

PLUG

The invention relates to an improved design of three-pin electrical plugs.

5 Conventional three-pin plugs comprise a body to which all three pins are attached and from which all three pins point outwards. In the UK, such conventional plugs are in accordance with BS1363. In this conventional design, all three pins are fixed in position relative to the body. This arrangement means that the conventional three-pin electric plug occupies a relatively large, fixed volume.

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As modern electrical devices such as palm-top or lap-top computers become ever smaller, the overall volume occupied by a traditional three-pin plug is becoming an increasingly significant proportion of the volume occupied by the device itself. This presents a particular problem when storing the electronic device and the plug (which
15 could, for example, be connected to a power lead) in the same packaging. The problem is exacerbated by the fact that the traditional three-pin plug occupies a volume which is similar in shape to a cube, with all three dimensions being approximately the same length. This is in contrast to the electrical devices for which the plugs are used, for example lap-top computers, which tend to have one dimension
20 which is appreciably smaller than the other two dimensions. As a result, the smallest dimension of a traditional three-pin plug is often longer than the smallest dimension of the electrical device itself. This means that packaging designed to house both the electrical device and the three-pin plug may have one dimension set by the plug itself, and so may be wider than would be necessary to house the electronic device
25 only.

According to one aspect of the invention there is provided an electrical plug comprising:

- 30 three pins;
 - a connecting member; and
 - a body; wherein
- one of the pins is rotatably connected to the connecting member, and the connecting member is rotatably connected to the body.

This enables the shape of the plug to be changed by relative movement of a pin to the body, e.g. moving the moveable pin from an operating position to a storage position.

- 5 According another embodiment of the invention, two of the three pins, neither of which is the pin which is rotatably connected to the connecting member (hereinafter referred to as the “moveable pin”), are attached to and fixed relative to the body. The longitudinal axes of these two fixed pins form a plane, and the moveable pin may be foldable such that its longitudinal axis is closer to lying in this plane when it
10 is in the storage position than when it is in the operating position.

- The moveable pin may be moveable between the storage position and the operating position by relative rotation to the connecting member. According to another embodiment, when the moveable pin is in the operating position, the longitudinal
15 axis of the connecting member is closer to being perpendicular to the longitudinal axis of said moveable pin to which it is connected than it is when said moveable pin is in the storage position. This has the advantage that the longitudinal axes of the moveable pin and the connecting member can be more closely aligned when the moveable pin is in the storage position than when the moveable pin is in the
20 operating position, thereby reducing an overall dimension of the connecting member/moveable pin assembly.

- According to one embodiment of the invention, when the moveable pin is in operating position, the maximum distance between the plane defined by the axes of
25 the other two pins and the moveable pin in a direction normal to said plane is greater than the maximum distance between the plane defined by the axes of the other two pins and the moveable pin in a direction normal to said plane when the moveable pin is in the storage position. With this construction, at least one overall dimension of a three-pin electric plug of the present invention is smaller when the moveable pin is in
30 the storage position than when it is in the operating position. In this way, the electrical plug can be more flat when the moveable pin is in the storage position than when the moveable pin is in the operating position.

In the storage position, the longitudinal axis of the moveable pin preferably lies substantially within the plane defined by the axes of the other two pins. This means that the three pins can be stored in a volume which has a smaller minimum

5 dimension than the minimum dimension of the volume required to store the three pins arranged as those of a conventional plug. In another embodiment, when the moveable pin is in the storage position, the longitudinal axes of all three pins are substantially parallel so as to minimise the minimum dimension of the volume required to store the three pins.

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In other embodiments, the longitudinal axes of the three pins may only point in approximately the same direction when the moveable pin is in the storage position.

This may be advantageous in order to minimise the thickness of the plug when the moveable pin is in the storage position in the case that the moveable pin is attached
15 to the body at a point which does not lie in the same plane as the longitudinal axes of the fixed pins. Preferably, the longitudinally axes of the three pins are within 30 degrees of each other when the moveable pin is in the storage position, more preferably the pins will be within 10 degrees of each other when the moveable pin is in the storage position.

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In another embodiment, when the moveable pin is in the storage position, the longitudinal axis of the connecting member is parallel to or nearly parallel to the longitudinal axis of the moveable pin, such that the connecting member also lies substantially within the plane formed by the longitudinal axes of the other two pins.

25 According to another embodiment, when the moveable pin is in the storage position, the longitudinal axis of said pin is within 30 degrees of the longitudinal axis of the connecting member. This has the advantage of reducing the overall thickness of the plug in a direction normal to the plane of the longitudinal axes of the two fixed pins.

30 Preferably, when the moveable pin is in the storage position, all three pins and the connecting member lie substantially in the same plane. Furthermore, in another embodiment of the invention, the body of the plug can be formed such that its

dimension in a direction normal to the plane formed by the longitudinal axes of the two fixed pins is relatively small, so that when the moveable pin is in the storage position, the whole plug apparatus is substantially flat.

- 5 When the moveable pin is in the operating position, the three pins of the plug are in the same positions relative to each other as the pins of a conventional three pin plug. In another embodiment, the relative positions of the pins are the same as those of a standard UK plug according to BS1363. In another embodiment, the shape of the pins is the same as the shape of the three pins according to BS1363, such that, when
10 the moveable pin is in the operating position, the plug of the present invention can be plugged into a standard UK socket according to BS1363.

- According to another embodiment, the connecting member rotates relative to the body when the moveable pin moves between the storage position and the operating
15 position. This enables the connecting member to be foldable between a position in which its longitudinal axis is parallel to or nearly parallel to the plane formed by the longitudinal axes of the two fixed pins, and a position in which its longitudinal axis is not parallel to the plane formed by the longitudinal axes of the two fixed pins.

- 20 According to another aspect of the invention there is provided an electrical plug comprising three pins and a body wherein an overall dimension of the plug in a direction defined normal to a plane defined by the longitudinal axes of two of the pins is greater when the plug is in an operating condition than when the plug is in a storage condition, and wherein the two pins whose longitudinal axes form said plane
25 are fixed relative to the body. Accordingly, at least one overall dimension of the three-pin electric plug is reduced when the plug moves from the operating condition to the storage position, thereby making storage of the plug easier.

- According to another aspect of the invention there is provided an electrical plug
30 comprising three pins wherein one pin is moveable from a first position to a second position, with a longitudinal axis of said moveable pin being in substantially the same direction relative to the body of the plug in both the first position and the

second position. The movement of the moveable pin can comprise only rotation relative to the body, only translation relative to the body, or a combination of rotation and translation relative to the body. In one embodiment, the first position could be an operating position, and the second position could be a storage position, wherein an overall dimension of the plug is smaller in the storage position than in the operating position. This enables the packaging required to store the plug to have a smaller minimum dimension than would be required for a conventional three pin plug, or for a plug according to the present invention with the moveable pin in the operating position.

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According to another aspect of the invention there is provided an electrical plug adapter as described above, and further comprising two openings in a body. This electrical plug adapter enables a conventional two pin plug (such as that used in the USA or continental Europe) to be plugged into a conventional three-pin socket (such as that used in the UK, Malaysia, Singapore, Hong Kong, Malta, Cyprus or Ireland), whilst retaining the advantage that it may be stored in a volume which has a smaller minimum dimension than the minimum dimension which is required for storage of a conventional two-pin to three-pin plug adapter.

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According to a further aspect of the invention, there is provided an electrical plug adapter comprising two pins and two openings for accepting the live and neutral pins of a standard three-pin plug. In one embodiment, the standard three-pin plug could be a UK plug. The electrical plug of any one of the embodiments of the electrical plug described herein could be used with such an electrical plug adapter, so that electronic equipment fitted with a three-pin plug could be used in countries with two-pin sockets without the need for a bulky three-pin to two-pin plug adapter.

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The plug according to the present invention can be adapted to suit a range of applications. For example, according to one aspect of the invention there is provided a charger unit comprising the electrical plug of any of the embodiments described in the application and a cable which is suitable for being plugged into an electrical device. The charger unit further comprises suitable electrical charging apparatus,

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part or all of which could be provided within the body or housing of the electrical plug. In another embodiment, the charging apparatus could be provided outside the housing of the plug. The charger unit could, for example, be suitable for charging a mobile telephone, a PDA, a radio, an MP3 player, a lap-top computer, a palm-top
5 computer, or a GPS device. The foldable or moveable pin means that the charger can be folded so as to be flatter than a conventional three-pin charger.

According to another embodiment, the electrical plug described above could be connected to the first end of an electrical cable, which has its second end connected
10 to a transformer for use in powering electrical equipment, such as a laptop computer. In another embodiment, the second end of the electrical cable could be connected to an electrical socket for plugging into electrical equipment. In both cases, the foldable or moveable pin means that the plug and cable apparatus can be stored in a volume which is flatter than the equivalent conventional three-pin plug and cable
15 apparatus.

The invention will now be described by example only with reference to the drawings in which:

20 Fig. 1 shows a 3-D view of a three-pin plug according to one aspect of the present invention in the storage position.

Fig. 2 shows a 3-D view of a three-pin plug according to one aspect of the present invention in the operating position.

Fig. 3A shows a side view of a three-pin plug according to one embodiment
25 of the present invention in an operating position.

Fig. 3B shows a plan view three-pin plug according to one embodiment of the present invention in the operating position.

Fig. 4A shows a side view of a three-pin plug according to one embodiment of the present invention in the storage position.

30 Fig. 4B shows a plan view of a three-pin plug according to one aspect of the present invention in the storage position.

Fig. 4C shows a side view of a three-pin plug according to another embodiment of the present invention in the storage position.

Fig. 5 is a schematic 3-D diagram of the internals of a three-pin plug according to one embodiment of the present invention.

5 Fig. 6 shows an exploded 3-D view of the internals of a three-pin plug according to one embodiment of the present invention.

Fig 7. shows an exploded 3-D view of an embodiment in which the moveable pin has a projection, and the connecting member has a groove.

10 Fig. 8A. shows a 3-D view of a three-pin to two-pin electrical plug adapter according to an embodiment of the present invention.

Fig. 8B. shows a three-pin to two-pin electrical plug adapter according to an embodiment of the present invention, with an embodiment of the three pin plug according to the present invention plugged into it.

15 Fig. 9A. shows 3-D view of a two-pin to three-pin electrical plug adapter according to an embodiment of the present invention.

Fig. 9B. shows a two-pin to three-pin electrical plug adapter according to an embodiment of the present invention, with a conventional two-pin plug plugged into it.

20 Fig. 10. shows a telephone charger according to an embodiment of the present invention.

Fig. 11A-H shows a further embodiment of the present invention.

Fig. 12A-E shows an adaptor or charger according to the present invention.

Fig. 13A-F shows changeable inserts for use in a kit of parts according to the present invention.

25 Fig. 14A-B shows a three-pin plug with a stopping element according to the present invention.

Fig. 15 shows a charger body for use in a kit of parts according to the present invention.

30 Fig. 16A-C shows an assembled charger unit according to the present invention in the storage and operating position.

Fig 17 shows a rotating pin with a stopping element for use with the present invention.

Fig. 18 shows a three-pin plug according to the present invention in the storage position that has been over-moulded.

5 The invention will now be described with reference to the embodiments shown in the accompanying figures in which like reference numerals refer to the same or similar components.

Figures 1 and 2 show an electrical plug (1) with a body or frame (2) having an upper surface (2A) and a lower surface (2B), and three pins (3, 4, 5). In this description,
10 the term "pin" refers to the part of a plug that is suitable for being inserted into a plug socket. One of the electrical pins is a moveable pin (5) which is connected to the body via a connecting member (6), i.e. it is not fixedly attached to the body. The connecting member is different from the body.

15 The moveable pin (5) has a proximal end (5A) and a distal end (5B), and the connecting member (6) has a proximal end (6A) and a distal end (6B). In the embodiment shown, the proximal end (6A) of the connecting member (6) is rotatably mounted or pivoted to the body (2), and the proximal end (5A) of the moveable pin (5) is rotatably attached or pivoted to the distal end (6B) of the connecting member
20 (6).

In the embodiment shown, two of the pins (3, 4) are attached to the body (2) and fixed in position relative to it, i.e. they are not designed to be freely moveable by an operator.

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This invention reduces the minimum dimension of the volume required for storage of a three-pin electrical plug. In one embodiment, this aim is achieved by having one of the pins moveable between a first position, corresponding to an operating position, in which the pins of the electrical plug are in the same arrangement as those of a
30 traditional three-pin plug (such as that used in the United Kingdom, Malaysia, Singapore, Hong Kong, Malta, Cyprus or Ireland), and a second position, corresponding to a storage position, in which the storage volume occupied by the three-pin plug of the present invention has a smaller minimum dimension.

In the embodiments shown in the figures, when the moveable pin (5) is in the operating position, the longitudinal axes of all three pins (3, 4, 5) are aligned, and the moveable pin (5) extends further forward than the two fixed pins. That is to say, the tip of the moveable pin (5) is further from the plane which is normal to the longitudinal axes of the two fixed pins (3, 4) and passes through the forwardmost point of the body (2) than the tips of the two fixed pins (3, 4), as would be the case with a conventional three-pin plug in accordance with BS1363. In operation of the plug (1), this construction enables the moveable pin (5) to enter a three-hole socket before the two fixed pins (3, 4), thereby opening the contact gates for the two fixed pins (3, 4), as is a function of the earth pin in the operation of a conventional UK socket in accordance with BS1363.

According to another embodiment, there is an electrical plug (1) comprising three pins (3,4,5) and a body (2) wherein an overall dimension of the plug in a direction defined normal to a plane defined by the longitudinal axes of two of the pins (3, 4) is greater when the plug is in an operating condition than when the plug is in a storage condition, and wherein the two pins (3, 4) whose longitudinal axes form said plane are fixed relative to the body.

In the embodiment shown, the connecting member (6) is rotatably mounted or hinged to the body (2) by a first shaft (7), as shown in accompanying Figure 5, such that it is rotatable about an axis which is parallel to the plane formed by the longitudinal axes of the two fixed, stationary pins (3, 4), and perpendicular to the longitudinal direction of the two fixed pins (3, 4). In the embodiment shown in the figures, this axis is between the lower surface (2B) of the body (2) and the plane formed by the longitudinal axes of the two stationary pins (3, 4). In other embodiments, the axis may be between the upper surface (2A) of the body (2) and the plane formed by the longitudinal axes of the two stationary pins (3, 4), or it may lie in the plane formed by the longitudinal axes of the two stationary pins (3, 4)

The movable pin (5) is rotatably mounted or hinged at its proximal end (5A) to the distal end (6B) of the connecting member (6) by a second shaft (8) such that it is rotatable or pivotable about an axis substantially parallel to that which the connecting member (6) is rotatable about.

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In another embodiment, the moveable pin (5) is pivoted at its proximal end (5A) distal end (6B) of the connecting member (6) by a second shaft (8) such that it is rotatable or pivotable about an axis substantially perpendicular to that which the connecting member (6) is rotatable about.

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In the embodiment shown, a projection of the longitudinal axis of the moveable pin (5) onto the plane formed by the longitudinal axes of the two stationary, fixed pins (3, 4) is equidistant from the longitudinal axis of the two fixed pins (3, 4) when the moveable pin (5) is in both the operating and the storage position. In other

15 embodiments, a projection of the longitudinal axis of the moveable pin (5) onto the plane formed by the longitudinal axes of the two fixed pins (3, 4) may not be equidistant from the longitudinal axes of the two pins (3, 4) when the moveable pin (5) is in the storage position

20 In other embodiments, a projection of the longitudinal axis of the moveable pin (5) onto the plane formed by the longitudinal axes of the two fixed pins (3, 4) may not be parallel to the longitudinal axes of the two pins (3, 4) when the moveable pin (5) is in the storage position

25 In other embodiments, a projection of the longitudinal axis of the moveable pin (5) onto the plane formed by the longitudinal axes of the two fixed pins (3, 4) may be perpendicular to the longitudinal axes of the two pins (3, 4) when the moveable pin (5) is in the storage position

30 In other embodiments, the connecting member (6) may comprise a plurality of segments. These segments may be independently rotatable.

Figures 1 and 4B show the arrangement of the plug according to an embodiment of the present invention when the moveable pin (5) is in the storage position. As can be seen in the figures, the longitudinal axes of the moveable pin (5) and the connecting member (6) can be aligned when the plug is in this configuration.

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The invention allows a change in shape and/or volume required for storage of a three-pin plug by having one of the pins moveable between an operating position, and a storage position. It will therefore be appreciated that, in other embodiments of the invention, the moveable pin (5) and the connecting member (6) need not necessarily have their longitudinal axes aligned when the moveable pin (5) is in the storage position. For example, when the moveable pin (5) is in the storage position, the proximal end (6A) of the connecting member (6) could be situated towards the lower surface (2B) of the body (2), with the distal end (5B) of the moveable pin (5) being situated above the proximal end (6A) of the connecting member (6) (that is to say further towards the upper surface (2A) of the body (2)), as shown in Figure 4C.

Alternatively, the proximal end (6A) of the connecting member (5) could be situated towards the upper surface (2A) of the body (2), with the distal end (5B) of the moveable pin (5) being situated below the proximal end (6A) of the connecting member (6) (that is to say towards the lower surface (2B) of the body (2)). In both of these cases, the longitudinal axes of the moveable pin (5) and the connecting member (6) are not aligned, but the overall storage volume required by the plug in this storage position is similar to that required by the embodiment shown in Figures 1 and 4B in which the longitudinal axes of the moveable pin (5) and the connecting member (6) are aligned.

In another embodiment, when the moveable pin (5) is in the storage position, its longitudinal axis lies substantially normal to the longitudinal axes of the two fixed pins (3, 4), and substantially parallel to the plane formed by the longitudinal axes of the two fixed pins (3, 4). Preferably, the longitudinal axis of the moveable pin (5) lies closer to the plane formed by the longitudinal axes of the two fixed pins (3, 4) when in the storage position than when in the operating position, and more

preferably the longitudinal axis of the moveable pin (5) lies substantially in the same plane as that formed by the longitudinal axes of the two fixed pins (3, 4) when in the storage position

- 5 In order to reduce the minimum dimension of the storage volume of the plug, when the moveable pin (5) is in the storage position, its longitudinal axis can lie in approximately the same plane as the longitudinal axes of the two fixed pins (3, 4). The longitudinal axis of the connecting member (6) may also lie in approximately the same plane, such that all three pins (3, 4, 5) and the connecting member (6) form a
- 10 substantially flat apparatus when the moveable pin (5) is in the storage position. In another embodiment, the axes of the moveable pin (5) and the connecting member (6) are within 30 degrees of the longitudinal axis of the two stationary pins (3, 4) when the moveable pin (5) is in the storage position. In another embodiment, the longitudinally axes of the moveable pin (5) and the connecting member (6) are
- 15 within 10 degrees of the longitudinal axes of the two stationary pins (3, 4) when the moveable pin (5) is in the storage position.

- In an embodiment which has the axis of the first shaft (7) not lying in the plane formed by the longitudinal axes of the two stationary pins (3, 4), it may be
- 20 advantageous to have the longitudinal axis of the moveable pin (5) and/or the longitudinal axis of the connecting member (6) not parallel to the longitudinal axes of the two fixed pins (3, 4) in order to improve packaging, as shown in Figure 4A.

- In the embodiment shown in Figures 1-4 the housing (2) has a recess (9) in which the proximal end (6A) of the connecting member (6) is mounted using the first shaft (7).
- 25 The recess (9) contains a narrowing (10) so that the recess (9) is wider at the lower surface (2B) of the body (2) than it is at the upper surface (2A) of the body (2). This enables the distal end (5B) of the moveable pin (5) as well as the rotatably mounted proximal end (6A) of the connecting member (6) to be housed within the wider part
- 30 of the recess (9) when the moveable pin (5) is in the storage position. The narrowing (10) also ensures that the recess (9) is of a width necessary to allow rotational movement of the connecting member (6) about an axis defined by the first shaft (7),

but not so wide as to permit lateral movement of the connecting member (6) within the recess (9) of the body (2). In the embodiment shown, the centreline of the narrow part of the recess in a direction normal to the plane formed by the longitudinal axes of the two fixed pins (3, 4) is closer to one of the fixed pins (3) than
5 to the other fixed pin (4). In other embodiments, the centreline of the narrow part of the recess in a direction normal to the plane formed by the longitudinal axes of the two fixed pins (3, 4) is equidistant from the longitudinal axes of the two fixed pins.

Furthermore, in the embodiment shown in Figures 1 and 2, when the moveable pin
10 (5) is moved between the storage position and the operating position, the narrowing or step (10) acts on the moveable pin (5) so as to rotate the longitudinal axes of the moveable pin (5) and the connecting member (6) relative to each other about an axis defined by the second shaft (8) connecting the moveable pin (5) to the connecting member (6), thereby separating the moveable pin (5) and the connecting member (6)
15 so that they can be more easily moved independently as the moveable pin (5) is moved into the operating position.

In the embodiment shown in Figures 1-4, when the moveable pin (5) is in the operating position (as shown in Figure 2), the position of the connecting member (6)
20 is determined by the rear surface of the connecting member (6) engaging with the rear surface (11) of the recess (9). Preferably, the first shaft (7) about which the connecting member (6) rotates, is located towards the lower surface (2B) of the body (2) such that there is a large area of contact between the rear surface of the connecting member (6) and the rear surface (11) of the recess (9) in the operating
25 position, thereby increasing the support for the connecting member (6) and improving the structural integrity and longevity of the plug.

In another embodiment, there is a snap fitting which locates the position of the connecting member (6) when the moveable pin (5) is in the operating position. The
30 snap fitting can comprise a notch in either the body (2) or the connecting member (6) into which a projection on the other one of either the body (2) or the connecting

member (6) fits when the connecting member (6) is in the position required for the moveable pin (5) to be in the operating position.

5 In the embodiment shown, when the moveable pin (5) is in the operating position, as shown in figure 2 for example, the longitudinal axis of the connecting member (6) is approximately normal to the plane formed by the longitudinal axes of the two stationary pins (3, 4), with the longitudinal axis of the moveable pin (5) being approximately perpendicular to the longitudinal axis of the connecting member (6). In other embodiments, the connecting member (6) may not be perpendicular to the
10 plane defined by the longitudinal axes of the two fixed pins (3, 4) when the moveable pin (5) is in the operating position, and the longitudinal axis of the of the moveable pin (5) may also not be perpendicular to the longitudinal axis of the connecting member (6) in the operating position. The only requirement is that, in the operating position, the three pins are arranged such that they can be inserted into a
15 conventional three-pin plug socket such as, for example, one which is in accordance with BS1363.

In the embodiment shown in Figure 4B in the storage position, the moveable pin (5) and the connecting member (6) extend outwards from the body (2) in approximately
20 the same direction as the two fixed pins (3, 4). In alternative embodiments, the body (2) could have a slot in either the upper surface (2A) or the lower surface (2B) of the body (2) into which both the connecting member (6) and the moveable pin (5) rotate when the pin (5) is in the storage position. The slot may or may not be communicable with recess (9) in which the connecting member (6) is pivotally
25 mounted. When the connecting member (6) and the moveable pin (5) are stored in such a slot, the moveable pin (5) rotates through an angle of approximately 180 degrees about an axis which is parallel to the plane which contains the longitudinal axes of the two fixed pins (3, 4), and normal to the axes of the two fixed pins (3, 4) when moving between the storage position and the operating position. In another
30 embodiment, the rotation could be between 150 degrees and 210 degrees.

The moveable pin (5) can comprise a projection (12), as shown in Figure 7. The projection (12) runs inside a groove (13) which is formed in the connecting member (6) such that when the projection (12) engages with the first end (13A) of the groove (13) the relative position of the connecting member (6) to the moveable pin (5) is the same as when in the operating position. The groove (13) may also be formed such that when the projection (12) engages with the second end (13B) of the groove (13), the relative position of the moveable pin (5) to the connecting member (6) is the same as when they are in the storage position. In this manner, the relative position of the connecting member (6) and moveable pin (5) are defined in the storage position and the operating position by the projection (12) and groove (13). In an alternative embodiment, the projection (12) could be situated on the connecting member (6), such that it runs inside a groove (13) on the moveable pin (5).

In the embodiment shown in Figure 3A, the connecting member has a stopper (14) which prevents further rotation of the connecting member (6) away from the operating position. This is achieved in the embodiment shown in Figure 3A by the connecting member (6) having an angled proximal end (14), part or all of which rotatably engages the rear surface (11) of the recess (9) when the moveable pin (5) is moved into the storage position. In this way, the direction of the longitudinal axis of the connecting member (6) can be fixed when the moveable pin (5) is in the storage position.

As illustrated in Figure 6, one or both of the moveable pin (5) and the connecting member (6) may have biasing means (15, 16) to bias them from the storage position to the operating position. The biasing means may comprise springs (15, 16). In the embodiment shown, the first biasing means (15) biases the connecting member (6) so that it is biased to rotate around the first shaft (7) connecting the proximal end (6A) of the connecting member (6) to the body (2) from the storage position to the operating position. Also in the embodiment shown, the second biasing means (16) biases the moveable pin (5) such that it is biased to rotate about the longitudinal axis of the connecting shaft (8) which connects the proximal end (5A) of the moveable pin (5) to the distal end (6B) of the connecting member (6) from the relative position

of the moveable pin (5) to the connecting member (6) in the storage position to the relative position of the moveable pin (5) to the connecting member (6) in the operating condition. Different embodiments can have one, both or none, or other arrangements of the first and second biasing means.

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In order to retain the moveable pin (5) and connecting member (6) in the storage position, a restrainer (17) can be used. In the embodiment shown in Figure 5, a restrainer or clip (17) has a first extension (17A) which prevents movement of the connecting member (6) from the storage position to the operating position, and a
10 second extension (17B) which prevents movement of the moveable pin (5) from the storage position to the operating position. The clip (17) is biased towards the position in which the moveable pin (5) and connecting member (6) are prevented from moving from the storage position to the operating position by a biasing means (18), which could, for example, be a spring. A clip (17) which performs this function
15 could be used in embodiments which have biasing means (15, 16) to bias the connecting member (6) and moveable pin (5) from the storage position to the operating position, as well as embodiments which do not have such biasing means.

The moveable pin (5) could, for example, be an earth pin. In other embodiments, the
20 moveable pin (5) could be either of the live pin or the neutral pin. In the case of the moveable pin (5) being an earth pin, it could be made (partly or wholly) from a non-conductive material, such as plastic or carbon fibre. For example, many modern electronic devices use plugs which do not have an earth connection, with the earth pin only being used to open the contact gates for the live and neutral pins of the
25 three-pin plug. In this case a non-conductive material could be used for the earth pin. In another embodiment, the moveable pin could be partly or wholly made from metal.

In one embodiment, the two fixed pins (3, 4) could be the live and neutral pins, and
30 could be made partly or wholly from metal. In one embodiment, the two fixed pins (3, 4) have a partially metallic surface, and a partially insulated surface.

The body (2) could be double insulated. Furthermore, the body (2) could be a housing which could house a fuse.

In another embodiment, the body or housing (2) can comprise two or more parts.

5 The two or more parts can be connected, attached or fixed together using fastening means. The fastening means can be either part of the two or more parts of the body or housing (2), such as a clip, or the fastening means could be separate from the two or more parts of the body or housing (2), such as one or more screws.

10 Preferably, the maximum height of the body (2) in a direction which is normal to the plane formed by the longitudinal axes of the two fixed pins (3, 4) is less than three times the height of the two fixed pins (3, 4) in a direction which is normal to the plane formed by the longitudinal axes of the two fixed pins (3, 4). In another
15 embodiment, the maximum height of the body (2) in a direction which is normal to the plane formed by the longitudinal axes of the two fixed pins (3, 4) could be up to five times the height of the two fixed pins (3, 4) in a direction which is normal to the plane formed by the longitudinal axes of the two fixed pins (3, 4) and still retain the advantages such as having a thinner plug when the moveable pin (5) is in the storage position than a conventional three-pin plug.

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In another embodiment, there is an electrical cable extending from the body (2), which is connected at a first end to electrical contacts of the plug. At the second end of the cable, there can be, for example, another plug or socket for connecting directly to electrical equipment. In this embodiment, the plug of the present invention, the
25 cable, and the other plug or socket form a power cable apparatus. Alternatively, the second end of the cable could be connected to a transformer for use in transforming the power supply to electrical equipment.

According to another aspect of the invention shown in Figures 8A and 8B, there is
30 provided an adapter socket (19) which could be used to allow the three-pin plug described above to be used with conventional two-pin sockets in other countries. The adapter is smaller than conventional three-pin to two-pin plug adapters as it only

requires two holes (20) for accepting the two-pins (3, 4) other than the moveable pin (5), rather than all three pins. The adapter (19) has two holes (20) on one side, and two pins (21) on another side. In the embodiment shown, the surface of the body (22) of the adapter (19) from which the two pins extend is on the opposite side of the
5 body (22) from the surface in which the two holes are formed. Inside the adapter (19), there can be electrical connections in the holes (20) which make contact with the two pins (3, 4) of the three-pin plug (1) when it is plugged into the holes (20).

When the embodiment of the electrical plug (1) shown in the figures is used with this
10 adapter (19), the longitudinal axes of the connecting member (6) and the moveable pin (5) are not aligned with the longitudinal axes of the two fixed pins (3, 4) when the two fixed pins (3, 4) are plugged into the adapter (19), but are instead pointing in a direction that allows the two fixed pins (3, 4) to be inserted into the adapter (19) without obstruction from the moveable pin (5) or the connecting member (6). The
15 holes (20) in the adapter (19) could be, for example, the same dimensions as those required to accept the live and neutral pins of a conventional three-pin plug, such as that used in, for example, the United Kingdom, Malaysia, Singapore, Hong Kong, Malta, Cyprus or Ireland. The two pins (21) of the adapter (19) could be the same as the two pins of a conventional two-pin plug, such as that used in Europe or the USA.
20 This plug adapter (19), which occupies a smaller volume than the conventional three-pin to two-pin plug adapter, complements the three-pin plug (1) with a moveable pin (5) described above.

According to another aspect of the invention shown in Figures 9A and 9B, there is
25 provided an electrical adapter plug (23) for allowing a two-pin electrical plug (25) to be used with a conventional three-pin electrical plug socket. The adapter (23) has the moveable pin (5) of any of the electrical plugs described herein, and therefore shares the storage advantages of the three-pin plug described herein. It also has two openings or holes (24) which can accept the two pins of a conventional two-pin plug,
30 such as that used in Europe or the USA. Inside the body (26) of the adapter (23), there can be electrical connections which the two pins of the conventional two-pin plug make contact with when the two-pin plug is plugged into the holes (24). Such

an adapter (23) would be beneficial when travelling from a country which has two-pin electrical plugs to a country which uses three-pin electrical plugs, as it would not be necessary to purchase a conventional, bulky, three-pin adapter plug.

- 5 According to another aspect of the invention there is provided a charger unit comprising the electrical plug of any of the embodiments described in the application and a cable which is suitable for being plugged into an electrical device. The embodiment shown in Figure 10 is suitable for operating as a telephone charger (27). In this embodiment, charging apparatus is contained within the housing (28) of the
- 10 charger (27). A cable (29), which is connected to electrical contacts within the housing (28), is attached to the housing (28) and has a plug (30) connected to one end of it which can be plugged into a suitable socket on a mobile telephone. The charger (27) has the foldable or moveable pin (5) described herein with reference to other embodiments of the invention, which means that the charger (27) can be folded
- 15 so as to be flatter than a conventional three-pin charger. In another embodiment, the charging apparatus could be provided outside the housing of the plug. The charger (27) of the embodiment shown in Figure 10 is intended for use with a mobile telephone, but in other embodiments, the charger could, for example, be suitable for charging and/or powering, a PDA, a radio, an MP3 player, a lap-top computer, a
- 20 palm-top computer, or a GPS device.

Figure 11 illustrates a further embodiment of a plug according to the present invention. In the embodiment of Figure 11 several features have been added over those described above. These features relate, in particular, to improved safety of the

25 plug and improved usability and durability.

Figures 11A-11G illustrate, in order, how the plug is opened up and in particular the interaction of the connecting member 6 with a fuse storage facility which ensures that the fuse cannot be accessed whilst the plug is in the use position.

30

A recess 50 is provided in the body for the positioning of a fuse 55 therein. Connections are provided within the recess 50 in order for the fuse 55 to be

electrically connected between the live pin 4 and the cable which exits the plug in the usual way.

A door or cover member 60 is provided which is moveable (rotatable in the illustrated embodiment) from a position in which access to the recess is possible to a position over the opening of the recess 50 to cover the fuse 55 and associated terminals. The cover 60 may be provided with a closure device such as a snap fitting such that the cover 60 will generally remain in the closed position covering the recess 50 unless it is deliberately prised open. The inside of the recess 50 can be accessed for changing the fuse 55 using a screwdriver or similar implement.

As can be seen by comparing Figures 11B-11E, in order to ensure that the cover 60 cannot be opened during use of the plug 1 (i.e. when it is in a socket) the connecting member 6 is provided with a protrusion 70 at its base. The relative geometry of the plug 1 is such that the protrusion 70, when the connecting member 6 is in the use position, is positioned over the cover 60 thereby to prevent opening of the cover 60 when the connecting member 6 is in the use position. This feature greatly increases the safety of the plug in that it can be provided with a fuse and has a feature which blocks the potentially dangerous possibility of touching or removing the fuse whilst the plug 1 is inserted into a socket.

The feature of the protrusion 70 on the connecting member 6 also provides further support of the connecting member 6 in the use position. The foot prevents further rotation of the connecting member 6 beyond about the vertical position by interaction between the foot 70 and the cover 60 and/or the other parts of the body 2. This feature increases the strength of the plug 1, particularly during insertion of the plug into a socket when large forces can be applied to the connecting member 6 at its joint to the body 2.

Further illustrated in Figure 11 is a plate member 80 which is attached to an end of the moveable pin 5 opposite the end of the moveable pin 5 which is inserted into the socket and on the other side to that end of the second shaft 8. This plate member 80

is arranged such that in the use position it engages with a plate receiving surface 82 of the connecting member 6 thereby to prevent further rotation of the moveable member 5 past approximately the horizontal position of the moveable pin 5.

- 5 The plate member 80 is profiled with a groove and an extending projection 85 shaped ergonomically to help the user rotate the moveable pin 5 relative to the connecting member 6. The plate 80 is orientated such that its major faces are substantially perpendicular to the longitudinal axis of the pin 5. Thus, a major surface of the plate member 80 engages with the receiving surface 82 of the
- 10 connecting member 80 which is substantially parallel to the longitudinal axis of the connecting member 6. Furthermore, an end surface 83 of the plate member 80 engages with a plate member end surface receiving surface 84 of the connecting member 6. The plate member end surface receiving surface 84 of the connecting member 6 is substantially perpendicular to the longitudinal axis of the connecting
- 15 member 6.

In this way, as can be seen from Figure 11H, the aesthetics of the plug 1 are substantially improved from a view from behind as well as the usability and strength. This is partly due to the plate member 80 as well as due to the specific shape of the

20 connecting member 6. The connecting member 6 includes two plates 62, 64 which are positioned on either side of the moveable pin 5. Thus, the second shaft 8 passes first through a first plate 62 of the connecting member, then through the moveable pin 5 followed by the second plate 64 of the connecting member 6. This mechanism is hidden by the plate member 80 from behind when in the use position. The plate

25 members 62, 64 can be each individually hinged to the body 2 (compared to the first shaft 7 of the Figure 1 embodiment) so that there are two equivalent shafts in the body equivalent to first shaft 7 of Figure 2. This enables the rotatable pin 5 to be rotated relative to the connecting member 6 such that their longitudinal axes are co-incident or parallel. That is, in the folded position shown in Figure 11A an end of the

30 pin 5 is actually in the axis about which the connecting member 6 rotates relative to the body 2.

A final feature of the embodiment of Figure 11 is the provision of a flange 90 around a face of the body 2 which sits flush with a socket when the plug 1 is inserted into a socket. A corresponding flange 92 is provided on the connecting member. The flanges 90, 92 improve the safety of the device by increasing the distance from the holes of the socket to the edge of the plug without markedly increasing the bulk of the body 2.

Figures 12A-E illustrate a charger unit/power supply similar that of Figure 10. One potential drawback of the charger/unit power supply of Figure 10 is that, when inserted into a socket the housing 28 extends quite far from the socket. Thus, there is the potential for quite large forces to be exerted on the plug by small forces applied to the end of the housing 28 furthest from the socket. However, the size of a charger unit cannot necessarily be minimised much further and so there exists a potential difficulty. This difficulty is overcome in the embodiment of Figure 12.

Figure 12A is a view, in the use position from above and Figures 12B-E illustrate how the various components of the charger unit are moved to assemble it into the use position from the storage position.

Where appropriate, the features of the embodiment of Figure 11 are incorporated into the plug components of the charger unit/power supply of Figure 12.

As can be most clearly seen from a comparison of Figures 12B and 12C, the body 2 to which the pins 3/4 are fixedly attached is rotatable relative to the housing 28 which houses most of the components of the charger. In this way, by making the housing 28 of a flat, generally elongate design, it is possible once again to minimise the thickness of the charger unit/power supply in the storage position. This is done by making sure that the housing 28 is no thicker or not much thicker than the thickness of the body 2. The body 2 is then arranged to be rotatable through approximately 90° relative to the housing 28 through an axis substantially parallel to the axes of shafts 7, 8. Thus, when the connecting member 6 and moveable pin 5 are moved into the use position the housing 28 has been rotated into a position such that

it only protrudes from the socket by an amount equal to its thickness (as opposed to an amount to its length which is the case in the embodiment of Figure 10). This is achieved by making the pins 3/4 rotatable relative to the housing and the moveable pin 5 rotatable relative to the connecting member which itself is also rotatable relative to the pins 3/4 independently of the housing. In this way the safety of the device is improved further. The device of Figure 12 may be used in all of the functions as described in relation to Figure 10.

Figure 13 shows six different arrangements of pins (110) for inserts (100) for use with a kit of parts according to an embodiment of the present invention. The pins (110) are mounted in fixed relation on a body (120). According to the illustrated embodiments, the body (120) is cylindrical, but in other embodiments, the body (120) may be different shapes.

The kit of parts according to the present invention comprises at least two of the inserts (100), together with a housing (130) as illustrated in Figure 15. The housing (130) may, for example, either be a plug housing, which may include a fuse, a charger housing (130) or a power supply unit. For example, the pin inserts (100) could be used with the charger unit (130) shown in figure 15 by fitting the charger unit (130) and one of the inserts (100) together. Once inserted, the pin inserts (100) are rotatable relative to the housing (130), between a storage position and an operating position in a similar way to the embodiment of Figure 12. The embodiments of Figures 14 can also form one of the inserts for the kit of parts.

Each arrangement of pins (110) on the different inserts (100) is such that the resulting plug may be used with a socket in a particular country (or countries). The arrangement of pins (110) is not limited to those shown in the figures, and so the pins (110) may correspond to the sockets of any country. The inserts (100) may therefore include any number of pins (110).

The inserts (100) may be chosen or changed at the time of manufacture, or they may be chosen or changed by the user according to which socket the plug, charger, or power supply unit is to be inserted into.

Figures 14A and 14B show an embodiment of the invention which includes a stopper (140) for locating the movable pin (5) and/or the connecting member (6). The stopper (140) may be located on, and moveable with, the connecting member (6). A
5 detailed view of an embodiment of the connecting member (6) including a stopper (140) is shown in Figure 17.

The stopper (140) can be used for locating the position of the movable pin (5) relative to the connecting member (6) when in the operating position by engaging
10 with a projection (150) on the moveable pin (5). The stopper (140) may be used in this way to ensure that the angle between the moveable pin (5) and the connecting member (6) does not exceed a predetermined maximum, for example, 90 degrees.

The stopper (140) may additionally, or alternatively, be used to ensure that the angle
15 between the connecting member (6), and the body (2) does not exceed a predetermined maximum, by engaging with a part of the body (2), as shown in figure 14B (in which the stopper (140) engages with a housing (160)).

The embodiment illustrated in figures 14A and 14B shows the stopper (140) as part
20 of a connecting member (6) mounted on a housing (160) which could be inserted into the charging body (130) shown in figure 15. The resulting charging unit (170), which incorporates moveable pin (5) and the connecting member (6) with a stopper (140) is shown in figures 16A-C.

25 The stopper (140) could alternatively be used with any of the other embodiments of the present invention described herein involving a connecting member and a movable pin. For example, a moveable pin (5) and connecting member (6) geometry including a stopper (140), such as that shown in figure 17, could be incorporated into a three-pin plug, or into a charger unit.

30

As described above with reference to figure 11, the connecting member 6 is comprised of two parts. This has several advantages including that the moveable pin

5 can be positioned between the parts in the storage position and also that the connecting member 6 may be compressed slightly at the position where it is attached to the body to aid assembly.

- 5 Figure 18 shows an embodiment in which the plug is over-moulded using, for example, an insulating material, such as plastic. This feature could be applied to any of the plug or charger units described herein. By over-moulding the electrical internals, such as the fuse, the plug or charger unit can be made to be more safe, for example by making it water resistant.

10

Claims

1. An electrical plug comprising:
three pins;
a connecting member, and
5 a body, wherein
one of the pins is rotatably connected to the connecting member, and the
connecting member is rotatably connected to the body.
2. The electrical plug of claim 1, wherein two of the three pins, neither of which
10 are the pin which is rotatably connected to the connecting member, are attached to
and fixed relative to the body.
3. The electrical plug of claim 1 or 2, wherein the pin which is rotatably
connected to the connecting member is moveable between a storage position and an
15 operating position.
4. The electrical plug of claim 3, wherein when the pin which is rotatably
connected to the connecting member is in the operating position, the maximum
distance between the plane defined by the axes of the other two pins and the pin
20 which is rotatably connected to the connecting member in a direction normal to said
plane is greater than the maximum distance between the plane defined by the axes of
the other two pins and the pin which is rotatably connected to the connecting
member in a direction normal to said plane when the pin which is rotatably
connected to the connecting member is in the storage position.
25
5. The electrical plug of claim 3 or 4, wherein the pin which is rotatably
connected to the connecting member is movable between the storage position and the
operating position by relative rotation to the connecting member.
- 30 6. The electrical plug of claim 3, 4 or 5, wherein the connecting member can
rotate relative to the body when the pin which is rotatably connected to the
connecting member moves between the storage position and the operating position.

7. The electrical plug of claim 3-6, wherein when the pin which is rotatably connected to the connecting member is in the storage position it lies in substantially the same plane as the other two pins, and when said pin which is rotatably connected
5 to the connecting member is in the operating position, it lies outside the plane of the other two pins.

8. The electrical plug of claims 3-7, wherein when the pin which is rotatably connected to the connecting member is in the operating position, the longitudinal
10 axis of said pin is parallel to the longitudinal axes of the other two pins, but lies in a different plane to the plane shared by the longitudinal axes of the other two pins.

9. The electrical plug of any one of claims 3-8, wherein when the pin which is rotatably connected to the connecting member is in the operating position, the
15 longitudinal axis of the connecting member is closer to being perpendicular to the longitudinal axis of said pin than it is when said pin is in the storage position.

10. The electrical plug of any one of the claims 3-9, wherein when the pin which is rotatably connected to the connecting member is in the storage position, the
20 longitudinal axis of said pin is within 30 degrees of the longitudinal axis of the connecting member.

11. The electrical plug of any one of claims 3-10, wherein when the pin which is rotatably connected to the connecting member is in the storage position, the
25 longitudinal axis of the connecting member is closer to being parallel to the axes of the other two pins than it is when the pin which is rotatably connected to the connecting member is in the operating position.

12. The electrical plug of any one of claims 3-11, wherein the body comprises a
30 slot in which both (i) the pin which is rotatably connected to the connecting member, and (ii) the connecting member sit when said pin is in the storage position.

13. The electrical plug of any one of claims 3-11, wherein the connecting member is rotatably connected in a recess in the body such that when the pin which is rotatably connected to the connecting member is moved to the operating position, the connecting member is rotatable to rest against a surface of the recess in the body, thereby fixing its orientation by preventing further rotation relative to said body.

14. The electrical plug of claim 12, wherein the connecting member is rotatably connected in a recess in the body such that when the pin which is rotatably connected to the connecting member is moved to the operating position, the connecting member is rotatable to rest against a surface of the recess in the body, thereby fixing its orientation by preventing further rotation relative to said body, and wherein said recess is communicable with said slot.

15. The electrical plug of claim 13 or 14, wherein the surface of the recess in the body prevents further rotation of the pin which is rotatably connected to the connecting member away from the other two pins.

16. The electrical plug of any one of claims 3-15, wherein when the pin which is rotatably connected to the connecting member is in the storage position, said pin and the connecting member protrude outwards from the body in substantially the same direction as the two other pins.

17. The electrical plug of any one of claims 6-16, further comprising means for biasing the pin which is rotatably connected to the connecting member and/or the connecting member from the storage position to the operating position.

18. The electrical plug of claim 17, wherein the biasing means comprise a spring.

19. The electrical plug of any one of claims 3-18, further comprising a restrainer for releasably restraining the pin which is rotatably connected to the connecting member and/or the connecting member in the storage position.

20. The electrical plug of any one of the preceding claims, wherein the axis of rotation of the pin which is rotatably connected to the connecting member is substantially parallel to the plane formed by the longitudinal axis of the two other pins, and substantially perpendicular to the longitudinal direction of the other two pins.
21. The electrical plug of any one of the preceding claims, wherein the axis of rotation of the connecting member is substantially parallel to the plane formed by the longitudinal axis of the two other pins, and substantially perpendicular to the longitudinal direction of the other two pins.
22. The electrical plug of any one of the preceding claims, wherein one of: (i) the pin which is rotatably connected to the connecting member, and (ii) the connecting member, comprises a projection, and the other one of: (i) the pin which is rotatably connected to the connecting member, and (ii) the connecting member, comprises a groove within which the projection can move.
23. The electrical plug of claim 22, wherein the pin can move to a first position at which the projection engages one end of the groove.
24. The electrical plug of any one of the preceding claims, further comprising a recess in said body for the insertion therein of a fuse for said plug.
25. The electrical plug of claim 24, wherein said connecting member comprises a protrusion which, in a use position of said connecting member, blocks user access to said recess and in a storage position allows user access to said recess.
26. The electrical plug of claim 24 or 25, further comprising a cover for covering said recess.
27. The electrical plug of any one of the preceding claims, wherein the connecting member comprises a stopper for ensuring that, in use, the angle between

the moveable pin and the connecting member, and/or the angle between the connection member and the body, does not exceed a predetermined maximum.

28. An electrical plug comprising three pins and a body wherein an overall
5 dimension of the plug in a direction defined normal to a plane defined by the longitudinal axes of two of the pins is greater when the plug is in an operating condition than after the plug has been set to a storage condition by folding and/or rotation of one of said pins relative to the pins whose longitudinal axes form said plane, and wherein the two pins whose longitudinal axes form said plane are fixed
10 relative to the body.

29. The electrical plug of claim 28, wherein one of the pins is movable from a first position, which is a storage position, to a second position, which is an operating position.
15

30. The electrical plug of claim 29, further comprising a connecting member wherein one end of the connecting member is rotatably connected to the movable pin, and the other end of the connecting member is rotatably connected to the body.
20

31. The electrical plug of claim 29 or 30, wherein the longitudinal axis of the movable pin is substantially in the same direction in both the first position and the second position.

25 32. The electrical plug of claim 29, 30 or 31, wherein the motion of said moveable pin between the first position and the second position is described substantially by a translation in a plane which is normal to the plane of the other two pins and contains the longitudinal axis of the moveable pin.

30 33. The electrical plug of claim 32, wherein the motion of the movable pin between the first position and the second position does not comprise rotation about an axis normal to said plane of the motion.

34. The electrical plug of claim 32, wherein the motion of the movable pin between the first position and the second position comprises rotation about an axis normal to said plane of the motion.

5

35. The electrical plug of claim 34, wherein said rotation is between 150 degrees and 210 degrees.

36. The electrical plug of claim 34, wherein said angle of rotation is between -30 degrees and +30 degrees.

10

37. The electrical plug of any one of the preceding claims, wherein said moveable pin or said pin which is rotatably connected to the connecting member is an earth pin.

15

38. The electrical plug of any one of the preceding claims, wherein said moveable pin or said pin which is rotatably connected to the connecting member is at least partly made from non-conductive material.

39. The electrical plug of any one of the preceding claims, wherein said moveable pin or said pin which is rotatably connected to the connecting member is made from plastic or carbon fibre.

20

40. The electrical plug of any one of the preceding claims, wherein the electrical plug is a double insulated plug.

25

41. The electrical plug of any one of the preceding claims, wherein the body is a housing.

42. The electrical plug of any one of the preceding claims, further comprising an electrical cable wherein the electrical cable is in electrical contact with a pin.

30

43. An electrical plug adaptor comprising the electrical plug of claims 1-41, wherein the body comprises a socket with two openings.
44. The apparatus of claim 43, further comprising an electrical contact in the openings of the socket, and an electrical connection between one of the pins and an electrical contact and between another of the pins and the other electrical contact.
45. A charger unit or power supply comprising the electrical plug of claims 1-41.
46. The charger or power supply of claim 45, further comprising a cable which is suitable for being plugged into an electrical device.
47. The charger unit or power supply of claim 45 or 46, further comprising a housing for housing components of said charger unit or power supply.
48. The charger unit or power supply of claim 47, wherein said housing is rotatable relative to said body.
49. The charger unit or power supply of claim 48, wherein said housing and body are rotatable relative to each other in an axis substantially parallel to an axis about which said connecting member is rotatable relative to said body.
50. The charger unit or power supply of claims 45-49, suitable for charging a mobile telephone, a PDA, a radio, an MP3 player, a lap-top computer, a palm-top computer or a gps device.
51. The charger unit or power supply of claims 45-50 further comprising charging equipment, wherein part of the charging equipment is contained within the body.
52. An electrical plug adapter comprising two pins and two openings for accepting the live and neutral pins of a standard three-pin plug.

53. An electrical plug comprising a main body and three pins, at least one of said pins being moveable from a storage position, in which at least one overall dimension of said plug is less than in a use position, to a use position in which use position
5 access to a fuse of said plug is blocked.

54. The electrical plug of claim 53, wherein access to said fuse is blocked in said use position by the necessary position of at least one component of the plug for the correct positioning of said moveable pin in the use position.
10

55. The electrical plug of claim 53 or 54 further comprising the features of any one of claims 1-42.

56. An electrical device comprising:
15 a housing; and
at least two inserts, each insert being constructed so as to be insertable into the housing, and each insert comprising at least one pin insertable into an electrical socket.

20 57. The electrical device according to claim 56, wherein each insert is constructed so as to be rotatable relative to the housing when it is inserted in the housing.

58. The electrical device according to claim 56 or 57, wherein the housing is a
25 charger unit, a power supply unit, or a plug.

59. An electrical plug constructed and arranged substantially as hereinbefore described or with reference to any one of the accompanying drawings.

30 60. An electrical plug adapter constructed and arranged substantially as hereinbefore described or with reference to any one of the accompanying drawings.

61. A charger unit constructed and arranged substantially as hereinbefore described or with reference to any one of the accompanying drawings.

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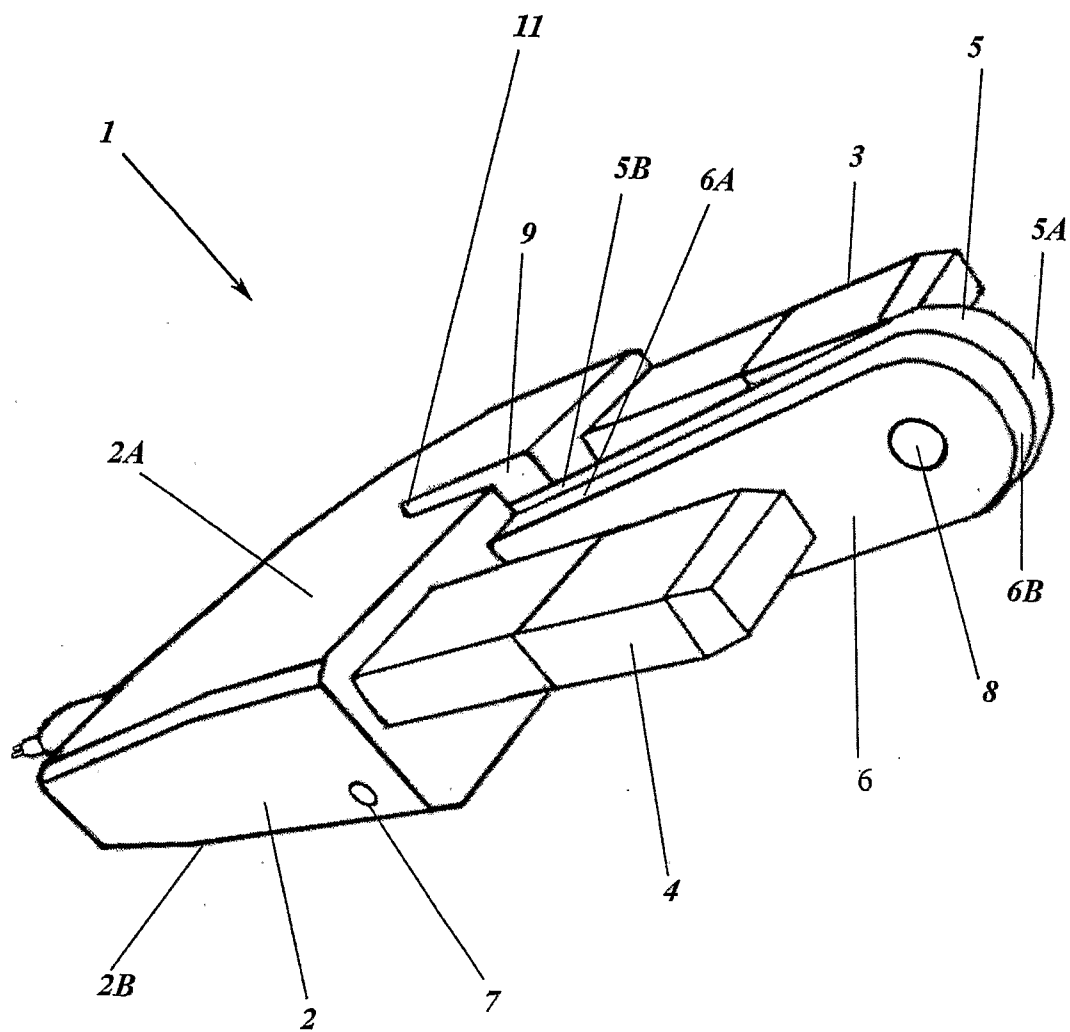


Fig 1

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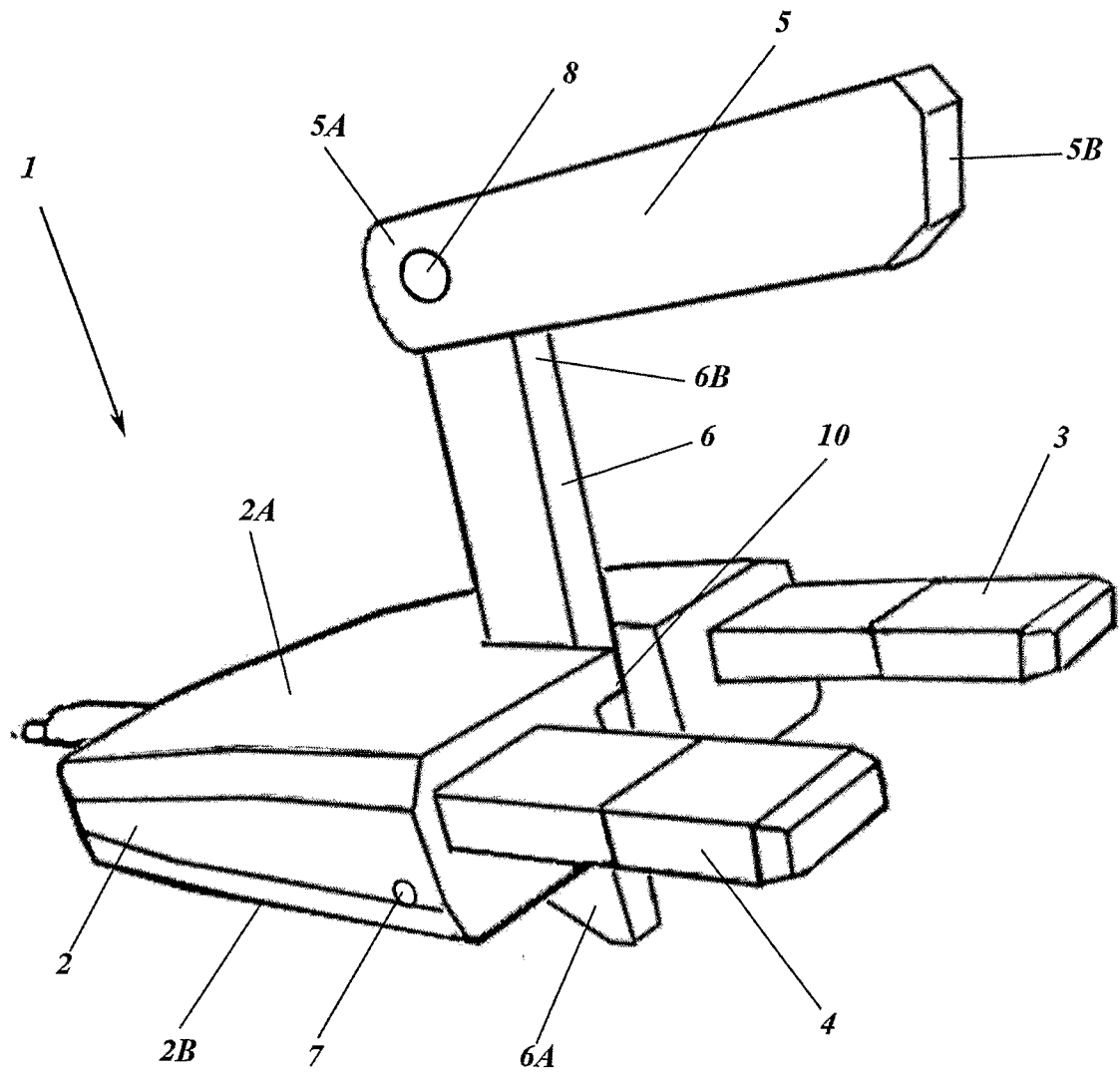


Fig 2

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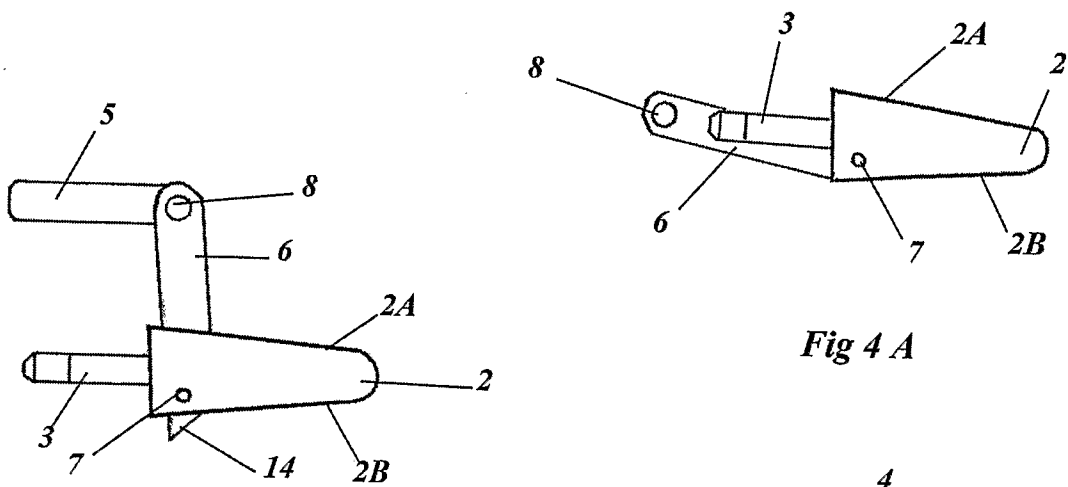


Fig 3 A

Fig 4 A

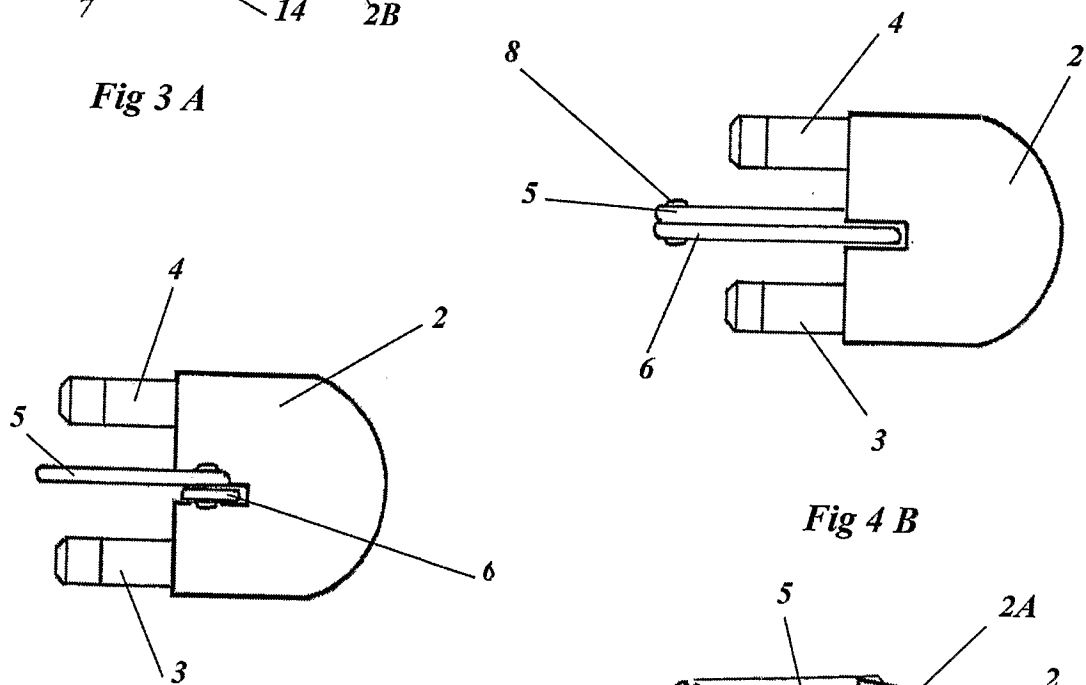


Fig 3 B

Fig 4 B

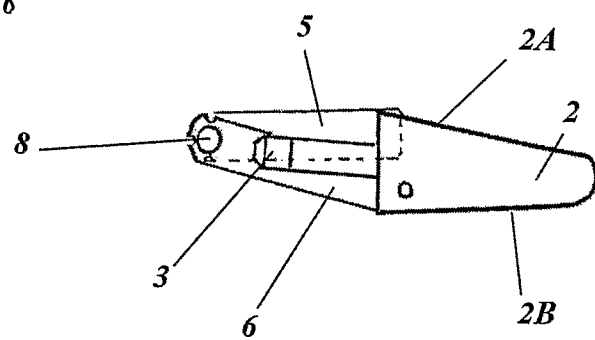


Fig 4 C

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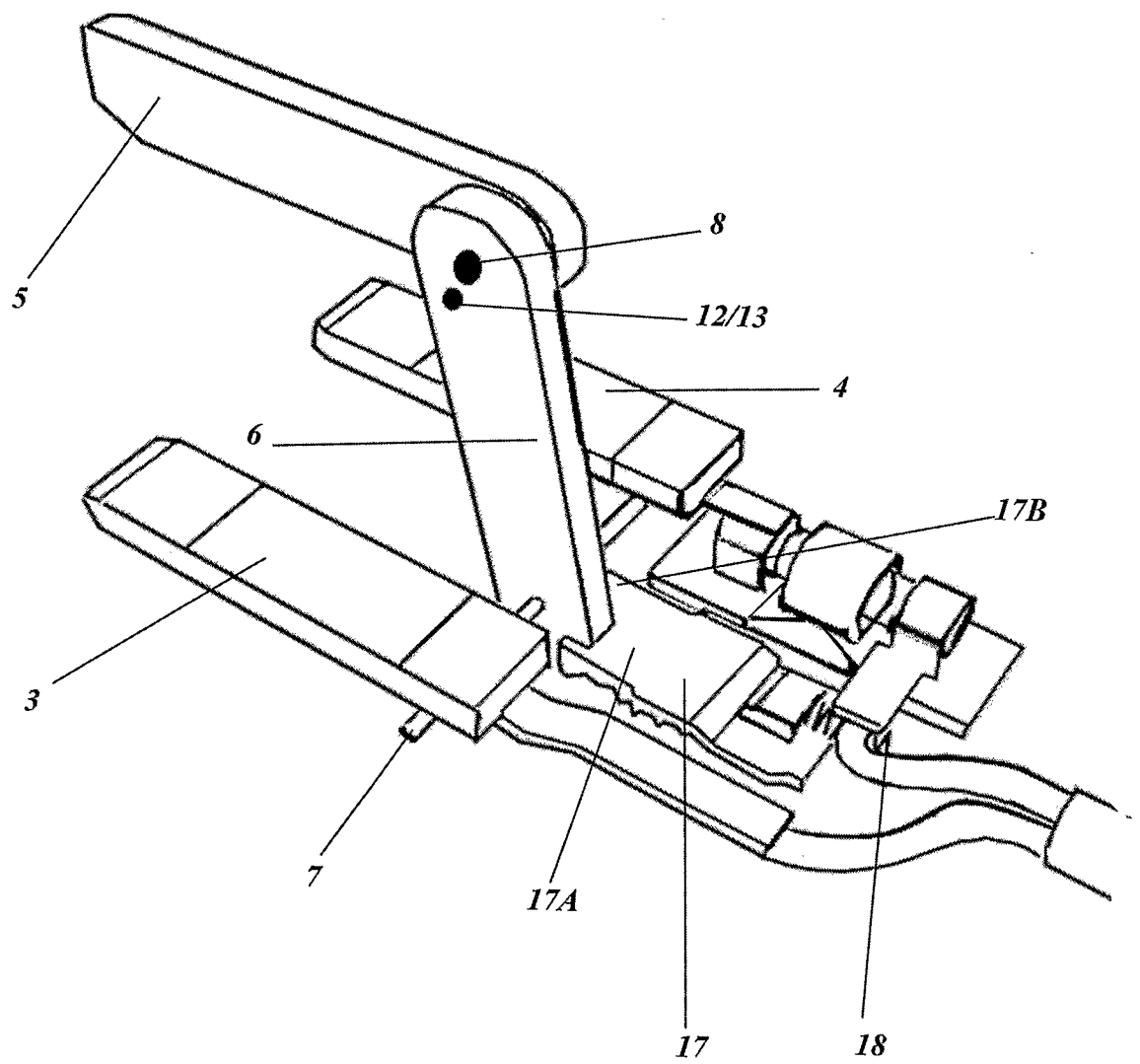


Fig 5

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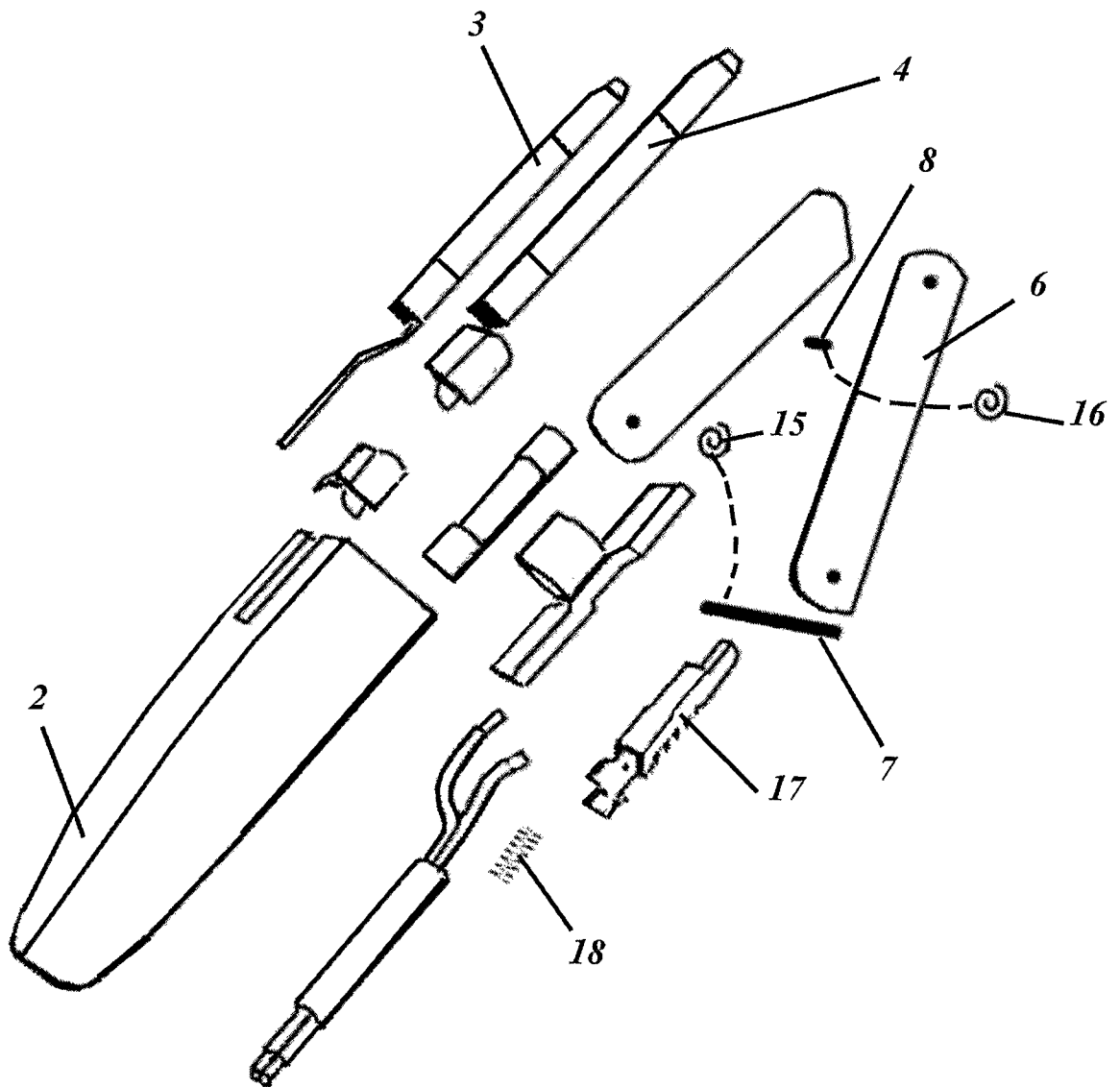


Fig 6

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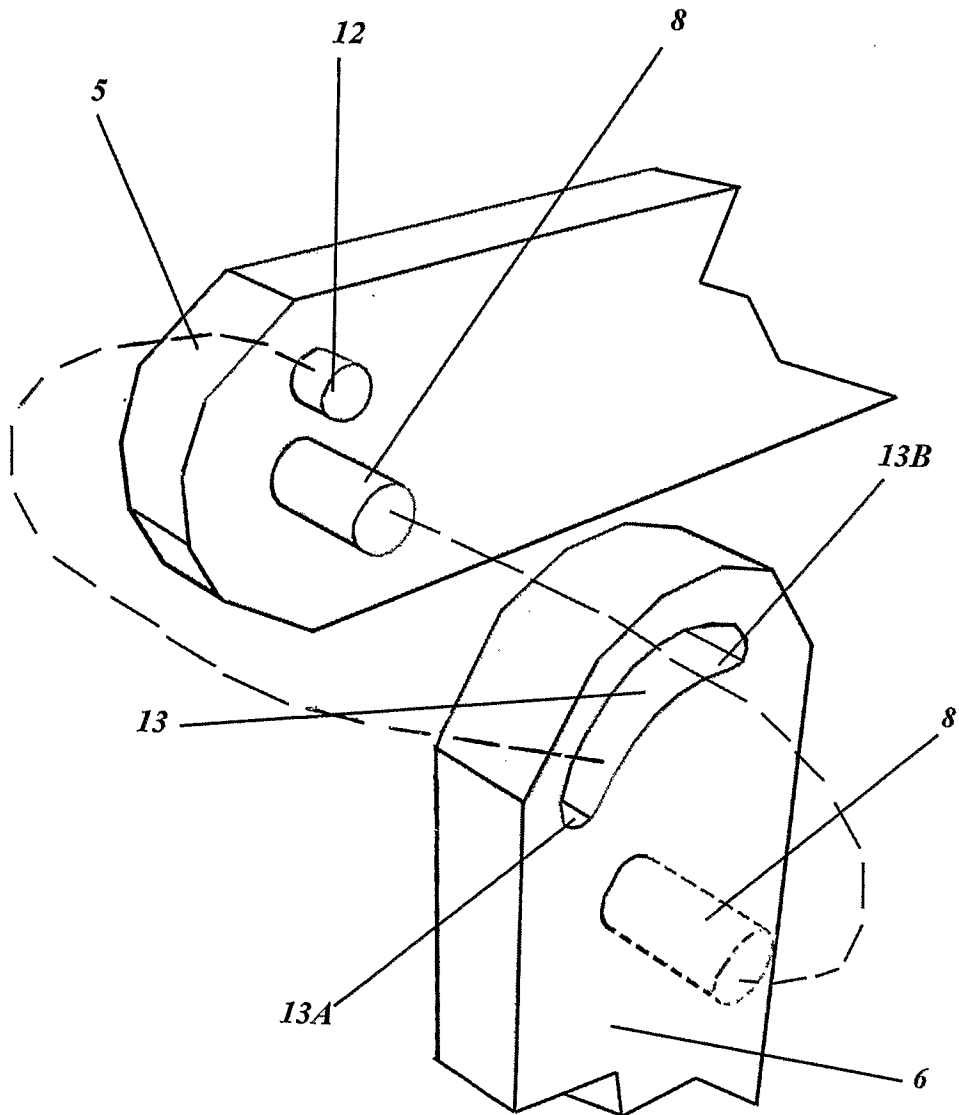


Fig 7

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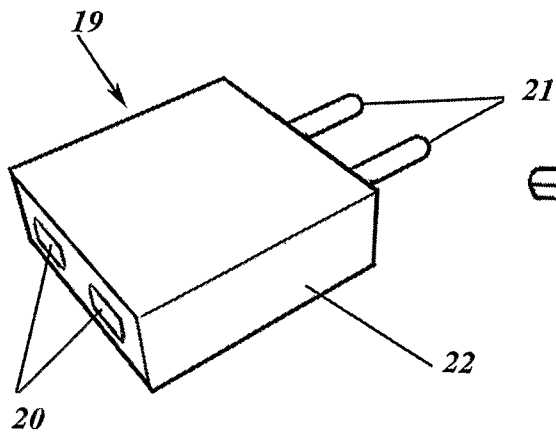


Fig 8 A

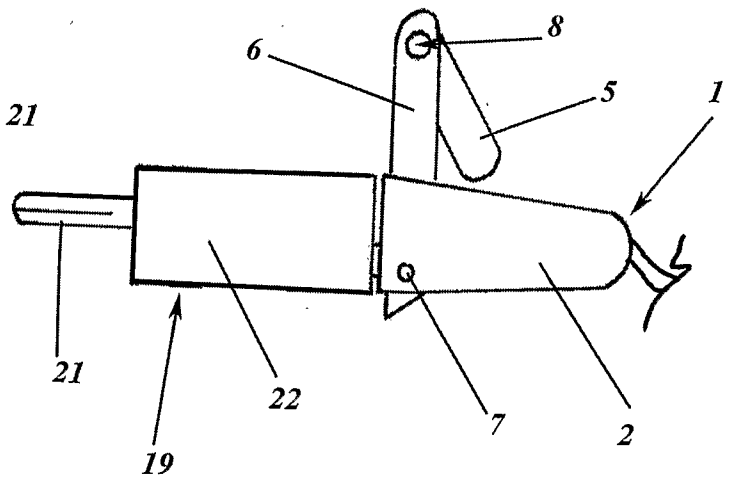


Fig 8 B

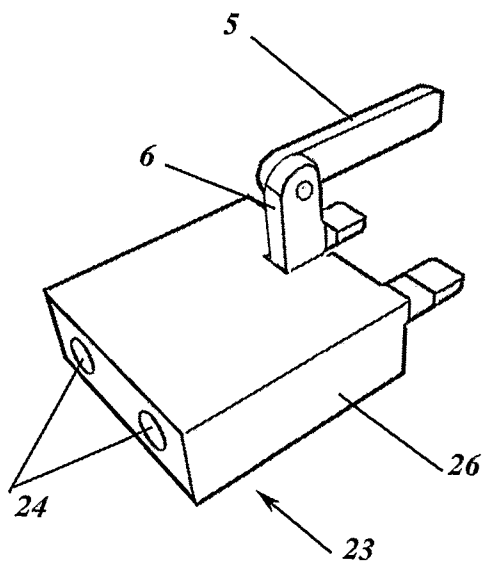


Fig 9 A

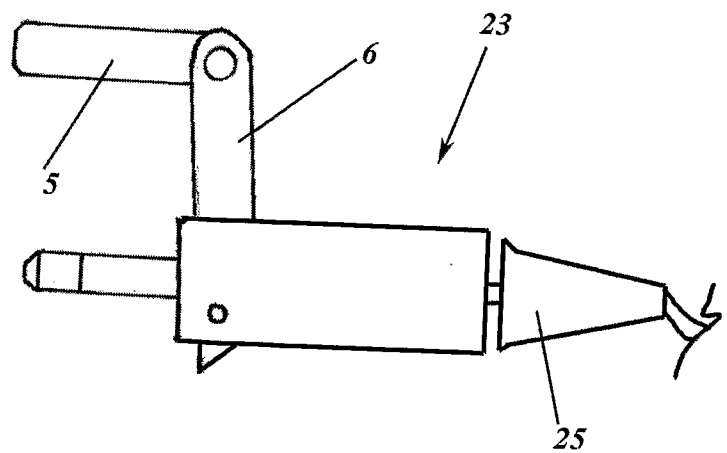


Fig 9 B

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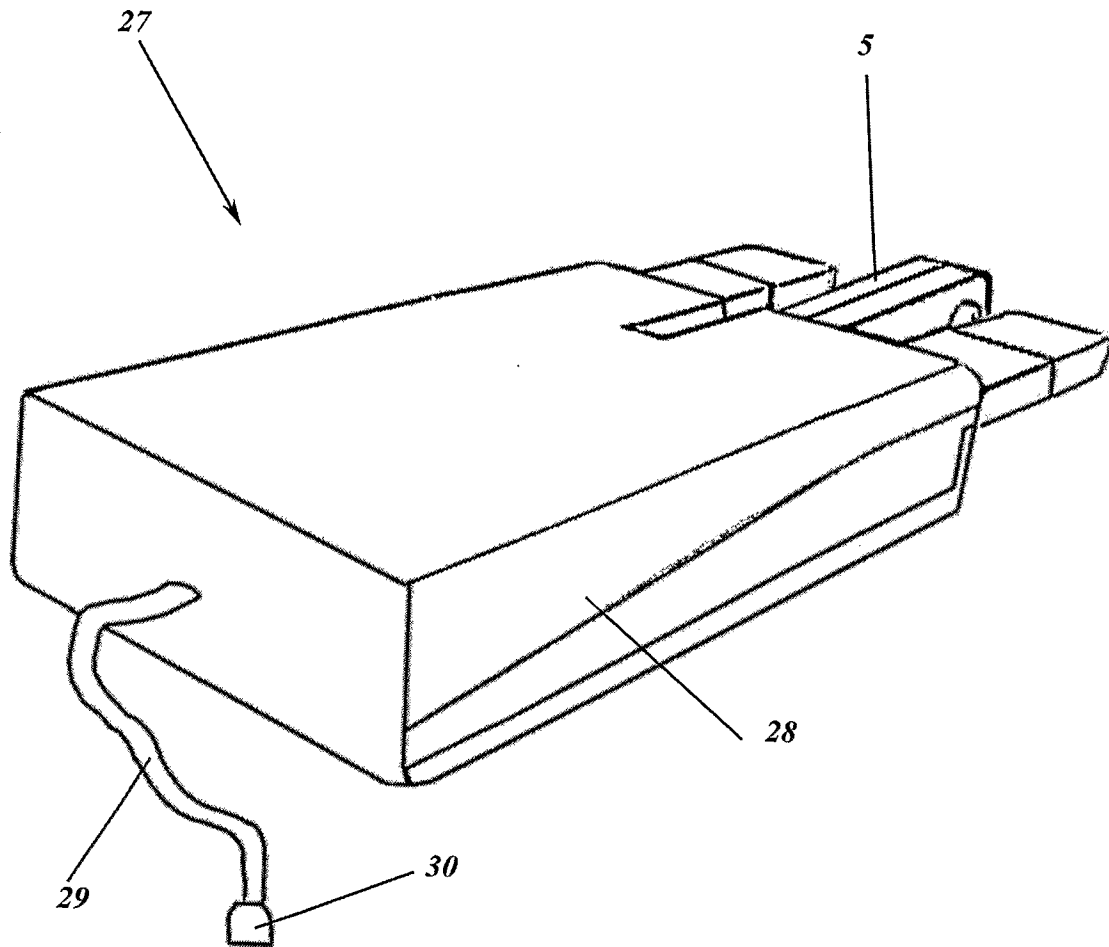


Fig 10

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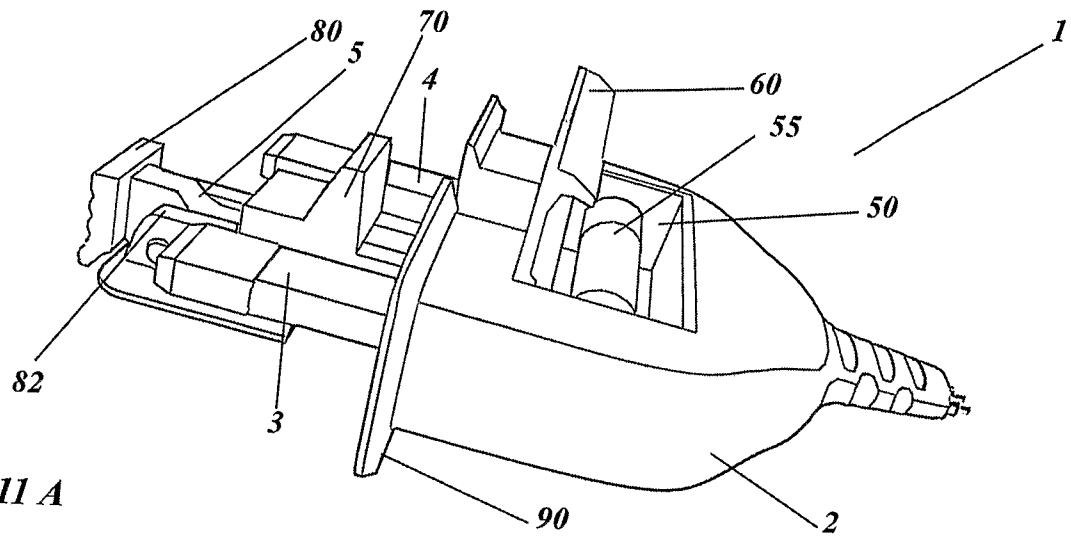


Fig 11 A

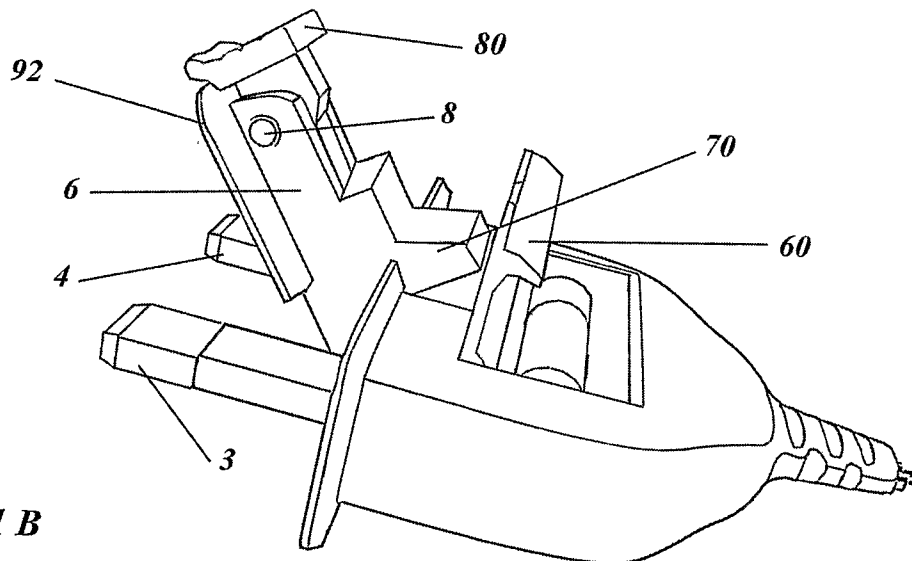


Fig 11 B

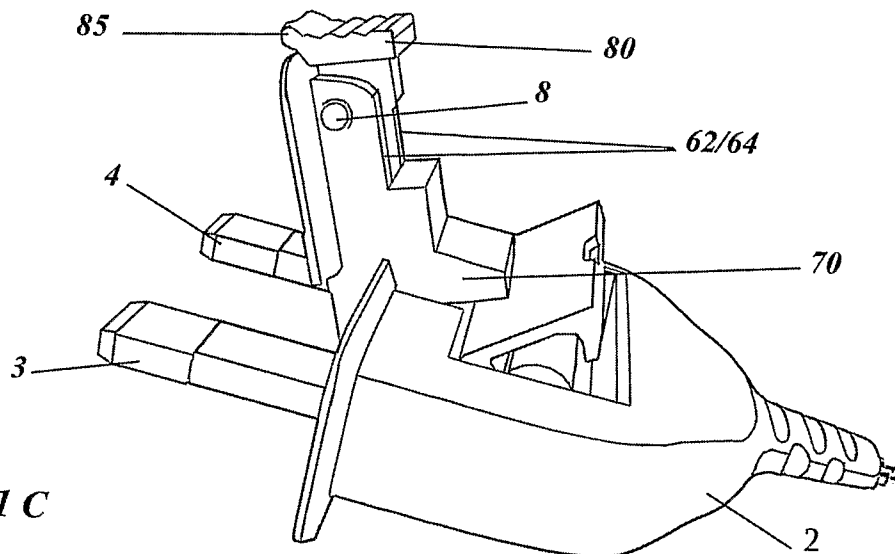


Fig 11 C

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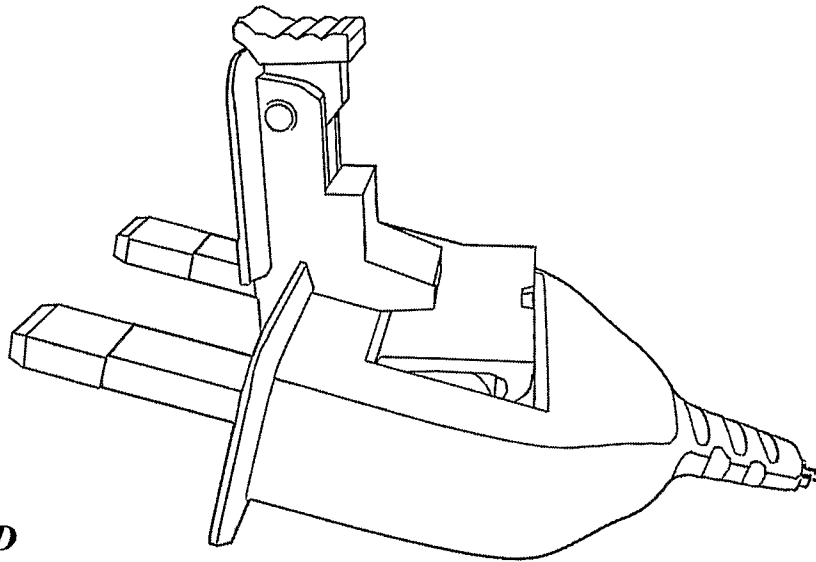


Fig 11 D

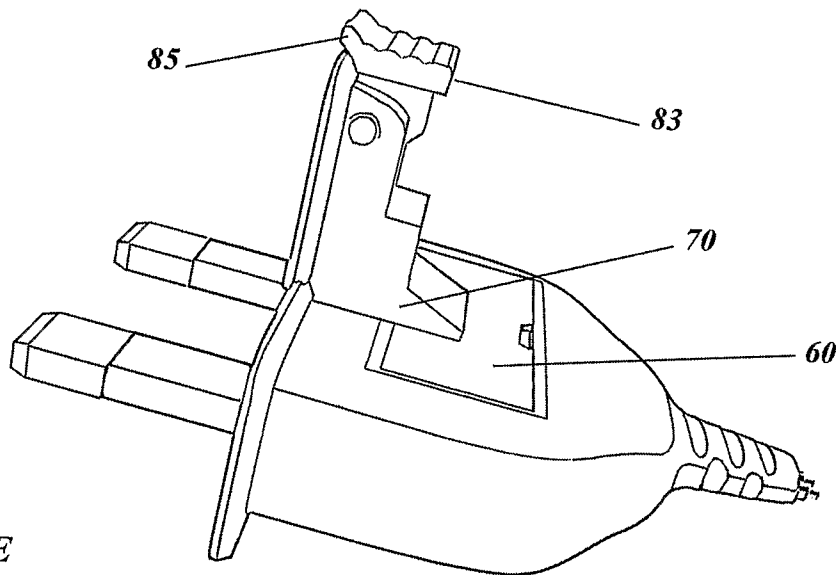


Fig 11 E

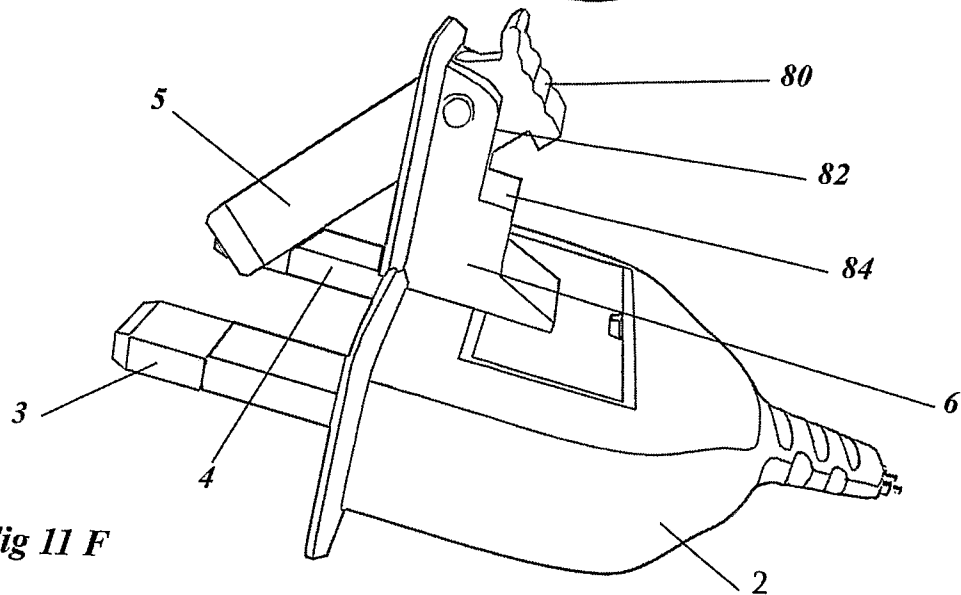


Fig 11 F

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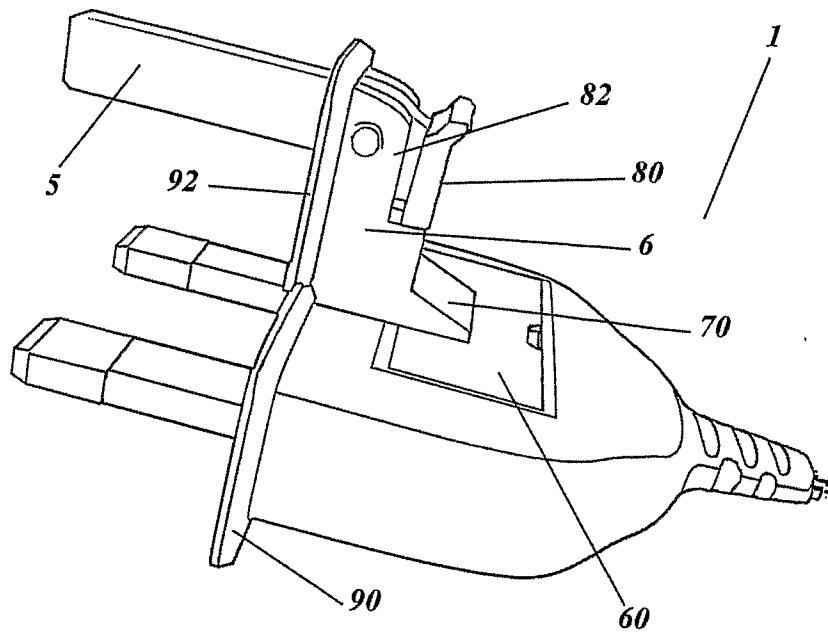
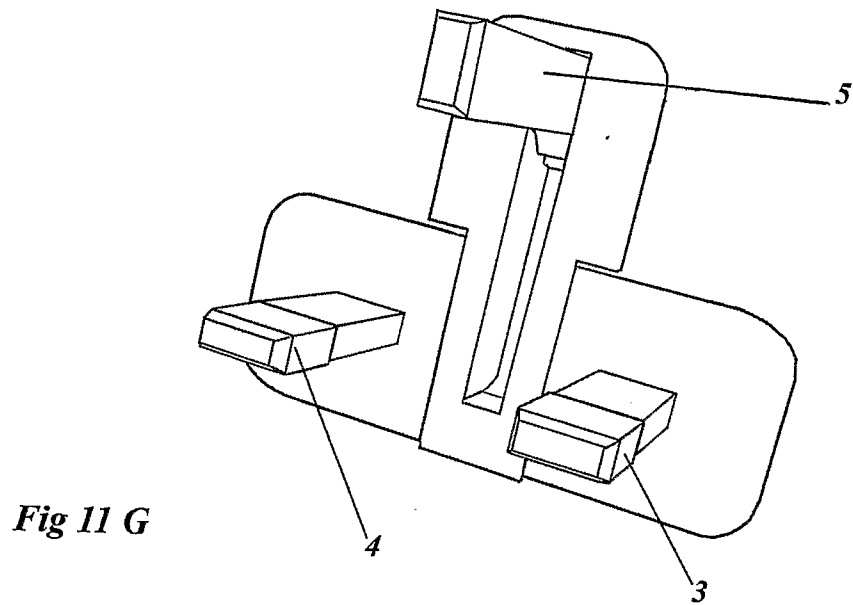


Fig 11 H

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Fig 12 A

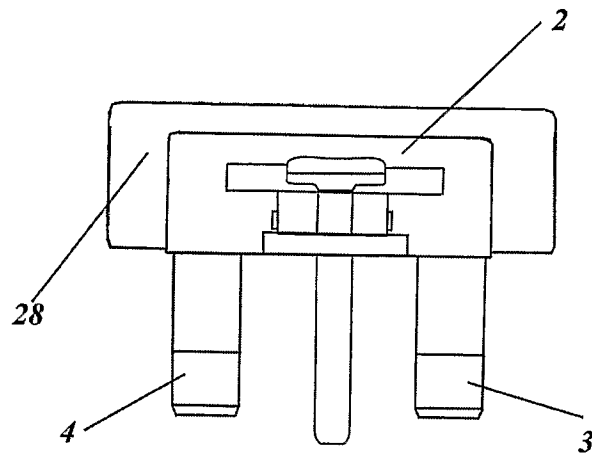


Fig 12 B

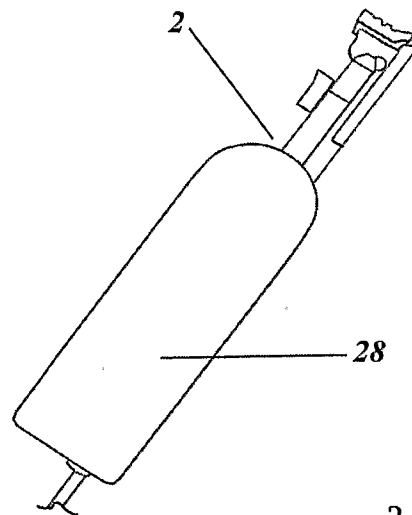
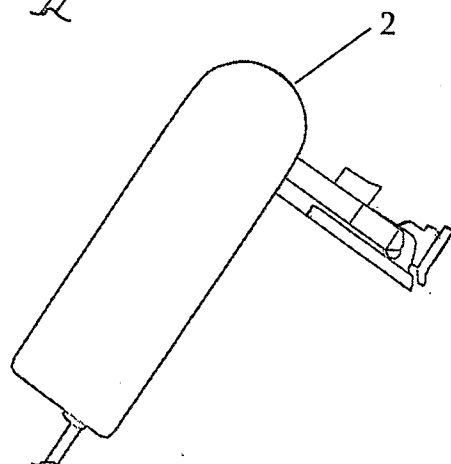


Fig 12 C



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Fig 12 D

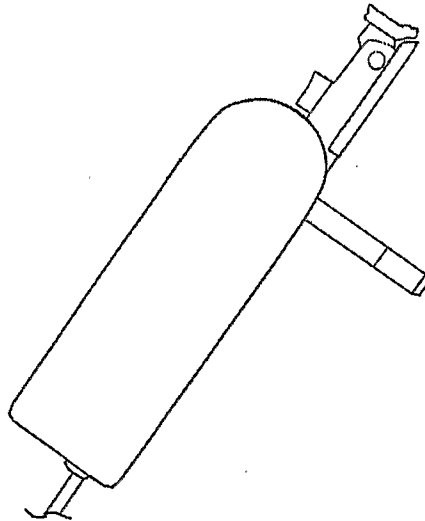
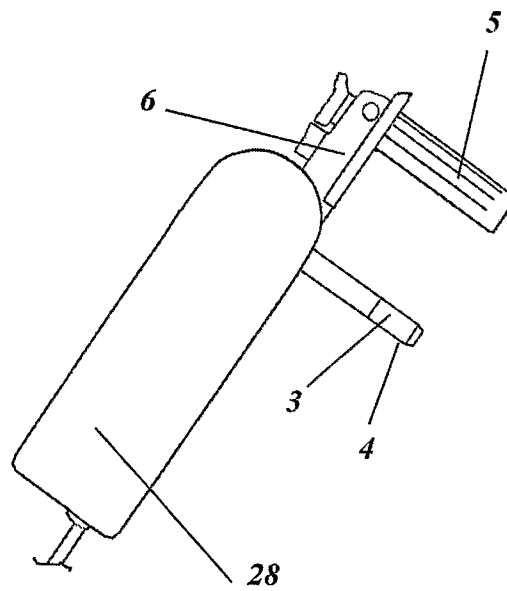


Fig 12 E



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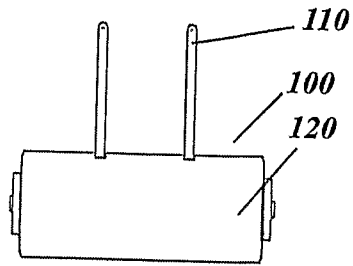


Fig 13 A

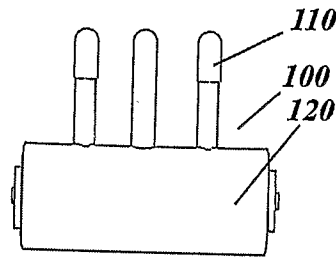


Fig 13 B

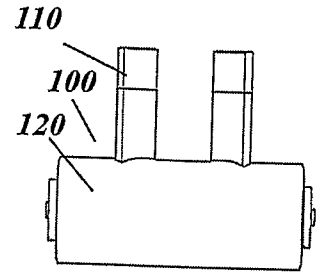


Fig 13 C

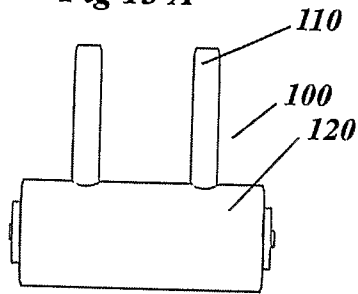


Fig 13 D

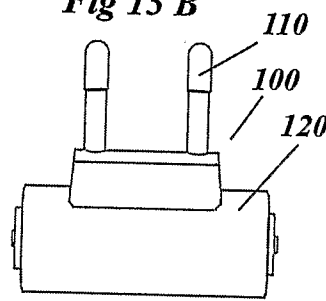


Fig 13 E

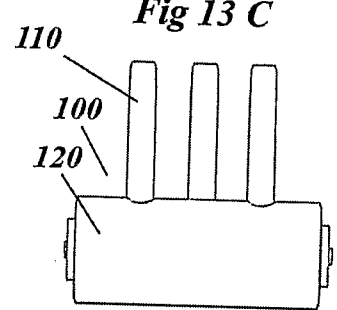


Fig 13 F

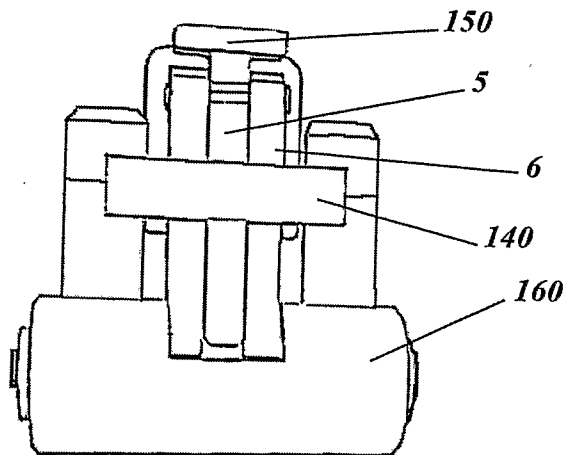


Fig 14 A

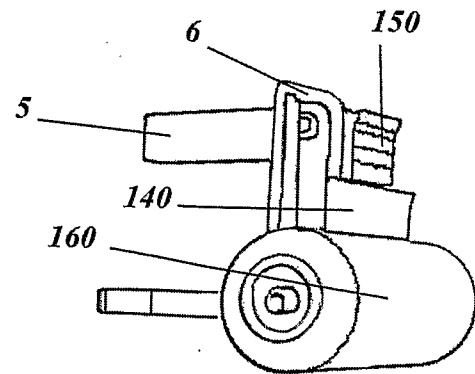


Fig 14 B

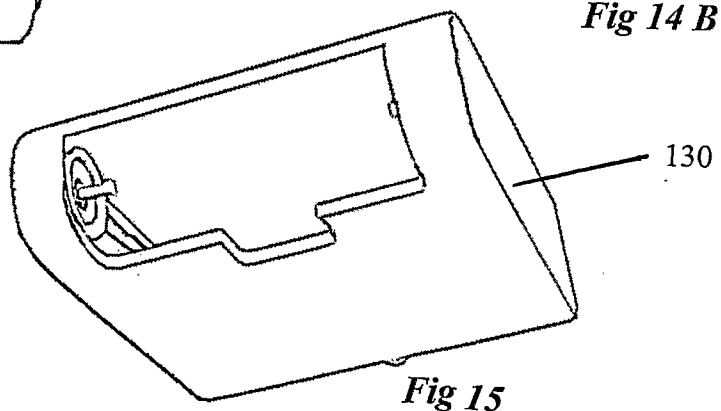
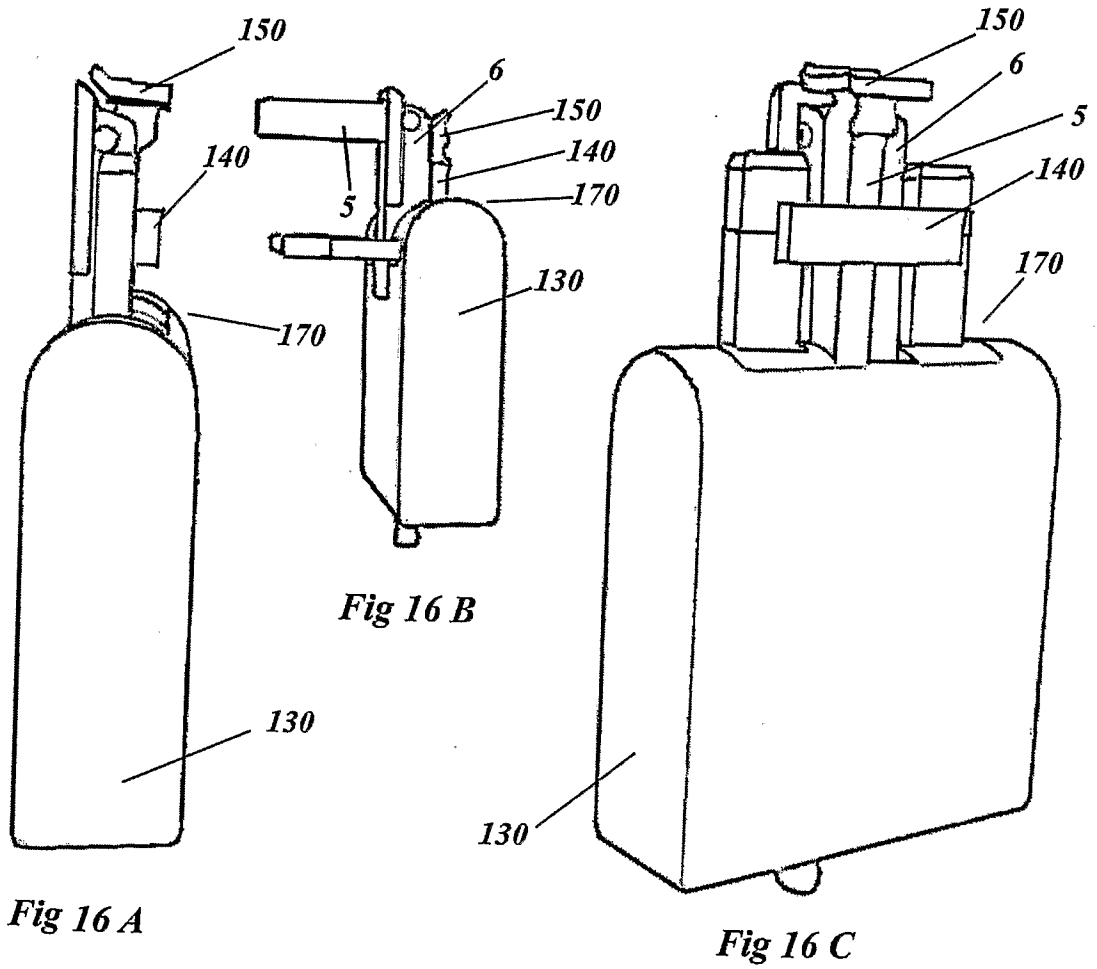


Fig 15

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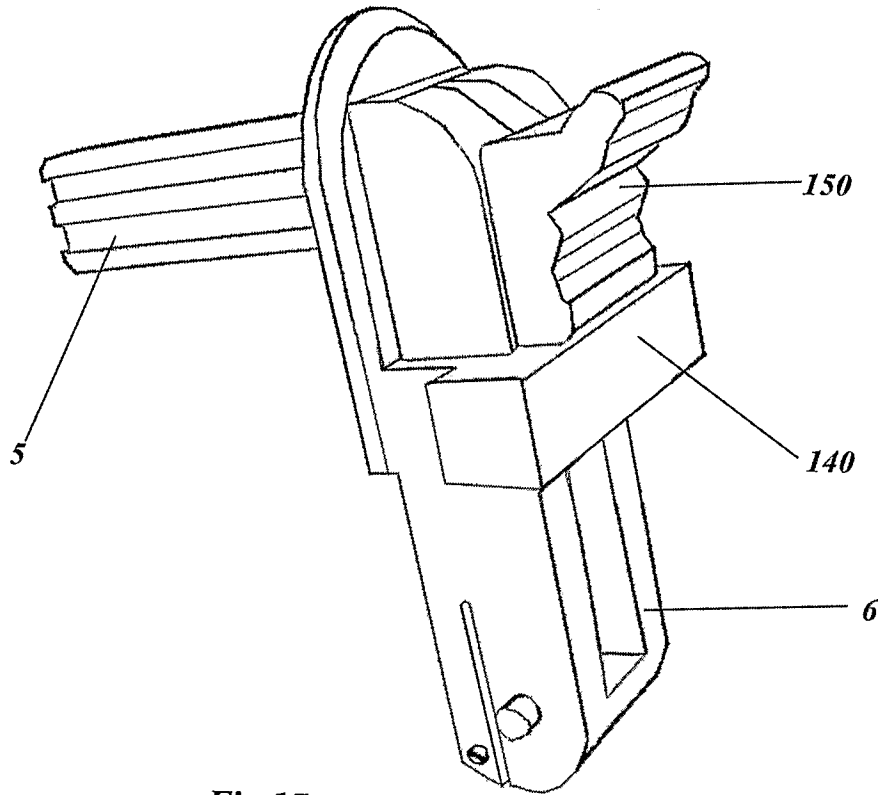


Fig 17

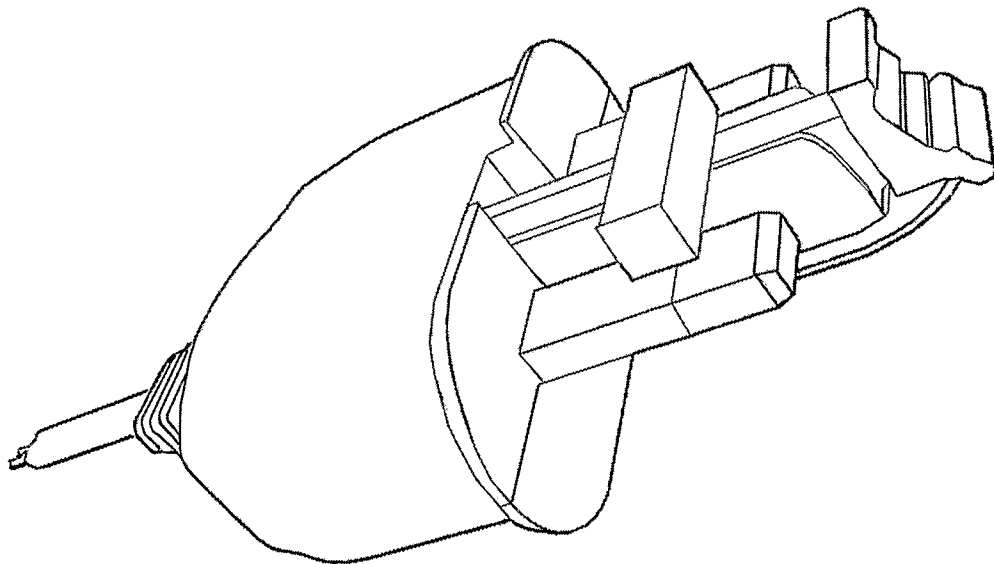


Fig 18