Office de la Propriété Intellectuelle du Canada
Un organisme d'Industrie Canada

Canadian Intellectual Property Office
An agency of Industry Canada

CA 2349649 A1 2002/01/31

(21) 2 349 649

(12) DEMANDE DE BREVET CANADIEN
CANADIAN PATENT APPLICATION

(13) A1

(22) Date de dépôt/Filing Date: 2001/06/01

(41) Mise à la disp. pub./Open to Public Insp.: 2002/01/31

(30) Priorité/Priority: 2000/07/31 (09/628,998) US

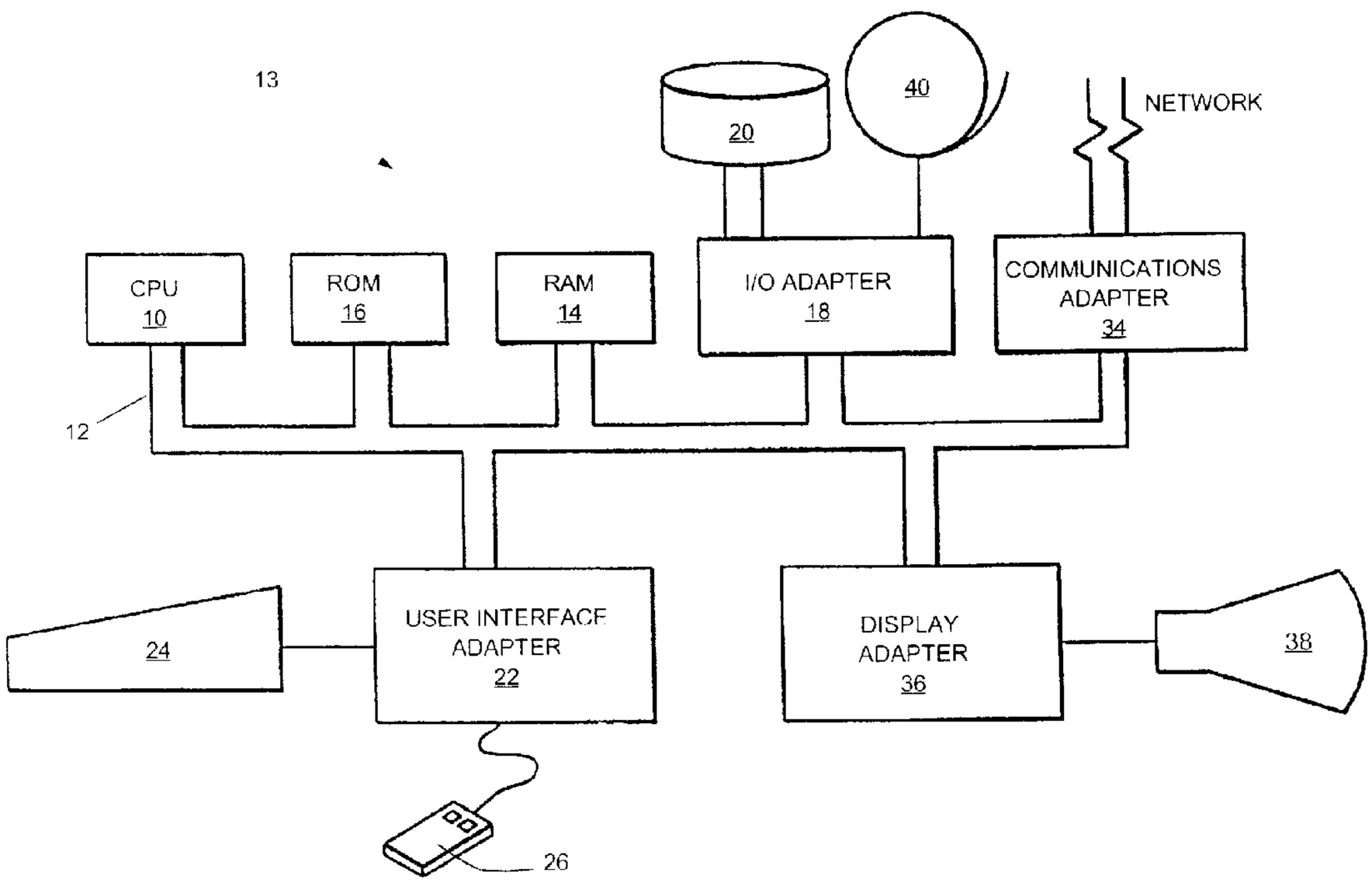
(51) Cl.Int.^{7}/Int.Cl.^{7} G06F 3/14, G06F 9/48

(71) Demandeur/Applicant:
INTERNATIONAL BUSINESS MACHINES CORPORATION, US

(72) Inventeur/Inventor:
ABRAMS, ROGER K., US

(74) Agent: ROSEN, ARNOLD

(54) Titre : COMMUTATION ENTRE BUREAUX VIRTUELS
(54) Title: SWITCHING BETWEEN VIRTUAL DESKTOPS



(57) Abrégé/Abstract:
A method, system and computer program product for switching between desktop panes, i.e., virtual desktops. In one embodiment, the method comprises the step of providing a display device. The method further comprises the step of providing a display area where the display area comprises a plurality of desktop panes. One out of the plurality of desktop panes in the display area is visible on the display device. Furthermore, each of the plurality of desktop panes comprises one or more borders to one or more other desktop panes. The method further comprises selecting a particular border of the desktop pane visible on the display device by executing at the particular border a pointing device, e.g., mouse, trackballs and pressure sensitive pads. Once the user selects the particular border, the method further comprises displaying on the display device a particular desktop pane associated with the particular border selected. The particular desktop pane associated with the particular border selected is adjacent or diagonal to the desktop pane comprising the particular border selected.

SWITCHING BETWEEN VIRTUAL DESKTOPS

ABSTRACT OF THE INVENTION

A method, system and computer program product for switching between desktop panes, i.e., virtual desktops. In one embodiment, the method comprises the step of providing a display device. The method further comprises the step of providing a display area where the display area comprises a plurality of desktop panes. One out of the plurality of desktop panes in the display area is visible on the display device. Furthermore, each of the plurality of desktop panes comprises one or more borders to one or more other desktop panes. The method further comprises selecting a particular border of the desktop pane visible on the display device by executing at the particular border a pointing device, e.g., mouse, trackballs and pressure sensitive pads. Once the user selects the particular border, the method further comprises displaying on the display device a particular desktop pane associated with the particular border selected. The particular desktop pane associated with the particular border selected is adjacent or diagonal to the desktop pane comprising the particular border selected.

SWITCHING BETWEEN VIRTUAL DESKTOPS

TECHNICAL FIELD

The present invention relates to the field of display systems, including computer displays, with multiple desktop panes, and more particularly to a method, system and computer program product for switching between desktop panes.

BACKGROUND INFORMATION

Over the last several years computer user interfaces and software applications have undergone much change. Early character-based user interfaces, such as that of DOS, provided environments in which software application programs would be run serially, one application at a time, with each application using the entire display. More recently, graphical user interfaces (GUIs) have become common, providing environments in which multiple desktop panes share portions of a display area, one of which is viewed by the user on a display device. Each desktop pane includes what is commonly referred to as a virtual desktop. A virtual desktop may refer to the multiple windows, icons and toolbar that may be displayed on the screen of a computer display device.

Methods have been developed to allow the user to switch between desktop panes of a display area. One such method has a block of colored targets, i.e., represent desktop panes, on the toolbar at the bottom of the screen of a computer display device. The user must position the mouse in one of the target areas. By clicking on one of the target areas, a screen transition to the corresponding desktop pane occurs. Unfortunately, this method requires the user to precisely move the mouse to click on the target which is smaller than an icon which can be tiresome if performed many times during the day.

Another prior art method of switching between desktop panes, i.e., virtual desktops, includes a pull-down menu that allows you to switch to the prior desktop pane or to the next desktop pane. Unfortunately, this method is awkward and difficult to use. Furthermore, this method limits the user to only switching to the prior or next desktop pane and not allowing the user to switch to a diagonal desktop pane, i.e., desktop pane diagonal to desktop pane viewed on display device.

Another prior art method includes having an automatic screen transition to a corresponding

desktop pane by moving the mouse to the border of the screen. Unfortunately, this method will allow a screen transition to a corresponding desktop pane even if the user accidently moves the mouse to the border of the screen.

It would therefore be desirable to allow the user to switch between adjacent and/or diagonal desktop panes without the aforementioned disadvantages.

SUMMARY OF THE INVENTION

The problems outlined above may at least in part be solved in some embodiments by selecting, e.g., clicking with a pointing device such as a mouse, a particular border of a desktop pane currently being displayed on a display device. Once the user selects the particular border, the display device displays a new desktop pane associated with the particular border, i.e., adjacent or diagonal to the desktop pane comprising the particular border selected.

In one embodiment, a method for switching between virtual desktops comprises the steps of providing a display device and a display area where the display area comprises a plurality of desktop panes. One out of the plurality of desktop panes in the display area is visible on the display device. Furthermore, each of the plurality of desktop panes comprises one or more borders to one or more other desktop panes. The method further comprises selecting a particular border of the desktop pane visible on the display device by executing at the particular border a pointing device, e.g., mouse, track balls and pressure sensitive pads. Once the user selects the particular border, the method further comprises displaying on the display device a particular desktop pane associated with the particular border selected. The particular desktop pane associated with the particular border selected is adjacent or diagonal to the desktop pane comprising the particular border selected.

In another embodiment of the present invention, the borders of each of the plurality of desktop panes are adjacent or diagonal transitional borders. In another embodiment of the present invention, the borders of each of the plurality of desktop panes are adjacent and diagonal transitional borders.

The foregoing has outlined rather broadly the features and technical advantages of the present invention in order that the detailed description of the invention that follows may be better understood. Additional features and advantages of the invention will be described hereinafter which

form the subject of the claims of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

A better understanding of the present invention can be obtained when the following detailed description is considered in conjunction with the following drawings, in which:

Figure 1 illustrates a data processing system configured in accordance with the present invention;

Figure 2 illustrates an embodiment of a display area with a plurality of desktop panes; and

Figure 3 is a flowchart depicting a method for switching desktop panes according to an embodiment of the present embodiment.

DETAILED DESCRIPTION

The present invention comprises a method, system and computer program product for switching between virtual desktops. In one embodiment of the present invention a method comprises the step of providing a display device. The method further comprises providing a display area comprising a plurality of desktop panes, where one of the plurality of desktop panes is visible on the display device. Each of the plurality of desktop panes may comprise one or more adjacent borders and/or one or more diagonal transition borders to one or more adjacent and/or diagonal desktop panes, respectively. The method further comprises selecting a particular adjacent border or a particular diagonal transition border of one of the plurality of desktop panes by executing at the particular adjacent or particular diagonal transition border a pointing device, e.g., mouse, track balls and pressure sensitive pads. The method further comprises displaying on the display device a particular adjacent or particular diagonal desktop pane associated with the particular adjacent or particular diagonal transition border selected, respectively.

Figure 1 - Computer System

Figure 1 illustrates a typical hardware configuration of data processing system 13 which is representative of a hardware environment for practicing the present invention. Data processing system 13 has a central processing unit (CPU) 10, such as a conventional microprocessor, coupled

to various other components by system bus 12. Read only memory (ROM) 16 is coupled to system bus 12 and includes a basic input/output system ("BIOS") that controls certain basic functions of data processing system 13. Random access memory (RAM) 14, I/O adapter 18, and communications adapter 34 are also coupled to system bus 12. I/O adapter 18 may be a small computer system interface ("SCSI") adapter that communicates with disk units 20 and tape drives 40. Communications adapter 34 interconnects bus 12 with an outside network enabling data processing system 13 to communicate with other such systems. Input/Output devices are also connected to system bus 12 via a user interface adapter 22 and a display adapter 36. A display device 38 is connected to system bus 12 by display adapter 36. In this manner, a user is capable of inputting to system 13 through a keyboard 24, a mouse 26, pressure sensitive pads (not shown), mouse joysticks (not shown), PDA's (not shown), etc., and receiving output from system 13 via display 38.

Preferred implementations of the invention include implementations as a computer system programmed to execute the method or methods described herein, and as a computer program product. According to the computer system implementations, sets of instructions for executing the method or methods are resident in the random access memory 14 of one or more computer systems configured generally as described above. Until required by the computer system, the set of instructions may be stored as a computer program product in another computer memory, for example, in disk drive 20 (which may include a removable memory such as an optical disk or floppy disk for eventual use in disk drive 20). Furthermore, the computer program product can also be stored at another computer and transmitted when desired to the user's work station by a network or by an external network such as the Internet. One skilled in the art would appreciate that the physical storage of the sets of instructions physically changes the medium upon which it is stored so that the medium carries computer readable information. The change may be electrical, magnetic, chemical or some other physical change.

Figure 2 - Illustration of a Display Area with a Plurality of Desktop Panes

Figure 2 illustrates an embodiment of the present invention of a display area 200 (which could be implemented on display 38) comprising a plurality of desktop panes 210A-D divided by a horizontal border 220 and a vertical border 230. Horizontal border 220 comprises two segment

adjacent borders 240A and 240B. Vertical border 230 comprises two segment adjacent borders 240C and 240D. A diagonal transition border 240E may be implemented at the intersection of 240A, 240C, 240B and 240D.

Referring to Figure 2, desktop pane 210A borders desktop pane 210B and vice-versa by adjacent border 240C. Desktop pane 210A borders desktop pane 210C and vice-versa by adjacent border 240A. Desktop pane 210B borders desktop pane 210D by adjacent border 240B. Desktop pane 210D borders desktop pane 210C by adjacent border 240D. Desktop pane 210A is diagonal to desktop pane 210D and vice-versa through diagonal transition border 240E. Desktop pane 210B is diagonal to desktop pane 210C and vice-versa through desktop diagonal transition border 240E. Desktop panes 210A-D may collectively or individually be referred to as desktop panes 210 or desktop pane 210, respectively. Adjacent borders 240A-D and diagonal transition border 240E may collectively or individually be referred to as borders 240 or border 240, respectively.

As illustrated in Figure 2, desktop panes 210 are arranged in a pattern where each desktop pane 210 is adjacent to two other desktop panes 210 and diagonal to one other desktop pane 210. It is noted that display area 200 may comprise any number of desktop panes 210 and that desktop panes 210A-D of display area 200 are illustrative only. It is further noted that desktop panes 210 may be arranged in any pattern. In one embodiment, desktop panes 210 may be arranged in a pattern in display area 200 where each desktop pane 210 is adjacent to one or more other desktop panes 210 but not diagonal to any desktop pane 210. In another embodiment, desktop panes 210 may be arranged in a pattern in display area 200 where each desktop pane 210 is diagonal to one or more other desktop panes 210 but not adjacent to any desktop pane 210. In another embodiment, desktop panes 210 may be arranged in a pattern in display area 200 where each desktop pane 210 is adjacent to one or more other desktop panes 210 and each desktop pane 210 is diagonal to one or more other desktop panes 210.

As stated in the Background Information section, only one of the plurality of desktop panes 210 in display area 200 may be displayed on the screen of a computer display device, e.g., display device 38. Each desktop pane 210 comprises what is commonly referred to as a virtual desktop. A virtual desktop may refer to the multiple windows, icons and toolbar that may be displayed on the screen of a computer display device, e.g., display device 38. If a user wants to switch to a different

desktop pane 210, i.e., virtual desktop, the user may switch to a different desktop pane 210 by executing a pointing device, e.g., mouse 26, trackballs and pressure sensitive pads, on either the adjacent border 240 or the diagonal transition border 240 of the desktop pane 210 displayed on display device 38. Display device 38 then displays the adjacent desktop pane 210 or the diagonal desktop pane 210 associated with the adjacent border 240 or the diagonal transition border 240 selected, respectively. The following example illustrates a user selecting a different desktop pane 210, i.e., virtual desktop, in the embodiment of Figure 2.

If the user desires to switch desktop pane 210A currently displayed on display device 38 to the virtual desktop of desktop pane 210B, then the user simply clicks on adjacent border 240C on the screen of display device 38 with a pointing device such as mouse 26. Consequently, desktop pane 210B appears on the screen of display device 38. If the user desires instead to switch to the virtual desktop of desktop pane 210C, then the user clicks on adjacent border 240A on the screen of display device 38 with mouse 26. Consequently, desktop pane 210C appears on the screen of display device 38. If the user desires instead to switch to the virtual desktop of desktop pane 210D, then the user clicks on diagonal transition border 240E on the screen of display device 38 with mouse 26 since desktop 210D is diagonal with respect to desktop pane 240A. Consequently, desktop 210D appears on the screen of display device 38.

In one embodiment of the present invention, borders 240 are invisible. In another embodiment of the present invention, borders 240 are color coded. That is, each border 240 may comprise a different color corresponding to a different desktop pane 210, i.e., virtual desktop, the user may switch with the desktop pane 210 currently viewed on display device 38. In another embodiment of the present invention, borders 240 are a few pixels wide. It is noted again that display area 200 may comprise any number of desktop panes 210 in any pattern and consequently display area 200 may comprise any number and type of borders 240.

Figure 3 - Method for Switching Desktop Panes

Figure 3 illustrates a method 300 according to an embodiment of the present invention. Figure 3 is a method 300 for switching desktop panes, i.e., virtual desktops, in display area 200. In step 310, a display device, e.g., display device 38, is provided. In step 320, a display area 200

comprising a plurality of desktop panes 210 is provided. As stated above, only one of the plurality of desktop panes 210 of display area 200 is visible on display device 38. Each desktop pane 210 of display area 200 comprises one or more adjacent borders 240 and/or one or more diagonal transition borders 240 to one or more adjacent and/or diagonal desktop panes 210, respectively. In one embodiment, borders 240 are invisible. In another embodiment, borders 240 are color coded. That is, each border 240 may comprise a different color corresponding to a different desktop pane 210, i.e., virtual desktop, the user may switch with the desktop pane 210 currently viewed on display device 38. In another embodiment, borders 240 are a few pixels wide.

In step 330, a user may select a particular adjacent or diagonal border 240 of desktop pane 210 visible on display device 38 by executing at the particular adjacent or diagonal border 240 a pointing device, e.g., mouse 26, trackballs and pressure sensitive pads. In step 340, after the user selects the particular adjacent or diagonal border 240, display device 38 displays the particular adjacent desktop pane 210 or particular diagonal pane 210 associated with the particular adjacent border 240 or diagonal border 240 selected, respectively. For example, if display device 38 is currently displaying desktop pane 210A of Figure 2 and user clicks on adjacent border 240C, then the adjacent desktop pane, i.e., 210B, associated with adjacent border 240C, is displayed on display device 38.

Although the method, system and computer program product of the present invention is described in connection with several embodiments, it is not intended to be limited to the specific forms set forth herein, but on the contrary, it is intended to cover such alternatives, modifications, and equivalents, as can be reasonably included within the spirit and scope of the invention as defined by the appended claims. It is noted that the headings are used only for organizational purposes and not meant to limit the scope of the description or claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A method of switching between virtual desktops comprising the steps of:

providing a display area comprising a plurality of desktop panes, wherein one of said plurality of desktop panes is visible, wherein each of said plurality of desktop panes comprises one or more borders to one or more desktop panes;

selecting a particular border of the visible desktop pane; and

displaying a particular desktop pane associated with said particular border selected.

2. The method as recited in claim 1, wherein said particular border of the visible desktop pane is selected by executing at said particular border a pointing device.

3. The method as recited in claim 1, wherein said one or more borders of each of said plurality of desktop panes are adjacent borders, wherein said particular desktop pane associated with said particular border selected is adjacent to said desktop pane comprising said particular border selected.

4. The method as recited in claim 1, wherein said one or more borders of each of said plurality of desktop panes are diagonal transition borders, wherein said particular desktop pane associated with said particular border selected is diagonal to said desktop pane comprising said particular border selected.

5. The method as recited in claim 1, wherein said one or more borders of each of said plurality of desktop panes are invisible.

6. The method as recited in claim 1, wherein said one or more borders of each of said plurality of desktop panes are color coded.

7. The method as recited in claim 1, wherein said one or more borders of each of said plurality

of desktop panes are a few pixels wide.

8. The method as recited in claim 2, wherein said pointing device is a mouse.

9. The method as recited in claim 2, wherein said pointing device is a trackball.

10. The method as recited in claim 2, wherein said pointing device is a pressure sensitive pad.

11. A data processing system providing the capability of switching between virtual desktops comprising:

a processor;

a user interface adapter coupled to said processor;

a display adapter coupled to said processor;

a display device coupled to said display adapter;

a display area comprising a plurality of desktop panes, wherein one of said plurality of desktop panes is visible on said display device, wherein each of said plurality of desktop panes comprises one or more borders to one or more desktop panes; and

a pointing device coupled to said user interface adapter, wherein a particular border of the desktop pane visible on said display device is selected by executing said pointing device at said particular border, wherein said display device displays a particular desktop pane associated with said particular border selected.

12. The data processing system as recited in claim 11, wherein said one or more borders of each of said plurality of desktop panes are adjacent or diagonal transition borders, wherein said particular desktop pane associated with said particular border selected is adjacent or diagonal to desktop pane comprising said particular border selected.

13. The data processing system as recited in claim 11, wherein said one or more borders of each of said plurality of desktop panes are adjacent and diagonal transition borders, wherein said

particular desktop pane associated with said particular border selected is adjacent or diagonal to desktop pane comprising said particular border selected.

14. The data processing system as recited in claim 11, wherein said one or more borders of each of said plurality of desktop panes are invisible.

15. The data processing system as recited in claim 11, wherein said one or more borders of each of said plurality of desktop panes are color coded.

16. The data processing system as recited in claim 11, wherein said one or more borders of each of said plurality of desktop panes are a few pixels wide.

17. The data processing system as recited in claim 11, wherein said pointing device is a mouse.

18. The data processing system as recited in claim 11, wherein said pointing device is a trackball.

19. The data processing system as recited in claim 11, wherein said pointing device is a pressure sensitive pad.

20. A computer program product having a computer readable medium having computer program logic recorded thereon for switching between virtual desktops comprising:

programming operable for providing a display area comprising a plurality of desktop panes, wherein one of said plurality of desktop panes is visible on a display device, wherein each of said plurality of desktop panes comprises one or more borders to one or more desktop panes;

programming operable for selecting a particular border of the desktop pane visible on said display device by executing at said particular border a pointing device; and

programming operable for displaying on said display device a particular desktop pane associated with said particular border selected.

21. The computer program product as recited in claim 20, wherein said one or more borders of each of said plurality of desktop panes are adjacent or diagonal transition borders, wherein said particular desktop pane associated with said particular border selected is adjacent or diagonal to desktop pane comprising said particular border selected.

22. The computer program product as recited in claim 20, wherein said one or more borders of each of said plurality of desktop panes are adjacent and diagonal transition borders, wherein said particular desktop pane associated with said particular border selected is adjacent or diagonal to desktop pane comprising said particular border selected.

23. The computer program product as recited in claim 20, wherein said one or more borders of each of said plurality of desktop panes are invisible.

24. The computer program product as recited in claim 20, wherein said one or more borders of each of said plurality of desktop panes are color coded.

25. The computer program product as recited in claim 20, wherein said one or more borders of each of said plurality of desktop panes are a few pixels wide.

26. The computer program product as recited in claim 20, wherein said pointing device is a mouse.

27. The computer program product as recited in claim 20, wherein said pointing device is a trackball.

28. The computer program product as recited in claim 20, wherein said pointing device is a pressure sensitive pad.

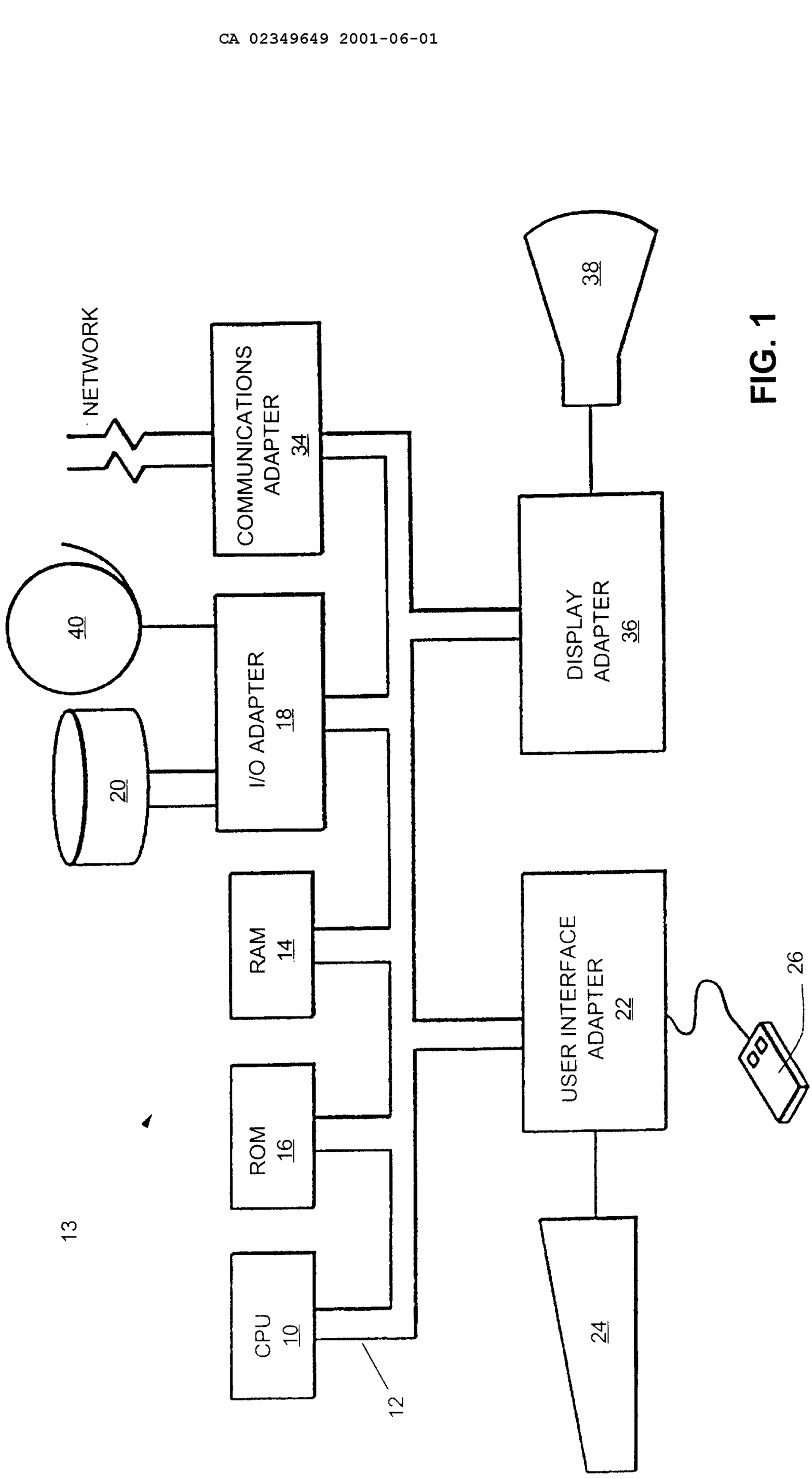

38
DISPLAY ADAPTER 36
COMMUNICATIONS ADAPTER 34
NETWORK
40
I/O ADAPTER 18
20
RAM 14
ROM 16
CPU 10
USER INTERFACE ADAPTER 22
26
24
12
13

FIG. 1

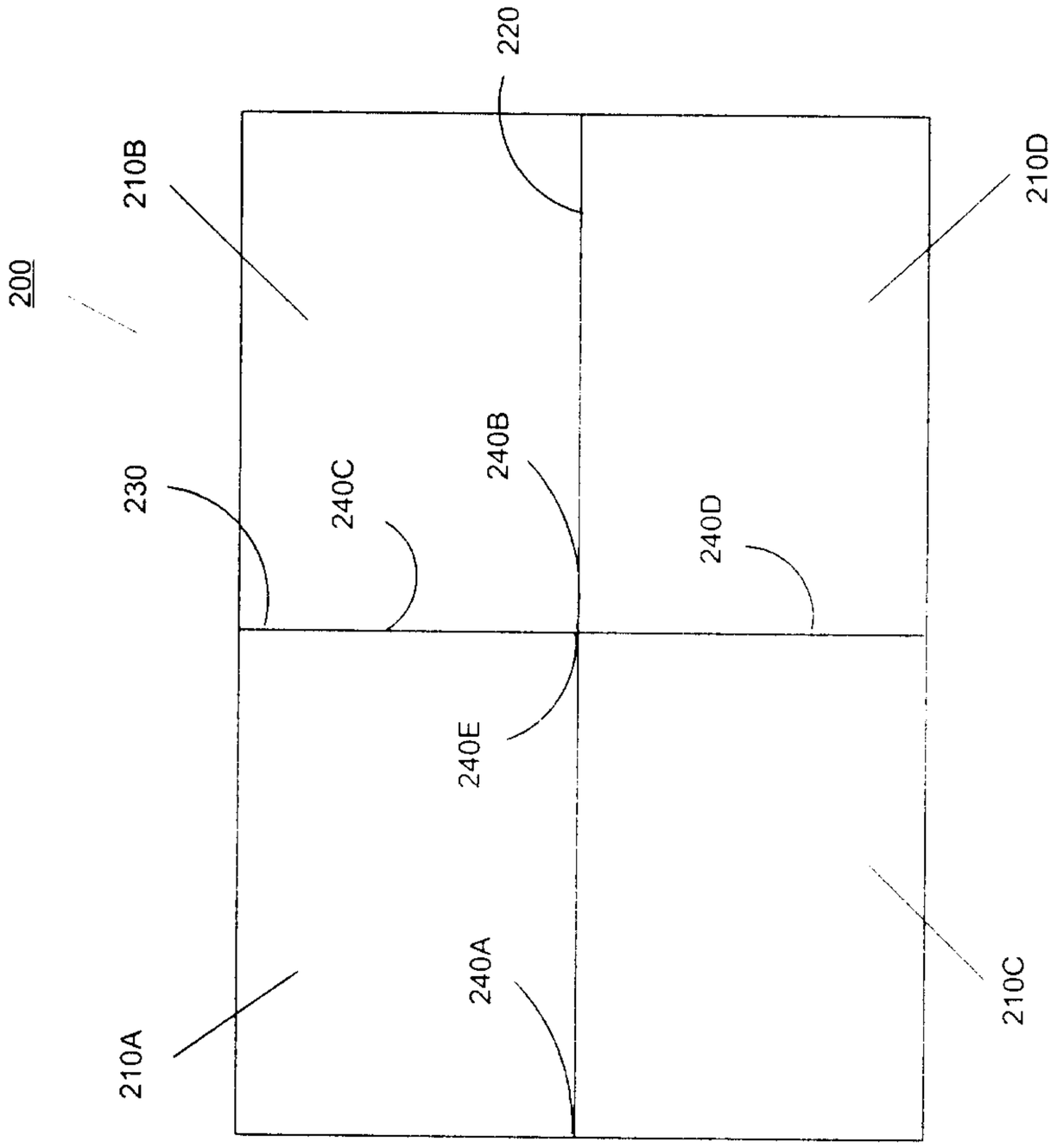


FIG.2

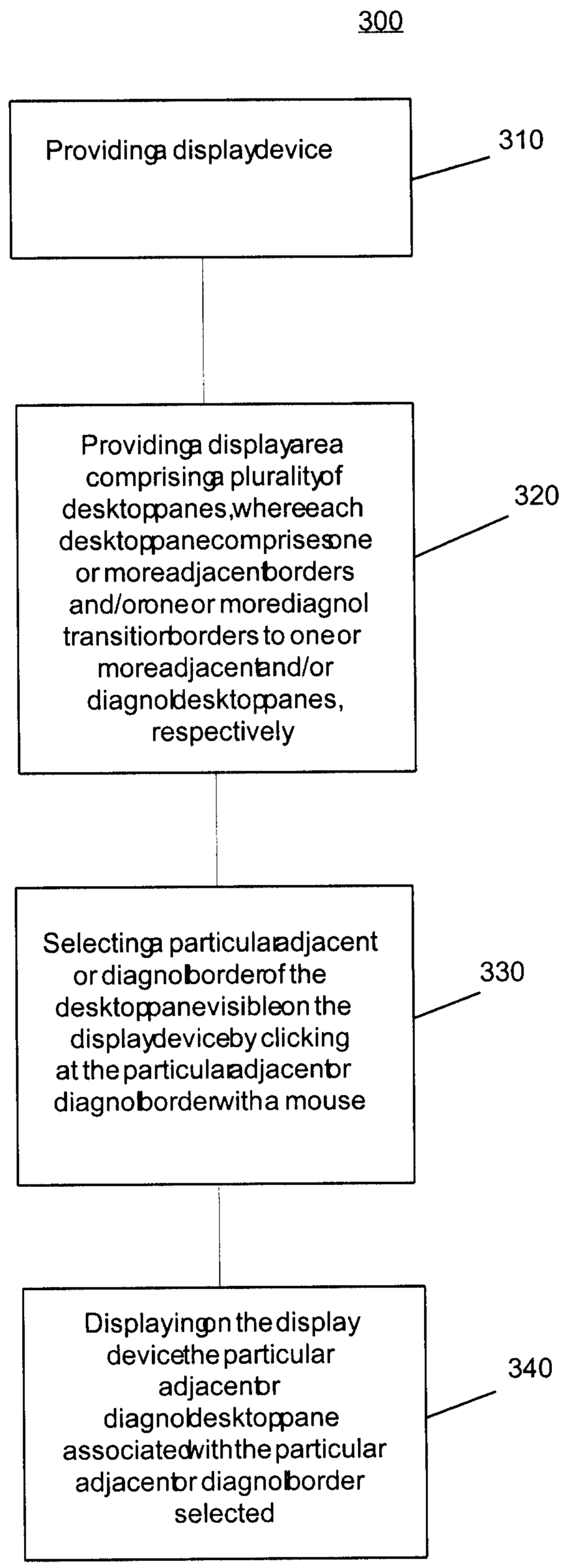
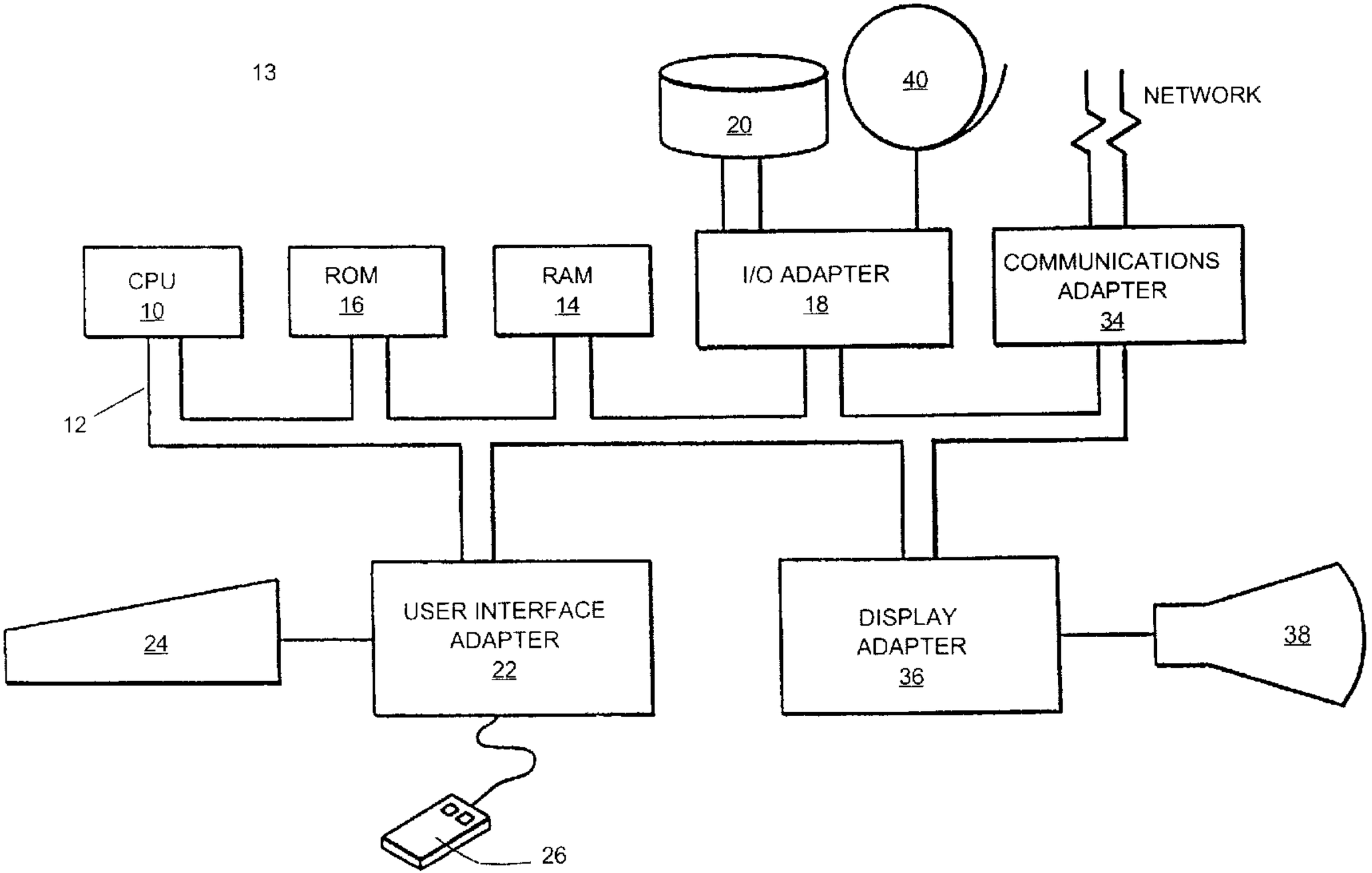

300
Providing a display device
310
Providing a display area comprising a plurality of desktop panes, where each desktop pane comprises one or more adjacent borders and/or one or more diagnol transition borders to one or more adjacent and/or diagnol desktop panes, respectively
320
Selecting a particular adjacent or diagnol border of the desktop pane visible on the display device by clicking at the particular adjacent or diagnol border with a mouse
330
Displaying on the display device the particular adjacent or diagnol desktop pane associated with the particular adjacent or diagnol border selected
340

FIG.3


13
20
40
NETWORK
CPU
10
ROM
16
RAM
14
I/O ADAPTER
18
COMMUNICATIONS
ADAPTER
34
12
24
USER INTERFACE
ADAPTER
22
DISPLAY
ADAPTER
36
38
26