aligning plate shown in FIGURE 1.

FIGURE 3 is a side elevational view of the transformer and aligning plate of FIGURES 1 and 2 showing engagement between the transformer and the aligning plate for proper positioning of the terminals of the transformer.

FIGURE 4 is a side elevational view showing the transformer and aligning plate of FIGURES 1, 2 and 3 with the aligning plate in full engagement with the transformer and with the terminals of the transformer properly aligned and secured in such positions.

FIGURE 5 shows a typical transformer, the terminals of which may be aligned and positioned by the method of this invention. FIGURE 5 shows, in section, a modification of the aligning plate of this invention.

FIGURE 6 is a side elevational view of the transformer and aligning plate of FIGURE 5 with the aligning plate secured to the transformer.

FIGURE 7 is a fragmentary top plan view showing an aligning jig or block of this invention.

FIGURE 8 is a section view taken substantially on line 8—8 of FIGURE 7.

FIGURE 9 is a side elevational view showing the transformer aligning plate of FIGURES 5 and 6 and showing the aligning block of FIGURE 7 in full engagement for properly aligning and positioning the terminal connector leads of the transformer.

FIGURE 10 is a perspective view showing another modification of an aligning plate of this invention and a typical transformer for use thereof.

FIGURE 11 is a side elevational view showing the transformer and aligning plate of FIGURE 10 with the aligning plate in engagement with the transformer.

FIGURE 12 is a side elevational view similar to FIGURE 11 but showing another position of engagement between the transformer and the aligning plate.

FIGURE 13 is a perspective view showing a modification in the assembly of a transformer and aligning plate of this invention.

FIGURE 14 is a fragmentary side elevational view, with parts shown in section, of a typical transformer

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and another modification in an aligning means of this invention.

FIGURE 15 is a fragmentary side elevational view of the transformer shown in FIGURE 14. This figure also shows an aligning jig for alignment of the transformer terminal leads and means for clamping the terminal leads in aligned positions.

Referring to the drawings in detail, FIGURES 1, 2, 3 and 4 show the use of an alignment plate 16 which is adapted for use in accurately positioning terminal leads 18 of a transformer 20 which is provided with a core 21 and a coil 23.

The alignment plate 16 is used for accurately positioning the terminal leads 18 one with respect to the other and for positioning the terminal leads 18 with respect to mounting studs 22 of the transformer 20. The alignment plate 16 may preferably be made of any suitable insulation material and is provided with a plurality of eyelet members 24, there being one eyelet member 24 for each of the terminal leads 18. Each of the eyelet members 24 has a conical portion 26 and a cylindrical portion 28.

The alignment plate 16 is used to align and position all of the terminal leads 18. This aligning and positioning of the terminal leads 18 is accomplished by relative movement between the transformer 20 and the alignment plate 16 in a manner as shown in FIGURE 3. During this relative movement, one toward the other, the mounting studs 22 pass through slots 30 in the alignment plate 16 and the terminal leads 18 are directed by the conical portion 26 of the eyelet members 24 as the terminal leads 18 are slightly bent by the conical portion 26. Thus, the terminal leads 18 move into the cylindrical portion 28 of the eyelet members 24. The opening at the vertex of the conical portion 26 and the opening in the cylindrical portion 28 is only large enough to slidably receive a terminal lead 18. The alignment plate 16 is moved with respect to the transformer 20 until the alignment plate 16 engages the core 21 as shown in FIGURE 4.

Therefore, the relative predetermined positions of the terminal leads 18 one with respect to the other and with respect to the mounting studs 22 is precisely obtained.

The transformer 20 is provided with a plurality of prongs 32 which are bent in the manner shown in FIGURE 4 to firmly retain the alignment plate 16 in engagement with the core 21. After the alignment plate 16 is so positioned solder or the like, or any suitable solidifiable material, as indicated by reference numeral 34, may be used to secure the terminal leads 18 to the eyelet members 24. Also, any other suitable means may be used to secure the terminal leads 18 within the eyelet members 24. Thus, the terminal leads 18 are rigidly maintained in desired position.

The transformer 20 may then be mounted upon a connection panel by means of the mounting studs 22 and the terminal leads 18 are accurately and precisely positioned in a predetermined manner with respect to other elements of the panel.

In FIGURES 5, 6, 7, 8 and 9, a preferred modification of the means and method of this invention is disclosed. A typical transformer 40 having a coil 42, a core 44, and terminals 46 is shown. The transformer 40 is also provided with mounting lugs 48 and clamping prongs 50. The terminals 46 are positioned in approximately the desired positions when the assembly of the transformer 40 has progressed to the stage shown in FIGURE 5.

An alignment plate 54 is provided with cylindrical eyelets 56 for receiving the terminals 46. The apertures of eyelets 56 are considerably larger than the terminals 46 so that the terminals 46 may easily move into the eyelets 56. The alignment plate 54 is also provided with slots 58 for receiving the mounting lugs 48 of the transformer 40. The alignment plate 54 is moved with respect to the transformer 40 so that the alignment plate 54 comes into engagement with the core 44 of the transformer 40, as shown in FIGURE 6. During the movement of the align-

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ment plate 54 with respect to the transformer 40, the terminals 46 move through the cylindrical eyelets 56 and the mounting lugs 48 move through the slots 58 of the alignment plate 54. The terminals 46 are thus retained in approximate desired positions by means of the cylindrical eyelets 56. Then the clamping prongs 50 which are on either side of the core 44, are bent over to firmly secure the alignment plate 54 to the transformer 40, as shown in FIGURE 6.

An aligning jig or block 60 is then used to accurately form and position the terminals 46. The aligning block 60 is provided with a plurality of apertures 62 extending through the block 60. Each of the apertures 62 has a tapered or conical portion 64 at one end thereof and a cylindrical portion 66 at the other end thereof and joining the conical portion 64. The aligning jig 60 is also provided with a plurality of slots or notches 67 for receiving the mounting lugs 48. If desired, the slots or notches 67 may have tapered edges, as shown, to aid in directing the mounting lugs into the notches or slots 67.

With the terminals 46 positioned in the manner shown in FIGURE 6, the lower portion of the transformer 40 may be dipped into a body of molten solder or the like or any suitable molten material so that molten material fills the apertures of the eyelets 56. With the solder, or the like, in a molten condition filling the apertures of the eyelets 56 and engaging the terminals 46, the terminals 46 are inserted into the apertures 62 and the lugs 48 are inserted into the notches 67 of the block 60 as the transformer 40 and the alignment plate 54 are moved one with respect to the other, as shown in FIGURE 9. A plurality of recesses 69 are provided in the aligning jig 60 for receiving the bent-over clamping prongs 50.

The terminals 46 enter the tapered portion 64 of the apertures 62. The terminals 46 are thus guided by the tapered portions 64 into the cylindrical portion 66 of the apertures 62. The terminals 46, which are only slightly smaller than the cylindrical portion 46 of the apertures 62, are thus accurately positioned, as shown in FIGURE 9. While the terminals 46 are thus positioned in the aligning apertures 62 of the aligning jig 60, the solder 68 is allowed to solidify. In FIGURE 9, the solder is indicated by reference numeral 68. Thus, the terminals 46 are firmly retained within the eyelets 56 and are in proper aligned position, one with respect to the other and with respect to the mounting lugs 48. Thus, the transformer 40 may be mounted upon any suitable prearranged panel and the terminals 46 are precisely positioned with respect to the terminals on the panel to which they are to be connected.

As a modification of the procedure in the use of an aligning jig 60, the terminals 46 may be inserted into the apertures 62 and the mounting lugs 48 inserted into the slots 67 of the aligning jig 60 before solder or the like is applied to the terminals 46 and to the eyelets 56. Therefore, after the terminals 56 and the mounting lugs 48 are properly aligned by the aligning jig 60, solder or the like is applied and is permitted to solidify while the terminals 46 remain within the alignment block 60. Then by relative movement between the aligning block 60 and the transformer 40, the terminals 46 and the mounting lugs 48 are withdrawn from the aligning block 60.

In FIGURES 10, 11 and 12, a transformer 70 of a conventional type having a core 72, a coil 74 and terminals 76 is shown. An aligning plate 78 is provided for locating the terminals 76. The aligning plate 78 is provided with a plurality of eyelets 80 extending through the aligning plate 78. The eyelets 80 may be similar to the eyelets 56 shown in FIGURES 5, 6 and 9. At the central portion of the aligning plate 78 an elongate opening 82 is provided.

The aligning plate 78 is moved relative to the transformer 70 so that the elongate opening 82 receives a portion of the core 72 and each of the eyelets 80 receives one of the terminals 76, as shown in FIGURE 11. If

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desired, the transformer 70 and the aligning plate 78 may be moved one with respect to the other a further distance so that the positions thereof are as shown in FIGURE 12 with the aligning plate 78 in juxtaposed relation with the coil 74.

With the terminals 76 and the aligning plate 78 positioned in the manner shown in FIGURE 11 or as shown in FIGURE 12, an aligning jig such as the aligning jig 60 shown in FIGURES 7, 8 and 9 may be used to accurately and precisely align the terminals 76 as solder or other suitable solidifiable material is applied immediately before or after the terminals 76 are precisely positioned and located by the aligning jig.

FIGURE 13 shows a transformer 90 provided with a core 92, a coil 94, and terminal leads 96. During the assembly of the coil 94 and the core 92, an aligning plate 98 is positioned in engagement with the coil 94 so that the terminal leads 96 extend through eyelets 100 of the aligning plate 98 as shown in FIGURE 13. The aligning plate 98 encompasses a portion of the core 92 and is disposed between a portion of the core 92 and the coil 94. The eyelets 100 may be similar to the eyelets 80 shown in FIGURES 10, 11 and 12. An aligning jig such as the aligning jig 60 shown in FIGURES 7, 8 and 9 may be used to simultaneously, accurately and precisely align all of the terminal leads 96 as discussed above. Solder or the like may be applied to the terminal leads 96 and to the eyelets 100 to rigidly retain the position of the terminal leads 96 one with respect to the other and with respect to the core 92.

FIGURES 14 and 15 show another modification in the method and means of this invention for positioning and retaining terminal leads. A typical transformer 110 has a core 111 and a coil 112 with terminal leads 113 extending therefrom. The transformer 110 is also provided with mounting studs 116.

An aligning plate or terminal board 118 is attached to the transformer 110 in a manner described above with respect to the alignment plate 54. The terminal board 118 is provided with eyelets 120, there being one eyelet 120 for each of the terminal leads. Each of the eyelets 120 has an end portion 122 extending from the terminal board 118.

When the terminal board 118 is attached to the transformer 110, the terminal leads 113 extend freely through the eyelets 122, as shown in FIGURE 14. By relative movement between the transformer 110 and an aligning jig 126, the terminal leads 113 are precisely aligned and positioned in a predetermined manner, as shown in FIGURE 15. With the terminal leads 113 thus positioned in conical apertures 128 of the alignment jig 126, the end portions 122 of the eyelets 120 are crimped or bent into firm engagement with the terminal leads 113, as shown in FIGURE 15. This engagement of the eyelets 120 with the terminal leads 113 secures the terminal leads 113 in the desired spaced relationship, one with respect to the other, and with respect to the mounting lugs 116. The transformer 110 and the alignment jig 126 are then disengaged, one from the other, so that the transformer 110 with the terminal leads 113 is in condition for accurate mounting in a predetermined manner.

It is to be understood that the process of aligning terminal leads of an electrical device by means of this invention simultaneously positions all of the terminal leads. Such positioning is accurately and precisely performed. It is also to be understood that all of the operations discussed above for precisely aligning terminal leads and for maintaining the alignment thereof may be carried out by automatically operated machinery so that very little, if any, of the work is carried out manually.

Thus, by means of this invention many types of electrical devices may have the terminal leads thereof rapidly, accurately, and precisely positioned one with respect to the other and with respect to other elements of the

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devices. Therefore, the electrical devices may be mounted upon any suitable prearranged panels so that the terminals of the electrical devices are accurately positioned with respect to other elements previously applied to the panel. The accurate and precise alignment of terminal leads by the means and method of this invention permits the electrical devices to be mounted and connected by means of automatically operated apparatus.

Although the preferred embodiment of the device has been described, it will be understood that within the purview of this invention various changes may be made in the form, details, proportion and arrangement of parts, the combination thereof and mode of operation, which generally stated consist in a device capable of carrying out the objects set forth, as disclosed and defined in the appended claims.

Having thus described our invention, we claim:

1. In a method of producing a transformer of the type provided with a core and a coil having terminal leads provided with extending portions, the transformer being provided with mounting lugs for association with mounting means of a panel, said method serving to position the extending portions of the terminal leads of the coil in a predetermined spaced relationship one with respect to the other and with respect to the mounting lugs comprising the provision of an alignment plate provided with a plurality of conical eyelets to receive the extending portions of the terminal leads and provided with a plurality of apertures to receive the mounting lugs, there being one eyelet for each of the terminal leads, there being one aperture for each of the mounting lugs, the apexes of the conical eyelets being in the predetermined relative spaced relationship desired for the terminal leads, the terminal leads being only slightly smaller than the opening at the apex of the eyelets so that the terminal leads are slidably movable through the eyelets, the apertures being only slightly larger than the mounting lugs, moving the alignment plate with respect to the transformer so that all of the terminal leads simultaneously move through their respective eyelets while all of the mounting lugs move through their respective apertures, the terminal leads thus being moved into desired predetermined spaced relationship one with respect to the others and with respect to the mounting lugs, attaching the alignment plate to the transformer with the mounting lugs inserted through the apertures and with the terminal leads inserted through the conical eyelets with the larger end of the conical eyelets being directed toward the coil, the terminal leads thus being maintained in desired predetermined spaced relationship one with respect to the other and with respect to the mounting lugs of the transformer so that the terminal leads may be readily and directly connected to other elements of a panel which are at predetermined spaced positions with respect to the mounting means of the panel.

2. A method of positioning terminal leads of a transformer provided with a core and coil comprising providing a positioning plate having an opening to receive the core and having a plurality of apertures, the opening in the plate being only slightly larger than the core so that the core may fit closely within the opening so that there is no lateral movement of the plate with respect to the core there being one aperture for each of the terminal leads of the transformer, each aperture being somewhat larger than the cross section of the terminal lead extending therethrough so that each terminal lead may move laterally within its respective aperture followed by relative movement between the transformer and the plate so that the plate encompasses a portion of the core adjacent the terminal leads with one of the terminal leads extending through each of the apertures, followed by positioning all of the leads simultaneously in a jig having a plurality of tapered recesses, there being one tapered recess to receive each of the terminal leads, the tapered recesses being at positions desired for the leads one with

respect to the others and with respect to the core, at least some of the leads moving laterally within their respective apertures during said positioning of the leads, followed by applying solidifiable material to each of the terminal leads and to the plate to secure the terminal leads in desired position with respect to the plate, followed by relative movement between the jig and the transformer disengaging the terminal leads from the jig, the positioning plate thus maintaining the terminal leads in the positions thereof established by the jig, the terminal leads thus being retained and supported in desired relationship with respect to the core and with respect to each other.

3. A method of positioning a plurality of conductor members of an electrical apparatus having mounting means so that the conductor members are positioned in a predetermined relationship with respect to the mounting means and in a predetermined spaced-apart relation comprising the provision of a plurality of spaced-apart hollow conical members open at both ends thereof, positioning the conical members by relative movement between the electrical apparatus and the conical members so that the apexes of the conical members are in precise predetermined position one with respect to the other and relative to the mounting means, said relative movement between the conical members and the electrical apparatus being in a direction so that all of the conductor members substantially simultaneously enter the larger end of the conical members and are directed through the apexes thereof so that all of the conductor members are simultaneously positioned one with respect to the other and with respect to the mounting means as determined by the apexes of the conical members, securing the conical members with respect to the electrical apparatus, the conductor members thus being held in the predetermined positions thereof relative to the mounting means and in predetermined spaced-apart relationship.

4. In a method of positioning extending portions of the terminal leads of an electrical device so that the portions are firmly positioned in desired predetermined spaced-apart relation and in desired relation with respect to the electrical device, comprising the steps of inserting extending portions of all of the terminal leads simultaneously through an aligning plate having a plurality of apertures, there being one aperture for each terminal lead, each extending portion of a terminal lead being laterally movable within its respective aperture, followed by attachment of the aligning plate to the electrical device, followed by applying molten solidifiable material to the extending portions of the terminal leads and permitting the molten material to engage the edges of the apertures, followed by placing the extending portions of all of the terminal leads simultaneously into a group of spaced-apart conical aligning members, there being one conical aligning member for each of the terminal leads, the apexes of the conical aligning members being in the spaced-apart relationship and in the positions thereof with respect to the electrical device desired for the extending portions of the terminal leads, the aligning members thus causing all of the extending portions of the terminal leads to be simultaneously positioned in the desired spaced-apart relationship and in the desired relationship with respect to the electrical device, followed by retaining the extending portions of the terminal leads in said aligning members until the molten material becomes solidified so that the extending portions of the terminal leads are secured in desired relative positions and in the desired positions relative to the electrical device, followed by removal of the terminal leads from the aligning members.

5. A method of producing a transformer of the type having a core and a coil assembly provided with semi-flexible terminal leads extending from the coil so that the terminal leads are accurately disposed and maintained in desired predetermined positions one with respect to

the other and with respect to the core, comprising providing a positioning plate having a plurality of apertures therein, there being one aperture for each of the terminal leads, each of the terminal leads being considerably smaller than its respective aperture and laterally movable therein, the apertures being approximately spaced in the manner desired for the terminal leads, attaching the positioning plate to the assembly with one of the terminal leads extending through each of the apertures, the plate being attached so that the terminal leads are positioned in the approximate desired positions thereof with respect to the assembly, followed by engaging all of the terminal leads simultaneously with an aligning means which moves the terminal leads with respect to the apertures and positions the terminal leads in the desired predetermined spaced-apart positions, positioning the aligning means with respect to the transformer so that the terminal leads are positioned at the desired predetermined positions with respect to the assembly, followed by application of molten solidifiable material to the portions of the terminal leads within the apertures of the positioning plate so that the molten material engages the sides and edges of the apertures as well as the terminal leads, followed by permitting the material to solidify, thus firmly positioning the terminal leads in the desired locations, followed by disengagement between the terminal leads and the aligning means so that the terminal leads are firmly retained by the positioning plate in the desired locations thereof one with respect to the other and with respect to the assembly.

6. In a method of bending and positioning flexible terminal leads of an electrical device having mounting means adapted to be received by mounting means of a board or panel so that the terminal leads are firmly positioned in desired predetermined spaced relation with respect to the mounting means and in predetermined spaced-apart relation, comprising the steps of inserting the terminal leads through an aligning plate having a plurality of apertures, there being one aperture for each terminal lead, each aperture being somewhat larger than the cross section of the terminal lead which extends therethrough so that each terminal lead may move laterally within its respective aperture, securing the aligning plate to the electrical device, followed by applying molten solder material to the terminal leads and permitting the solder to engage the edges of the apertures, followed by placing all of the terminal leads simultaneously into a group of spaced-apart conical aligning members, the apexes of the conical aligning members being in a predetermined spaced-apart relationship desired for the terminal leads, there being one conical recess for each of the terminal leads, the aligning members causing the terminal leads to be positioned in the desired spaced-apart relationship, followed by retaining the terminal leads in said aligning members until the solder material becomes solidified, followed by removal of the terminal leads from the aligning members, the aligning plate thus serving as a support plate retaining the terminal leads in the desired spaced-apart relationship so that the leads may be readily connected to other elements having given spaced relationships with respect to the mounting means of the board or panel.

7. The method of positioning flexible terminal leads of an electric device so that the electric device can be attached to a control circuit panel in precise predetermined position with the terminal leads located in precise predetermined positions with respect to the control circuits of the panel, comprising forming said terminal leads so that they are approximately in the desired spaced relationship, followed by relative movement between the electric device and an alignment member having a group of hollow conical members, the conical members being open at the ends thereof and fixedly maintained in a spaced-apart relation so that the apexes thereof are located at positions equal to the desired spaced relationship of the terminal leads, said movement being in a di-

rection so that all of the terminal leads simultaneously enter the larger end of the conical members and move into the small portion of the conical members, attaching the alignment member to the electric device so that all of the apexes are in the desired relationship with respect to the device, the extending terminal leads thus being positioned at the apexes of the conical members and all of the terminal leads thus being simultaneously positioned and secured in the desired spaced-apart relation and in the desired relationship with respect to the electric device.

8. A method of accurately locating in predetermined positions extending portions of flexible terminal leads of a transformer provided with a core and a coil and mounting means comprising providing a terminal lead support plate, attaching the terminal lead support plate to the transformer, the terminal lead support plate having a plurality of apertures therein, there being an extending portion of one terminal lead of the transformer extending through each aperture, each extending portion being laterally movable within its respective aperture, each aperture having an edge portion, providing an aligning jig having a plurality of conical recesses, the apexes of the recesses being in the predetermined spaced-apart relationship which is desired for the terminal leads, the jig having means for causing predetermined positioning of the jig with respect to the mounting means of the transformer, moving the transformer with respect to the aligning jig so that the extending portions of all of the terminal leads are simultaneously directed into the apexes of the conical portions, positioning the aligning jig with respect to the transformer so that said portions of the terminal leads are in positions desired for said portions with respect to the mounting means of the transformer, followed by applying molten solidifiable material to all of said portions of the terminal leads at the portions of the terminal leads which extend through the apertures so that the solidifiable material engages the edge portions of the apertures as well as the terminal leads, followed by permitting the molten material to solidify thus securing the terminal leads to the terminal lead support plate in desired predetermined relative positions and in desired predetermined positions with respect to the mounting means of the transformer.

9. A method of producing a transformer of the type having mounting means and a core and coil provided with flexible terminal leads so that extending portions of the terminal leads are accurately disposed in predetermined positions for mounting of the transformer upon a panel in a predetermined position with the terminal leads precisely positioned with respect to elements of the panel comprising the provision of an alignment plate provided with a plurality of spaced-apart apertures there-through, each of the apertures being larger at one end than at the other end, there being one aperture for each of the terminal leads, the smaller end of the apertures being in the predetermined relative spaced relationship desired for the terminal leads, each of the terminal leads being only slightly smaller than the opening in the smaller end of the apertures so that the terminal leads are slidably movable through the apertures, attaching the alignment plate to the transformer with the extending portions of the terminal leads inserted through the apertures with the larger end of the apertures facing the coil and with the terminal leads in the desired predetermined positions with respect to the mounting means of the transformer, the extending portions of the terminal leads thus being firmly retained in the desired predetermined positions with respect to the mounting means of the transformer and one with respect to the other.

10. A method of aligning and positioning terminal leads of a transformer provided with a coil and core with the coil extending laterally from the core comprising providing a terminal lead support plate having an opening to receive the core and having a plurality of apertures, there being one aperture for each of the terminal

leads of the transformer, followed by relative movement between the transformer and the terminal lead support plate so that the terminal lead support plate closely encompasses a portion of the core adjacent the terminal leads with one of the terminal leads extending through each of the apertures, each of the apertures being larger than the terminal lead which extends therethrough so that each terminal lead is laterally movable within its respective aperture, securing the support plate with respect to the coil and core, followed by aligning all of the leads simultaneously in a jig having a plurality of tapered recesses, there being one tapered recess to receive each of the terminal leads, the jig being positioned so that the terminal leads located therein are in desired predetermined locations one with respect to the other and with respect to other portions of the transformer, at least some of the leads being moved laterally within their respective apertures as the leads are placed in the jig, followed by securing the terminal leads with respect to the terminal lead support plate, followed by relative movement between the jig and the transformer disengaging the terminal leads from the jig, the terminal leads thus being fixed to the support plate and fixed in desired relative positions and with respect to other portions of the transformer.

11. A method of producing an electric device of the type having a core and coil with terminal leads extending from the coil so that the terminal leads are precisely disposed and maintained in desired predetermined positions one with respect to the others and with respect to the core, comprising providing an aligning plate for approximately aligning the terminal leads, the aligning plate having a plurality of spaced-apart eyelets extending there-through, each of the eyelets having an end portion extending from the aligning plate, inserting one of the terminal leads through each of the eyelets, securing the aligning plate to the electric device, followed by aligning and positioning simultaneously all of the terminal leads in the desired predetermined positions one with respect to the others and with respect to other portions of the electric device by simultaneously passing all of the leads into a jig having tapered recesses and which is held at a predetermined position with respect to portions of the electric device, each of the tapered recesses having an opening at the desired position for a lead, the terminal leads being laterally movable within the eyelets, followed by bending said end portions of the eyelets into firm engagement with the terminal leads so that the terminal leads are retained by the eyelets in the aligned positions, followed by removal of the leads from the jig leaving the terminal leads secured by the aligning plate in the desired predetermined positions thereof one with respect to the others and with respect to the electric device.

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