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(72) Inventor: **Lin, Paul**
Strathfield, New South Wales 2135 (AU)

(74) Representative: **Hocking, Adrian Niall et al**
Albright Patents LLP
Eagle Tower
Montpellier Drive
Cheltenham
Gloucestershire GL50 1TA (GB)

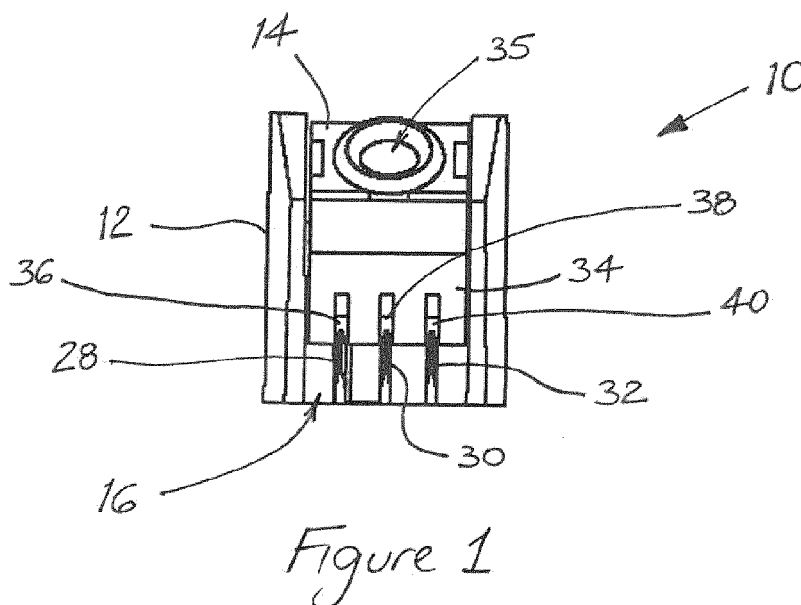
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(71) Applicant: **Kolex Pty Ltd**
Strathfield, New South Wales 2135 (AU)

(54) **An electrical connector with insulation displacement contacts**

(57) An electrical connector (10) has insulation displacement contacts adapted to make electrical connection with respective insulated conductors in a cable (26). The connector (10) includes a passageway (16) for receiving the cable (26) and three cutting edges (28, 30, 32) of respective insulation displacement contacts for cutting into the insulated conductors of the cable to make separate electrical connections thereto when received in the passageway. The cutting edges are aligned longitudinally with the passageway. The electrical connector

(10) also includes a movable press (14) located adjacent to the passageway (16) and movable between a first position where it allows access of the cable (26) into the passageway and a second position where it presses against the cable (26) and forces it against the cutting edges (28, 30, 32). This causes the cutting edges to cut through the cable (26) and make separate electrical connections to the conductors in the cable substantially simultaneously and longitudinally with reference to the direction of the cable in the passageway.



Description

FIELD OF INVENTION

[0001] The present invention relates to an apparatus and a method for making electrical connection with an electrically insulated wire or cable and, in particular, to an electrical connector with one or more insulation displacement contacts that can be used in electrical power outlet sockets, electrical power switches, electrical junction boxes, power transformers, ballasts for fluorescent lights and other electrical devices.

BACKGROUND ART

[0002] Electrical power outlet sockets are a common form of electrical device which are used extensively in domestic and commercial buildings for providing outlets from which electrical appliances can be supplied with mains electrical power. An electrical power outlet socket may typically be installed in a lower region of a wall, and have socket receptacles for three plug pins corresponding to an active, a neutral and an earthing connection. Electrically insulated connecting wires are installed within the building wall to connect the respective contacts of the socket receptacles to the mains electrical power source at, for example, the electrical switching or fuse box of the building, and to other electrical power outlet sockets in the same region of the building. In order to provide a secure electrical connection between the connecting wires in the wall and the electrical contacts of the power outlet socket, screw contacts have normally been utilised. A screw contact requires that insulation from an end of the connecting wire be removed, and the exposed conductor portion of the wire, consisting of a bundle of thin wire strands, be twisted and inserted in a contact opening and then engaged into secure electrical contact by screwing a contact screw into the contact opening to physically and electrically engage the exposed conductor portion. Although this is not a particularly difficult operation, it will nonetheless be very labour intensive and inconvenient if many electrical power outlets are to be installed. It also requires the use of pliers, a stripper and a screwdriver to carry out the cut, strip, twist, insert and screw operations. Also, stripped insulation, which is normally made of PVC, will litter the vicinity of these operations unless they are removed. It would be desirable, therefore, to reduce the number and complexity of operations required to make electrical connections to each electrical power outlet socket.

[0003] Australian Patent No. 784,652 discloses an electrical connector which addresses some of these problems by being able to effect relative movement between the conductors and its insulation displacement contacts, the relative movement being so restrained as to make the electrical connections therebetween in a substantially sequential manner. That electrical connector also requires that, for electrical connection to a doubly

insulated cable, the outer insulative sheath of the cable be first stripped or removed from a portion of the cable and the thus revealed inner insulated wires be received in wire channels of one part of the connector. That electrical connector also has its insulation displacement contacts configured laterally with respect to the directions of the insulated wires received in the channels, so that the insulated wires are cut cross-wise at an angle that, whilst cutting through the insulation, may also cut through and sever the nearby wire strands, thus reducing the level of electrical connection.

SUMMARY OF THE INVENTION

[0004] It is an object of the present invention to provide an electrical connector that achieves a faster, easier, safer, cleaner and/or more effective form of electrical connection with insulated conductors in the form of a cable (which has a double layer of insulation) or an electrically insulated connecting wire (which has a single layer of insulation), than in the aforementioned prior art.

[0005] According to the invention there is provided an electrical connector having one or more insulation displacement contacts adapted to make electrical connection with respective insulated conductors in the form of a cable or an electrically insulated connecting wire, the connector comprising:

- (a) a passageway for receiving the or each insulated conductor,
- (b) one or more cutting edges of respective insulation displacement contacts for cutting into a respective insulated conductor to make electrical connection to the or each conductor when received in the passageway, the or each cutting edge being aligned longitudinally with the passageway, and
- (c) a movable press located adjacent to the passageway and movable between a first position where it allows access of the or each insulated conductor into the passageway and a second position where it presses against the or each insulated conductor and forces the insulated conductor against the respective cutting edge whereby the or each cutting edge cuts into the respective insulated conductor and makes electrical connection to the or each conductor longitudinally with reference to the direction of the or each conductor in the passageway.

[0006] In a preferred form, the electrical connector has a plurality of cutting edges which are aligned longitudinally with the passageway, whereby the cutting edges make separate electrical connections to respective conductors substantially simultaneously.

[0007] Preferably, the insulated conductors that are received in the passageway are in the form of a cable and comprise connecting wires separately covered with electrical insulation, and the so insulated connecting wires are enclosed by an outer electrically insulative sheath to

form the cable that is received in the passageway.

[0008] Alternatively, the insulated conductors that are received in the passageway are in the form of one or more electrically insulated connecting wires which are separated by stripping away the outer sheath of a cable in which the or each connecting wire was previously located, and the cutting edges cut through the electrical insulation covering the wires only.

[0009] In a particularly preferred form of the electrical connector of the invention, the movable press is pivotally movable between the first and second positions, although in other embodiments the press may be moved by pushing, sliding, punching or other application of force.

[0010] The movable press preferably includes a curved pressing surface that, when in the first position, is spaced apart from the or each insulated conductor in the passageway, and when in the second position presses against the or each insulated conductor.

[0011] The pressing surface preferably has a plurality of elongated slots aligned longitudinally with respective cutting edges so that each slot receives therethrough its respective cutting edge as the insulated conductors are being forced against the cutting edges.

SUMMARY OF DRAWINGS

[0012] In order that the invention may be more readily understood and put into practical effect, reference will now be made to the accompanying drawings, in which:-

Figure 1 is a first end view of an electrical connector according to a first preferred embodiment of the invention,

Figure 2 is a partly sectional side view of the electrical connector of Figure 1 through which is received insulated conductors in the form of a flat cable, with the movable press of the electrical connector being in the first position,

Figure 3 is a partly sectional side view of the electrical connector and insulated conductors of Figure 2, with the movable press of the electrical connector being in the second position,

Figure 4 is a perspective view of the flat cable shown in Figures 2 and 3 in which the cutting edges of the electrical connector shown in Figure 1 have cut through the cable and made separate electrical connections to the conductors therein,

Figure 5 is an isolated side view of the wire strands comprising one of the conductors of the cable shown in Figure 4, in which the cable outer sheath and the electrical insulation covering the conductor have been removed to show internal features, showing a cutting edge having cut through the conductor longitudinally,

Figure 6 is an end view of the conductor and cutting edge of Figure 5,

Figure 7 is a perspective view of an electrical connector according to a second preferred embodiment

of the invention through which is received insulated conductors in the form of separated bundles of electrically insulated wire strands produced by stripping away the outer sheath of a round cable, with the movable press of the electrical connector being in the second position,

Figure 8 is a partly sectional end view of the electrical connector and insulated conductors of Figure 7,

Figure 9 is a perspective view of a junction box comprising three self-contained electrical connectors according to a third preferred embodiment of the invention,

Figure 10 is a top view of the junction box of Figure 9, Figure 11 is a sectional side view through A-A of the junction box of Figure 9,

Figure 12 is a top view of the junction box of Figures 9 and 10 in which the electrical connectors have been removed to show a first internal arrangement of electrical contacts and their conductive interconnections, Figure 13 is a top view of a junction box similar to that of Figures 9 and 10, but in which the electrical connectors have been removed to show a second internal arrangement of electrical contacts and their conductive interconnections,

Figure 14 is a perspective view of a junction box comprising three self-contained electrical connectors according to a fourth preferred embodiment of the invention,

Figure 15 is a perspective view of the junction box of Figure 14 in which the electrical connectors have been removed to show the first internal arrangement of electrical contacts,

Figure 16 is a perspective view of the junction box of Figure 14 through which is received a plurality of flat cables, with the movable press of each electrical connector being in the first position,

Figure 17 is a perspective view of the junction box and flat cables of Figure 16 in which the electrical connectors have been removed to show the ends of three flat cables received therein,

Figure 18 is a perspective view of the junction box and flat cables of Figure 16 in which the electrical connectors have been removed to show one continuous flat cable and the end of one flat cable received therein,

Figure 19 is a perspective top view of a high profile, surface power socket comprising a removable electrical connector according to a fifth preferred embodiment of the invention, the electrical connector being located internally and hidden from view,

Figure 20 is a perspective bottom view of the power socket of Figure 19 in which the electrical connector has been removed to show an internal arrangement for receiving a continuous flat cable and for allowing engagement of the electrical connector,

Figure 21 is an isolated perspective view of the removable electrical connector of the power socket of Figure 19,

Figure 22 is an isolated perspective view of an internal part of the power socket of Figure 19 for engaging the electrical connector of Figure 21,

Figure 23 is a partly cut-away perspective view of the power socket of Figure 19 showing the electrical connector of Figure 21 engaging the internal part of Figure 22,

Figure 24 is a perspective view showing a first step in the engagement of the electrical connector of Figure 21 with the internal part of Figure 22 in the power socket of Figure 19,

Figure 25 is a perspective view similar to that of Figure 24 but showing a second step in the engagement of the electrical connector of Figure 21 with the internal part of Figure 22 in the power socket of Figure 19,

Figure 26 is a top view of the first step shown in Figure 24,

Figure 27 is a top view of the second step shown in Figure 25,

Figure 28 is an isolated perspective view of a push button used in the internal portion of Figure 22 in the power socket of Figure 19,

Figure 29 is a perspective bottom view showing a continuous flat cable received by the internal arrangement shown in Figure 20 of the power socket of Figure 19,

Figure 30 is a perspective bottom view showing the electrical connector of Figure 21 being engaged with the cable engaged in the power socket of Figure 19,

Figure 31 is a partly sectional side view of the power socket of Figure 19 showing engagement of the electrical connector of Figure 21 with the continuous flat cable received by the internal arrangement shown in Figure 20 of the power socket of Figure 19,

Figure 32 is a perspective view of a low profile, wall mounted power socket comprising two electrical connectors according to a sixth preferred embodiment of the invention,

Figure 33 is a perspective view similar to that of Figure 32 but showing hidden internal detail of one of the electrical connectors in the power socket of Figure 32, and

Figure 34 is a perspective view showing the engagement of two continuous flat cables with respective electrical connectors in the power socket of Figure 32.

DETAILED DESCRIPTION OF INVENTION

[0013] The electrical connector 10 shown in Figures 1 to 3 is of the kind having insulation displacement contacts that are adapted to make electrical contact with respective insulated conductors. Such insulated conductors may, for example, comprise cables formed of three linearly extending bundles of electrically insulated copper wire strands, each bundle covered by a respective electrical insulation covering having a functionally coded col-

our to form an insulated connecting wire, and the three insulated connecting wires enclosed by an outer electrically insulative sheath. Such cables may be flat cables, in which the three insulated wires are arranged in a straight line when the cable is viewed cross-sectionally, or round cables, in which the three insulated wires are arranged triangularly around a central point when the cable is viewed cross-sectionally. Alternatively, such insulated conductors may comprise separated insulated wires produced by stripping away the outer sheath of a round cable in which the insulated wires were previously located.

[0014] The connector 10 has a housing 12, to opposed side walls of which is mounted a roller or movable press 14. There is a passageway 16 between the press 14 and a floor 18 of the housing 12 for receiving three insulated conductors 20, 22, 24 (as shown in Figure 4) in the form of a flat cable 26. Extending upwardly through the floor 18 are three cutting edges 28, 30, 32 of copper blades which serve as insulation displacement contacts or terminals for active, earth and neutral conductors, respectively. The cutting edges are aligned longitudinally with the passageway 16. The press 14 is, in this embodiment, pivotally movable about a pivot point 33 between a first position (as shown in Figure 2) where it allows access of the cable 26 into the passageway 16 (in the direction shown by arrow A) and a second position (as shown in Figure 3) where it presses against the cable 26 and forces it against the cutting edges 28, 30, 32. The application of this force is through a curved pressing surface 34 of the press 14 which has three elongated slots 36, 38, 40 aligned longitudinally with the three cutting edges 28, 30, 32 so that each slot receives therethrough its respective cutting edge as the cable is being forced by the pressing surface 34 against the cutting edges. By application of this force, the three cutting edges 28, 30, 32 cut into the cable 26 and make separate electrical connections to the three conductors 20, 22, 24 of the cable 26 substantially simultaneously and longitudinally with reference to the direction of the conductors in the passageway 16. The slots 36, 38, 40 ensure that the cutting edges completely penetrate the insulated conductors by cutting through the insulation and piercing between the copper wire strands, thereby achieving optimum contact and conductivity for effective electrical connections.

[0015] The press 14 has an aperture 35 which can receive the tip of a screwdriver 36 or other tool for applying the necessary force to enable movement between the first and second positions. The tool 36 can be used to push the press 14 into the first position to open the passageway 16, and can be used to pull the press 14 into the second position to close the passageway 16.

[0016] The curved pressing surface 34 varies along its length in its distance from the pivot point 33 of the press 14, such that at location 38 along the surface, an initial light contact force is applied on the cable 26 and that force progressively increases as the press 14 is pivoted towards its second position and the length of the pressing

surface 34 in contact with the cable 26 is further from the pivot point and closer to the cutting edges 28, 30, 32.

[0017] As shown in Figures 5 and 6, each cutting edge 28 cuts longitudinally through the middle or near middle of each bundle of electrically insulated wire strands 40, forcing or piercing its way between strands and thus substantially maintaining the number of strands for optimal electrical connection, rather than severing them and depleting the number of strands, as would be the case if the cutting edges were arranged laterally with respect to the direction of the conductors.

[0018] Each cutting edge 28 also cuts into its respective insulated conductor, and thus makes separate electrical connections to the three conductors of the cable 26, substantially simultaneously, rather than sequentially, as the force that is applied is substantially simultaneous on all conductors of the cable.

[0019] The electrical connector 50 shown in Figures 7 and 8 is similar in structure, operation and function to the connector 10, except that it is configured to make separate electrical connections to insulated conductors comprising separated insulated connecting wires 52, 54, 56 produced by stripping away the outer sheath of a round cable 58. For this purpose, extending upwardly from the floor of the housing 60 are two walls 62, 64 which, together with the opposed side walls 66, 68, define therebetween three regions of a passageway 69 through which respective ends of the three insulated wires 52, 54, 56 are received. Extending upwardly through the floor of each such region of the passageway are respective cutting edges 72 which are aligned longitudinally with the passageway 69.

[0020] The electrical connector 50 has three curved pressing surfaces separated by two gaps 70 therebetween, the gaps being aligned longitudinally with the two walls 62, 64, and each curved pressing surface has an elongated slot 71 aligned longitudinally with a respective cutting edge 72. Each slot receives therethrough its respective cutting edge as the cable is being forced by the pressing surfaces against the cutting edges. Each cutting edge cuts longitudinally through the middle or near middle of each bundle of electrically insulated wire strands, and makes separate electrical connections to the three conductors substantially simultaneously, in the same manner as is achieved by the cutting edges of the electrical connector 10.

[0021] The junction box 80 shown in Figures 9 to 12 has a T-shaped housing 82 for three self-contained electrical connectors located in respective lobes 84, 86, 88 of the housing 82. Two of the lobes 84, 86 are aligned longitudinally and the other lobe 88 is aligned perpendicularly to the longitudinally aligned lobes.

[0022] The electrical connectors are identical to each other in structure, operation and function. Each connector of the junction box 80 is similar to the connector 10, and has a pivotally movable press 90, a passageway 92 between the press 90 and a floor 94 of the respective lobe of the housing 82, and three cutting edges 96, 98,

100 extending upwardly through the floor 94 and aligned longitudinally with the passageway 92. Each lobe has a side opening 102 for receiving into the passageway 92 an end of a flat cable when the press 90 is in the first position. Pivoting the press 90 to the second position results in making separate electrical connections to the three conductors of the flat cable substantially simultaneously and longitudinally with reference to the direction of the conductors in the passageway 92.

[0023] As shown in Figure 12, the three cutting edges of each electrical connector are conductively interconnected so that there is electrical continuity between all of the active terminals (denoted as A), between all of the earth terminals (denoted as E), and between all of the neutral terminals (denoted as N).

[0024] As shown in Figure 13, one of the lobes of the housing 82 of the junction box 80 may be configured to locate an electrical connector (such as a wall mounted light switch assembly) that differs from the other electrical connectors in its application by making separate electrical connections to two active conductors 104 of a cable or of respective insulated conductors comprising separated insulated wires.

[0025] The junction box 110 shown in Figures 14 to 18 is similar in structure, operation and function to the junction box 80, except that it includes a pair of corner mounting flanges 112, 114 having holes 116 for receiving threaded fasteners therethrough, and is configured to either receive into each passageway the respective ends of three flat cables 118, 120, 122 (as shown in Figure 17) or receive into the two passageways that are aligned longitudinally a continuous flat cable 124 and into the other passageway the end of a flat cable 126 (as shown in Figure 18). This change in configuration is achieved by having a removable separator plate 128 that normally forms a wall of the housing between the electrical connectors located in lobes 84, 86. When required, the separator plate 128 is slidably removed from its engaging tracks in the housing to provide a continuous passageway for receiving the continuous flat cable 124 which may supply mains power.

[0026] The high profile, surface power socket 140 shown in Figures 19 to 31 (also known as a plug top) has a housing 142 formed as two integrally connected portions, a first generally cylindrical portion 144 for receiving an electrical three pin plug and a second generally tetragonal portion 146 for mounting the power socket 140 to a wall or like surface.

[0027] The power socket 140 has a removable electrical connector part 148 which is engaged to an internal mounting part 150 of the socket 140. The power socket 140 can also engage three insulated conductors in the form of a continuous flat cable 152 (see Figures 29, 30 and 31).

[0028] The removable electrical connector part 148 does not include a plurality of cutting edges, but the cutting edges 154 are provided by the internal mounting part 150 of the socket 140, so that the parts 148 and 150

together form an electrical connector according to the present invention. The electrical connector part 148 has a housing 156, to opposed side walls of which is mounted a pivotally movable press 158. There is a passageway 160 beneath the press 158 and extending between opposed side openings of the electrical connector part 148 for receiving the continuous flat cable 152. The press 158 is able to pivot between first and second positions in a manner as described earlier with reference to other embodiments of the invention.

[0029] The three cutting edges 154 extend upwardly through a floor 155 of the internal mounting part 150 and, when the electrical connector part 148 is engaged thereto, are aligned longitudinally with the passageway 160.

[0030] The electrical connector part 148 has four corner feet 164, 166, 168, 170 and a side lock 172 for engaging the internal mounting part 150.

[0031] The internal mounting part 150 has four guide surfaces 174, 176, 178, 180, on the same sides of which are gaps for receiving respective corner feet of the connector part 148. The internal mounting part 150 also has a spring loaded push button 182 and slide tracks 184, 186 on opposite sides of the floor 155. The push button 182 (as shown in Figure 28) has a side catch 187.

[0032] The electrical connector part 148 is engaged to the internal mounting part 150 by firstly lowering it so that the four corner feet 164, 166, 168, 170 enter the gaps beside each guide surface 174, 176, 178, 180 (as shown in Figures 24 and 26) and the side lock 172 pushes down on the side catch 187 of the push button 182 until the connector part 148 is supported on the floor 155. The electrical connector part 148 is then slid along the floor in the direction shown by arrows B in Figures 26 and 27 so that the corner feet are located under the guide surfaces and the side lock 172 no longer pushes down on the side catch 187, whereby the push button 182 springs back to its normal position and the side lock 172 is located alongside the side catch 187. In this engaged position (as shown in Figures 25 and 27) the electrical connector part 148 cannot be slid out from under the guide surfaces because of the obstruction to such sliding provided by the side lock 172 abutting the side catch 187 of the push button 182.

[0033] When the electrical connector part 148 needs to be disengaged from the internal mounting part 150, say, for engaging the continuous flat cable 152 to the power socket 140, the push button 182 is pressed until the side catch 187 is located entirely below the side lock 172 and, whilst the push button 182 is held in that position, the electrical connector part 148 is slid out from under the guide surfaces in the opposite direction to that for engagement. The push button 182 is then released and the electrical connector part 148 can be lifted from the floor 155 of the internal mounting part 150.

[0034] As shown in Figure 29, the continuous flat cable 152 is received in slots 162 formed in opposite ends of the housing portion 146 and crosses the floor 155 of the internal mounting part 150 above the three cutting edges

154. The electrical connector part 148 is then engaged to the internal mounting part 150 in the manner as described above (see Figure 30), so that the cable 152 is received through the passageway 160 when the press 158 is in the first position. Pivoting the press 158 to the second position results in the three cutting edges 154 making separate electrical connections to the three conductors of the flat cable 152 substantially simultaneously and longitudinally with reference to the direction of the conductors in the passageway 160 (see Figure 31).

[0035] The low profile, wall mounted power socket 200 shown in Figures 32 to 34 has a housing 202 to which is fixedly mounted two electrical connectors 204, 206. The structure, operation and function of the electrical connectors 204, 206 are similar to that of the electrical connectors described with reference to earlier embodiments. The electrical connectors 204, 206 are located side by side but with a gap therebetween created by a connecting web 208 between each connector housing so that each electrical connector 204, 206 can receive the end of a respective flat cable 210, 212. Features of the electrical connectors 204, 206 that are the same as features of the electrical connector 10 described earlier are identified by the same numerals.

[0036] It will be readily apparent to persons skilled in the art that various modifications may be made in details of design and construction of the electrical connectors described above without departing from the scope or ambit of the invention.

[0037] For example, the electrical connector of the present invention may have only one cutting edge aligned longitudinally with the passageway, and the movable press may be moved by sliding, punching or other application of force.

[0038] In other alternative forms, the electrical connector may, rather than having the press being movable relative to the stationary cutting edges in the passageway, instead have the one or more cutting edges being movable relative to stationary pressing surfaces of a press, so that it is the movable cutting edges that move between the first and second positions.

Claims

1. An electrical connector having one or more insulation displacement contacts adapted to make electrical connection with respective insulated conductors in the form of a cable or an electrically insulated connecting wire, the connector comprising:

- (a) a passageway for receiving the or each insulated conductor,
- (b) one or more cutting edges of respective insulation displacement contacts for cutting into a respective insulated conductor to make electrical connection to the or each conductor when received in the passageway, the or each cutting

- edge being aligned longitudinally with the passageway, and
(c) a movable press located adjacent to the passageway and movable between a first position where it allows access of the or each insulated conductor into the passageway and a second position where it presses against the or each insulated conductor and forces the insulated conductor against the respective cutting edge whereby the or each cutting edge cuts into the respective insulated conductor and makes electrical connection to the or each conductor longitudinally with reference to the direction of the or each conductor in the passageway.
2. The electrical connector of claim 1 wherein there is a plurality of cutting edges which are aligned longitudinally with the passageway, whereby the cutting edges make separate electrical connections to respective conductors substantially simultaneously.
 3. The electrical connector according to claim 1 or claim 2 wherein the movable press is pivotally movable between the first and second positions.
 4. The electrical connector according to any one of claims 1 to 3 wherein the movable press includes a curved pressing surface that, when in the first position, is spaced apart from the or each insulated conductor in the passageway, and when in the second position presses against the or each insulated conductor.
 5. The electrical connector according to any one of claims 1 to 4 and further including a housing, to opposed side walls of which is pivotally mounted the movable press, the housing having a floor from which extend upwardly the or each cutting edge.
 6. The electrical connector according to any one of claims 1 to 5 wherein there are three cutting edges which are formed on respective copper blades that serve as the insulation displacement contacts for active, earth and neutral conductors, respectively.
 7. The electrical connector according to any one of claims 1 to 6 wherein the or each cutting edge is so located in longitudinal alignment with the passageway that it cuts longitudinally through the middle of the respective insulated conductor, thereby piercing between wire strands of the or each conductor so as to optimise electrical connection to the or each conductor.
 8. The electrical connector according to claim 4 wherein the curved pressing surface has a plurality of elongated slots aligned longitudinally with a plurality of cutting edges so that each slot receives therethrough a respective cutting edge as each one of a plurality of insulated conductors is being forced by the pressing surface against a respective cutting edge.
 9. The electrical connector according to any one of claims 1 to 8 wherein the movable press includes an aperture which is adapted to receive a tool for applying a force to enable movement of the press between the first and second positions.
 10. An electrical junction box comprising a plurality of the electrical connectors according to any one of claims 1 to 9.
 11. A power socket comprising an electrical connector of any one of claims 1 to 9.
 12. A power socket comprising an electrical connector of any one of claims 1 to 9 and an internal mounting part of the socket, the cutting edges extending upwardly through a floor of the internal mounting part so as to co-operate with a movable press provided by an electrical connector part removably engaged to the internal mounting part, and the passageway being defined between the floor of the internal mounting part and the movable press.
 13. An electrical connector having one or more insulation displacement contacts adapted to make electrical connection with respective insulated conductors in the form of a cable or an electrically insulated connecting wire, the connector comprising:
 - (a) a passageway for receiving the or each insulated conductor;
 - (b) a press located adjacent to the passageway, and
 - (c) one or more movable cutting edges of respective insulation displacement contacts for cutting into a respective insulated conductor to make electrical connection to the or each conductor when received in the passageway, the or each cutting edge being movably aligned longitudinally with the passageway, and being movable between a first position where the or each cutting edge allows access of the or each insulated conductor into the passageway and a second position where the or each cutting edge presses against the respective insulated conductor and forces the insulated conductor against the press whereby the or each cutting edge cuts into the respective insulated conductor and makes electrical connection to the or each conductor longitudinally with reference to the direction of the or each conductor in the passageway.

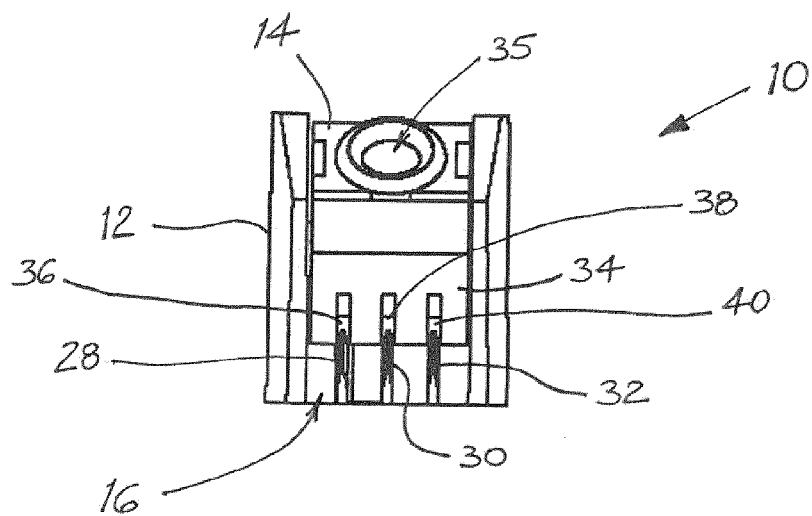


Figure 1

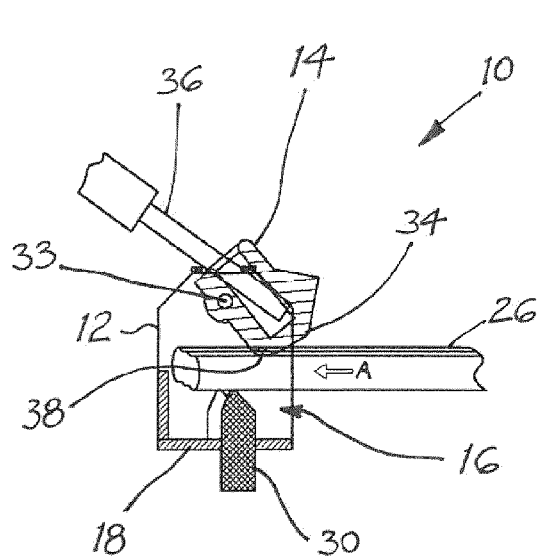


Figure 2

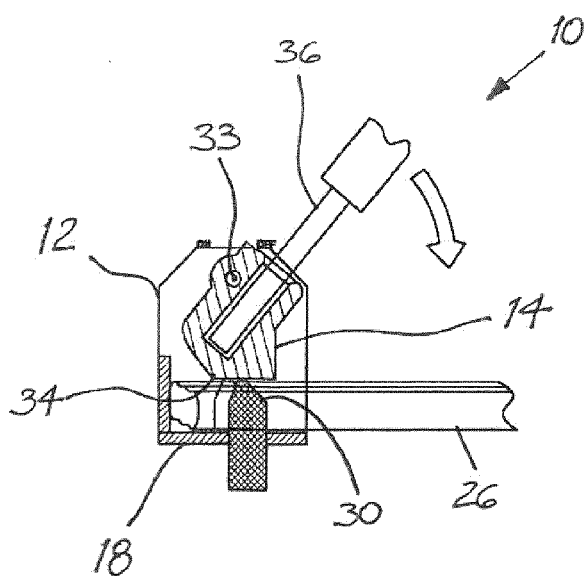


Figure 3

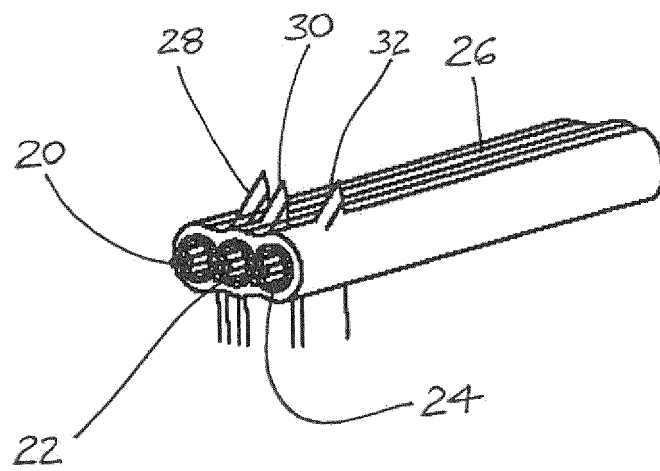


Figure 4

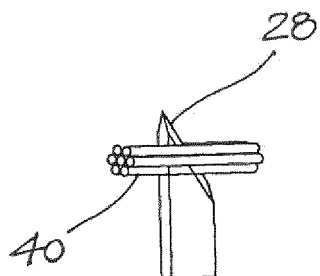


Figure 5



Figure 6

Figure 7

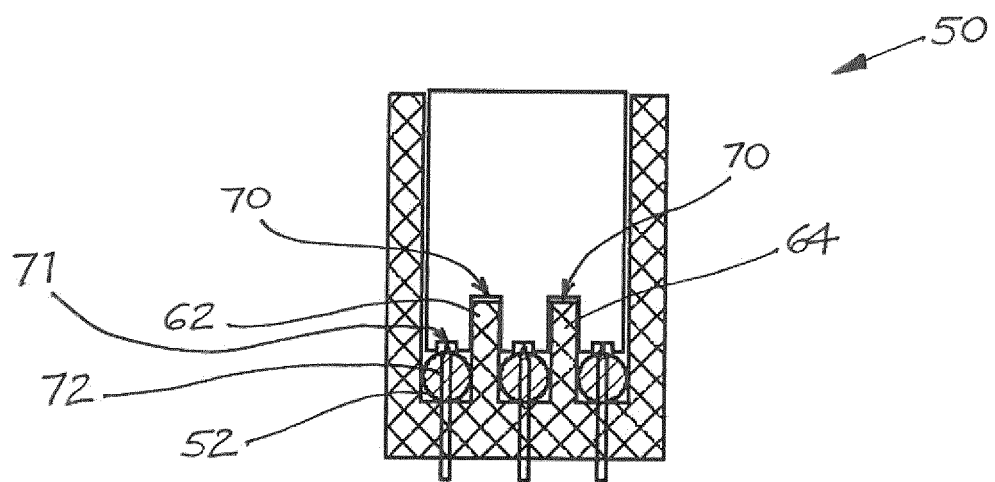
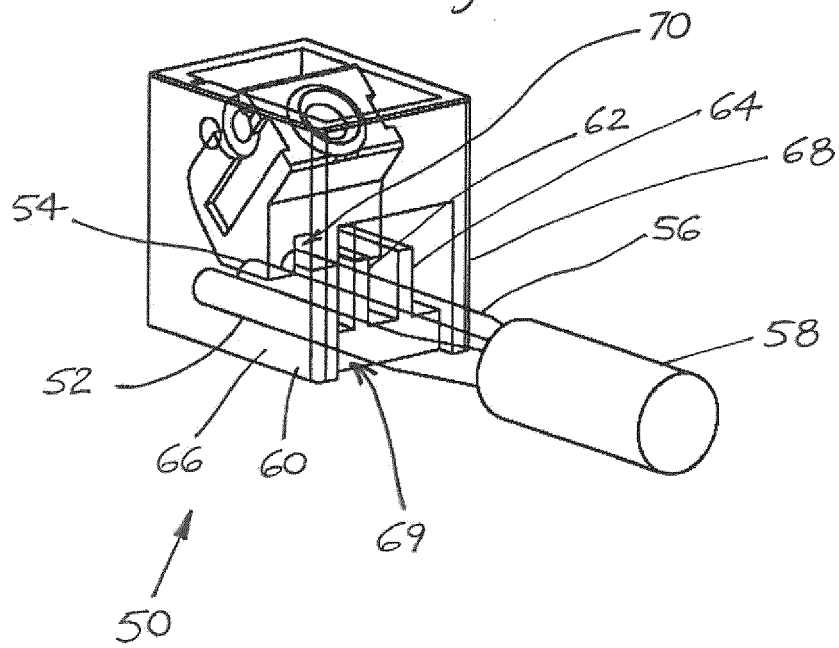


Figure 8

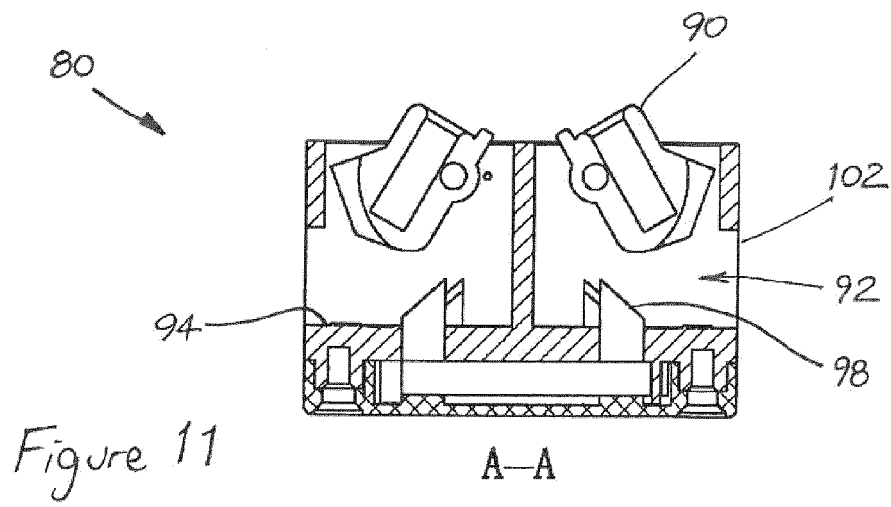
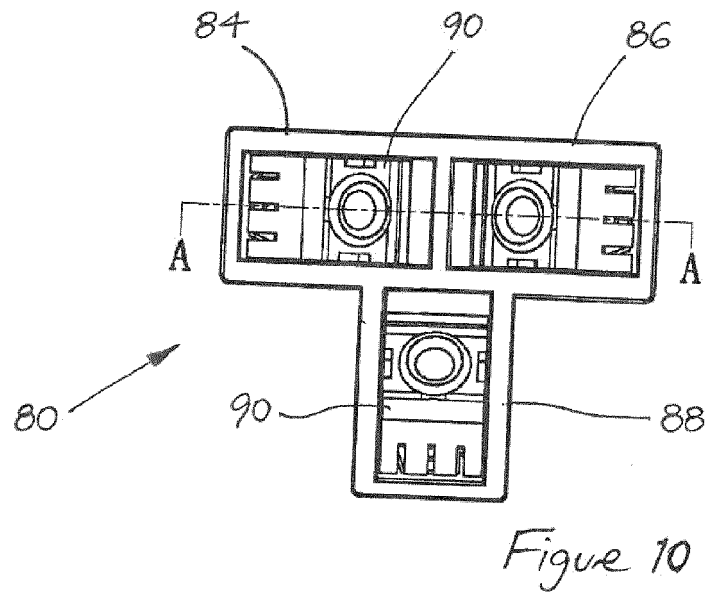
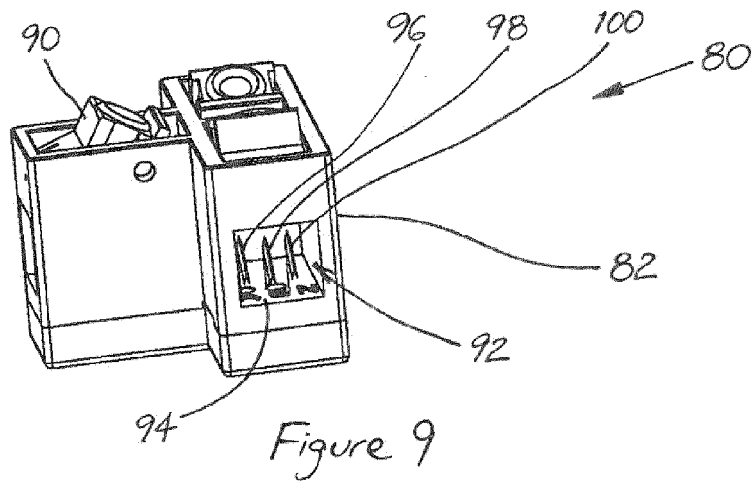


Figure 12

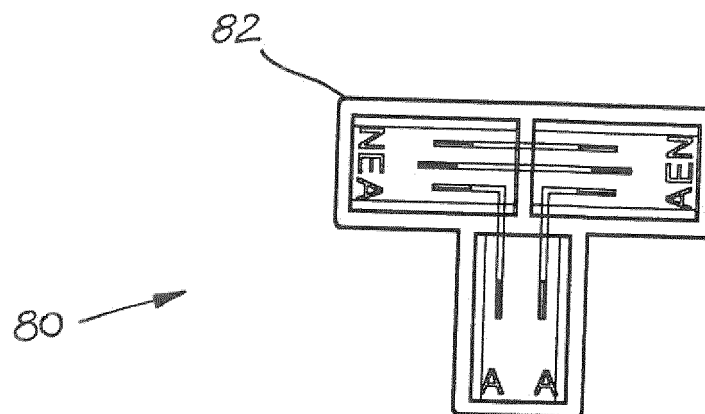
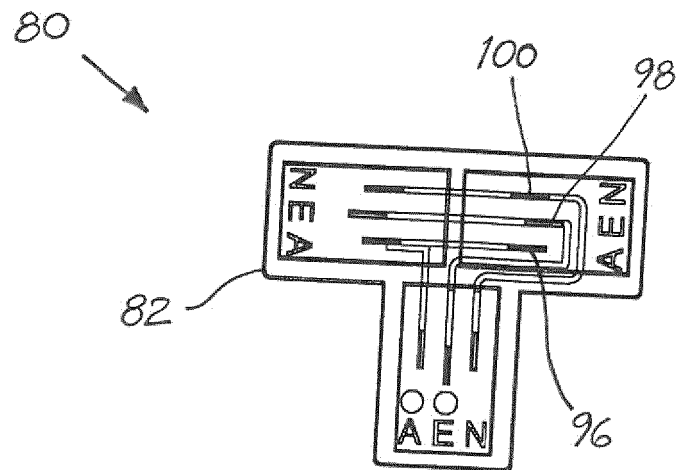


Figure 13

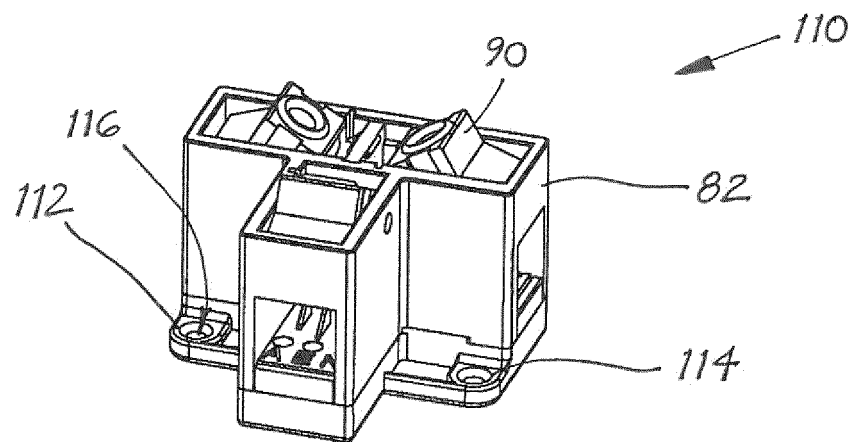


Figure 14

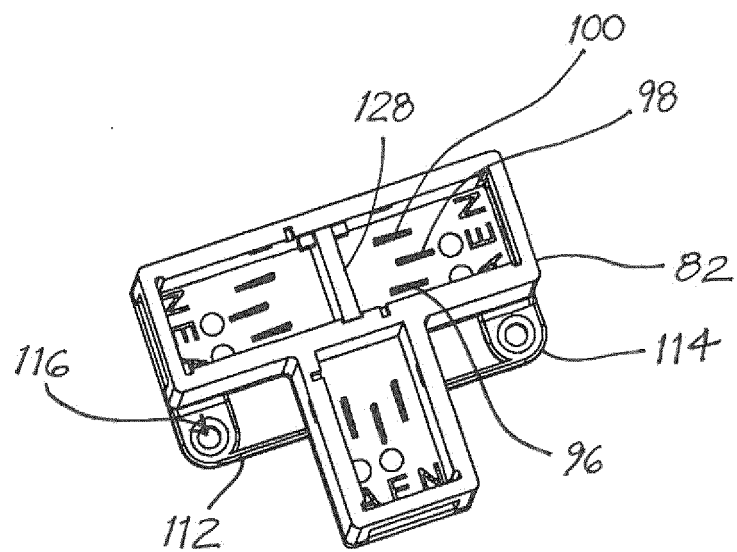


Figure 15

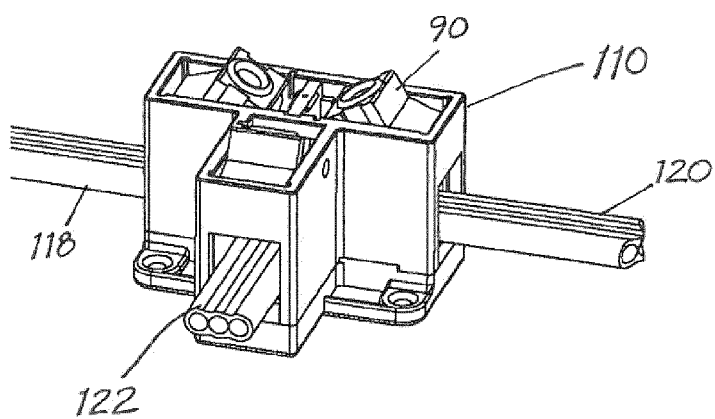


Figure 16

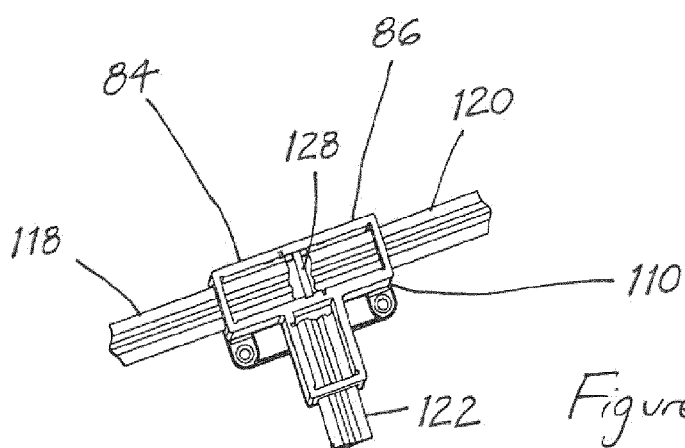


Figure 17

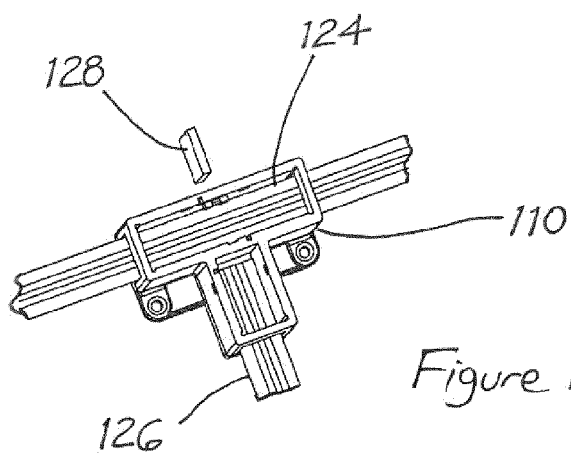
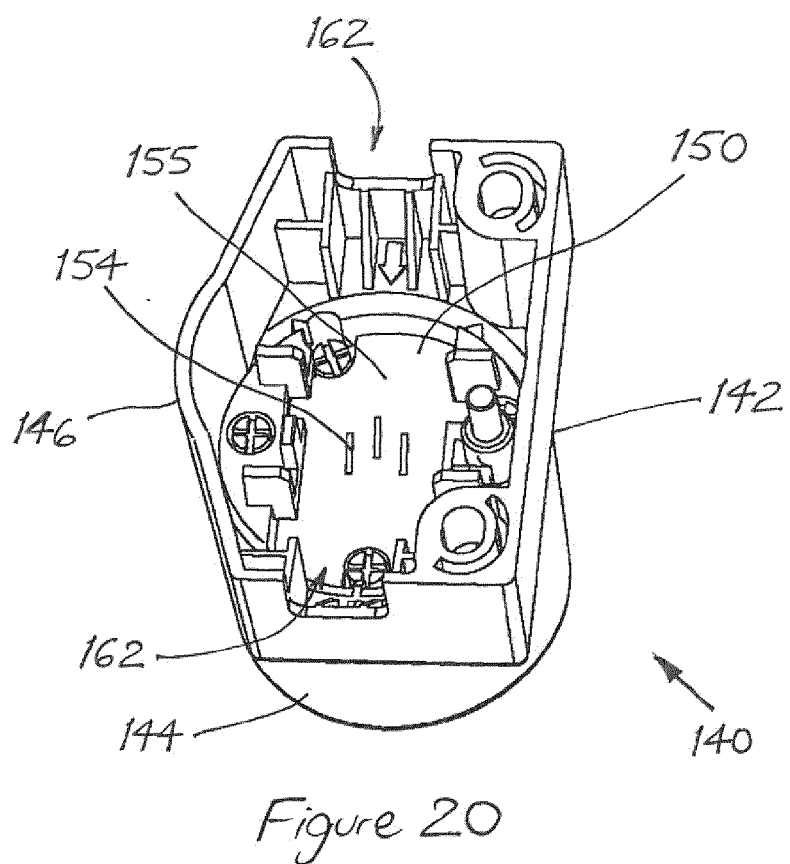
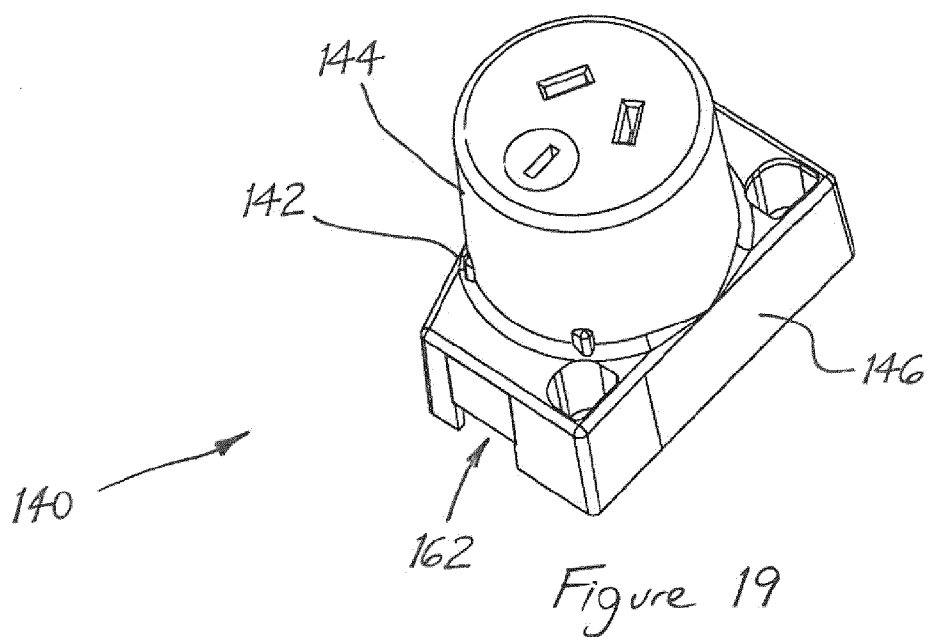
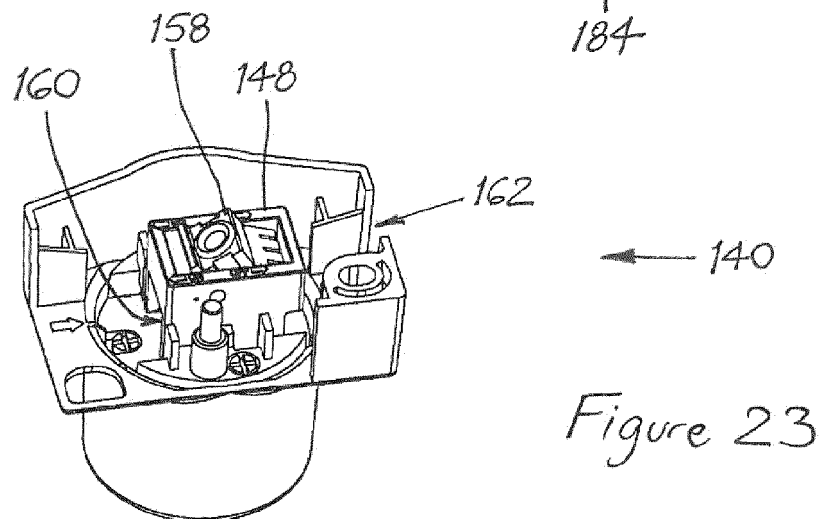
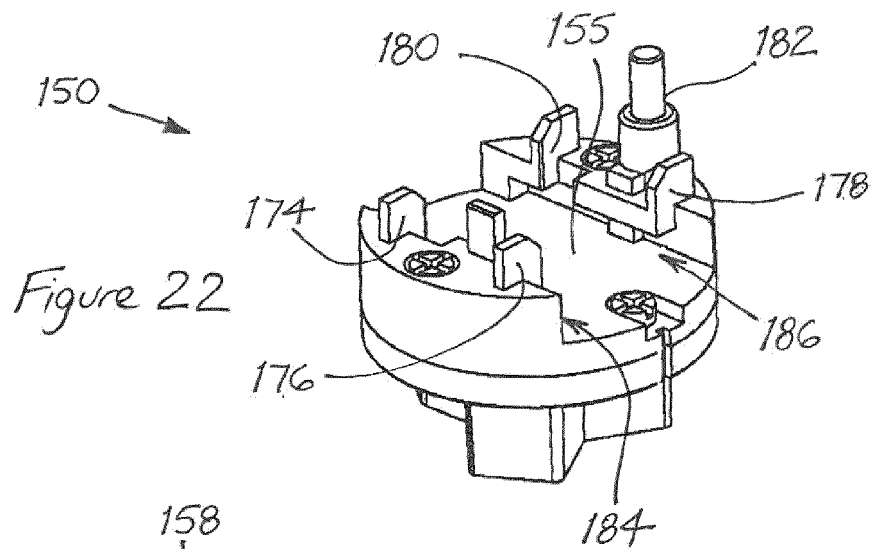
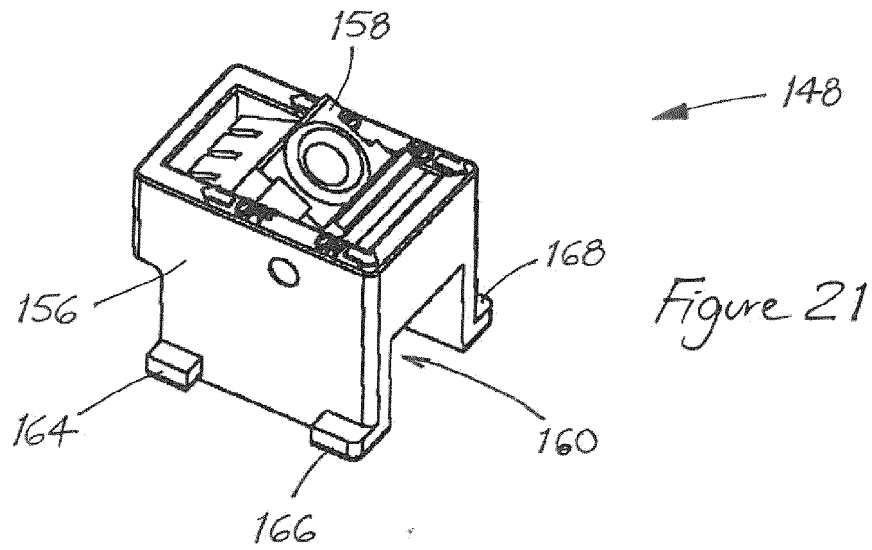
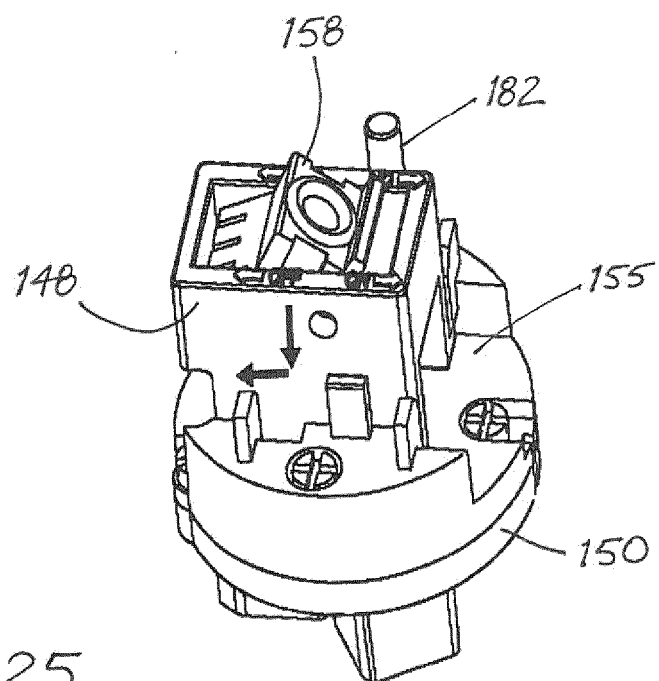
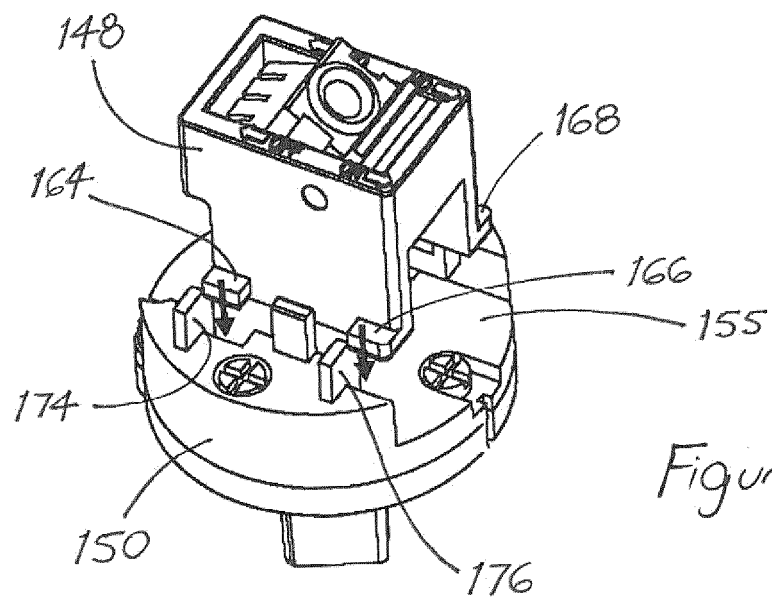
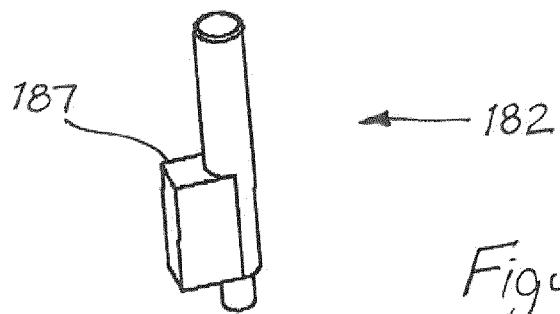
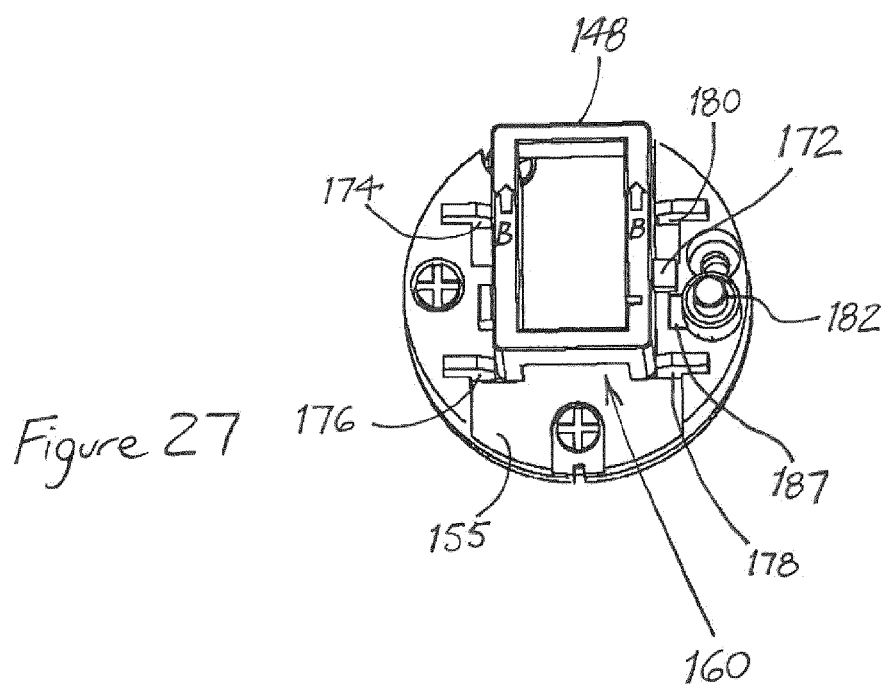
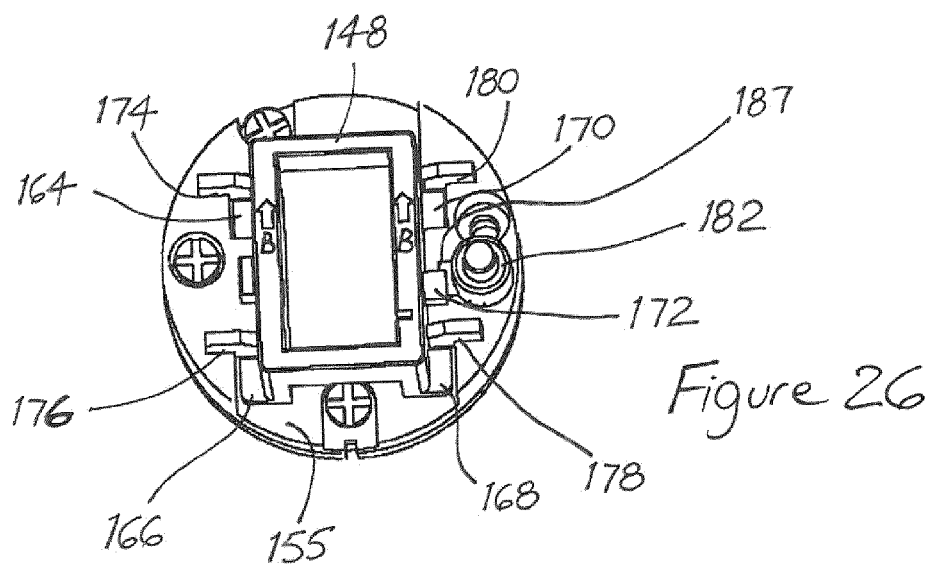


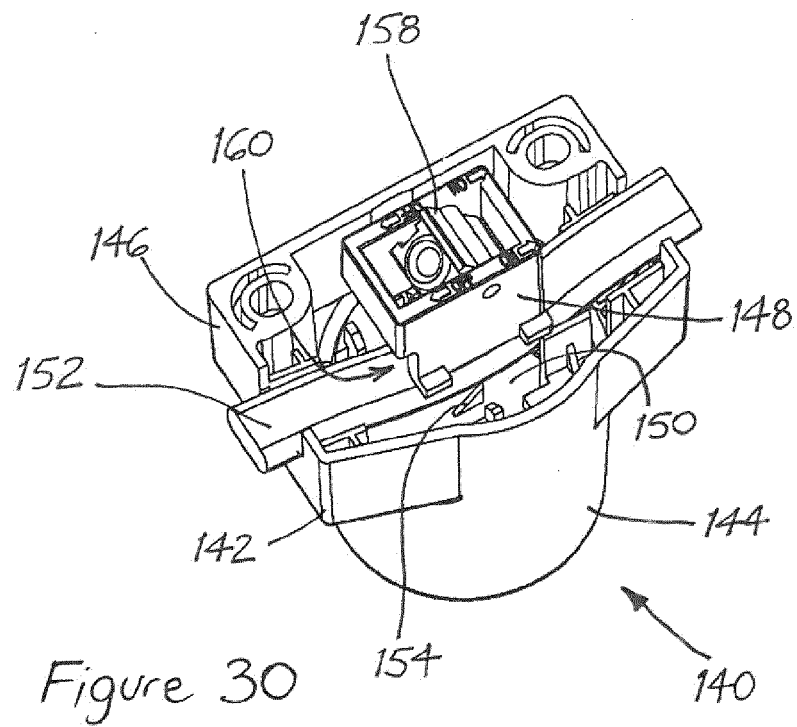
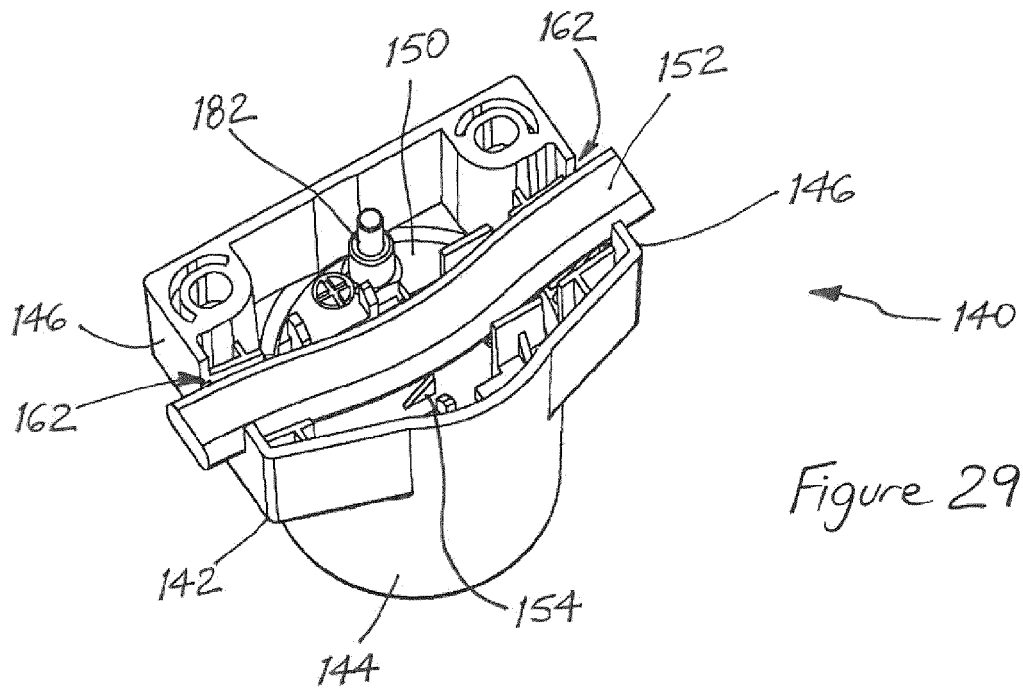
Figure 18

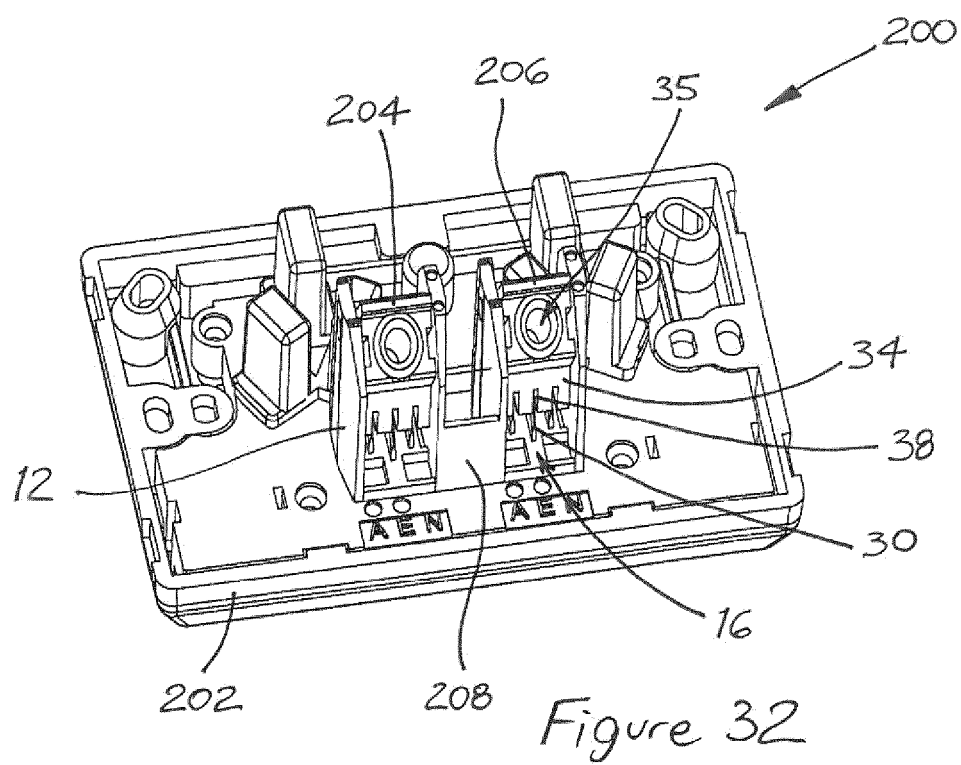
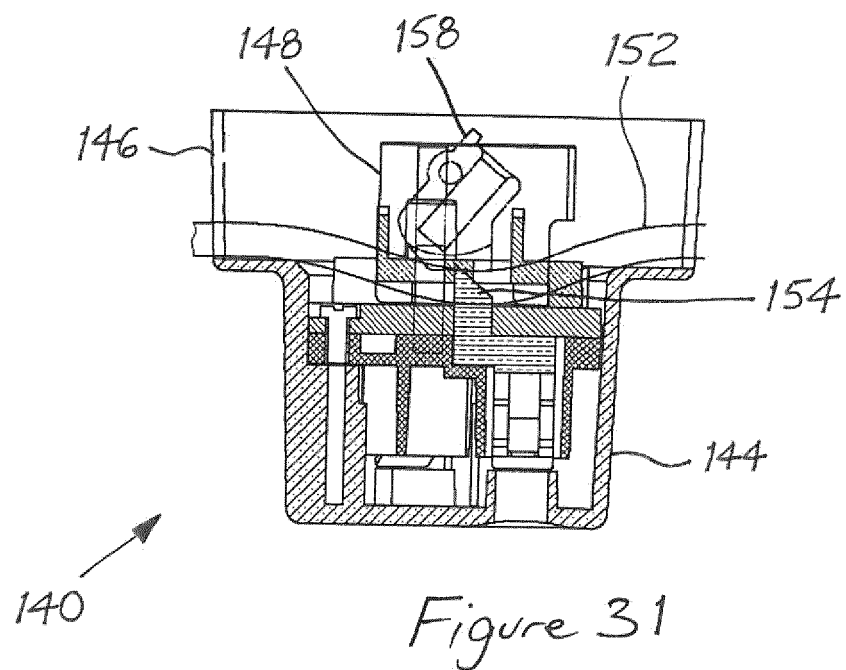


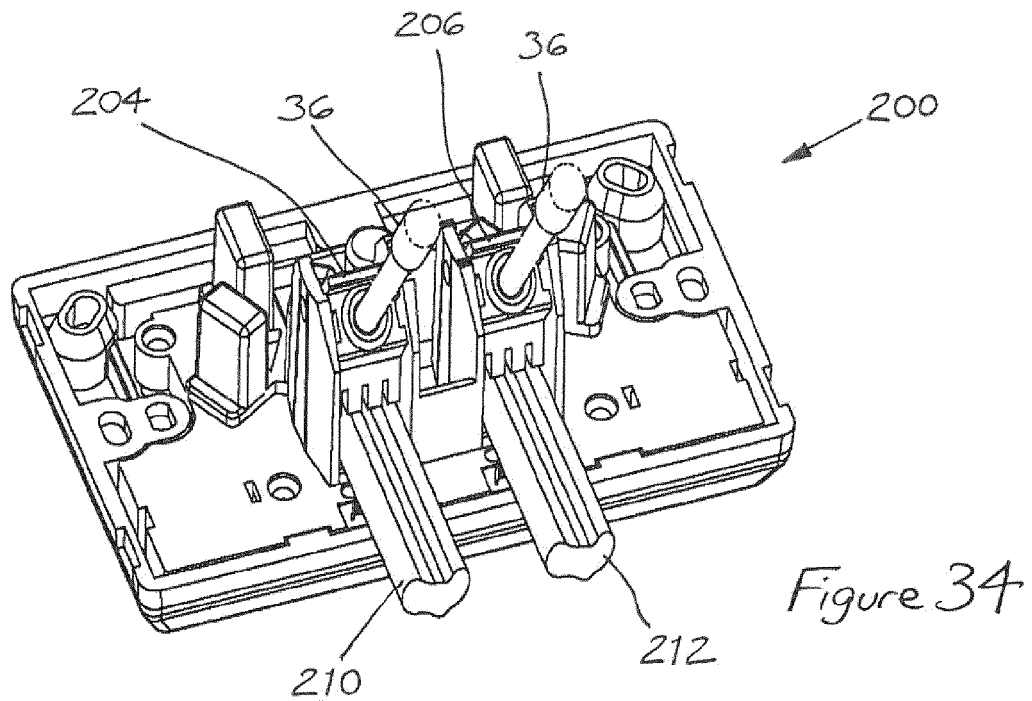
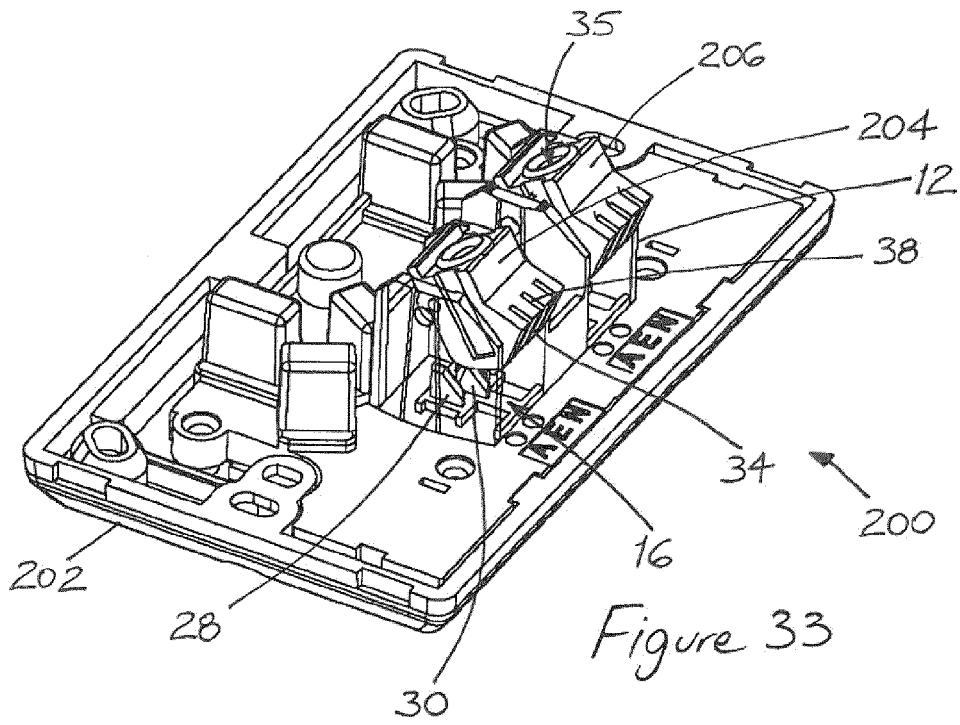












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Patent documents cited in the description

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