US 20250256538A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2025/0256538 A1**

Shelton, III (43) **Pub. Date: Aug. 14, 2025**

(54) **MULTI-CURRENT TRAILER CONNECTOR**

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(21) Appl. No.: **19/045,084**

(22) Filed: **Feb. 4, 2025**

Related U.S. Application Data

(60) Provisional application No. 63/551,986, filed on Feb. 9, 2024.

Publication Classification

(51) **Int. Cl.**

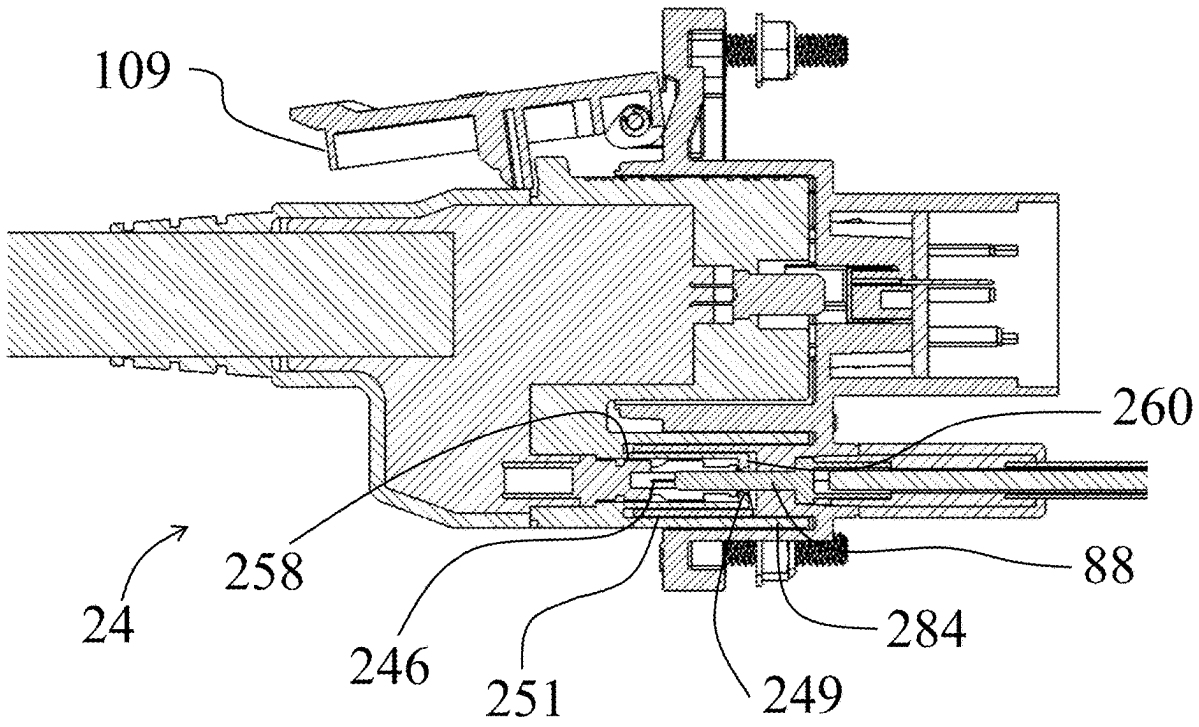
B60D 1/62	(2006.01)
H01R 9/24	(2006.01)
H01R 13/04	(2006.01)
H01R 13/11	(2006.01)
H01R 13/447	(2006.01)

(52) **U.S. Cl.**

CPC ***B60D 1/62*** (2013.01); ***H01R 9/2491*** (2013.01); ***H01R 13/04*** (2013.01); ***H01R 13/111*** (2013.01); *H01R 13/447* (2013.01); *H01R 2201/26* (2013.01)

(57) **ABSTRACT**

A first assembly that has a non-conductive housing including a face plate that has an outer surface. A first socket extends behind the outer surface of the face plate and it has a plurality of terminals. The first assembly has a second socket with a terminal block. The terminal block has a sidewall that surrounds a plurality of terminal pins. The sidewall extends outward of the surface of the face plate in a direction opposite to that of the first socket. The terminal block is surrounded by a terminal block channel. The outer sidewall first telescopically contacts the sidewall of the terminal block then upon further sliding of the first and second assemblies beyond the first contact causes sliding contact of the outer sidewall between the sidewall of the terminal block and the second socket sidewall. After that and upon further sliding an electrical connection is made.



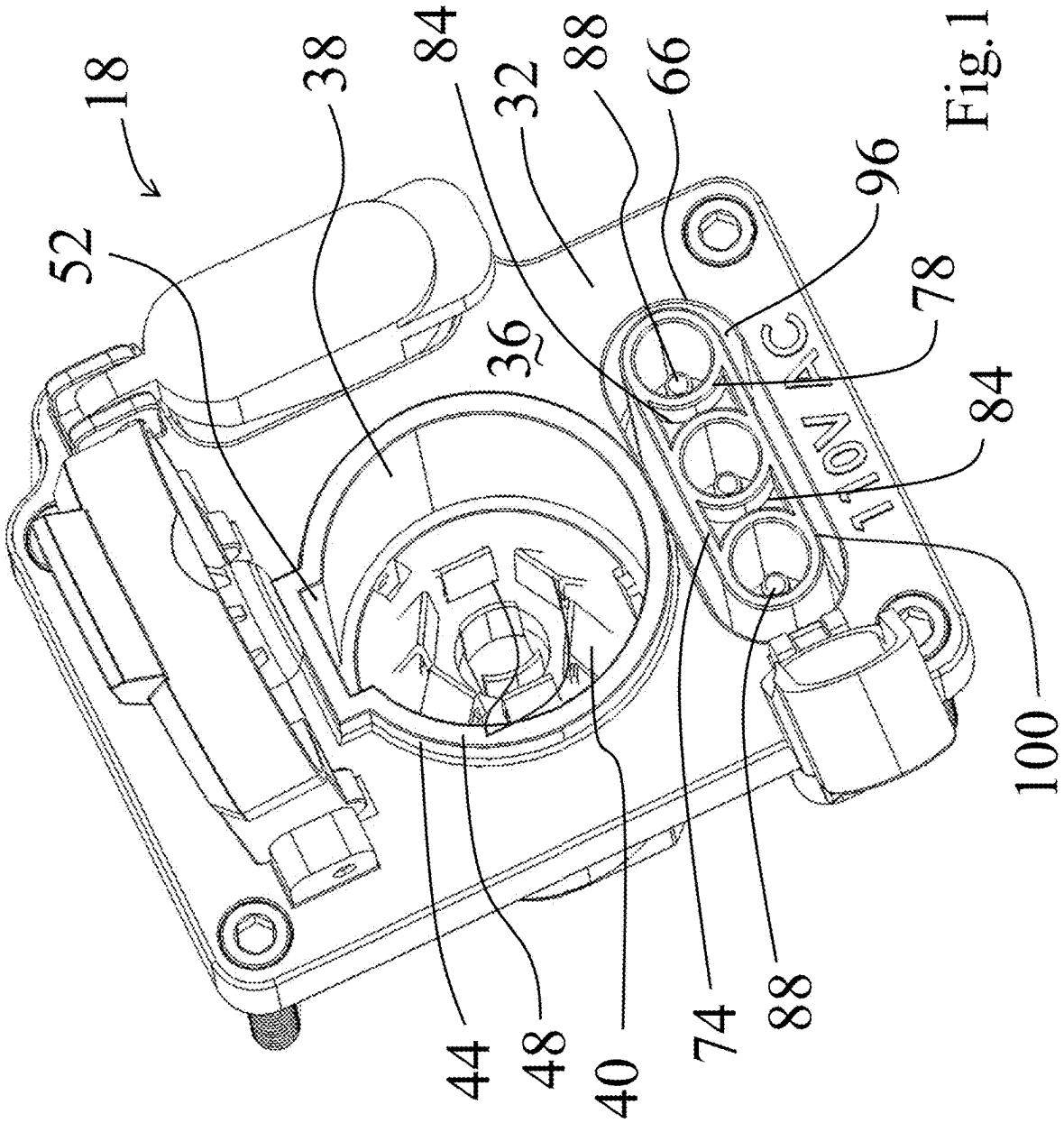
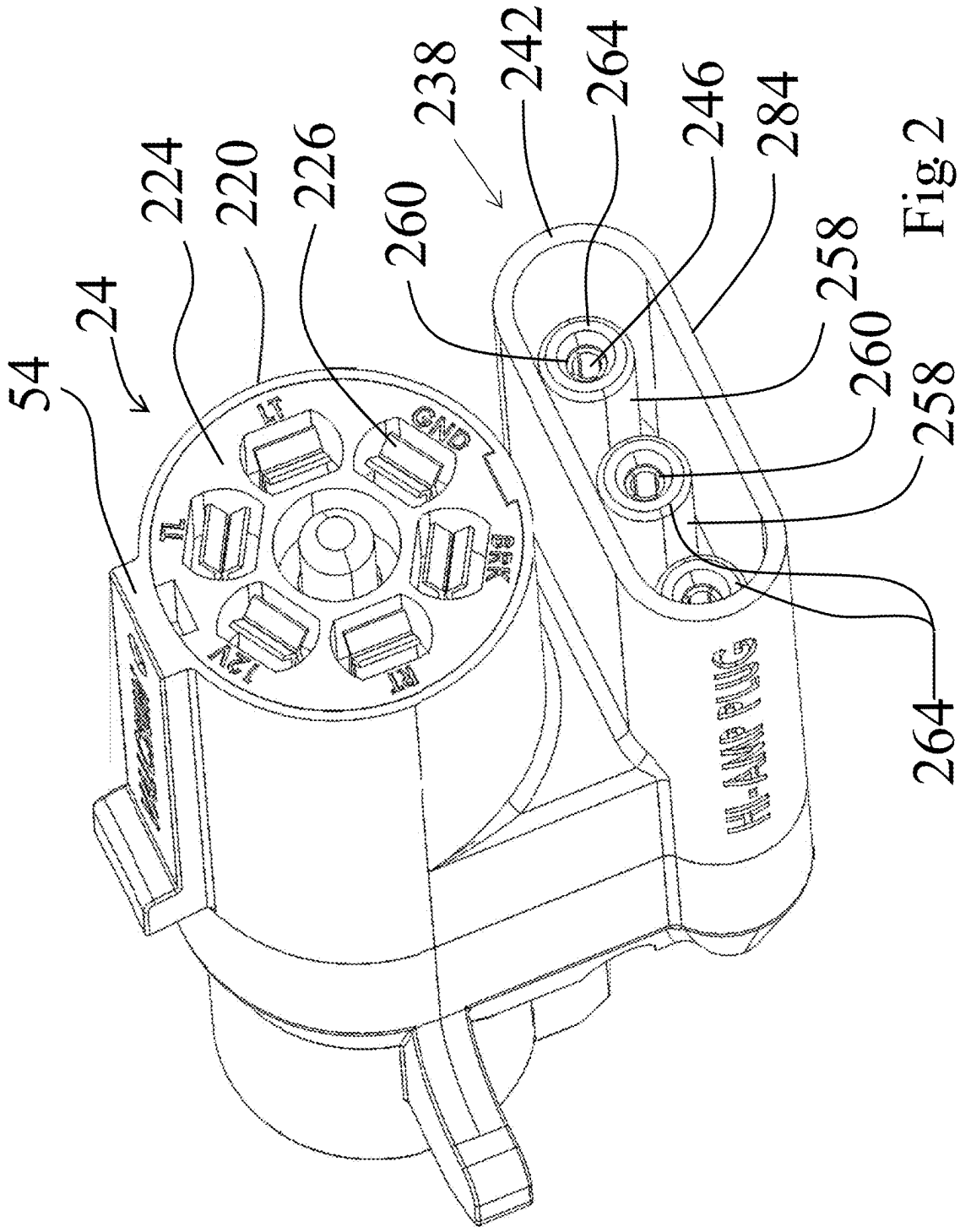


Fig. 1


54
24
224
220
226
260
238
242
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246
284
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260
258
264
LT
GND
TL
BRK
12V
RT
4-Flat Plug

Fig 2

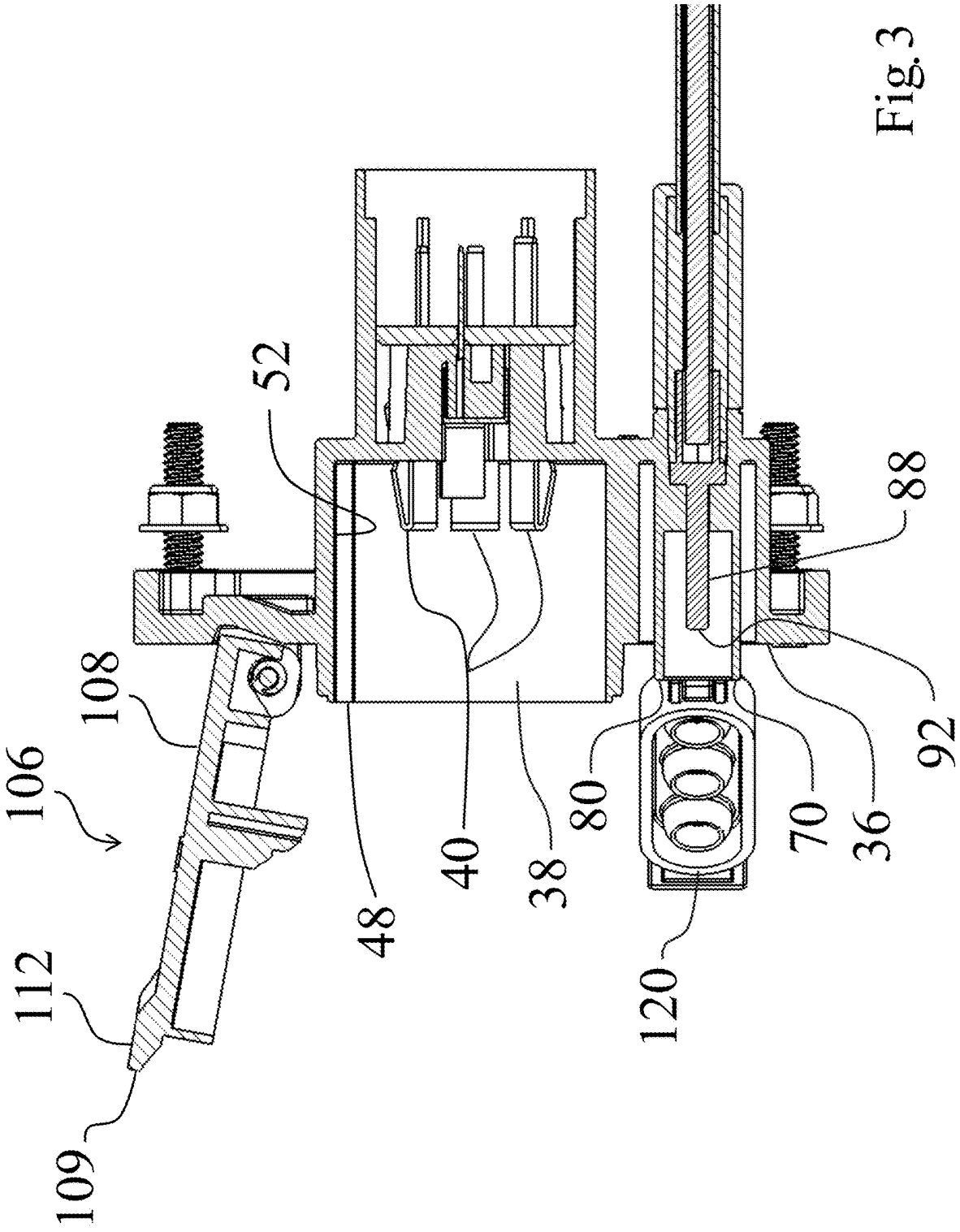


Fig. 3

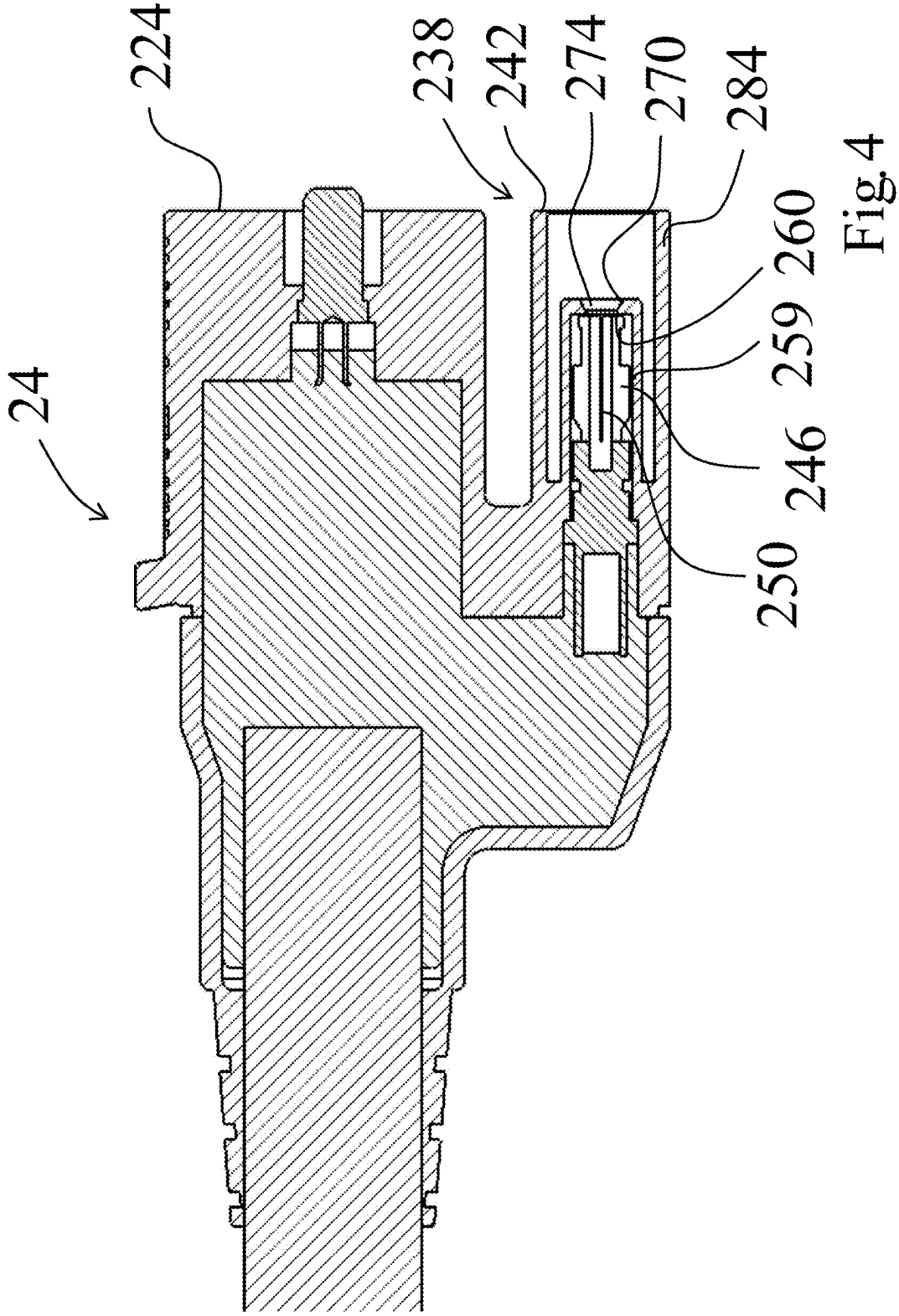


Fig. 4

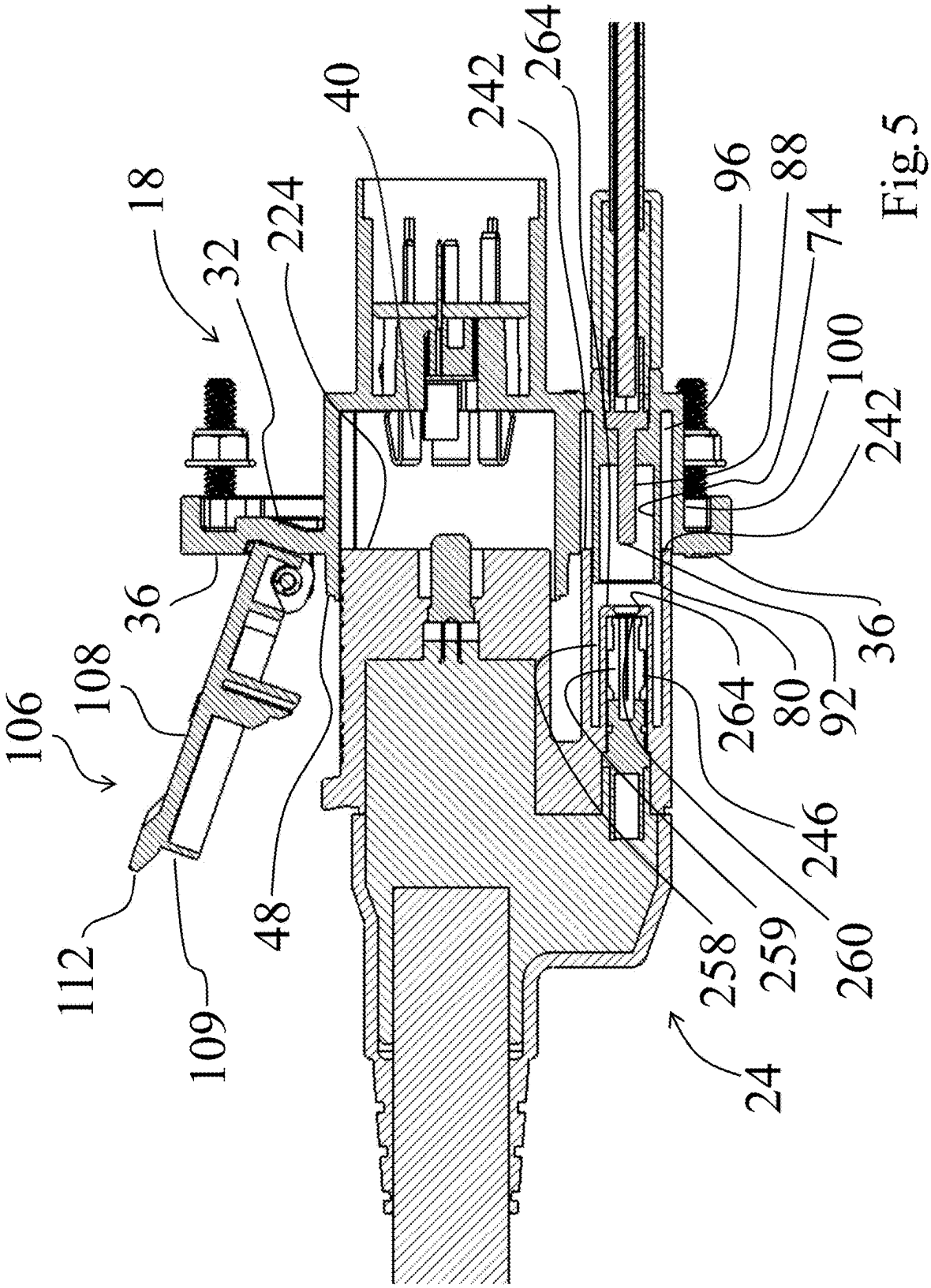
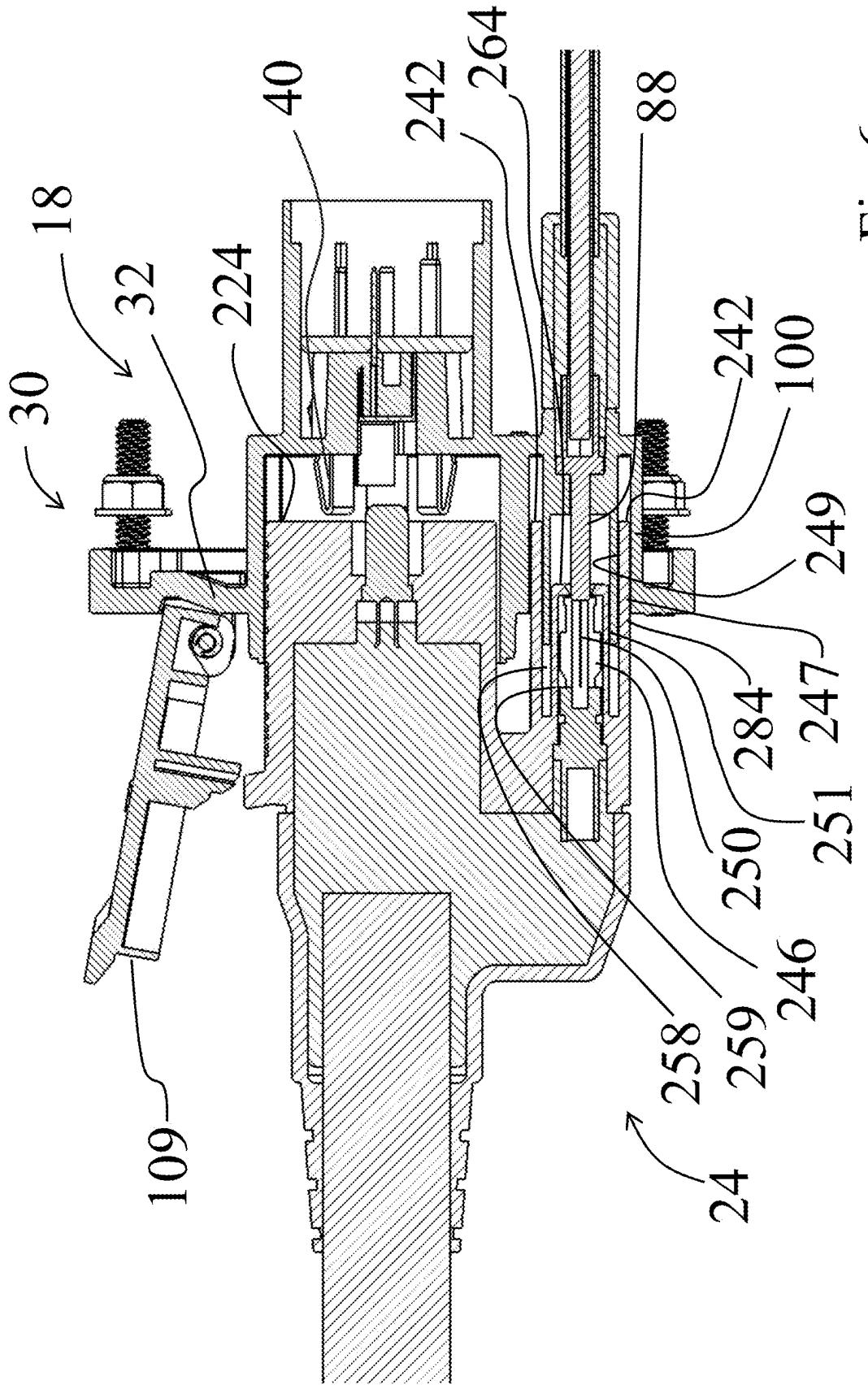

18
32
224
40
242
264
96
88
74
100
242
36
36
108
106
264
80
92
246
112
109
48
258
259
260
24

Fig. 5


30
18
32
224
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242
264
88
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100
249
247
284
251
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246
259
258
24
109

Fig. 6

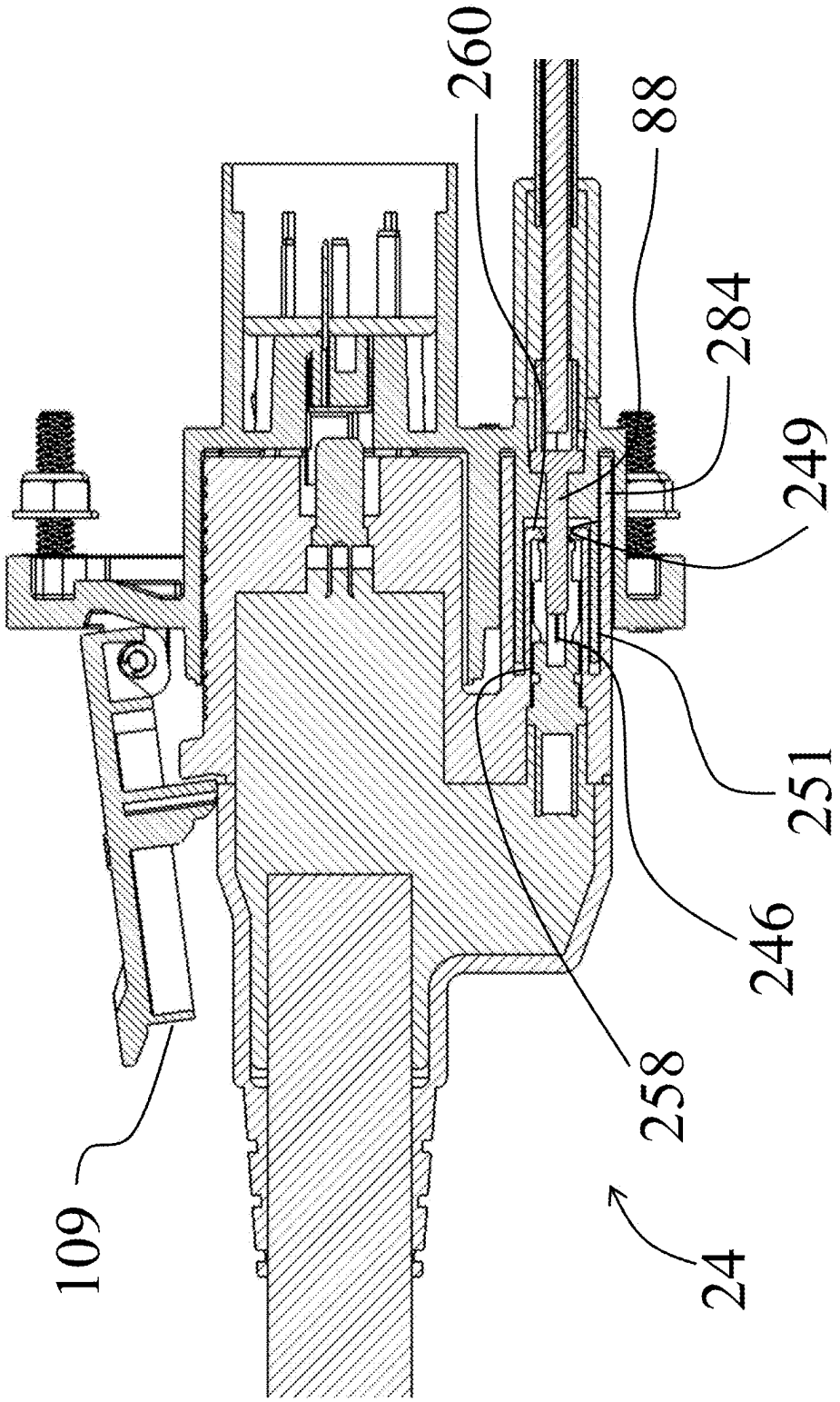

Fig. 7

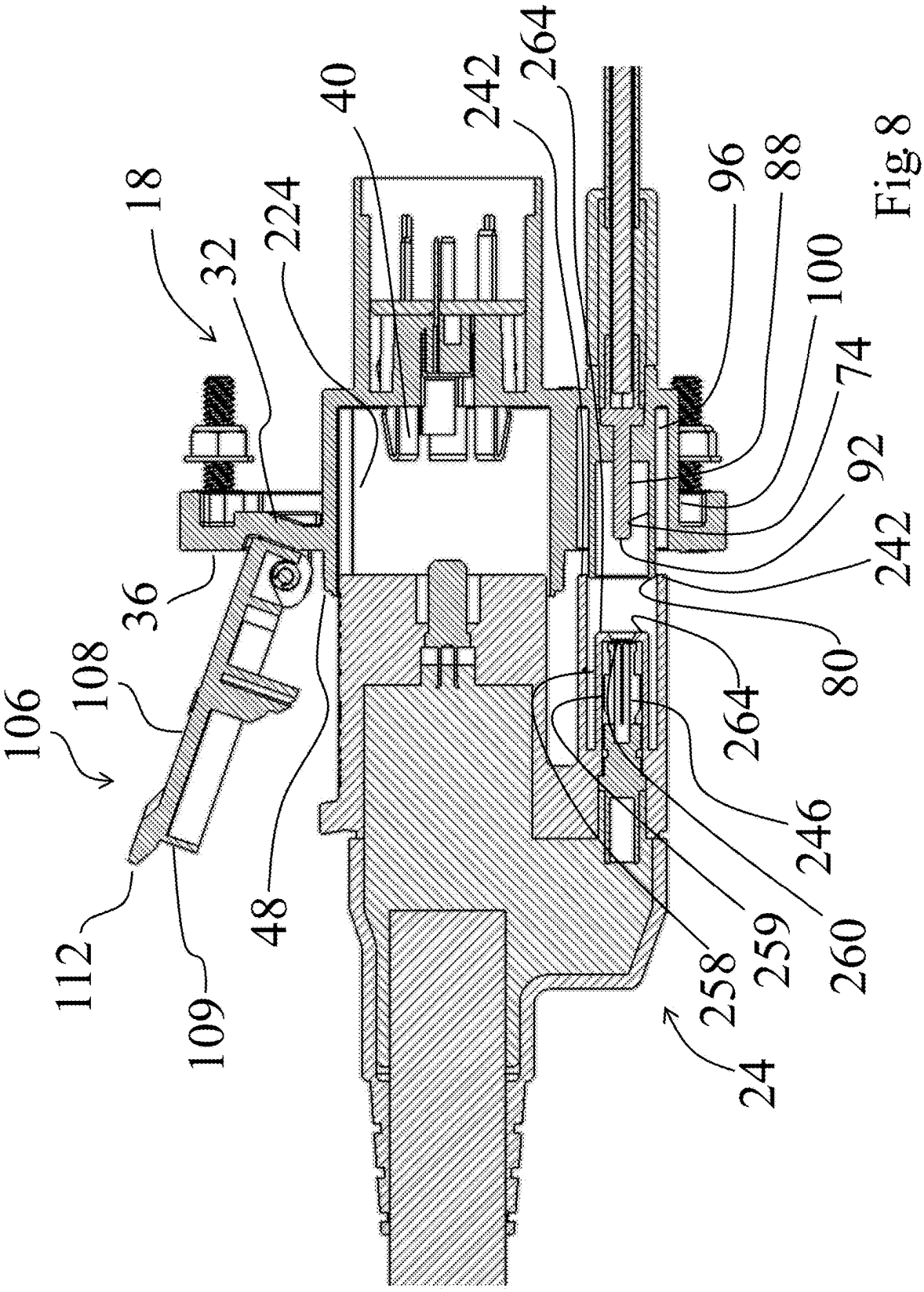
18
32
224
40
242
264
96
88
100
74
92
242
80
264
246
258
259
260
24
36
108
106
112
109
48

Fig. 8

MULTI-CURRENT TRAILER CONNECTOR

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority of U.S. Provisional application 63/551,986, filed Feb. 9, 2024, which application is hereby incorporated in its entirety by reference.

BACKGROUND OF THE INVENTION

[0002] Vehicle connectors for transmitting electricity have existed for quite some time. Generally, such connectors have been low current and low voltage connections. However, modern vehicles can require significantly much more power across plugs and receptacles that are used to make electrical connections. Electrical vehicle chargers are an example of an electrical connection that is a high amperage and high voltage connection. The power across an electrical vehicle charger plugged into a vehicle presents a significant danger to any person who might come into contact with the conductors transmitting the power. As such, SAE J1772 provides a complicated and rather expensive way of protecting users of electric vehicle chargers through the design of the plug and receptacle. This standard includes a means for using a latch as part of the mechanism that disconnects power from the terminals of the plug that extends from a vehicle charger. The latching mechanism is a device that must be actuated to connect and disconnect the vehicle plug to the respective vehicle to be charged. This is an active mechanism that requires mechanical components to affirmatively make or break a circuit to the charging terminals in the charging plug.

[0003] Many trailer and recreational vehicle operators desire a plug and receptacle capable of transmitting low amperage and low voltage for trailer lights and also want the additional capacity to transmit high voltage and high amperage. Thus far, the complicated plugs in the industry for electrical vehicles cannot not satisfy that function, nor would traditional trailer connectors. Ideally, a plug carrying high amperage and high voltage would be well shielded from the environment and the user without separate mechanisms that can have the potential to fail and expose a user to a significant amount of electricity. There is an unmet need to have a vehicle plug that has the capacity to passively shield a user from the electricity it carries.

SUMMARY OF THE INVENTION

[0004] The present invention includes a first assembly that has a non-conductive housing that includes a face plate that has an outer surface. A first socket extends behind the outer surface of the face plate. The first socket includes a plurality of terminals in a location that is offset from the outer surface of the face plate. This locates the terminals in a recessed location in the first socket with respect to the face plate. The first assembly includes a second socket within it that has a terminal block. The terminal block has a sidewall that surrounds a plurality of terminal pins. The sidewall extends outward of the outer surface of the face plate in a direction opposite to that of the first socket. The sidewall of the terminal block includes an outer end surface that is offset from the outer surface of the face plate in a direction opposite to that of the first socket. The terminal block is surrounded by a terminal block channel. The terminal block channel is defined by the sidewall of the terminal block and a second socket sidewall. The terminal block channel is spaced from the first socket.

[0005] A second assembly includes a non-conductive housing that has a plug block having an end surface. The plug block contains a group of terminals that has a plurality of terminals for providing electrical paths. The plug block has an outer wall having an inner surface and an outer surface. The outer wall ends at an end surface of the plug block. The outer wall of the second plug block is spaced from and surrounds a plurality of upstanding terminal bosses. Each of the terminal bosses terminates at an offset surface that is recessed from the end surface of the plug block. Each of the and surfaces of the terminal bosses includes an aperture. Each of the terminal bosses has a terminal adjacent to the aperture for contacting one of the terminal pins in the terminal block of the first assembly and this connection forms an electrical connection. The outer sidewall fits in complementary engagement over the terminal block of the first assembly when the second assembly is engaged with the first assembly. This substantially shields the terminal block when the second assembly is engaged with the first assembly The outer sidewall first telescopically contacts the sidewall of the terminal block when the second assembly is engaged with the first assembly for a first contact of the first and second assemblies. Further sliding of the first and second assemblies beyond the first contact causes sliding contact of the outer sidewall between the sidewall of the terminal block and the second socket sidewall for a second contact of the first and second assemblies. Still further sliding of the first and second assemblies beyond the second contact causes connection of the terminal pins and the terminals in the terminal bosses.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] FIG. **1** is a perspective view of the receptacle;

[0007] FIG. **2** is a perspective view of the plug;

[0008] FIG. **3** is a sectional view of the receptacle through the center;

[0009] FIG. **4** is a sectional view of the plug through the center;

[0010] FIG. **5** is a sectional view of the plug inserted into the receptacle through the center of both with the second plug block sidewall between the terminal block and outer sidewall of the second socket;

[0011] FIG. **6** is a sectional view of the plug showing electrical contact in the second socket of the receptacle;

[0012] FIG. **7** is a sectional view of the plug in FIG. **6** showing the plug fully inserted into the receptacle; and

[0013] FIG. **8** is a sectional view of the plug in FIGS. **6** and **7** showing the plug making first contact with the terminal block in the second socket.

DETAILED DESCRIPTION OF INVENTION

[0014] FIG. **1** shows a receptacle **18** that is mateable with the plug **24** (shown in FIG. **2**) for the multi-current trailer connector **30** that is the subject of this invention. The receptacle **18** serves as a non-conductive housing that is designed to be mounted on a towing vehicle as has been done with prior art receptacles. The receptacle **18** is not only useful for towing vehicles, but may also be used for recreational vehicles ("RV") or other vehicles that would be well served to have a connection for transmitting a significant

amount of electrical power in a safe manner. The receptacle **18** has a face plate **32** that is a generally planar surface with an outer surface **36** that defines a face that shows outwardly to a user of the receptacle **18**. The receptacle **18** has a first socket **38** that extends behind the outer surface **36** of the face plate **32**. In the embodiment shown, the first socket includes a plurality of terminals **40** that are offset from the outer surface **36** of the face plate **32**. As shown, the terminals **40** in the first socket **38** form the connectors for a 7-way trailer connector. The terminals **40** are for carrying 12 Volts DC and are generally considered low amperage connections. The terminals **40** are electrically connected to the electrical system of the towing vehicle and are generally for ensuring functions on a trailer are simultaneously actuated with those same functions on the towing vehicle. Those functions are typically lighting and braking. The first socket **38** is surrounded by an upstanding collar **44** that stands proud of the outer surface **36** of the face plate **32**. The upstanding collar **44** ends at an outer surface **48** that defines its height above the outer surface **36** of the face plate **32**. As is typical in a 7-way connector, the first socket **38** has an alignment feature **52** that is a slot that mates with a ridge **54** on the plug **24** when the plug **24** is inserted into the first socket **38**. As can be seen, the terminals **40** in the first socket are offset inwardly from the outer surface **36** of the face plate **32**.

[0015] The receptacle **18** has a second socket **66** that extends into and behind the face plate **32**. The second socket **66** has a terminal block **70** that is within the second socket **66**. A sidewall **74** circumscribes three protective collars **78**. The protective collars **78** are cylindrical and extend into the second socket **66** along with the sidewall **74**. The sidewall **74** and protective collars **78** both end at an outer end surface **80** that defines the end of the terminal block **70**. The outer end surface **80** is offset and proud of the outer surface **36** of the face plate **32**. The outer end surface **80** is offset outwardly of the outer surface **36** in the opposite direction of the first socket **38**. The outer end surface **80** of the terminal block **70** is aligned with the outer surface **48** of the upstanding collar **44**. As such, the outer end surface **80** and the outer surface **44** of the collar **44** are coplanar. The terminal block **70** is not enclosed and is unobstructed above the outer surface **36**. The protective collars **78** are cylindrical walls that are integral with the sidewall **74**. The protective collars **78** have gaps **84** between them. Within each of the protective collars **78** is a concentrically located terminal pin **88**. Each of the terminal pins **88** provides a separate conducive path to the electrical system to a vehicle on which the receptacle **18** is installed. The terminal pins **88** extend with the protective collars **78** to a distal end **92**. The distal end **92** of each terminal pin **88** is rounded and the distal ends **92** of the terminal pins **88** are recessed within the protective collars **78**. The distal ends **92** of the terminal pins **88** are offset from the outer end surface **80** within the second socket **66** to be below the outer end surface **80** of the terminal block **70**. This recessed location of the distal ends **92** with respect to the outer end surface **80** prevents inadvertent contact with the terminal pins **88**. This is important because terminal pins **88** that carry current are live at all times when the vehicle is running and even when the vehicle is not running. The gaps **84** between the protective collars **78** provide additional electrical insulation between the terminal pins **88** beyond the non-conductive material of the entire receptacle **18** that is typically made of plastic. The air within the gaps **84** provides an additional dielectric beyond the protective collars **78** for the terminal pins **88**. The gaps **84** are important because pins **88** carry high amperage AC electricity and pins **88** need significant insulation. Additionally, the gaps **84** diminish the likelihood of any electrical bridging due to inadvertent water on the terminal block **70**. Such water could provide an electrical path that could provide a short circuit or potentially provide a path for electrical shock. The terminal block **70** is surrounded by a terminal block channel **96**. The terminal block channel **96** is defined by the sidewall **74** of the terminal block **70** and an opposing outer sidewall **100** that defines the outer perimeter of the second socket **66**. The outer sidewall is connected to the face plate **32**.

[0016] The receptacle **18** has a spring loaded first door **106** having a cover portion **108** that is designed to cover the first socket **66**. A cover sidewall **109** stands upwardly from the cover portion **108**. The cover sidewall **109** is cylindrical and mates in a complementary manner with the upstanding collar **44** when the cover portion **108** is in its closed position. The cover portion **108** extends into a tab **112**. A spring biases the first door **106** into a closed position that covers the first socket **66**. The receptacle **18** has a second door **120** that is hinged to the receptacle **18** and covers the terminal block **70** in its closed position. When the second door **120** is in its closed position and the first door **106** is in its closed positions, the tab **112** on the first door **106** overlaps with the second door **120** in a manner to keep the second door **120** in its closed position.

[0017] The plug **24** forms a non-conductive housing that includes a first plug block **220** having an end surface **224** that includes a first group of terminals **226**. Each of the terminals **226** are designed to mate with the terminals **40** within the first socket **38**. The plug **24** also has a second plug block **238** having an end surface **242**. The end surface **224** of the first plug block **220** and the end surface **242** of the second plug block **238** are coplanar with each other. The second plug block **238** has a group of three terminals **246**. The terminals **246** are cylindrical and have slits **250** that allow the terminals **246** to receive the terminal pins **88** in the second socket **66** of the receptacle **18**. The terminals **246** are housed within terminal bosses **258** having a sidewall **259** and the terminal bosses **258** are within the second plug block **238**. Each of the terminals **246** have a distal end **260** that defines the maximum height to which the terminals **246** reach within the second plug block **238**. The terminal bosses **258** are cylindrical and terminate at an offset end **264** that is spaced from the distal end **260** of each corresponding terminal **246** contained within the corresponding terminal boss **258**. The offset end **264** of each terminal boss **258** has an inclined surface **270** that leads to an aperture **274**. The inclined surface **270** provides guidance for a terminal pin **88** to be guided into a corresponding terminal boss **258** so that the distal end **92** of a corresponding terminal pin **88** can connect with a corresponding terminal **246**. The offset end **264** of the terminal bosses **258** are recessed inwardly from the end surface **242** of the second plug block **238**. The second plug block **238** is defined at its outer extent by a second plug block sidewall **284** that terminates at the end surface **242**. The end surface **242** of the second plug block **238** and end surface **224** of the first plug block **220** are aligned, although that is not necessarily required. The second plug block sidewall **284** defines a cavity that houses each of the terminal bosses **258** that are spaced from the second plug block sidewall **284**.

[0018] As shown in FIG. **5**, the plug **24** is designed to be inserted into the receptacle **18**. On the receptacle **18**, the outer end surface **80** of terminal block **70** is aligned with the outer surface **48** of the upstanding collar **44**. When the plug **24** is inserted into the receptacle **18**, the end surface **224** of the first plug block **220** and the end surface **242** of the second plug block sidewall **284** contact the receptacle **18** simultaneously. The first plug block **220** is a complementary fit with the first socket **38**. The second plug block **238** has multiple complementary relationships with the second socket **66** of the receptacle **18**. The second plug block sidewall **284** fits in a complementary manner over terminal block **70**. The simultaneous engagement of the second plug block sidewall **284** over the terminal block **70** and the first plug block **220** within the first socked **38** effectively shrouds the second terminal block **70** from the outside environment and a user inserting the plug **24** into the receptacle **18**. When the second plug block sidewall **284** first contacts the terminal block **70**, that contact occurs at a location that is offset from the outer surface **36** of the face plate **32**. This is shown in FIG. **8**. At that point, where the first plug block **220** and second plug block sidewall **284** first make contact with the receptacle **18**, the inside of the second plug block sidewall **284** and first plug block **220** telescopically guide the plug **24** into the receptacle **18**. At the point of first contact between the second plug block sidewall **284** and the terminal block **70**, the terminal pins **88** and terminals **246** are not in contact and no electrical circuit is formed between them. As the plug **24** is further inserted into the receptacle **18**, the second plug block sidewall **284** will contact the opposing outer sidewall **100** and the sidewall **74** of the terminal block channel **96**. This is shown in FIG. **5**. When the second plug block sidewall **284** first contacts the opposing outer sidewall **100** the offset ends **264** of the terminal bosses **258** are spaced from the terminal pins **88**. In other words, to describe this relationship, when the end surface **242** of the second plug block sidewall **284** is aligned with the outer surface **36** of the face plate **32** of the receptacle **18**, the offset ends **264** of the terminal bosses **258** are spaced from the terminal pins **88**. Because the terminal bosses **258** are spaced from the terminal pins **88** at the location when the second plug block sidewall **284** is first inserted into the terminal block channel **96**, the terminals **246** do not contact the terminal pins **88**. As such, no electrical path is formed when the second plug block sidewall **284** is inserted into the terminal block channel **96** until a predetermined distance of complementary nesting of the second plug block sidewall **284** within the terminal block channel **96**. Once, the second plug block sidewall **284** is inserted to a predetermined distance, the distal ends **260** of the terminal **246** will contact terminal pins **88** to form an electrical path going through the plug **24** and receptacle **18**. This is shown in FIG. **6** that illustrates electrical contact being made between terminals **246** and terminal pins **88**. Only when the end surface **242** of the second plug block sidewall **284** is below the outer surface **36** will an electrical connection be made between pins **88** and terminals **246**. This means that no electrical connection will be made between pins **88** and terminals **246** until that connection is securely insulated in multiple places. Only when the second plug block sidewall **284** is located within the terminal block channel **96**, will an electrical connection be made between pins **88** and terminals **246**. The location where the terminals **246** connect with the terminal pins **88** is a connection point that is well insulated from a user of the plug **24** and receptacle **18**. The connection point is shown in FIG. **6**. Further secure insulation is shown in FIG. **7**, where the second plug block sidewall **284** is fully inserted into the terminal block channel **96**.

[0019] The order of contact in telescoping engagement between the receptacle **18** and plug **24** are important to functioning of both parts. At the initial contact between the plug **24** and receptacle **18**, the second plug block sidewall **284** connects with the terminal block **70** at the sidewall **74** for a first contact. Further sliding of the plug **24** into the receptacle **18** beyond the first contact causes the second plug block sidewall **284** to be located between the sidewall **74** of the terminal block **70** and the outer sidewall **100**. In other words, the second plug block sidewall **284** is captured between sidewall **74** and outer sidewall **100** in the terminal block channel **96**. This is a second contact between the plug **24** and receptacle **18**. Further sliding of the plug **24** into the receptacle causes contact of the terminal pins **88** and the terminals **246** for a third contact that provides an electrical connection across terminal pins **88** and terminals **246**. The connection point (where the terminal pins **88** and terminals **246** first make their electrical connection) locates the terminal bosses **258** in a complementary nested alignment with the protective collars **78**. Thus, at the connection point the electrically insulative terminal bosses **258** and protective collars **78** form a double insulative cooperative structure. Additionally, the complementary fit of the second plug block sidewall **284** and the sidewall **74** provide an insulating structure. Still further, the second plug block sidewall **284** being fully inserted into the terminal block channel **96** adds even more insulation at the connection point of insertion of the plug **24** into the receptacle **18** because the entire double insulated connection of the terminals **246** and terminal pins, **88** are fully encased by the second plug block sidewall **284**. This fully nested relationship that has been described above means that any water would necessarily need to circulate through a torturous path from the outside of the plug **24** and receptacle **18** to find its way into the connection at the connection point of the plug **24** within the receptacle **18**. The torturous path would necessarily require water to travel along a first interface **247** that is made by the contact of the second plug block sidewall **284** and the outer sidewall **100** of the second socket **66**. The torturous path continues around end surface **242** and to a second interface **249** that is made by the contact of the sidewall **74** of the terminal block **70** and the inside of the second plug block sidewall **284**. The torturous path continues around outer end surface **80** of the terminal block **70** to a third interface **251** that is made by the contact of the inside of the protective collars and terminal bosses **258**. Further insulation between terminal pins **88** is achieved by the gaps **84** between the protective collars **78** that surround each terminal pin **88**. As shown the protective collars **78** are cylindrical, but it is contemplated that the protective collars **78** could be other shapes as well as long as that shape is able to telescopically nest in guiding alignment with the terminal bosses **258**. The telescoping alignment described above prevents bending of the terminal pins **88** and allows the smallest diameter pins **88** that can effectively carry the desired current.

[0020] The highly insulated nature of the plug **24** and receptacle **18** when the plug **24** is located at its connection point with respect to the receptacle **18** is important because the second plug block **238** is used for carrying high amperage current. The terminals **40** in the receptacle **18** and

terminals **226** may engage nearly simultaneously as the connection point in the second socket **66** is reached but this is not critical. Often, the terminal pins **88** in the second socket **66** will carry 110 AC from the vehicle to which the receptacle **18** is affixed. In this case, one of the outer terminal pins **88** will be considered hot, the other outer terminal pin **88** will be a neutral. Thus, the outer terminal pins **88** can complete an AC electrical circuit when connected to the plug **24** when the plug **24** is inserted to its connection point within the receptacle **18**. The middle terminal pin **88** is used as a ground. It may be possible for an entire plug (not shown) to resemble just the second plug block **238** alone. In such a configuration of an entire plug consisting of just the second plug block **238** there would be no alignment feature to dictate the orientation within the second socket **66** of the receptacle **18**. Having the middle terminal pin **88** being a ground would allow flipping of a plug just consisting of the second plug block **238** to work properly and still be grounded. As shown, the first plug block **220** acts as an alignment feature that demands the second plug block **238** be inserted in a particular orientation.

[0021] The configuration of the plug **24** and receptacle **18** enables a high level of electrical insulation from the environment and a user without the necessity of an actively managed system or mechanism to shut off the flow of electricity. This configuration provides a quadruple wall insulated connection across pins **88** and terminals **246** when the plug **24** and receptacle **18** are connected. This quadruple wall insulation includes the outer sidewall **100** of the second socket **66**, the second plug block sidewall **284**, the sidewall **74**, and the sidewall **259** of each terminal boss **258**. This is particularly useful to vehicle manufacturers who are not accustomed to providing active power management to receptacles **18** on their vehicles, yet want to provide high amperage connections. The invention is not limited to the description above but may be modified within the scope of the following claims.

What is claimed is:

1. A connector comprising:

a first assembly including a non-conductive housing including a face plate having an outer surface, a first socket extending behind said outer surface of said face plate, said first socket including a plurality of terminals in a location offset from said outer surface of said face plate wherein said terminals are recessed within said first socket, a second socket within said first assembly including a terminal block, said terminal block having a sidewall circumscribing a plurality of protective collars, said sidewall extending outward of said outer surface of said face plate in a direction opposite to that of said first socket, each of said protective collars being connected to said sidewall of said terminal block and each of said protective collars surrounding a terminal pin being located within each said protective collar, said sidewall of said terminal block including an outer end surface being offset from said outer surface of said face plate in a direction opposite said first socket, said terminal block being surrounded by a terminal block channel and said terminal block channel being defined by said sidewall of said terminal block and a second socket sidewall, said terminal block channel being spaced from said first socket; and

a second assembly including a non-conductive housing including a first plug block having an end surface and containing a first group of terminals including a plurality of terminals for providing electrical paths and a second plug block having an end surface and containing a second group of terminals including a plurality of terminals for providing electrical paths, each of said terminals within said first plug block and said second plug block being connected to a wire and said wires being electrically insulated from each other and contained within a cord extending from said second assembly, said second plug block having an outer wall having an inner surface and an outer surface and said outer wall ending at said end surface of said second plug block, outer wall of said second plug block being spaced from and surrounding a plurality of upstanding terminal bosses, each of said terminal bosses terminating at an offset surface that is recessed from said end surface of said end surface of said second plug block, each of said end surfaces of said terminal bosses including an aperture, each said terminal bosses including a terminal adjacent to said aperture for contacting one of terminal pins of said terminal block of said first assembly and forming an electrical connection therewith; an outer sidewall fitting in complementary engagement over said terminal block of said first assembly when said second assembly is engaged with said first assembly thereby substantially shielding said terminal block when said outer sidewall connects with said terminal block, said outer sidewall being connectable to said terminal block above said outer surface of said face plate, said electrical connection of said terminal pins and said terminals within said terminal bosses occurring at a location wherein said outer sidewall completely covers said terminal block.

2. The connector of claim **1**, wherein said outer sidewall is below said outer surface of said face plate when said terminal pins contact said terminals within said terminal bosses.

3. The connector of claim **2**, wherein said terminal pins are concentrically located within said protective collars.

4. The connector of claim **2**, wherein said collars are spaced from each other and have a gap between them.

5. The connector of claim **2**, wherein said terminal pins are cylindrical and said terminals within said bosses are cylindrical for receiving said terminal pins in telescoping contact.

6. The connector of claim **2**, wherein said terminal pins and said terminals within said bosses contact each other simultaneously with the contact of said terminals in said first socket and said terminals in said first plug block.

7. A connector comprising:

a first assembly including a non-conductive housing including a face plate having an outer surface, a first socket extending behind said outer surface of said face plate, said first socket including a plurality of terminals in a location offset from said outer surface of said face plate wherein said terminals are recessed within said first socket, a second socket within said first assembly including a terminal block, said terminal block having a sidewall surrounds a plurality of terminal pins, said sidewall extending outward of said outer surface of said face plate in a direction opposite to that of said first socket, said sidewall of said terminal block including an outer end surface being offset from said outer surface of said face plate in a direction opposite said

first socket, said terminal block being surrounded by a terminal block channel and said terminal block channel being defined by said sidewall of said terminal block and a second socket sidewall, said terminal block channel being spaced from said first socket; and

a second assembly including a non-conductive housing including a first plug block having an end surface and containing a first group of terminals including a plurality of terminals for providing electrical paths and a second plug block having an end surface and containing a second group of terminals including a plurality of terminals for providing electrical paths, said second plug block having an outer wall having an inner surface and an outer surface and said outer wall ending at said end surface of said second plug block, said outer wall of said second plug block being spaced from and surrounding a plurality of upstanding terminal bosses, each of said terminal bosses terminating at an offset surface that is recessed from said end surface of said end surface of said second plug block, each of said end surfaces of said terminal bosses including an aperture, each said terminal bosses including a terminal adjacent to said aperture for contacting one of said terminal pins of said terminal block of said first assembly and forming an electrical connection therewith; said outer sidewall fitting in complementary engagement over said terminal block of said first assembly when said second assembly is engaged with said first assembly thereby substantially shielding said terminal block when said outer sidewall connects with said terminal block, said outer sidewall first telescopically contacting said sidewall of said terminal block when said second assembly is engaged with said first assembly for a first contact of said first and second assemblies, further sliding of said first and second assemblies beyond said first contact causing contact of said outer sidewall between said sidewall of said terminal block and said second socket sidewall for a second contact of said first and second assemblies, further sliding of said first and second assemblies beyond said second contact causing connection of said terminal pins and said terminals in said terminal bosses.

8. The connector of claim **7**, wherein said terminal pins are concentrically located within protective collars that are connected to said sidewall of said terminal block.

9. The connector of claim **7**, wherein said collars are spaced from each other and have a gap between them.

10. The connector of claim **7**, wherein said terminal pins are cylindrical and said terminals within said bosses are cylindrical for receiving said terminal pins in telescoping contact.

11. The connector of claim **7**, wherein said terminal pins and said terminals within said bosses contact each other simultaneously with the contact of said terminals in said first socket and said terminals in said first plug block.

12. A connector comprising:

a first assembly including a non-conductive housing including a face plate having an outer surface, a first socket extending behind said outer surface of said face plate, said first socket including a plurality of terminals in a location offset from said outer surface of said face plate wherein said terminals are recessed within said first socket, a second socket within said first assembly including a terminal block, said terminal block having a sidewall surrounds a plurality of terminal pins, said sidewall extending outward of said outer surface of said face plate in a direction opposite to that of said first socket, said sidewall of said terminal block including an outer end surface being offset from said outer surface of said face plate in a direction opposite said first socket, said terminal block being surrounded by a terminal block channel and said terminal block channel being defined by said sidewall of said terminal block and a second socket sidewall, said terminal block channel being spaced from said first socket;

a second assembly including a non-conductive housing including a plug block having an end surface and containing a group of terminals including a plurality of terminals for providing electrical paths, said plug block having an outer wall having an inner surface and an outer surface and said outer wall ending at said end surface of said plug block, said outer wall of said second plug block being spaced from and surrounding a plurality of upstanding terminal bosses, each of said terminal bosses terminating at an offset surface that is recessed from said end surface of said end surface of said plug block, each of said end surfaces of said terminal bosses including an aperture, each said terminal bosses including a terminal adjacent to said aperture for contacting one of said terminal pins of said terminal block of said first assembly and forming an electrical connection therewith; said outer sidewall fitting in complementary engagement over said terminal block of said first assembly when said second assembly is engaged with said first assembly thereby substantially shielding said terminal block when said outer sidewall connects with said terminal block, said outer sidewall first telescopically contacting said sidewall of said terminal block when said second assembly is engaged with said first assembly for a first contact of said first and second assemblies, further sliding of said first and second assemblies beyond said first contact causing contact of said outer sidewall between said sidewall of said terminal block and said second socket sidewall for a second contact of said first and second assemblies, further sliding of said first and second assemblies beyond said second contact causing connection of said terminal pins and said terminals in said terminal bosses.

13. The connector of claim **12**, wherein said terminal pins are concentrically located within protective collars that are connected to said sidewall of said terminal block.

14. The connector of claim **12**, wherein said collars are spaced from each other and have a gap between them.

15. The connector of claim **12**, wherein said terminal pins are cylindrical and said terminals within said bosses are cylindrical for receiving said terminal pins in telescoping contact.

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