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(56) Documents Cited:  
**GB 2463688 A** **GB 2318224 A**  
**GB 2234402 A** **GB 2224892 A**  
**GB 2222322 A** **GB 2193047 A**  
**GB 2171265 A** **GB 2150767 A**  
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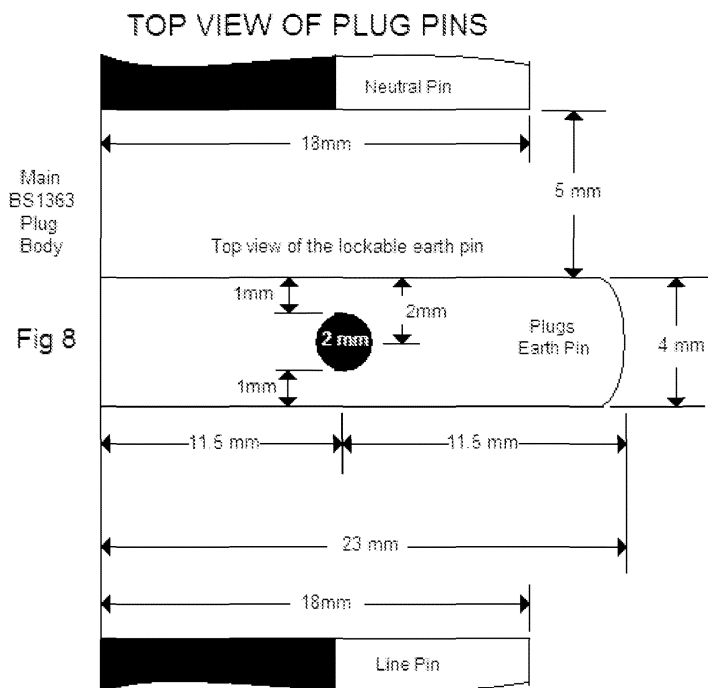
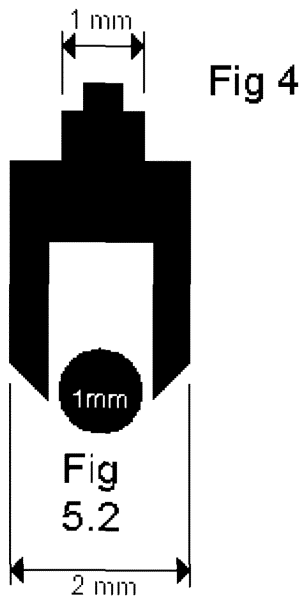
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(58) Field of Search:  
 INT CL **H01R**  
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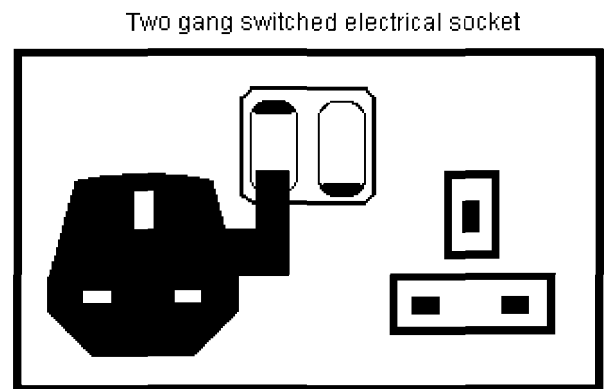
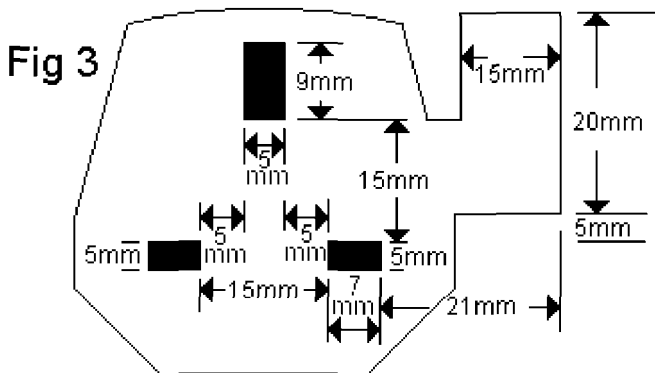
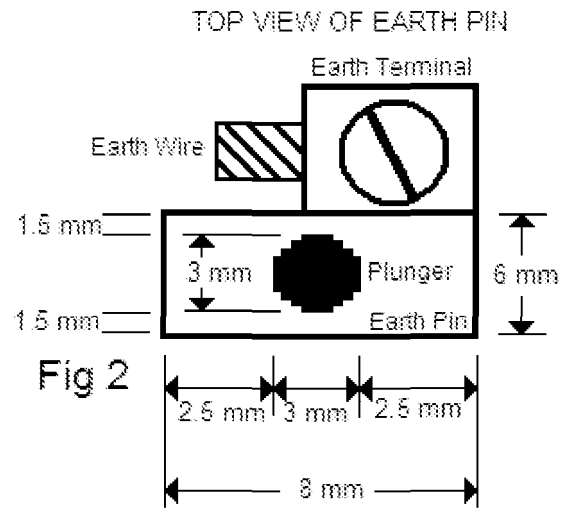
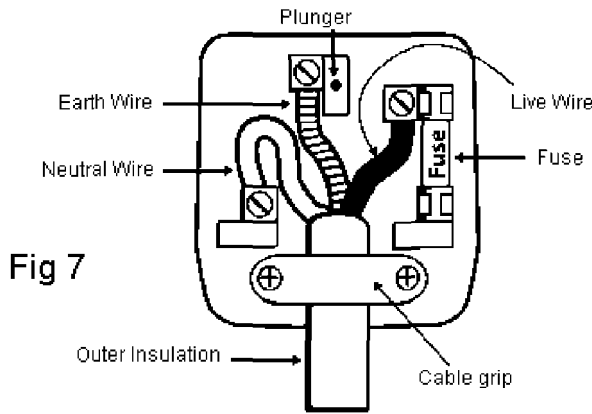
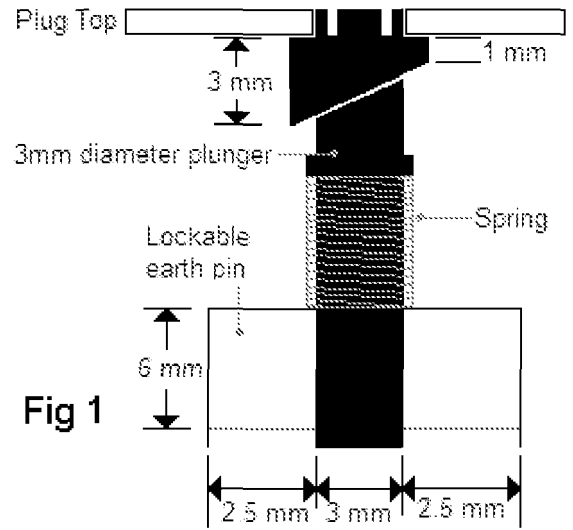
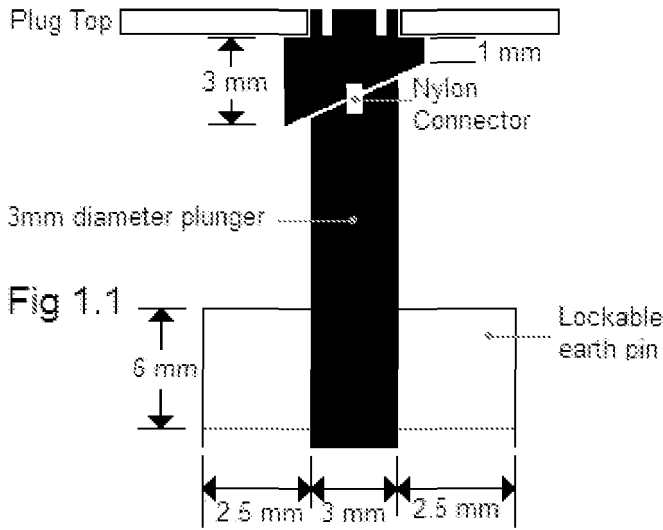
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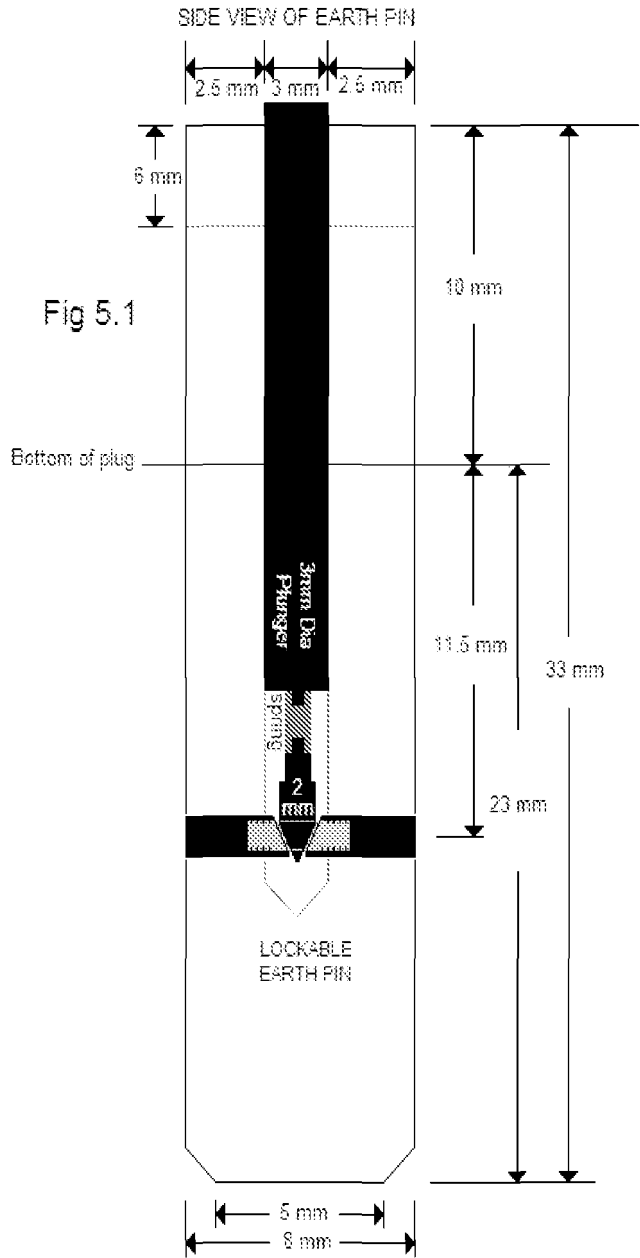
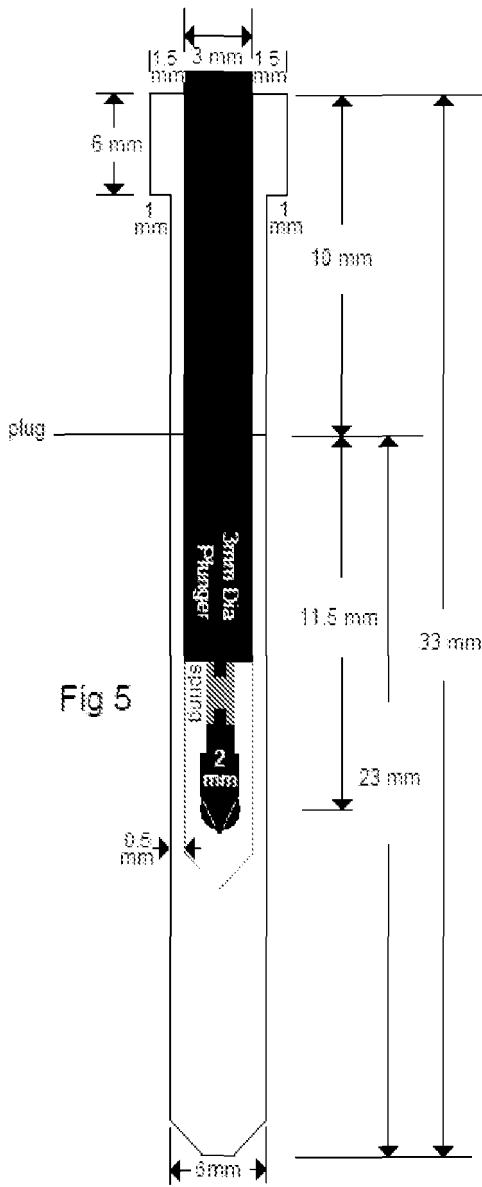
(54) Title of the Invention: **Lockable earth pin for a BS1363 plug**  
 Abstract Title: **Lockable earth pin for a BS1363 plug**

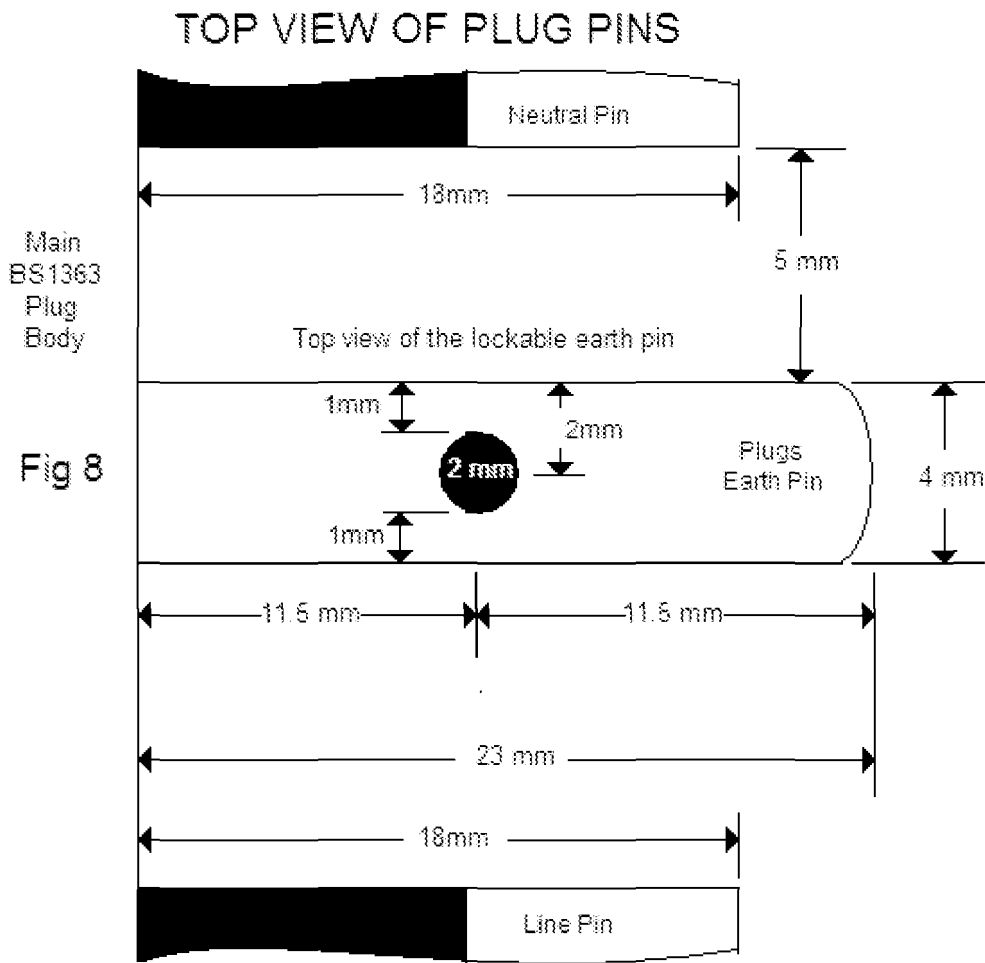
(57) A three-pin BS1363 plug has a lockable earth pin. After it is plugged into a socket, a plastic disc (Fig 1.1) is rotated, moving a plunger. The plunger may be biased with a spring (Fig 1) or connected to the disc. Moving the plunger pushes out two pins to lock the earth pin in the socket. If one pin is prevented from being pushed out, a spring arrangement (Fig 8.5) may nevertheless push out the other. The plug may be supplied with an adaptor (Fig 3) that goes between the plug and the socket and covers the socket's switch, so that the switch on the socket cannot be switched off while the plug is in place.



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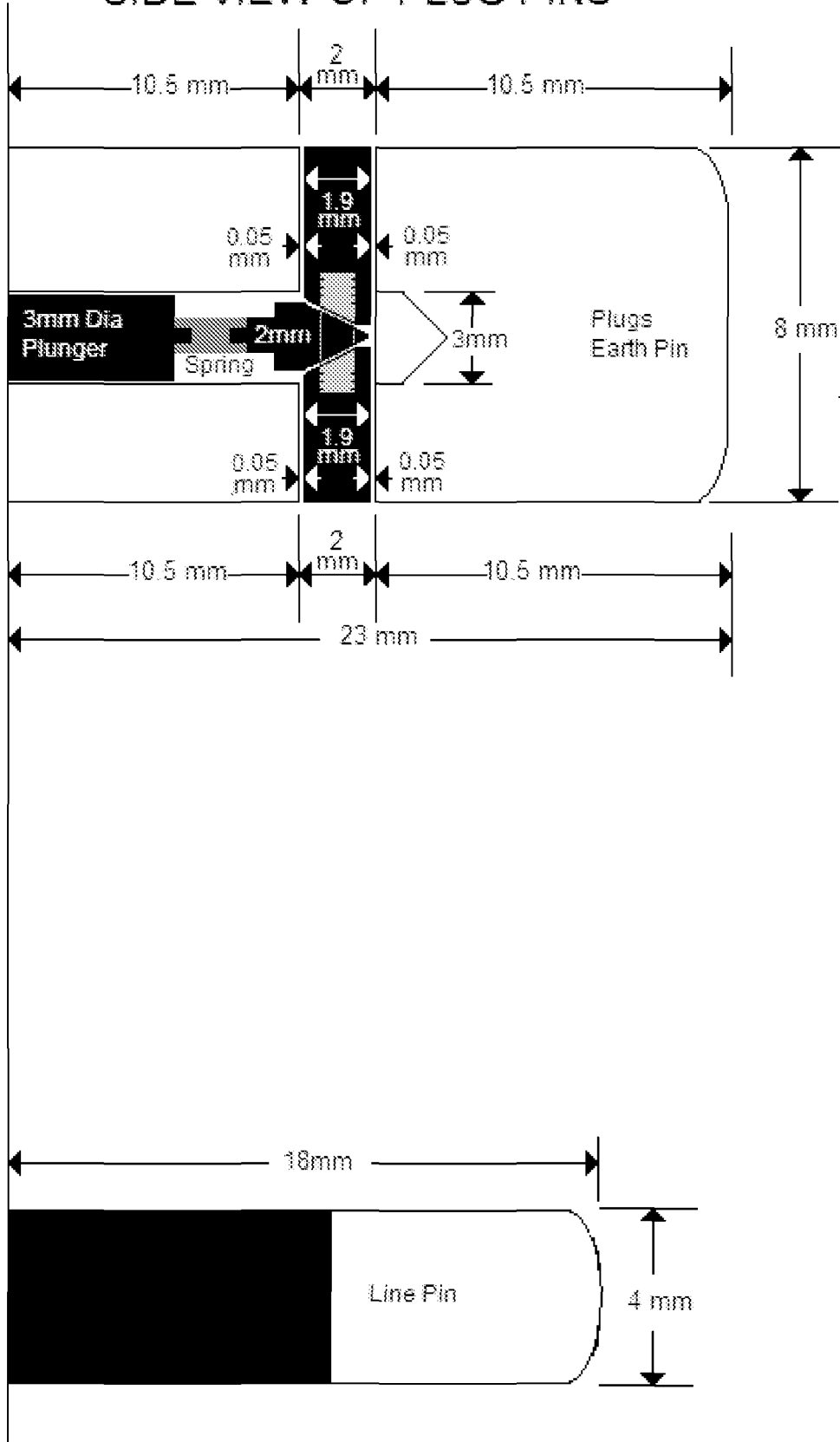




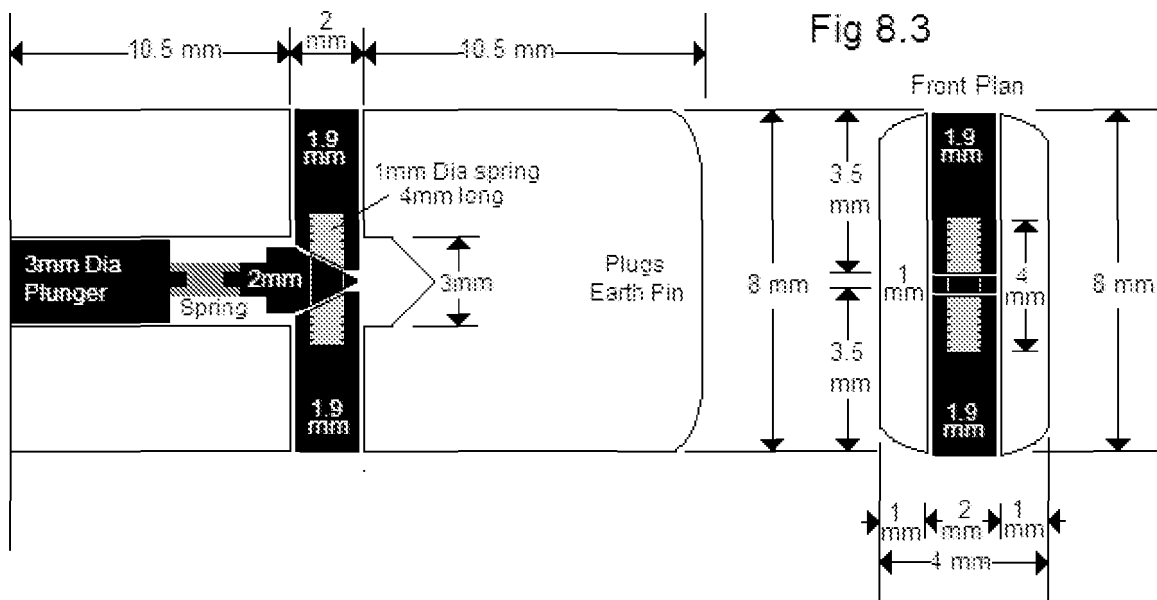
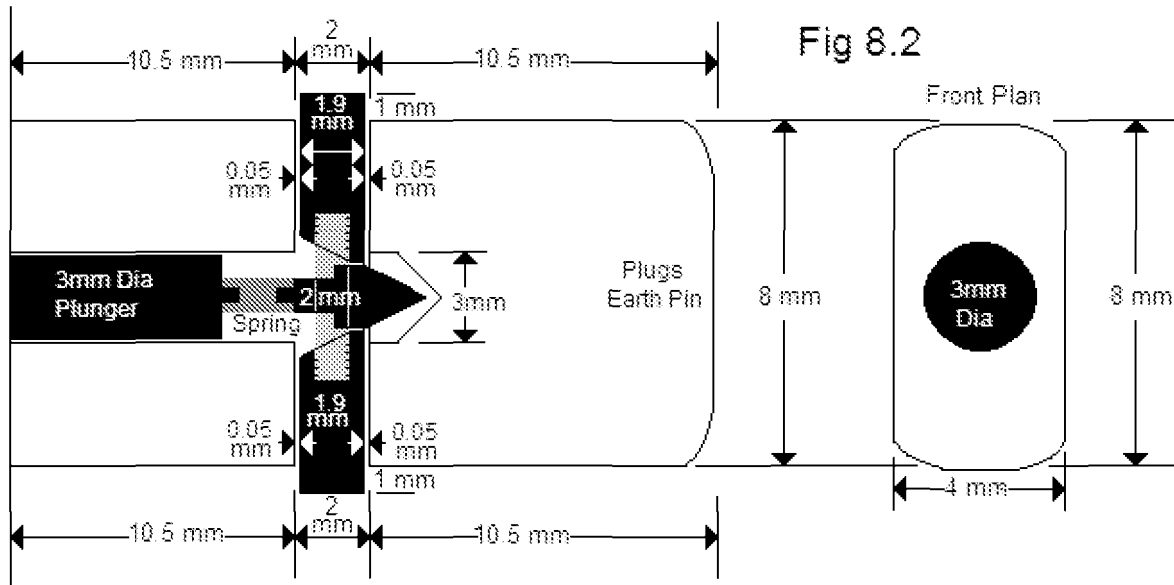
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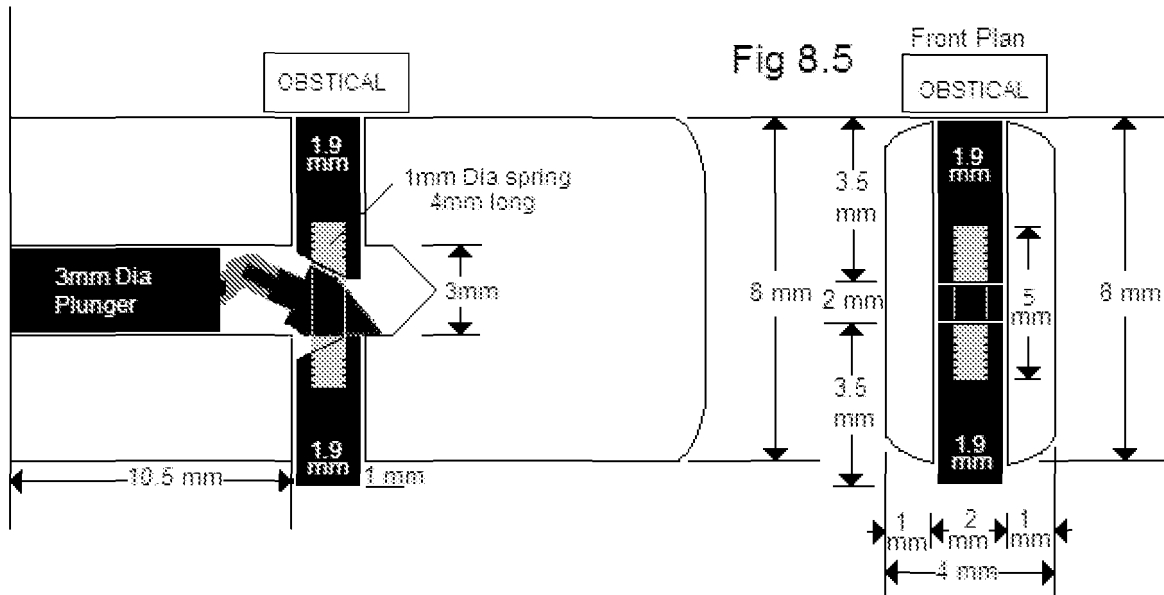
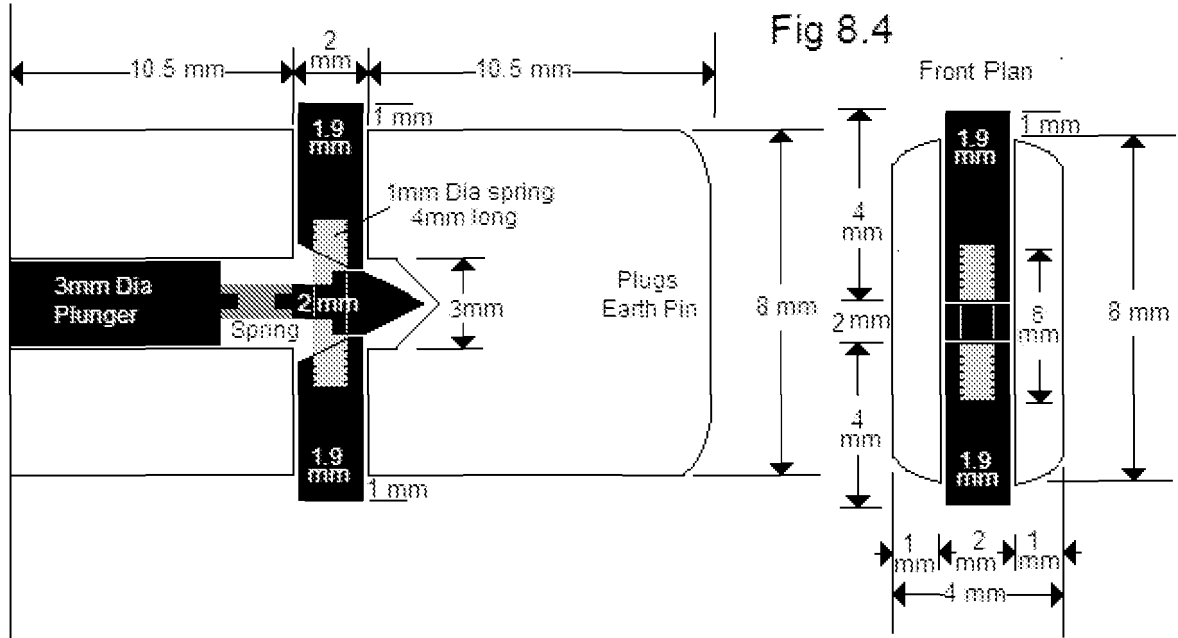
### SIDE VIEW OF PLUG PINS

Fig 8.1



Main  
BS1363  
Plug  
Body





**Lockable Earth Pin for a BS1363 plug by Paul John Maxwell-King**

Patent application number is **GB1100244.1** filed on **09/01/2011 20:06:10**

**Overview:**

The 3 pin BS1363 plug with a lockable earth pin will be mechanically locked into its socket via the BS1363 plugs earth pin so that it cannot easily be removed from the socket.

The patent is for the lockable earth pin of the BS1363 plug.

**How this works:**

Once you have wired your portable appliance with the BS1363 plug with a lockable earth pin you would place the plug into any socket. If the socket is a switched type then you must add to the plug a switch guard (see Fig 3) which easily fits over all three plug pins (Neutral, live and lockable earth) and when the BS1363 plug with a lockable earth pin is inserted into the socket the switch is covered at the bottom (see Fig 6) to stop anyone from easily switching off the socket.

When the BS1363 plug with a lockable earth pin is inserted into the socket (plugged in) then you would turn the plastic disc on top of the BS1363 plug (see Fig 1 and Fig 1.1) with a lockable earth pin clockwise with the special tool adaptor 180 degrees (half a revolution). This will lock the BS1363 plug with a lockable earth pin into the socket via the earth pin so that the BS1363 plug with a lockable earth pin can't be removed without reversing the lockable action.

**Technical Information:**

The BS1363 plug with a lockable earth pin is the same dimensions of a standard BS1363 plug only that it incorporates a lockable earth pin and a rotating 180 degree lockable screw on the plug top (see Fig 1 and Fig 1.1).

The BS1363 plug with a lockable earth pin is wired the same as a standard BS1363 plug (see Fig 7) and is also fitted together with the single cross head threaded screw which is between the earth pin and the live and neutral pins just like a standard BS1363 plug.

The only difference is that the earth pin has two spring loaded pins (see Fig 8.1) that protrude once the plastic disc is rotated clockwise 180 degrees. If for any reason one of the two pins can't protrude then only one pin will lock the earth pin into the socket (see Fig 8.5). Once the plastic rotating disc is turned anti-clockwise 180 degrees with the special tool then the protruding pins will retract back into the main earth pin (see Fig 8.1 and 8.3).

**Typical applications:**

Can be used for portable appliance equipment in hospitals where they can't be disconnected.

Office areas so that the electrical portable appliance must not be disconnected, for example network hub or laser printer. Use for any home products, fridge freezer, games console, TV or computer.

Any public place that you do not want the plug to be removed, show room, night club or airport.



### Drawing specification information.

#### **Fig 1:**

The plug top has a disc that turns clockwise 180 degrees using a two pronged key. This action pushes down a 3mm diameter plunger inside the centre of the earth pin using a sloping cam mechanism.

The centre of the plunger is attached to the centre of the plug top disc by a press fit nylon connector. This allows the 3mm plunger to return back to its home position once the plug top rotating disc is turned 180 degrees anti clockwise back to its original home position.

One side of the cam is 1mm thick and this slopes to a 3mm thick, giving a 2mm plunger travel in a downward direction. When unlocking the earth pin by turning the plug top disc anti-clockwise 180 degrees will lift the 3mm plunger back to its home position via the nylon connector or a spring around the 3mm plunger, see Fig 1.1.

The rotating disc on the top of the plug has two holes drilled for use of a special key to lock and unlock the plug from the socket.

#### **Fig 1.1:**

Shows a spring around the 3mm plunger so that when the plug top disc is rotated clockwise it will compress the spring and when anti-clockwise the spring will return back to its original state.

With this method there is no need for the nylon press fit connector.

#### **Fig 2:**

This is the connection inside the plug and you can see that the earth connection is to the side of the earth pin as the top of the earth pin is where the 3mm plunger fits into the earth pin. The size of the earth pin is a standard BS 1363 earth pin size.

#### **Fig 3:**

A 1mm thick plastic optional plug switch lock which slots over the BS1363 plug pins and covers the bottom part of the socket switch if fitted. This could change due to the different types of socket switches but the drawing is based on the majority of switched double sockets. Naturally this can be reversed if the lockable earth pin plug is in the right hand socket by sliding off the plug switch lock and reversing position to the other side.

#### **Fig 4:**

The two 2mm locking pins are protruded from the earth pin sides (top and bottom) by a 2mm diameter coned separator that travels over a 1mm diameter spring. The connecting spring is 4mm long connecting the two lockable pins (see Fig 4.1).

As well as separating the earth locking pins it also is used to centre the mechanism.

The 1mm spring will travel vertically into the separator body when a 2mm downward motion is introduced. For more information and a graphic showing the movement you can look at

<http://www.lockmyplug.com/tech.html>

**Fig 5:**

This is the full length of the earth pin and shows you the mechanism inside the earth pin. Basically if you imagine a 3mm hole drilled from the top of the earth pin (the top which is inside the plug top cover) all the way through towards the bottom 25mm in length and then a 2mm hole drilled through the centre of the earth pins narrow side (23mm from the bottom of the plug)

Once the 3mm diameter plastic plunger is rotated downward then the two 2mm pins that are held together by a 1mm diameter spring will move outward locking the plug into the socket. In some plug sockets only one of the pins will lock due to the top of the earth bar or the socket plastic being an obstruction. This is why we had to use a 1 mm spring in between the plunger and the separator.

One pin is enough to lock the plug into the socket. The earth pin still maintains conductivity and does not compromise the BS7671 17th edition wiring regulations and will still carry half the current capacity of the main cable in an earth fault condition.

**Fig 5.1:**

Again the earth pin but showing the wider view of the earth pin and the inside mechanism. You can find an animation of the pin movement at <http://www.lockmyplug.com/tech.html>

As the plunger travels down 2mm it opens up the two locking pins into the socket. It does this by spreading the two 2mm diameter locking pins that's attached by a 1mm diameter 4mm long spring.

**Fig 6:**

This is showing a double socket with the switch protector fitted to the plug. As you can see it covers the bottom part of the switch and it's switched on and can be reversed if you are using the other socket.

**Fig 7:**

Showing the inside of the plug with the 3mm plunger on the top of the earth pin. You can see the earth wire is connected to the terminal at the side of the earth pin which is pressed fit (welded) onto the earth pin.

**Fig 8:**

This shows you the top outside of the plug looking down from the earth pin and you can see one of the 2mm locking pins that would protrude outside the earth pin and into the socket. There is another pin on the opposite side that you can't see from the picture.

**Fig 8.1:**

Shows you the outside view of the plug, you can see the line pin below. Also this shows the mechanism that's inside the plug that will protrude the two locking pins once the plunger travels 2mm downwards.

**Fig 8.2:**

This shows the plunger at its maximum travel and these causes the two off 2mm locking pins to protrude into the socket. The 1mm diameter spring joining the two 2mm diameter pins at this stage is 6mm long when the two locking pins are protruded.

**Fig 8.3:**

This shows the plunger at its minimum travel and these causes the two off 2mm locking pins are inside the earth pin so that the pug can be removed from the socket. The 1mm diameter spring joining the two 2mm diameter pins at this stage is 4mm long when the two locking pins are inside the earth pin.

**Fig 8.4:**

Fig 8.4 is the same as fig 8.2 only that the plan view is showing the two pins protruding and the mechanism inside the earth pin.

**Fig 8.5:**

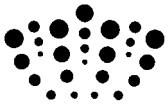
Showing what happens inside when one of the two 2mm pins hits an obstacle like an earth bar inside the socket. You can see that the 2mm diameter coned separator slides past the 2mm pin that can't move and moves the other 2mm pin to lock the 2mm pin into the socket.

If there are two obstacles and neither pin will be able to lock into the socket which should never be the case then the spring that is attached to the 3mm plunger and the 2mm coned separator will compress, thus not breaking the mechanism.

**Overview:**

The 3 pin BS1363 plug with a lockable earth pin will be mechanically locked into its socket via the BS1363 plugs earth pin so that it cannot easily be removed from the socket.

The patent is for a lockable earth pin that fits a BS1363 type plug.



**Application No:** GB1100244.1

**Examiner:** Paul Nicholls

**Claims searched:** 1 - 2

**Date of search:** 4 May 2011

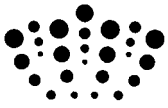
**Patents Act 1977: Search Report under Section 17**

**Documents considered to be relevant:**

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1, 2	GB 2318224 A (WHATMORE) - See spheres 333, screw 336
X	1, 2	GB 2193047 A (COX) - See bolt 17, figure 1
X	1, 2	GB 2150767 A (JAGO) - See end 14 of earth pin 13
X	1, 2	GB 2224892 A (SANFORD) - See catch 6
X	1, 2	GB 2234402 A (HILLMAN NEWBY) - See real plug in figure 7
X	1, 2	GB 2171265 A (STEWART) - See lock 17
X	1, 2	GB 2463688 A (JACKSON-LOCKYER) - See locking earth pin 6
A	-	GB 2222322 A (LEGG) - See switch cover 5
A	-	GB 2077509 A (BANKS) - See the figures

**Categories:**

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.



**Field of Search:**

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC<sup>X</sup> :

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Worldwide search of patent documents classified in the following areas of the IPC

H01R
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The following online and other databases have been used in the preparation of this search report

WPI, EPODOC
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**International Classification:**

<b>Subclass</b>	<b>Subgroup</b>	<b>Valid From</b>
H01R	0013/639	01/01/2006
H01R	0013/20	01/01/2006