(12) UK Patent Application (19) GB (11) 2465002 (13) A

(43) Date of A Publication 12.05.2010

(21) Application No: 0820104.8

(22) Date of Filing: 04.11.2008

(51) INT CL:
*H04N 7/18* (2006.01) *G02C 11/00* (2006.01)
*H04N 5/225* (2006.01)

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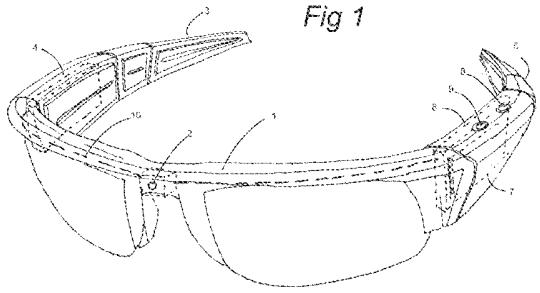
(56) Documents Cited:
**GB 2327165 A**
**WO 1998/025736 A1**
**US 5455466 A**
**US 20060109350 A1**
**US 20020159023 A1**
**WO 2007/079633 A1**
**DE 010238297 A1**
**US 20070030442 A1**
**US 20050275714 A1**

(58) Field of Search:
INT CL **G02C, H04N**
Other: **EPODOC, WPI**

(54) Title of the Invention: **Video recording apparatus**
Abstract Title: **Video recording glasses**

(57) Glasses contain: a video camera 2, a memory (62, figure 3) for storing its output, a first inductive loop or coil 7, a rechargeable battery 4 and associated circuitry 8, 9, (61, figure 3). A separate storage case (11, figure 2) for the glasses has a second inductive loop or coil (12), processor (133), a battery (14, 15), a buffer memory (134, figure 3) and means (133) for detecting whether the glasses are present in the case. Power from the battery (14) is transferred by induction between the coils 7, (11, figure 2) to recharge the battery 4. Video data from the memory (62) is transferred via the inductive connection of coils 7, (12, figure 2) to the buffer memory (134). A USB interface (132) and connector (14) allows the video data to be transferred from the buffer (134) to a computer for viewing, in conventional manner. A radio transmitter within the headgear is avoided and therefore the power requirements during capture of the video image are greatly reduced.

Fig 1



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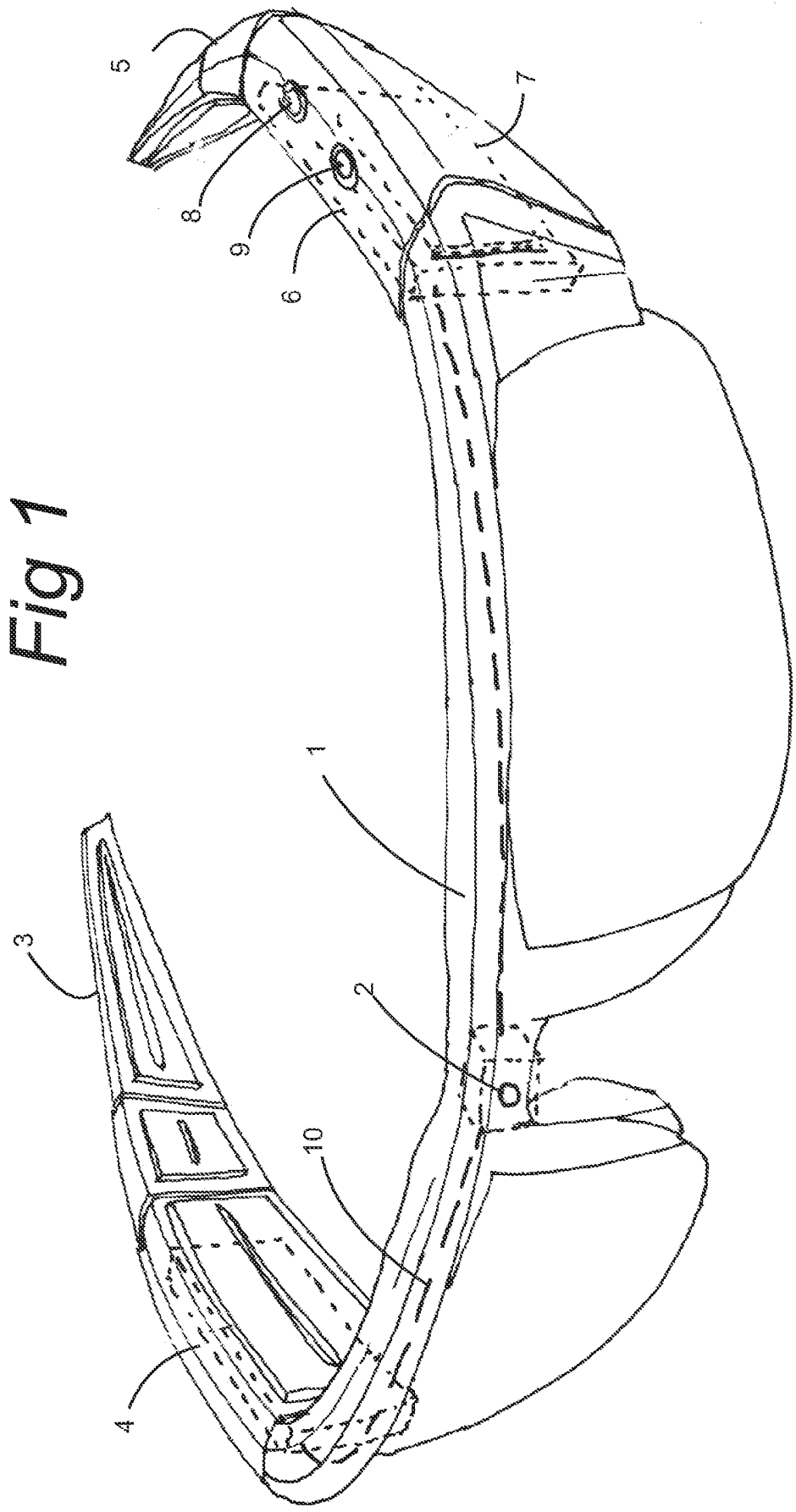
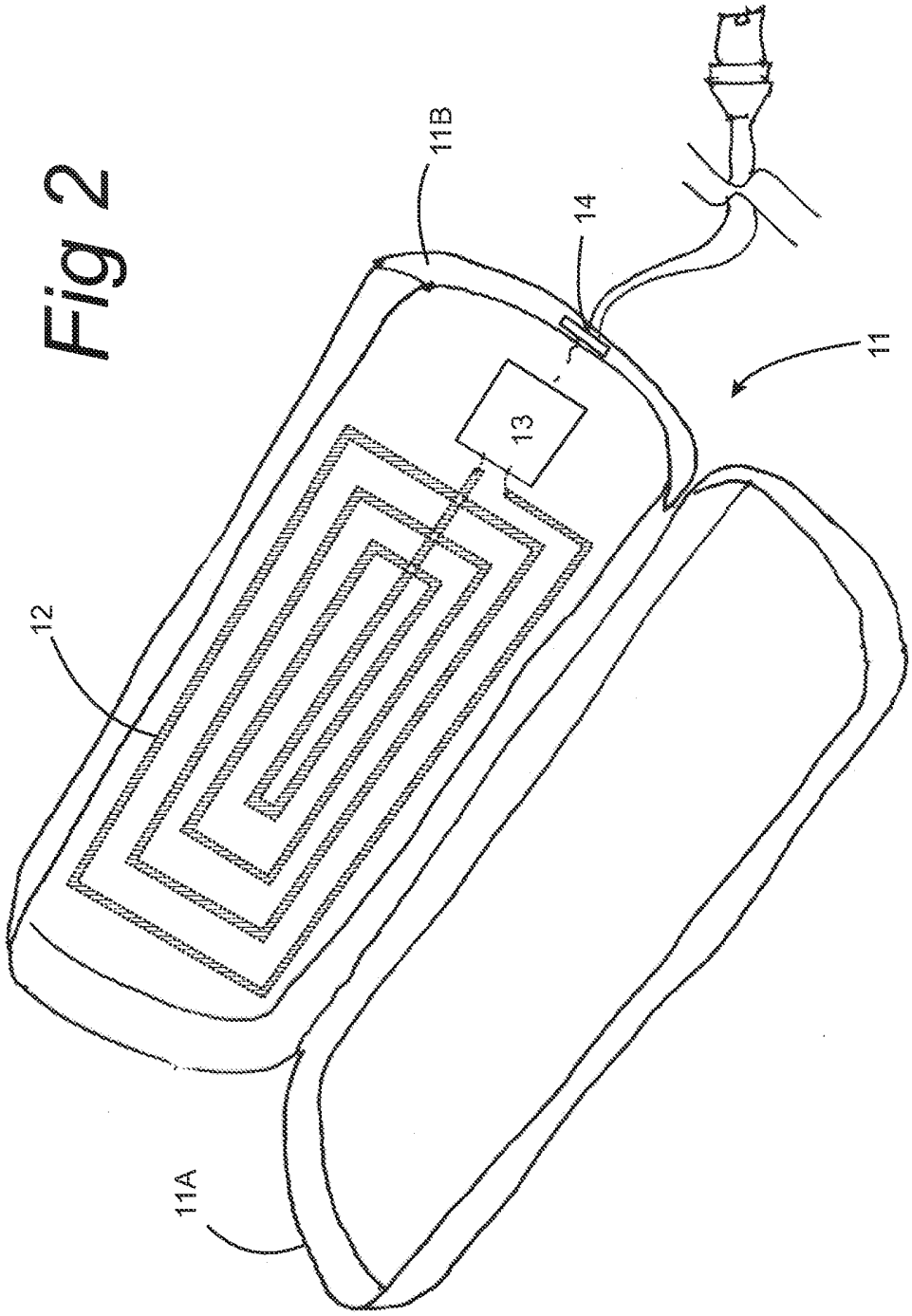
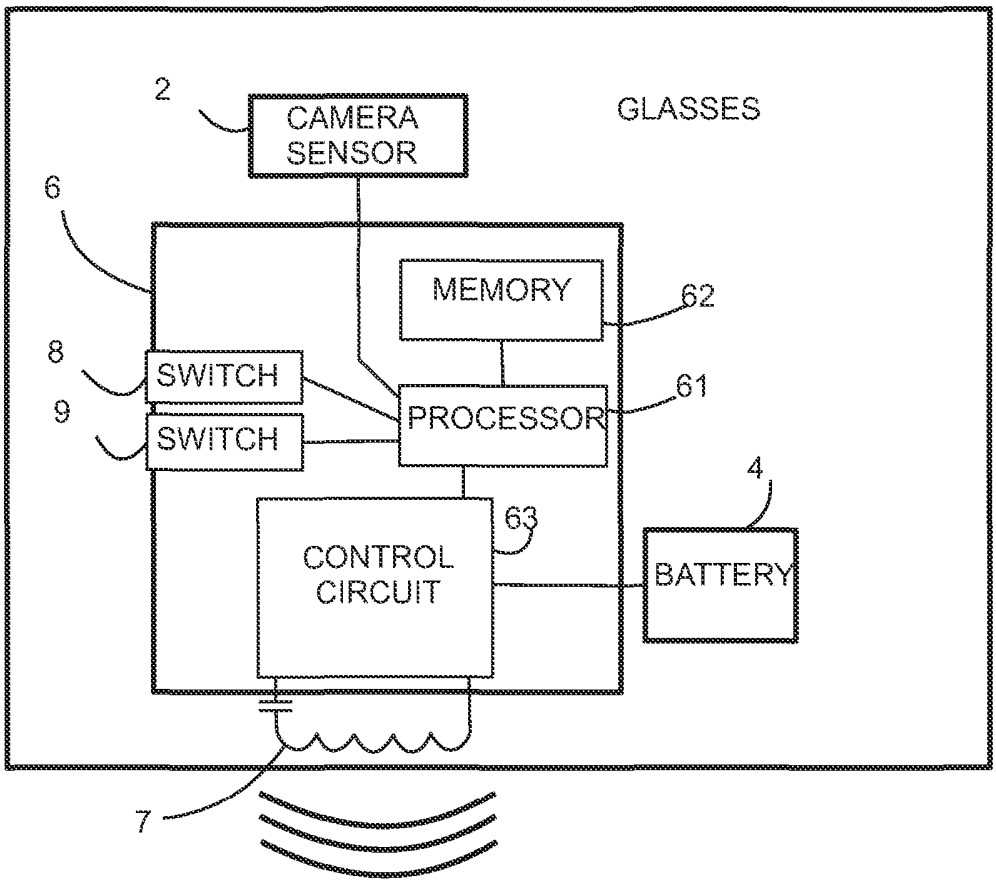


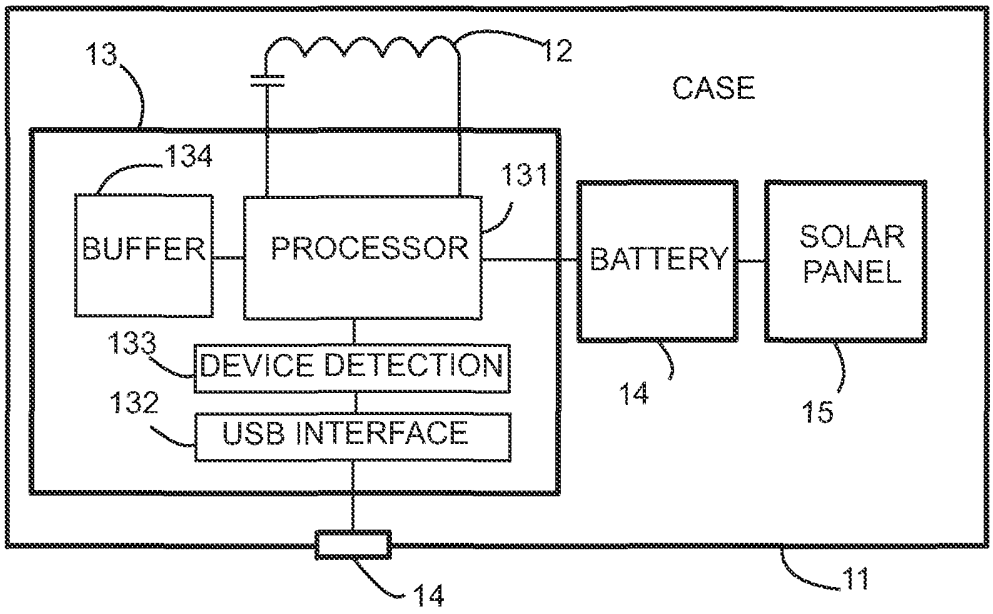

Fig 1

Fig 2



# Fig 3


2
CAMERA SENSOR
GLASSES
6
MEMORY
62
8
SWITCH
9
SWITCH
PROCESSOR
61
4
63
CONTROL CIRCUIT
BATTERY
7


13
12
CASE
134
131
BUFFER
PROCESSOR
BATTERY
SOLAR PANEL
133
DEVICE DETECTION
132
USB INTERFACE
14
15
14
11

# Video Recording Apparatus

This invention relates to video recording apparatus and more particularly to video recording apparatus that is incorporated into an article of headgear. This takes advantage of the relative stability of the human head as compared with other parts of the body when engaged in sporting and other activities.

It is known from patent specification GB2327165 to include a video camera in a pair of spectacles together with a wireless transmitter and antenna connected so that the video signal is transmitted to a separate location where the video signal may be stored for subsequent viewing. A problem with this proposal is that of supplying sufficient power to operate the transmitter, which needs to be in its transmitting mode continuously during the whole time that the device is being used.

According to the invention there is provided video recording apparatus comprising headgear that includes: a video camera, means for storing a video signal from the camera and inductive coupling means for transferring the stored data to a data terminal separate from the headgear.

According to another aspect of the invention there is provided video recording apparatus comprising headgear that includes: a video camera, means for storing a video signal from the camera, a rechargeable battery, wireless means for transferring the stored data to a data terminal separate from the headgear, and inductive coupling means for re-charging the battery from a power source in the data terminal.

By employing the invention the need for a radio transmitter within the headgear is avoided and the power requirements, during capture of the video image are therefore greatly reduced. For example it is envisaged that sufficient power can be supplied for recording a full day's sporting activities by a battery small enough to fit into the frame of a pair of designer sunglasses. Power required for charging the battery and

for transfer of data to the data terminal can be supplied inductively from the data terminal, eg whilst the recorded data is being transferred.

The data terminal preferably has means for locating the headgear during data transfer in a position so that inductive loops or coils in the headgear and in the terminal are positioned in an optimum relative position for magnetic coupling. Where the headgear takes the form of spectacles or sunglasses, this can be achieved by forming the data terminal into a glasses case.

The use of inductive coupling makes it possible for the apparatus to be free from exposed electrical contacts and therefore waterproof or water resistant. The invention is therefore of particular value to those engaged in activities such as skiing where eye or head protection is required and where the headgear may be subjected to dampness.

The apparatus preferably includes a facility for linking the data terminal to a general purpose computer eg via a USB or short range wireless data connection. This allows the user to examine and download video files derived from the headgear For situations where no computer is available the data terminal preferably has its own battery (which may be recharged from a solar panel), a buffer memory, and means for detecting the presence of the headgear and for automatically downloading the video data into the buffer memory for subsequent access by a computer.

One example of how the invention may be employed will now be described by way of example with reference to the accompanying drawings in which: -

**Fig 1** is a perspective view of a pair of sunglasses constructed in accordance with the invention;

**Fig 2** is a perspective view of a data terminal in the form of a case for the sunglasses of Fig 1; and

**Fig 3** is a schematic block diagram of the circuitry within the components of Figs 1 and 2.

Referring first to Fig 1, the illustrated sunglasses comprise a front frame 1 containing a camera lens and sensor assembly 2. Hinged to the front frame 1 is a side arm 3 containing a battery 4 and a side arm 5 containing a circuit board 6 and an inductive coupler 7 formed by a coil, loop or spiral of conductive material. This may be wire or formed by conductive tracks on a printed board. Waterproof ON and OFF press-switches 8 and 9 are linked to the camera sensor 2, battery 4 and circuit board 6 by conductors 10 for the transfer of power and data.

Referring to Fig 2, a glasses case 11 has a holding container 11A hinged to a lid 11B and is designed to receive the sunglasses of Fig 1 and to locate them in a position so that, when the lid is closed, the inductive coupler 7 lies in close proximity to a second inductive coupler 12 also formed by a wire coil or printed conductive loop or spiral. The coupler 12 is connected via a control circuit 13 to a USB connection 14 whereby the case can be connected to a general purpose computer.

When the press-switch 8 is operated, a processor 61 (Fig 3) carried by the circuit board 6 is prompted to interact with the camera sensor 2 to produce a video signal and to store it in a memory 62. Power for this operation is supplied from the rechargeable battery 4 via a control circuit 63 and recording is stopped by operation of the press-switch. 9. The circuit board carries a microphone, not shown, the output from which is added to the video signal.

After typically a day's recording, the sunglasses are folded and placed in the case 11 (Fig 2) so that, when the lid 11B is closed, the inductive couplers 7 and 11 lies close together. The processor 131 receives power from an internal battery 14 of considerably larger capacity than the battery 4 within the sunglasses. The battery 14 is charged either from a USB interface 132 or from a solar panel 15 exposed on the outer surfaces of the case 11.

When circuit 133 detects the presence of the inductive loop 7 in the sunglasses and there is sufficient charge in the battery 14, a data transfer process is automatically initiated. In the course of this process power from the battery 14 is used to energise the coupler 12 with a high frequency alternating current. This induces a corresponding current in the coupler 7, which is rectified and voltage-converted to provide charging current to the battery 4 via the circuit 63. The circuit 63 and processor 131 also contain modulating and demodulating mechanisms which use the high frequency as a carrier onto which data, to be transferred between the processor 61 and the processor 131, is modulated. In this way the data from the store 62 is transferred into the buffer memory 134 for subsequent access by a computer connected to the USB port 14. When the video footage has been transferred to the computer, it can be viewed on that computer or shared with others via the internet.

The data terminal can be programmed for connection to a hand held mobile phone and data storage device. The video data can then be downloaded to the mobile device and either viewed on that mobile device or transmitted onto a mobile radio phone network for sharing with others.

Claims

1. Video recording apparatus comprising headgear that includes: a video camera, means for storing a video signal from the camera and inductive coupling means for transferring the stored data to a data terminal separate from the headgear.

2. Apparatus according to Claim 1 including a data terminal having inductive coupling means adapted to co-operate with the inductive coupling means in the headgear for the reception of the data.

3. Apparatus according to Claim 2 in which the data terminal is designed to receive the headgear in a defined relative position such that coupling of data between the headgear and the data terminal is optimised.

4. Apparatus according to any preceding Claim in which the headgear is water resistant.

5. Apparatus according to any preceding Claim in which the headgear includes a battery and means for charging the battery using current induced in the coupling means.

6. Apparatus according to any preceding Claim in which the headgear is eyewear.

7. Apparatus according to Claim 6 in which the eyewear is a pair of sunglasses.

8. Apparatus according to Claim 2 or any of Claims 3 to 7 when dependant thereon in which the data terminal is adapted to be connected to and to receive power from a general purpose computer.

9. Apparatus according Claim 2 or 8 or any of Claims 3 to 7 when dependant on Claim 8 in which the data terminal includes a battery, a buffer memory and means for transferring data into the buffer memory.

10. Apparatus according to Claim 9 in which the data terminal includes a solar power generator for charging its battery.

11. Apparatus according Claim 2, 8, 9 or 10 or any of Claims 3 to 17 when dependant on Claim 2 in which the data terminal contains a data storage and processing facility programmed for connection to a mobile phone device.

12. Video recording apparatus comprising headgear that includes: a video camera, means for storing a video signal from the camera, a rechargeable battery, wireless means for transferring the stored data to a data terminal separate from the headgear, and inductive coupling means for re-charging the battery from a power source in the data terminal.

**Application No:** GB0820104.8 **Examiner:** Dr Andrew Courtenay

**Claims searched:** 1 to 12 **Date of search:** 21 July 2009

## Patents Act 1977: Search Report under Section 17

**Documents considered to be relevant:**

| Category | Relevant to claims | Identity of document and passage or figure of particular relevance |
|---|---|---|
| X | 1 to 12 | US 2007/030442 A1 (HOWELL ET AL) Whole document relevant, especially paragraphs 90, 109, 140, 144 and 145. |
| X | 1 to 12 | WO 2007/079633 A1 (CHEN) See English language abstract and figures 1, 10 and 11 especially. |
| X | 1 to 12 | US 2006/109350 A1 (YEH) Whole document relevant, especially paragraphs 16 and 21. |
| A | 1 to 12 | US 2002/159023 A1 (SWAB) Whole document relevant, especially figures 5, 6 and 8. |
| A | 1 to 12 | US 2005/275714 A1 (ISHIKAWA et al) |
| A | 1 to 12 | GB 2327165 A (FOXTALBOT) |
| A | 1 to 12 | DE 10238297 A1 (ALBER) See English language abstract and figure 1. |
| A | 1, 5 and 12 | US 5455466 A (PARKS et al) Document demonstrates inductive charging and data transfer. |
| A | 1, 5 and 12 | WO 98/25736 A1 (PHILIPS ELECTRONICS) Document demonstrates inductive charging and data transfer. |

Categories:

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

**Field of Search:**

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC$^{X}$ :

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

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|---|
| G02C; H04N |

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

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| EPODOC, WPI |

**International Classification:**

| Subclass | Subgroup | Valid From |
|---|---|---|
| H04N | 0007/18 | 01/01/2006 |
| G02C | 0011/00 | 01/01/2006 |
| H04N | 0005/225 | 01/01/2006 |