A UNIVERSAL POWER SOCKET

FIELD OF THE INVENTION

The present invention relates to power connection means and, more particularly, to electrical power sockets and outlets. More specifically, the present invention relates to power sockets more commonly known as universal power sockets.

BACKGROUND OF THE INVENTION

Electrical power connection means is essential for power delivery between a power source and a load. In many power connection configurations, power coupling means, such as plugs and socket pairs, are widely used. For example, power outlets more commonly known as wall sockets are available in many buildings or structures at distributed locations so that power can be more convenient coupled to electrical appliances using compatible plugs. However, it is well known that there are many different standards of plug and socket systems in the world which are typically defined by various national and/or international standards. To facilitate connection of plugs of different standards to a socket, connection means more commonly known as universal sockets or adaptors are known. Such universal sockets and adaptors are, for example, described in US Patent Nos. 5,007,848, 5,836,777 and 6,010,347, which are incorporated herein by reference.

Conventional universal-type sockets typically comprise a pair of base contact receptacles and a third contact receptacle which are disposed at the vertices of an isosceles triangle. In particular, the pair of base contact receptacles is disposed at the base vertices of the isosceles triangle and the third contact receptacle is disposed at the top vertices of the isosceles triangle. Each of the contact receptacles and the associated metallic contacts are configured so that various types of electric plugs of different prong sizes can be inserted into the corresponding contact receptacles for making electrical connections. However, conventional universal-type sockets are designed to fit as many varieties of plugs as possible which means some plugs may be very loosely received within the contact receptacles while other plugs may be too-tightly received. For example, the circular prongs of the more commonly available standard plugs have a diameter between 3.7 - 5.1mm. Such a range, when translated into the design of a universal socket or adaptor, means that if a contact mechanism can tightly receive a 5mm circular prong and a prong with non-circular cross-section, such as a base prong of a British BS1363 13A plug, is tightly received, an electrical plug with a 3.7mm circular prong will be in loose contact and this may lead to overheating, fire or other hazards.

SUMMARY OF THE INVENTION

According to this invention, in a first aspect there is provided an electrical socket for receiving an electrical plug, the socket comprising:

a first socket region and a second socket which are electrically connected for alternative use, each of said first and said second socket regions comprising a base pair of contact receptacles and a third contact receptacle which are located

at the vertices of an isosceles triangular arrangement with the base pair of contact receptacles disposed at the base vertices of the isosceles triangular arrangement,

said first socket region and said second socket region being adapted for receiving electrical plugs of a first type and a second type respectively,

wherein an electrical plug of said first type and an electrical plug of said second type comprise at least a pair of base contact prongs which are respectively insertable into the pair of base contact receptacles of said first and said second socket regions respectively, and

the foot-print of a pair of base contact prongs of an electrical plug of the first type falls within the foot-print of the pair of base contact receptacles of the second socket region, and the foot-print of a pair of base contact prongs of an electrical plug of said second type exceeds the foot-print of the pair of base contact receptacles of said first socket region.

Preferably the isosceles triangular arrangement formed by the contact receptacles of said first socket region and said second socket region are in inverted relationship with respect to each other. An axis joining the base pair of contact receptacles of said first socket region is preferably parallel to an axis joining the base pair of contact receptacles of said second socket region, wherein the contact receptacles of said first and second socket region are on the vertices of a trapezium. The first socket region is preferably disposed between the pair of base contact receptacles and the third contact receptacle of said second socket region.

Preferably the second socket region comprises a movable protective member which is movable between a closed position and a open position, wherein when in

the closed position the protective member obstructs insertion of a pair of base contact prongs of an electrical plug of the first type into said second socket region, and wherein when in the open position, the protective member opens the pair of base contact receptacles of said second socket region.

The protective member is preferably movable away from the obstruction configuration upon insertion of a pair of base contact prongs of an electrical plug of the second type into said second socket region. Preferably the protective member is slidable between an open position for receiving contact prongs of an electrical plug and a closed position for obstructing the insertion of contact prongs of an electrical plug, said protection member is under spring bias to return to the closed position.

The protective member preferably comprises a first protective member and a second protective member, said first protective member comprising means for closing the third contact receptacle of said second socket region, said second protective member for closing the base contact receptacles of said second socket region and is slidable relative to said first protective member when the first protective member is at a position at which the third contact receptacle of the second socket region is closed. Preferably the first protective member and said second protective member are under independent spring bias to move towards the closed position.

Each of said first and second protective members preferably comprises an inclined surface which is below the contact receptacle it is covering, the inclined surfaces tapering away from the axis joining the base contact receptacles of said pair of second contact receptacles in a manner such that said first and second

protective members are urged towards to the open position upon insertion of an electrical plug of the second type.

Preferably the second protective member is pivotally movable about an axis which is substantially orthogonal to an axis joining the base contact receptacles of said second socket region. The second protective member is preferably arranged so as to pivot about said axis upon non-symmetrical insertion of a pair of prongs into said pair of base contact receptacles.

Each one of the pair of base contact receptacle of said first socket region is preferably adapted for receiving a prong of an electrical plug of diameter between 3.7 to 5.1mm.

In another aspect, the present invention provides an electrical socket for receiving an electrical plug, said socket comprising:

at least one first socket region having a pair of base contact receptacles and a third contact receptacle located in relation to each other in an isosceles triangular arrangement with the base pair of contact receptacles disposed at the base vertices of the triangular arrangement, said first socket region being adapted for receiving electrical plugs of a first type; and

a movable protective member which is movable between a closed position and a open position, wherein when in the closed position the protective member obstructs insertion of a pair of base contact prongs of an electrical plug and when in the open position, the protective member opens the pair of base contact receptacles of said second socket region.

Preferably the protective member is movable away from the obstruction configuration upon insertion of a pair of base contact prongs. The protective member is preferably slidable between an open position for receiving contact prongs of an electrical plug and a closed position for obstructing the insertion of contact prongs of an electrical plug, said protection member is under spring bias to return to the closed position.

The protective member preferably comprises a first protective member and a second protective member, said first protective member comprising means for closing the third contact receptacle of said first socket region, said second protective member for closing the base contact receptacles of said first socket region, and is slidable relative to said first protective member when the first protective member is at a position at which the third contact receptacle of the second socket region is closed. Preferably the first protective member and said second protective member are under independent spring bias to move towards the closed position.

Preferably each of said first and second protective members comprises an inclined surface which is below the contact receptacle it is covering, the inclined surfaces tapering away from the axis joining the base contact receptacles of said pair of second contact receptacles in a manner such that said first and second protective members are urged towards to the open position upon insertion of an electrical plug of the second type.

The second protective member is preferably pivotally movable about an axis which is substantially orthogonal to an axis joining the base contact receptacles of said second socket region. Preferably the second protective member is arranged

so as pivots about said axis upon non-symmetrical insertion of a pair of prongs into said pair of base contact receptacles.

In a further aspect, the present invention provides an electrical socket for receiving an electrical plug, said socket comprising:

at least one first socket region having a pair of base contact receptacles and a third contact receptacle located in relation to each other in an isosceles triangular arrangement with the base pair of contact receptacles disposed at the base vertices of the triangular arrangement, said first socket region being adapted for receiving electrical plugs of a first type; and

a movable protective member which is movable between a closed position and an open position,

wherein when in the closed position the protective member obstructs insertion of a pair of base contact prongs of an electrical plug and when in the open position, the protective member opens the pair of base contact receptacles of said second socket region and upon non-symmetrical insertion of a pair of prongs into said pair of base contact receptacles the protective member is prevented from moving to the open position.

The protective member is preferably pivotally movable such that upon non-symmetric insertion of prongs into said pair of base contact receptacles the protective member rotates so as to impede movement to the open position. Preferably the protective member pivots about an axis substantially parallel to the direction of insertion of an electrical plug into the socket.

The protective member preferably comprises a first protective member and a second protective member, said first protective member comprising means for closing the third contact receptacle of said first socket region, said second protective member for closing the base contact receptacles of said first socket region, and is slidable relative to said first protective member when the first protective member is at a position at which the third contact receptacle of the second socket region is closed. Preferably the first protective member and said second protective member are under independent spring bias to move towards the closed position.

Each of said first and second protective members preferably comprises an inclined surface which is below the contact receptacle it is covering, the inclined surfaces tapering away from the axis joining the base contact receptacles of said pair of second contact receptacles in a manner such that said first and second protective members are urged towards to the open position upon insertion of an electrical plug of the second type.

BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the present invention will be explained in further detail below by way of examples and with reference to the accompanying drawings, in which:-

Fig. 1 is a front view of a socket of a first preferred embodiment of this invention,

Fig. 1A shows the respective connection terminals of the contact receptacles of Fig. 1,

Fig. 2 shows a front view of a socket of a second preferred embodiment of this invention,

Fig. 2A shows the respective connection terminals of the contact receptacles of Fig. 2,

Fig. 3 shows an exemplary application of the preferred embodiment of Fig. 1 as a wall socket **(110)**,

Fig. 4 shows an exemplary application of the preferred embodiment of Fig. 2 as a wall socket **(210)**,

Fig. 5 shows a preferred embodiment of a protective mechanism for use with a socket of this invention in a first operating mode,

Fig. 5A & 5B respectively shows the side and perspective views of the protective mechanism of Fig. 5,

Fig. 6 shows the protective mechanism of Fig. 5 in a first operative mode,

Fig. 7 shows the protective mechanism of Fig. 5 in a second operative mode,

Fig. 8A shows an end view of the mechanism of Fig. 8 along the viewing direction X of the protective mechanism of Figs. 5 and 6 when subject to a non-balanced insertion force,

Fig. 8B shows the protective mechanism of Fig. 8A when subject to a non-balanced force as illustrated in Fig. 8D,

Fig. 8C shows the plan view of the protective means of Fig. 8A,

Fig. 8D illustrates the application of an unbalanced force on the protective means of Fig. 8A,

Fig. 9 illustrates the insertion of a pair of contact prong of an electrical plug of a first type into a second socket region of this invention when the protective mechanism is in the closed position, and

Fig. 9A shows the plane view of the protective mechanism showing the position of the pair of contact prongs of Fig. 9.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

As mentioned above, an electrical socket which is adapted for receiving electrical plugs of different standards are more commonly referred to as a "universal socket" or an "international type socket". In this specification, the term "universal socket" is only used for convenience and is not meant to incorporate any specific technical meaning for the avoidance of doubt. For the sake of clarity, a universal socket includes an international type socket which is for receiving plugs conforming to various national standards.

Referring to Fig. 1, there is shown a first preferred embodiment of a socket of this invention. This socket **100** is adapted to receive electrical plugs of various national and international standards with some examples illustrated in Tables A and B below for convenience.

The socket of Fig. 1 comprises first **(1)** and second **(2)** socket regions for receiving electrical plugs of a first type and a second type. Two socket regions

are provided in this invention to cater for electrical lugs of various prong sizes and configuration so that plugs will not be too loosely received in the contact receptacles to mitigate the risk of overheating and/or arcing which may cause fire hazards or personal injuries.

Each of the first socket region **(1)** and the second socket region **(2)** comprises a pair of base contact receptacles and a third contact receptacle, with the three contact receptacles forming the vertices of an isosceles triangle. Each contact receptacle comprises a contact aperture and a contact mechanism which is directly underneath the contact aperture. The contact aperture defines the size and shape of an aperture which is accessible to a contact prong of an electrical plug upon insertion. The contact aperture is typically formed on a rigid front housing which is usually made of durable plastics so that the prong contact mechanisms and the underlying wiring connections are insulated from the outside. The contact mechanism typically comprises metallic contacts which form a resilient bracket-type catch so that an appropriate prong of an electrical plug can be compressively held for good electrical contact. Such compressive contacts are known in the art and are incorporated herein by reference. Specifically, the pair of base contact receptacles **(121, 122) (111, 112)** is on the base vertices of the isosceles triangle while the third contact receptacle **(113, 123)** is on the top vertice. The respective electrical connection of each of the individual contact receptacles of the first and second socket regions of this socket is more particularly illustrated in Fig. 1 using various standard nomenclatures for easy reference. For example, the pair of base receptacles is respectively connected to the N (neutral) and L (live) terminals with the third contact receptacle **(113, 123)** is for connection to the E (earth) terminal. It can be seen from Fig. 1A that the

contact receptacles are arranged so that contact receptacles of the first socket region and the second socket region on the same side of the third contact receptacles are for connection to the terminal of the same marking. For example, contact receptacles on the left side of the third contact receptacles are connected to the "N" terminals while those on the right side are connected to the L terminals with the third contact receptacles for connection to the E terminals.

Referring to Figs. 1-4 and Tables A and B, the second socket region **(2)** is adapted for receiving electrical plugs of the second type (Type 2 sockets) as set out in Table B below for illustrative purposes. More particularly, the second type plugs include plugs conforming to the following standards, British standard BS1363 (250V, 13A), BS546 (250V, 5A), Chinese standard GB1002 (250V, 10A), Australian standard AS3112 (250V, 10A), IEC standard IEC60884-1 (250V, 16A). The second column on Table B illustrates how the various plugs are fitted into the second socket region and how the second socket region universally accommodates the various plugs. For example, the Chinese standard plug GB1002 comprises two parallel prongs of a substantially rectangular cross-section with the longer sides of the pair of prongs parallel to each other. The portion of the contact aperture adapted for receiving the pair of parallel prongs of this GB1002 plug is formed on the pair of base contact apertures proximal to each other. In addition, the portion of the pair of contact apertures closest to each other are also shaped to receive a pair of divergent prongs of the AS3112. In addition, the third contact aperture on the second socket region is also formed and shaped to receive the third prong of the plugs where an electrical plug comprises a third prong. The IEC 60884-1 plug is similar to the configuration of GB1002 but with a third prong and the second socket region is provided with an appropriately shaped

and configured third contact aperture. The BS1363 plug comprises a pair of prongs having a substantially rectangular cross-section with the longitudinal axis of the pair of prongs substantially co-linear. The third prong of the BS1363 plug has a substantially rectangular cross-section with the longitudinal axis substantially orthogonal to the line joining the pair of base prongs forming the base vertices of an isosceles triangle. To accommodate the pair of base prongs of a BS1363 plug, the contact apertures of the second socket region are dimensioned to receive the pair of base prongs as shown in row 13 of Table B. Similarly, the top contact aperture is also dimensioned to receive the top prong of this plug. Similarly, the BS546 plug comprises prongs of a substantially circular cross-section and the contact apertures are accordingly dimensioned to accommodate the three substantially circular prongs, preferably in a closely-fitted manner.

The first socket region is adapted for receiving various plugs which are collectively referred to as type-one plugs, examples of which are set out in column 1 of Table A. More particularly, the type-one plug comprises a pair of substantially parallel prongs with a substantially circular cross-section. As a convenient example, the base contact apertures of this first socket region are dimensioned so that circular prongs with a diameter between 3.7mm and 5.1mm can be received in a closely-fitted manner under compressive contact of the resilient metallic contacts underneath the contact apertures. Of course, the range of diameter of the prongs to be receivable by the base apertures can be varied according to individual applications without loss of generality. Typical type-one plugs are shown in the second column of Fig. A and include electrical plugs conforming to European standard EN50075, Spanish standard SEV1011, Italian standard CEI23-

16, Scandinavian standard CEE7. To also cater for type-one plugs with a third circular prong, a pair of alternative circular apertures are provided intermediate the pair of base contact apertures as shown in the region one illustration. More particularly, the pair of alternative circular contact apertures comprises a first circular aperture co-linear with the pair of base contact apertures and a second one which is offset from the line joining the two base apertures. The first alternative circular aperture which is in line with the pair of base apertures is provided to receive a third prong of a plug of a corresponding configuration such as the Italian CEI23-16 plug with three contact prongs. Likewise, the offset middle contact aperture is for receiving the offset prong of Swiss plug/Spanish plug SEV1011. Broadly speaking, the dimension of the base contact receptacle of the first socket region is adapted for receiving a plug with prongs of a circular cross-sectional shape and dimension, while a plug comprising a prong or prongs of non-circular cross-sectional shape is for the second socket region. By allocating the second socket region for plugs comprising a non-circular prong or non-circular prongs, the varieties of prongs to be received by the pair of base receptacles of the second socket region are less and a safer contact mechanism with a tighter resilient grip on the prongs can be provided.

Referring again to Figs. 1, 1a and 3, the first socket region and the second socket region are disposed so that the isosceles triangles formed by the corresponding contact apertures are in inverted relation to each other. Specifically, the vertices corresponding to the two pairs of base contact receptacles substantially forms the vertices of a trapezoid with the top vertices of the pair of isosceles triangles pointing towards each other. Fig. 3 illustrates the

application of the Fig.1 configuration as a wall socket with a front housing mounting plate made of durable plastics.

In the configurations of Figs, 2, 2a and 4, the first and second socket regions are disposed so that the pairs of isosceles triangles formed by the respective contact receptacles are also inverted relative to each other. In this configuration, the first socket region (comprising **211, 212** and **213)** is completely disposed intermediate the pair of base contact receptacles **(221, 222)** and the third top receptacle **(223)** of the second socket region. Although the four vertices formed by the two pairs **(221, 222, 211, 212)** of base receptacles are still disposed on the vertices of a trapezoid, the size of the trapezoid is substantially reduced, resulting in a more compact design so that the effective area to be occupied by all the contact receptacles are substantially identical to the dimensions of a typical single-standard socket. Similarly, the configuration of the Figs. 2 and 2A universal socket is applied as an illustrative example of a wall socket as shown in Fig. 4. Although the two socket regions are arranged as two pairs of inverted isosceles triangles, it will be appreciated that it is not necessary so and the two triangles can be arranged in a parallel configuration.

It will be appreciated by persons skilled in the art that a pair of base prongs of a type-one electrical plug can be inserted into the base contact receptacles **(121, 122)** of the second socket region due to their larger aperture dimensions.

To mitigate the risk of insertion of an electrical plug of a wrong type into the second socket region, protective means is provided. Because the second socket region is best catered for type-two plugs which comprise both two-pronged and three-pronged plugs, conventional shutter-gate type protective members

comprising an insulated shutter gate which normally closes the three-contact apertures but will be opened when a rigid post is inserted into the third contact receptacle is inappropriate.

Referring to Figs. 5, 5A and 5B, the protective means comprises a first shutter-gate sub-assembly **(320)** and a second shutter-gate sub-assembly **(340)** which together form a shutter-gate assembly **(300)**. The shutter-gate assembly **(300)** comprises a plurality of insulated shutter members which are movable between a closing position and an opening position. In the closing position, the insulating shutter members are directly underneath the contact apertures while, at the opening position, the insulating shutter members are clear of the contact apertures so that the contact mechanisms underneath the contact aperture can be accessible from the outside. The shutter-gate assembly is under spring bias so that the shutter members are normally at the closing position by spring urge. A plurality of coil springs **(350)** is used as example. The first shutter-gate sub-assembly **(320)** comprises a rigid body moulded of durable plastics with a pair of wing-like shutter members **(322, 324)** symmetrically formed about a central axis **(326)**. The first shutter-gate sub-assembly is movable relative to the second shutter-gate sub-assembly along the axial direction of the central axis **(326)** and between an opening position and a closing position. In the closing position, the pair of wing-like shutter members is directly underneath the base contact apertures of the second socket region and, at the opening position, the shutter members are cleared away from the pair of base contact apertures of the second socket region to allow insertion of a pair of prongs of an electrical plug of the second type.

Each of the wing-like shutter member of the first shutter-gate sub-assembly **(320)** is tapered along the axial direction of the central axis so that when a pair of prongs of an electrical plug with a projection falling on the shutter members is inserted towards the shutter members **(322, 324)**, the tapering will cause the shutter members to be urged in a direction along the axial direction of central axis **(326)**, thereby opening the contact apertures. In this preferred embodiment, the tapering is towards the axial end of the shutter members which approaches the third contact receptacle of the second socket region, as is more clearly seen in Fig. 8D. A spring means is disposed at the distal end (that is, the end which is away from the tapered end) so that when the shutter member is moved towards the distal end for opening the contact aperture, spring bias will be built-up to store energy to return the shutter members towards the closing position.

As shown in Fig. 5, a coil spring is installed and retained in position by an axial protrusion **(328)** formed at the distal end of the shutter member. The lateral dimension (that is, the width) of the wing-like shutter members are adapted so that the maximum lateral extent of the wing-like shutter members corresponds to the maximum extent of a pair of base contact-prongs of a two-pronged type-two electrical plugs. With this configuration, because the lateral extent of type-one two-pronged electrical plugs will fall outside the maximum lateral extent of the pair of wing-like shutter members of this first shutter-gate sub-assembly, the two prongs of a type-one circular post will not act on the tapered region to push the shutter members towards the opening position. In addition, the pair of wing-like shutter member are also shaped and dimensioned so that the two prongs of a type-one plug cannot act on the two tapered regions on the shutter members. As

a result, the pair of shutter members cannot be opened by a type-one two-pronged plug.

As an additional safety measure, the first shutter-gate sub-assembly **(320)** further provides means to alleviate the risk of unbalanced insertion, for example, due to insertion of a single post into one of the base contact receptacles of the second socket region. This is achieved by supporting the first shutter assembly at the longitudinal ends of the central axis **(326)** so that the pair of shutter members will be pivoted above the central axis **(326)** when subject to an unbalanced insertion force as more particularly depicted in Figs. 8A to 8D. In addition, this arrangement of the first shutter assembly also alleviates the risks of unsymmetrical or tilted insertion of the two prongs into the socket. Hence, in addition to relative axial movements relative to the second shutter-gate sub-assembly, the first shutter-gate sub-assembly is also pivotable relative to the second shutter-gate sub-assembly and about a longitudinal axis substantially along the line "E" in Fig. 1A. The second shutter-gate sub-assembly comprises a fork-like member made also of durable plastics with a first shutter member **(342)** formed on one side of the fork-like body and a pair of bifurcated shutter member **(344, 346)** formed at the other side and extending along an opposite direction to the first shutter member **(342)**. Similar to the first shutter-gate sub-assembly, the second shutter-gate sub-assembly is also movable between a close position and an opened position. The shutter members of this second shutter-gate sub-assembly are underneath the three contact apertures of the second socket region under normal circumstances so that, in combination with the first shutter-gate sub-assembly, all the three contact apertures of the second socket region are closed unless and until an appropriate electrical plug is inserted.

The first shutter member **(342)** of this second shutter-gate sub-assembly is accessible through the third contact receptacle (the Earth Terminal) of the second socket region and the shutter member extends substantially axially away from the pair of fork-like shutter members. The first shutter member **(342)** is also tapered towards its free end, as more particularly shown in Figs. 5A and 5B. With this tapered arrangement, when a third prong of a type-two electrical plug is inserted into the third contact aperture, the downward insertion of the third prong towards the tapered end will push the second shutter-gate sub-assembly towards the opening position, as more particularly shown in Fig. 6, thereby opening the entire sub-assembly to allow plug insertion. As shown in Figs. 5, 5A and 5B, the first shutter- gate sub-assembly is embraced between the pair of fork-like members, the movement of the second shutter-gate sub-assembly towards the opening position will also drive the first shutter-gate sub-assembly towards the opening position, thereby opening all the three contact apertures against spring bias. Furthermore, since the pair of fork-like members are not tapered, when a pair of circular prongs corresponding to the foot-print of the pair of fork-like members is inserted against the pair of fork-like shutter members, there will be no sliding movement unless there is a third post acting on the tapered first shutter member.

As shown in Fig. 7, when a pair of electrical plugs having a pair of base prongs corresponding to the type-two plugs are inserted, the pair of base prong members of the type-two two-pronged electrical plug will drive the first shutter-gate assembly towards the opening position while leaving the second shutter-gate sub-assembly unmoved. Figs. 8, 8A and 8B illustrate in various views the pivotal movement of the first shutter-gate sub-assembly relative to the socket housing

and the second shutter-gate sub-assembly when subject to an unbalanced insertion force.

Figs. 9 and 9A illustrate the situation when a pair of posts of a type-one two-pronged electrical plug is inserted into the second socket region. Because the foot-print of the type-one prongs are outside the maximum lateral extent of the wing-like shutter members of the first shutter-gate sub-assembly, the pair of prongs will fall partially on the fork-like member and, in the absence of the driving of a tapered and of one of the shutter members, the shutter members will remain close. Although the protective means described above have been described with reference to a universal socket comprising a first socket region and a second socket region, it will be appreciated that this protective means can be applied in a universal socket with only a second-socket region without loss of generality.

While the present invention has been explained by reference to the examples or preferred embodiments described above, it will be appreciated that those are examples to assist understanding of the present invention and are not meant to be restrictive. The scope of this invention should be determined and/or inferred from the preferred embodiments described above and with reference to the Figures where appropriate or when the context requires. In particular, variations or modifications which are obvious or trivial to persons skilled in the art, as well as improvements made thereon, should be considered as falling within the scope and boundary of the present invention.

Furthermore, while the present invention has been explained by reference to wall sockets, it should be appreciated that the invention can apply, whether with

or without modification, to other connection means such as adaptors without loss of generality.

CLAIMS

1. An electrical socket for receiving an electrical plug, said socket comprising:

at least one first socket region having a pair of base contact receptacles and a third contact receptacle located in relation to each other in an isosceles triangular arrangement with the base pair of contact receptacles disposed at the base vertices of the triangular arrangement, said first socket region being adapted for receiving electrical plugs of a first type;

a movable protective member which is movable between a closed position and a open position, wherein when in the closed position the protective member obstructs insertion of a pair of base contact prongs of an electrical plug and when in the open position, the protective member opens the pair of base contact receptacles of said second socket region.

2. An electrical socket according to claim 14, wherein the protective member is movable away from the obstruction configuration upon insertion of a pair of base contact prongs.

3. An electrical socket according to claim 14 or claim 15, wherein said protective member being slidable between an open position for receiving contact prongs of an electrical plug and a closed position for obstructing the insertion of contact prongs of an electrical plug, said protection member is under spring bias to return to the closed position.

4. An electrical socket according to claim 14, 15 or 16, wherein said protective member comprises a first protective member and a second protective member, said first protective member comprising means for closing the third contact receptacle of said first socket region, said second protective member for closing the base contact receptacles of said first socket region, and is slidable relative to said first protective member when the first protective member is at a position at which the third contact receptacle of the second socket region is closed.

5. An electrical socket according to claim 17, wherein said first protective member and said second protective member are under independent spring bias to move towards the closed position.

6. An electrical socket according to claim 17 or claim 18, wherein each of said first and second protective members comprises an inclined surface which is below the contact receptacle it is covering, the inclined surfaces tapering away from the axis joining the base contact receptacles of said pair of second contact receptacles in a manner such that said first and second protective members are urged towards to the open position upon insertion of an electrical plug of the second type.

7. An electrical socket according to wherein said second protective member is pivotally movable about an axis which is substantially orthogonal to an axis joining the base contact receptacles of said second socket region.

8. An electrical socket according to claim 20, wherein said second protective member is arranged so as pivots about said axis upon non-symmetrical insertion of a pair of prongs into said pair of base contact receptacles.

9. An electrical socket for receiving an electrical plug, said socket comprising:

at least one first socket region having a pair of base contact receptacles and a third contact receptacle located in relation to each other in an isosceles triangular arrangement with the base pair of contact receptacles disposed at the base vertices of the triangular arrangement, said first socket region being adapted for receiving electrical plugs of a first type;

a movable protective member which is movable between a closed position and a open position,

wherein when in the closed position the protective member obstructs insertion of a pair of base contact prongs of an electrical plug and when in the open position, the protective member opens the pair of base contact receptacles of said second socket region and upon non-symmetrical insertion of a pair of prongs into said pair of base contact receptacles the protective member is prevented from moving to the open position.

10. An electrical socket according to claims 22, wherein said protective member is pivotally movable such that upon non-symmetric insertion of prongs into said pair of base contact receptacles the protective member rotates so as to impede movement to the open position.

11. An electrical socket according to claim 23, wherein said protective member pivots about an axis substantially parallel to the direction of insertion of an electrical plug into the socket.

12. An electrical socket according to any of claims 22 to 24, wherein said protective member comprises a first protective member and a second protective member, said first protective member comprising means for closing the third contact receptacle of said first socket region, said second protective member for closing the base contact receptacles of said first socket region, and is slidable relative to said first protective member when the first protective member is at a position at which the third contact receptacle of the second socket region is closed.

13. An electrical socket according to claim 25, wherein said first protective member and said second protective member are under independent spring bias to move towards the closed position.

14. An electrical socket according to claim 25 or claim 26, wherein each of said first and second protective members comprises an inclined surface which is below the contact receptacle it is covering, the inclined surfaces tapering away from the axis joining the base contact receptacles of said pair of second contact receptacles in a manner such that said first and second protective members are urged towards to the open position upon insertion of an electrical plug of the second type.