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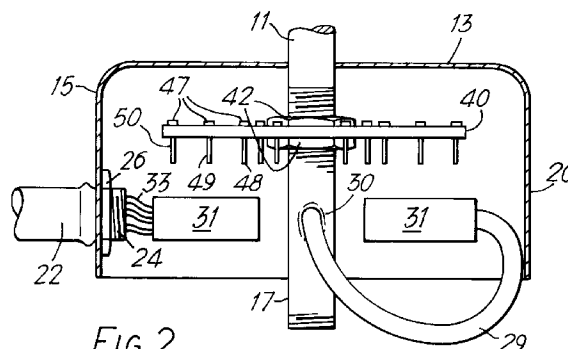
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(54) **Chandelier.**

(57) A chandelier comprises a junction chamber (13) which can be mounted on an overhead support and hollow lamp arms (22) extend laterally from the chamber. End parts of the arms extend through respective openings in a sidewall of the chamber and closely fit, each within an apertured element (26) in alignment with a corresponding one of said openings. First electrical flex conductors (29) for connecting the chandelier to a source of electrical supply extend within the junction chamber where they connect with a busbar (40) and second electrical flex conductors (33) extend within the lamp arms where they connect with lamp holders (27) thereof and within the junction chamber where the conductors of each arm terminate in a respective connecting means (31) which are separably connected to the busbar. The connecting means are able when disconnected from the busbar and upon separation of the associated lamp arm from the junction chamber to pass through the corresponding apertured element and opening in the chandelier side wall with which that element is aligned.



This invention relates to chandeliers and more particularly to chandeliers of the kind comprising a supporting means for mounting the chandelier on an overhead support, a junction chamber carried on said supporting means, hollow lamp arms extending laterally from and supported on said chamber, respective lamp holders carried on said arms remotely from said chamber, first electrical flex conductors extending into said chamber and for connecting said chandelier to a source of electrical supply and second electrical flex conductors extending through said arms and operatively connected, with the lamp holders, said second flex conductors being electrically connected in said junction chamber with said first flex conductors to enable said source of supply to be placed in electrical circuit with said lamp holders. Frequently the chandelier supporting means comprise a central hollow stem through which said first electrical flex conductors extend and which carries the junction chamber. Decorative crystals of glass or similar material may be fixed to any part of the mechanical structure described.

When the supporting means comprise a central hollow stem on which the junction chamber is carried, electrical connection of the lamp holders to a source of supply is normally effected, by way of a ceiling rose or junction box in a ceiling, by means of a two or three core flexible cable which passes through the central stem to the junction chamber carried thereon. From this chamber two or three single core flexes or a two or three core flex run through each lamp arm to the lamp holder at the end of the arm. The chamber serves as a junction box within which the flex in the central stem is connected with the flexes in the lamp arms. Simple devices such as scruts are employed to connect the conductors of the flex in the stem with those of the flexes in the arms.

Although assembling the electrical circuit should present little difficulty, frequently assembly is found to be faulty. Because of this, electrical assembly is effected prior to transportation and, therefore, transportation involves the conveyance of bulky structures.

It is accordingly an object of the present invention to provide chandeliers of the kind set forth with electrical circuitry which can simply be assembled so that risk of connection errors in the course of assembly is minimised.

The present invention consists in a chandelier comprising a supporting means for mounting the chandelier on an overhead support, a junction chamber carried on said supporting means, hollow lamp arms extending laterally from and supported on said chamber, respective lamp holders carried on said arms remotely from said chamber, first electrical flex conductors extending into said chamber and for connecting said chandelier to a source of electrical supply and second electrical flex conductors extending through said arms and operatively connected, with the

lamp holders, said second flex conductors being electrically connected in said junction chamber with said first flex conductors to enable said source of supply to be placed in electrical circuit with said lamp holders, characterised in that said arms are separably mounted on said chamber each through close engagement of an end part thereof with an apertured element in alignment with an opening in a side wall of said chamber and a busbar is disposed within said chamber and has said first flex conductors electrically connected thereto whilst the conductors of each of said second flexes terminate in said chamber in electrical connecting means which are separately electrically connected to said busbar, said connecting means having dimensions enabling passage thereof through said openings in said chamber side wall and said apertured elements.

Advantageously, said supporting means comprise a central hollow stem for mounting the chandelier on an overhead support, said junction chamber being carried on said stem, and said first electrical flex conductors extend through said stem for connecting said chandelier to said source of electrical supply.

Preferably, said busbar is formed with conductive tracks to which said first flex conductors and said connecting means are connected. Advantageously, the connecting means of each second flex connect with complementary connecting means provided on said conductive tracks.

In one embodiment of the invention said connecting means of each second flex and complementary connecting means of the busbar form a male and female type connection. Advantageously, said connecting means connecting the flex conductors of each arm to the busbar comprise a female connector and said complementary connecting means comprise respective pins upstanding from said tracks with which said female connector is engageable. Preferably, said female connector comprises a generally cylindrical body having a plurality of female elements which open through a side of said body and respectively connect to the flex conductors of the corresponding arm, said conductors entering said body at an end thereof.

Suitably, said busbar comprises a printed circuit board on which said conductive tracks are formed. In one form of the invention, said conductive tracks are concentric circular tracks. In another form said tracks are of chevron form in nested array.

Preferably, the printed circuit board is supported in the junction chamber upon a part of said stem and is disposed normal to the stem. A further preferred form has externally threaded end parts of the lamp arms extending through respective apertures in the junction chamber side wall and engaging respective nuts aligned with said apertures. Where the female connector is of cylindrical form, it is dimensioned to allow passage thereof through said nuts.

The chandelier structure according to the inven-

tion is readily dismantled by removing the cover of the junction chamber to expose the electrical connections therein. The connections between the second flexes which extend in the lamp arms to the busbar are then disconnected and the arms can then be separated from the chamber. In the course of such separation, the electrical connections to the conductors of the arm flexes are drawn out through nuts and the side wall of the junction chamber. Dismantling of the chandelier achieves a reduction in the volume required for shipment by as much as 85%. The smaller box thus required for shipment can be made of thinner material and yet be as strong as the box required to hold the fully assembled chandelier.

The invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

FIGURE 1 is a side elevation of a chandelier of the kind to which the present invention relates;

FIGURE 2 is a cross-sectional view of a part of the chandelier of Figure 1;

FIGURE 3 is a plan view of an electrical component illustrated in Figure 2;

FIGURE 4 is a side elevation of a female type of electrical connector employed in the electrical circuitry of the invention;

FIGURE 5 is a longitudinal sectional view of the connector of Figure 4;

FIGURE 6 is a transverse sectional view of the connector of Figures 4 and 5;

FIGURE 7 is a perspective view of circuit components employed in a modified version of the invention;

FIGURE 8 is a circuit diagram employing the components of Figure 7; and,

FIGURES 9, 10 and 11 are views of components of a further embodiment of the invention.

Throughout the drawings, like parts have been accorded the same references.

Referring first to Figures 1 to 6, a chandelier 10 comprises a central hollow stem 11 provided with a ring fitting 12 at its upper end for supporting the chandelier from an overhead support. Near its lower end, there is mounted on the stem 11 a junction chamber 13 comprising an inverted cup 15 closed by a cover 16. A lower part 17 of the stem 12 is externally threaded and the cup 15 is mounted on the stem adjacent the upper end of said externally threaded part 17. The cover 16 is secured to the cup 15 by an internally threaded knob 18. The cup 15 has a vertical side wall 20 in which are formed a plurality of apertures for receiving hollow lamp arms 22. Externally threaded end portions 24 of the lamp arms extend respectively through said apertures in the side wall 20 of the junction chamber 13.

Within the chamber 13 respective nuts 26 are provided in which the threaded end portions 24 of the arms 22 are engaged, the nuts 26 being then coaxially

disposed with the apertures in the side wall. At the ends of the lamp arms 22 remote from the junction chamber 13 are lamp holders 27.

The means of connecting the lamp holders 27 to a source of electrical supply in the ceiling from which the chandelier is hung is now described. A first three core flex 29 extends within the stem 11 and adjacent the ring mounting 12 provides three conductors for connection to a ceiling rose or junction box to which electrical power is supplied from a remote source. The flex 29 emerges from a lateral opening 30 near the bottom of part 17 of the stem 11 and at its free end terminates in a female connector 31, hereinafter more fully described. Within each lamp arm 22 there extends from the corresponding lamp holder 27 three single core flexes 33 which terminate within the junction chamber where the flex conductors are connected to a female connector 31. A three core flex can be employed in place of the three flexes 33. The female connectors 31 each comprise a two part moulding, each of semi-cylindrical form, within which are contained three hollow connectors 34 to which, are connected, in the case of the lamp arm flexes, the conductors respectively of the flexes 33 and, in the case of the flex 29, the three conductors of that flex. The conductors are connected to the hollow connectors 34 by having their free ends crimped to laterally extending parts 35 of the connectors 34.

Towards the upper end of the threaded part 17 of the stem 11 is mounted a busbar 40. To this end, the busbar has a central aperture 41 which is engaged on the part 17 and secured between nuts 42 near the upper end of that part. The busbar 40 comprises a printed circuit board formed on its upper surface with concentric conductive tracks 43, 44, 45. Radial rows 46 of pins 47 each comprise three pins 48, 49, 50 which penetrate the tracks 43, 44, 45 respectively making electrical connection with said tracks. The pins 48, 49, 50 are disposed parallel with the axis of the stem 11. It will be seen that each connector 31 can cooperate with a row of pins 47 so that its female connector elements 34 are engaged respectively by said pins and make electrical contact therewith. In known manner, such as by differential spacing of the pins, the engagement between each connector 31 and the corresponding row of pins is adapted so as to allow only an electrically safe connection, i.e. a connection of safe polarity, to be formed.

As will be observed, the female connectors 31 are of generally cylindrical form and the female connecting elements 34 thereof open through the cylindrical side wall thereof. The conductors of the flexes, as the case may be, 29 or 33, extend from an end of the cylindrical body of the connector 31.

The overall diameter of the cylindrical body of each connector 31 connected with a lamp arm flex 33 is small enough to allow passage of the connector 31 through the nut 26 and the aperture in the wall 15 align-

ned coaxially with the nut 26. The connector 31 attached to the flex 29 will normally be of the same dimensions as the other connectors 31 though, since in dismantling the chandelier, the chamber 13 is not separated from the stem 11, there is no need to separate the connector 31 of the flex 29 from the pins on the busbar 40.

In order to dismantle the chandelier, the connectors 31 which are connected to the flexes 33 are removed from the respective rows of pins to which they are connected. The arms 22 are then separated from the nuts 26 and the associated connectors can then be passed through the nuts 26 so as wholly to detach the arms from the junction chamber 13. Flat packing of the chandelier is accordingly facilitated.

Whilst it would be possible theoretically to provide the connectors 31 in male form with pins which fitted in rows of holes formed respectively in the concentric tracks of the busbar 40, for ease of passage of the lamp arm connectors 31 through the nuts 26 it is preferred to provide the connectors 31 in the female form described.

With chandeliers of the form described, the internal diameter of the nuts 26 is normally 8.9mm to engage with lamp arms of standard diameter. The cylindrical body of the connectors 31 can be made to be slightly less than this dimension whilst at the same time ensuring that adequate creepage and clearance exists between conducting metal parts.

In a variant of the embodiment of the invention described, instead of having a central hollow support stem the chandelier may be otherwise supported from its overhead support, e.g. by a chain. In this event the chandelier arms can be separated as described from the chamber and the size of the packaging for transportation of the chandelier thus reduced.

Although the busbar has been described as a printed circuit board with concentric conductive tracks, the tracks could alternatively be in the form of an array such that a row of three pins connected to the tracks forms a polarised set of three for engagement with the connectors.

Referring now to Figures 7 and 8, a circular, busbar 50 is mounted on the stem 11 as previously described and has five concentric conductive tracks with which pins 51 of each of a plurality of radial rows 52 of pins make contact. In this case, a five core flex 53 is employed in place of the flex 29 and has live lines L1, L2 and L3 neutral line N and earth line E. In this instance the chandelier would have five lamps or sets of lamps indicated by filaments A, B, C, D and E and it will be seen that when line L1 is live lamps A, B and C will be energised whilst when line L2 is energised lamp D will be lit and when line 3 is energised lamp E will be lit. It will be apparent that the connectors 31 of lamp D will need to connect line L2 via the busbar to the lamp holder of lamp D and the connector 31 of lamp E will require to connect line L3 by way of the

busbar with the lamp holder of lamp E.

One or more of the lines L₁, L₂ and L₃ or additional live lines could instead of being connected to lamps, be used to carry control signals.

Referring now to Figures 9 to 11 which show a two conductor disconnectible system, it is possible with such a system more easily to provide male connectors fitting with female connectors on a busbar mounted on the stem 11. Thus, a male connector 60 has axially extending pins 61 and 62 which connect with conductors of single core flexes 63, 64 which extend through the lamp arms to the lamp holders. In the male connector 60 adequate insulation is provided between pins 61 and 62.

Busbar 70 with which the pins 61 and 62 make contact comprises pairs of plates 71, 72 and 73, 74 which form spring contacts between which the pins 61 and 62 engage. As there is no polarity requirement, the pins can each engage with either of the plate pairs 71, 72 or 73, 74. The only possible incorrect connection would be when both pins 61 and 62 were inserted between the same pair of plates and this would not make an unsafe situation.

The flex 29 in the stem 11 is in this case a two core flex, one core of which connects with plate pair 71, 72 and the other with plate pair 73, 74.

As in the embodiment of Figures 1 to 6, this assembly is effected by first disconnecting the plug 60 from the busbar and then disconnecting each lamp arm from the chamber 13 and thereafter passing the plug 60 through the corresponding nut 26 and aperture in the side wall of the chamber aligned therewith.

Claims

1. A chandelier comprising a supporting means for mounting the chandelier on an overhead support, a junction chamber carried on said supporting means, hollow lamp arms extending laterally from and supported on said chamber, respective lamp holders carried on said arms remotely from said chamber, first electrical flex conductors extending into said chamber and for connecting said chandelier to a source of electrical supply and second electrical flex conductors extending through said arms and operatively connected, with the lamp holders, said second flex conductors being electrically connected in said junction chamber with said first flex conductors to enable said source of supply to be placed in electrical circuit with said lamp holders, characterised in that said arms are separably mounted on said chamber each through close engagement of an end part thereof with an apertured element in alignment with an opening in a side wall of said chamber and a busbar is disposed within said chamber and has said first flex conductors electrically con-

- nected thereto whilst the conductors of each of said second flexes terminate in said chamber in electrical connecting means which are separately electrically connected to said busbar, said connecting means having dimensions enabling passage thereof through said openings in said chamber side wall and said apertured elements.
2. A chandelier as claimed in Claim 1, characterised in that said supporting means comprises a central hollow stem for mounting the chandelier on an overhead support, said junction chamber being carried on said stem, and said first electrical flex conductors extend through said stem for connecting said chandelier to said source of electrical supply.
 3. A chandelier as claimed in Claim 1 or Claim 2, characterised in that said busbar is formed with conductive tracks to which said first flex conductors and said connecting means are connected.
 4. A chandelier as claimed in any preceding claim, characterised in that the connecting means of each second flex connect with complementary connecting means provided on said conductive tracks.
 5. A chandelier as claimed in Claim 4, characterised in that said connecting means of each second flex and complementary connecting means of the busbar form a male and female type connection.
 6. A chandelier as claimed in Claim 5, characterised in that said connecting means connecting the flex conductors of each arm to the busbar comprise a female connector and said complementary connecting means comprise respective pins upstanding from said tracks with which said female connector is engageable.
 7. A chandelier as claimed in Claim 6, characterised in that said female connector comprises a generally cylindrical body having a plurality of female elements which open through a side of said body and respectively connect to the flex conductors of the corresponding arm, said conductors entering said body at an end thereof.
 8. A chandelier as claimed in any preceding claim, characterised in that said first flex conductors are connected to said busbar by a female and male form of connection.
 9. A chandelier as claimed in any preceding claim, characterised in that said busbar comprises a printed circuit board on which said conductive tracks are formed.
 10. A chandelier as claimed in Claim 9, characterised in that said tracks are concentric circular tracks.
 11. A chandelier as claimed in Claim 9 or Claim 10, and in which said supporting means comprise a central hollow stem on which said junction chamber is mounted, characterised in that said printed circuit board is supported in said junction chamber upon a part of said stem and is disposed normal to said stem.
 12. A chandelier as claimed in any preceding claim, characterised in that externally threaded end parts of said arms extend through respective apertures in the junction chamber side wall and engage within the chamber with respective nuts aligned with said apertures.
 13. A chandelier as claimed in Claim 5, characterised in that externally threaded end parts of said arms extend through respective apertures in the junction chamber side wall and engage respective nuts aligned with said apertures, and said connecting means of the second flex conductors are dimensioned to allow passage thereof through said nuts.
 14. A chandelier as claimed in any preceding claim, characterised in that said first flex means comprises a plurality of live conductors a neutral and an earth conductor, said conductors being connected to respective conductive paths of said busbar and said connecting means are adapted to engage with said neutral and earth conductors and respectively with said live conductors.
 15. A chandelier as claimed in any one of Claims 1 to 5, characterised in that said second flexes comprise conductors which terminate in said junction chamber in said connecting means which comprises a two pin male connector and said busbar comprises two pairs of contact plates with which the respective pins of said male connector are separably engageable.

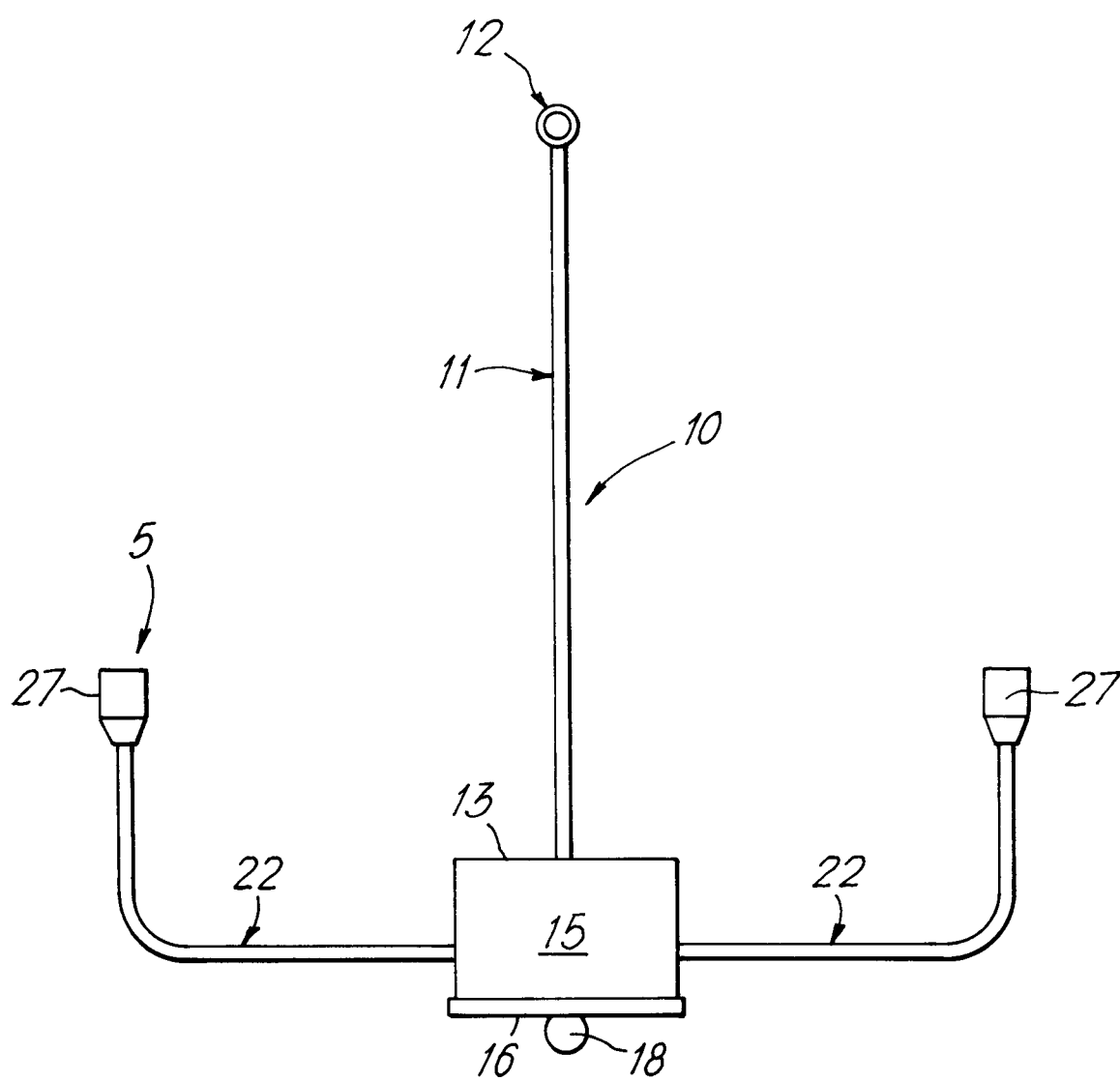


FIG. 1

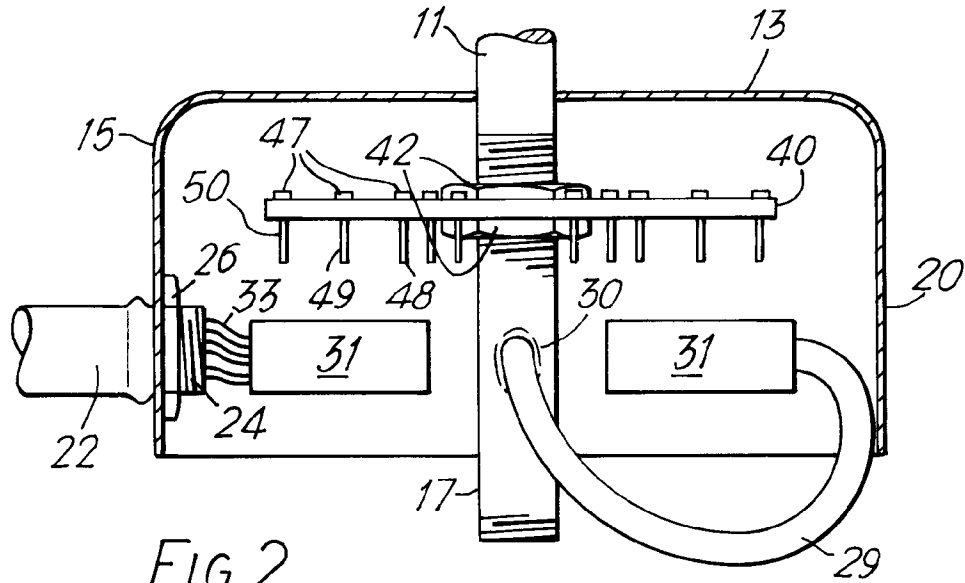


FIG. 2

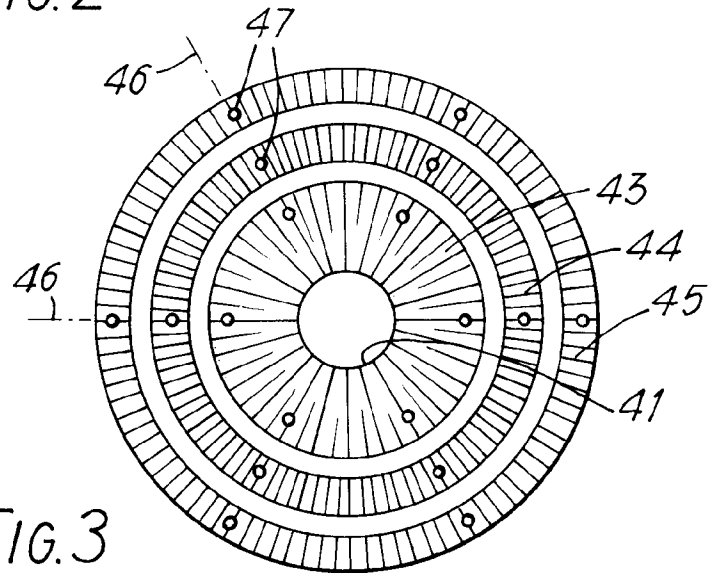


FIG. 3

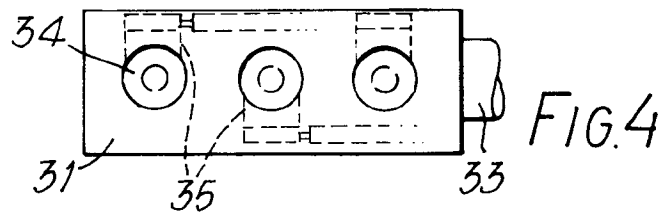


FIG. 4

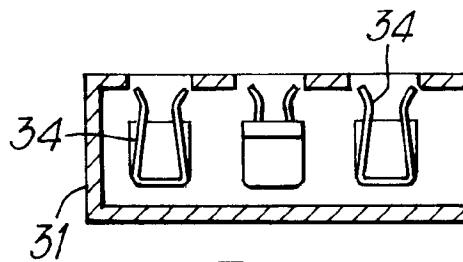


FIG. 5

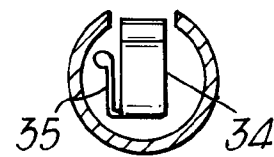


FIG. 6

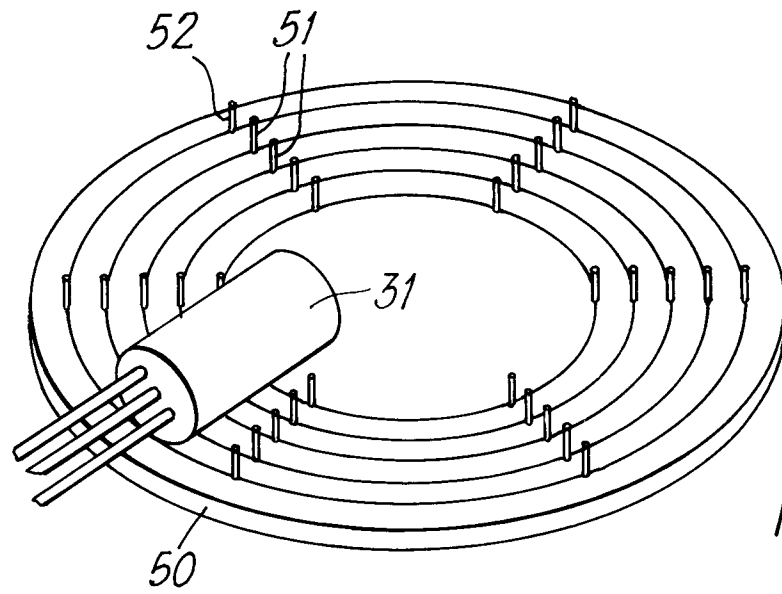


FIG. 7

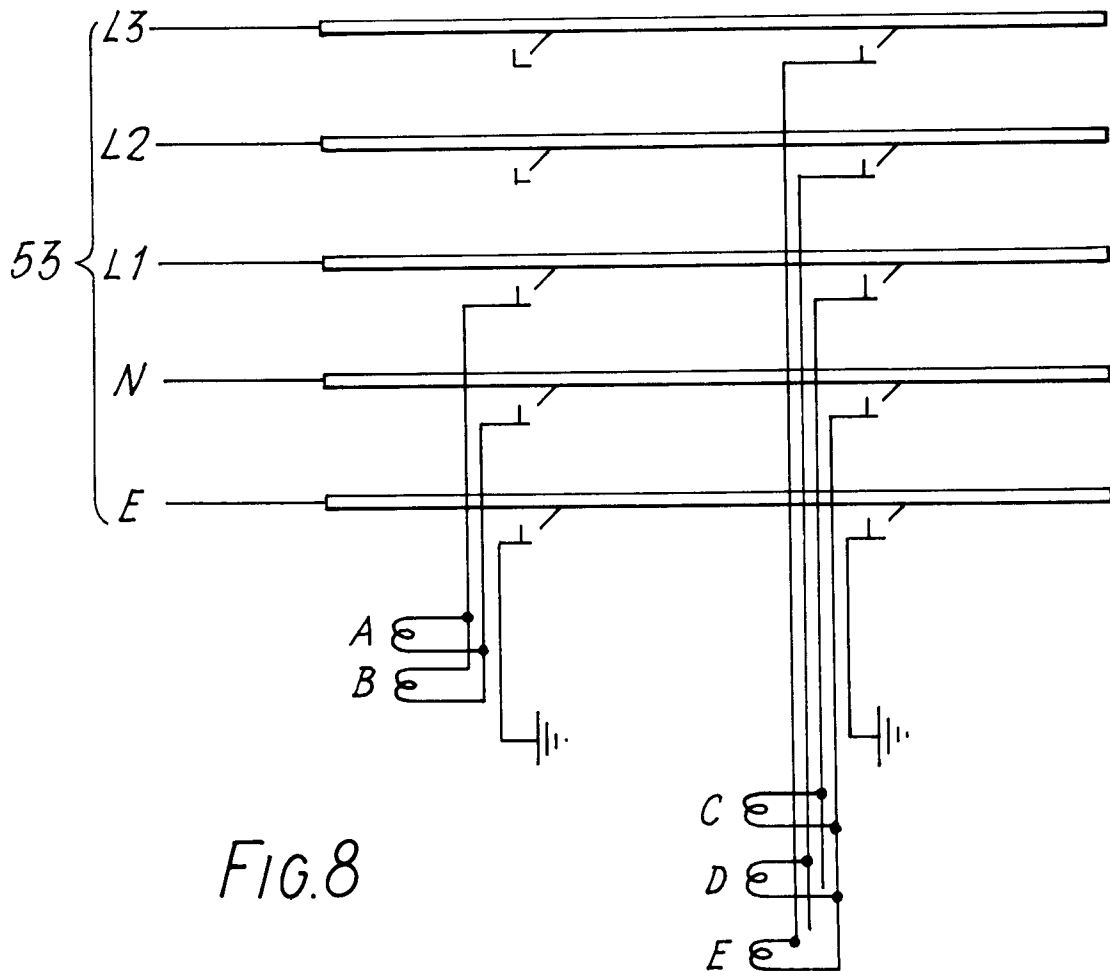
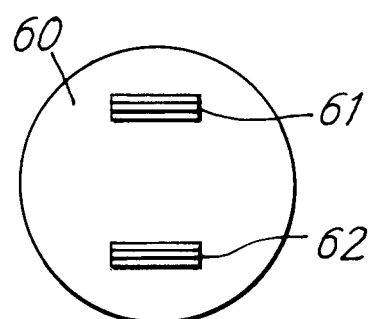
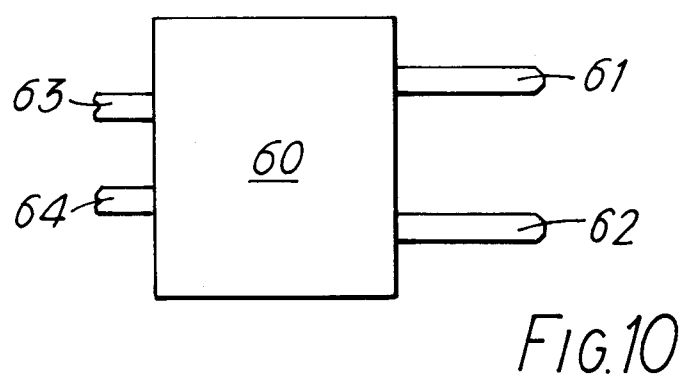
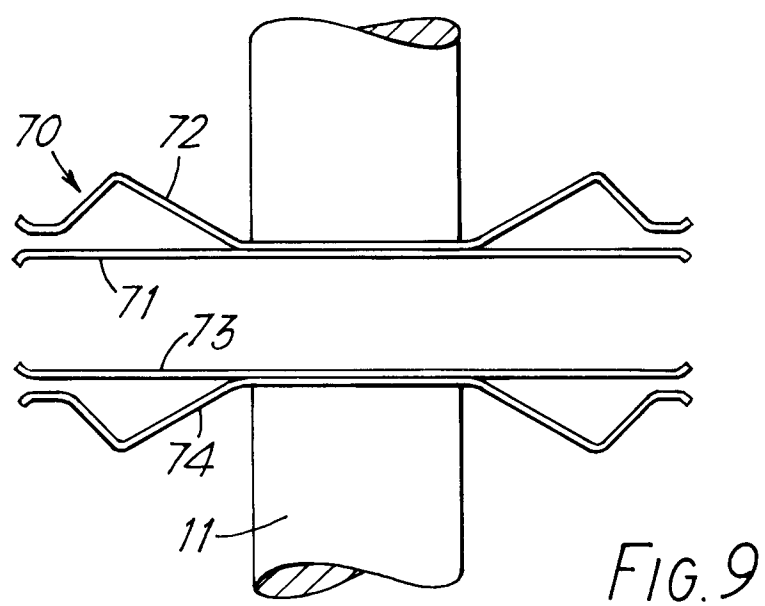


FIG. 8





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 92 30 1517

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	US-A-4 107 770 (WEBER) * the whole document *	1-5, 8, 15	F21S1/06 F21V23/06
A	---	11	
X	FR-A-2 300 961 (B.P. LAMPADARI DI BORTOLUZZI PIETRO) * the whole document *	1-6, 8	
A	---	10, 11, 14	
X	GB-A-416 A.D. 1913 (FISHER) * the whole document *	1-3	
A	---	10, 11, 15	
A	FR-A-2 612 004 (G.P.B. BEGHELLI) * page 4, line 27 - line 30; figures 4, 5 *	5, 6, 9	
A	FR-A-2 539 215 (MOULAGES PLASTIQUES DU MIDI) * figure 7 *	12	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			F21S F21V
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 25 MAY 1992	Examiner MARTIN C. P. A.
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