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(54) **MOVABLE SOCKET ASSEMBLY**

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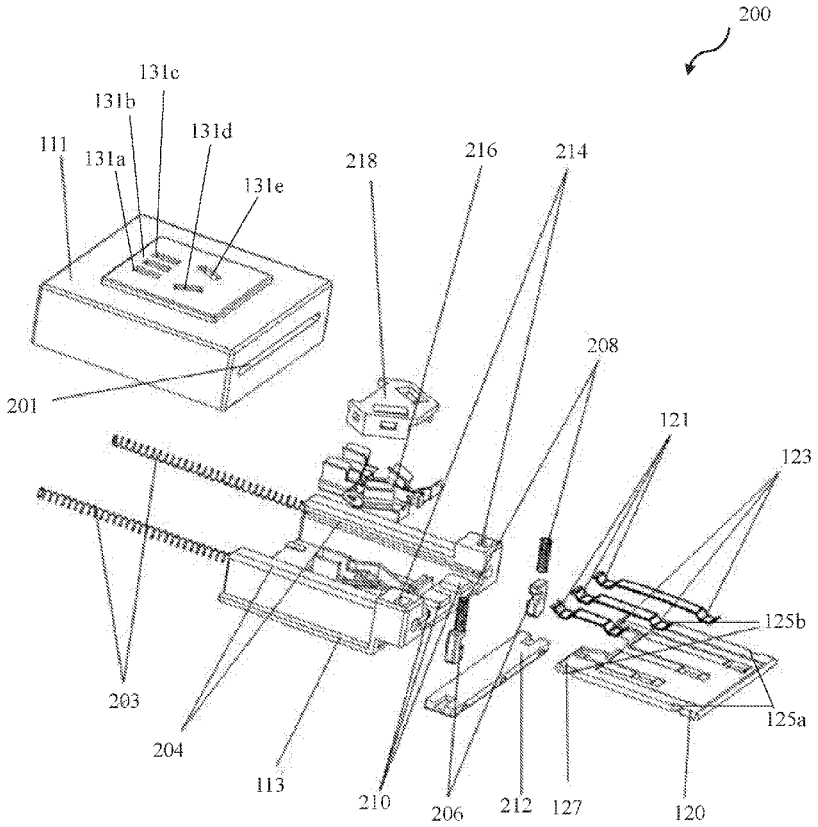
(52) **U.S. Cl.**

CPC ***H01R 13/2464*** (2013.01); ***H01R 25/142*** (2013.01); ***H01R 13/502*** (2013.01); *H01R 31/02* (2013.01); ***H01R 24/78*** (2013.01); ***H01R 13/4538*** (2013.01); ***H01R 13/60*** (2013.01)

(57) **ABSTRACT**

The present disclosure relates to a movable socket assembly. The movable socket assembly may include a housing, a plug part installed in said housing, a plurality of elastic conducting contact points formed on said plug part, and an adjusting mechanism for positioning the plug part out of the housing so that the plug part can be removably inserted into an external power outlet. The housing may further include a first housing and a second housing, and the second housing can retract into the first housing to extend the flat insertion piece out of the housing through an opening of the second housing.



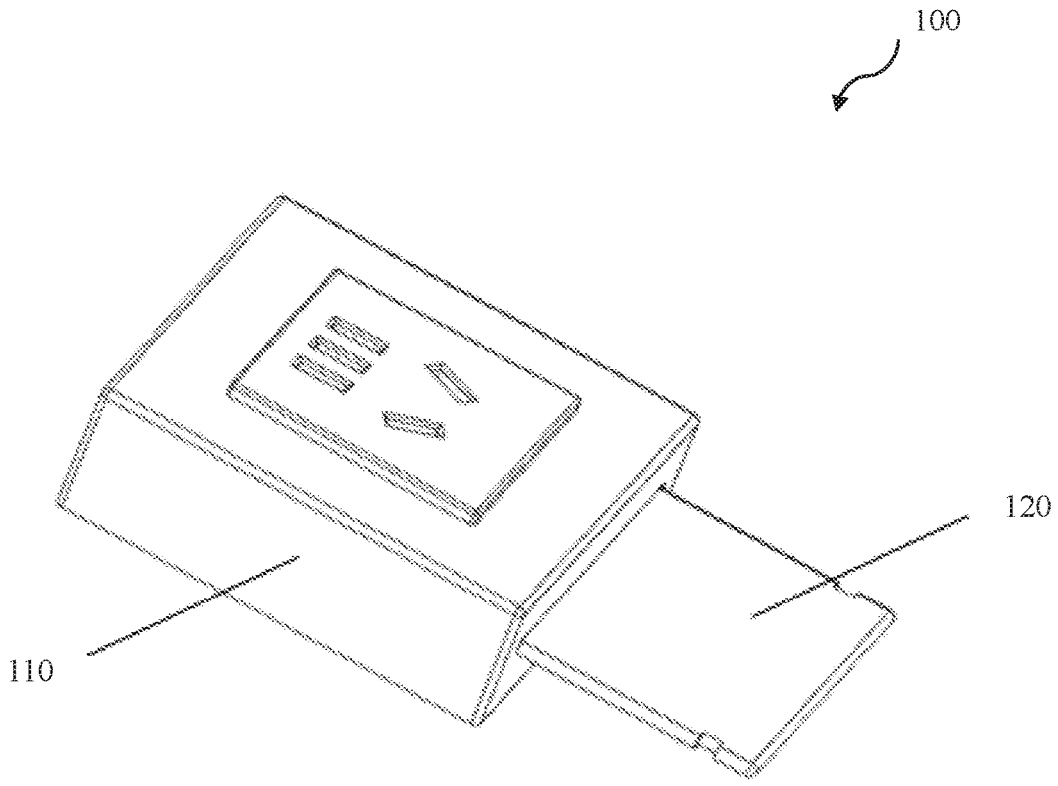


FIG. 1

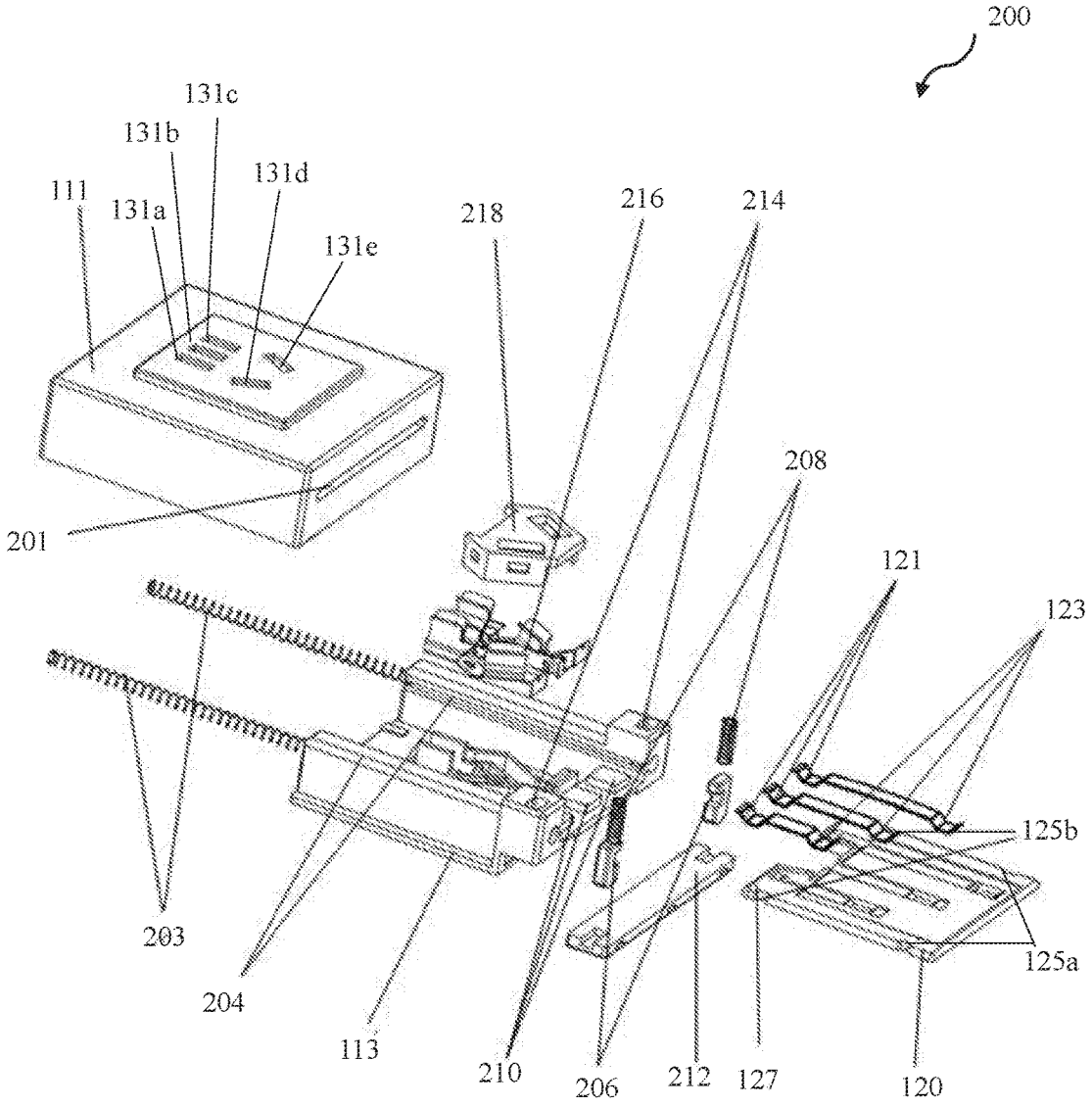

200
131c
131b
131d
111
131a
131e
218
216
214
208
201
121
123
125b
125a
203
204
113
210
206
212
127
120

FIG. 2

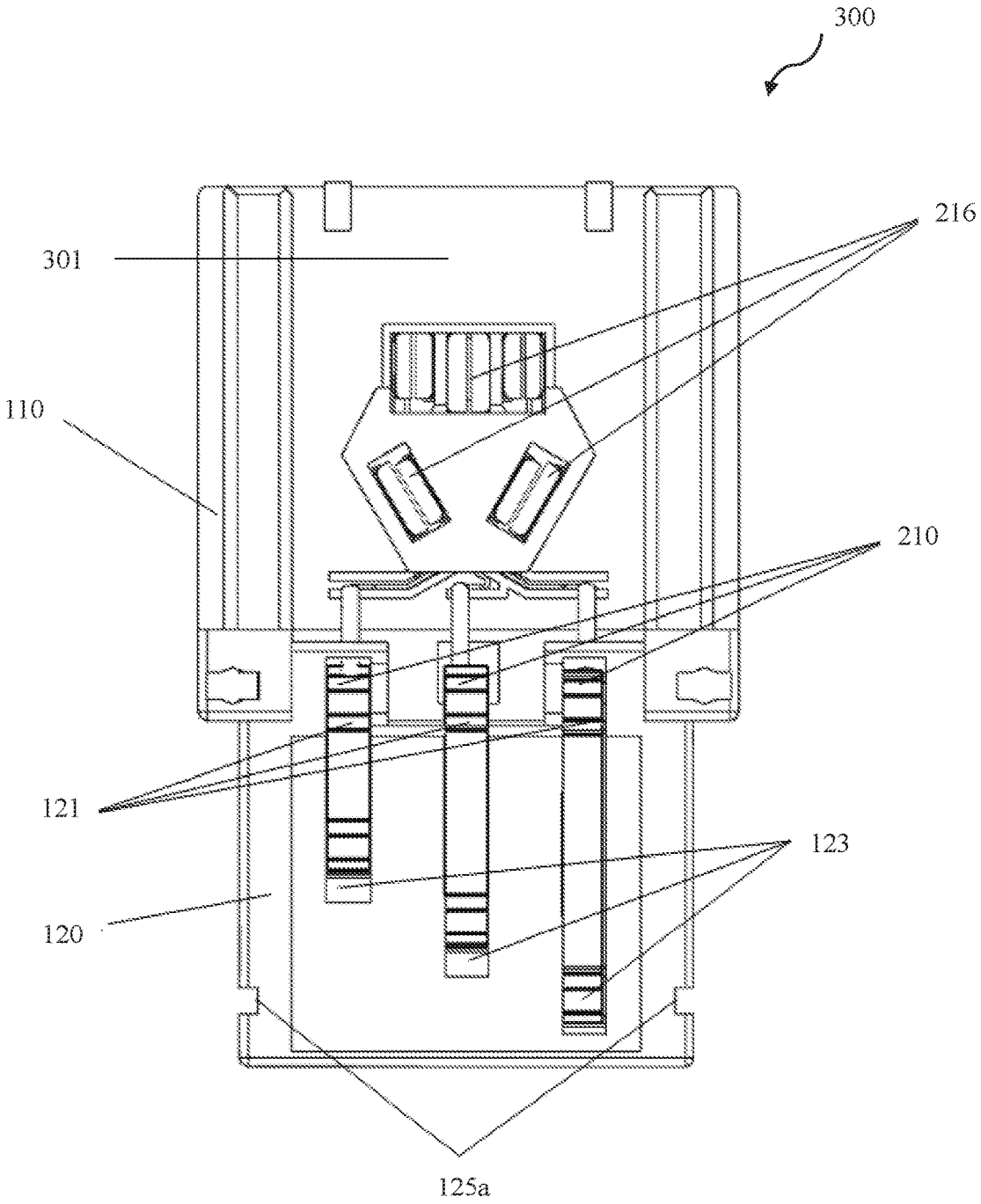


FIG. 3

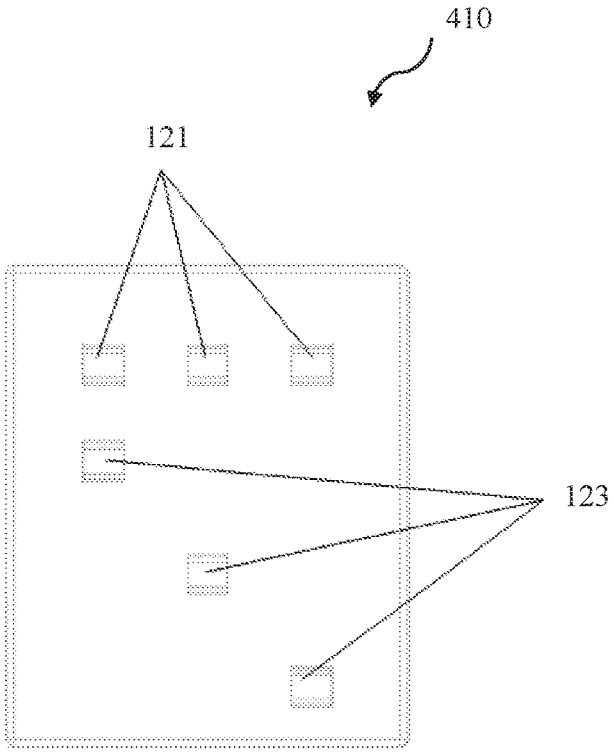


FIG. 4A

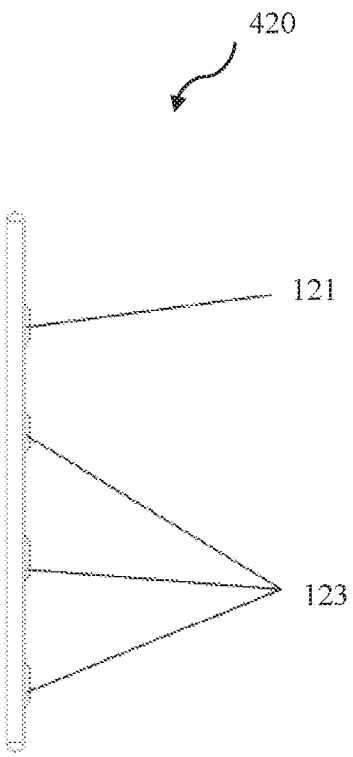


FIG. 4B

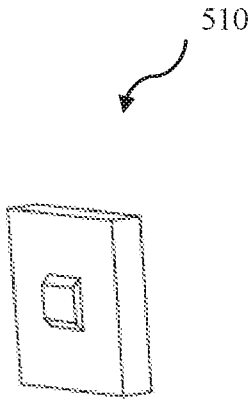


FIG. 5A

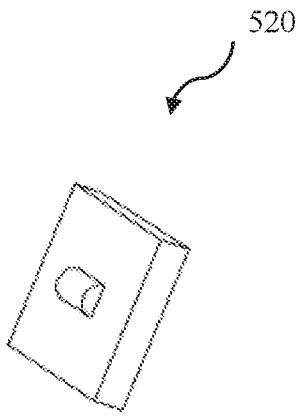


FIG. 5B

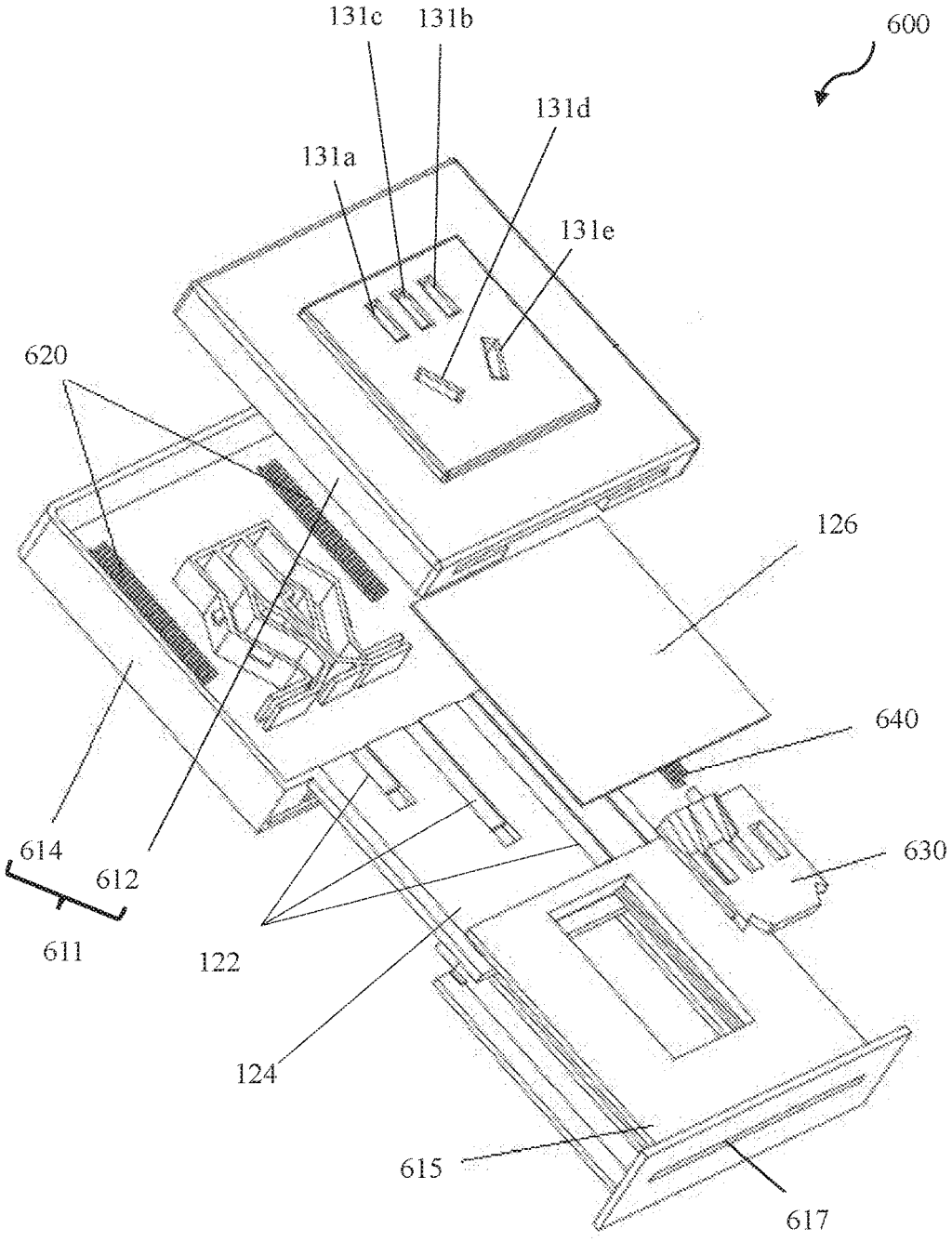

131c
131b
600
131d
131a
131e
620
126
640
614
630
612
611
122
124
615
617

FIG. 6

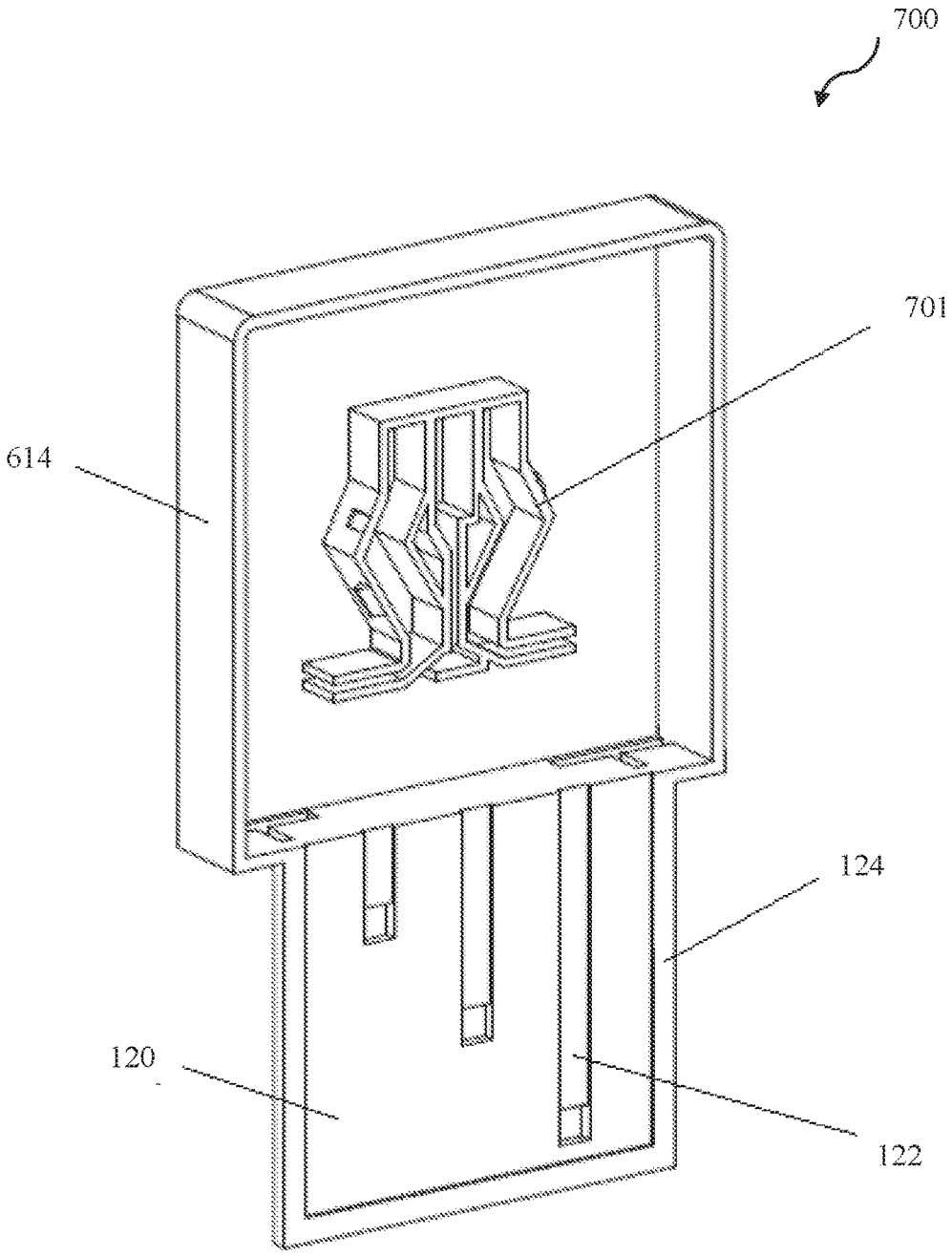


FIG. 7

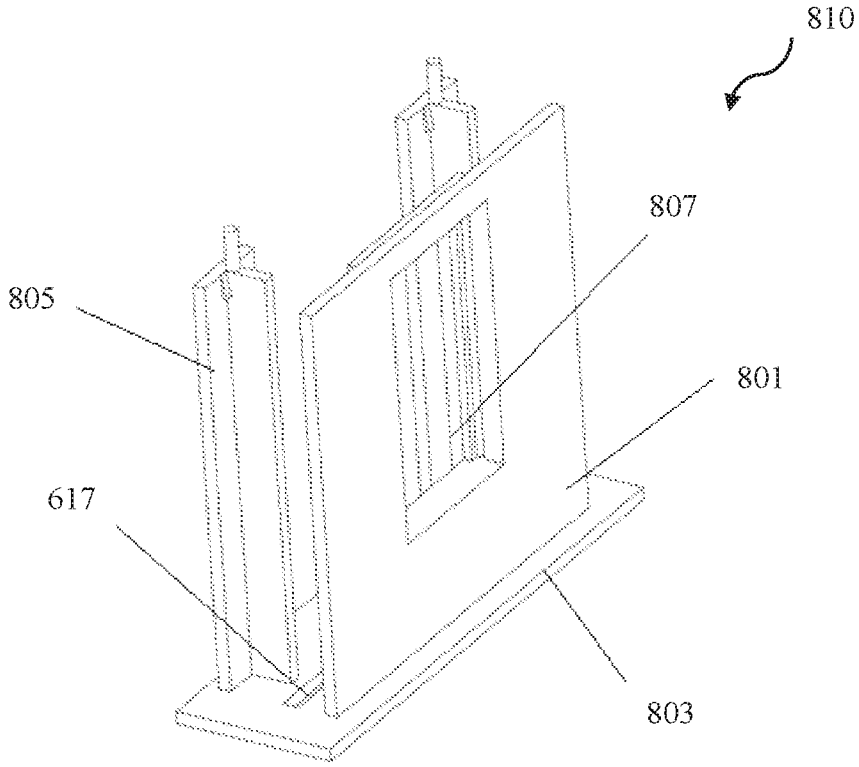


FIG. 8A

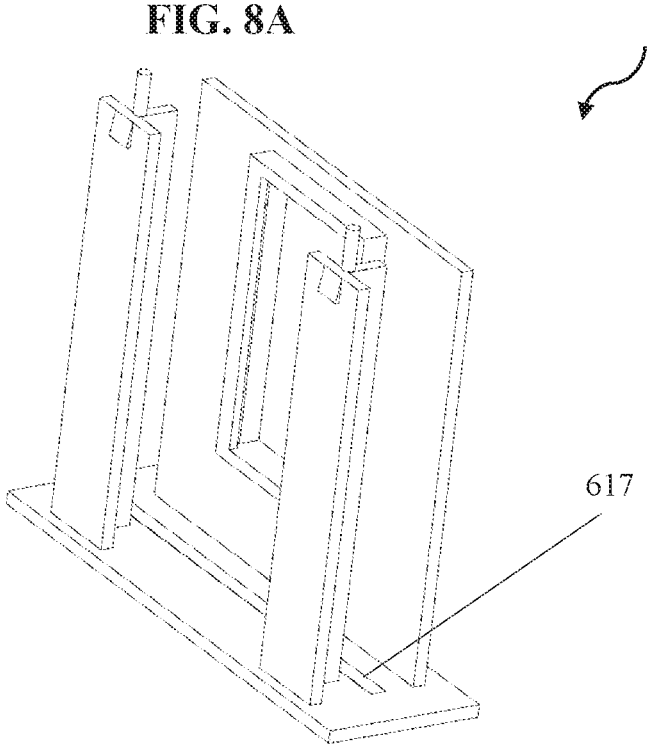


FIG. 8B

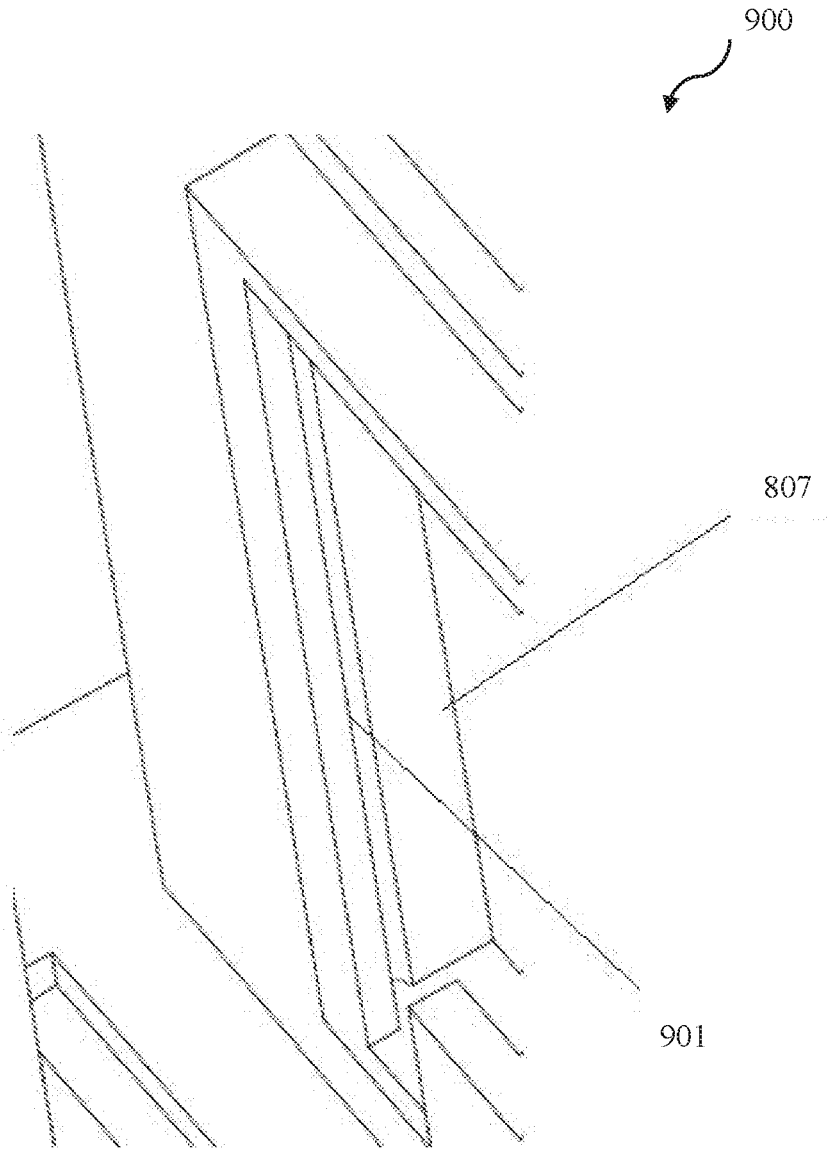


FIG. 9

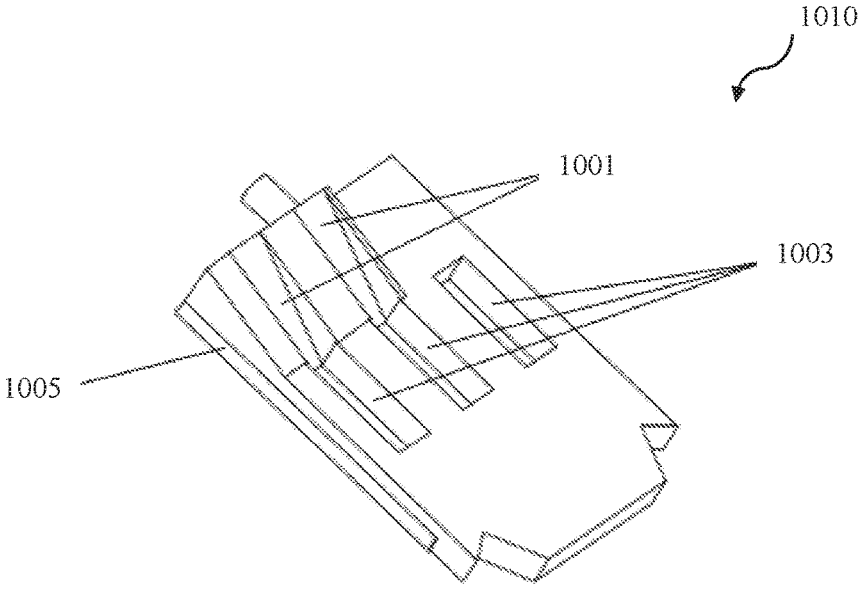


FIG. 10A

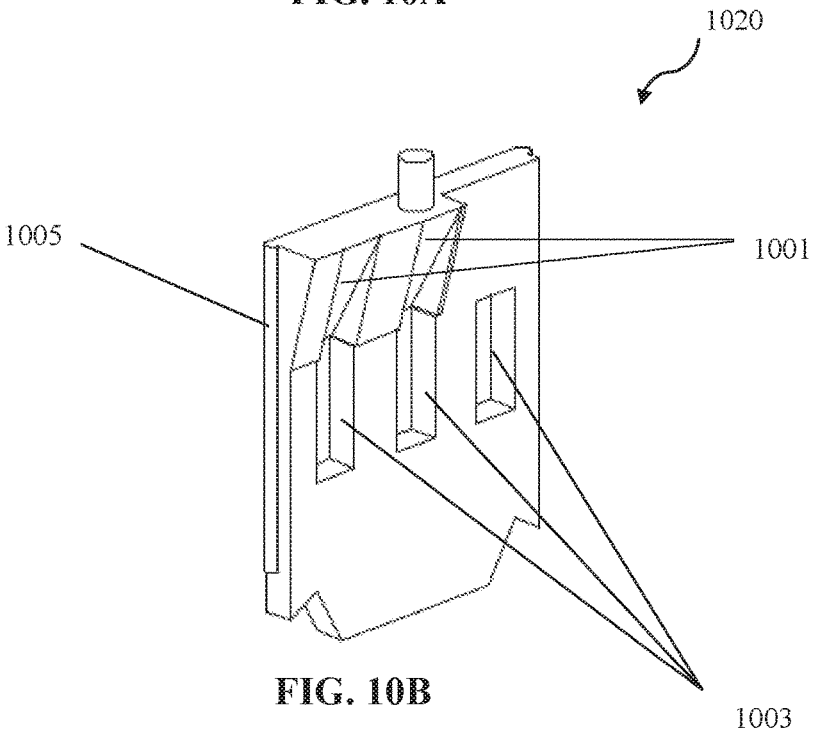


FIG. 10B

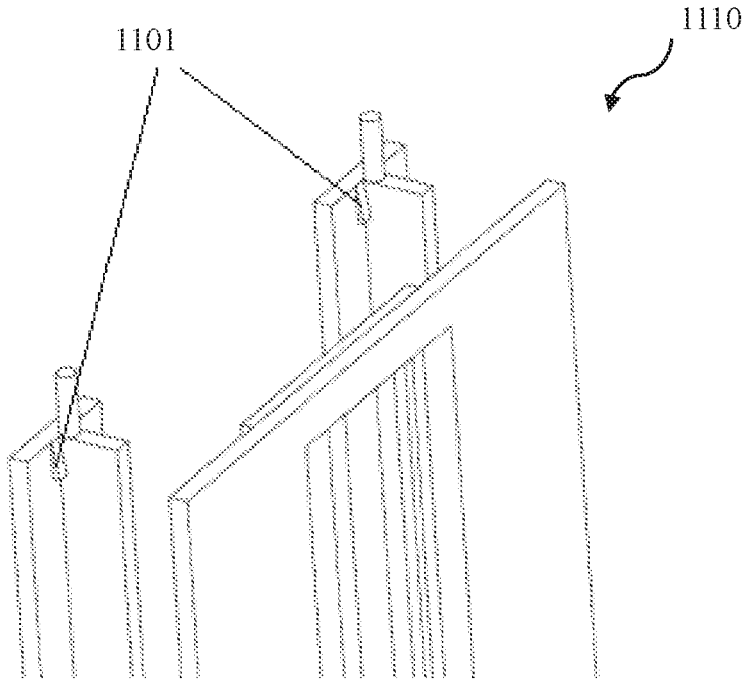


FIG. 11A

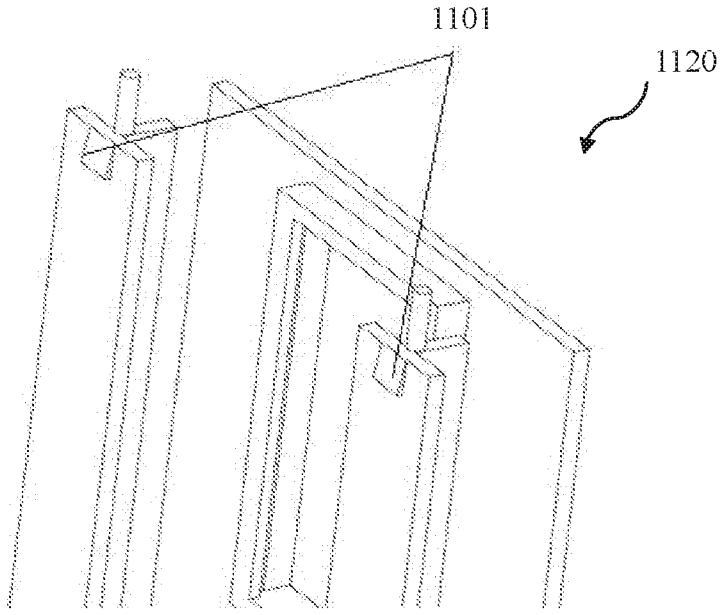


FIG. 11B

MOVABLE SOCKET ASSEMBLY

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of U.S. patent application Ser. No. 15/745,427, filed on Jan. 16, 2018, which is a U.S. national stage application of International Application No. PCT/CN2016/085142, filed on Jun. 7, 2016, which claims priority of Chinese Application No. 201510451677.1 filed on Jul. 28, 2015, and Chinese Application No. 201510512159.6 filed on Aug. 19, 2015, the entire contents of each of which are hereby incorporated by reference.

TECHNICAL FIELD

[0002] The present disclosure relates to a movable socket assembly.

BACKGROUND

[0003] Socket is widely used in our daily life. Traditional socket assembly is generally fixed at a location and has a limited number of outlets. If an electrical equipment is located far away from the socket assembly or the number of outlets is not enough, then a socket/outlet strip and additional power cord are needed. This is less flexible and the messy power cords may cause potential safety issues in a house. Installing additional sockets on a wall complicates the wiring inside the wall. And it is difficult to predict the number of sockets that will be needed in the future. For this reason, there is a need for a type of socket assembly with more flexibility and removability.

SUMMARY

[0004] According to one aspect of the present disclosure, provided herein is a movable socket assembly. Particularly, in some embodiments, the movable socket assembly comprises a housing, a plug part installed in said housing, a plurality of elastic conducting contact points formed on said plug part, and an adjusting mechanism for positioning the plug part out of the housing so that the plug part can be removably inserted into an external power outlet.

[0005] In some embodiments, the plug part comprises a flat insertion piece having two insulation layers and a plurality of conducting strips placed between the two insulation layers, and each conducting strip penetrates one of the two insulation layers to form one of the plurality of elastic conducting contact points at a surface of said insulation layer.

[0006] In some embodiments, the movable socket assembly comprises a plurality of holes formed on a side of the housing for receiving an external plug.

[0007] In some embodiments, the plurality of elastic conducting contact points are formed on a same side of the flat insertion piece.

[0008] In some embodiments, the plurality of elastic conducting contact points are formed on different sides of the flat insertion piece.

[0009] In some embodiments, each elastic conducting contact point has one of a curved surface, a plane surface, a waved surface, and a stepped surface.

[0010] In some embodiments, the adjusting mechanism comprises a slide guide and a spring for ejecting the flat insertion piece out of the housing along the slide guide.

[0011] In some embodiments, the movable socket assembly comprises a locking mechanism for locking the flat insertion piece into a position.

[0012] In some embodiments, the locking mechanism comprises a button, a second spring, and a lock key, wherein the second spring can push the lock key to engage a notch formed on the flat insertion piece to lock the flat insertion piece into the position, and wherein the button can push the lock key to disengage the notch to unlock the flat insertion piece from the position.

[0013] In some embodiments, the flat insertion piece further comprises a bulge which stops the flat insertion piece from being completely ejected from the housing.

[0014] In some embodiments, the movable socket assembly comprises a safety unit. The safety unit comprises a gate installed between the plurality of holes and a plurality of conductors, a spring attached to the gate, and a slope formed on the gate. When the external plug is inserted into the holes the external plug engages with the slope to push the gate aside so that the external plug can connect to the plurality of conductors.

[0015] In some embodiments, the housing of the movable socket assembly comprises a first housing and a second housing, and the second housing can retract into the first housing to extend the flat insertion piece out of the housing through an opening of the second housing.

[0016] In some embodiments, the adjusting mechanism comprises a spring for ejecting the second housing out of the first housing when the flat insertion piece is being removed from the external power outlet.

[0017] In some embodiments, the second housing of the movable socket assembly comprises an upper housing portion which has a safety unit mount part, a lower housing portion which has a socket core structure, and a bottom portion.

[0018] In some embodiments, the second housing of the movable socket assembly comprises a bulge for preventing the second housing from completely disengage the first housing, and wherein said bulge is formed at an end of the upper housing portion.

[0019] In some embodiments, the housing of the movable socket assembly comprises a chamber for installing a smart chip.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] FIG. **1** illustrates an exemplary embodiment of a movable socket assembly in accordance with some embodiments of the disclosed subject matter.

[0021] FIG. **2** illustrates a partial exploded view of a movable socket assembly in accordance with some embodiments of the disclosed subject matter.

[0022] FIG. **3** illustrates a partial front view of part of a movable socket assembly in accordance with some embodiments of the disclosed subject matter.

[0023] FIG. **4**A illustrates a front view of the plug part in accordance with some embodiments of the disclosed subject matter.

[0024] FIG. **4**B illustrates a side view of the plug part in accordance with some embodiments of the disclosed subject matter.

[0025] FIGS. **5**A and **5**B illustrate two exemplary elastic conducting contact points in accordance with some embodiments of the disclosed subject matter.

[0026] FIG. **6** illustrates a partial exploded view of a movable socket assembly in accordance with some embodiments of the disclosed subject matter.

[0027] FIG. **7** illustrates a partial front view of part of a movable socket assembly in accordance with some embodiments of the disclosed subject matter.

[0028] FIGS. **8**A and **8**B illustrate a part of the second housing in accordance with some embodiments of the disclosed subject matter.

[0029] FIG. **9** illustrates a part of the upper housing portion in accordance with some embodiments of the disclosed subject matter.

[0030] FIGS. **10**A and **10**B illustrate a part of a safety gate in accordance with some embodiments of the disclosed subject matter.

[0031] FIGS. **11**A and **11**B illustrate a part of a second housing in accordance with some embodiments of the disclosed subject matter.

DETAILED DESCRIPTION

[0032] In the following detailed description, numerous specific details are set forth by way of examples in order to provide a thorough understanding of the relevant disclosure. However, it should be apparent to those skilled in the art that the present disclosure may be practiced without such details. In other instances, well known methods, procedures, systems, components, and/or circuitry have been described at a relatively high-level, without detail, in order to avoid unnecessarily obscuring aspects of the present disclosure.

[0033] These and other features, and characteristics of the present disclosure, as well as the methods of operation and functions of the related elements of structure and the combination of parts and economies of manufacture, may become more apparent upon consideration of the following description with reference to the accompanying drawing(s), all of which form a part of this specification. It is to be expressly understood, however, that the drawing(s) are for the purpose of illustration and description only and are not intended to limit the scope of the present disclosure. As used in the specification and in the claims, the singular forms of "a", "an", and "the" include plural references unless the context clearly dictates otherwise.

[0034] After reading this description, it will become apparent to one skilled in the art how to implement the disclosure in various alternative embodiments and alternative applications. However, not all embodiments of the present disclosure are specifically described herein. It will be understood that the embodiments are presented by way of example only, and not limitation. As such, this detailed description of various alternative embodiments should not be construed to limit the scope or breadth of the present invention as set forth below.

[0035] According to one aspect of the present disclosure, provided herein are movable socket assemblies. FIG. **1** illustrates an exemplary embodiment of a movable socket assembly **100** in accordance with some embodiments of the disclosed subject matter. As illustrated in FIG. **1**, the movable socket assembly **100** includes a housing **110**, a plug part **120** and any other suitable components (not shown in FIG. **1**) in accordance with the disclosed subject matter. The housing **110** protects the components of the movable socket assembly **100**. When in use, the plug part **120** is extended out of the housing **110** so that the plug part can be removably inserted into an external power outlet.

[0036] FIG. **2** illustrates a partial exploded view of a movable socket assembly **100** in accordance with some embodiments of the disclosed subject matter.

[0037] In one embodiment, the housing **110** includes a front housing portion **111** and a rear housing portion **113**. The front housing portion **111** and the rear housing portion **113** are attached to each other to enclose the components installed inside the housing **110**. The front housing portion **111** has a housing opening **201** through which the plug part **120** can be extended out of the housing **110**.

[0038] In one embodiment, a plurality of holes **131***a-e* are formed on a side of the front housing portion **111**. The movable socket assembly **100** further includes a socket core structure **218** and a plurality of conductors **216**. Together, the plurality of holes **131***a-e*, the socket core structure **218**, and the plurality of conductors **216** work as a socket for receiving an external plug. In a different embodiment, a separate socket part or a different electronic device (e.g., a router, a sensor, an alarm, a probe, a detector, a camera, a charger, or a converter) may be attached to the movable socket assembly.

[0039] The plurality of holes **131***a-e* may be formed on a same side of the front housing portion **111** (e.g., on the top side of the front housing portion **111**). Alternatively, the plurality of holes **131***a-e* may be formed on different sides of the front housing portion **111**. For example, holes **131***a* and **131***b* may be on one side of the front housing portion **111**, and holes **131***c*, **131***d* and **131***e* may be formed on a different side of the front housing portion **111**.

[0040] In one embodiment, the movable socket assembly **200** has an adjusting mechanism for extending the plug part **120** out of the housing **110**. The adjusting mechanism may be formed on the front housing portion **111** or the rear housing portion **113**. For example, the rear housing portion **113** has a slide guide **204** on each side of the rear housing portion **113**. A spring **203** is placed in each slide guide **204**. One end of the spring **203** connects to the plug part **120** so that it can eject the plug part **120** out of the housing **110** for insertion into an external power outlet. The plug part **120** may slide in the housing **110** along the slide guide **204**.

[0041] In one embodiment, a button **212** and a switch container **214** are installed on one end of the rear housing portion **113**. The switch container **214** may be formed as part of the rear housing portion **113**. The button **212** is connected to the switch container **214** through the lock key **206** and a spring **208**. A pair of front notches **125***a* are formed on the front end of the plug part **120** and a pair of back notches **125***b* are formed on the rear end of the plug part **120**. When the button **212** is not pressed, each spring **208** pushes down the corresponding lock key **206** to engage a front notch **125***a* to lock the plug part **120** inside the housing **110**. When the button **212** is pressed, the button **212** pushes up each lock key **206** to disengage the corresponding front notch **125***a*. The plug part **120** is therefore unlocked and may be ejected out of the housing **110** through the housing opening **201** by the spring **203**. A bulge **127** is formed on the rear end of the plug part **120** so that the front housing portion **111** can stop it from being completely ejected out of the housing **110**. Once the button **212** is released, the pressure of the springs **208** pushes down the lock keys **206** to engage with the back notches **125***b* to lock the plug part **120** so that it may be inserted into an external power outlet.

[0042] In one embodiment, the plug part **120** is a flat insertion piece which has one or more insulation layers and

a plurality of conducting strips. For example, the plug part **120** may have two insulation layers and three conducting strips placed between the two insulation layers. Each conducting strip has one end penetrating an insulation layer to form an elastic conducting contact point **123** on the outer surface of the insulation layer. Alternatively, the elastic contacting point **123** may be separately formed on the outer surface of an insulation layer and is then connected to the stripe. The plurality of elastic conducting contact points **123** may be formed on the same side or different sides of the plug part **120**. The plurality of elastic conducting contact points **123** may be formed on one or more sides of the plug part **120**. In addition, they may be arranged horizontally, diagonally, or in a different configuration on the surface of the plug part **120** if the insertion direction is the downward direction. When the plug part **120** is inserted into an external power outlet, the plurality of elastic conducting contact points **123** are electrically connected to the electrical wires to receive electricity.

[0043] The other end of each conducting strip may form a similar elastic conducting contact point **121**. When the plug part **120** is fully ejected, these elastic conducting contact points **121** are electrically connected to a plurality of fixed contact points **210**, which in turn are connected to the conductors **216**. Further detailed disclosure regarding the elastic conducting contact point **121** is provided in FIGS. **5**A and **5**B and related descriptions below.

[0044] The structures and functions described above in relation to the movable socket assembly **100** are not exhaustive and are not limiting; numerous other changes, substitutions, variations, alterations, and modifications may be ascertained to one skilled in the art and it is intended that the present disclosure encompasses all such changes, substitutions, variations, alterations, and modifications as falling within the scope of the appended claims.

[0045] FIG. **3** illustrates a partial front view of part of a movable socket assembly **100** in accordance with some embodiments of the disclosed subject matter. As illustrated in FIG. **3** the housing **110** further includes a chamber **301**. The chamber **301** may be configured to install a smart chip.

[0046] FIG. **4**A illustrates a front view of the plug part **120** in accordance with some embodiments of the disclosed subject matter. FIG. **4**B illustrates a side view of the plug part **120** in accordance with some embodiments of the disclosed subject matter.

[0047] In one embodiment, the plug part **120** has three elastic contact points **121** arranged in-line horizontally on the surface of the plug part **120** for connecting to the fixed contact points **210** (shown in FIG. **2**) and three elastic conducting contact points **123** arranged diagonally on the surface of the plug part **120** for connecting to the electrical wires in an external power outlet. As long as these elastic conducting contact points are connected to the correct conductor/wire and they do not interfere with each other when the plug part **120** is inserted into an external power outlet, they may be arranged in a different configuration on the surface of the plug part **120**. Further detailed disclosure regarding the elastic conducting contact point **123** is provided in FIGS. **5**A and **5**B and related descriptions below.

[0048] FIGS. **5**A and **5**B illustrate two exemplary elastic conducting contact points **121** and **123** in accordance with some embodiments of the disclosed subject matter. The elastic conducting contact point **121***s* and/or **123** may have any shape (e.g., a curved surface, a plane surface, a waved surface, or a stepped surface) for a larger contact area. In one embodiment, as shown in FIG. **5**A, the elastic conducting contact points **121** and/or **123** has a stepped surface. In another embodiment, as shown in FIG. **5**B, the elastic conducting contact points **121** and/or **123** has a curved surface. Each of the plurality of the elastic conducting contact points **121** and/or **123** may have a same type of surface or different types of surfaces. In one embodiment, two of the elastic conducting contact points **121** may have a stepped type surface, and the third elastic conducting contact point **121** may have a curved type surface.

[0049] FIG. **6** illustrates a partial exploded view of a movable socket assembly **600** in accordance with some embodiments of the disclosed subject matter.

[0050] As illustrated in FIG. **6**, the movable socket assembly **600** includes a front housing portion **612**, a rear housing portion **614**, a second housing **615** and any other suitable components in accordance with the disclosed subject matter.

[0051] The front housing portion **612** and the rear housing portion **614** are attached together to form a first housing. In one embodiment, a plug part, whose structure may be similar to the plug part **120** shown in FIGS. **2**, **3**, **4**A, **4**B, **5**A and **5**B, is fixed to the first housing.

[0052] In one embodiment, a plurality of holes **131***a-e* are formed on a side of the front housing portion **612** and a socket core structure **701** (as shown in FIG. **7**) is fixed to the rear housing portion **614**. The plurality of holes **131***a-e*, the socket core structure **701**, and the plurality of conductors installed in the socket core structure **701** work together as a socket part for receiving an external plug. A safety unit may be installed between the plurality of holes **131***a-e* and the socket core structure **701**. The safety unit may include a safety gate spring **640** and a safety gate **630**. The safety unit may be placed in the second housing **615** and slide in the second housing **615**. When in use, the second housing **615** retracts into the first housing and the safety unit is positioned between the plurality of holes **131***a-e* and the socket core structure **701**. When an external plug is inserted into the plurality holes **131***a-e*, it pushes the safety gate **630** aside and goes through the gate to connect to the conductors in the socket core structure **701**. When the external plug is unplugged, the safety gate **630** is pulled back to its original position by the safety gate spring **640**.

[0053] The second housing **615** is attached to the first housing to contain the plug part when the movable socket assembly is not in use. The second housing **615** may be pressed to slide into the first housing so that the plug part is extended out of the second housing **615** for insertion into an external power outlet. A pair of springs **620** are installed inside the first housing. One end of each spring **620** is attached to the rear housing portion **614**, and the other end of the spring **620** is attached to the second housing **615**. When the plug part is unplugged, the second housing **615** is pushed back to its original position by the springs **620** to fully contain the plug part again.

[0054] FIG. **7** illustrates a partial front view of part of a movable socket assembly **600** in accordance with some embodiments of the disclosed subject matter. As illustrated in FIG. **7**, the movable socket assembly **600** further has a socket core structure **701**, which may be formed as part of the rear housing portion **614**, for holding a plurality of conductors (not shown in FIG. **7**).

[0055] FIGS. **8**A and **8**B illustrate a part of the second housing **615** in accordance with some embodiments of the

disclosed subject matter. As illustrated in FIGS. **8**A and **8**B, the second housing **615** further includes an upper housing portion **801**, a bottom portion **803**, and a lower housing portion **805**. The upper housing portion **801** may slide into the front housing portion **612**. The upper housing portion **801** may have a safety unit mount part **807** for holding a safety unit. The lower housing portion **805** may slide into the rear housing portion **614**. The lower housing portion **805** may connect to the spring **620**. The bottom portion **803** may have a housing opening **617**. The lower housing portion **805** have two sliding boards in symmetry. Each of the sliding boards connect to a spring **620**. A spring guide post of the spring **620** may be formed on the end of the connecting point for guiding the spring **620**.

[0056] In one embodiment, the safety gate **630** may move in the safety unit mount part **807**. The safety gate spring **640** is attached to the upper housing portion **801**. The spring guide post of the safety gate spring **640** is on the end of the connecting point of the safety gate **630** and the safety gate spring **640**.

[0057] FIG. **9** illustrates a part of the upper housing portion **801** in accordance with some embodiments of the disclosed subject matter. As illustrated in FIG. **9**, the safety unit mount part **807** have a safety gate sliding groove **901**. The safety gate **630** can slide along with the safety gate sliding groove **901**.

[0058] FIGS. **10**A and **10**B illustrate a part of a safety gate **630** in accordance with some embodiments of the disclosed subject matter. As illustrated in FIGS. **10**A and **10**B, a slope **1001** and a plurality of pass-through holes **1003** may be formed on the safety gate **630**. The slope **1001** may only correspond to the holes (such as **131***a* and **131***b* as shown in FIG. **6**) for the neutral line and earth line. When the plug part **120** is insert into the plurality of holes, the plug part **120** engages the slope **1001** and pushes the safety gate **630** to move so that the pass-through holes **1003** are aligned with the plurality of holes (such as **131***a-e* as shown in FIG. **6**). The safety gate **630** may further include a guide **1005** that fits into the safety gate sliding groove **901**. When an object is inserted into the hole corresponding to the hot wire (the right most hole in FIG. **10**A), because there is no slope, the insertion force cannot be translated into a vertical force to move the safety gate **630** away. As such, the safety gate **630** prevents the object from connecting to the hot wire and no harm may be caused. When an object is inserted into the hole corresponding to the ground wire or neutral wire, the slope **1001** translates the insertion force into a vertical force, which moves the safety gate **630** to allow the object to go through the through holes to connect to the ground/neutral wire. However, because the ground/neutral wire does not have any voltage, there is no safety risk. When an external plug is inserted into the plurality of holes **131***a-e*, the plug's neutral leg or ground leg engages the slope to move aside the safety gate **630** so that the plug's hot leg can go through the through holes to connect to the hot wire. However, if the plug part **120** has not been fully inserted into the external power outlet, the safety gate **630** is not positioned deep enough into the first housing **611**, the legs of the external plug still cannot go through the through holes.

[0059] FIGS. **11**A and **11**B illustrate a part of a second housing **615** in accordance with some embodiments of the disclosed subject matter. As illustrated in FIGS. **11**A and **11**B, the second housing **615** further includes a bulge **1101**. The bulge **1101** may be formed on an end of an upper housing portion **801**. In one embodiment, as shown in FIG. **11**A, the bulge **1101** is on the inner side of the upper housing portion **801**. In another embodiment, as shown in FIG. **11**B, the bulge **1101** is on the outer side of the upper housing portion **801**. The bulge **1101** may be configured to stop the plug part **120** from being completely ejected from the housing.

[0060] The structures and functions described above in relation to the movable socket assembly **600** are not exhaustive and are not limiting; numerous other changes, substitutions, variations, alterations, and modifications may be ascertained to one skilled in the art and it is intended that the present disclosure encompasses all such changes, substitutions, variations, alterations, and modifications as falling within the scope of the appended claims.

What is claimed is:

1. An extendable socket assembly, comprising:

a housing;

a plug part comprising a flat insertion piece installed in the housing, wherein the plug part having an extended configuration and a retraced configuration,

a lock assembly having a locked state and an unlocked state, wherein the lock assembly including a movable element having a first position in the locked state and a second position in the unlocked state; and

wherein the movable element is configured for controlling the transformation of the plug part from the retraced configuration to the extended configuration by moving the movable element from the first position to the second position.

2. The extendable socket assembly of claim **1**, wherein the movable element is a button, wherein the first position is a position where the button isn't pressed and the second position is a position where the button is pressed.

3. The extendable socket assembly of claim **1**, wherein the movable element is a lock key, wherein the first position is a position where the lock key is engaging a front notch and the second position is a position where the lock key is disengaging the front notch.

4. The extendable socket assembly of claim **1**, wherein the plug part having a plurality of elastic conducting contact points.

5. The extendable socket assembly of claim **4**, wherein the flat insertion piece having two insulation layers and a plurality of conducting strips placed between the two insulation layers, and each conducting strip penetrates one of the two insulation layers to form one of the plurality of elastic conducting contact points on a surface of the insulation layer.

6. The extendable socket assembly of claim **4**, wherein the plurality of elastic conducting contact points are formed on a same side of the flat insertion piece.

7. The extendable socket assembly of claim **4**, wherein the plurality of elastic conducting contact points are formed on different sides of the flat insertion piece.

8. The extendable socket assembly of claim **4**, each elastic conducting contact point has one of a curved surface, a plane surface, a waved surface, or a stepped surface.

9. The extendable socket assembly of claim **1** further comprising an adjusting assembly configured for ejecting the flat insertion piece out of the housing for insertion of the flat insertion piece into an external power outlet.

10. The extendable socket assembly of claim **9**, wherein the adjusting assembly comprising two springs for ejecting the flat insertion piece out of the housing along a slide guide.

11. The extendable socket assembly of claim **9**, wherein the housing comprises a first housing and a second housing, and the second housing can retract into the first housing to extend the flat insertion piece out of the housing through an opening of the second housing.

12. The extendable socket assembly of claim **11**, wherein the adjusting assembly comprising a spring for ejecting the second housing out of the first housing when the flat insertion piece is being removed from the external power outlet.

13. The extendable socket assembly of claim **11**, wherein the second housing comprising a bulge for preventing the second housing from completely disengage the first housing, and wherein the bulge is formed at an end of the upper housing portion.

14. The extendable socket assembly of claim **9**, wherein the second housing comprising an upper housing portion which has a safety unit mount part, a lower housing portion which has a socket core structure, and a bottom portion.

15. The extendable socket assembly of claim **1** further comprising a plurality of holes formed on a side of the housing for receiving an external plug.

16. The extendable socket assembly of claim **1** further comprising a safety unit, the safety unit comprising a gate installed between the plurality of holes and a plurality of conductors, a spring attached to the gate, and a slope formed on the gate, wherein when the external plug is inserted into the holes the external plug engages with the slope to push the gate aside so that the external plug can connect to the plurality of conductors.

17. The extendable socket assembly of claim **1**, wherein the flat insertion piece comprising a bulge which stops the flat insertion piece from being completely ejected from the housing.

18. The extendable socket assembly of claim **1**, wherein the housing comprises a chamber for installing a smart chip.

19. A method for inserting an extendable socket assembly into an external power outlet, comprising:

providing the extendable socket assembly, wherein the extendable socket assembly comprising a housing, a plug part comprising a flat insertion piece installed in the housing having an extended configuration and a retraced configuration, a lock assembly having a locked state and an unlocked state;

making the lock assembly from the locked state to the unlocked state to enable the plug part transform from the retraced configuration to the extended configuration;

getting the flat insertion piece ejecting out of the housing in the extended configuration; and

inserting the extendable socket assembly into the external power outlet.

20. An extendable socket assembly, comprising:

a housing comprising a plurality of holes formed on a side of the housing for receiving an external plug;

a plug part installed in the housing;

a plurality of elastic conducting contact points formed on the plug part;

a lock assembly for locking or unlocking the plug part so that the plug part can be removable inside or outside of the housing; and

an adjusting assembly configured for ejecting the flat insertion piece out of the housing for insertion of the flat insertion piece into an external power outlet.

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