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(56) Documents Cited:
EP 0622265 A2 **US 4915639 A**
US 20090263999 A1 **US 20020166890 A1**

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(54) Title of the Invention: **Apparatus and method for identifying a voltage and frequency to be supplied to a voltage**
Abstract Title: **Identifying whether a device contains a universal power supply**

(57) A device 130 to be powered contains an ID tag in its plug 137. An outlet 110 contains a plug reader 119 to read this tag. If it determines from this that the device contains a universal power supply then it supplies power at a fixed voltage and frequency, via switch 113 and receptacle 112 with a universal pin configuration. The outlet may store a list of suitable devices, which it may access over the internet using a transceiver 117.

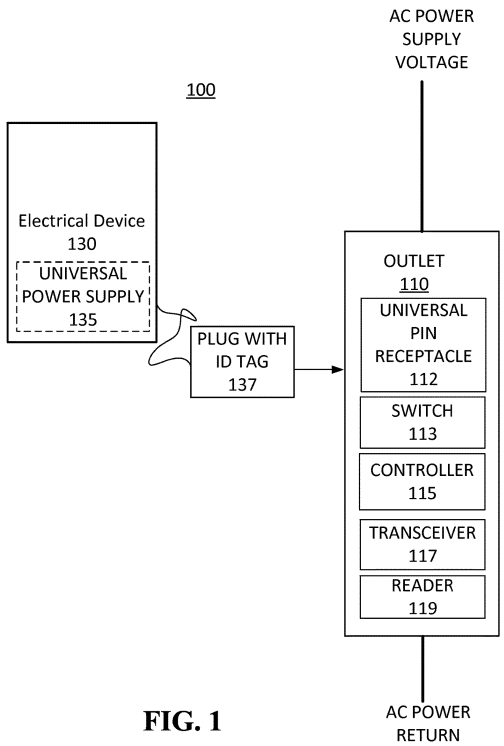

FIG. 1

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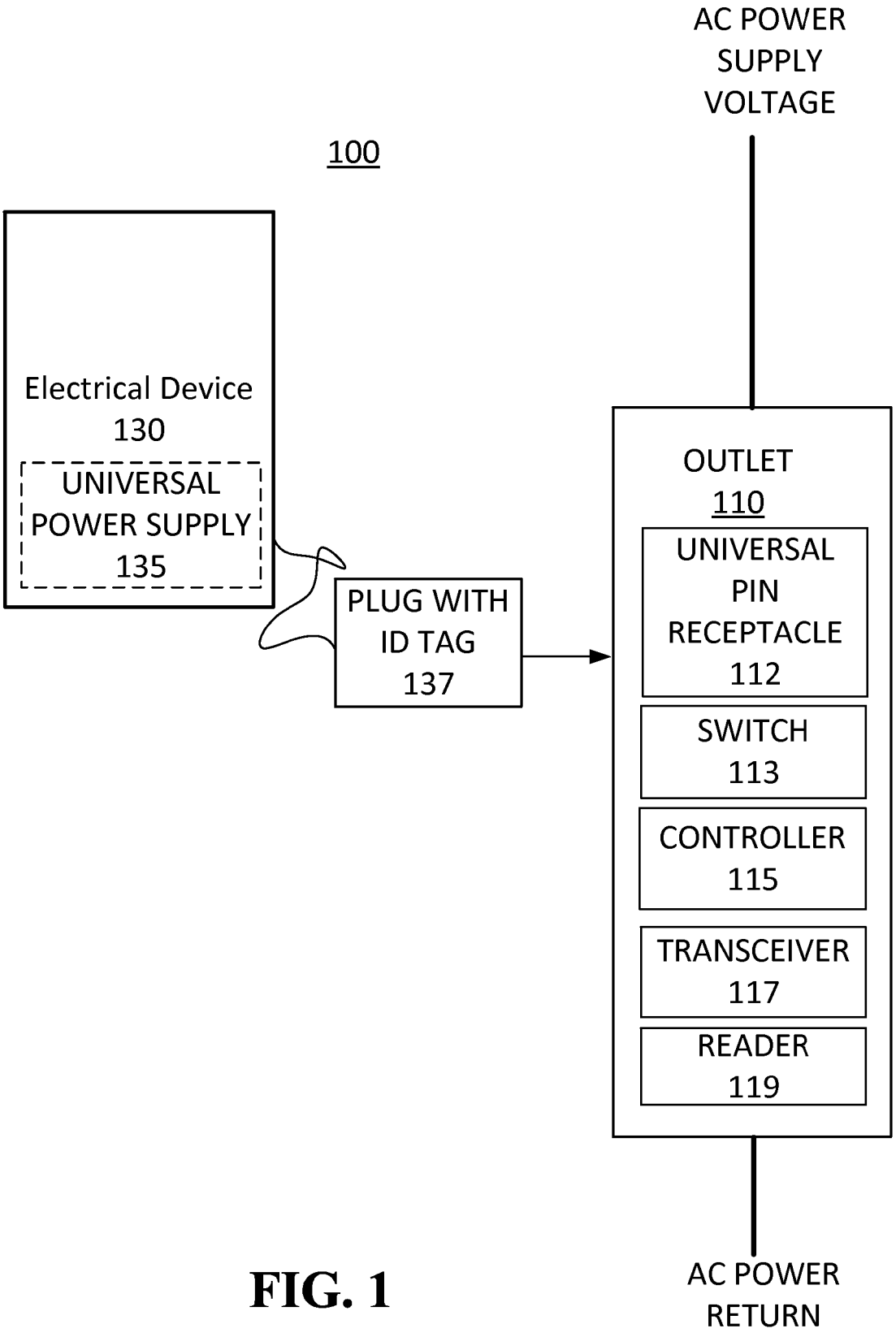
AC POWER SUPPLY VOLTAGE
100
Electrical Device 130
UNIVERSAL POWER SUPPLY 135
PLUG WITH ID TAG 137
OUTLET 110
UNIVERSAL PIN RECEPTACLE 112
SWITCH 113
CONTROLLER 115
TRANSCEIVER 117
READER 119
AC POWER RETURN

FIG. 1

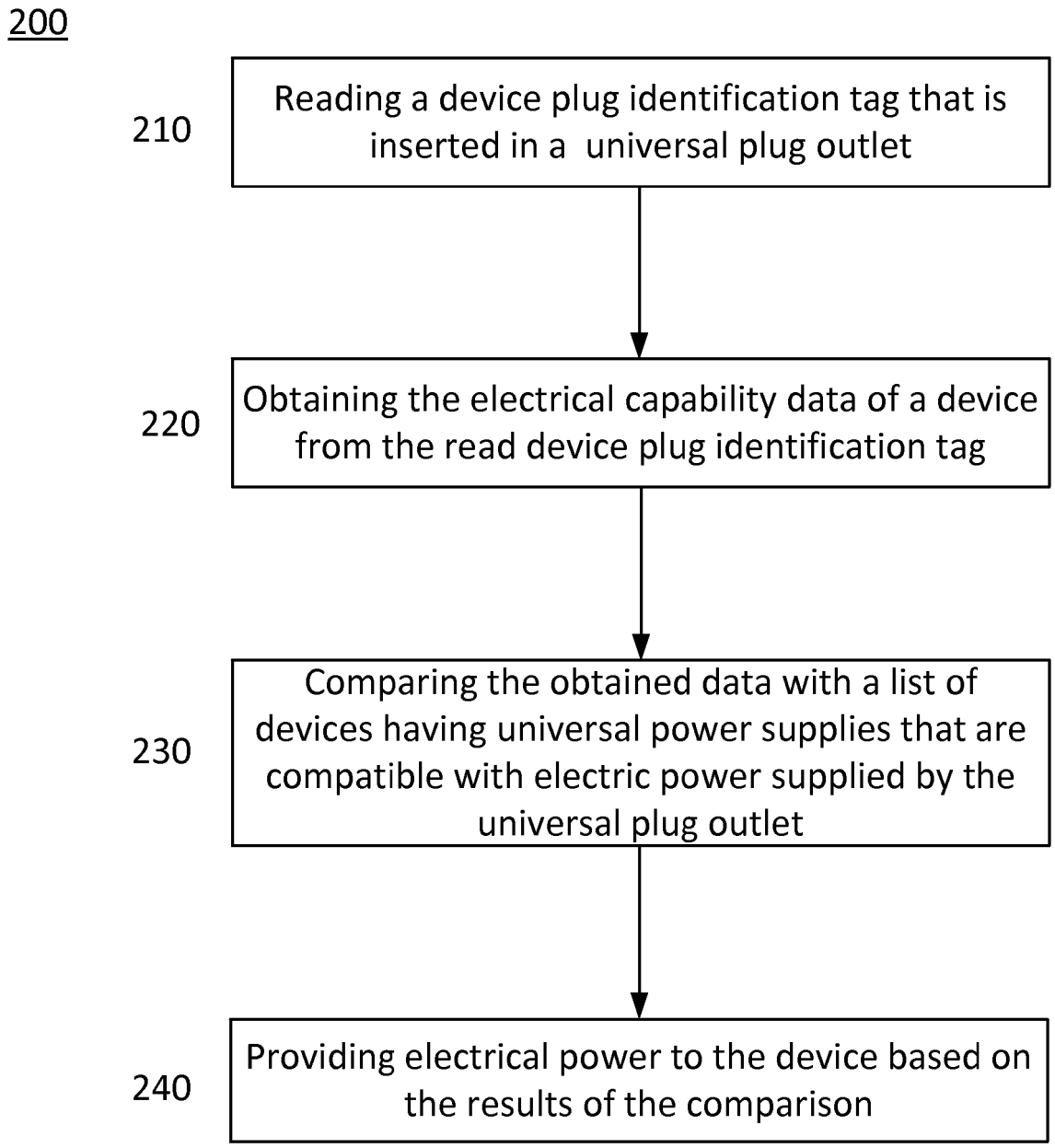
200
210
Reading a device plug identification tag that is inserted in a universal plug outlet
220
Obtaining the electrical capability data of a device from the read device plug identification tag
230
Comparing the obtained data with a list of devices having universal power supplies that are compatible with electric power supplied by the universal plug outlet
240
Providing electrical power to the device based on the results of the comparison

FIG. 2

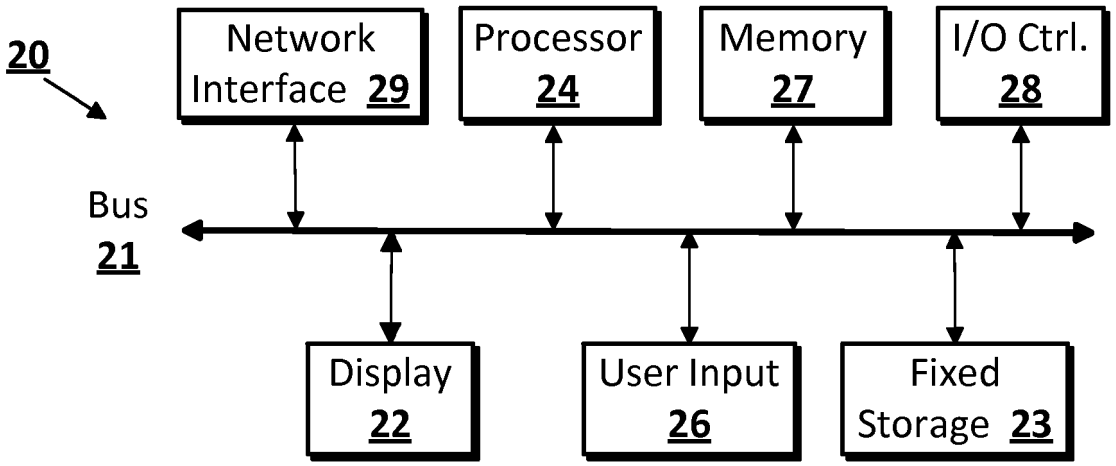
20
Network Interface 29
Processor 24
Memory 27
I/O Ctrl. 28
Bus 21
Display 22
User Input 26
Fixed Storage 23

FIG. 3

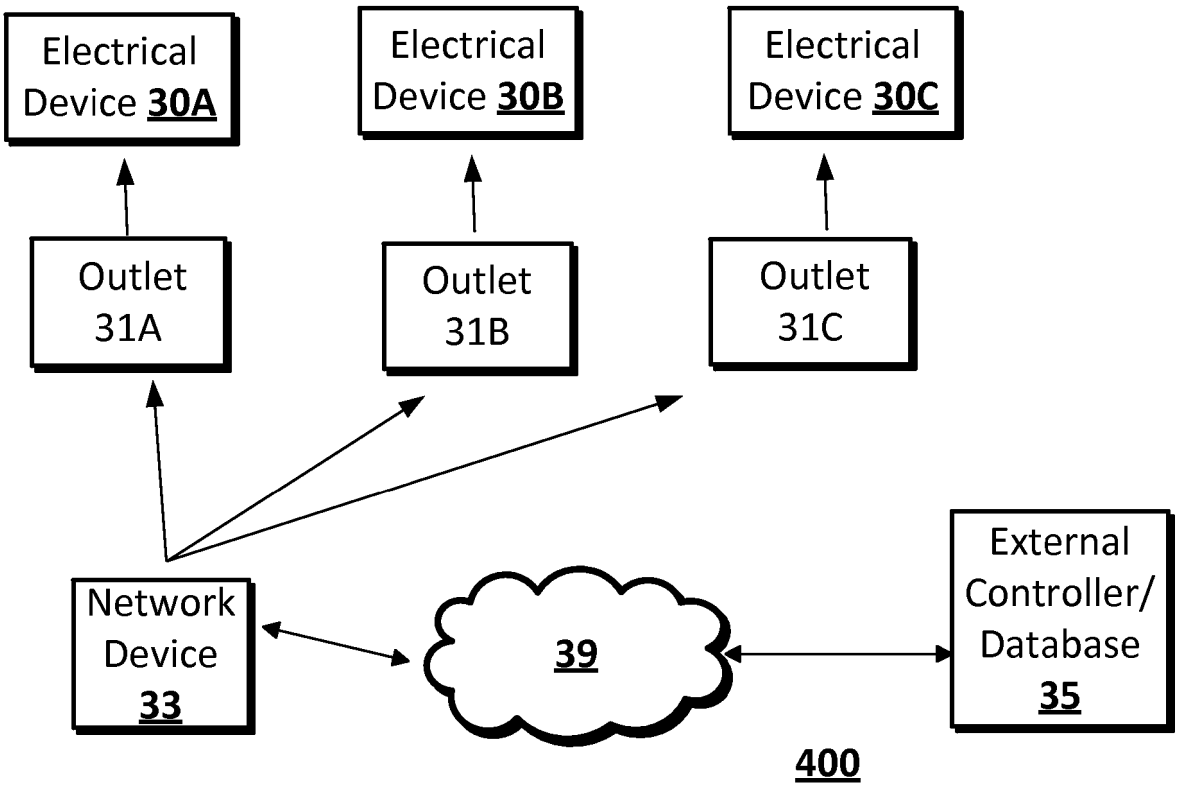
Electrical Device 30A
Electrical Device 30B
Electrical Device 30C
Outlet 31A
Outlet 31B
Outlet 31C
Network Device 33
39
External Controller/ Database 35
400

FIG. 4

APPARATUS AND METHOD FOR IDENTIFYING A VOLTAGE AND FREQUENCY TO BE SUPPLIED TO A VOLTAGE

BACKGROUND

Alternating current (AC) outlets in different regions of the world supply different AC voltages and frequencies. Historically, different pin configurations on the outlet and plug are used to prevent insertion of a plug into an outlet carrying an AC supply that a device cannot support. Recently, some devices are able to use a variety of voltages and/or frequencies because the device includes a "universal" power supply that conditions the supplied electrical power to form suitable for operation of the device. Popularity of these universal devices has also popularized the use of universal pin configurations, allowing the insertion of a variety of plug types into a single outlet. This allows a device with a universal power supply to be easily used in a region with, typically, a different pin configuration.

However, a potential hazardous situation exists because not all devices include a "universal" power supply to condition the supplied power. For example, a user may plug an 110V-only appliance into a 240V outlet. As a result, the appliance may be destroyed and possibly cause a fire.

BRIEF SUMMARY

According to an embodiment of the disclosed subject matter, a method comprises: reading a plug identification tag of an electrical device plug that is inserted in an outlet, the outlet configured to provide power at a single predefined specific voltage and frequency; obtaining a voltage and frequency compatibility of the electrical device based solely upon the read device plug identification tag, based upon the voltage and frequency compatibility, determining that the device contains a universal power supply; and responsive to determining that the device contains a universal power supply, providing electrical power to the electrical device at the single predefined specific voltage and frequency.

The step of obtaining may comprise: sending commands to a transceiver, wherein the transceiver has access to a network; retrieving a list of devices equipped with universal power supplies; and providing the retrieved list of devices to the controller. The method may further comprise outputting an indication that the electrical capability data read from the plug is found on the list of devices. The method may further comprise, in response to an outputted indication that the plugged-in electrical device has a universal power supply, operating a switching device to provide electrical power to the plugged-in electrical device. The method may further comprise: accessing a website at a remote server to obtain an updated list of devices with universal power supplies; and confirming, based on the updated list of devices, the presence of the universal power supply in the electrical device. The method may further comprise, in response to a conflict between the list of devices obtained from a list of devices equipped with a universal power supply and the updated list of devices, the outlet does not provide electrical power to the electrical device.

According to another embodiment of the disclosed subject matter, a method comprises: reading at an outlet a device plug identification tag connected to an electrical device, the outlet configured to provide electrical power at a single predefined specific voltage and frequency; identifying an electrical capability of the electrical device from the read device plug identification tag, wherein the electrical capability of the electrical device indicates that the device includes a universal power supply; obtaining a list of devices that have a universal power supply from an internal memory of the outlet; confirming that the electrical capability data is included on the list of devices; and based on the results of the confirmation, providing electrical power through the outlet to the device at the single predefined specific voltage and frequency.

The step of obtaining may comprise: sending commands to a transceiver, wherein the transceiver has access to a network; retrieving a list of devices equipped with universal power supplies; and providing the retrieved list of devices to the controller. The method may further comprise outputting an indication that the data read from the plug is found on the list of devices. The step of providing power through the outlet to the device may comprise, in response to an outputted indication that the plugged-in electrical device has a

universal power supply, operating a switching device to provide electrical power to the plugged-in electrical device.

According to another embodiment of the disclosed subject matter, a system comprises: a power receptacle for connection to a power supply and for supplying electrical power at a single predefined specific voltage and frequency to an electrical device, wherein the power receptacle is configured to receive a power supply plug of the electrical device; a plug reader for reading a communication tag of an electrical device plug; a power supply switch responsive to control signals; and a transceiver for sending and receiving signals. The system further comprises a controller configured to: receive read data from the plug reader; in response to receiving data read from the communication tag, identify an electrical capability of the electrical device, wherein the electrical capability of the electrical device indicates that the device contains a universal power supply; obtain a list of devices that have a universal power supply from an internal memory; confirm that the electrical capability data is included on the list of devices; and based on the results of the confirmation, provide electrical power to the device at the single predefined specific voltage and frequency.

The controller may be further configured to: command the transceiver to retrieve a list of devices equipped with universal power supplies from a website at a remote server; compare the data read from the plug with the list of devices equipped with universal power supplies; and output an indication that the data read from the plug is found on the list of devices. The power supply switch may be configured to, in response to an outputted indication that the plugged-in electrical device has a universal power supply, provide electrical power to the plugged-in electrical device. The transceiver may be operable to access a network to retrieve data from a data storage. The network may be the Internet. The transceiver may be operable to access the network via a wireless connection.

According to another embodiment of the disclosed subject matter, a system comprises: a power receptacle for connection to a power supply and for supplying electrical power at a single predefined specific voltage and frequency to an electrical device, wherein the power receptacle is configured to receive a power supply plug of the electrical device; a plug reader for reading a communication tag of an electrical device plug, a power supply switch

responsive to control signals; and a transceiver for sending and receiving signals. The system further comprises a controller configured to: receive read data from the plug reader; in response to receiving data read from the communication tag, obtain a voltage and frequency compatibility of the electrical device based solely upon the read communication tag; based upon the voltage and frequency compatibility, determine that the device contains a universal power supply; and responsive to determining that the device contains a universal power supply, provide electrical power to the electrical device at the single predefined specific voltage and frequency.

The controller may be configured to determine that the device contains a universal power supply by: sending commands to the transceiver, wherein the transceiver has access to a network; and receiving a list of devices equipped with universal power supplies from the transceiver. The controller may be configured to output an indication that the electrical capability data read from the plug is found on the list of devices. The power supply switch may be operable to provide electrical power to the electrical device in response to an indication that the electrical device has a universal power supply. The transceiver may be operable to access a website at a remote server to obtain an updated list of devices with universal power supplies. The controller may be configured to confirm, based on the updated list of devices, the presence of the universal power supply in the electrical device. The system may be configured not to provide electrical power to the electrical device in response to a conflict between the list of devices obtained from a list of devices equipped with a universal power supply and the updated list of devices.

According to an embodiment of the disclosed subject matter, a method is provided for supplying power to a device able to safely support the form of power available, and preventing the supply of power to devices unable to safely handle the available power. The method may include reading a device plug identification tag that may be inserted in an outlet. The outlet may be capable of delivering high residential or commercial voltages. Electrical capability data of a device may be obtained from the read device plug identification tag. The electrical capability data may indicate that the device contains a universal power supply. A controller may compare the obtained data with a list of devices

that are compatible with supplied electric power. The supply of electrical power to the device may be enabled or disabled based on the results of the comparison.

Another embodiment of the presently disclosed subject matter provides a method for enabling power to be supplied through a receptacle device having a universal pin configuration. The method may include reading by the receptacle device with the universal pin configuration a device plug identification tag inserted into an electrical device. An electrical capability of the electrical device may be identified. The electrical capability of the electrical device may be at least one of a voltage and frequency compatibility of the device. Based on the read voltage and frequency, it may be determined whether a universal power supply is included in and compatible with the device. Based on the results of the determination, power may be supplied to the device.

Another embodiment of the presently disclosed subject matter provides a system for enabling power to be supplied to a receptacle device with a universal pin configuration. The system may include a plug reader, a controller, a power supply switch, a receptacle, and a transceiver. The plug reader may read a communication tag of an electrical device plug. The power supply switch may be responsive to control signals from the controller. The controller may be configured to receive data read from the plug reader. The controller, in response to receiving data read from the communication tag, may identify an electrical capability of the electrical device. The electrical capability of the electrical device may be at least one of a voltage and frequency compatibility of the device. Based on the at least one voltage and frequency compatibility data, the controller may be configured to determine whether the device includes a universal power supply. The controller, based on the results of the determination, may cause power to be provided to the device based on the results of the comparison. The transceiver may send and receive signals under control of the controller.

Another embodiment of the presently disclosed subject matter provides a system comprising a power receptacle for connection to a power supply and for supplying power to an electrical device, wherein the power receptacle is adapted to receive a power supply plug of the electrical device. The system may further comprise a plug reader for reading a communication tag of an electrical device plug, The system may further comprise a power

supply switch responsive to control signals. The system may further comprise a controller configured to: receive read data from the plug reader; in response to receiving data read from the communication tag, identify an electrical capability of the electrical device, wherein the electrical capability indicates that the device contains a universal power supply; compare the obtained data with a list of devices equipped with universal power supplies that are compatible with the power supply; and provide electrical power to the device based on the results of the comparison. The system may further comprise a transceiver for sending and receiving signals under control of the controller.

Additional features, advantages, and embodiments of the disclosed subject matter may be set forth or apparent from consideration of the following detailed description, drawings, and claims. Moreover, it is to be understood that both the foregoing summary and the following detailed description are exemplary and are intended to provide further explanation without limiting the scope of the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide a further understanding of the disclosed subject matter, are incorporated in and constitute a part of this specification. The drawings also illustrate embodiments of the disclosed subject matter and together with the detailed description serve to explain the principles of embodiments of the disclosed subject matter. No attempt is made to show structural details in more detail than may be necessary for a fundamental understanding of the disclosed subject matter and various ways in which it may be practiced.

FIG. 1 shows an example system configuration according to an embodiment of the disclosed subject matter.

FIG. 2 shows a process flowchart according to an embodiment of the disclosed subject matter.

FIG. 3 shows a computer configuration according to an embodiment of the disclosed subject matter.

FIG. 4 shows a network configuration according to an embodiment of the disclosed subject matter.

DETAILED DESCRIPTION

It would be advantageous for an outlet to be able to determine whether a device includes or is equipped with a universal power supply. This feature may allow the potentially hazardous situation described above to be avoided by providing a plug identification tag to indicate to the outlet that the device does not have a universal power supply, or supports only a limited voltage or frequency range. FIG. 1 illustrates an embodiment of a system 100 capable of determining whether a device has a universal power supply. An electrical device 130 may connect to a receptacle through a plug 137 that may have a communication tag. The plug 137 communication tag may store a variety of information related to the electrical device. For example, the communication tag may store data that identifies the device's model number, serial number, manufacturer, place of manufacture, date of manufacture, equipment installed on the device, such as a universal power supply 135, voltage capability (e.g., a minimum voltage, a maximum voltage, or a voltage range), voltage frequency capability (e.g., a minimum frequency, maximum frequency, or frequency range), and other information related to the electrical device. The universal power supply 135 may be optional equipment for the electrical device 130. For example, the power supply 135 may be sold or otherwise provided separately from the device 130, such as in an add-on or optional module that is combined with the device 130. The electrical device 130 may be a household appliance, such as a refrigerator, a television, a microwave, a lighting system, or an audio system, for example, or a personal appliance, such as a hairdryer, an electric razor, and the like.

The universal power supply 135 may be able to accept, for example, voltages in the range of approximately 90-260 volts AC that may have a frequency in the range of approximately 45-65 Hz. The universal power supply 135 may be able to convert or transform any commonly supplied voltages into a voltage acceptable for proper operation of the equipped device. A laptop, blu-ray player, electronic gaming system and the like may be equipped

with a universal power supply as disclosed herein may be used in both the United States and Europe. For example, a laptop may have components that operate with a voltage of 110 volts and 60 Hz as is commonly provided in the United States, but a user may wish to use the laptop in Europe, where a common supply voltage is 240 volts and 50 Hz frequency. More generally, appliances as disclosed herein may be used in any location and/or with any voltage supply within a specified range, without requiring the appliance to be modified for use with a specific voltage.

The outlet 110 may receive AC electrical power from an AC electrical power source. The outlet 110 may include a universal pin configuration receptacle 112, a switch 113, controller 115, a transceiver 117 and a reader 119. The universal pin configuration receptacle 112 may accept several different types of commonly used plugs with different pins. For example, the plug may be a three pin configuration suitable for receiving 110 volts. Other plug configurations including two-pin, three-pin, four-pin or the like may be inserted into the universal pin configuration receptacle 112. The controller 115 may be a processor that executes program instructions to process data and provide control instructions to components. The reader 119 may read the plug identification tag to determine if the device has a universal power supply. The reader 119 may be capable of reading an RFID tag, near field communication (NFC) tag, or may be an optical barcode reader or an imaging device configured to obtain data from the plug communication tag.

The plug identification tag may be incorporated into a plug as an RFID label or tag, or a label incorporating a barcode, alphanumeric code or some other machine-readable code. For example, a near-field communication label or tag may be affixed to or embedded in a plug that may be read by the reader 119. Alternatively, the reader 119 on the outlet 110 may be an optical reader that reads a barcode or alphanumerical characters on the plug identification tag. A controller 115 within the outlet 110 may process the tag by performing, for example, optical character recognition (OCR) of the alphanumeric code read from the communication tag to obtain the identification information. Power for the controller 115 and other devices in the outlet 110 may be obtained from the AC power supply. Upon power loss, the switch 113 may default to a position that disconnects power from the device 130.

The controller 115 may have connections to the transceiver 117. The transceiver 117 may be responsive to control signals from the controller 115, and may connect with remote databases via Wi-Fi, the Internet, LAN, WAN or similar network. The controller 115 may retrieve data from the remote database related to the data read from the plug identification tag. The controller may process the data and output commands, for example, to the switch 113, based on the results of the processing. The outlet 110 may also include a memory (not shown) for storing data, such as a lookup table containing a listing of devices that may be plugged into the outlet. The list of devices may include devices that are expected to be plugged into the outlet 110. For example, if the outlet 110 is in a bathroom, then devices commonly used in a bathroom, such as hairdryers, razors, toothbrushes and the like will be included in the list of devices. The controller 115 may be programmed with location information to narrow the list of devices. The list of devices may be loaded into the outlet 110 memory at time of manufacture of the outlet or may be dynamically loaded when power is connected. The operation of the system 100 will be described in more detail with reference to FIG. 2.

FIG. 2 shows an example of a method for providing power to a device having a universal power supply according to an embodiment of the disclosed subject matter. The method 200 for providing electrical power to the universal power supply may begin by reading a device plug identification tag that is inserted in an outlet (step 210). The data read form the device plug identification tag may be processed by a controller. The electrical capability data of a device may be obtained by the controller, for example, by interpreting the NFC tag data, or performing optical character recognition of alphanumeric data, read from the device plug identification tag (step 220). The electrical capability data may indicate that the device contains a universal power supply, the device operating voltage and frequency, an operating voltage and frequency range, or combinations of each. Of course, other data may also be provided, such as a device model number and the like. The outlet may have an internal, non-volatile memory that stores a list of devices that have or are equipped with a universal power supply.

Alternatively, the outlet controller may access an external network and retrieve a list of devices that include a universal power supply. For example, the controller may send commands to a transceiver, which may access a communication network and connect to a

remote data storage or server. A list of devices equipped with universal power supplies may be retrieved from the remote data storage or server, and may be provided to the controller.

At step 230, the controller may compare the obtained data with a list of devices equipped with universal power supplies that are compatible with supplied electric power. As a result of the comparison of the data read from the plug identification tag with the list of devices having universal power supplies, electrical power may be provided to the plugged-in device including the universal power supply (step 240). For example, if it is determined based on the comparison that the plugged-in device includes a universal power supply, the controller may output an indication, such as a control signal to the switch, that the device has a universal power supply. The control signal to the switch may cause contacts within the switch to close and provide electrical power to the plugged-in device.

In an embodiment, the outlet controller may access a website at a remote server to obtain an updated list of devices with universal power supplies. The outlet controller may also review the list of devices and make a separate determination of the presence of the universal power supply. The additional determination of the device having a universal power supply by the remote server provides confirmation to the outlet that the device includes a universal power supply. In the case of conflicting results, the outlet may not provide power to the plugged-in device.

In an embodiment, the outlet controller may deliver data identifying the plugged-in device to an external server, for example, and the external server may make the determination that the device includes a universal power supply. The outlet controller may receive the determination result from the external server. If the presence of a universal power supply determination is made by the remote server, the comparing step 230 may be eliminated. In which case, the controller may send an indication directly to the switch in response to the determination made by the remote server.

Embodiments of the presently disclosed subject matter may be implemented in and used with a variety of component and network architectures. FIG. 3 is an example computer 20 suitable for implementing embodiments of the presently disclosed subject matter. The computer 20, which may act as an outlet controller, includes a bus 21 which interconnects major components of the computer 20, such as a central processor 24, a memory 27

(typically RAM, but which may also include ROM, flash RAM, or the like), an input/output controller 28, a user display 22, such as an indicator or small display, a user input interface 26, which may include one or more controllers and associated user input devices such as a button or switch, and the like, and may be closely coupled to the I/O controller 28, fixed storage 23, such as a hard drive, flash storage, Fibre Channel network, SAN device, SCSI device, and the like.

The bus 21 allows data communication between the central processor 24 and the memory 27, which may include read-only memory (ROM) or flash memory (neither shown), and random access memory (RAM) (not shown), as previously noted. The RAM is generally the main memory into which the operating system and application programs are loaded. The ROM or flash memory can contain, among other code, the Basic Input-Output system (BIOS) which controls basic hardware operation such as the interaction with peripheral components. Applications resident with the computer 20 are generally stored on and accessed via a computer readable medium, such as a hard disk drive (e.g., fixed storage 23), an optical drive, floppy disk, or other storage medium 25.

The fixed storage 23 may be integral with the computer 20 or may be separate and accessed through other interfaces. A network interface 29 may provide a direct connection to a remote server via a telephone link, to the Internet via an internet service provider (ISP), or a direct connection to a remote server via a direct network link to the Internet via a POP (point of presence) or other technique. The network interface 29 may provide such connection using wireless techniques, including digital cellular telephone connection, Cellular Digital Packet Data (CDPD) connection, digital satellite data connection or the like. For example, the network interface 29 may allow the computer to communicate with other computers via one or more local, wide-area, or other networks, as shown in FIG. 2.

Many other devices or components (not shown) may be connected in a similar manner (e.g., document scanners, digital cameras and so on). Conversely, all of the components shown in FIG. 3 need not be present to practice the present disclosure. The components can be interconnected in different ways from that shown. The operation of a computer such as that shown in FIG. 3 is readily known in the art and is not discussed in detail in this application. Code to implement the present disclosure can be stored in computer-readable storage media

such as one or more of the memory 27, fixed storage 23, removable media 25, or on a remote storage location.

FIG. 4 shows an example network arrangement 400 according to an embodiment of the disclosed subject matter. One or more electrical devices 30A-C, such as computers, light fixtures, razors, microwaves, and the like may connect to intelligent outlets 31A-C to receive electrical power. The outlets 31A-C may communicate with a network device 33. The network device 33 may include a processor that controls the operation of the outlets 31A-C. The network device 33 may communicate with the network 39, which may be a local network, wide-area network, the Internet, or any other suitable communication network or networks, and may be implemented on any suitable platform including wired and/or wireless networks. The outlets 31A-C may each communicate with one or more servers 35 and/or databases.

More generally, various embodiments of the presently disclosed subject matter may include or be embodied in the form of computer-implemented processes and apparatuses for practicing those processes. Embodiments also may be embodied in the form of a computer program product having computer program code containing instructions embodied in non-transitory and/or tangible media, such as floppy diskettes, CD-ROMs, hard drives, USB (universal serial bus) drives, or any other machine readable storage medium, wherein, when the computer program code is loaded into and executed by a computer, the computer becomes an apparatus for practicing embodiments of the disclosed subject matter. Embodiments also may be embodied in the form of computer program code, for example, whether stored in a storage medium, loaded into and/or executed by a computer, or transmitted over some transmission medium, such as over electrical wiring or cabling, through fiber optics, or via electromagnetic radiation, wherein when the computer program code is loaded into and executed by a computer, the computer becomes an apparatus for practicing embodiments of the disclosed subject matter. When implemented on a general-purpose microprocessor, the computer program code segments configure the microprocessor to create specific logic circuits. In some configurations, a set of computer-readable instructions stored on a computer-readable storage medium may be implemented by a general-purpose processor, which may transform the general-purpose processor or a device containing the general-purpose processor into a special-purpose device configured to

implement or carry out the instructions. Embodiments may be implemented using hardware that may include a processor, such as a general purpose microprocessor and/or an Application Specific Integrated Circuit (ASIC) that embodies all or part of the techniques according to embodiments of the disclosed subject matter in hardware and/or firmware. The processor may be coupled to memory, such as RAM, ROM, flash memory, a hard disk or any other device capable of storing electronic information. The memory may store instructions adapted to be executed by the processor to perform the techniques according to embodiments of the disclosed subject matter.

The foregoing description, for purpose of explanation, has been described with reference to specific embodiments. However, the illustrative discussions above are not intended to be exhaustive or to limit embodiments of the disclosed subject matter to the precise forms disclosed. Many modifications and variations are possible in view of the above teachings. The embodiments were chosen and described in order to explain the principles of embodiments of the disclosed subject matter and their practical applications, to thereby enable others skilled in the art to utilize those embodiments as well as various embodiments with various modifications as may be suited to the particular use contemplated.

CLAIMS

1. A method comprising:

reading a plug identification tag of an electrical device plug that is inserted in an outlet, the outlet configured to provide power at a single predefined specific voltage and frequency;

obtaining a voltage and frequency compatibility of the electrical device based solely upon the read device plug identification tag,

based upon the voltage and frequency compatibility, determining that the device contains a universal power supply; and

responsive to determining that the device contains a universal power supply, providing electrical power to the electrical device at the single predefined specific voltage and frequency.

2. The method of claim 1, wherein the obtaining comprises:

sending commands to a transceiver, wherein the transceiver has access to a network;

retrieving a list of devices equipped with universal power supplies; and

providing the retrieved list of devices to the controller.

3. The method of claim 1 or claim 2, further comprising:

outputting an indication that the electrical capability data read from the plug is found on the list of devices.

4. The method of any of claims 1 to 3, further comprising:

in response to an outputted indication that the plugged-in electrical device has a universal power supply, operating a switching device to provide electrical power to the plugged-in electrical device.

5. A method comprising:

reading at an outlet a device plug identification tag connected to an electrical device, the outlet configured to provide electrical power at a single predefined specific voltage and frequency;

identifying an electrical capability of the electrical device from the read device plug identification tag, wherein the electrical capability of the electrical device indicates that the device includes a universal power supply;

obtaining a list of devices that have a universal power supply from an internal memory of the outlet;

confirming that the electrical capability data is included on the list of devices; and

based on the results of the confirmation, providing electrical power through the outlet to the device at the single predefined specific voltage and frequency.

6. The method of claim 5, wherein the obtaining comprises:

sending commands to a transceiver, wherein the transceiver has access to a network;

retrieving a list of devices equipped with universal power supplies; and

providing the retrieved list of devices to the controller.

7. The method of claim 5 or claim 6, further comprising:

outputting an indication that the data read from the plug is found on the list of devices.

8. The method of any of claims 5 to 7, wherein the providing power through the outlet to the device comprises:

in response to an outputted indication that the plugged-in electrical device has a universal power supply, operating a switching device to provide electrical power to the plugged-in electrical device.

9. A system comprising:

a power receptacle for connection to a power supply and for supplying electrical power at a single predefined specific voltage and frequency to an electrical device, wherein the power receptacle is configured to receive a power supply plug of the electrical device;

a plug reader for reading a communication tag of an electrical device plug,

a power supply switch responsive to control signals;

a controller configured to:

receive read data from the plug reader;

in response to receiving data read from the communication tag, identify an electrical capability of the electrical device, wherein the electrical capability of the electrical device indicates that the device contains a universal power supply;

obtain a list of devices that have a universal power supply from an internal memory;

confirm that the electrical capability data is included on the list of devices; and

based on the results of the confirmation, provide electrical power to the device at the single predefined specific voltage and frequency; and

a transceiver for sending and receiving signals.

10. The system of claim 9, wherein the controller is further configured to:

command the transceiver to retrieve a list of devices equipped with universal power supplies from a website at a remote server;

compare the data read from the plug with the list of devices equipped with universal power supplies; and

output an indication that the data read from the plug is found on the list of devices.

11. The system of claim 9 or claim 10, wherein the power supply switch is configured to:

in response to an outputted indication that the plugged-in electrical device has a universal power supply, provide electrical power to the plugged-in electrical device.

12. The system of any of claims 9 to 11, wherein the transceiver is operable to access a network to retrieve data from a data storage.

13. The system of claim 12, wherein the network is the Internet.

14. The system of claim 12, wherein the transceiver is operable to access the network via a wireless connection.

15. The method of any of claims 1 to 4, further comprising:

accessing a website at a remote server to obtain an updated list of devices with universal power supplies; and

confirming, based on the updated list of devices, the presence of the universal power supply in the electrical device.

16. The method of claim 15, further comprising:

in response to a conflict between the list of devices obtained from a list of devices equipped with a universal power supply and the updated list of devices, the outlet does not provide electrical power to the electrical device.

17. A system comprising:

a power receptacle for connection to a power supply and for supplying electrical power at a single predefined specific voltage and frequency to an electrical device, wherein the power receptacle is configured to receive a power supply plug of the electrical device;

a plug reader for reading a communication tag of an electrical device plug,

a power supply switch responsive to control signals;

a controller configured to:

receive read data from the plug reader;

in response to receiving data read from the communication tag, obtain a voltage and frequency compatibility of the electrical device based solely upon the read communication tag;

based upon the voltage and frequency compatibility, determine that the device contains a universal power supply; and

responsive to determining that the device contains a universal power supply, provide electrical power to the electrical device at the single predefined specific voltage and frequency; and

a transceiver for sending and receiving signals.

18. The system of claim 17, wherein the controller is configured to determine that the device contains a universal power supply by:

sending commands to the transceiver, wherein the transceiver has access to a network; and

receiving a list of devices equipped with universal power supplies from the transceiver.

19. The system of claim 17 or claim 18, wherein the controller is further configured to:

output an indication that the electrical capability data read from the plug is found on the list of devices.

20. The system of any of claims 17 to 19, wherein the power supply switch is operable to provide electrical power to the electrical device in response to an indication that the electrical device has a universal power supply.

21. The system of any of claims 17 to 20, wherein:

the transceiver is operable to access a website at a remote server to obtain an updated list of devices with universal power supplies; and

the controller is configured to confirm, based on the updated list of devices, the presence of the universal power supply in the electrical device.

22. The system of claim 21, wherein:

in response to a conflict between the list of devices obtained from a list of devices equipped with a universal power supply and the updated list of devices, the system is configured not to provide electrical power to the electrical device.

23. A method comprising:

reading an electrical device's plug identification tag that is inserted in an outlet;

obtaining the electrical capability data of the electrical device from the read device plug identification tag, wherein the electrical capability data indicates that the device contains a universal power supply;

comparing, by a controller, the obtained data with a list of devices equipped with universal power supplies that are compatible with supplied electric power; and

providing electrical power to the device based on the results of the comparison.

24. The method of claim 23, wherein the obtaining comprises:

sending commands to a transceiver, wherein the transceiver has access to a network;

retrieving a list of devices equipped with universal power supplies; and

providing the retrieved list of devices to the controller.

25. The method of claim 23 or claim 24, further comprising:

outputting an indication that the electrical capability data read from the plug is found on the list of devices.

26. The method of claim 25, further comprising:

in response to the outputted indication that the plugged-in electrical device has a universal power supply, operating a switching device to provide electrical power to the plugged-in electrical device.

27. A method comprising:

reading a device plug identification tag connected to an electrical device;

identifying an electrical capability of the electrical device, wherein the electrical capability of the electrical device may be at least one of a voltage and frequency compatibility of the device;

based on the voltage and frequency, determining, by a controller, whether a universal power supply is included in the device;

based on the results of the determination, providing power through the outlet to the device.

28. The method of claim 27, wherein the determining comprises:

sending commands to a transceiver, wherein the transceiver has access to a network;

retrieving a list of devices equipped with universal power supplies; and

providing the retrieved list of devices to the controller.

29. The method of claim 27 or claim 28, further comprising:

outputting an indication that the data read from the plug is found on the list of devices.

30. The method of any of claims 27 to 29, wherein the providing power through the outlet to the device comprises:

in response to an outputted indication that the plugged-in electrical device has a universal power supply, operating a switching device to provide electrical power to the plugged-in electrical device.

31. A system comprising:

a power receptacle for connection to a power supply and for supplying power to an electrical device, wherein the power receptacle is adapted to receive a power supply plug of the electrical device;

a plug reader for reading a communication tag of an electrical device plug,

a power supply switch responsive to control signals;

a controller configured to:

receive read data from the plug reader;

in response to receiving data read from the communication tag, identify an electrical capability of the electrical device, wherein the electrical capability of the electrical device is at least one of a voltage and frequency compatibility of the device;

based on the at least one voltage and frequency compatibility data, determine whether a universal power supply is included in the device;

based on the results of the determination, provide power to the device based on the results of the comparison; and

a transceiver for sending and receiving signals under control of the controller.

32. The system of claim 31, wherein the controller is further configured to:

command the transceiver to retrieve a list of devices equipped with universal power supplies;

compare the data read from the plug with the list of devices equipped with universal power supplies; and

output an indication that the data read from the plug is found on the list of devices.

33. The system of claim 31 or claim 32, wherein the power supply switch is configured to:

in response to the outputted indication that the plugged-in electrical device has a universal power supply, provide electrical power to the plugged-in electrical device.

34. The system of any of claims 31 to 33, wherein the transceiver is operable to access a network to retrieve data from a data storage.

35. The system of claim 34, wherein the network is the Internet.

36. The system of claim 34 or claim 35, wherein the transceiver is operable to access the network via a wireless connection.

37. The system of any of claims 31 to 36, wherein the receptacle is adapted to receive a plurality of plug types, which have different plug pin configurations.

38. A system comprising:

a power receptacle for connection to a power supply and for supplying power to an electrical device, wherein the power receptacle is adapted to receive a power supply plug of the electrical device;

a plug reader for reading a communication tag of an electrical device plug,

a power supply switch responsive to control signals;

a controller configured to:

receive read data from the plug reader;

in response to receiving data read from the communication tag, identify an electrical capability of the electrical device, wherein the electrical capability indicates that the device contains a universal power supply;

compare the obtained data with a list of devices equipped with universal power supplies that are compatible with the power supply; and

provide electrical power to the device based on the results of the comparison; and

a transceiver for sending and receiving signals under control of the controller.

39. The system of claim 38, wherein the controller is configured to identify the electrical capability of the electrical device by:

sending commands to the transceiver; and

receiving a list of devices equipped with universal power supplies from the transceiver.

40. The system of claim 38 or claim 39, wherein the controller is further configured to:

output an indication that the electrical capability data read from the plug is found on the list of devices.

41. The system of claim 40, wherein the power supply switch is operable to provide electrical power to the electrical device in response to the outputted indication.

42. A computer-readable medium comprising instructions which, when executed by a suitable computer, cause the computer to perform a method in accordance with any of claims 1 to 8, 15, 16 or 23 to 30.

43. An apparatus comprising means for performing each of the steps of any of claims 1 to 8, 15, 16 or 23 to 30.

44. A method substantially as described herein and/or as illustrated in any of the accompanying drawings.

45. An apparatus substantially as described herein and/or as illustrated in any of the accompanying drawings.

Application No: GB1311653.8 **Examiner:** Paul Nicholls

Claims searched: 1 - 16 **Date of search:** 24 July 2013

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
A	-	US 2002/0166890 A1 (HSUAN et al) - UPS 100 reads the ID 116 of device 112 and supplies appropriate power
A	-	EP 0622265 A2 (FORD) - Charger 16 reads an ID from adapter 10 and draws appropriate power, see figs 1 and 2
A	-	US 4915639 A (COHN et al) - Outlet 12 reads ID 76 on plug 14 and switches as a result, see paragraph spanning columns 4 and 5
A	-	US 2009/0263999 A1 (ONOUE) - Plug must provide ID to get power, see paragraph [0009]

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^{X} :

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

H01R; H02G

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

WPI, EPODOC

International Classification:

Subclass	Subgroup	Valid From
H01R	0013/70	01/01/2006
H01R	0013/46	01/01/2006
H01R	0013/66	01/01/2006
H02G	0003/18	01/01/2006