

updated while not physically connected to the central spine column. This also facilitates reattachment of the page, since no (or very few, say just power) electrical connections need to be formed when reinserting the page into the central spine column.

EXAMPLE 4

An Electronic Reader which Incorporates Two Distinct E-Reader Units that are Able to be Operated Separately and are Able to be Attached Together to Form a Single E-Reader Unit.

[0082] A fourth embodiment of the present invention is disclosed, wherein two electronic readers are provided that can be joined together to form a single e-reader unit, as described above. Each individual e-reader incorporates one or more single or double-sided electronic pages for example as described above. Each electronic page of the e-reader may have a connector which, when the e-readers are coupled, becomes part of a spine of the combined reader.

[0083] FIG. 11 shows the individual units represented by FIG. 11 *a*) and FIG. 11 *b*), each unit comprises an individual e-reader device. Each unit is preferably operable to refresh each electronic page for example by the use of a button. Therefore, each individual user is able to download and read separate material onto their unit. In order to allow each of the units to operate independently of each other, each electronic page preferably has its own driver electronics.

[0084] When the two units are joined together, then the resultant device is preferably able to operate as is described above: Each page of the resultant device is able to be refreshed either during or shortly after the turning motion of the page, as is described above and is shown in FIG. 1 and FIG. 2. Communication between the two e-readers when joined together may be via a wireless link, and/or by a physical electrical connection formed when the two e-readers are joined together.

[0085] The e-reader we describe may comprise rigid display devices, or they may comprise flexible displays that convey the touch and feel of paper in that they can be bend when turning the pages. Flexible displays on plastic or thin metal substrates are also more robust than glass based displays. The use of flexible displays within the device can in embodiments allow the individual pages of the device to be rollable. In this case, the electronic pages may be configured such that they can be rolled into the central spine in order to reduce the form factor of the electronic reader for ease of storage and transportation.

[0086] The electronic reader may have a touch screen and include a stylus. In such a device, the user may use the stylus to make annotations on the display next to the original text. These notes may be saved and stored, for example as separate files from the page containing the original text.

[0087] FIG. 12 shows a docking station 14, which may be used in order to upload new reading material or recharge the battery of the device. The docking station may also comprise a USB port, or other standard interface, such as a Bluetooth connection for connecting the device to a PC, mobile phone or PDA. Alternatively such communication interface can be integrated directly into the central spine unit, to enable the content of the reader to be updated even when the device is not connected to the docking station.

[0088] Referring to FIG. 13, this shows a block diagram of an embodiment of an electronic document reading device

1300 as described above. The device includes a controller 1302 comprising a processor coupled to working memory and permanent program memory storing program code for controlling the e-reader to function as described above. The stored code may, optionally, also be provided on a removable storage medium, illustratively shown by portable storage media 1304.

[0089] The controller 1302 is coupled to a user interface 1306 such as the scroll or menu select wheel 7 described above and optionally to one or more other interfaces 1308 such as a Bluetooth™ interface, a wireless local area network interface, a USB interface or the like. The controller is also coupled to non-volatile memory 1310, for example Flash RAM, which stores one or more documents or parts of documents, and which may additionally store other data such as bookmark data identifying the locations of one or more bookmarks within a stored document a bookmark having been placed, for example, as described above. A docking station interface 1312 is provided for interfacing with a docking station 1314 to receive data such as document data, power for recharging a rechargeable battery 1316, and optionally for outputting data such as bookmark data.

[0090] The controller is also coupled to one or more electronic pages 13, 18*a*, *b* each with one or more (single- or double-sided) page displays 1320*a*, *b*. As illustrated the electronic pages also include display driver, and optionally sensor interface circuitry 1322*a*, *b* (if a page is touch-sensitive), to interface with the controller to receive data for driving a page display surface and, optionally, to provide touch data back to the controller. The display driver circuitry may either be part of a main device or may be part of an electronic page and may, in embodiments, be fabricated on a page surface (in embodiments on a flexible page surface by solution deposition techniques) according to the application. Fabricating some or all of the driver/interface electronics on a display surface can potentially reduce a number of electrical connections to a page, which may be advantageous. Suitable solution deposition techniques which may be employed to fabricate driver/interface electronics are described in a number of the present applicant's previous patent applications, for example WO 01/47045, WO 2004/070466, WO 01/47043, WO 2006/059162, WO 2006/056808, and WO 2006/061658, all hereby incorporated by reference in their entirety. A page turn sensor 1324 is preferably sensitive to rotation of one of the electronic pages 1318*a*, *b* with respect to the other in order to sense page turning by a user of the device.

[0091] The code stored in the program memory of controller 1302 comprises operating system code, code to implement user interface 1306, the other interfaces 1308, 1312, page turn sensing code, touch sensing code and display driving code. In particular the program memory includes code to sense a page turn 1350, to determine a display surface to update 1352 in response, and code to then read 1354 a portion of document from the non-volatile memory and to write 1356 this to the display surface to be updated. Preferably code is also included to sense 1358 a bookmark at a position in the displayed document and to write 1360 the bookmark to the non-volatile memory.

[0092] As an additional feature, a reading light may be incorporated within the device; this may or may not be detachable from the e-reader device. In embodiments an e-reader as described above may be at least partially solar powered.