

INTERNATIONAL 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 pin 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 pins 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 pin and a pin with non-circular cross-section, such as a base pin of a British BS1363 13A plug, is tightly received, an electrical plug with a 3.7mm circular pin will be in loose contact and this may lead to overheating, fire or other hazards.

Summary of the Invention

In a first aspect, the present invention provides an electrical socket for alternately receiving round-pin and rectangular-pin arrangement mains power electrical plugs, the socket comprising:

a housing having a first socket region for receiving a pair of rectangular pins of at least a first type of rectangular-pin arrangement electrical plug and including a pair of first contact receptacles for providing electrical contact with said pair of rectangular pins;

a second socket region for receiving a pair of round pins of at least a first type round-pin arrangement electrical plug and including a pair of second receptacle for providing electrical contact with said round pins; and

an earth region for receiving an earth pin from rectangular-pin arrangement electrical plugs and round-pin arrangement electrical plugs and including a third contact receptacle for providing electrical contact with said earthpins;

wherein the first socket region is adapted to prevent the reception of the pins of round-pin arrangement electrical plugs and the second socket region is adapted to prevent the reception of the pins of rectangular-pin arrangement electrical plugs.

Preferably, the pair of first contact receptacles and the third contact receptacle are located at the vertices of a first isosceles triangular arrangement and the pair of second contact receptacles are located at the vertices of a second isosceles triangular arrangement. The central axes of the first isosceles triangular arrangement and the second isosceles triangular arrangement are preferably substantially parallel to each other. More preferably, the first isosceles triangular arrangement and the second isosceles triangular arrangement are displaced from each other in a non-inverted relationship.

The first socket region preferably includes a first gate portion having apertures adapted to prevent reception of round pins. Preferably the second socket region includes a second gate portion adapted to prevent reception of rectangular pins.

The second socket region preferably includes a second gate portion having apertures adapted to prevent reception of rectangular pins.

Preferably the first pair of contact receptacles is adapted to provide electrical contact with a plurality of rectangular-pin arrangement electrical plugs having pins with differing geometries and sizes.

The electrical socket preferably further comprising a first shutter member moveable from an open position for allowing reception of a first rectangular-pin arrangement electrical plug. Preferably the first shutter member moveable from an open position for allowing reception of a plurality of first rectangular-pin arrangement electrical plugs having pins of differing geometries, orientations or sizes by the first contact receptacle, to a closed position for preventing reception of the pins of electrical rectangular-pin arrangement electrical plugs of other geometries, orientations or sizes and other object by the first contact receptacle.

The first shutter preferably comprises an upper member and a lower member being moveable relative to each other and relative to the housing in a plane normal to the pins of an electrical plug and in a direction parallel to an axis extending between and normal to the pins to allow contact of the pins with the pair of first contact receptacles, the upper and lower members being biased in a direction parallel to the axis extending between and normal to the pins and being moveable relative to each other;

the upper member having a pair of apertures extending therethrough to allow passage of the pins of a first type of rectangular pins therethrough wherein the pair of apertures have size and geometry so as to obstruct the passage of other types of rectangular pins; and

the lower member having an inclined surface positioned so as to close the pair of apertures when the first shutter is in said closed position, the inclined surface being inclined in the direction of movement of the upper and lower member;

wherein upon the pins of a first type being urged through said pair of apertures and against the inclined surface of the lower member, the lower member is

urged against the bias so as to move the first shutter to said open position and allow the pins of the first type to be received by the first contact receptacles.

Preferably the upper member of the first shutter further comprises a further inclined surface positioned so as to further define the closed position of the first shutter and prevent contact with the first contact receptacles, wherein upon the pins of a second type of a rectangular-pin arrangement plug being urged against the further inclined surface of the upper member, the upper member and lower member are urged against the bias is urged so as to move the first shutter to said open position and allow the pins of the second type to be received by the first contact receptacles. Preferably movement of the upper member urges the lower member against the bias.

The apertures of the upper member of the first shutter preferably further allow passage of the pins of a third type of rectangular pins therethrough, wherein upon the pins of the third type being urged through said pair of apertures and against the inclined surface of the lower member, the lower member is urged against the bias so as to move the first shutter to said open position and allow the pins of the third type to be received by the first contact receptacles.

Preferably the pins of the first type are substantially parallel having their long faces in an opposed relationship, the pins of the second type are substantially parallel and collinear and the pins of the third type are inclined with respect to each other.

The first contact receptacles preferably includes contact portions sized and shaped so as to receive a particular pair of pins.

Preferably the shutter is adapted to rock about its direction of motion upon introduction of a single pin or other object in a manner such that the first shutter impinges the housing and prevents the shutter moving to the open position.

The upper member of the first shutter preferably further comprises a blocking surface substantially parallel to the direction of travel and adjacent the pair of apertures, wherein upon introduction an other pin arrangement the blocking surface cause the upper member and lower member to maintain the closed position.

The electrical socket preferably further comprising a second shutter member moveable from an open position for allowing reception of a first round-pin arrangement electrical plug.

The electrical socket preferably further comprising a second shutter member moveable from an open position for allowing reception of a plurality of first round-pin arrangement electrical plugs having pins of differing sizes by the second contact receptacle, to a closed position for preventing reception of the pins of electrical rectangular-pin arrangement electrical plugs of other sizes and other object by the second contact receptacle.

Preferably the second shutter comprises an upper member being moveable relative to the housing in a plane normal to the pins of an electrical plug and in a direction parallel to an axis extending between and normal to the pins to allow contact of the pins with the pair of second contact receptacles, the upper member being biased in a direction parallel to the axis extending between and normal to the pins.

The upper member is preferably provided as two moveable portions each moveable independently with respect to the other and being moveable relative to each other, so as to allow passage to the earth receptacle located therebetween.

Preferably the second shutter further comprises a lower member having a pair of apertures extending therethrough to allow passage of the pins of at least a first type of round pins therethrough, wherein the pair of apertures have size and geometry so as to obstruct the passage of other types of pins or objects.

The upper member of the second shutter preferably further comprises an inclined surface positioned so as to further define the closed position of the second shutter and prevent contact with the second contact receptacles, wherein upon the pins of the at least a first type of a round-pin arrangement plug being urged against the inclined surface of the upper member, the upper member is urged against the bias so as to move the second shutter to said open position and allow the pins of the first type to be received by the second contact receptacles.

The shutter is preferably adapted to rock about its direction of motion upon introduction of a single pin or other object in a manner such that the first shutter impinges the housing and prevents the shutter moving to the open position.

Preferably the third contact receptacle of the earth region of said socket is adapted to receive the earth pin of a respective electrical plug.

In a second aspect, the present invention provides a shutter for obstructing contact with contact receptacles of an electrical socket, the shutter being moveable from an open position for allowing reception of a plurality of first -pin arrangement electrical plugs having pins of differing geometries, orientations or sizes by the first contact

receptacle, to a closed position for preventing reception of the pins of electrical plugs of other geometries, orientations or sizes and other object by the first contact receptacle, the shutter comprising:

an upper member and a lower member being moveable relative to each other and relative to the housing in a plane normal to the pins of an electrical plug and in a direction parallel to an axis extending between and normal to the pins to allow contact of the pins with a pair of contact receptacles, the upper and lower members being biased in a direction parallel to the axis extending between and normal to the pins and being moveable relative to each other;

the upper member having a pair of apertures extending therethrough to allow passage of the pins of a first type therethrough wherein the pair of apertures have size and geometry so as to obstruct the passage of other types of pins;

the lower member having an inclined surface positioned so as to close the pair of apertures when the first shutter is in said closed position, the inclined surface being inclined in the direction of movement of the upper and lower member;

wherein upon the pins of a first type being urged through said pair of apertures and against the inclined surface of the lower member, the lower member is urged against the bias so as to move the first shutter to said open position and allow the pins of the first type to be received by the contact receptacles.

Preferably the plurality of first pin arrangement electrical plugs are rectangular-pin type electrical plugs.

The upper member of the first shutter preferably further comprise a further inclined surface positioned so as to further define the closed position of the first shutter

and prevent contact with the contact receptacles, wherein upon the pins of a second type of plug being urged against the further inclined surface of the upper member, the upper member and lower member are urged against the bias is urged so as to move the shutter to said open position and allow the pins of the second type to be received by the first contact receptacles.

Preferably movement of the upper member urges the lower member against the bias.

The apertures of the upper member of the first shutter preferably further allow passage of the pins of a third type of pins therethrough, wherein upon the pins of the third type being urged through said pair of apertures and against the inclined surface of the lower member, the lower member is urged against the bias so as to move the first shutter to said open position and allow the pins of the third type of pins to be received by the contact receptacles.

Preferably the pins of the first type are flat and substantially parallel having their long faces in a an opposed relationship, the pins of the second type are flat and substantially parallel and collinear and the pins of the third type are flat and inclined with respect to each other.

The contact receptacles preferably include contact portions sized and shaped so as to receive a particular pair of pins.

Preferably the shutter is adapted to rock about its direction of motion upon introduction of a single pin or other object in a manner such that the first shutter impinges the housing and prevents the shutter moving to the open position.

The upper member of the first shutter preferably further comprises a blocking surface substantially parallel to the direction of travel and adjacent the pair of apertures, wherein upon an other pin arrangement the blocking surface cause the upper member and lower member to maintain the closed position.

In a third aspect, the present invention provides a shutter for obstructing contact with contact receptacles of an electrical socket, the shutter being moveable from an open position for allowing reception of a plurality of pins of one or more plugs having pins of differing geometries, orientations or sizes a contact receptacle, to a closed position for preventing reception of other objects by the contact receptacle, the shutter comprising:

an upper member being moveable relative to the housing of an electrical socket in a plane normal to the pins of an electrical plug and in a direction parallel to an axis extending between and normal to the pins to allow contact of the pins with the pair of electrical contact receptacles, the upper member being biased in a direction parallel to the axis extending between and normal to the pins;

wherein the upper member is provided as two moveable portions which are laterally spaced apart so as to allow passage therebetween to an earth receptacle.

Preferably, the two moveable portions are each moveable independently with respect to the other and being moveable relative to each other.

The second shutter may further comprise a lower member having a pair of apertures extending therethrough to allow passage of the pins of at least a first type of pins therethrough wherein the pair of apertures have size and geometry so as to obstruct the passage of other types of pins or objects.

The upper member of the second shutter may further comprise an inclined surface positioned so as to further define the closed position of the second shutter and prevent contact with the contact receptacles, wherein upon the pins of the at least a first type arrangement plug being urged against the inclined surface of the upper member, the upper member is urged against the bias is urged so as to move the second shutter to said open position and allow the pins of the first type to be received by the contact receptacles.

Preferably the shutter is adapted to rock about its direction of motion upon introduction of a single pin or other object in a manner such that the first shutter impinges the housing and prevents the shutter moving to the open position.

The shutter member is preferably moveable from an open position for allowing reception of a plurality of first round-pin arrangement electrical plugs having pins of differing sizes by the contact receptacle, to a closed position for preventing reception of the pins of electrical rectangular-pin arrangement electrical plugs of other sizes and other object by the contact receptacle.

In a fourth aspect, the present further provides an adapter for alternately receiving round-pin and rectangular-pin arrangement mains power electrical plugs and for engagement with a mains power socket, the adapter comprising:

a socket according to the first aspect; and

a pin arrangement for engagement and electrical communication with a mains powers socket and being in electrical communication with the socket.

The socket and the pin arrangement are preferably positioned in relation to each other in an opposed relationship.

The adapter may further include a housing body, wherein the pin arrangement is detachably removable from the housing.

Brief Description of the Drawings

Preferred embodiments of the present invention will now be described by way of non-limiting example only with reference to the accompanying drawings in which:

Fig. 1 shows a schematic outline of a preferred embodiment of an electrical socket according to the present invention,

Fig. 2 depicts the respective connection terminals of the contact receptacles of the embodiment depicted in Fig. 1,

Fig. 3 shows an exemplary application of the preferred embodiment of Fig. 1 and Fig. 2 as a wall socket,

Fig. 4 shows a rear view of the exemplary application of Fig. 3 as a wall socket,

Fig. 5 shows a rear perspective view of the exemplary embodiment of Fig. 3 and Fig. 4 having a first type of rectangular-pin socket inserted,

Fig. 6 shows a rear perspective view of the exemplary embodiment of Fig. 3 and Fig. 4 having a second type of rectangular-pin socket,

Fig. 7 shows a rear perspective view of the exemplary embodiment of Fig. 3 and Fig. 4 having a third rectangular-pin plug inserted,

Fig. 8 shows a rear perspective view of the exemplary embodiment of Fig. 3 and Fig. 4 having a round-pin socket inserted,

Fig. 9A shows a top plan view of a first shutter member according to the present invention,

Fig. 9B shows an end view of the first shutter member as depicted in Fig. 9A,

Fig. 9C shows a perspective top view of the first shutter member of Fig. 9A and Fig. 9B in a close arrangement,

Fig. 9D shows a perspective view of the first shutter member of Figs. 9A, 9B and 9C in an open arrangement,

Fig. 10 shows a top perspective view of the first shutter member of Figs. 9A, 9B, 9C and 9D depicting electrical pin contact regions,

Fig. 11 shows a top perspective view of a lower member of the first shutter member as depicted in Figs. 9A, 9B, 9C, 9 D and Fig. 10,

Fig. 12A shows a top perspective view of the first shutter member in a close configuration in relation to first contact receptacles,

Fig. 12B shows a top perspective view of the first shutter member in an open arrangement with the introduction of a first type of rectangular-pins,

Fig. 13A shows a top perspective view of the first shutter member in relation to the first contact receptacles prior to insertion of a second type of rectangular-pin plug,

Fig. 13B shows a top perspective view of the first shutter member in an open configuration upon introduction of the second type of rectangular-pin plug,

Fig. 14A shows a top perspective view of the first shutter member in relation to the first contact receptacles prior to introduction of third type of rectangular-pin plug,

Fig. 14B shows a top perspective view of the first shutter member in an open configuration upon introduction of the third type of rectangular-pin plug,

Fig. 15A shows a top perspective view of the first shutter member in relation to a round-pin plug,

Fig. 15B shows a top plan view of the first shutter member in relation to the round-pin plug,

Fig. 16A shows a schematic top view of the electrical socket in relation to a round-pin plug,

Fig. 16B shows a sectional view of the electrical socket depicting the first shutter member,

Fig. 16C shows a sectional view of the electrical socket depicting the first shutter member in a locked configuration,

Fig. 16D shows a top plan view of the first shutter member in relation to a single round-pin,

Fig. 17A shows a top plan view of a second shutter member according to the present invention in a close configuration,

Fig. 17B shows a side view of the second shutter member in a close configuration,

Fig. 17C shows a top perspective view of the second shutter member in a close configuration,

Fig. 18A shows a top perspective view of the first shutter member in relation to second contact receptacles in a close configuration prior to insertion of a round-pin plug.

Fig. 18B shows a perspective view of the second shutter member in an open configuration upon insertion of a round-pin plug.

Detailed Description of the Invention

The following description refers to preferred embodiments of the umbrella according to the present invention. To facilitate an understanding of the invention, reference is made in the description to the accompanying drawings whereby the socket is illustrated in preferred embodiments. Similar components between the embodiments are identified by the same reference numerals.

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 pin 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.

In the present invention the two socket regions have been separately differentiated such that the first socket region (1) is adapted to receive only rectangular-pin arrangements, and such that the second socket region (2) is adapted to only receive round-pin arrangements.

It should be noted that the term "rectangular-pin" is understood to include pins of plugs having non-circular cross-section such as flat or elongate pins and thick rectangular pins.

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 pin 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 pin 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 pin 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, 121a) (122, 122a) is on the base vertices of the isosceles triangle while the third contact receptacle (123) is on the top vertex. 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. 1 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. 1-7 and Tables A and B, the first socket region (1) is adapted for receiving rectangular-pin arrangement plugs (Type 1 plugs) as set out in Table B below for illustrative purposes. More particularly, the first type plugs include plugs conforming to the following standards, British standard BS1363 (250V, 13A), Chinese standard GB1002 (250V, 10A), Australian standard AS3112 (250V, 10A), TIS166-2535, a Thailand safety standard. 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 pins of a substantially rectangular cross-section with the longer sides of the pair of pins parallel to each other. The portion of the contact aperture adapted for receiving the pair of parallel pins 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 is also shaped to receive a pair of divergent pins of the AS3112. In addition, the third contact aperture on the second socket region is also formed and shaped to receive the third pin of the plugs where an electrical plug comprises a third pin. The TIS166-2535 plug is similar to the configuration of GB1002 but with a third pin and the second socket region is provided with an appropriately shaped and configured third contact aperture. The BS1363 plug comprises a pair of pins having a substantially rectangular cross-section with the longitudinal axis of the pair of pins substantially co-linear. The third pin of the BS1363 plug has a substantially rectangular cross-section with the longitudinal axis substantially orthogonal to the line joining the pair of base pins forming the base vertices of an isosceles triangle. To accommodate the pair of base pins of a BS1363 plug, the contact apertures of the first socket region are dimensioned to receive the pair of base pins as shown in row 13 of Table B. Similarly, the top contact aperture is also dimensioned to receive the top pin of this plug.

The second socket region (2) is adapted for receiving various plugs which are collectively referred to as round-pin plugs (Type 2 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 pins with a substantially circular cross-section. As a convenient example, the base contact apertures of this first socket region are dimensioned so that circular pins 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 pins to be receivable by the base apertures can be varied according to individual applications without loss of generality. Typical round-pin 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. Similarly, the BS546 plug comprises pins of a substantially circular cross-section and the contact apertures are accordingly dimensioned to accommodate the three substantially circular pins, preferably in a closely-fitted manner.

To also cater for round-pin plugs with a third round-pin, 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 pin of a plug of a corresponding configuration such as the Italian CEI23-16 plug with three contact pins. Likewise, the offset middle contact aperture is for receiving the offset pin of Swiss plug/Spanish plug SEV1011.

Broadly speaking, the dimension of the base contact receptacle of the first socket region (1) is adapted for receiving a plug with pins of a rectangular cross-sectional shape and dimension, while a plug comprising a pin or pins of circular cross-sectional shape is for the second socket region (2).

By allocating the second socket region for plugs comprising a circular pin or non-circular pins, the varieties of pins 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 pins can be provided.

Referring again to Figs. 1 and 2, the first socket region (1) and the second socket region (2) are disposed so that the isosceles triangles formed by the corresponding contact apertures are in a substantially parallel and axially offset relationship to each

other. Fig. 3 illustrates the application of the Fig.1 and Fig. 2 configuration as a wall socket with a front housing mounting plate made of durable plastics.

In the configurations of Figs 1 to 7, the first and second socket regions (1) and (2) are disposed so that the pairs of isosceles triangles formed by the respective contact receptacles are parallel and translated relative to each other. Although the four vertices formed by the two pairs (121, 121a; 122, 122a) 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. The configuration of the Figs. 1 and 2 universal socket is applied as an illustrative example of a wall socket as shown in Fig. 3. 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. Figs. 5, 6 and 7 depict examples of plugs rectangular-type pins being introduced into the socket in the first region (1) whilst Fig. 8 depicts an example of a plug having round-pins being introduced into the second region (2).

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

It will also be appreciated by those skilled in the art that the apertures of the first and second socket regions are disposed from each other in a manner such that standard electrical plugs cannot be inappropriately introduced so that Live, Neutral and Earth pins cannot be introduced into the socket in the incorrect receptacles.

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 first socket region is catered for rectangular-pin 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. 9A-9D, Fig. 10 and Fig. 11, there is shown a first shutter member for use in conjunction with the electrical socket as depicted in the preceding Figures. An exemplary embodiment of the first shutter member in conjunction with the electrical socket as depicted in Figs. 3 and 4 is shown in Fig. 9A. The first shutter member (200) comprises an upper member (210) and a lower member (220), the upper member (210) and the lower member (220) being movable in a sliding relationship with respect to each other in the direction of arrow (A). The upper member (210) and the lower member (220) are biased by a biasing means, in the present embodiment a compression spring (230), in the direction of arrow (A). In the present embodiment, a single spring (230) is provided, and the lower member (220) abuts the upper member (210) such that the force exerted on the lower member (220) by the compression spring (230) is imparted to the upper member (210). The first shutter member (200) is sized and configured so as to obstruct contact with the first contact receptacles, thus defining a closed position as depicted in Fig. 9A. The upper member (210) has a pair of apertures extending therethrough to allow passage of the pins of a first type of rectangular pin. The apertures (212) may be sized and have a geometry so as to obstruct passage of other types of rectangular pins or other objects. The lower member (220) has a pair of inclined surfaces positioned so as to close the apertures (212) of the upper member (210) when in a neutral closed position and arrangement as depicted in

Fig. 9C and Fig. 9D. When the pins of a first type are urged through the pair of apertures (212) and against the inclined surfaces (222) of the lower member (220), the lower member (220) is urged against the compression spring (230), the compression spring (230) being at least partly compressed so as to allow the lower member (220) to move in the direction A thus allowing the first type of pins to extend through the apertures (212) of the upper member (210) and thus allow the pins to further extend so as to be received by a pair of contact receptacles so as to provide electrical contact between the pins and the receptacles.

Referring to Fig. 12A and 12B, an example of the manner in which the shutter members (210, 220) move in relation to each other and in relation to the electrical socket (100) is shown. As will be seen from Fig. 12A, prior to a pair of parallel flat-pins being engaged with the first shutter member (220), both the upper member (210) and the lower member (220) are urged by the spring (220) so as to assume a closed configuration of the first shutter member (200). As will be seen from Fig. 12B, upon the pins (400) being urged towards first contact receptacles (121, 121a), the pins (400) extend through the apertures (212) of the upper member (210) so as to contact the inclined surfaces (220) of the lower member, thus urging the lower member against the compression spring (230), resulting in the lower member being displaced so as to allow the pins (400) to extend through the apertures (212) and further into contact receptacles (121, 121a). It will be noted that the upper member (210) remains stationary during the introduction of the pair of parallel flat-pins as depicted in the present example.

Referring again to Fig. 10 and Figs. 13A and 13B, the upper member (210) of the first shutter member (200) further comprises an inclined surface position so as to further define the closed position of the first shutter member (200) and prevent contact with the first contact receptacles (121, 121a) as shown in Fig. 13A. Upon the pins (420) of a

second type of rectangular-pin arrangement plug (420) being urged against the further inclined surface (214), both the upper member (210) and the lower member (220) are displaced against the spring (230) so as to allow passage of the pins of the second type of rectangular-pins (420) to be advanced into the first contact receptacles (121, 121a), thus providing electrical communication between the pins (420) and the receptacles (121, 121a). As will be understood, movement of the upper member (210) urges the lower member (220) against the bias, thus allowing a single biasing means (230) to be used as shown in the present embodiment. Of course, those skilled in the art will appreciate in other or alternate embodiments other or alternate biasing means may be provided without departing from the scope of the invention.

Referring to Fig. 14A and Fig. 14B, the apertures (212) may be further adapted to allow passage of the pins of a third type of rectangular arrangement to pass therethrough. In the present example, the third type of rectangular pins is flat-pin type pins of a diverging relationship. As will be appreciate, similarly as described with reference to Figs. 12A and 12B, the third type of pins (440) are urged against the inclined surface (222) of the lower member (220) so as to again to cause the lower member (220) to be displaced against the biasing means and the upper member (210) to remain stationary so as to allow the third type of rectangular pins (440) to pass through the apertures (212) so as to extend into the first contact receptacles (121, 121a). It will be appreciated that the types of pins as described with reference to Figs. 12A, 12B, 13A, 13B, 14A and 14B are exemplary embodiments of the invention, and other or alternate pins having other shades geometries incited may equally be as applicable and the upper member (210) and the lower member (220) may be appropriately configured accordingly.

Referring to Fig. 10, Fig. 15A and Fig. 15B, the upper member (210) may be provided with a contact surface (216) generally parallel to the direction of movement of the upper member (210), the contact surface being provided as or adjacent the apertures (212). As will be understood by those skilled in the art, different types of pin arrangements have different sizes and geometries so as to allow a plug to be located within an appropriate socket. For the socket according to the present invention, further due to safety requirements, it is desirable to prevent inappropriate plugs being introduced into the first socket region. Thus, as evident from Fig. 15B, a round-pin arrangement (480) having an inappropriate spacing will cause the pins to abut the contact surfaces (216) of the upper member (210), and as the contact surfaces are not inclined, urging the pins (280) onto the contact surfaces (216) will not cause the shutter to be moved to an opened position, thus not allowing the pins (280) to be inserted within the contact receptacles.

Referring to Figs. 16A, 16B, 16C and 16D, the first shutter member (200) is located within the electrical socket in a manner so as to provide a rocking motion upon introduction of a single pin or other object in a manner such that the first shutter impinges the housing and prevents the shutter from moving to the opened position. Thus, in the event of a foreign object or an inappropriate plug being introduced into the first socket region, the shutter maintains its closed arrangement, thus preventing contact with the contact receptacles located beneath the shutter. As will be appreciated by those skilled in the art, numerous manners in which to provide pivotal motion or movement of the first shutter member may be implemented, such as a concave surface and integral shaft portion, a convex engagement pivot surface or the like. Further, as will be noted from Figure 16A, although a round pin plug may be attempted to be inserted

incorrectly, as the rocking feature is provided, the plug is prevented from opening the shutter, thus still maintaining safety.

Referring to Figs. 17A, 17B and 17C and Figs. 18A and 18B, there is provided a second shutter member (300) for use in conjunction with the electrical socket (100) so as to prevent and provide passage of a pair of pins with second receptacles (122, 122A). In the present embodiment, the second shutter member (300) is adapted to be movable from an opened position for allowing reception of a first round-pin arrangement electrical plug from the second socket region to off the electrical socket (100), to a closed position as depicted in Figs. 17C and 18A for preventing reception of rectangular-pin arrangement electrical plugs of other sizes and other objects by the second contact receptacles (122, 122A). The second shutter (300) comprises an upper member (310) being movable relative to the electrical socket (100) in a plain normal to the pins of an electrical plug and in the direction parallel to an axis extending between and normal to the pins, so as to allow contact of the pins with the second contact receptacles (122, 122A). The upper member is biased in a direction parallel to the axis extending between and normal to the pins. In the present embodiment, the upper member (310) is provided as two movable portions each movable independently with respect to the other and being movable relative to each other.

The second shutter (300) further comprises a lower member (320) having a pair of apertures extending therethrough so as to allow passage of pins of at least a first type of round-pin, wherein the pair of apertures may be sized and have a geometry so as to obstruct the passage of other types of pins or objects. The apertures may be suitably sized so as to allow passage of pins of varying diameter to pass therethrough. The upper member (310) includes an inclined surface (312) positioned and sized so as to further define the closed position of the second shutter (300) and to prevent contact with

the second contact receptacles (122, 122A). Upon the pins (490) of a first type of round-pin arrangement plug being urged against the inclined surface (312) of the upper member (310), the upper member (310) is urged against a spring, in the present embodiment, a pair of springs (330) so as to move the second shutter to the opened position and allow the pins (490) to be received through the apertures of the lower member (320) by the second contact receptacles (122, 122A).

It must be appreciated that by providing the upper member (310) as two moveable portions, an aperture (322) provided in the lower member (320) allows passage of earth pins of other or alternate electrical plugs to pass therethrough to the earth contact receptacle. Thus, the present invention allows the second shutter to be located in closer proximity of the first shutter member, thus providing a more compact universal socket by allowing the first socket region and the second socket region to be more closely located without earth pins interfering with the second shutter and thus without the necessity of the second shutter and hence the second socket region to be unnecessarily spaced apart.

As will be appreciated by those skilled in the art, by providing a first and second socket region closely located to each other allows for a more compact and aesthetically pleasing universal socket to be provided. Further, a more compact socket whilst having a dual a shutter system so as to prevent incorrect insertion of plug whilst meeting critical safety standards, will be appreciated by those skilled in the art to provide advantages over prior art devices.

Although in the present embodiment, the second shutter member (300) is comprised of an upper member (310) and lower member (320), in other or alternate embodiments, the lower member may be integrally formed with the electrical socket

(100), without departing from the spirit or scope of the invention. Again, as will be appreciated by those skilled in the art, the second shutter member may be adapted to rock about its direction of measurement upon introduction of a single pin or another object in a manner such that the second shutter impinges the electrical socket and prevents the shutter moving to an opened position.

It will be appreciated that the universal socket according to the present invention may be particularly applicable and suitable for use as a fixture in locations whereby users often bring electrical devices of differing pin configurations, for example in hotels, airport departure terminals and the like. Other applications may include guests or visitor's rooms in domestic dwellings.

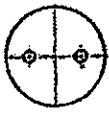
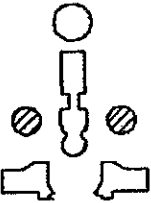
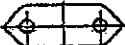
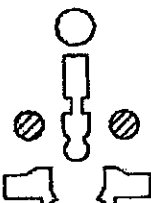
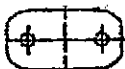
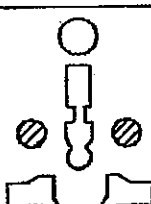
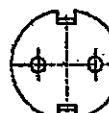
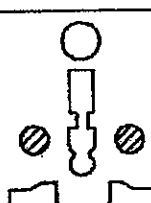
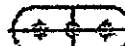
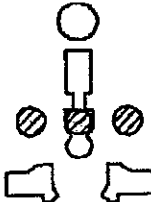
Although not depicted in the present drawings, those skilled in the art will appreciate that although the invention has been described above with respect to a permanent or semi permanent fixture such as a wall socket, in further or alternate embodiments there may be provided an adapter comprising the universal socket according to the socket present invention, as well as a pin arrangement suitable for engagement with a standard mains socket. Such an adapter would usually be jurisdictional dependent and may be suitable in both commercial and domestic environments.

It will be appreciated that the above described embodiments may take alternate forms and include additional features which, when used with the present invention, remain within the scope and spirit of the invention as described and claimed.

It will be understood that the invention disclosed and defined in this specification extends to all alternative combinations of two or more of the individual features mentioned or

evident from the text or drawings. All of these different combinations constitute various alternative aspects of the invention.

List of Compatible Plugs

Table A					
No.	Type 1 Plugs	Corresponding Insertion	Countries	Plug Standard Reference	Rating
1	 Dia. 4.8 x 19.0		European	EN50075 VDE 6624 CEE 7	250V 10/16A
2	 Dia. 4.0 x 19.0		Switzerland Spain	SEV1011	250V 10A
3	 Dia. 4.0 x 19.0		Italy Denmark	CEI 23-50	250V 10A
4	 Dia. 4.8 x 19.0		Denmark Belize Finland Sweden Norway Portugal Italy Poland Netherlands	CEE 7	250V 10/16A
5	 Dia. 4.0 x 19.0		Italy	CEI 23-16	250V 10A

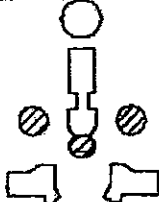
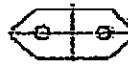
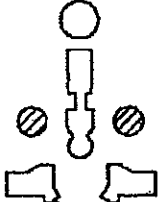
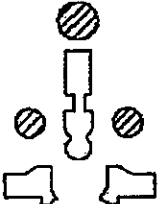
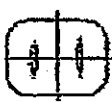
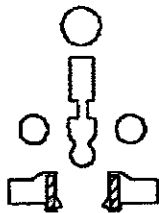
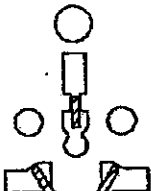
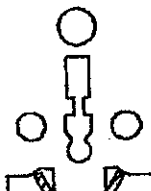
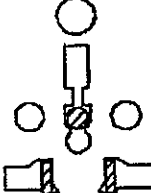
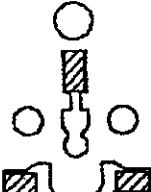
6	 Dia. 4.0 x 19.0		Switzerland Spain	SEV1011	250V 10A
7	 Dia. 4.0 x 17.5		Denmark Finland Czech Republic France Germany Italy Norway Poland Netherlands Portugal Switzerland	EN50076 CEE 7	250V 2.5A
8			United Kingdom Hong Kong SAR South Africa	BS546	250V 5A

Table B					
No.	Type 2 Plugs	Corresponding Insertion	Countries	Plugs Standard Reference	Rating
8			China	GB2099	250V 10A

10			Australia New Zealand China	AS/NZS 3112 GB 2099	250V 10A
11			Australia New Zealand	AS/NZS 3112	250V 10A
12			Thailand Philippines Vietnam	TIS166-2635	250V 10/15A
13			United Kingdom Hong Kong SAR Singapore Malaysia South Africa	BS1363	250V 13A

CLAIMS

1. An electrical socket for alternately receiving round-pin and rectangular-pin arrangement mains power electrical plugs, the socket comprising:

a housing having a first socket region for receiving a pair of rectangular pins of at least a first type of rectangular-pin arrangement electrical plug and including a pair of first contact receptacles for providing electrical contact with said pair of rectangular pins;

a second socket region for receiving a pair of round pins of at least a first type round-pin arrangement electrical plug and including a pair of second receptacle for providing electrical contact with said round pins; and

an earth region for receiving an earth pin from rectangular-pin arrangement electrical plugs and round-pin arrangement electrical plugs and including a third contact receptacle for providing electrical contact with said earth pins;

wherein the first socket region, the first socket region including a first gate portion having apertures, is adapted to prevent the reception of the pins of round-pin arrangement electrical plugs and the second socket region is adapted to prevent the reception of the pins of rectangular-pin arrangement electrical plugs.

2. An electrical socket according to claim 1, wherein the pair of first contact receptacles and the third contact receptacle are located at the vertices of a first isosceles triangular arrangement and the pair of second contact receptacles are located at the vertices of a second isosceles triangular arrangement.

3. An electrical socket according to claim 2 wherein the central axes of the first isosceles triangular arrangement and the second isosceles triangular arrangement are substantially parallel to each other.
4. An electrical socket according to claim 2 or claim 3, wherein the first isosceles triangular arrangement and the second isosceles triangular arrangement are displaced from each other in a non-inverted relationship.
5. An electrical socket according to any one of the preceding claims, wherein the second socket region includes a second gate portion having apertures adapted to prevent reception of rectangular pins.
6. An electrical socket according to any one of the preceding claims, wherein the first pair of contact receptacles is adapted to provide electrical contact with a plurality of rectangular-pin arrangement electrical plugs having pins with differing geometries and sizes.
7. An electrical socket according to any one of the preceding claims, further comprising a first shutter member moveable from an open position for allowing reception of a first rectangular-pin arrangement electrical plug.
8. An electrical socket according to any one of the preceding claims, further comprising a first shutter member moveable from an open position for allowing reception of a plurality of first rectangular-pin arrangement electrical plugs having pins of differing geometries, orientations or sizes by the first contact receptacle, to a closed position for preventing reception of the pins of electrical rectangular-pin or round pins arrangement electrical plugs of other geometries, orientations or sizes and other object by the first contact receptacle.

9. An electrical socket according to claim 7 or claim 8, wherein the first shutter comprises:

an upper member and a lower member being moveable relative to each other and relative to the housing in a plane normal to the pins of an electrical plug and in a direction parallel to an axis extending between and normal to the pins to allow contact of the pins with the pair of first contact receptacles, the upper and lower members being biased in a direction parallel to the axis extending between and normal to the pins and being moveable relative to each other;

the upper member having a pair of apertures extending therethrough to allow passage of the pins of a first type of rectangular pins therethrough wherein the pair of apertures have size and geometry so as to obstruct the passage of other types of rectangular pins and round pins; and

the lower member having an inclined surface positioned so as to close the pair of apertures when the first shutter is in said closed position, the inclined surface being inclined in the direction of movement of the upper and lower member;

wherein upon the pins of a first type being urged through said pair of apertures and against the inclined surface of the lower member, the lower member is urged against the bias so as to move the first shutter to said open position and allow the pins of the first type to be received by the first contact receptacles.

10. An electrical socket according to claim 9, wherein the upper member of the first shutter further comprises a further inclined surface positioned so as to further define the closed position of the first shutter and prevent contact with the first contact receptacles, wherein upon the pins of a second type of a rectangular-pin arrangement plug being

urged against the further inclined surface of the upper member, the upper member and lower member are urged against the bias is urged so as to move the first shutter to said open position and allow the pins of the second type to be received by the first contact receptacles.

11. An electrical socket according to claim 10, wherein movement of the upper member urges the lower member against the bias.

12. An electrical socket according to any one of claims 9 to 11, wherein the apertures of the upper member of the first shutter further allow passage of the pins of a third type of rectangular pins therethrough, wherein upon the pins of the third type being urged through said pair of apertures and against the inclined surface of the lower member, the lower member is urged against the bias so as to move the first shutter to said open position and allow the pins of the third type to be received by the first contact receptacles.

13. An electrical socket according to any one of claims 9 to 12, wherein the pins of the first type are substantially parallel having their long faces in an opposed relationship.

14. An electrical socket according to claim 11 or claim 12, wherein the pins of the second type are substantially parallel and collinear.

15. An electrical socket according to claim 12, wherein the pins of the third type are inclined with respect to each other.

16. An electrical socket according to any one of the preceding claims, wherein the first contact receptacles include contact portions sized and shaped so as to receive a particular pair of pins.

17. An electrical socket according to any one of claims 9 to 16, wherein the shutter is adapted to rock about its direction of motion upon introduction of a single pin or other object in a manner such that the first shutter impinges the housing and prevents the shutter moving to the open position.

18. An electrical socket according to any one of claims 9 to 17, wherein the upper member of the first shutter further comprises a blocking surface substantially parallel to the direction of travel and adjacent the pair of apertures, wherein upon introduction of an other pin arrangement the blocking surface cause the upper member and lower member to maintain the closed position.

19. An electrical socket according to any one of the preceding claims, further comprising a second shutter member moveable from an open position for allowing reception of a first round-pin arrangement electrical plug.

20. An electrical socket according to any one of the preceding claims, further comprising a second shutter member moveable from the open position for allowing reception of a plurality of first round-pin arrangement electrical plugs having pins of differing sizes by the first contact receptacle, to a closed position for preventing reception of the pins of electrical rectangular-pin arrangement electrical plugs of other sizes and other object by the second contact receptacle.

21. An electrical socket according to claim 19 or claim 20, wherein the second shutter comprises an upper member being moveable relative to the housing in a plane normal to the pins of an electrical plug and in a direction parallel to an axis extending between and normal to the pins to allow contact of the pins with the pair of second contact receptacles, the upper member being biased in a direction parallel to the axis extending between and normal to the pins.

22. An electrical socket according to claim 21, wherein the upper member is provided as two moveable portions each moveable independently with respect to the other and being moveable relative to each other, so as to allow passage to the earth receptacle located therebetween.

23. An electrical socket according to claim 21 or 22, wherein the second shutter further comprises a lower member having a pair of apertures extending therethrough to allow passage of the pins of at least a first type of round pins therethrough, wherein the pair of apertures have size and geometry so as to obstruct the passage of other types of pins or objects.

24. An electrical socket according to any one of claims 21 to 23, wherein the upper member of the second shutter further comprises an inclined surface positioned so as to further define the closed position of the second shutter and prevent contact with the second contact receptacles, wherein upon the pins of the at least a first type of a round-pin arrangement plug being urged against the inclined surface of the upper member, the upper member is urged against the bias so as to move the second shutter to said open position and allow the pins of the first type to be received by the second contact receptacles.

25. An electrical socket according to any one of claims 20 to 24, wherein the shutter is adapted to rock about its direction of motion upon introduction of a single pin or other object in a manner such that the first shutter impinges the housing and prevents the shutter moving to the open position.

26. An electrical socket according to any one of the preceding claims, wherein the third contact receptacle of the earth region of said socket is adapted to receive the earth pin of a respective electrical plug.

27. A shutter for obstructing contact with contact receptacles of an electrical socket, the shutter being moveable from an open position for allowing reception of a plurality of first -pin arrangement electrical plugs having pins of differing geometries, orientations or sizes by the first contact receptacle, to a closed position for preventing reception of the pins of electrical plugs of other geometries, orientations or sizes and other object by the first contact receptacle, the shutter comprising:

an upper member and a lower member being moveable relative to each other and relative to the housing in a plane normal to the pins of an electrical plug and in a direction parallel to an axis extending between and normal to the pins to allow contact of the pins with a pair of contact receptacles, the upper and lower members being biased in a direction parallel to the axis extending between and normal to the pins and being moveable relative to each other;

the upper member having a pair of apertures extending therethrough to allow passage of the pins of a first type therethrough wherein the pair of apertures have size and geometry so as to obstruct the passage of other types of pins;

the lower member having an inclined surface positioned so as to close the pair of apertures when the first shutter is in said closed position, the inclined surface being inclined in the direction of movement of the upper and lower member;

wherein upon the pins of a first type being urged through said pair of apertures and against the inclined surface of the lower member, the lower member is urged against the bias so as to move the first shutter to said open position and allow the pins of the first type to be received by the contact receptacles.

28. A shutter according to claim 27, wherein the plurality of first -pin arrangement electrical plugs are rectangular-pin type electrical plugs.

29. A shutter according to claim 27 or claim 28, wherein the upper member of the first shutter further comprises a further inclined surface positioned so as to further define the closed position of the first shutter and prevent contact with the contact receptacles, wherein upon the pins of a second type of plug being urged against the further inclined surface of the upper member, the upper member and lower member are urged against the bias is urged so as to move the shutter to said open position and allow the pins of the second type to be received by the first contact receptacles.

30. A shutter according to claim 29, wherein movement of the upper member urges the lower member against the bias.

31. A shutter according to any one of claims 27 to 30, wherein the apertures of the upper member of the first shutter further allow passage of the pins of a third type of pins therethrough, wherein upon the pins of the third type being urged through said pair of apertures and against the inclined surface of the lower member, the lower member is urged against the bias so as to move the first shutter to said open position and allow the pins of the third type of pins to be received by the contact receptacles.

32. A shutter according to any one of claims 27 to 31, wherein the pins of the first type are flat and substantially parallel having their long faces in a an opposed relationship.

33. A shutter according to claim 28 or claim 30, wherein the pins of the second type are flat and substantially parallel and collinear.

34. A shutter according to claim 31, wherein the pins of the third type are flat and inclined with respect to each other.

35. A shutter according to any one of claim 26 to 33, wherein the contact receptacles include contact portions sized and shaped so as to receive a particular pair of pins.

36. A shutter according to any one of claims 27 to 35, wherein the shutter is adapted to rock about its direction of motion upon introduction of a single pin or other object in a manner such that the first shutter impinges the housing and prevents the shutter moving to the open position.

36. A shutter according to any one of claims 27 to 35, wherein the upper member of the first shutter further comprises a blocking surface substantially parallel to the direction of travel and adjacent the pair of apertures, wherein upon an other pin arrangement the blocking surface cause the upper member and lower member to maintain the closed position.

37. A shutter for obstructing contact with contact receptacles of an electrical socket, the shutter being moveable from an open position for allowing reception of a plurality of pins of one or more plugs having pins of differing geometries, orientations or sizes a contact receptacle, to a closed position for preventing reception of other objects by the contact receptacle, the shutter comprising:

an upper member being moveable relative to the housing of an electrical socket in a plane normal to the pins of an electrical plug and in a direction parallel to an axis extending between and normal to the pins to allow contact of the pins with the pair of electrical contact receptacles, the upper member being biased in a direction parallel to the axis extending between and normal to the pins;

wherein the upper member is provided as two moveable portions which are laterally spaced apart so as to allow passage therebetween to an earth receptacle.

38. A shutter according to claim 37, wherein the two moveable portions are each moveable independently with respect to the other and being moveable relative to each other.

39. A shutter according to claim 37 or 38, wherein the second shutter further comprises a lower member having a pair of apertures extending therethrough to allow passage of the pins of at least a first type of pins therethrough wherein the pair of apertures have size and geometry so as to obstruct the passage of other types of pins or objects.

40. A shutter according to any one of claims 37 to 39, wherein the upper member of the second shutter further comprises an inclined surface positioned so as to further define the closed position of the second shutter and prevent contact with the contact receptacles, wherein upon the pins of the at least a first type arrangement plug being urged against the inclined surface of the upper member, the upper member is urged against the bias is urged so as to move the second shutter to said open position and allow the pins of the first type to be received by the contact receptacles.

41. A shutter according to any one of claims 37 to 40, wherein the shutter is adapted to rock about its direction of motion upon introduction of a single pin or other object in a manner such that the first shutter impinges the housing and prevents the shutter moving to the open position.

42. A shutter according to any one of claims 37 to 41, wherein the shutter member moveable from an open position for allowing reception of a plurality of first round-pin

arrangement electrical plugs having pins of differing sizes by the contact receptacle, to a closed position for preventing reception of the pins of electrical rectangular-pin arrangement electrical plugs of other sizes and other object by the contact receptacle.

43. An adapter for alternately receiving round-pin and rectangular-pin arrangement mains power electrical plugs and for engagement with a mains power socket, the adapter comprising:

a socket according to any one of claims 1 to 26; and

a pin arrangement for engagement and electrical communication with a mains powers socket and being in electrical communication with the socket.

44. An adapter according to claim 43, wherein the socket and the pin arrangement are positioned in relation to each other in an opposed relationship.

45. An adapter according to claim 43 or claim 44, further including a housing body, wherein the pin arrangement is detachably removable from the housing.