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Silverbrook(10) **Pub. No.: US 2010/0079107 A1**(43) **Pub. Date: Apr. 1, 2010**(54) **MOBILE PHONE CHARGING STAND
INCORPORATING INK REFILL UNIT**

Feb. 13, 2002 (AU) PS0493

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BALMAIN 2041 (AU)**(73) Assignee: **Silverbrook Research Pty Ltd**(21) Appl. No.: **12/630,648**(22) Filed: **Dec. 3, 2009****Related U.S. Application Data**

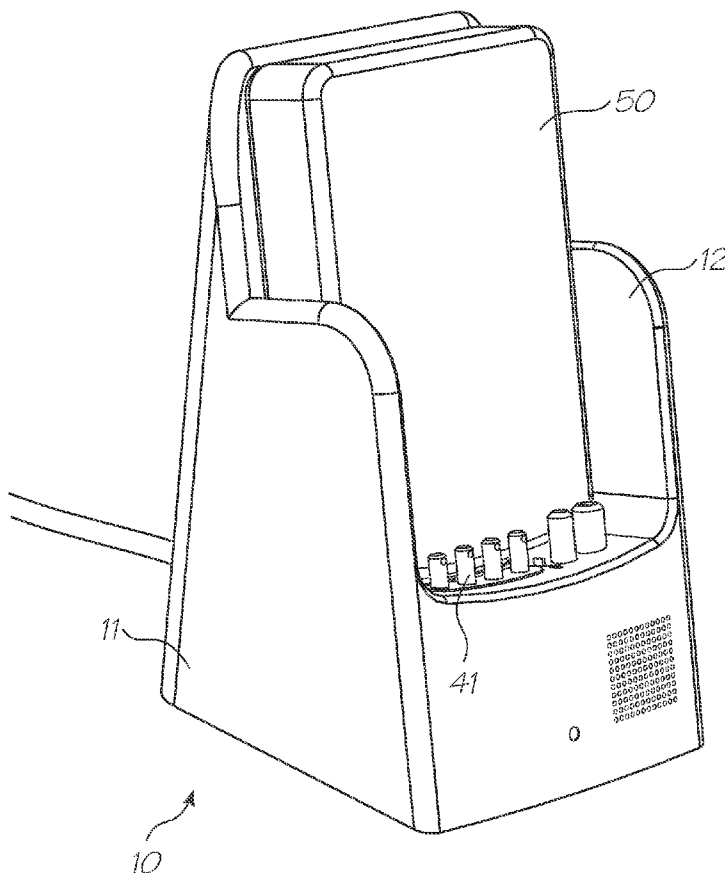
(63) Continuation of application No. 12/194,532, filed on Aug. 19, 2008, now Pat. No. 7,637,677, which is a continuation of application No. 11/474,280, filed on Jun. 26, 2006, now Pat. No. 7,431,519, which is a continuation of application No. 10/503,901, filed on Aug. 9, 2004, now Pat. No. 7,108,437, filed as application No. PCT/AU2003/000170 on Feb. 12, 2003.

(30) **Foreign Application Priority Data**

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Publication Classification(51) **Int. Cl.**
H02J 7/00 (2006.01)(52) **U.S. Cl.** **320/115**(57) **ABSTRACT**

A charging stand for charging a mobile phone, includes a base defining a receptacle for receiving the mobile phone; a battery charging circuit for supplying a charging voltage to the mobile phone; a removable ink cartridge received in the receptacle, the removable ink cartridge for supplying ink to a printer of the mobile phone; a hollow cartridge connection pin protruding from the base for effecting fluid communication with the removable ink cartridge; a hollow device connection pin protruding from the base for effecting fluid communication with the mobile phone; an ink connection provided in the base molding, the ink connection connecting the cartridge connection pin and the device connection pin; and an elastomeric molding formed around the cartridge connection pin and device connection pin, the elastomeric molding covering respective outlets of the cartridge connection pin and device connection pin. The elastomeric molding is adapted to compress upon receipt of the mobile phone in the receptacle to expose the respective outlets.



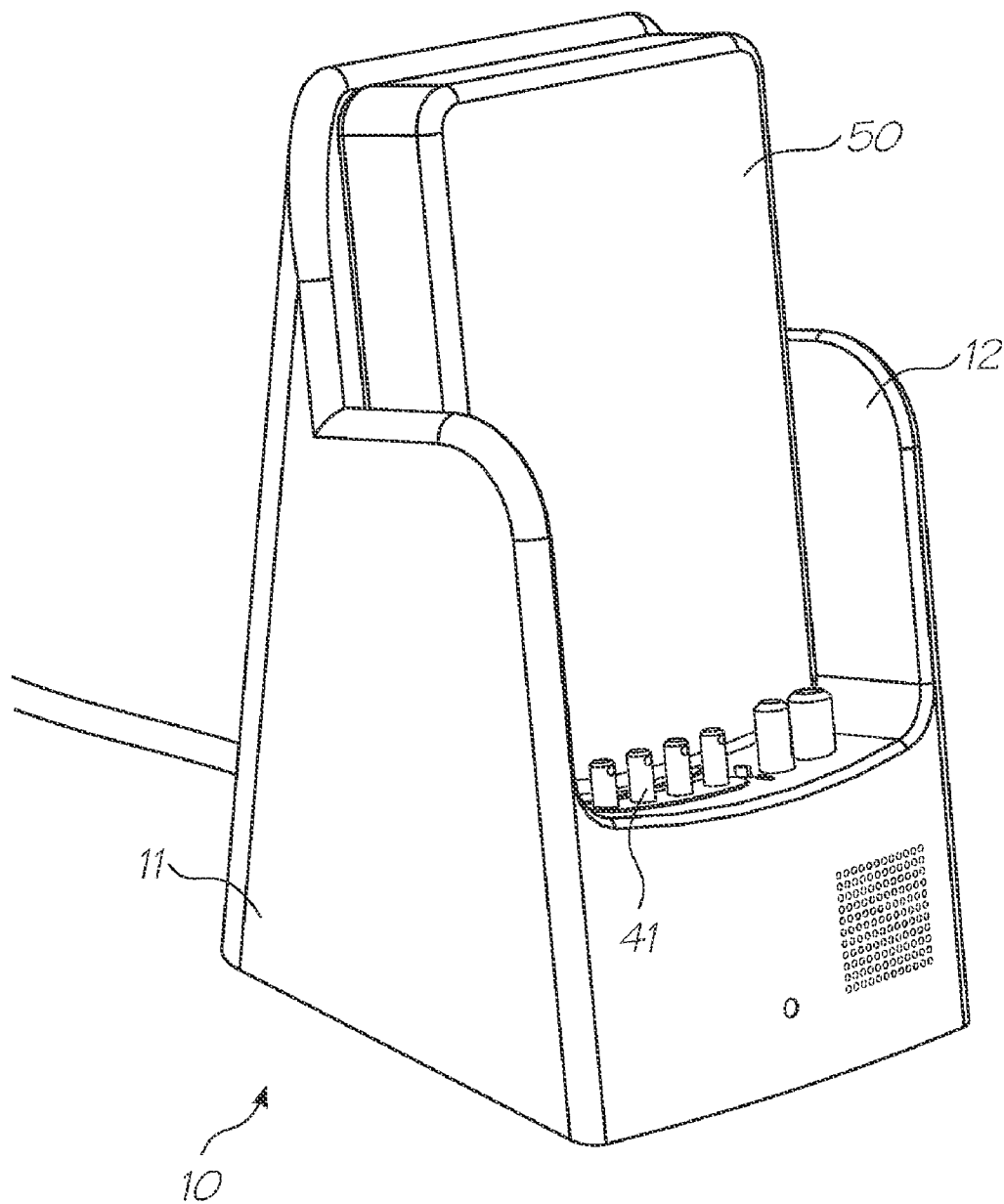


FIG. 1

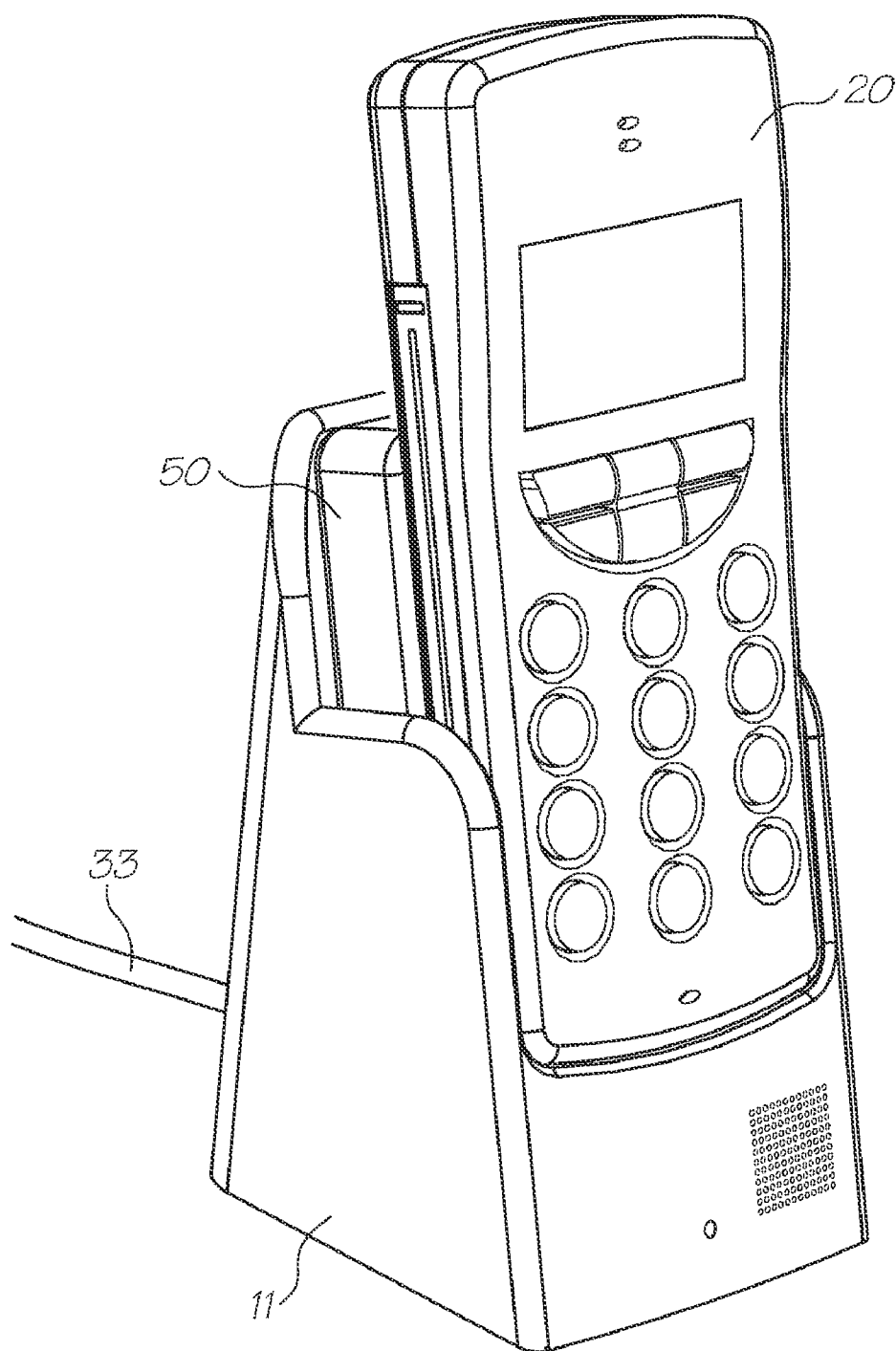


FIG. 2

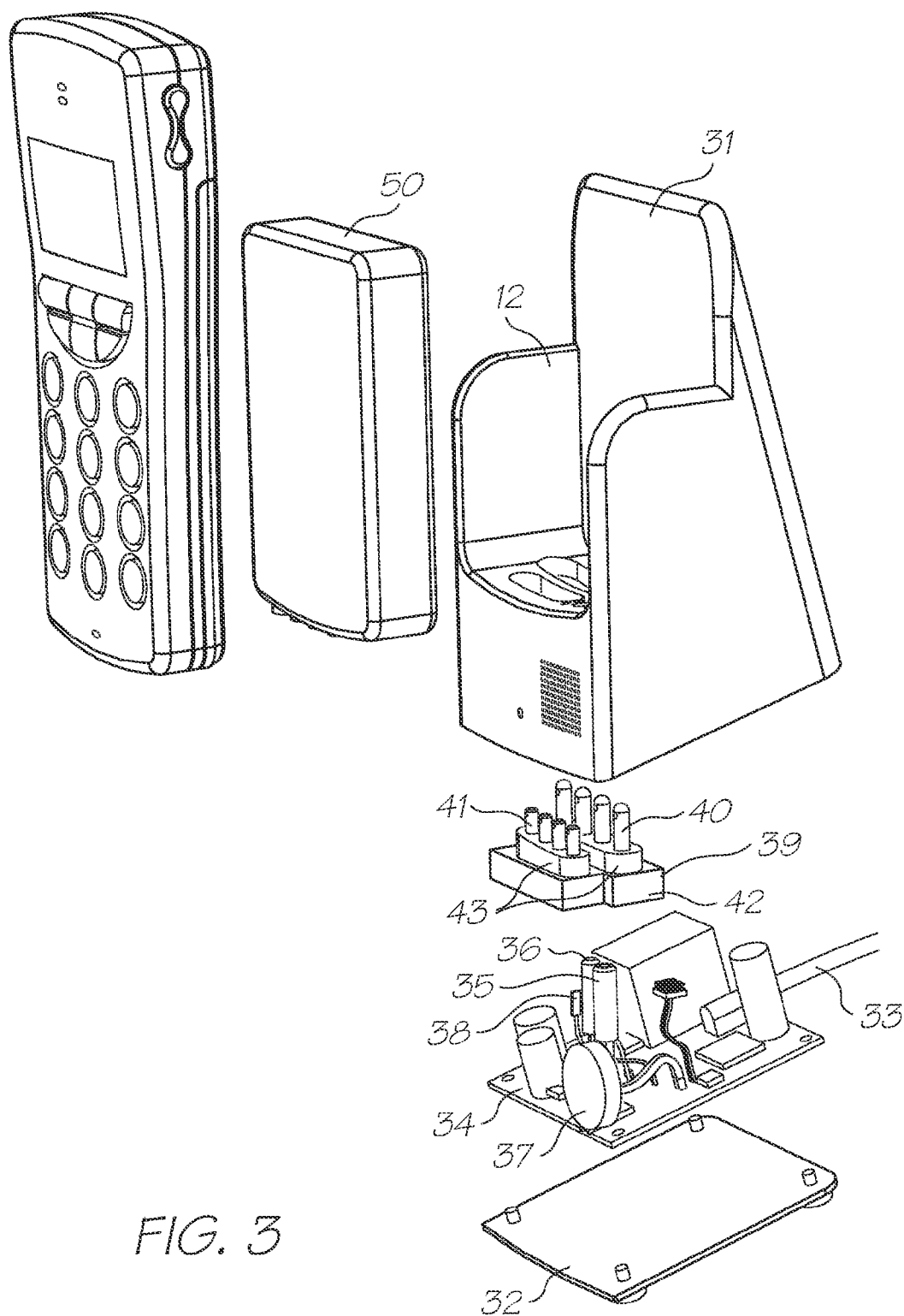


FIG. 3

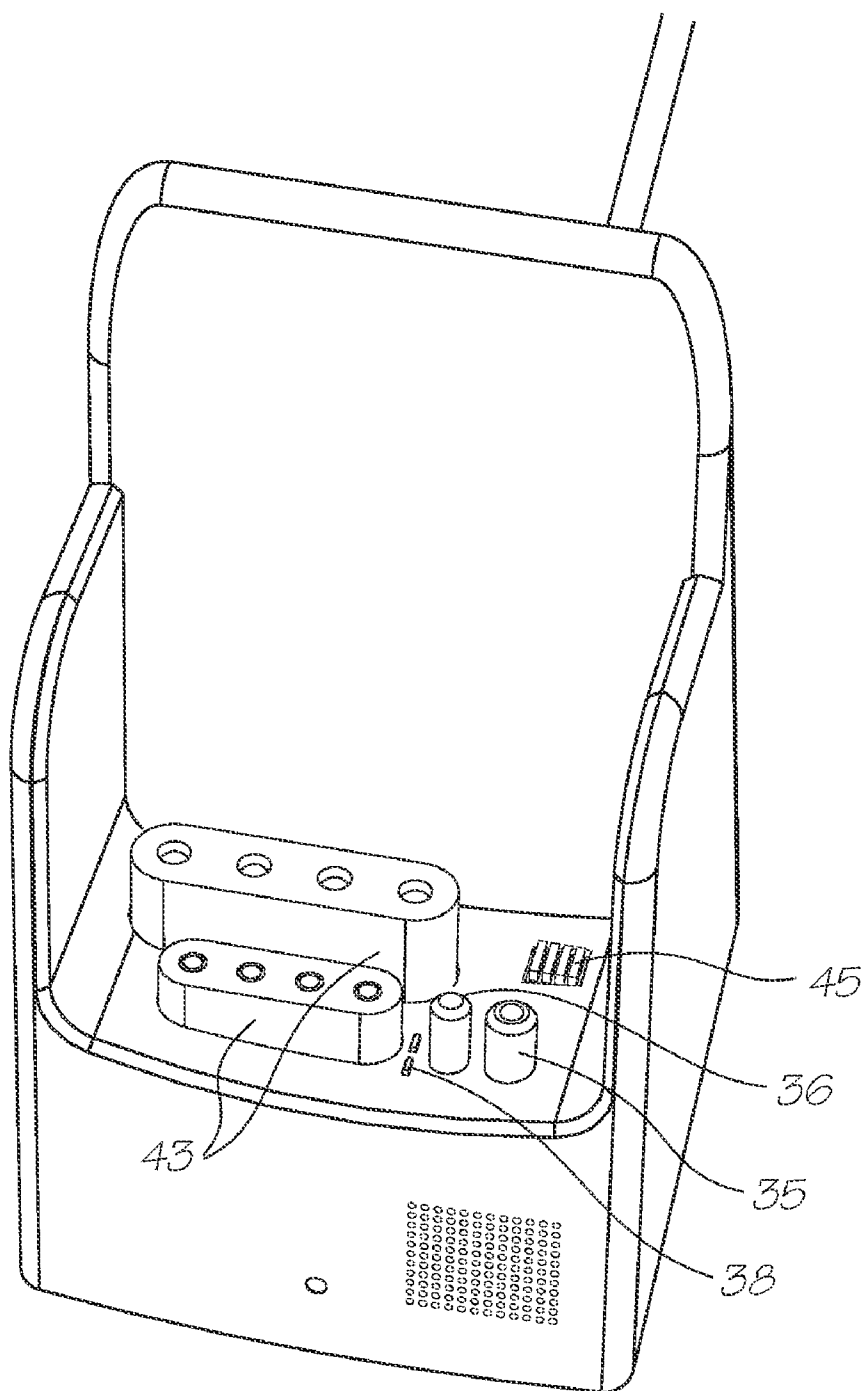


FIG. 4

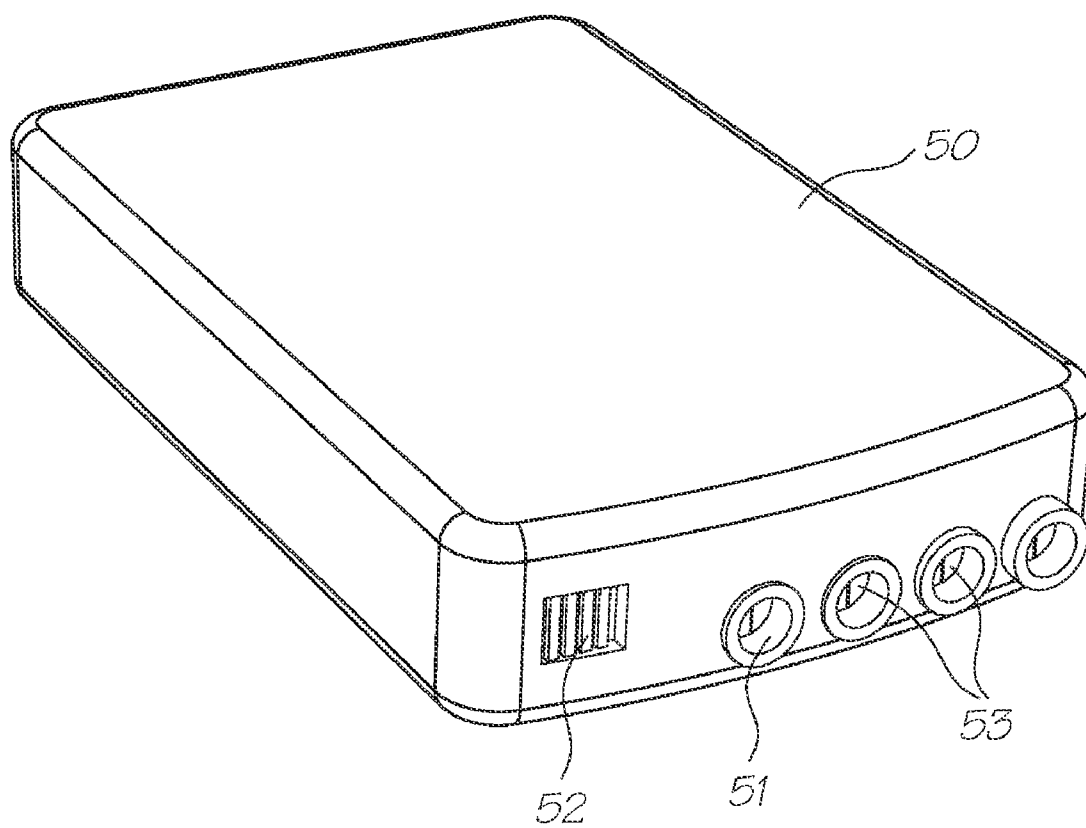


FIG. 5

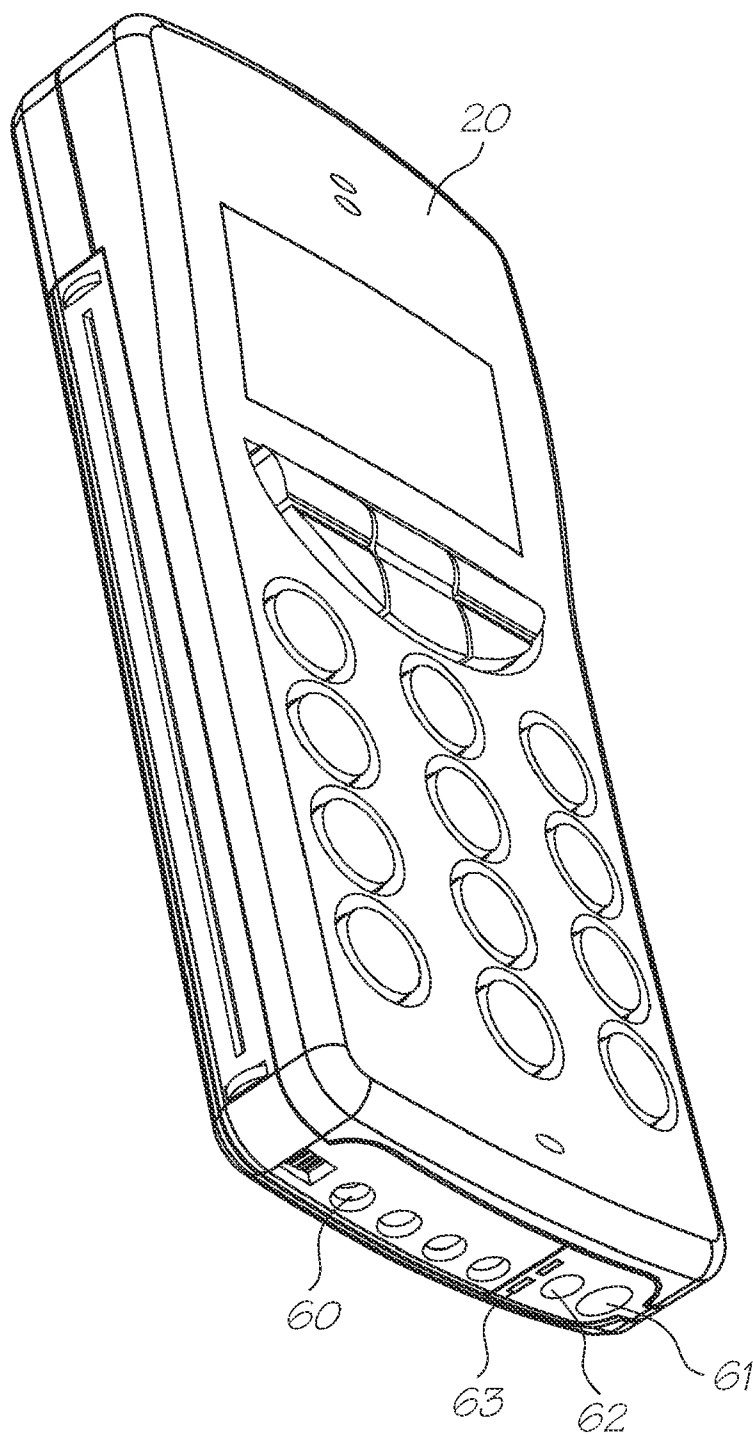


FIG. 6

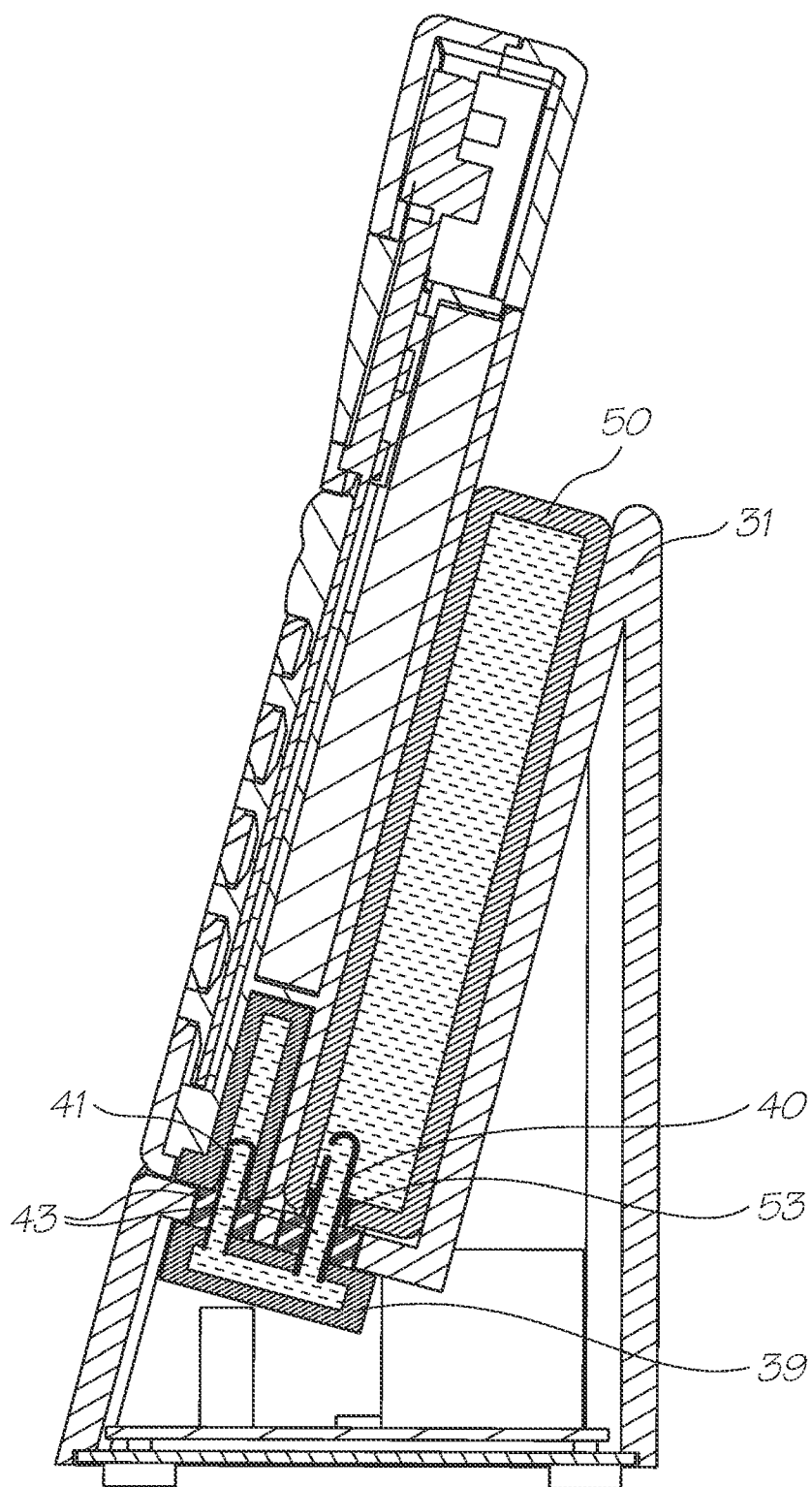


FIG. 7

MOBILE PHONE CHARGING STAND INCORPORATING INK REFILL UNIT

CROSS REFERENCE TO RELATED APPLICATION

[0001] The present application is a continuation of U.S. application Ser. No. 12/194,532 filed Aug. 19, 2008, which is a continuation of U.S. application Ser. No. 11/474,280 filed Jun. 26, 2006, now issued U.S. Pat. No. 7,431,519, which is a continuation of U.S. application Ser. No. 10/503,901 filed Aug. 9, 2004, now issued U.S. Pat. No. 7,108,437, which is a 371 of PCT/AU03/00170 filed Feb. 12, 2003, all of which is herein incorporated by reference.

FIELD OF THE INVENTION

[0002] This invention relates to electronic devices having an internal printer and to a charging assembly for replenishing the internal ink reservoir of the printer.

[0003] This application refers to the following co-pending applications of the present applicant, the entire contents of which are duly incorporated herein:—

CO-PENDING APPLICATIONS

[0004] Various methods, systems and apparatus relating to the present invention are disclosed in the following co-pending applications filed by the applicant or assignee of the present invention simultaneously with the present application:

PCT/AU03/00154	PCT/AU03/00151	PCT/AU03/00150
PCT/AU03/00145	PCT/AU03/00153	PCT/AU03/00152
PCT/AU03/00168	PCT/AU03/00169	PCT/AU03/00170
PCT/AU03/00162	PCT/AU03/00146	PCT/AU03/00159
PCT/AU03/00171	PCT/AU03/00149	PCT/AU03/00167
PCT/AU03/00158	PCT/AU03/00147	PCT/AU03/00166
PCT/AU03/00164	PCT/AU03/00163	PCT/AU03/00165
PCT/AU03/00160	PCT/AU03/00157	PCT/AU03/00148
PCT/AU03/00156	PCT/AU03/00155	

[0005] The disclosures of these co-pending applications are incorporated herein by cross-reference. Each application is temporarily identified by its file reference. This will be replaced by the corresponding PCT Application Number when available.

RELATED PATENT APPLICATIONS AND PATENTS

[0006]

6,566,858	6,331,946	6,246,970
6,442,525	PCT/AU01/00141	09/505,951
PCT/AU01/00139	6,816,968	6,757,832
PCT/AU01/00140	PCT/AU00/00741	6,238,044
PCT/AU00/00742	6,425,661	6,227,652
6,213,588	6,213,589	6,231,163
6,247,795	6,394,581	6,244,691
6,257,704	6,416,168	6,220,694
6,257,705	6,247,794	6,234,610
6,247,793	6,264,306	6,241,342
6,247,792	6,264,307	6,254,220
6,234,611	6,302,528	6,283,582
6,239,821	6,338,547	6,247,796

-continued

6,557,977	6,390,603	6,362,843
6,293,653	6,312,107	6,227,653
6,234,609	6,238,040	6,188,415
6,227,654	6,209,989	6,247,791
6,336,710	6,217,153	6,416,167
6,243,113	6,283,581	6,247,790
6,260,953	6,267,469	6,273,544
6,309,048	6,420,196	6,443,558
6,439,689	6,378,989	6,848,181
6,634,735	PCT/AU98/00550	PCT/AU00/0
6,390,605	6,322,195	6,612,110
6,480,089	6,460,778	6,305,788
PCT/AU00/00172	6,426,014	PCT/AU00/00338
6,364,453	PCT/AU00/00339	6,457,795
PCT/AU00/00581	6,315,399	PCT/AU00/0
6,338,548	PCT/AU00/00582	6,540,319
PCT/AU00/00587	6,328,431	PCT/AU00/00588
6,328,425	PCT/AU00/00589	6,991,320
PCT/AU00/0	6,595,624	PCT/AU00/00340
PCT/AU00/00749	6,417,757	PCT/AU01/0
7,095,309	PCT/AU01/01318	6,854,825
PCT/AU00/00750	7,075,677	PCT/AU00/00751
6,428,139	PCT/AU00/00752	6,575,549
PCT/AU01/0	PCT/AU00/00583	6,383,833
PCT/AU02/01120	PCT/AU00/00593	6,464,332
PCT/AU00/00333	PCT/AU00/01513	6,428,142
PCT/AU00/00590	6,390,591	PCT/AU00/00591
7,018,016	PCT/AU00/00592	6,328,417
PCT/AU00/0	6,322,194	PCT/AU00/00585
6,382,779	PCT/AU00/00586	6,629,745
PCT/AU00/01514	6,565,193	PCT/AU00/01515
6,609,786	PCT/AU00/0	6,609,787
PCT/AU00/01517	6,439,908	PCT/AU00/01512
6,684,503	PCT/AU00/00753	6,755,513
PCT/AU00/00594	6,409,323	PCT/AU00/0
6,281,912	PCT/AU00/00596	6,604,810
PCT/AU00/00597	6,318,920	PCT/AU00/00598
6,488,422	PCT/AU01/01321	6,655,786
PCT/AU01/0	6,457,810	PCT/AU01/01323
6,485,135	PCT/AU00/00516	6,795,215
PCT/AU00/00517	7,154,638	PCT/AU00/00511
6,859,289	PCT/AU00/0	6,977,751
PCT/AU00/00755	6,398,332	PCT/AU00/00756
6,394,573	PCT/AU00/00757	

BACKGROUND OF THE INVENTION

[0007] Historically, printers have been desktop devices and have thus been large and immobile. Printers have had large capacity ink cartridges requiring seldom replacement. Replacement ink cartridges are typically kept on hand so that when the current ink cartridge is exhausted it can be replaced with little interruption to the printer operation.

[0008] Recent developments have seen printers being incorporated into portable telecommunications devices such as mobile telephones. Examples of such applications can be found in the present applicant's co-pending applications listed above. However, with a portable printer, there is a problem that a replacement ink cartridge will not always be at hand if the ink supply is exhausted. To overcome this problem the ink cartridge will be replaced before it is absolutely necessary resulting in a wastage of ink otherwise there will be a risk that the ink supply will run out, rendering the printer useless until a replacement ink cartridge is found.

SUMMARY OF THE INVENTION

[0009] According to an aspect of the present disclosure, a charging stand for charging a mobile phone, includes a base defining a receptacle for receiving the mobile phone; a battery

charging circuit for supplying a charging voltage to the mobile phone; a removable ink cartridge received in the receptacle, the removable ink cartridge for supplying ink to a printer of the mobile phone; a hollow cartridge connection pin protruding from the base for effecting fluid communication with the removable ink cartridge; a hollow device connection pin protruding from the base for effecting fluid communication with the mobile phone; an ink connection provided in the base moulding, the ink connection connecting the cartridge connection pin and the device connection pin; and an elastomeric molding formed around the cartridge connection pin and device connection pin, the elastomeric molding covering respective outlets of the cartridge connection pin and device connection pin. The elastomeric molding is adapted to compress upon receipt of the mobile phone in the receptacle to expose the respective outlets.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] A preferred embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

[0011] FIG. 1 is a perspective view of a charging stand, in accordance with the invention;

[0012] FIG. 2 is a perspective view of a charging stand with a mobile telephone positioned therein;

[0013] FIG. 3 is an exploded view of the charging stand;

[0014] FIG. 4 is an assembled view of the charging stand of FIG. 3,

[0015] FIG. 5 is a perspective view of a removable ink cartridge;

[0016] FIG. 6 is a perspective view of a mobile telephone adapted for use with a charging stand of the invention; and

[0017] FIG. 7 is a cross section of a charging stand and mobile telephone, in accordance with the invention.

DESCRIPTION OF PREFERRED EMBODIMENT

[0018] A charging stand according to the invention is shown generally at 10 in FIG. 1. The stand 10 receives a mobile telecommunications device 20, e.g. a mobile telephone, as depicted in FIG. 2. The stand 10 includes a base 11 with a receptacle 12 that receives the mobile telephone. A set of ink contacts 13 and power contacts 14 are disposed in the base receptacle 12. The base 11 also receives an ink cartridge 50.

[0019] Reference is now made to FIG. 3, which is an exploded view of the charging stand 10 illustrating the internal features. The charging stand 10 includes a base moulding 31 and base plate 32. A power cord 33 passes through an aperture in the base moulding 31 and connects to a Printed Circuit Board (PCB) 34 within the base moulding 31. The opposite end of the power cord 33 includes a standard plug for connection with mains power, which will usually be alternating current (AC). In this case, the power will need to be rectified if it is to be fed to the battery of the mobile telecommunications device in a direct current (DC) form. Alternatively, the charging stand is configured for connection with an alternative power source such as through the cigarette lighter connection of a car, which will usually be direct current (DC). In either case, the power will typically need to be stepped down to provide compatible voltage and current to a battery of the mobile telecommunications device.

[0020] The PCB 34 supports components including a power-in plug 35, a speaker plug 36 connected to a speaker 37

and charging contacts 38. The power-in plug 35, speaker plug 36 and charging contacts 38 protrude through the base moulding 31 into the receptacle 12.

[0021] The base moulding 31 also houses ink connections 39 that include hollow cartridge connection pins 40 and device connection pins 41 connected through a conduit in an ink connection base 42. Four pins are shown in FIG. 3 that provide an ink flow path for three colour inks and black ink. The cartridge pins and device pins protrude through the base moulding 31 into the receptacle 12. Elastomeric pads 43 are formed around the pins 40, 41 for protection but compress to the configuration depicted in FIG. 3 during loading of an ink cartridge or telephone device into the receptacle, thereby exposing the pins for use. The device pins may be fitted with a cap or seal that prevents ink flow when no device is received in the receptacle but are removed prior to, or in the act of, loading a device into the charging stand.

[0022] FIG. 4 demonstrates the resilience of the elastomeric pads 43 once the ink cartridge and telephone have been removed. The pads return to their uncompressed state thereby providing protection to the ink cartridge pins and device pins when the pins are not in use. In addition to providing protection, the elastomeric pads 43 also act to seal the ink flow path through the ink connector 40 thereby preventing any ink trapped within the connector 40 from drying out and potentially causing a blockage. As can be seen from FIG. 4 the power-in plug 35, speaker plug 36 and charging contacts 38 remain exposed.

[0023] The charging stand receives a removable ink cartridge 50 of the type illustrated in FIG. 5. The ink cartridge 50 includes an ink reservoir sized to fit into the receptacle 12 of the charging stand. Internally the ink cartridge is divided into four separate chambers for the four different types of ink. Four apertures 51 formed in the end of the cartridge 50 provide an outlet for each of the four chambers and are located on the cartridge 50 so as to receive the cartridge pins 41 of the charging stand when the cartridge is loaded into the receptacle of the charging stand. A seal 53, for example an elastomeric seal, is disposed within each ink chamber about the outlet 51 to seal the respective chamber when the cartridge is removed from the charging stand.

[0024] The cartridge 50 may be provided with a QA chip and contacts 52 that communicate with similar contacts 45 (FIG. 4) on the charging stand to ensure that only compatible cartridges 50 are used with the charging stand.

[0025] The charging stand 10 receives a mobile telephone 20 or like device equipped with an internal printer and battery. As shown in FIG. 6, the telephone 20 includes a series of ink inlet ports 60 that lead to the ink supply systems of the printer, a power socket 61, hands free jack 62 and charging contacts 63 leading to a battery or like charge storage device of the telephone. When the telephone 20 is loaded onto the charging stand receptacle 12 as depicted in FIG. 2, the ink inlets, power socket, hands free jack and charging contacts align with and engage respectively the device pins, power-in connection, speaker plug and charging contacts of the charging stand. Power is then supplied to the telephone both to allow operation of the telephone and to re-charge the telephone batteries in a known manner.

[0026] FIG. 7 shows a reverse cross section of the loaded charging stand of FIG. 2 illustrating the connection from the printer of the telephone to the ink cartridge 50. As shown in FIG. 7, the ink cartridge 50 is disposed in the receptacle such that the cartridge pin 40 has penetrated the seal 53 and pro-

trudes into one of the ink chambers of the cartridge. Similarly, the ink inlet ports of the telephone have engaged the device pins of the charging stand. Thus the ink connector 39 provides a conduit from the ink cartridge 50 to the ink reservoirs of the printer. Pressure, gravitational or osmotic effects between the ink chambers of the cartridge and the ink reservoir of the printer causes ink to flow to the printer reservoir.

[0027] While the embodiments of the invention have been described with particular reference to mobile telephones, it will be apparent to the skilled addressee that the invention is equally suitable to other types of mobile telecommunications devices such as Wireless Internet Access Devices (WIADs), in particular Wireless Applications Protocol (WAP) terminals, pagers etc.

[0028] The charging stand of the present invention allows the battery and ink supplies of a mobile telephone with printer to be re-charged simultaneously. Furthermore, using a charging stand as herein described, it is unlikely that ink supplies of the printer would ever be exhausted as by the time this event occurred, there would be insufficient power in the battery to operate the printer.

[0029] The invention has also been described with reference to a four colour printer where the ink cartridge of the charging stand has four chambers for three colour inks and black ink. The configuration of the ink cartridge and the number of pins of the ink connector will depend on the type of printer employed in the mobile telecommunications device. For example the cartridge may store only black ink. Alternatively or in addition, the ink cartridge may include a chamber and ink connection for supplying infra-red ink or some other ink type to a printer.

[0030] It will be appreciated that although the preferred embodiment of the invention takes the form of a stand, an alternative embodiment (not shown) is a plug that interfaces with corresponding ink and power sockets in a phone or communications device. An ink reservoir and power supply are still provided, but there is no stand or cradle for the phone to sit in. Rather, once the plug is plugged into the corresponding socket, the phone is simply laid in a suitable place such as a benchtop or desk. A potential advantage of this embodiment is that the ink reservoir (which might be relatively bulky if of high capacity) can be located remotely from the mobile phone charging point, such as on the floor or on a shelf out of the way. In some cases, this can avoid the reservoir being bumped, or at least diminishes the amount of clutter in a work area. The reservoir in this case can also be mounted in the same housing as, or adjacent to, a transformer for rectifying AC mains power for supply to the mobile phone.

[0031] While particular embodiments of this invention have been described, it will be evident to those skilled in the art that the present invention may be embodied in other specific forms without departing from the essential characteristics thereof. The present embodiments and examples are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced

therein. It will further be understood that any reference herein to known prior art does not, unless the contrary indication appears, constitute an admission that such prior art is commonly known by those skilled in the art to which the invention relates.

We claim:

1. A charging stand for charging a mobile phone, the stand comprising:

- a base defining a receptacle for receiving the mobile phone;
- a battery charging circuit for supplying a charging voltage to the mobile phone;
- a removable ink cartridge received in the receptacle, the removable ink cartridge for supplying ink to a printer of the mobile phone;
- a hollow cartridge connection pin protruding from the base for effecting fluid communication with the removable ink cartridge;
- a hollow device connection pin protruding from the base for effecting fluid communication with the mobile phone;
- an ink connection provided in the base molding, the ink connection connecting the cartridge connection pin and the device connection pin; and
- an elastomeric molding formed around the cartridge connection pin and device connection pin, the elastomeric molding covering respective outlets of the cartridge connection pin and device connection pin, wherein the elastomeric molding is adapted to compress upon receipt of the mobile phone in the receptacle to expose the respective outlets.

2. A charging stand as claimed in claim 1, wherein the base includes a backrest and a pair of spaced lateral walls extending from the backrest which together define the receptacle, and the ink cartridge is received between the mobile phone and the backrest.

3. A charging stand as claimed in claim 1, wherein the battery charging circuit includes a power cord extending into the base, step-down circuitry for reducing a supplied voltage from the cord, and exposed contacts configured to supply the reduced voltage as the charging voltage to a battery of the mobile phone.

4. A charging stand as claimed in claim 3, wherein the step-down circuitry includes a Printed Circuit Board located within the base and a rectifier mounted to the PCB for rectifying an AC supply voltage to a DC output voltage.

5. A charging stand as claimed in claim 13, wherein the step-down circuitry includes a Printed Circuit Board located within the base and a voltage regulator means mounted to the PCB for regulating an automotive DC supply voltage to a mobile phone DC supply voltage.

6. A charging stand as claimed in claim 1, wherein the base includes a speaker connected to a protruding speaker plug in the receptacle.

7. A charging stand as claimed in claim 1, further comprising a quality assurance integrated circuit arrangement provided in the base to validate authentic ink cartridges.

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