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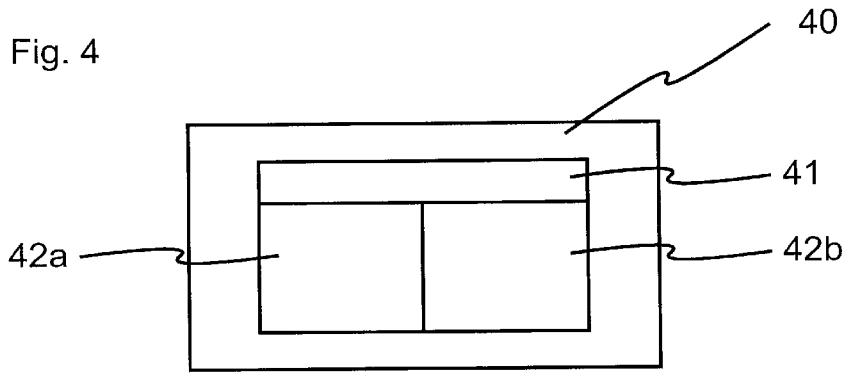
(54) Title: METHOD AND SYSTEM FOR SUPPORTING PORTABLE DESKTOP

Fig. 4



(57) Abstract: A method for operating a portable peripheral memory storage device, wherein the peripheral memory storage device is operable in either of two modes of operation In a first mode of operation, the deuce supports portable desktop functionality In a second other mode of operation the portable peripheral memory storage device supports external memory storage as a mounted storage device within a host system

METHOD AND SYSTEM FOR SUPPORTING PORTABLE DESKTOP

FIELD OF THE INVENTION

[001] The present invention generally relates to the field of data processing systems and networks and more particularly to a method and system for using a portable peripheral memory storage device to implement secure and portable personalized desktop functionality.

BACKGROUND

[002] The concept of a portable desktop is well known in the field of data processing systems and data processing networks. A portable desktop generally refers to personal desktop that a user can recreate on any of a number of computers, for example connected to a network. Implied by the term personal desktop is the private data associated with each user including, for example, email, appointments, personal files, and the like. By enabling users to use a greater number of devices without sacrificing the benefits of a familiar and personalized interface, portable desktops have the potential to expand mobility and convenience, greatly. Typically, portable desktops are achieved by storing within a network a personalized file system or directory for each user. In order to enable a user's desktop, files and home directory to be portable, the user's file system or disk is networked within the network. This model, unfortunately, can lead to security lapses in which, for example, a root system administrator snoops and reads a user's personal email, files, etc.

[003] One attempt to address this problem contemplates distributing a personal data device drive to each user. The user's personal directory is stored on the personal drive. When the user connects to the network using a particular computer, the personal drive is inserted into an appropriate slot of the machine. After "hot plugging" the drive into the machine, a network workstation mounts the personal directory on the personal drive and provides a personalized interface to the user. It will be appreciated, however, that the cost and inconvenience associated with requiring users to perform field installs and disk drive configurations every time they wish to access their portable disks makes this solution impractical. Further, the software for each computer supporting the personal desktop application is custom and therefore limits use of the personal desktop and all data associated therewith.

[004] It would be desirable, therefore, to provide a system and method supporting benefits of personalized and portable desktops without sacrificing security and without incurring the cost and inconvenience of the prior art.

SUMMARY OF THE INVENTION

[005] In accordance with the invention there is provided a portable peripheral memory storage device comprising: a housing; a port for interfacing with a workstation; and a memory comprising at least a first portion and a second portion, the first portion comprising portable desktop data and for supporting of portable desktop functionality on a workstation coupled thereto and the second portion for providing portable peripheral memory storage device functionality for a workstation coupled thereto via the port and independent of the portable desktop functionality.

[006] In accordance with another aspect of the invention there is provided a method comprising: coupling a peripheral memory storage device with a workstation; in a first mode of operation, mounting a portion of the peripheral memory storage device on the workstation for operation therewith in a first mode of operation as a storage medium; and, in a second other mode of operation using data within the peripheral memory storage device to support a personal desktop on the workstation.

[007] In accordance with another aspect of the invention, there is provided a portable peripheral memory storage device comprising: a housing; a port for interfacing with a workstation; and a memory comprising at least a first portion for supporting portable desktop functionality on a workstation coupled thereto, the first portion hidden unless the portable peripheral memory storage device is operable for providing the portable desktop functionality.

BRIEF DESCRIPTION OF THE DRAWINGS

[008] Other objects and advantages of the invention will become apparent upon reading the following detailed description and upon reference to the accompanying drawings in which:

[009] FIG. 1a is a simplified block diagram of a portable peripheral memory storage device in the form of a universal serial bus (USB) memory key;

[0010] FIG. 1b is a simplified block diagram of a portable peripheral memory storage device in the form of a wireless memory key;

[0011] FIG. 2 is a simplified memory diagram for a prior art portable peripheral memory storage device;

[0012] FIG. 3 is a simplified memory diagram for a prior art portable peripheral memory storage device supporting virtualisation of a desktop;

[0013] FIG. 4 is a simplified memory diagram for a portable peripheral memory storage device according to an embodiment of the invention wherein the device supports a single security process;

[0014] FIG. 5 is a simplified memory diagram for a portable peripheral memory storage device according to an embodiment of the invention supporting several different security processes;

[0015] FIG. 6 is a simplified memory diagram for a portable peripheral memory storage device according to an embodiment of the invention absent security within the portable peripheral memory storage device

[0016] FIG. 7 is a simplified flow diagram of a method of providing a virtual desktop;

[0017] FIG. 8 is a simplified flow diagram of a method of supporting a portable desktop independent of a removable memory store within a portable peripheral memory device;

[0018] FIG. 9 is a simplified flow diagram of a method of supporting a portable desktop supporting limited access to a removable memory store within a portable peripheral memory device; and,

[0019] FIG. 10 is a simplified flow diagram of a method of supporting a portable desktop supporting access to a removable memory store within a portable peripheral memory device.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0020] Referring to Fig. 1a, shown is a prior art portable peripheral memory storage device 100. The device comprises a USB connector 101 and a housing 102. When the USB connector 101 is coupled to a mating connector on a host computer in the form of a personal computer (not shown), data is exchanged between the portable peripheral memory storage device 100 and the host computer. The USB communication circuit 103 communicates with another USB communication circuit within the host computer. The USB communication circuit 103 further communicates with processor 104 in the form of a microcontroller. The processor in turn communicates with static random access memory (static RAM) 105 within the portable peripheral memory storage device 100.

[0021] When powered on, the prior art peripheral memory storage device commences interactions with a host computer system from which it draws power. The interactions allow the host computer system to mount the portable peripheral memory storage device 100 for access as a memory storage device by the host computer system. Thus, the portable peripheral memory storage device 100, for example, appears as a storage device listed with other storage devices of the host computer. It is known to then store data on or retrieve data from the portable peripheral memory storage device 100. Removing the portable peripheral memory storage device 100 from the host computer system allows for portability of any of the data stored therein to another host computer either locally or wherever the portable peripheral memory storage device 100 is taken.

[0022] Referring to Fig. 1b, shown is a prior art portable peripheral memory storage device 110. The device comprises an antenna 111 and a housing 112. When the portable peripheral memory storage device 110 is wirelessly coupled to a host computer in the form of a personal computer (not shown), data is exchangeable between the portable peripheral memory storage device 110 and the host computer. A transceiver circuit 118 present within the housing 112 converts data into amplified signals for driving the antenna 111. A communication circuit 113 communicates with another communication circuit within the host computer via the wireless communication link formed therebetween. The communication circuit 113 further communicates with processor 114 in the form of a microcontroller. The processor 114

in turn communicates with static random access memory (static RAM) 115 within the portable peripheral memory storage device 110.

[0023] Once wirelessly coupled to a host computer, the prior art portable peripheral memory storage device commences interactions with the host computer system. The interactions allow the host computer system to mount the portable peripheral memory storage device 110 for access as a memory storage device by the host computer system. Thus, the portable peripheral memory storage device 110, for example, appears as a storage device listed with other storage devices of the host computer. It is known to then store data on or retrieve data from the portable peripheral memory storage device 110. Moving the portable peripheral memory storage device 110 allows for portability of any of the data stored therein to another host computer either locally or wherever the portable peripheral memory storage device 110 is taken.

[0024] Referring to Fig. 2, it is further known to secure data within the portable peripheral memory storage device of Fig. 1a and of Fig. 1b and to require user authentication in order to access same. In such a portable peripheral memory storage device, a user is prompted to provide user authentication data, either to the host computer or to the peripheral memory storage device itself in order to "unlock" the data stored within the peripheral memory storage device. For example, a peripheral memory storage device comprising a fingerprint scanner requires a user to provide a live fingerprint thereto before releasing data stored therein. As shown in Fig. 2, a memory space 20 includes a peripheral memory storage area 22 and a security data storage area 21. Data stored within the security data storage area is for securing the data stored within the peripheral memory storage area. For example, this area includes processes for execution by a controller within the portable peripheral memory storage device for securing and de-securing of data. Optionally, this area includes correlation data for being correlated with user provided security data or information.

[0025] The peripheral memory storage area 22 comprises static RAM and effectively appears as the mounted storage area within an operating system of the host system.

[0026] Referring to Fig. 3, it is further known to secure data within the portable peripheral memory storage device of Fig. 1a and of Fig. 1b and to require user authentication in order to access same. In such a portable peripheral memory storage device, a user is prompted to provide user authentication data, either to the host computer or to the peripheral memory storage device itself in order to "unlock" the data stored within the peripheral memory storage device. For example, a peripheral memory storage device comprising a fingerprint scanner requires a user to provide a live fingerprint thereto before releasing data stored therein. As shown in Fig. 3, a memory space 30 includes a peripheral memory storage area 32 and a security data storage area 31. Data stored within the security data storage area is for securing the data stored within the peripheral memory storage area. For example, this area includes processes for execution by a controller within the portable peripheral memory storage device for securing and de-securing of data. Optionally, this area includes correlation data for being correlated with user provided security data or information.

[0027] The peripheral memory storage area 32 comprises static RAM for having data relating to a personalized desktop stored therein for use with a host system in providing the user with portable desktop functionality. The data stored therein is modified and updated by the portable desktop application.

[0028] Generally speaking an embodiment of the present invention contemplates a system that enables personalized desktop functionality provided via a peripheral memory device while supporting other functions of the peripheral memory device.

[0029] Referring to Fig. 4, a memory diagram of an exemplary device is shown. In such a portable peripheral memory storage device, a user is prompted to provide user authentication data, either to the host computer or to the peripheral memory storage device itself in order to "unlock" the data stored within the peripheral memory storage device. For example, a peripheral memory storage device comprising a fingerprint scanner requires a user to provide a live fingerprint thereto before releasing data stored therein. As shown in Fig. 4, a memory space 40 includes peripheral memory storage areas 42a and 42b and a security data storage area 41. Data stored within the security data storage area is for securing the data stored within the peripheral memory storage area. For example, this area includes processes for execution by a controller within the portable peripheral memory storage device for

securing and de-securing of data. Optionally, this area includes correlation data for being correlated with user provided security data or information.

[0030] The peripheral memory storage area 42a comprises static RAM for having data relating to a personalized desktop stored therein for use with a host system in providing the user with portable desktop functionality. The data stored therein is modified and updated by the portable desktop application. The peripheral memory storage area 42b comprises static RAM and effectively appears as the mounted storage area within an operating system of the host system.

[0031] Thus, the portable peripheral memory storage device optionally includes circuitry for executing functions thereof such as cache management, memory use optimization, security functions, and communication functions. The portable peripheral memory storage device is operable in either of two modes of operation. In a first mode of operation, the device supports portable desktop functionality. In a second other mode of operation the portable peripheral memory storage device supports external memory storage as a mounted storage device within a host system.

[0032] Alternatively as shown in Fig. 5, a memory space 50 includes peripheral memory storage areas 52a and 52b and security data storage areas 51a and 51b. Data stored within the security data storage areas is for securing data stored within an associated portion of the peripheral memory storage area. For example, each of the areas 51a and 51b includes processes for execution by a controller within the portable peripheral memory storage device for securing and de-securing of data. Optionally, each area includes correlation data for being correlated with user provided security data or information.

[0033] The peripheral memory storage area 52a comprises static RAM for having data relating to a personalized desktop stored therein for use with a host system in providing the user with portable desktop functionality. The data stored therein is modified and updated by the portable desktop application. Accessing of the portable desktop is via security based on data within the area 51a. The peripheral memory storage area 52b comprises static RAM and effectively appears as the mounted storage area within an operating system of the host system. Accessing of the mounted storage area is via security based on data within the area 51b.

[0034] Thus, the portable peripheral memory storage device optionally includes circuitry for executing functions thereof such as cache management, memory use optimization, security functions, and communication functions. The portable peripheral memory storage device is operable in either of two modes of operation. In a first mode of operation, the device supports portable desktop functionality. In a second other mode of operation the portable peripheral memory storage device supports external memory storage as a mounted storage device within a host system.

[0035] In Fig. 6 a simplified memory diagram for a portable peripheral memory storage device that is not secured is shown. A memory space 60 includes peripheral memory storage areas 62a and 62b. In applications of this nature, either the data and portable desktop security is not considered of concern or the physical security of the portable device is relied upon to secure the data.

[0036] The peripheral memory storage area 62a comprises static RAM for having data relating to a personalized desktop stored therein for use with a host system in providing the user with portable desktop functionality. The data stored therein is modified and updated by the portable desktop application. The peripheral memory storage area 62b comprises static RAM and effectively appears as the mounted storage area within an operating system of the host system.

[0037] Thus, the portable peripheral memory storage device optionally includes circuitry for executing functions thereof such as cache management, memory use optimization, security functions, and communication functions. The portable peripheral memory storage device is operable in either of two modes of operation. In a first mode of operation, the device supports portable desktop functionality. In a second other mode of operation the portable peripheral memory storage device supports external memory storage as a mounted storage device within a host system.

[0038] Referring to Fig. 7, shown is a simplified flow diagram of a method of providing a virtual desktop. At 701, a first user is provided with a peripheral memory storage device in the form of a universal serial bus (USB) memory key comprising memory storage therein for coupling to a USB port of a host computer system. The peripheral memory storage device has data stored therein for supporting the portable desktop of the first user, for example by having stored thereon the user's personal

directory containing personal data/files including, for example, email, appointments, desktop files and the like. The peripheral memory storage device is preferably sufficiently small to enable users to clip it to their clothing or otherwise carry it on themselves in the same way that they might have a cellular telephone or a wireless paging device. Peripheral memory storage devices of this nature are well known and presently are offered in numerous small form factors many of which will fit in a change purse. Larger peripheral memory storage devices comprise hard drives, but even these are generally of a size and form factor for easy portability.

[0039] The portable peripheral storage device is coupled with a host computer during use thereof at 702. Typically, this is performed by inserting the USB connector of the portable peripheral memory storage device into a mating connector of the host computer. Alternatively, another method of coupling in the form of wireless coupling is used. Further alternatively, yet another coupling process is employed.

[0040] Because the host computer system is in use, at 704 a first partition of the portable peripheral memory storage device is mounted as an external removable storage device within an operating system of the host computer system. The first user is then able to, at 706, store and retrieve files within the partition. The first user, however, is barred from accessing any data within their portable desktop. Optionally, the portable desktop is completely hidden form the first user such that the device appears, for example, as a standard USB portable memory device.

[0041] Referring to Fig. 8, when the host computer is rebooted at 801, the portable peripheral memory device is detected at boot-up and at 802 causes the host computer to execute the personal desktop of the first user based on memory within a second partition of the portable peripheral memory storage device. The personal desktop denies the first user access to the first partition of the portable peripheral memory device.

[0042] Referring to Fig. 9, an alternative embodiment is shown. When the host computer is rebooted at 901, the portable peripheral memory device is detected at boot-up and at 902 causes the host computer to execute the personal desktop of the first user based on memory within a second partition of the portable peripheral memory storage device. At 903, the personal desktop mounts the first partition of the

portable peripheral memory storage device as a storage device. Thus, the portable peripheral memory storage device is usable as a personal desktop device and as a portable storage device. At 906, the first user retrieves data from the first partition. The first user is prevented from storing data within the first partition thereby allowing importing of external data to the portable desktop while preventing exporting of internal data from the personal desktop.

[0043] Referring to Fig. 10, an alternative embodiment is shown. When the host computer is rebooted at 1001, the portable peripheral memory device is detected at boot-up and at 1002 causes the host computer to execute the personal desktop of the first user based on memory within a second partition of the portable peripheral memory storage device. At 1003, the personal desktop mounts the first partition of the portable peripheral memory storage device as a storage device. Thus, the portable peripheral memory storage device is usable as a personal desktop device and as a portable storage device. At 1005, the first user stores data within the first partition and at 1006 the first user retrieves data from the first partition.

[0044] Though the term partition is used hereinabove other methods of securing portions of a storage medium from access thereto are also supported. For example, instead of preventing access to the first partition, access is prevented to a portion of the memory device having files stored therein and accessible when the portable peripheral memory device is mounted as a removable memory device.

[0045] The term mounted is typically used to denote making a memory store accessible from within an operating system. When the portable peripheral memory storage device is used to implement a portable desktop, the portable desktop itself is a result of access to the device. As such, the term mounting of a memory store within the device is optionally a software function within the portable desktop environment.

[0046] Optionally, when the portable desktop device is coupled to a host computer, authentication of the first user is required before the portable desktop device is accessible for portable desktop execution.

[0047] Further optionally, when the portable desktop device is coupled to a host computer, authentication of the first user is required before the portable desktop device is accessible for use as a memory storage device. Alternatively, even after

authentication has occurred, the portable desktop data within the portable desktop device is hidden form the user unless

[0048] Further optionally, when the portable desktop device is coupled to a host computer, authentication of the first user is required before the portable desktop device is accessible for use as either a portable desktop device or as a memory storage device.

[0049] Numerous other embodiments may be envisaged without departing from the spirit or scope of the invention.

CLAIMS

What is claimed is:

1. A portable peripheral memory storage device comprising:
a housing;
a port for interfacing with a workstation;
a memory comprising at least a first portion and a second portion, the first portion comprising portable desktop data and for supporting portable desktop functionality on a workstation coupled thereto and the second portion for providing portable peripheral memory storage device functionality for a workstation coupled thereto via the port and independent of the portable desktop functionality.

2. A peripheral memory storage device according to claim 1 wherein the port comprises a universal serial bus (USB) port.

3. A peripheral memory storage device according to claim 1 wherein the housing is sized and configured for fitting within the clothing of an individual.

4. A peripheral memory storage device according to claim 1 comprising a processor for preventing access to the first portion unless the device is operating to provide a portable desktop.

5. A peripheral memory storage device according to claim 4 wherein the processor hides the first portion unless the device is operating to provide a portable desktop.

6. A peripheral memory storage device according to claim 4 comprising a processor for providing access to the second portion when the device is operating to provide a portable desktop.

7. A peripheral memory storage device according to claim 1 comprising a processor for providing limited access to the second portion when the device is operating to provide a portable desktop, the limited access restricting access to the second portion relative to access to the second portion independent of the portable desktop

functionality.

8. A peripheral memory storage device according to claim 1 comprising a processor for providing access to the second portion when the device is operating to provide a portable desktop, the access to the second portion less restrictive relative to restricted access to the second portion from the portable desktop functionality.

9. A peripheral memory storage device according to claim 4 comprising a processor for preventing access to the second portion when the device is operating to provide a portable desktop.

10. A peripheral memory storage device according to claim 4 comprising a processor for preventing access to both the first and second portions absent prior user authentication.

11. A method comprising:
coupling a peripheral memory storage device with a workstation;
in a first mode of operation, mounting a portion of the peripheral memory storage device on the workstation for operation therewith in a first mode of operation as a storage medium;
in a second other mode of operation using data within the peripheral memory storage device to support a personal desktop on the workstation.

12. A method according to claim 11 wherein in the second mode of operation, the portion of the peripheral memory storage device is accessible via the portable desktop as a storage medium mounted thereto.

13. A method according to claim 12 wherein in the second mode of operation, the portion of the peripheral memory storage device is read only.

14. A method according to claim 13 wherein in the first mode of operation, the portion of the peripheral memory storage device is write only.

15. A method according to claim 11 wherein the data within the peripheral memory

storage device to support a personal desktop is inaccessible in the first mode of operation.

16. A method according to claim 15 wherein the portion of the peripheral memory storage device is inaccessible in the second mode of operation.

17. A method according to claim 11 wherein the data within the peripheral memory storage device to support a personal desktop is stored within a separate partition of the peripheral memory storage device.

18. A method according to claim 11 wherein the device operates within the second mode of operation when installed prior to booting the host computer and in the first mode of operation when installed within a host computer that is already booted.

19. A method according to claim 18 wherein when installed prior to booting the host computer the host computer boots from the peripheral memory storage device, the host computer having non-volatile memory storage other than the peripheral memory storage device disabled.

20. A method according to claim 11 comprising:
providing user authentication data to the peripheral memory storage device;
when the user authentication data is indicative of other than an authorized user, denying access to data stored within the peripheral memory storage device; and,
when the user authentication data is indicative of an authorized user, providing access to data stored within the peripheral memory storage device.

21. A portable peripheral memory storage device comprising:
a housing;
a port for interfacing with a workstation; and,
a memory comprising at least a first portion for supporting portable desktop functionality on a workstation coupled thereto, the first portion hidden unless the portable peripheral memory storage device is operable for providing the portable desktop functionality.

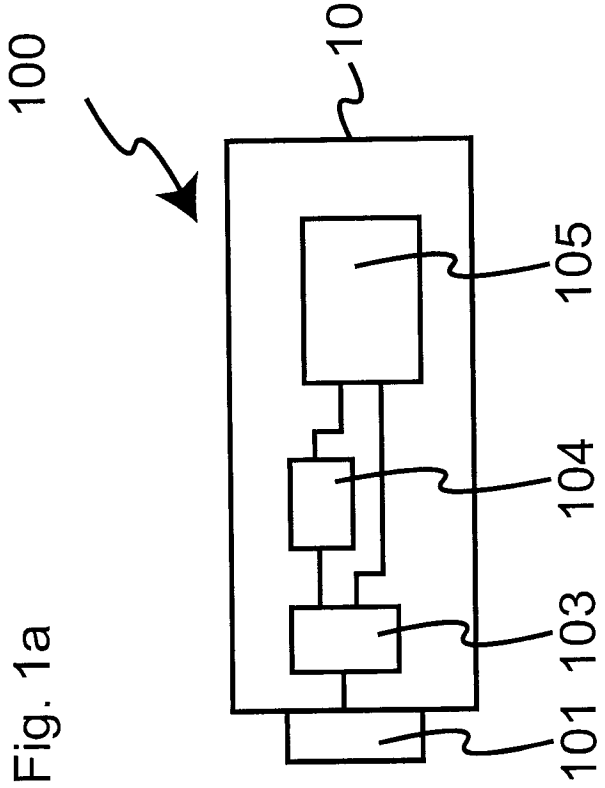


Fig. 1a

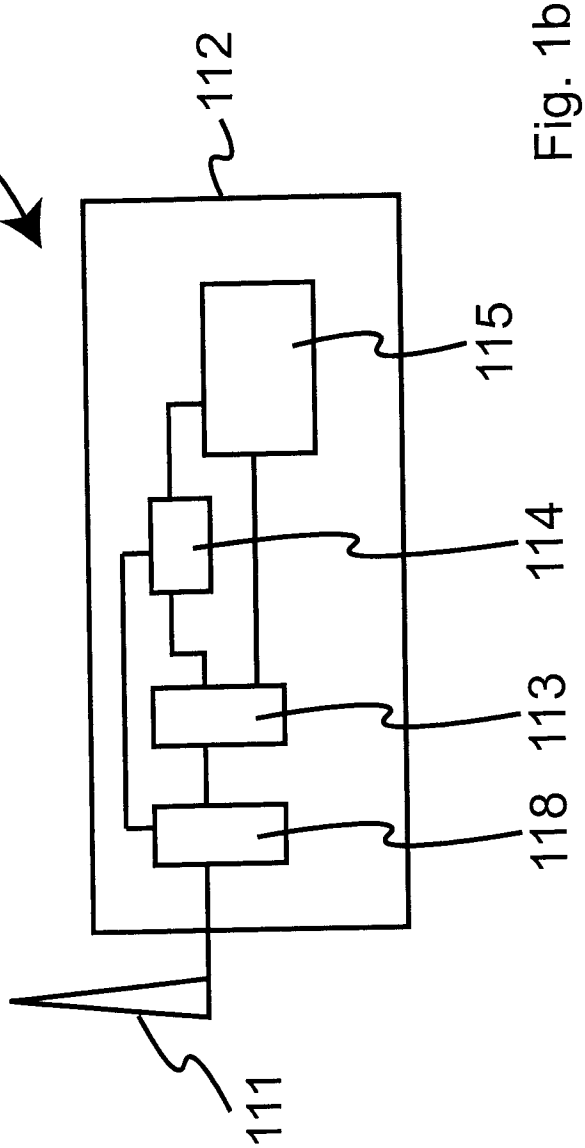


Fig. 1b

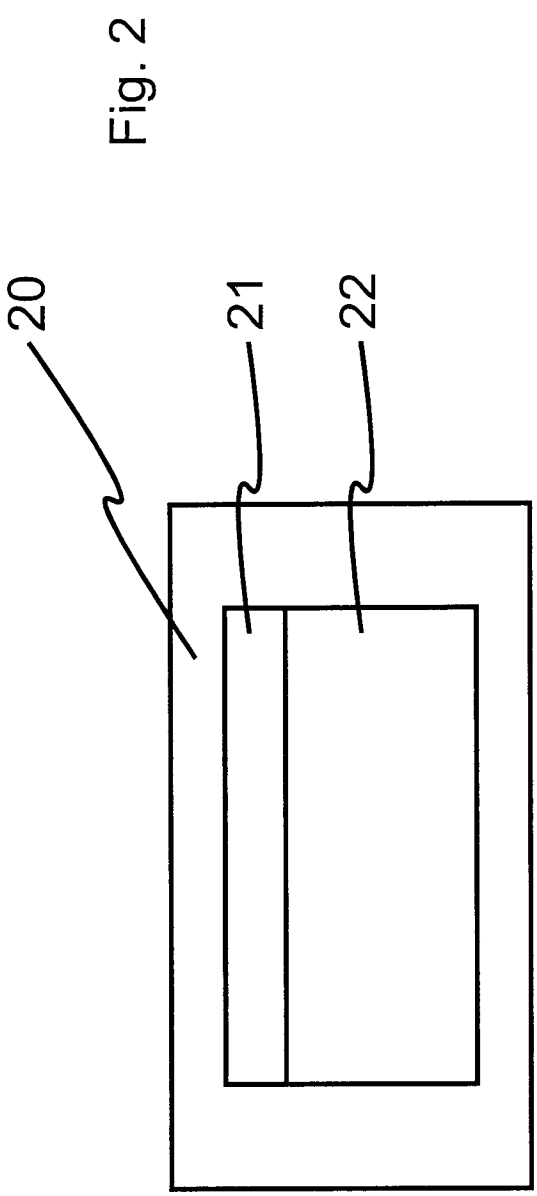


Fig. 2

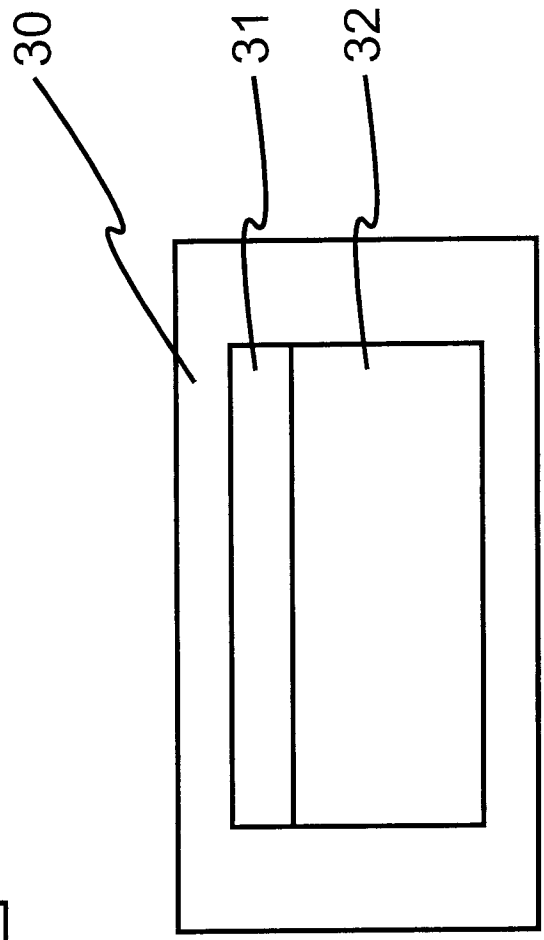


Fig. 3

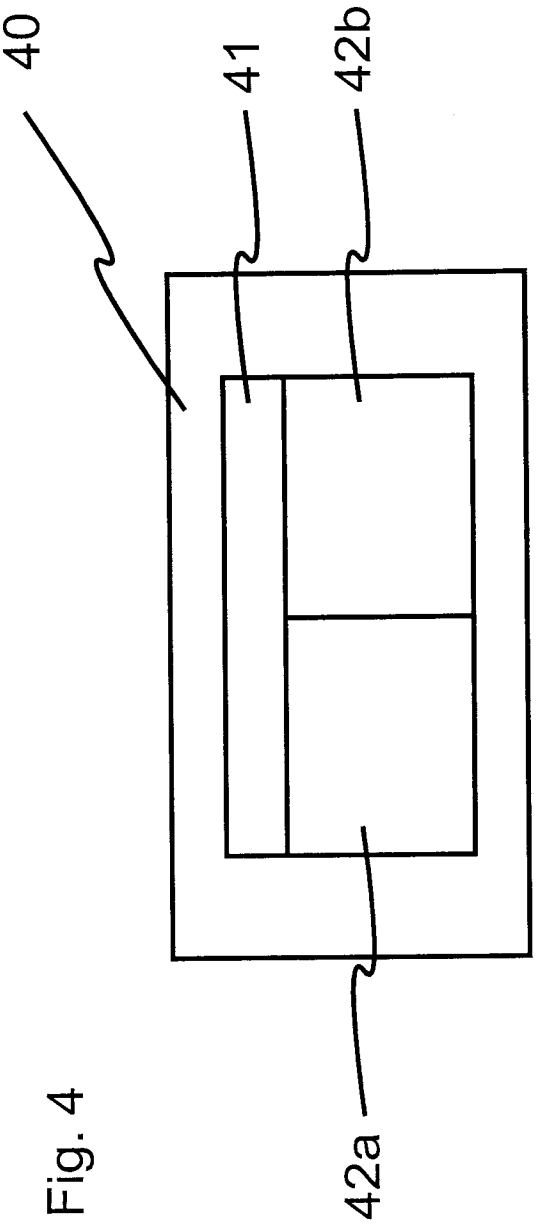


Fig. 4

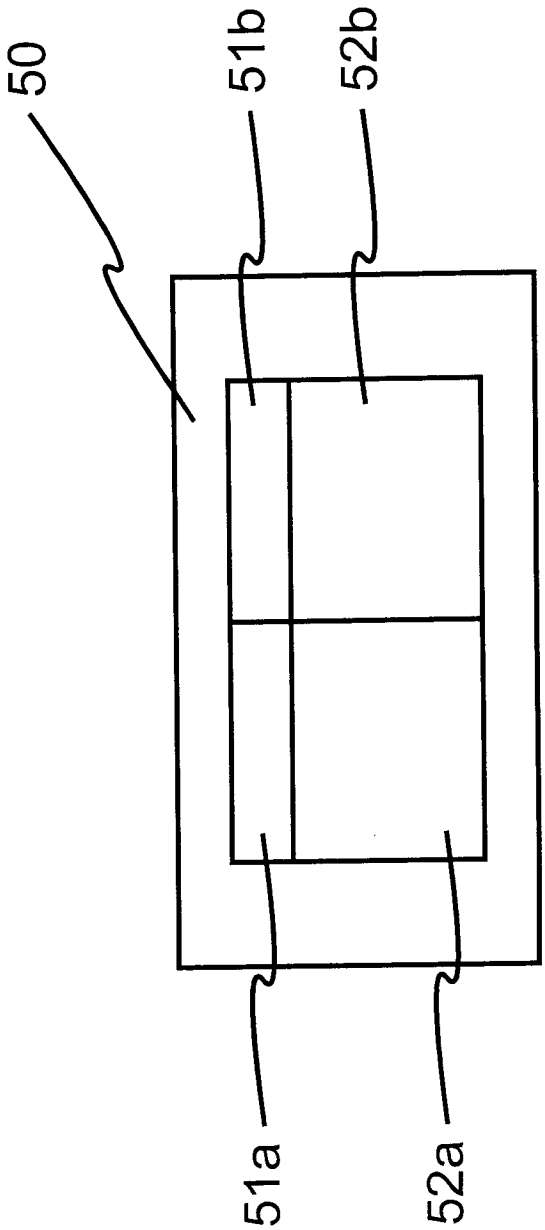


Fig. 5

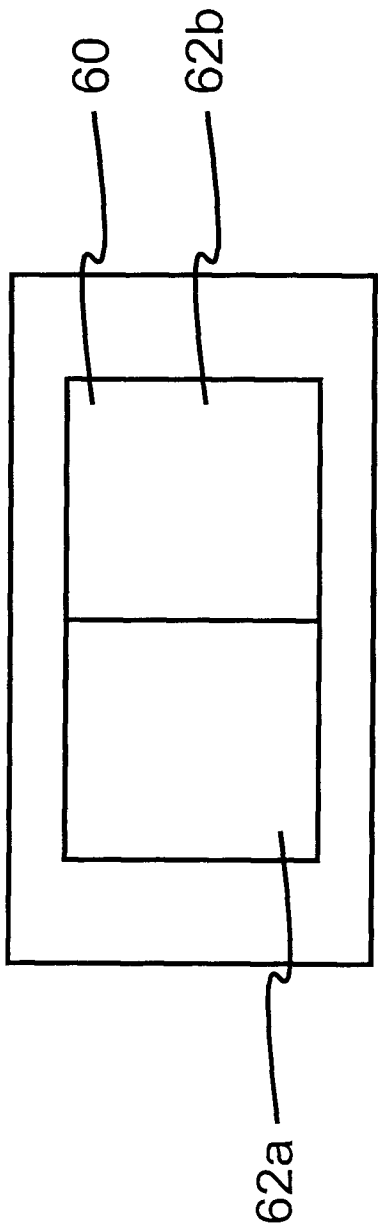


Fig. 6

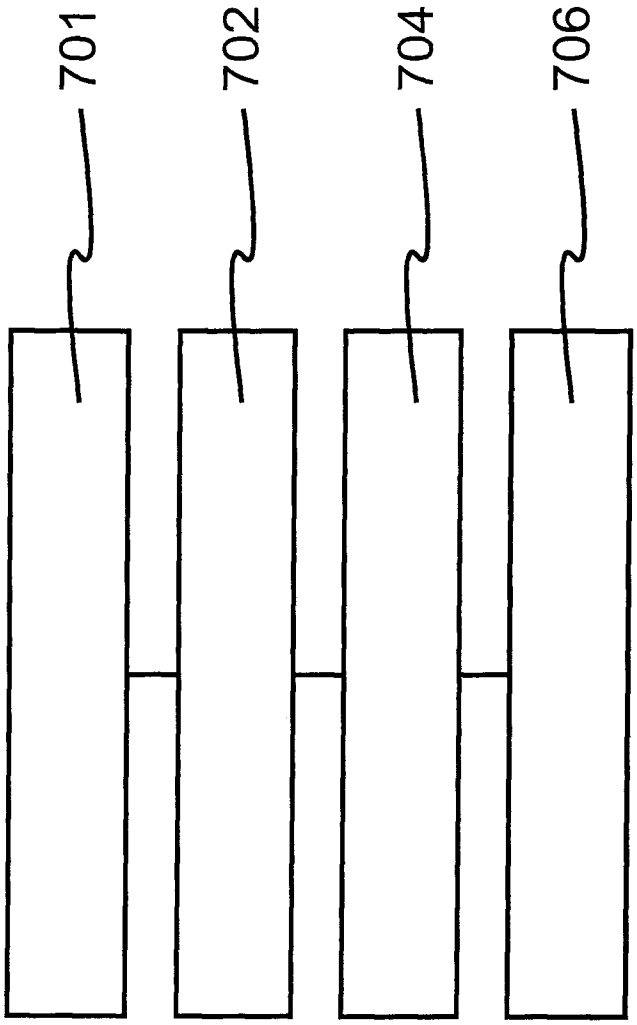


Fig. 7

Fig. 10

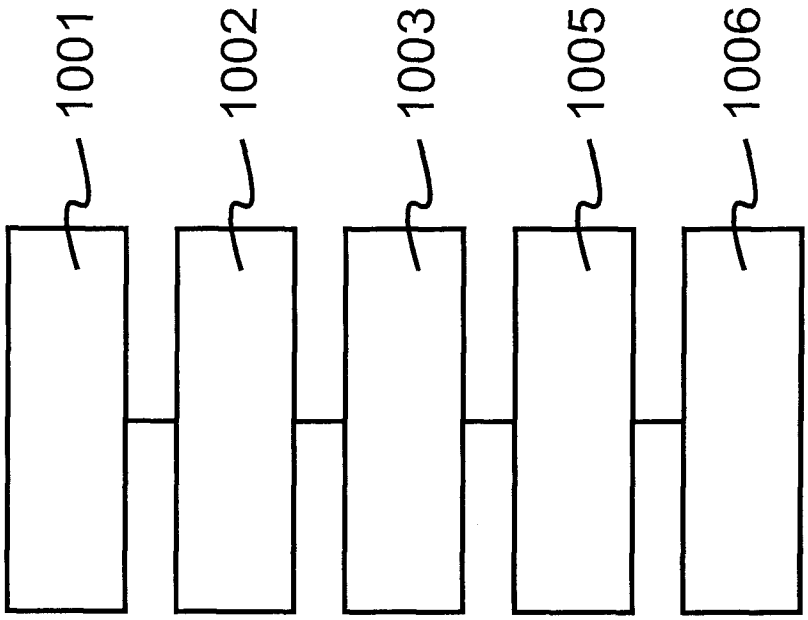


Fig. 8

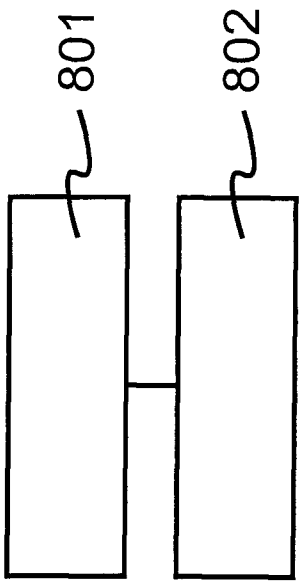
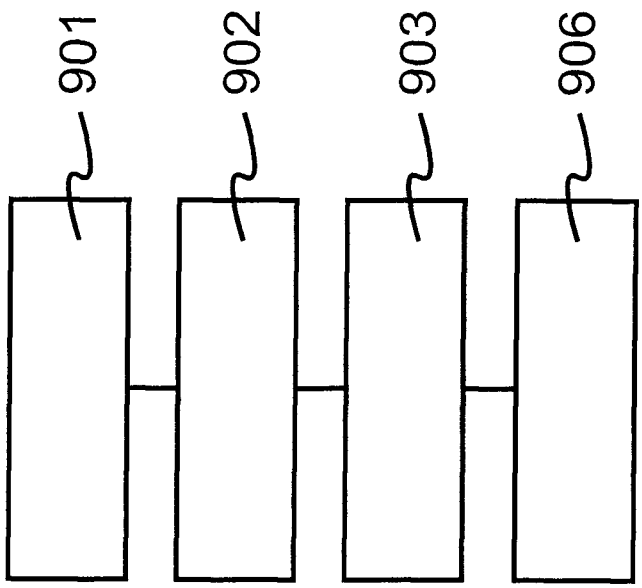


Fig. 9



INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2010/001554

A. CLASSIFICATION OF SUBJECT MATTER

IPC: ***G06F 3/06*** (2006.01) , ***G06F 1/16*** (2006.01) , ***G06F 12/00*** (2006.01) , ***G06F 15/00*** (2006.01)

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)

IPC: **ALL** (2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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

TotalPatent, EPOQUE and keywords: portable storage stick; flash memory/drive; memory stick/drive; USB memory/drive personal/portable/mobile/virtual desktop; boot or load; boot up; secure/security; authenticate/authentication

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2008/0052776 A1 (*Prabhat et al.*) - 28 February 2008 (28-02-2008) * abstract; [0006], [0007]; Figs. 1, 8 *	21
Y	US 2004/0103288 A1 (*Ziv et al.*) - 27 May 2004 (27-05-2004) * [0026] *	21
A	US 2008/0172555 A1 (*Keenan.*) - 17 July 2008 (17-07-2008) * the whole document *	
A	US 2003/0216136 A1 (*McBrearty et al.*) - 20 November 2003 (20-11-2003) * the whole document *	
A	US 2008/0215796 A1 (*Lam et al.*) - 4 September 2008 (04-09-2008) * the whole document *	

[ ] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"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	Date of mailing of the international search report
02 December 2010 (02-12-2010)	13 January 2011 (13-01-2011)

Name and mailing address of the ISA/CA	Authorized officer
Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 001-819-953-2476	Reginald Linco (819) 994-1683

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CA2010/001554

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
US2008052776A1	28-02-2008	US2008052776A1	28-02-2008
		US2009043840A1	12-02-2009
		US2009182955A1	16-07-2009
		WO2010111338A2	30-09-2010
US2004103288A1	27-05-2004	US2004103288A1	27-05-2004
		US7478248B2	13-01-2009
		US2009055655A1	26-02-2009
		US2009119502A1	07-05-2009
		US2009119517A1	07-05-2009
US2008172555A1	17-07-2008	US2008172555A1	17-07-2008
		WO2008088396A1	24-07-2008
US2003216136A1	20-11-2003	US2003216136A1	20-11-2003
US2008215796A1	04-09-2008	US2005125513A1	09-06-2005
		US7373451B2	13-05-2008