

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
19 July 2007 (19.07.2007)

PCT

(10) International Publication Number
WO 2007/080220 A1

(51) International Patent Classification:
H01R 31/06 (2006.01) **H04Q 7/32** (2006.01)

(21) International Application Number:
PCT/FI2007/000011

(22) International Filing Date: 11 January 2007 (11.01.2007)

(25) Filing Language: Finnish

(26) Publication Language: English

(30) Priority Data:
U20060015 12 January 2006 (12.01.2006) FI

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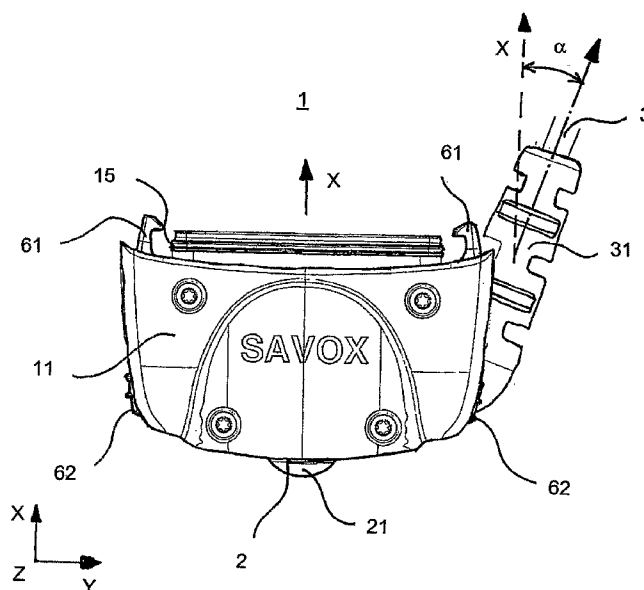
(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: TERMINAL ADAPTER



(57) Abstract: A terminal adapter (1) for connecting an accessory to a terminal, the terminal adapter (1) comprising a charging socket (2), to which a charging plug can be connected for charging the terminal, when the terminal adapter is connected to the terminal, and in connection with the terminal socket there is provided a shield plug (21) for protecting the charging socket (2) in a waterproof manner, when the charging plug is not connected to the charging socket (2); an accessory cable (3), which is connected to the one side of the terminal adapter through a connecting piece (31) so that when coming out of the connecting piece the direction of the free accessory cable (3) deviates from the connecting direction (X) of the terminal adapter at most by the angle $\alpha \leq 45^\circ$.

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Terminal adapter

The invention relates to a terminal adapter for connecting an accessory to a terminal.

5 The purpose of a terminal adapter is to function as a connecting piece, by means of which accessories, such as a head set, controllers, microphone-earphone combinations, helmet equipment, a portable computer, etc. can be connected to a terminal, especially to the THR880 and THR880i Tetra terminal available on the market under the name of Nokia or EADS, and to similar or other terminal equipment, a GPS
10 locator, mobile station or similar. For coupling the terminal has connector interface, to which the connection is made electrically by a terminal adapter. Required signals are conducted to the accessories via the terminal adapter, and these signals can be, for example, audio and/or data signals. The THR880 or THR880i adapter, which is a particular embodiment of this terminal adapter, is a data transmission device intended for authority use for the rescue/fire-fighting services and the police, by
15 means of which an authority operating in a target can transmit and receive information.

Because the terminal adapter is intended for demanding professional use, it has to be very reliable, with good usability, and mechanically robust and durable. The terminal and the terminal adapter connected to it are generally kept in the user's
20 pocket, where the circumstances are almost identical to those outside: big variations in temperature, humidity, and mechanical stress. The terminal needs electricity to function, the electricity being supplied by a battery, which is part of the terminal. If the charge of the battery becomes low, the empty battery will be changed to a new
25 charged battery.

It is characteristic of the terminal adapter of the invention that the terminal adapter comprises

- a charging socket, to which a charging plug can be connected for charging the terminal, when the terminal adapter is connected to the terminal, the charging
30 socket including a shield plug for protecting the charging socket in a waterproof manner, when the charging plug is not connected to the charging socket,
- an accessory cable, which is connected to the one side of the terminal adapter through a connecting piece so that upon exiting from the connecting piece, the di-

rection of the accessory cable deviates from the connecting direction (X) of the terminal adapter at most by the angle $\alpha \leq 45^\circ$.

In connection with this invention, waterproofness refers to waterproofness according to the category IP 55 of the standard SFS-EN 60529. In this invention the connecting direction of the terminal adapter refers to such a direction, which becomes the direction of motion when connecting the terminal adapter mechanically to the terminal for forming an electrical contact between the terminal adapter and the terminal. When the terminal is THR880 or THR880i, this is practically almost the same as the longitudinal direction of the terminal from the base towards the antenna. In connection with this invention, the X direction corresponds to the longitudinal direction of the terminal, the Y direction to the lateral direction, and the Z direction to the direction of depth, i.e. thickness, the X, Y and Z being orthogonal in relation to each other.

The terminal adapter has a charging socket, to which a charging plug can be connected for charging the terminal, when the terminal adapter is connected to the terminal. In this way, the terminal can be conveniently kept in a sufficiently charged state even for a long continuous use, as the terminal battery can be charged by car or AC/DC chargers, when needed.

In connection with the charging socket there is provided a shield plug for protecting the charging socket to be waterproof, when the charging plug is not coupled to the charging socket. The shield plug can be made of elastomer, and it can have lips for ensuring waterproofness and a grip surface for gripping to the shield plug. The shield plug is fastened to the casing of the terminal adapter so that it will not get lost when the charging socket is revealed.

The terminal adapter also includes an accessory cable, which is connected to the one side of the connecting piece through the accessory cable so that when exiting from the connecting piece the direction of the free accessory cable deviates at most 45° from the connecting direction of the terminal adapter. This direction of the accessory cable is relevant, because especially when the user of the terminal is using a head-set, the terminal is often in the user's pocket making it possible for him to use both hands for something other than the use of the terminal. When the terminal adapter of the invention is in the pocket, it takes a minimum amount of space making at the same time possible the longevity of the terminal adapter, because hardly any external stresses are directed to the accessory cable.

The accessory cable is connected to the terminal adapter by a connecting piece, in which case the connecting piece functions as a cable clamp mechanically protecting the accessory cable and the joints of the accessory cable, as a cable support, and as a gasket sealing the seam between the accessory cable and the casing of the terminal adapter to be waterproof. When the special embodiment is the said THR880 or THR880i terminal, the accessory cable is preferably connected to the right side of the terminal adapter, because part of the user interface of the terminal is located on the left side of the terminal, when seen from the front. In this case the accessory cable does not hinder the use of the keys belonging to the user interface, but facilitates their use, for example, in situations in which the terminal is used merely on the basis of sensorial observation, for example, through a coat. From the location of the accessory cable the user can easily determine the location of the key he needs, such as the tangent.

The terminal adapter of the invention will be illustrated in more detail referring to the enclosed drawings, in which

Figure 1 is a front view of the terminal adapter, and

Figure 2 is a front view of the terminal adapter seen diagonally from below and from the right.

Figure 1 illustrates the terminal adapter 1, which has the terminal adapter casing 11, the charging socket 2 located in the base, and the shield plug 21 for the charging socket. The accessory cable 3 is connected to the casing 11 of the terminal adapter through the connecting piece 31, the connecting piece 31 functioning as a cable clamp mechanically protecting the accessory cable 3 and the joints of the accessory cable, as a cable support, and as a gasket sealing the seam between the accessory cable 3 and the casing 11 of the terminal adapter to be waterproof. The casing 11 of the terminal adapter, the connecting piece 31, and the free accessory cable 3 coming out of the connecting piece 31 form substantially a plane in the XY plane. The accessory cable 3 is connected to the side of the terminal adapter 1, on which the terminal itself has fewer operating switches, such as keys or similar. The terminal being especially the THR880 or THR880i terminal, the accessory cable is connected to the right side of the terminal adapter.

The joint between the terminal and the terminal adapter 1 is waterproof, when the terminal adapter 1 is connected to the terminal and the shield plug 21 for the charging socket is closed. For this purpose, the terminal adapter 1 has elastic gaskets 15,

which when contacting the respective surface of the terminal make the joint between the terminal adapter 1 and the terminal waterproof.

The terminal adapter 1 has spring-loaded gripping elements 61, such as claws, staples, jaws, or similar, by which the terminal adapter 1 can be locked to the terminal.

- 5 The gripping elements 61 can be opened by the keys 62 so that the terminal adapter can be drawn out of the terminal. The gripping elements 61 can also be operated by screws.

- 10 When exiting from the connecting piece 31, the direction of the free accessory cable 3 deviates from the direction of connection X of the terminal adapter preferably approximately by the angle $\alpha \leq 20^\circ$. A small value for the angle α reduces the external dimensions of the terminal and the terminal adapter connected to it, but when the angle of the connecting piece approaches 90° , the mechanical strength of the structure is not necessarily the best possible any longer.

- 15 Figure 2 illustrates the terminal adapter from another angle, from the lower right-hand side so that the charging socket 2, the connecting piece 31 and the keys 62 can be seen more clearly than in the previous figure.

Claims

1. A terminal adapter (1) for connecting an accessory to a terminal, **characterised** in that the terminal adapter (1) has
 - a charging socket (2), to which a charging plug can be connected for charging the terminal, when the terminal adapter is connected to the terminal, and in connection with the charging socket there is provided a shield plug (21) for protecting the charging socket (2) in a waterproof manner, when the charging plug is not connected to the charging socket (2),
 - an accessory cable (3), which is connected to the one side of the terminal adapter through a connecting piece (31) so that when exiting from the connecting piece, the direction of the free accessory cable (3) deviates from the direction of connection (X) of the terminal adapter at most by the angle $\alpha \leq 45^\circ$.
2. A terminal adapter according to claim 1, **characterised** in that the casing (11) of the terminal adapter, the connecting piece (31), and the free accessory cable (3) coming out of the connecting piece (31) form substantially a plane in the direction of the XY plane.
3. A terminal adapter according to claim 1, **characterised** in that the joint between the terminal and the terminal adapter (1) is waterproof, when the terminal adapter (1) is connected to the terminal and the shield plug (21) for the charging socket (2) is closed.
4. A terminal adapter according to claims 1 and 3, **characterised** in that the terminal adapter (1) has elastic gaskets (15), which when contacting the respective surface of the terminal make the joint between the terminal and the terminal adapter (1) waterproof.
5. A terminal adapter according to claim 1, **characterised** in that the accessory cable (3) connects to that side of the terminal adapter, on which the terminal itself has fewer operating switches, such as keys or similar, and especially when the terminal is the THR880 or THR830i terminal of Nokia or EADS, the accessory cable is connected to the right side of the terminal adapter.
6. A terminal adapter according to claim 1, **characterised** in that terminal adapter (1) has spring-loaded gripping elements (61), such as claws, staples or jaws for locking the terminal adapter (1) to the terminal so that the gripping elements can be opened by the keys (62).

7. A terminal adapter according to claim 1, **characterised** in that when coming out of the connecting piece the direction of the free accessory cable (3) preferably deviates from the connecting direction (X) of the terminal adapter by the angle $\alpha \leq 20^\circ$.

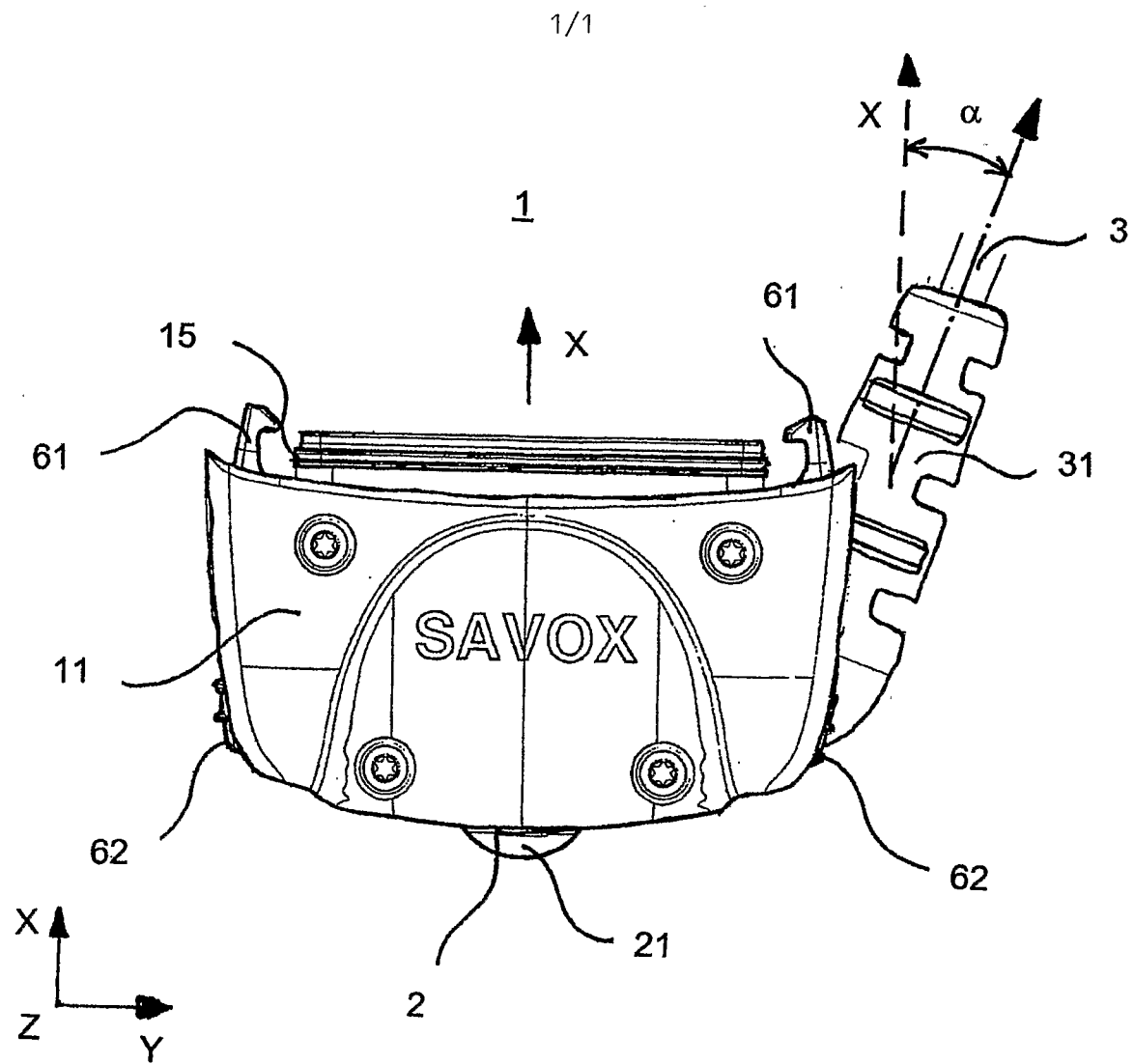


Fig. 1

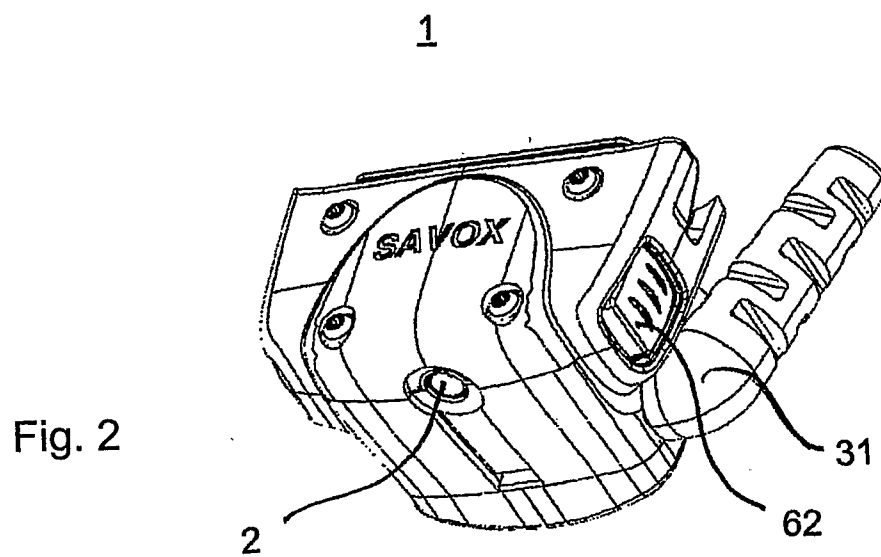


Fig. 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI2007/000011

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC8: H01R, H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
FI, SE, DK, NO

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, EPODOC, WPI, TXTE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of Box C.



See patent family annex.

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

20 February 2007 (20.02.2007)

Date of mailing of the international search report

20 April 2007 (20.04.2007)

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI2007/000011

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI2007/000011

CLASSIFICATION OF SUBJECT MATTER

Int.Cl.

H01R 31/06 (2006.01)

H04Q 7/32 (2006.01)