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(54) **PORTABLE POWER CHARGER**

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H02J 7/00 (2006.01)

(52) **U.S. Cl.** **320/103**

(57) **ABSTRACT**

A portable charger is provided for charging one or more electronic devices simultaneously from a rechargeable internal battery. To accommodate multiple electronic devices, a portable charger unit is combined with multiple connectors for connecting to more than one electronic device, as necessary. For example, the charger unit can include at least one power output for connection to electronic devices via connectors or charging cables, including a squid connector providing multiple connection interfaces adaptable to a variety of electronic devices. Alternatively, the charger unit can include two or more connector cables connected to the charger unit and stored within the charger housing for connection to electronic devices when needed. An adapter unit is provided for connection to the charger unit for recharging the internal battery of the charger unit.

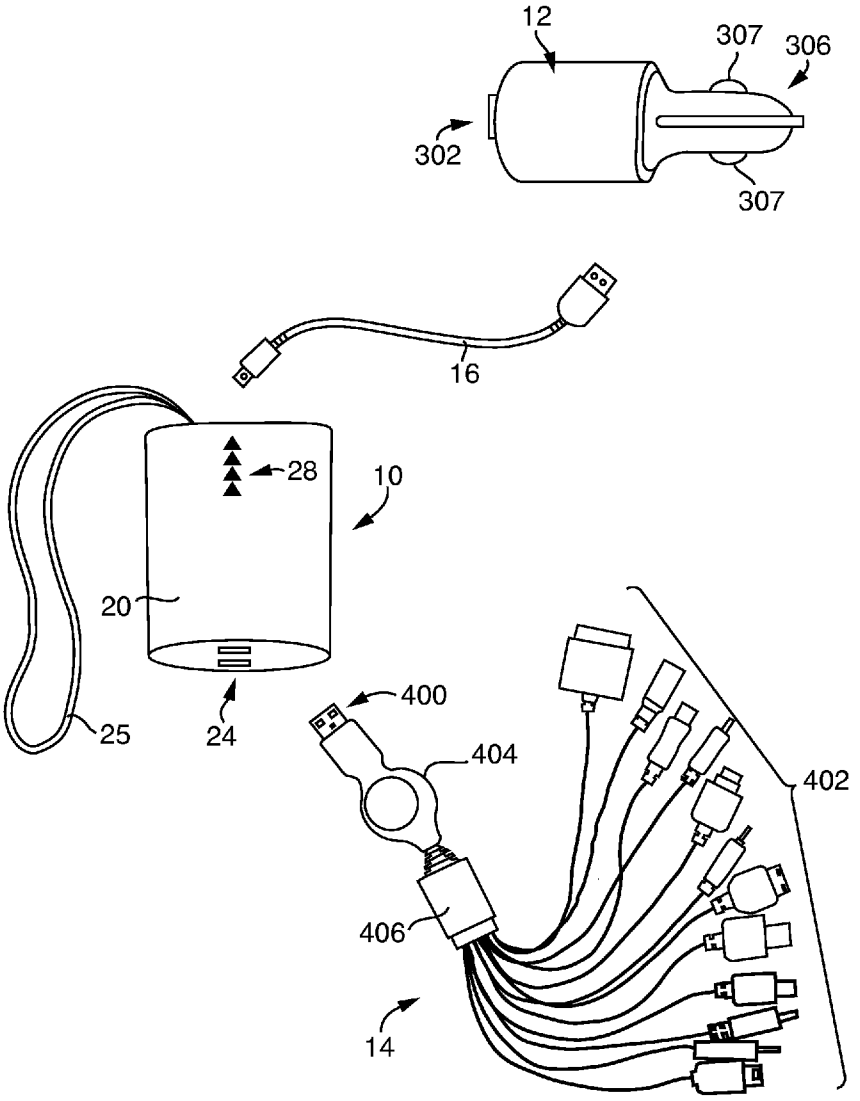
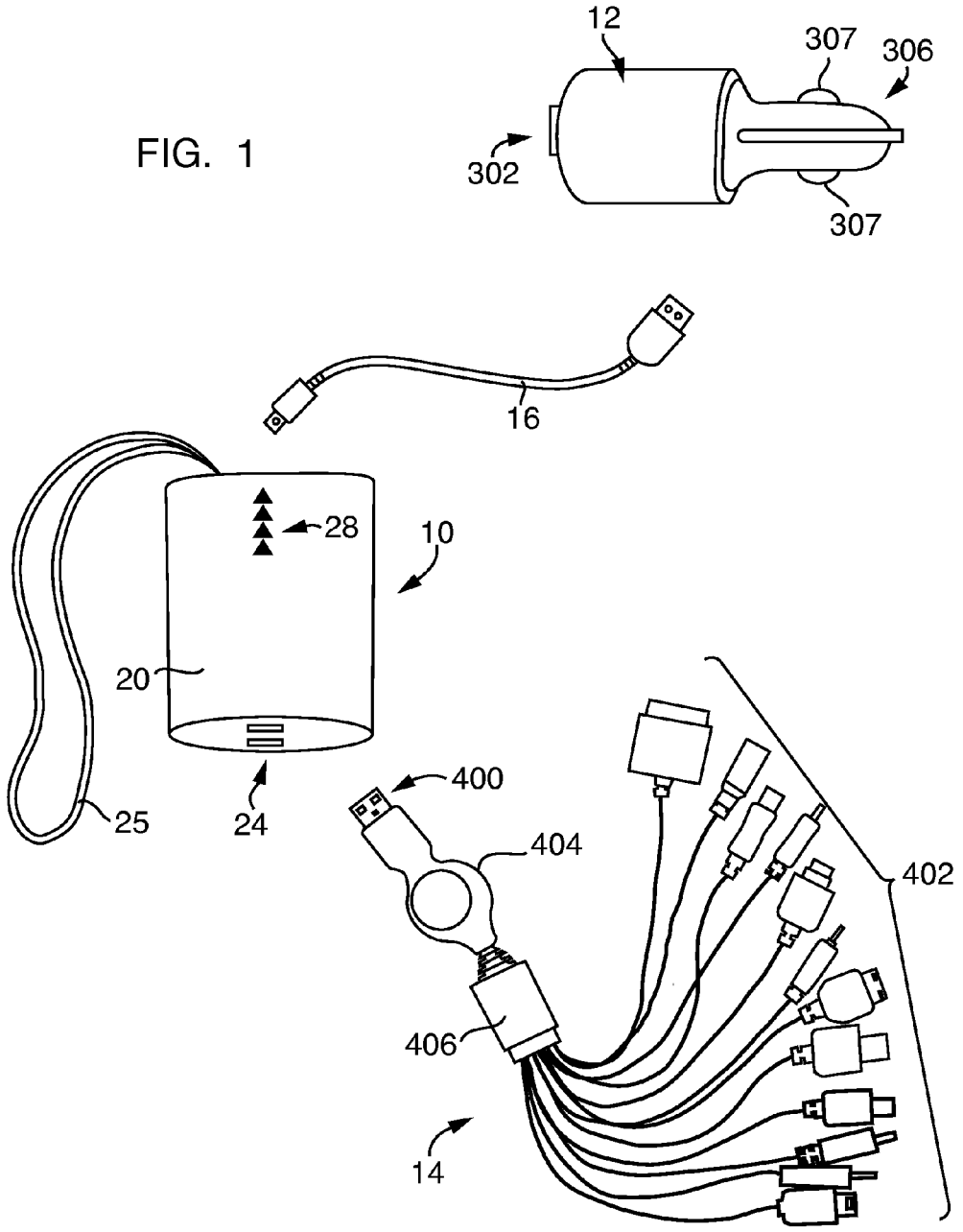


FIG. 1



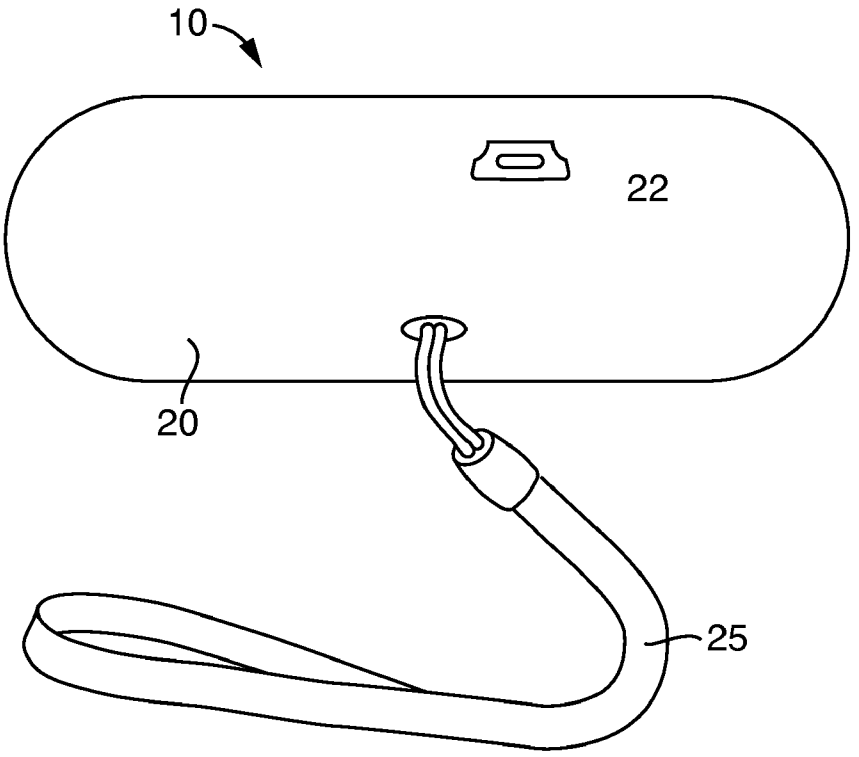


FIG. 2A

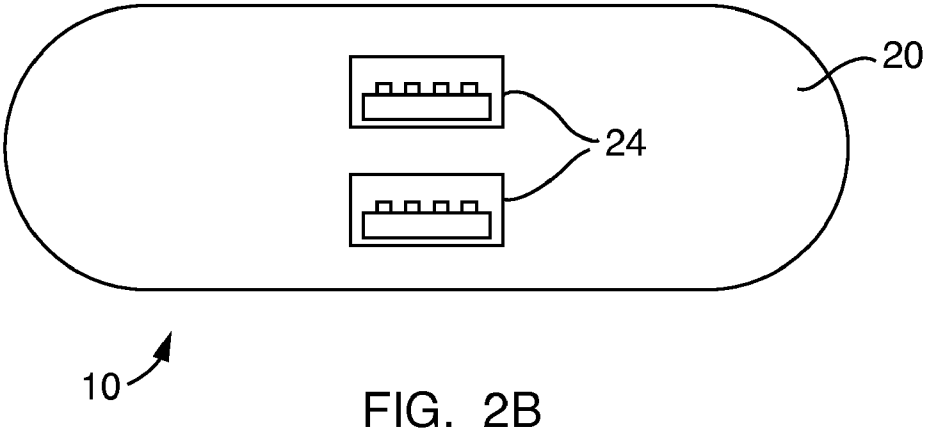


FIG. 2B

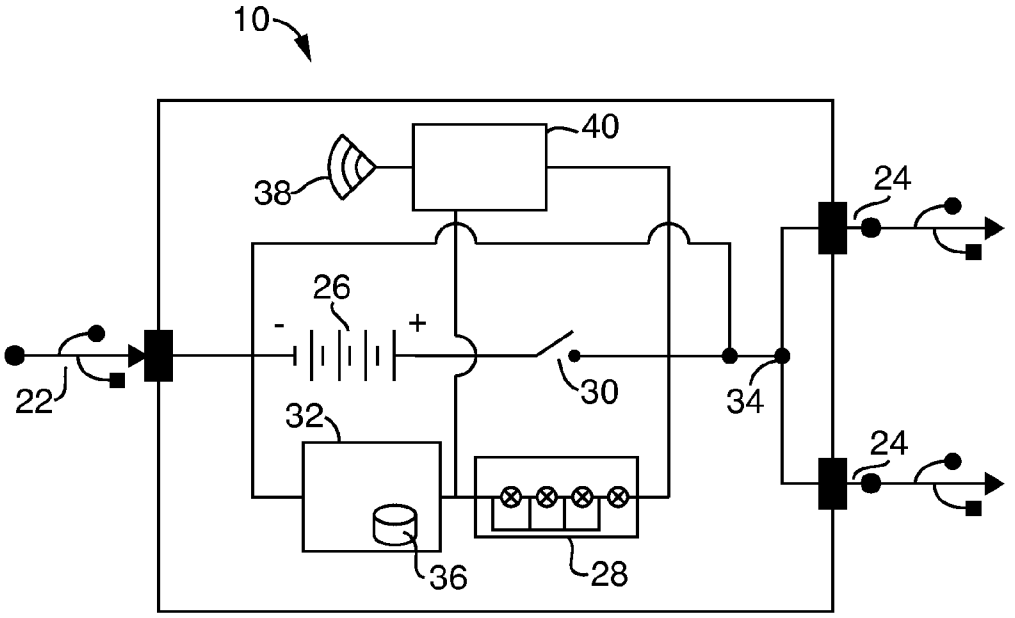


FIG. 3

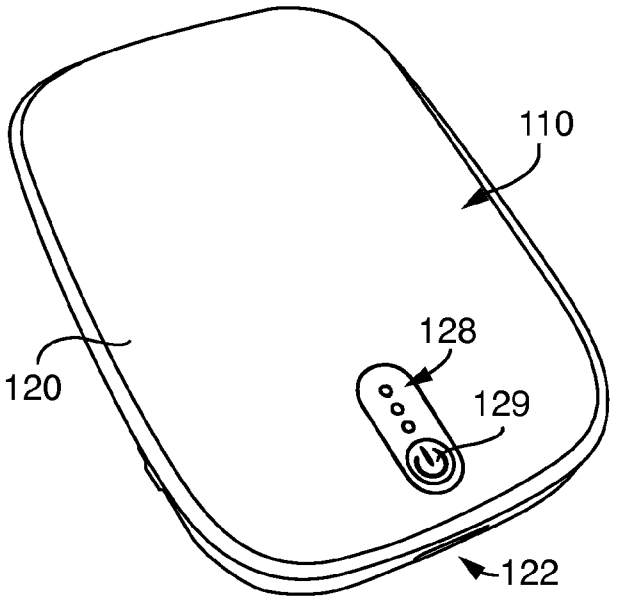

110
128
120
129
122

FIG. 4

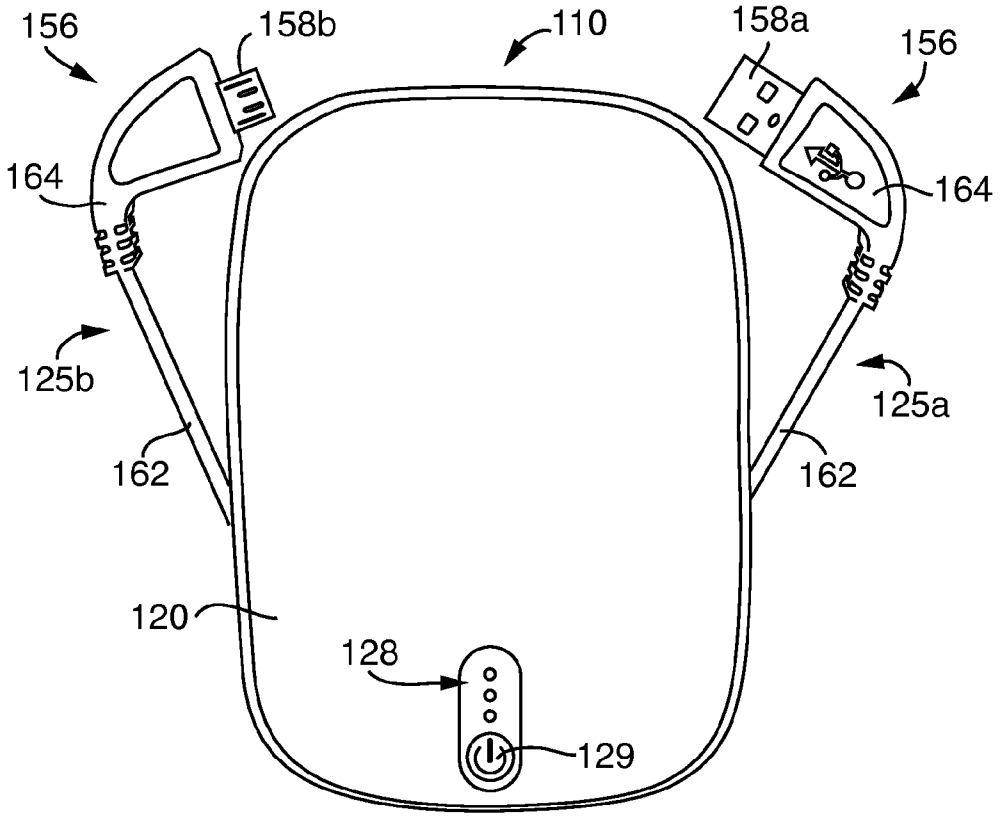

156
158b
110
158a
156
164
164
125b
125a
162
162
120
128
129

FIG. 5

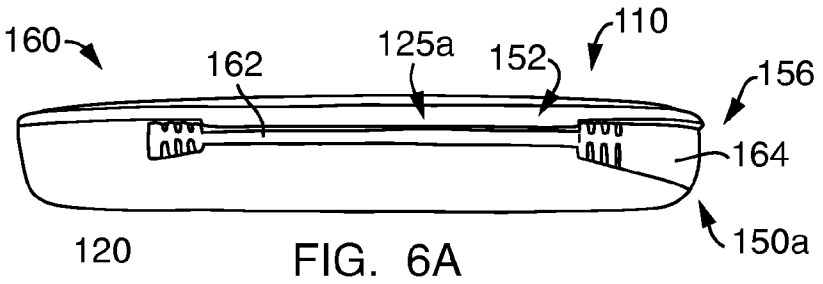


FIG. 6A

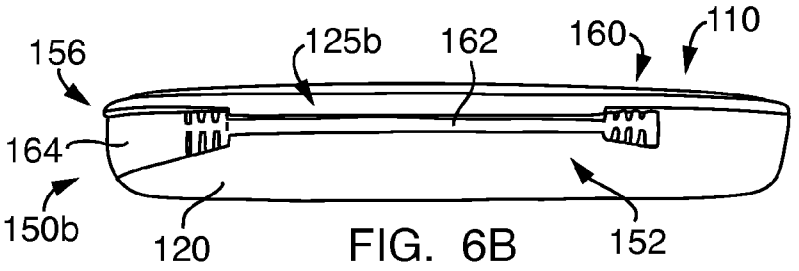


FIG. 6B

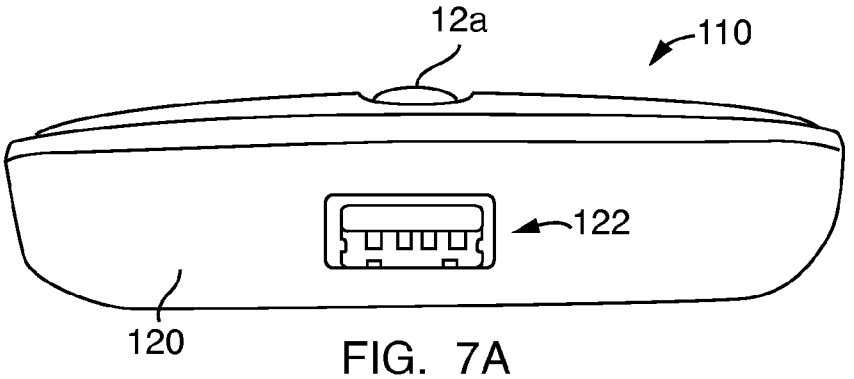


FIG. 7A

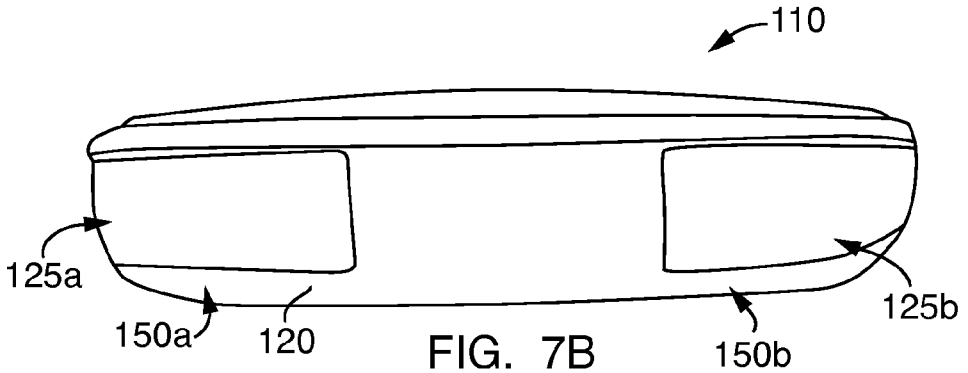


FIG. 7B

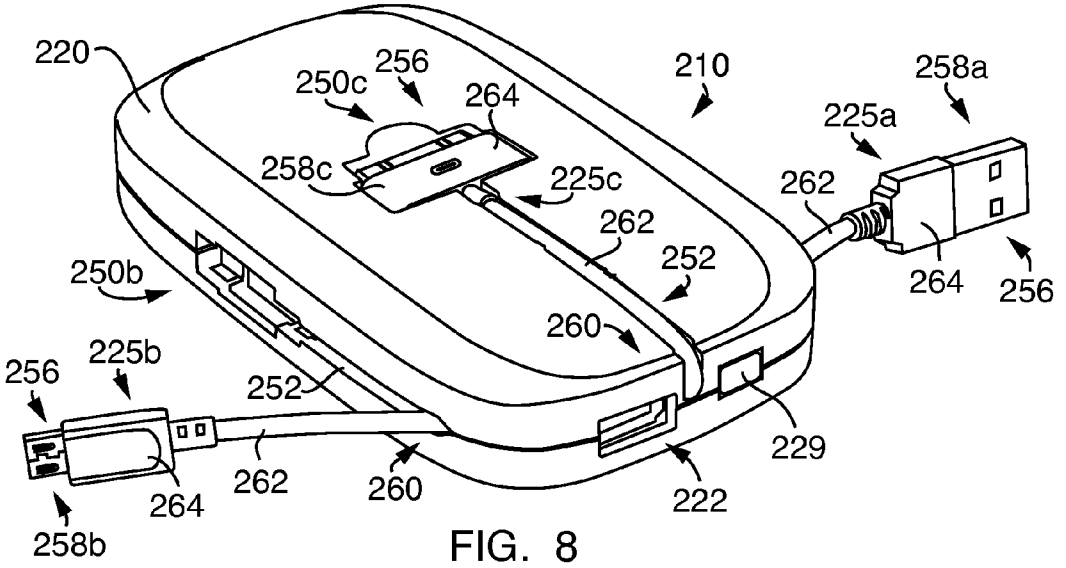


FIG. 8

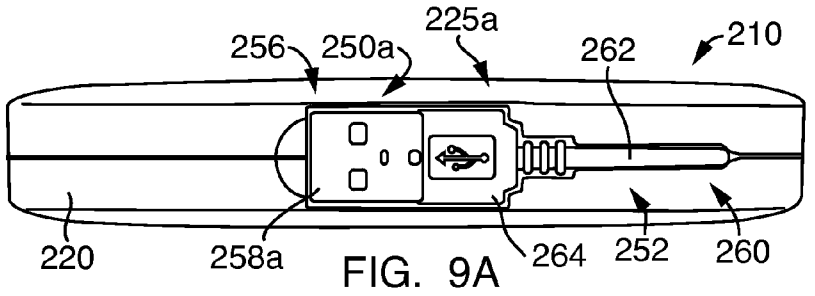


FIG. 9A

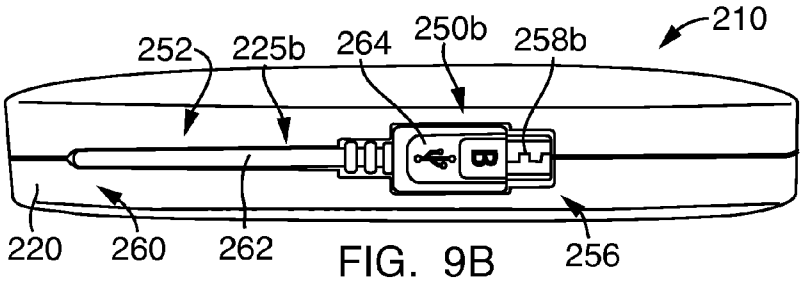


FIG. 9B

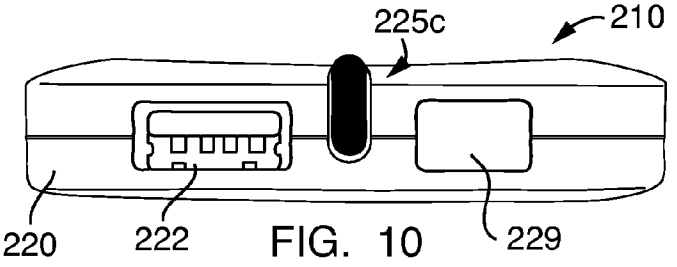


FIG. 10

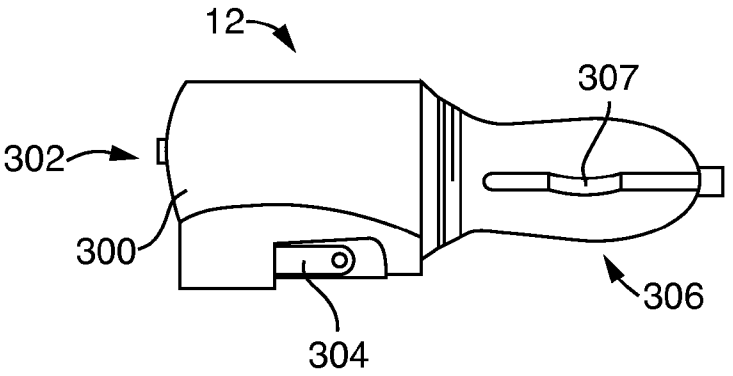


FIG. 11A

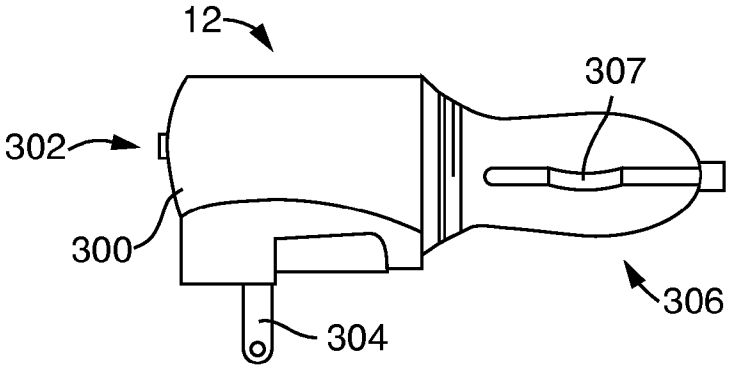


FIG. 11B

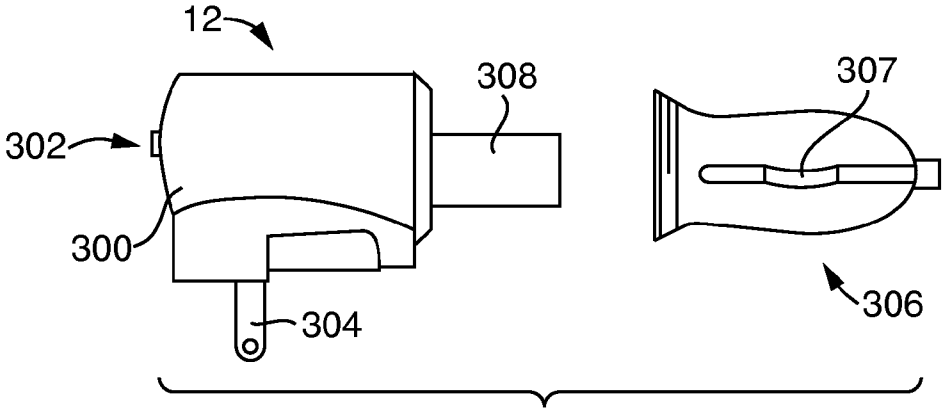


FIG. 11C

PORTABLE POWER CHARGER

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of U.S. Provisional Application No. 61/521,815, filed Aug. 10, 2011, which is incorporated herein by reference.

FIELD OF INVENTION

[0002] The present invention generally relates to power chargers for electronic devices, and more particularly relates to a portable charger capable of charging multiple electronic devices simultaneously.

BACKGROUND OF THE INVENTION

[0003] Present day consumers typically own several electronic devices specifically designed for portability and use on-the-go, including, for example, a mobile phone or smart phone, a portable music player like an iPod® or an MP3 player, a tablet, a portable gaming unit, and the like. Each of these devices requires frequent recharging. Such electronic devices typically utilize a cable for connecting the device to a power source, such as a wall outlet, a car charger, an airplane charger, or a computer. However, a separate cable is usually required for each power source. Moreover, different electronic devices often utilize different ports and interfaces such that a single charging cable is not compatible with multiple devices. Accordingly, a tech-savvy consumer, with several electronic devices, will usually have multiple charging cables to keep track of. Even then, the consumer may not always be in a place where a power source is readily available, or even if so, may not have the appropriate cable or adapter available to use with a particular power source.

[0004] With traditional power sources, such as those noted above, it is difficult to charge multiple devices at the same time, especially where each device requires a separate charging cable. For example, a car charger port will only handle a single cable at a time. Adaptor devices are available on the market for connecting multiple devices to a power source at the same time—for example, a two-to-one or three-to-one car charger splitter. However, such adapters are often only compatible with certain interfaces. Moreover, such adapters tend to be bulky.

[0005] Multi-source adapters are also available on the market for making a charging cable compatible with multiple power sources. For example, a charging cable with a traditional plug interface for connecting the cable to a wall outlet could exchange the plug with a car charger interface, or an airplane charger interface, or a standard USB interface. However, for such adapter devices, each of the interfaces is usually a separate piece, and therefore difficult to keep track of when not in use.

[0006] Similarly, interface attachments are also available for adapting a charging cable for use with a variety of devices, each with a different interface. However, such attachments are usually separate pieces, and therefore difficult to keep track of when not is use. Further, use of such attachments does not solve the problem presented by the need to charge multiple devices at the same time, as oftentimes, only one attachment can be used with a charging cable at a time.

[0007] Existing power charger devices also usually cannot charge multiple devices at the same time. Even if multiple devices may be attached to the power charger at the same time, the charger will prioritize how the devices are recharged—i.e., it will charge one device first and then the second. However, this approach risks not having sufficient charge remaining in the charger for fully charging the second device.

[0008] Further, some portable charger devices will not permit recharging from the charger when the charger is itself being recharged or connected to a power source. Such devices require the charger unit to be disconnected from a power source before a charge will be passed on to a device connected to the charger. Also, some such charger devices must be fully charged first before any device connected to the charger unit can be recharged.

[0009] In view of the foregoing, there is a need for a charger that can be used to charge a variety of electronic devices, including but not limited to smart phones, mobile phones, data tablets, music players, cameras, camcorders, gaming units, e-books, Bluetooth® headsets and earpieces, GPS devices, and the like, either individually or collectively in various combinations. Additionally, there is a need for such a charger that is portable and easily used in various conditions and locations to charge one or more electronic devices simultaneously, including but not limited to in a house or office, a car or an airplane. Still further, there is a need for a charger system that is compatible with a personal computer for not only charging one or more electronic device, but also provides a conduit by which data can be exchanged between such devices and a portable computer or an external storage database. Accordingly, it is a general object of the present invention to provide a portable charger that improves upon conventional power chargers currently on the market and that overcomes the problems and drawbacks associated with such prior art chargers.

SUMMARY OF THE INVENTION

[0010] In accordance with the present invention, a portable charger is provided for charging one or more electronic devices. In general, a portable charger kit may comprise a portable charger unit combined with multiple connectors for connecting to more than one electronic device, as necessary. For example, the charger unit can include at least one power output for connection to electronic devices via connectors or charging cables, including a squid connector providing multiple connection interfaces adaptable to a variety of electronic devices. Alternatively, the charger unit can include one or more connector cables connected to the charger unit and disposed within the charger housing for connection to electronic devices. Additionally, a portable charger kit may comprise a portable charger unit combined with an adapter unit for recharging the charger unit. Additional cables can be provided in the kit, such as a USB connection cable for connecting the portable charger unit to a computer for recharging or data exchange, without departing from the principles and spirit of the present invention.

[0011] In a first aspect of the present invention, the charger unit comprises a charger housing with a power input and at least one power output. A rechargeable battery is disposed within the charger housing and is operatively connected with the power input (for providing an electrical charge from an external power source for recharging the internal battery when the charge unit is connected to the power source) and the at least one power output (for charging other electronic devices from the rechargeable battery). The charger unit is portable as a result of the small size of the housing. Despite

the small size of the unit, the power capacity is very high so that the charger can accommodate multiple electronic devices at the same time. The charger unit further comprises connector means capable of connecting two or more electronic devices to the charger unit via at least one output port.

[0012] In an embodiment of the charger unit of the present invention, one or more connector cables, each having a respective connection interface, is attached to the charger housing and operatively connected to a respective power output of the charger unit. Preferably, the charger housing includes one or more cavity in which each connector cable may be stored, when not in use, and from which each connector cable may be removed when needed for recharging an electronic device. In a more preferable embodiment of the charger unit, the unit includes multiple connector cables each with a respective storage cavity formed in the charger housing, thereby permitting multiple electronic devices to be charged by the charger unit simultaneously.

[0013] In a preferred embodiment of the present invention, the charger unit turns on when it is plugged into an electronic device needing charging. In alternate embodiments, the charger unit may include "shake-to-activate" technology, whereby the unit is turned on by shaking the charger housing. Such technology utilizes an internal switch disposed within the housing that actuates to an "on" position by a quick force - such as the force created by a shake. The switch is operatively connected to a rechargeable battery unit.

[0014] In various embodiments of the present invention, the charger unit may further comprise a controller or processing unit, which can keep track of the capacity level of the battery unit, store data or provide a conduit means by which data can be exchanged between electronic devices, such as between a smart phone and a computer. In an embodiment of the present invention, information regarding the power level remaining in the battery unit is provided by shaking the charger unit.

[0015] In another aspect of the present invention, an adapter unit comprises multiple adapter interfaces for connecting the charger unit or another electronic device to a power source, such as a standard power outlet, a car charger port, an airplane charger port, or a USB interface. In a preferred embodiment, the adapter unit provides an all-in-one charger adapter in a compact, lightweight unit.

[0016] In another aspect of the present invention, a squid connector is provided for facilitating connection of one or more electronic devices to the portable charger unit or another power source. In a preferred embodiment, the squid connector comprises a USB connector adapted to engage a power output port of the portable charger unit or any other device with a USB port; multiple connector interfaces adaptable for various electronic devices; a retractor for extending the length of the cords of the squid connector; and a power indicator for confirming the existence of a power current being supplied through connector cables to the electronic devices to be charged.

[0017] An advantage of providing multiple connector cables—either attached to and included with the charger unit, or attachable to respective power output ports, or provided by a squid connector - is that several electronic devices can be charged at the same time. Moreover, multiple connector interfaces can be designed to attach to and accommodate various types of devices, including smart phones, mobile phones, data tablets, music players, cameras, camcorders, gaming units, e-books, Bluetooth headsets, GPS devices, and the like.

[0018] In another aspect of the present invention, a portable charger unit for simultaneously recharging a plurality of electronic devices, each having a rechargeable internal battery, comprises a charger housing internally storing a rechargeable battery, a power input port operatively connected to the internal battery for recharging the internal battery when the charger unit is connected to an external power source, and a plurality of power output ports operatively connected to the internal battery for charging electronic devices connected to the charger unit via the output ports. The charger unit recharges two or more electronic devices simultaneously when they are all connected to the charger unit via the output ports.

[0019] In another aspect of the present invention, a portable charger kit for simultaneously recharging a plurality of electronic devices, each having a rechargeable internal battery, comprises a portable charger unit and an adapter unit. The kit may further include a squid connector or additional connector cables for connecting multiple electronic devices to the charger unit for simultaneous charging.

[0020] These and other objects, features and advantages of the present invention will become apparent in light of the detailed description of embodiments thereof, as illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] FIG. **1** shows a portable charger kit in accordance with the present invention, including a portable charger unit, an adapter unit and a squid connector.

[0022] FIGS. **2**A and **2**B show planar end views of an embodiment of the portable charger unit of FIG. **1**.

[0023] FIG. **3** illustrates a schematic view of the internal components of the charger unit of FIG. **1**.

[0024] FIG. **4** shows a perspective view of an alternate embodiment of a portable charger unit in accordance with the present invention.

[0025] FIG. **5** shows a planar top view of the charger unit of FIG. **4**.

[0026] FIGS. **6**A and **6**B show planar side views of the charger unit of FIG. **4**.

[0027] FIGS. **7**A and **7**B show planar end views of the charger unit of FIG. **4**.

[0028] FIG. **8** shows a perspective view of another alternate embodiment of a portable charger unit in accordance with the present invention.

[0029] FIGS. **9**A and **9**B show planar side views of the charger unit of FIG. **8**.

[0030] FIG. **10** shows a planar end view of the charger unit of FIG. **8**.

[0031] FIGS. **11**A, **11**B and **11**C illustrate planar side views of an adapter unit comprising a part of a portable charger kit in accordance with the present invention.

DETAILED DESCRIPTION OF THE DRAWINGS

[0032] A portable charger kit in accordance with the present invention is shown in FIG. **1**, and generally comprises a portable charger unit **10** having a rechargeable internal battery for recharging one or more electronic devices. The portable charger unit **10** may have a variety of designs, as discussed further below, and may be provided with connector cables and adapters suitable for recharging the internal battery of the charger unit **10** and recharging the batteries of various electronic devices connected thereto. For example, as

shown in FIG. **1**, the portable charger kit may be combined with at least one of an adapter unit **12**, as shown in FIGS. **11**A-**11**C, for connecting the charger unit **10** to an external power source, and a squid connector **14**, for connecting one or more electronic devices to the charger unit **10**. Additional connector cables can be provided with the kit, such as a USB connection cable **16**, for connecting the portable charger unit **10** to the adapter unit **12** or separately to a computer for recharging or data exchange, without departing from the principles and spirit of the present invention.

[0033] In accordance with intended operation of the portable charging kit, a user can recharge one or more electronic devices using the charger unit **10**, a computer, a wall socket, a car power outlet, or an airplane power outlet. For example, the kit of the present invention can be used to charge smart phones, mobile phones, data tablets, music players, cameras, camcorders, gaming units, e-books, Bluetooth® headsets and earpieces, GPS devices, and the like, either individually or collectively in various combinations. In accordance with another feature of the present invention, the portable charger kit can also be used as a conduit by which data can be exchanged between electronic devices and a portable computer or an external storage database.

[0034] Referring to FIGS. **1**, **2**A and **2**B, the charger unit **10** comprises a charger housing **20** with a power input **22** (FIG. **2**A) and at least one power output **24** (FIG. **2**B). As shown in FIG. **2**A, the power input **22** generally takes the form of a mini-USB port, but can take the form of any known interface for connecting a device with a power source, including but not limited to a USB interface, a micro-USB interface, or an AC-to-DC connector interface. As shown in FIG. **2**B, two USB ports are provided as power outputs **24**. As a result, the charger unit **10** can be connected to two connector cords and/or devices via the USB ports at the same time. Again, the power output ports **24** can take the form of any known interface for connecting devices, including but not limited to a mini-USB interface, a micro-USB interface, or the like, and indeed, the two output ports **24** need not be the same type of interface. Additionally, the charger unit **10** can be connected to more than two devices at the same time using the squid connector **14** included in the portable charger kit of the present invention, as described in further detail below.

[0035] In accordance with the present invention, the charger unit **10** is readily portable as a result of the small size of the housing **20**. A lanyard **25** can be provided for carrying the charger unit **10**. Despite the small size of the unit, the power capacity is very high so that the charger **10** can accommodate multiple electronic devices at the same time.

[0036] Referring to FIG. **3**, the charger unit **10** comprises a rechargeable battery unit **26** disposed within the charger housing **20** that can be recharged by connecting the charger unit **10** to an external power source, such as a computer, a wall socket, a car or an airplane, using a power connecter attached to the power input **22** of the charger unit **10**. For example, the power connector can be a cable, such as the connection cable **16** having a mini-USB interface on one end for insertion into the input port **22** of the charger unit **10** and a standard USB interface on the other end for insertion into a USB port of a computer. Alternatively, the USB interface of the cable **16** can be inserted into the adapter unit **12** included in the portable charger kit of the present invention, as discussed in further detail below, for connection to a standard power source, such as a wall-socket via a standard U.S. plug or a variety of foreign plug styles, a car charger socket—e.g., a cigarette lighter socket—via a car charger interface, or an airplane charger socket via an airplane charger interface. In preferred embodiments, the rechargeable battery unit **26** is preferably a Lithium-Ion battery.

[0037] The rechargeable battery unit **26** is disposed within the charger housing **20** and is operatively connected with the power input port **22** for recharging the battery **26** when the charger unit **10** is connected to an external power source via the power input **22**. The rechargeable battery **26** is also operatively connected with each of the power output ports **24** for recharging electronic devices connected to the charger unit **10** via the power output ports **24** from the rechargeable battery unit **26**.

[0038] The charger housing **20** also includes a power indicator means **28** that will indicate not only that an electrical current is being supplied to one or more electronic devices connected to the charger unit, but also what the remaining capacity of the internal battery **26** in the charger unit **10** is. For example, in an embodiment of the present invention illustrated in FIG. **1**, the power indicator means **28** comprises a series of four lights, but can include more or fewer lights without departing from the principles and spirit of the present invention. When the battery **26** is at full capacity, all the lights will be lit up. As the battery power decreases, the lights will correspondingly decrease by one as the power is used—e.g., from four to three to two to one to none. Thus, when the battery **26** is at half capacity, only two lights will be lit up. If there is no capacity left in the internal battery **26**, none of the lights will be lit up. Alternatively, the power indicator means **28** can comprise a digital interface that provides a battery capacity level for the internal rechargeable battery unit **26**, or another known means of providing battery level information.

[0039] The charger housing **20** may include additional indicator means providing separate information for separate functions of the charger unit. For example, separate indicator means can be provided for the power level of the internal rechargeable battery unit **26** in the charger unit **10** and for the electronic devices attached to the charger unit **10** via each power output port **24**. Similarly, the device may use a digital output that provides data regarding the power level of the internal rechargeable battery unit **26** separate from data regarding any electronic device attached to the charger unit **10** via each of the output ports **24**.

[0040] In a preferred embodiment of the present invention, the charger unit **10** turns on when an electronic device needing charging is plugged into the charger unit **10**. In alternate embodiments of the present invention, the charger unit **10** may include "shake-to-activate" technology, whereby the unit **10** is turned on by shaking the charger housing **20**. In further alternate embodiments, the charger unit **10** can include an on/ off button or switch for activating and deactivating the unit **10**, such as the on/off button **129** shown in FIG. **4** and on/off button **229** shown in FIG. **8**.

[0041] As illustrated in FIG. **3**, the charger unit **10** includes an internal switch **30** disposed within the charger housing **20**. In a preferred embodiment, the switch **30** actuates to an "on" position when a device is connected to the charger unit **10** via an output port **24**. In an alternate embodiment, the switch **30** actuates to an "on" position by a quick force - such as the force create by a shake of the charger **10**.

[0042] The power indicator means **28** can confirm that the switch has been turned "on" by lighting up. The switch **30** is operatively connected to the rechargeable battery unit **26**. The charger housing **20** encloses various electrical components

(such as integrated circuit chips and other circuitry) to provide computing operations for the device. The integrated circuitry and other components may comprise a power supply (e.g., the internal rechargeable battery), a microprocessor and controller (e.g., a CPU), memory (e.g., ROM, RAM, flash), a circuit board, a hard drive, and/or various input/output (I/O) support circuitry. The electrical components may also include components for sending and receiving data and media (e.g., antenna, receiver, transmitter, transceiver, etc.).

[0043] As illustrated in FIG. **3**, the charger unit **10** comprises a controller, including a processing unit **32**, configured to execute instructions and to carry out operations associated with the charger unit **10**. For example, the processing unit **32** can keep track of the capacity level of the battery unit **26**, store data or provide a conduit means by which data can be exchanged between electronic devices, such as between a smart phone and a computer. The processing unit **32** communicates with the battery unit **26** to determine how much capacity is remaining in the battery **26**. Upon determining the capacity level, the processing unit **32** communicates with the power indicator means **28** to provide the user with the appropriate signal for showing how much capacity is remaining in the internal rechargeable battery unit **26**—e.g., two out of four lights indicates a half-full battery. In an alternate embodiment of the present invention, the power indicator means **28** can activate to show the power level in the internal battery **26** using the "shake-to-activate" technology—i.e., information regarding the power level remaining in the battery unit **26** may be provided by shaking the charger unit **10**. In still further embodiments, indicator means can be provided to show the battery capacity level of one or more electronic devices connected to the charger unit **10**.

[0044] The processing unit **32** also includes a smart interface to determine the total current required for the specific devices connected to the charger unit **10**. For example, if two devices are connected to the charger unit **10** via each of the output ports **24**, the processing unit **32** will assess how much power is needed to fully charge each of the devices and efficiently allocate an appropriate current to each of the devices at a node **34** so that each device can be charged in the shortest amount of time without interfering with the charging operation of the other device or without overloading the capacity of the charger unit **10**. Similarly, if four devices are connected to the charger unit **10** via a squid connector **14**, the processing unit **32** will likewise assess how much power is needed to fully and efficiently charge each of the devices. In this regard, the processing unit **32** operates in connection with the input/output (I/O) support circuitry to control interactions with devices connected to the charger unit **10**. The I/O support circuitry may be integrated with the processing unit **32** or may be a separate component. Generally, the I/O support circuitry operates by exchanging power (and possibly data) between the charger unit **10** and electronic devices connected thereto via the output ports **24**.

[0045] The processing unit **32** also preferably includes a timer for automatically turning the charger unit **10** off if there is no device attached to the unit **10** for a predetermined period of time. In this regard, the capacity of the battery **26** can be preserved. Upon shut down of the charger unit **10**, the power indicator means **28** will indicate that the charger **10** is being turned off—for example, the lights will provide a sequential blinking signal.

[0046] The processing unit **32** further includes a storage unit **36** that provides a place to hold data or instructions for operation of the charger unit **10** and rechargeable battery unit **26**, or data exchanged between the charger unit **10**, a computer, and electronic devices connected to the charger unit **10**, or memory needed for further operations of the charger unit **10**.

[0047] Referring again to FIG. **3**, the charger unit **10** can include communications components for sending and receiving data and media. For example, an antenna **38** is provided in connection with a transceiver **40**, or a receiver and transmitter (not shown), for communication over a wireless communication link. Components of transceivers, receivers, and transmitters are generally well known in the technical field, and thus are not further discussed herein.

[0048] The charger unit **10** of the present invention is adaptable to recharge an electronic device connected to the charger unit **10** directly from the internal rechargeable battery unit **26** or alternately from a power source to which the charger unit **10** is connected. Thus, the charger unit **10** can be a conduit through which a charge is provided from a standard power source, such as a wall socket, a car charger socket, an airplane charger socket, or even a computer. In this situation, the power charge bypasses the internal battery unit **26**. Indeed, in a preferred embodiment of the present invention, a charge provided from a standard power source can recharge the internal battery unit **26** simultaneously with one or more electronic devices connected to the charger unit **10**. Additionally, the portable charger unit **10** can be disconnected from a standard power source, even when electronic devices are connected to the charger unit **10**, and continue to recharge the electronic device from the internal battery unit **26** without interfering with the recharging process. For example, the charge switches from the external power source to the internal battery unit **26** as necessary.

[0049] An alternate embodiment of the charger unit is illustrated in FIGS. **4-7**. As shown, the charger unit **110** comprises a charger housing **120** having two connector cables **125***a* and **125***b* attached to the output ports of the charger unit **110** to connect respective electronic devices to the charger unit **110** to be recharged from an internal rechargeable battery unit **26**. As shown, the charger unit **110** further includes a power indicator means **128** (comprising three lights) and an on-off button **129**, each operatively connected to the internal functional components and electrical circuitry for operating the charger unit **110**. The internal functional components and electrical circuitry, including the internal rechargeable battery unit and a processing unit, operate similarly to the charger unit **110** shown in FIGS. **1-3** and discussed above.

[0050] Preferably, the connector cables **125***a* and **125***b* are permanently connected to the charger housing **120** and the output ports, although alternate embodiments may include connecter cables that are removable and replaceable so as to permit different connection interfaces to be used with the charger unit **110**. Storage cavities **150***a* and **150***b* are formed into the charger housing **120** for receiving the connector cables **125***a* and **125***b* when not in use. For example, FIGS. **4**, **6**A-**6**B and **7**B illustrate the connecter cables **125***a* and **125***b* disposed within the exterior volume and footprint of the charger housing **120** in a non-use condition. By comparison, FIG. **5** shows the connector cables **125***a* and **125***b* removed from the storage cavities **150***a* and **150***b* to make the connection interfaces thereon exposed for connection to electronic devices.

[0051] Referring again to FIG. **5**, the connector cables **125***a* and **125***b* each include a distal end **156** having a connection

interface **158**. For example, one cable **125***a* comprises a USB connection interface **158***a*, while the other cable **125***b* comprises a micro-USB connection interface **158***b*. The cables **125***a* and **125***b* may utilize any known interface without departing from the spirit and principles of the present invention. Additionally, as noted above, the cables **125***a* and **125***b* can be removable and replaceable so as to permit a user to easily change the connection interface for use with varying electronic devices. In this regard, the proximal ends **160** of the connector cables **125***a* and **125***b* include an interface that complements a respective output port provided in the charger housing **120** for attaching the connector cables **125***a* and **125***b* to the charger housing **120**.

[0052] The connector cables **125***a* and **125***b* are preferably flexible so they can be bent away from the charger housing **120** to connect to an electronic device during use of the charger unit **110**. The storage cavities **150***a* and **150***b* include channels **152** to receive a cord portion **162** of each of the cables **125***a* and **125***b* within the footprint of the charger housing **120**.

[0053] The distal ends **156** of the connector cables **125***a* and **125***b*, having the connection interfaces **158**, each includes a head **164** at the end of the respective cord portion **162** that is received within a respective storage cavity **150***a* and **150***b* on the charger housing **120**. Preferably, the shape of the head **164** complements the storage cavity to provide a sleek look to the charger housing **120** when the connector cables **125***a* and **125***b* are stored. Additionally, the head **164** and cord portion **162** of each cable **125***a* and **125***b* is preferably snap-fitted into the storage cavity **150***a* or **150***b* when stored so that the connector cables **125***a* and **125***b* do not accidentally disengage or otherwise come loose from the storage cavities **150***a* and **150***b*.

[0054] Referring to FIG. **7**A, the charger housing **120** further includes a power input port **122** for connecting the charger unit **110** to an external power source to recharge the internal rechargeable battery unit. As shown, the power input port **122** comprises a USB port, but can take the form of any known interface for connecting a device with a power source, including but not limited to a mini-USB interface, a micro-USB interface, or an AC-to-DC connector interface.

[0055] In an alternate embodiment of the charger unit **110**, the charger housing **120** can include one or more additional output ports comprising, for example, a USB port for receiving a separate connector cable (e.g., cable **16**) to attach additional devices to the charger unit **110**. Indeed, a squid connector **14** can be used to connect multiple devices to the charger unit **110** even when both of the connector cables **125***a* and **125***b* are already connected to respective devices. Still further, one of the attached connector cables **125***a* or **125***b* may be designated as a power input connection for recharging the internal rechargeable battery, and the other connector cable **125***a* or **125***b* and an output port (e.g., port **122** shown in FIG. **7**A) provided on the charger housing **110** can be used to charge multiple electronic devices simultaneously. In such a situation, the output port requires a separate cable to be connected between the charger unit **110** (via the output port) and the device(s) to be recharged.

[0056] Another alternate embodiment of the charger unit, generally designated by reference numeral **210**, is illustrated in FIGS. **8**-**10**. As shown, the charger unit **210** comprises a charger housing **220** having three connector cables **225***a*, **225***b* and **225***c* attached to output ports of the charger unit **210** to connect respective electronic devices to the charger unit **210** to be recharged from an internal rechargeable battery unit **26**. As shown, the charger unit **210** further includes an on-off button **229** on the end that is operatively connected to the internal functional components and electrical circuitry for operating the charger unit **210**. The internal functional components and electrical circuitry, including the internal rechargeable battery unit and a processing unit, operate similarly to the charger unit **210** shown in FIGS. **1**-**3** and discussed above.

[0057] Storage cavities **250***a*, **250***b* and **250***c* are formed into the charger housing **220** for receiving the connector cables **225***a*, **225***b* and **225***c* when not in use. For example, as shown in FIGS. **9**A and **9**B, two cavities **250***a* and **250***b* are formed on each side of the charger housing **220** for receiving a respective connector cable **225***a* and **225***b*. As shown in FIG. **8**, a third storage cavity **250***c* is formed on the top of the charger housing **220** for receiving its own connector cable **225***c*. FIGS. **9**A and **9**B illustrate connecter cables **225***a* and **225***b* disposed within the volume of the charger housing **220** in a non-use condition. By comparison, FIG. **8** shows one connector cable **225***c* disposed in a non-use condition, with the other two connector cables **225***a* and **225***b* are removed from their storage cavities **250***a* and **250***b* to make the connection interfaces **258** thereon exposed for connection to electronic devices.

[0058] As with the embodiment shown in FIG. **4** and discussed above, preferably, the connector cables **225***a*, **225***b* and **225***c* are permanently connected to the charger housing **220** and their respective output ports, although alternate embodiments may include connecter cables that are removable and replaceable so as to permit different connection interfaces to be used with the charger unit **210**.

[0059] Referring again to FIG. **8**, the connector cables **225***a*, **225***b* and **225***c* each include a distal end **256** having a connection interface **258**. For example, one cable **225***a* comprises a USB connection interface **258***a*, while another cable **225***b* comprises a micro-USB connection interface **258***b*, and a third cable **225***c* comprises an Apple® connection interface **258***c*. The cables **225***a*, **225***b* and **225***c* may utilize any known interface without departing from the spirit and principles of the present invention. Additionally, as noted above, the cables **225***a*, **225***b* and **225***c* can be removable and replaceable so as to permit a user to easily change the connection interface for use with varying electronic devices. In this regard, the proximal ends **260** of the connector cables **225***a*, **225***b* and **225***c* include an interface that complements a respective output port provided in the charger housing **220** for attaching the connector cables **225***a*, **225***b* and **225***c* to the charger housing **220**.

[0060] The connector cables **225***a*, **225***b* and **225***c* are preferably flexible so that they can be bent away from the charger housing **220** to connect to an electronic device during use of the charger unit **210**. Each of the storage cavities **250***a*, **250***b* and **250***c* includes a channel **252** to receive a cord portion **262** of the cables **225***a*, **225***b* and **225***c* within the footprint of the charger housing **220**.

[0061] The distal end **256** of each connector cable **225***a*, **225***b* and **225***c*, having the connection interface **258***a*, **258***b* or **258***c*, includes a head **264** at the end of the cord portion **262** that is received within a respective storage cavity **250***a*, **250***b* or **250***c* in the charger housing **220**. Preferably, the shape of the head **264** complements the storage cavity so that the cable and interface can be stored within the footprint and exterior volume of the charger housing **220** with no parts sticking out.

Additionally, the head **264** and cord portion **262** of each cable **225***a*, **225***b* and **225***c* is preferably snap-fitted into a respective storage cavity **250***a*, **250***b* and **250***c* when stored so that the connector cables **225***a*, **225***b* and **225***c* do not accidentally disengage or otherwise come loose from the storage cavities **250***a*, **250***b* and **250***c*.

[0062] Referring to FIG. **10**, the charger housing **220** further includes a power input port **222** for connecting the charger unit **210** to an external power source to recharge the internal rechargeable battery unit. As shown, the power input port **222** comprises a USB port, but can take the form of any known interface for connecting a device with a power source, including but not limited to a mini-USB interface, a micro-USB interface, or an AC-to-DC connector interface.

[0063] In an alternate embodiment of the charger unit **210**, the charger housing **220** can include one or more additional output ports comprising, for example, a USB port for receiving a separate connector cable to attach additional devices to the charger unit **210**. Indeed, the squid connector **14** can be used to connect multiple devices to the charger unit **210** even when all of the connector cables **225***a*, **225***b* and **225***c* are already connected to respective devices. Still further, one of the attached connector cables **225***a*, **225***b* or **225***c* may be designated as a power input connection for recharging the internal rechargeable battery of the charger unit **210**, and the other connector cables and at least one output port (e.g., port **222**) provided on the charger housing **220** can be used to charge multiple electronic devices simultaneously. In such a situation, the output port requires a separate cable (e.g., cable **16**) to be connected between the charger unit **210** (via the output port **222**) and the device(s) to be recharged.

[0064] As shown in FIGS. **11**A-**11**C, the adapter unit **12** comprises a multi-functional power supply adapter for providing power to a charger unit or a portable electronic device from multiple power sources, as needed. As shown, the adapter unit **12** comprises a main body **300** having multiple interfaces for connecting a portable charger device (e.g., charger units **10**, **110** or **210**) or another electronic device attached to the adapter unit **12** to a power source, such as a standard power outlet, a car charger port, an airplane charger port, or a computer. In a preferred embodiment, the adapter unit **12** provides an all-in-one charger adapter in a compact, lightweight unit.

[0065] As shown, the adapter unit **12** includes at least one output port **302**—e.g., a USB output port—whereby the adapter unit **12** can be connected to a charger unit or another electronic device via a separate cable (e.g., cable **16**) to recharge the internal battery of the charger unit or other device. Thus, the output port **302** permits the adapter unit **12** to be used to directly charge a computer or any other electronic device, for example, if the charger unit is not available or out of power. The adapter unit **12** further includes a plug **304** for a standard wall socket, a car charger interface **306** and an airplane charger interface **308**. The output port **302** is electrically connected with each of the input interfaces **304**, **306** and **308** for providing electrical power to a device connected to the output port **302**. In a preferred embodiment, as illustrated in FIG. **11**C, the airplane charger interface **308** is disposed within a removable car charger interface **306**, whereby the latter interface **306** can be removed to expose the former interface **308** for use. Additionally, the plug interface **304** is designed to fold within the footprint of the main body **300** for storage when not in use or needed, such as shown in FIG. **11**A. In these regards, the adapter unit **12** can be designed with a compact, all-in-one design, which is advantageous for storage and travel.

[0066] In the embodiment shown in FIG. **11**C, the car charger interface **306** includes contacts **307** in accordance with standard car charger designs for providing a current from the power source through the adapter unit **14**. The car charger contacts **307** are internally operatively connected with contacts on the airplane charger interface **308** so that the current is provided through the adapter unit **12** uninterrupted. When the car charger interface **306** is removed, the airplane contacts are exposed for connection to an airplane power socket.

[0067] The adapter unit **12** can be modified to use additional input connectors, such as foreign plug designs.

[0068] As shown in FIG. **1**, the squid connector **14** provides a user with the ability to connect multiple electronic devices to a power source for recharging. In a preferred embodiment, the squid connector **14** comprises a USB interface on a first end **400** that is adapted to engage a complementary port on a power source, such as the power output ports of the portable charger units discussed above, the power output port on the adapter unit discussed above, or any other device with a USB port. The other end of the squid connector **14** comprises multiple connector interfaces **402** adaptable for various electronic devices. As shown, the squid connector **14** provides connection capability of twelve different devices, but can be used with more or fewer connector interfaces **402** without departing from the principles and spirit of the present invention. The connector interfaces **402** can be designed to attach to and accommodate various types of devices, including smart phones, mobile phones, data tablets, music players, cameras, camcorders, gaming units, e-books, Bluetooth® headsets and earpieces, GPS devices, and the like, from a variety of manufacturers and brands. In use, several electronic devices can be charged at the same time.

[0069] As shown in FIG. **1**, the squid connector **14** further includes a retractor **404** for extending the length of the cords of the squid connector **14**, and a power indicator **406** for confirming the existence of a power current being supplied to the electronic devices to be charged. As shown, the power connector **406** is a light indicating that the charger or an external power source is supplying a power current to the devices through the squid connector **14**.

[0070] Though provided as a portable charger kit, each of the components shown in FIG. **1**—i.e., the charger unit **10**, **110** or **210**, the adapter unit **12**, and the squid connector **14**—can be used individually, or in various combinations, as needed. For example, a charger unit can be directly connected with an electronic device via one of its USB output ports. Similarly, the charger unit alone can be used to charge two electronic devices because it has two such output ports. Alternatively, the charger unit can be connected to more than two devices at the same time using the squid connector, as connected to one of the USB output ports on the charger unit. Still alternatively, the charger unit can be combined with the adapter unit to recharge the battery in the charger unit.

[0071] The foregoing description of embodiments of the present invention has been presented for the purpose of illustration and description. It is not intended to be exhaustive or to limit the invention to the form disclosed. Obvious modifications and variations are possible in light of the above disclosure. The embodiments described were chosen to best illustrate the principles of the invention and practical applications thereof to enable one of ordinary skill in the art to

utilize the invention in various embodiments and with various modifications as suited to the particular use contemplated.

What is claimed is:

1. A portable charger unit for simultaneously recharging a plurality of electronic devices, each having a rechargeable internal battery, said portable charger unit comprising:

a charger housing internally storing a rechargeable battery;

a power input port operatively connected to the internal battery for providing an electrical charge from an external power source to the charger unit and for recharging the internal battery when the charger unit is connected to said power source;

at least one power output port operatively connected to the internal battery for providing an electrical charge from the internal battery to an electronic device when said electronic device is connected to the charger unit via the output port; and

connector means capable of connecting two or more electronic devices to the charger unit via said at least one output port.

2. The portable charger unit according to claim **1**, wherein said connector means comprise two or more connector cables operatively connected with a respective output port on the charger housing for attachment to respective electronic devices for recharging the internal rechargeable batteries of said devices when so attached.

3. The portable charger unit according to claim **2**, wherein each of said connector cables is attached to the charger housing.

4. The portable charger unit according to claim **3**, wherein said charger housing includes a storage cavity for each of said two or more connector cables for receiving said cables in a non-use condition.

5. The portable charger unit according to claim **4**, wherein each connector cable comprises:

a proximal end attached to the charger housing,

a distal end having a connection interface adapted for engagement with an electronic device; and

a cord portion extending between said proximal and distal ends of said connector cable.

6. The portable charger unit according to claim **5**, wherein each storage cavity receives the connector cable within the exterior volume of the charger housing.

7. The portable charger unit according to claim **6**, wherein each storage cavity includes a channel portion for receiving the cord portion of a respective connector cable, and an interface portion for receiving the distal end of said respective connector cable.

8. The portable charger unit according to claim **4**, wherein each of said two or more connector cables are removably attached to respective power output port on the charger housing such that they may be disconnected from the charger housing.

9. The portable charger unit according to claim **2**, comprising two connector cables operatively connected with a respective output port on the charger housing for attachment to respective electronic devices for recharging the internal rechargeable batteries of said devices when so attached, and

wherein said charger housing includes two storage cavities, one for each of said connector cables, for receiving said cables in a non-use condition, wherein said storage cavities are positioned on opposing sides of said charger housing.

10. The portable charger unit according to claim **2**, comprising three connector cables operatively connected with a respective output port on the charger housing for attachment to respective electronic devices for recharging the internal rechargeable batteries of said devices when so attached, and

wherein said charger housing includes three storage cavities, one for each of said connector cables, for receiving said cables in a non-use condition, wherein two of said storage cavities are positioned on opposing sides of said charger housing, and the third of said storage cavities is positioned on a top side of said storage housing.

11. The portable charger unit according to claim **1**, further comprising a processing unit operatively connected to the internal battery for controlling recharging of the internal battery when said charger unit is connected to an external power source via the power input port and for controlling recharging of electronic devices connected to the charger unit via the at least one power output port.

12. The portable charger unit according to claim **11**, further comprising power indicator means provided on the charger housing and operatively controlled by the processing unit to indicate at least one of the power capacity in the internal battery of the charger unit and the power capacity of an electronic device connected to the charger unit via said at least one output port.

13. The portable charger unit according to claim **1**, wherein said connector means comprise a detachable squid connector having a first end comprising a connection interface for engagement with the power output port of the charger unit and a second end comprising two or more connection interfaces for engagement with respective electronic devices.

14. The portable charger unit according to claim **1**, further comprising an adapter unit designed for connection with an external power source and for connection to the power input port of the charger unit for supply a power charge from said external power source when the adapter unit is connected with both the external power source and the charger unit, said adapter unit comprising:

a main body;

a connector cable for engagement with the power input port of the charger unit; and

at least one of a wall socket plug interface, a car charger interface, an airplane charger interface, and a USB connection interface.

15. The portable charger unit according to claim **1**, wherein said charger unit is capable of recharging the internal battery of the charger unit by a connection with an external power source at the same time as one or more electronic devices are being recharged by the charger unit.

16. The portable charger unit according to claim **1**, wherein said charger unit recharges two or more electronic devices connected to the charger unit via said connector means simultaneously.

17. A portable charger unit for simultaneously recharging a plurality of electronic devices, each having a rechargeable internal battery, said portable charger unit comprising:

a charger housing internally storing a rechargeable battery;

a power input port operatively connected to the internal battery for providing an electrical charge from an external power source to the charger unit and for recharging the internal battery when the charger unit is connected to said power source; and

a plurality of power output ports operatively connected to the internal battery for providing an electrical charge

from the internal battery to an electronic device when said electronic device is connected to the charger unit via one of said output ports;

wherein said charger unit recharges two or more electronic devices connected to the charger unit via said power output ports simultaneously.

18. The portable charger unit according to claim **17**, further comprising two or more connector cables operatively connected with a respective output port on the charger housing for attachment to respective electronic devices for recharging the internal rechargeable batteries of said devices when so attached.

19. The portable charger unit according to claim **18**, wherein each of said connector cables is attached to the charger housing.

20. The portable charger unit according to claim **19**, wherein said charger housing includes a storage cavity for each of said two or more connector cables for receiving said cables in a non-use condition.

21. The portable charger unit according to claim **20**, wherein each connector cable comprises:

a proximal end attached to the charger housing,

a distal end having a connection interface adapted for engagement with an electronic device; and

a cord portion extending between said proximal and distal ends of said connector cable.

22. The portable charger unit according to claim **21**, wherein each storage cavity receives the connector cable within the exterior volume of the charger housing.

23. The portable charger unit according to claim **22**, wherein each storage cavity includes a channel portion for receiving the cord portion of a respective connector cable, and an interface portion for receiving the distal end of said respective connector cable.

24. The portable charger unit according to claim **20**, wherein each of said two or more connector cables are removably attached to respective power output port on the charger housing such that they may be disconnected from the charger housing.

25. The portable charger unit according to claim **18**, comprising two connector cables operatively connected with a respective output port on the charger housing for attachment to respective electronic devices for recharging the internal rechargeable batteries of said devices when so attached, and

wherein said charger housing includes two storage cavities, one for each of said connector cables, for receiving said cables in a non-use condition, wherein said storage cavities are positioned on opposing sides of said charger housing.

26. The portable charger unit according to claim **18**, comprising three connector cables operatively connected with a respective output port on the charger housing for attachment to respective electronic devices for recharging the internal rechargeable batteries of said devices when so attached, and

wherein said charger housing includes three storage cavities, one for each of said connector cables, for receiving said cables in a non-use condition, wherein two of said storage cavities are positioned on opposing sides of said charger housing, and the third of said storage cavities is positioned on a top side of said storage housing.

27. A portable charger kit for simultaneously recharging a plurality of electronic devices, each having a rechargeable internal battery, said portable charger kit comprising:

a portable charger unit, comprising:

a charger housing internally storing a rechargeable battery;

a power input port operatively connected to the internal battery for providing an electrical charge from an external power source to the charger unit and for recharging the internal battery when the charger unit is connected to said power source;

at least one power output port operatively connected to the internal battery for providing an electrical charge from the internal battery to an electronic device when said electronic device is connected to the charger unit via the output port; and

an adapter unit designed for connection with an external power source and for connection to the power input port of the charger unit for supply a power charge from said external power source when the adapter unit is connected with both the external power source and the charger unit, said adapter unit comprising:

a main body;

a connector cable for engagement with the power input port of the charger unit; and

at least two of a wall socket plug interface, a car charger interface, an airplane charger interface, and a USB connection interface.

28. The portable charger kit according to claim **27**, further comprising a detachable squid connector having a first end comprising a connection interface for engagement with the power output port of the charger unit and a second end comprising two or more connection interfaces for engagement with respective electronic devices.

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