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Malamud et al.

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(54) **INFORMATION CURSORS**

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Related U.S. Application Data

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(51) **Int. Cl.**[7] **G09G 5/08**
(52) **U.S. Cl.** **345/711**; 345/705
(58) **Field of Search** 345/145, 146, 345/156, 157, 163, 705, 711

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(57) **ABSTRACT**

Information cursors are provided for use in an operating system and/or application programs. Each information cursor includes a pointing portion to point to objects displayed on a video display and an information portion to display information about an object to which the pointing portion points. The information displayed in an information cursor may include the name of the object, a preview of the contents of the object, or property information about the object.

13 Claims, 6 Drawing Sheets

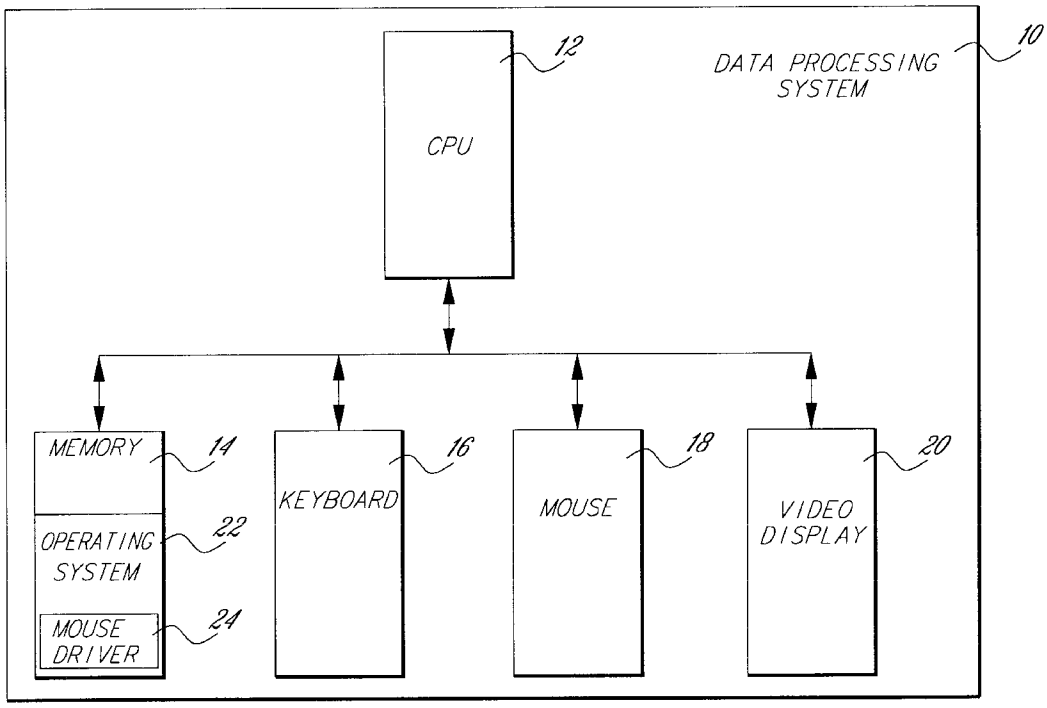

EXHIBIT 1004
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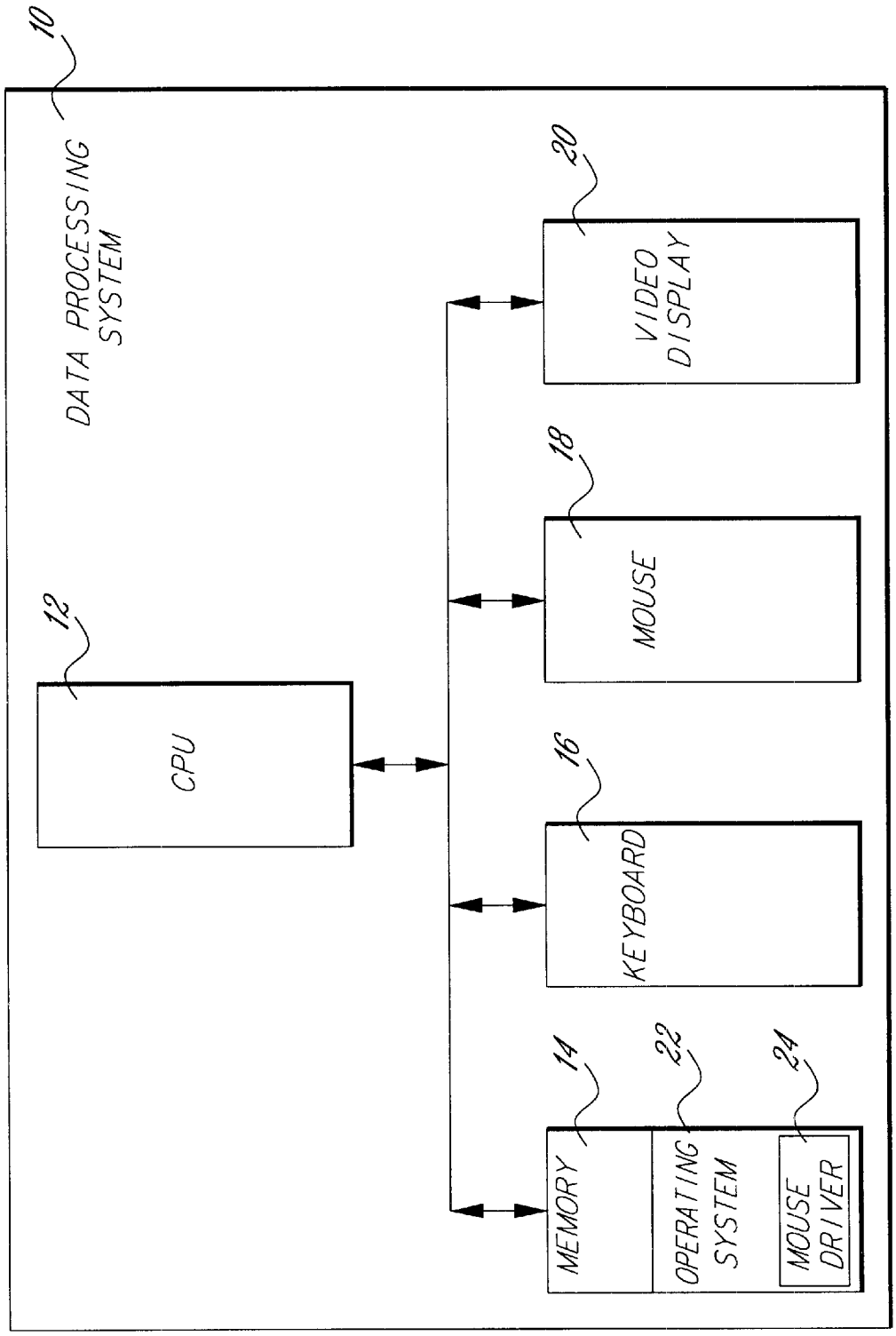

10
DATA PROCESSING SYSTEM
12
CPU
20
VIDEO DISPLAY
18
MOUSE
16
KEYBOARD
14
MEMORY
22
OPERATING SYSTEM
24
MOUSE DRIVER

Fig. 1

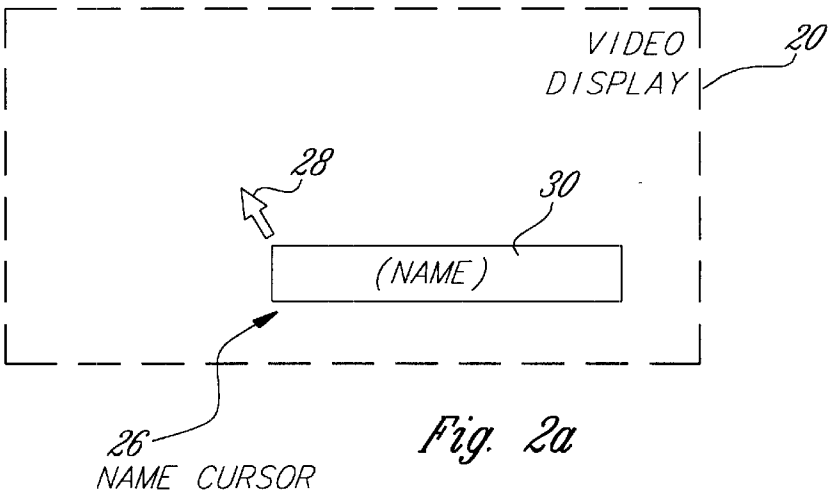


Fig. 2a

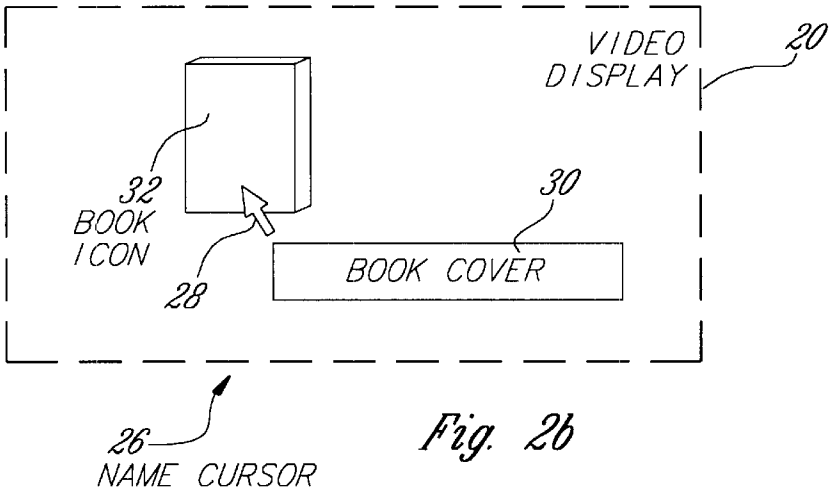


Fig. 2b

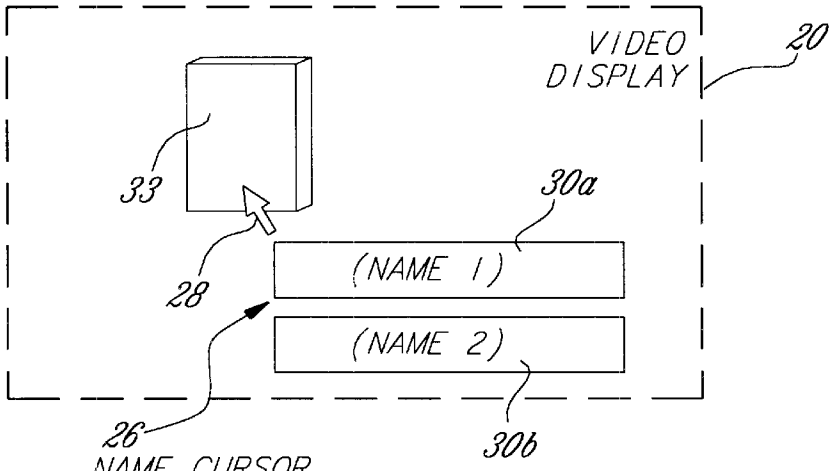


Fig. 2c

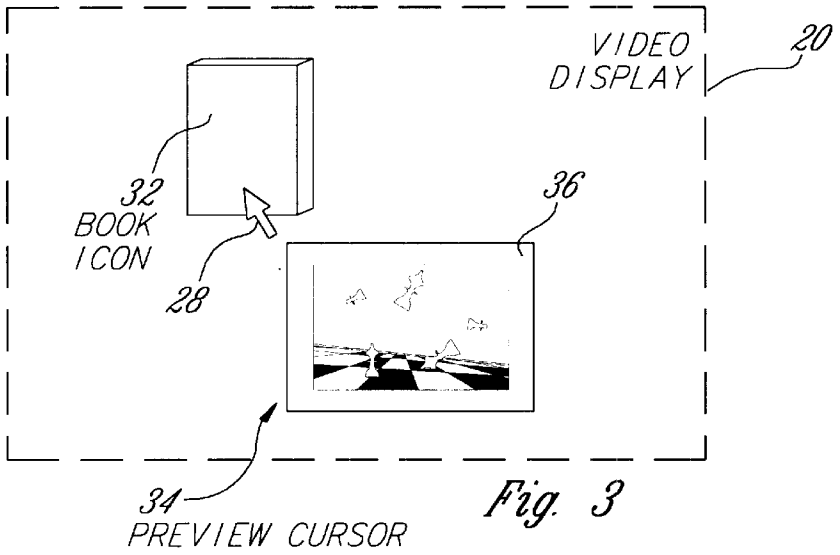


Fig. 3

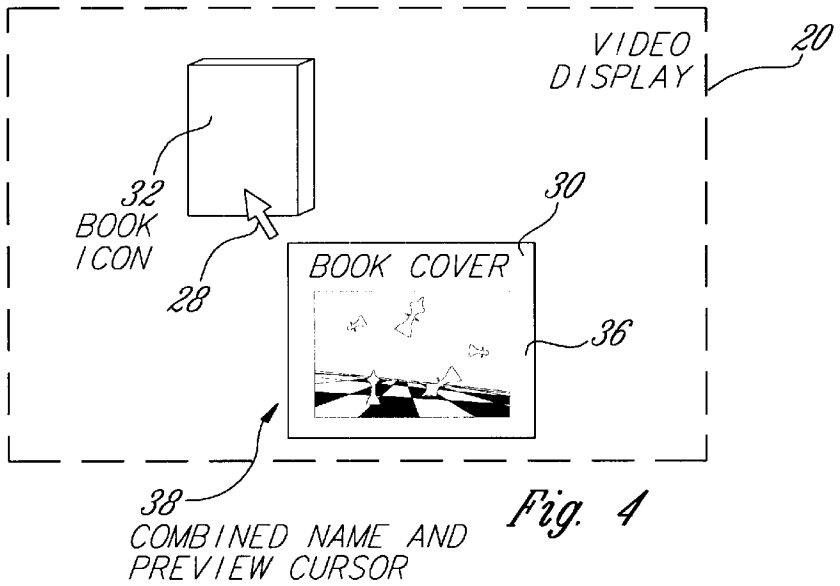


Fig. 4

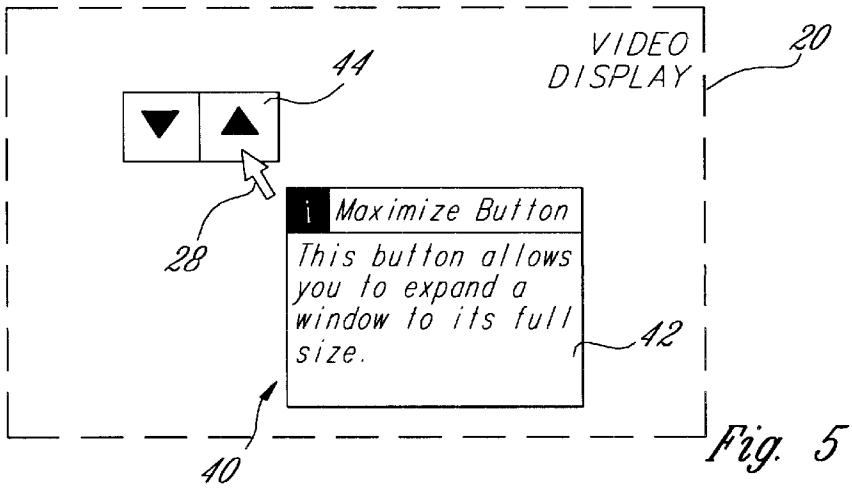


Fig. 5

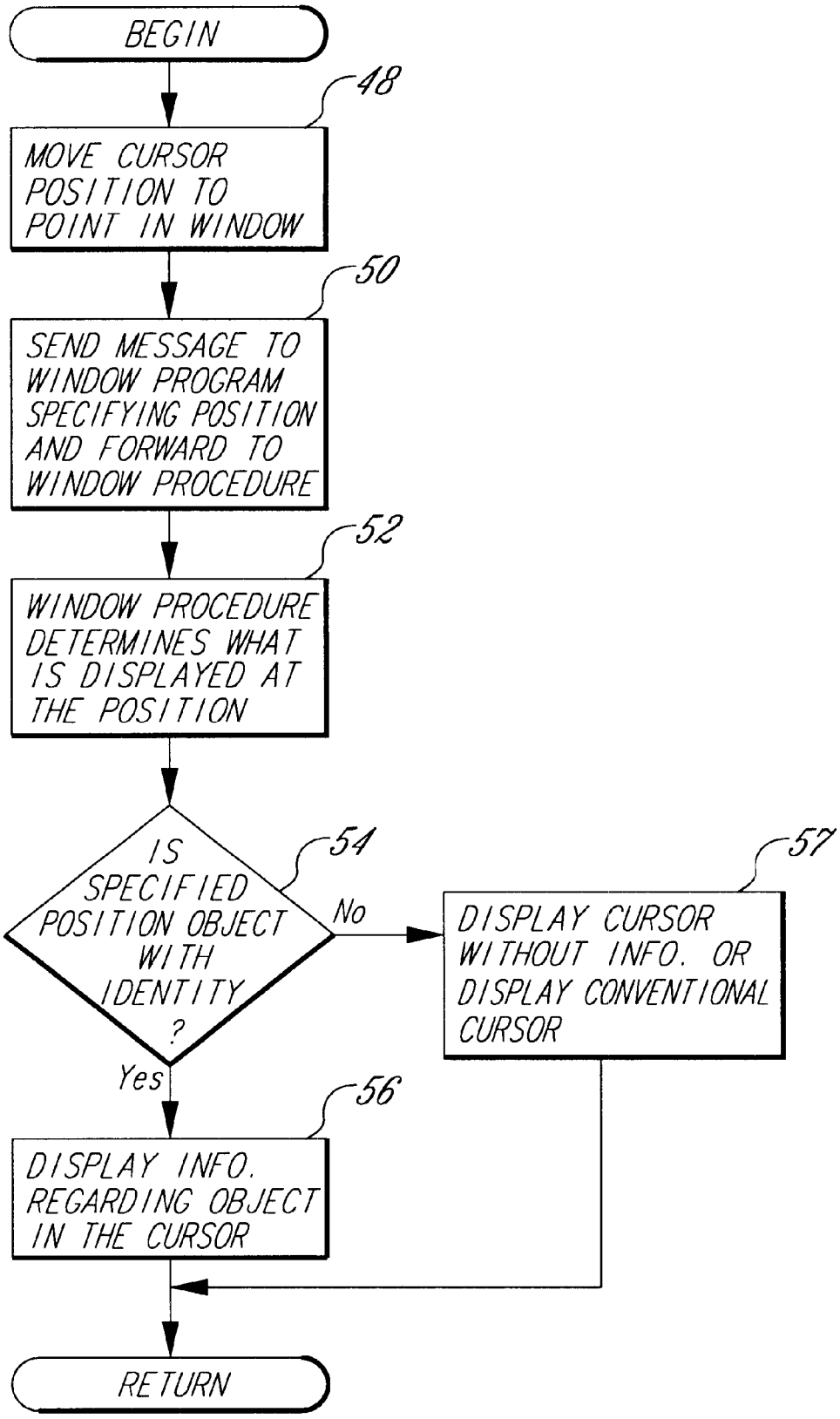

BEGIN
48
MOVE CURSOR POSITION TO POINT IN WINDOW
50
SEND MESSAGE TO WINDOW PROGRAM SPECIFYING POSITION AND FORWARD TO WINDOW PROCEDURE
52
WINDOW PROCEDURE DETERMINES WHAT IS DISPLAYED AT THE POSITION
54
IS SPECIFIED POSITION OBJECT WITH IDENTITY ?
No
57
DISPLAY CURSOR WITHOUT INFO. OR DISPLAY CONVENTIONAL CURSOR
Yes
56
DISPLAY INFO. REGARDING OBJECT IN THE CURSOR
RETURN

Fig. 6

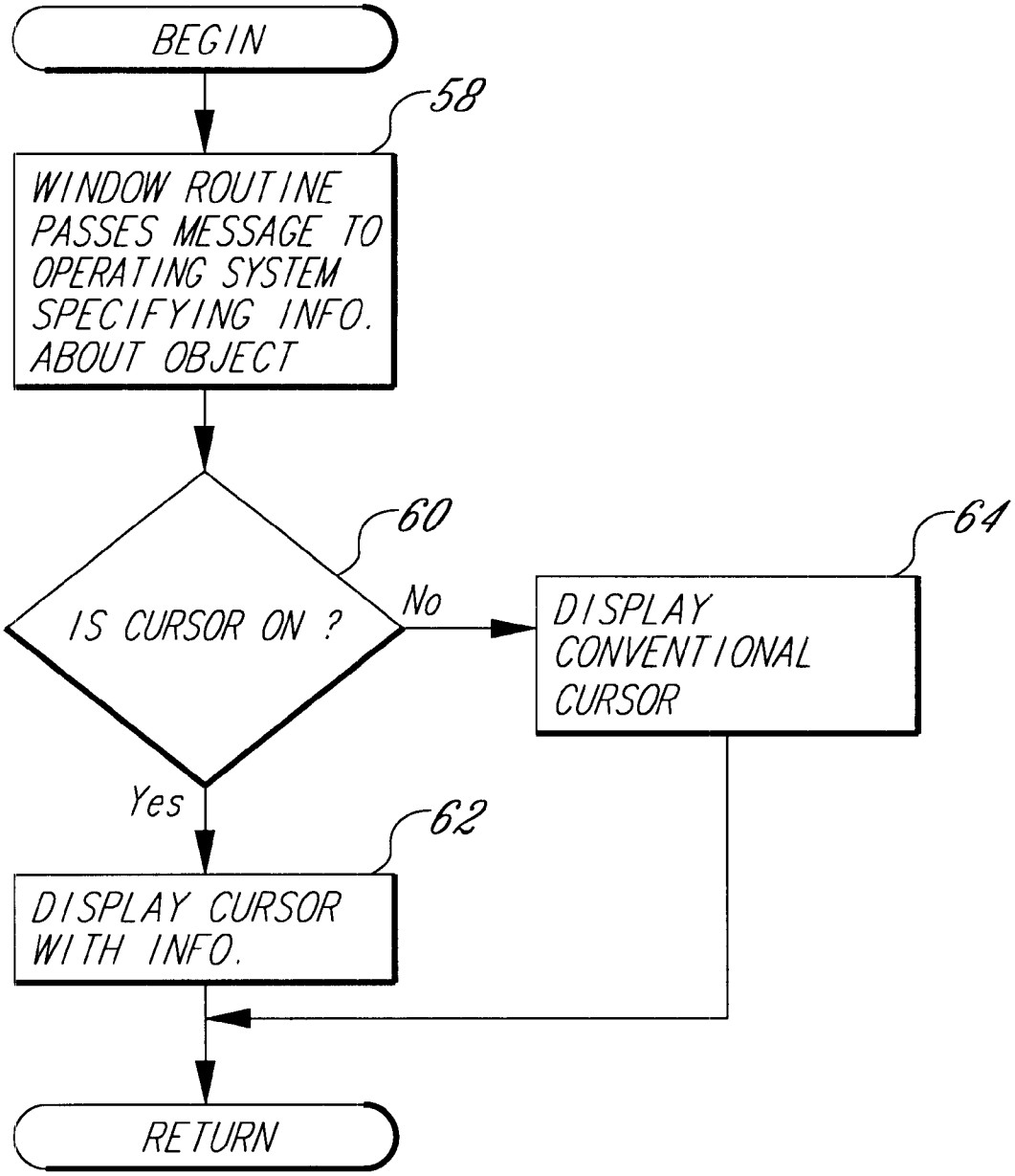

BEGIN
58
WINDOW ROUTINE PASSES MESSAGE TO OPERATING SYSTEM SPECIFYING INFO. ABOUT OBJECT
60
IS CURSOR ON ?
No
64
DISPLAY CONVENTIONAL CURSOR
Yes
62
DISPLAY CURSOR WITH INFO.
RETURN

Fig. 7

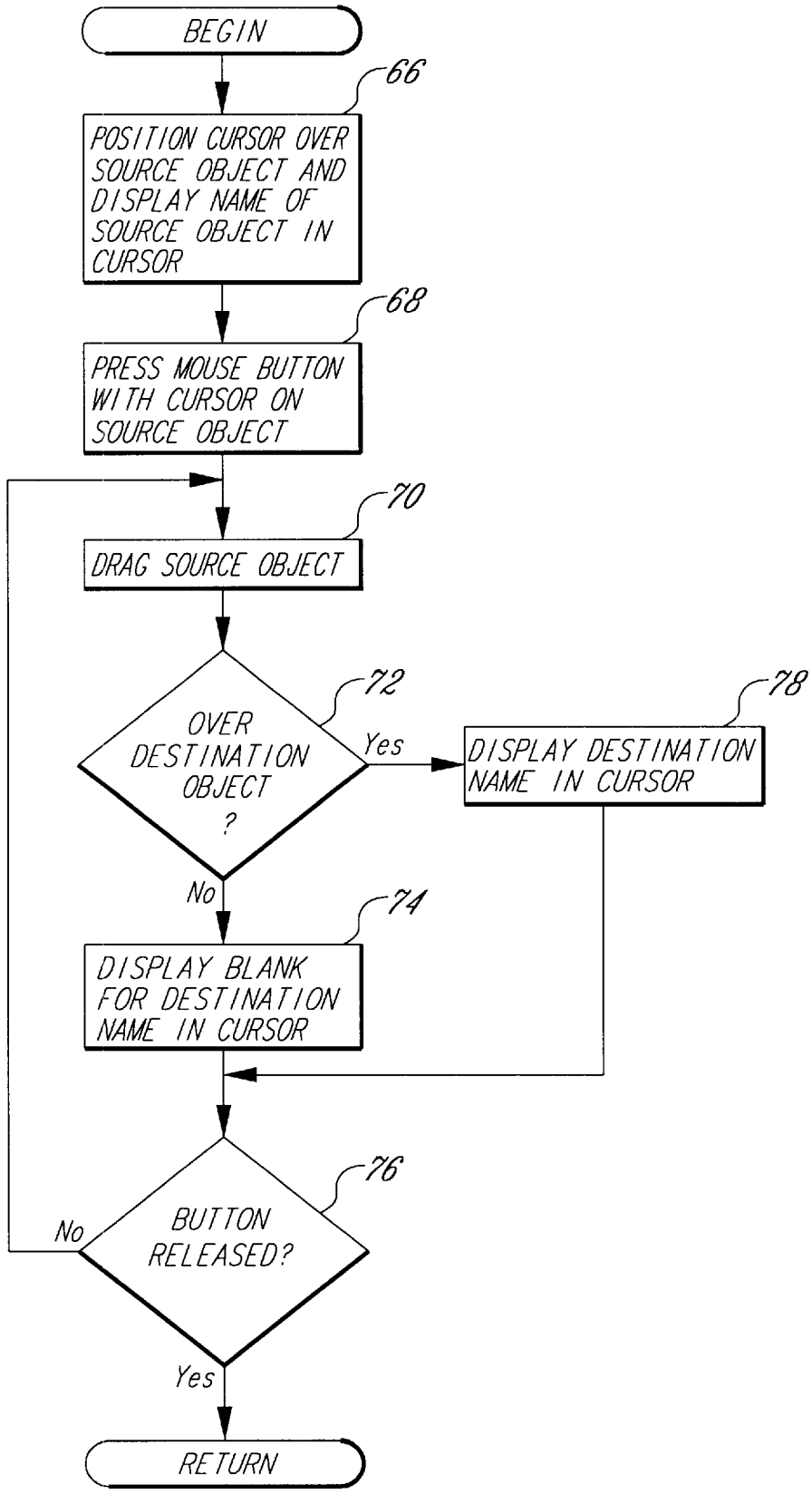

BEGIN
66
POSITION CURSOR OVER SOURCE OBJECT AND DISPLAY NAME OF SOURCE OBJECT IN CURSOR
68
PRESS MOUSE BUTTON WITH CURSOR ON SOURCE OBJECT
70
DRAG SOURCE OBJECT
72
OVER DESTINATION OBJECT ?
Yes
78
DISPLAY DESTINATION NAME IN CURSOR
No
74
DISPLAY BLANK FOR DESTINATION NAME IN CURSOR
76
BUTTON RELEASED?
No
Yes
RETURN

Fig. 8

INFORMATION CURSORS

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation of U.S. patent application Ser. No. 08/054,564, filed Apr. 28, 1993 now abandoned.

TECHNICAL FIELD

The present invention relates generally to data processing systems and, more particularly, to information cursors for use on video displays of data processing systems.

BACKGROUND OF THE INVENTION

Many operating systems provide a cursor that indicates a current position on a video display. The cursor is generally manipulable by an input device, such as a keyboard or a mouse. In certain operating systems, such as the Microsoft WINDOWS, version 3.1, operating system, which is sold by Microsoft Corporation of Redmond, Washington, a window may have a status bar that displays information about the object to which the cursor is currently pointing. As the cursor is moved to point at different objects, the contents of the status bar changes accordingly. The status bar is a separate graphic entity that is not connected to the cursor and does not move with the cursor. The status bar is positioned on the video display at a fixed location within a window. As such, a user has to look at two separate portions of the screen if he wishes to view both the cursor and the status bar. This separation of the status bar from the cursor can be confusing and burdensome to the user.

SUMMARY OF THE INVENTION

In accordance with a first aspect of the present invention, a method is practiced in a data processing system having a video display and an input device. In this method, objects, including an information cursor, are displayed on a video display. The cursor is positioned over at least a portion of one of the objects that is displayed in response to a user using the input device. Information about the object which at least a portion of the cursor is over is displayed on the video display.

The information that is displayed as part of the cursor may include a name of the object, a preview of the contents of the object, or property information about the object. The property information may include help information regarding the object. Furthermore, the input device may be a mouse that is used to position the cursor.

The information cursor may be displayed as having a pointing portion for pointing to objects on the video display and an information portion for displaying information about the object. The information cursor may be specified as "On" or "Off". When the information cursor is specified as "On", information about the object is displayed as part of the cursor. However, when the information cursor is specified as "Off", such information is not displayed as part of the cursor.

In accordance with another aspect of the present invention, a cursor, a source-object icon for a source object, and a destination-object icon for a destination object are displayed on a video display. The cursor is moved to point to the source object icon in response to movements of a mouse by a user. A name of the source object is displayed as part of the cursor on the video display. In response to the user depressing the button of the mouse while the cursor points to the source-object icon and moving the mouse while keeping the button depressed, the source-object icon is dragged over the video display to where the destination-object icon is positioned. The cursor then points to the destination object icon and the name of the destination object is displayed along with the name of the source object as part of the cursor.

In accordance with still another aspect of the present invention, a method is practiced wherein a pointing portion of an information cursor is displayed on the video display. The pointing portion points to an icon associated with an object. Information about the object that is associated with the icon to which the pointing portion points is displayed as part of the information cursor.

In accordance with a further aspect of the present invention, a data processing system includes a video display and an input device that is operable by a user to communicate with the data processing system. The data processing system includes a means for producing a user interface on the video display and a means for displaying objects on the user interface. The data processing system further includes a means for displaying a cursor and for moving the cursor in response to a user operating the input device. The cursor has an indicator portion and information display portion. The indicator portion indicates a user selected one of the objects that is displayed on the user interface. In addition, the data processing system includes a means for displaying information in the information display portion of the cursor regarding the object that is indicated by the indicator portion of the cursor.

The means for displaying information may include a means for displaying a name of the object, a means for displaying a preview of the object, or a means for displaying property information about the object. Still further, the data processing system may include a means for turning "On" or "Off" the cursor such that when the cursor is turned "off", the means for displaying information is deactivated.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a block diagram of a data processing system for practicing a preferred embodiment of the present invention.

FIGS. **2***a*, **2***b* and **2***c* each contain a diagram showing an example of a name cursor generated in accordance with the preferred embodiment of the present invention.

FIG. **3** is a diagram showing an example of a preview cursor generated in accordance with the preferred embodiment of the present invention.

FIG. **4** is a diagram showing an example of combined name and preview cursor generated in accordance with the preferred embodiment of the present invention.

FIG. **5** is a diagram showing an example of property cursor generated in accordance with the preferred embodiment of the present invention.

FIG. **6** is a flowchart showing the steps performed to implement the information cursors of the preferred embodiment of present invention.

FIG. **7** is a flowchart illustrating in more detail how information about an object is displayed in an information cursor generated in accordance with the preferred embodiment of the present invention.

FIG. **8** is a flowchart illustrating the steps performed by the preferred embodiment of the present invention in displaying a name cursor in a drag and drop operation.

DETAILED DESCRIPTION OF THE INVENTION

The present invention provides "information cursors" which display graphical or textual information about an

object to which the cursor points. Each information cursor has two portions: a pointing portion and an information portion. The pointing portion points to a position on a video display. The information portion displays textual or graphical information about the object to which the pointing portion points. Information cursors are made available by an operating system to applications that are run on the operating system. Information cursors are available in a number of different varieties. Four varieties of information cursors are provided by the preferred embodiment. The four varieties of information cursors are name cursors, preview cursors, combined name and preview cursors, and property cursors. The four types of information cursors are described in more detail below.

FIG. **1** is a block diagram of a data processing system **10** that is suitable for practicing the preferred embodiment of the present invention. The data processing system **10** includes a central processing unit (CPU) **12** that oversees operation of the system. The data processing system **10** also includes a memory **14**, a keyboard **16**, a mouse **18**, and a video display **20**. The memory **14** may include different types of storage, such as RAM, ROM, or disk storage. The memory **14** holds a copy of an operating system **22**. A mouse driver **24** is provided within the operating system **22** to drive the mouse **18**.

Before discussing the implementation details of the information cursors in the preferred embodiment of the present invention, it is helpful to further examine the different varieties of information cursors that are provided by the preferred embodiment. FIG. **2***a* shows an example of a name cursor **26** displayed on the video display **20**. Name cursor **26** includes a pointing portion **28** (i.e., a conventional pointing cursor) and a name box **30**. The name box **30** displays the name of the object to which the pointing portion **28** points.

FIG. **2***b* shows an example of how the name cursor **26** is used. Suppose that a book icon **32**, representing a book of text stored in the system **10** (FIG. **1**), is displayed on the video display **20**. When the pointing portion **28** of the name cursor **26** points to the book icon **32**, the name box **30** of the name cursor displays the phrase "Book Cover". More generally, the name box **30** displays the name of the item to which the pointing portion **28** points. The user interface may be programmed such that, when the pointing portion **28** points to nothing of significance, the name box **30** remains blank. Alternatively, the user interface may be programmed so that the name box **30** disappears in such an instance.

In some circumstances, the name cursor **26** may include two name boxes **30***a* and **30***b*, such as shown in FIG. **2***c*. For instance, in an operating system that supports drag and drop operations, two names may be displayed in the name cursor **26** during a drag and drop operation. In particular, the name of the source object and the name of the target object are shown in name boxes **30***a* and **30***b*, respectively. The target object name is not shown until the pointing portion **28** of the-name cursor **26** is moved to point to the target object. A source object icon **33** for the source object is dragged along with the cursor during the drag portion of the operation.

FIG. **3** shows an example of a preview cursor **34**, which includes a preview portion **36** and the same pointing portion **28** as the name cursor **26**. The preview cursor **34** provides a preview of the contents of the object to which the cursor points. In the example shown in FIG. **3**, the preview cursor **34** points to the book icon **32** displayed on the video display **20**. The preview portion **36** holds graphical data depicting a preview of the contents of the object (i.e., the book icon **32**) to which the pointing portion **28** points. In the example of FIG. **3**, the book concerns chess, and the preview portion **36** shows a graphical scene of chess pieces flying through the air.

The name cursor **26** (FIGS. **2***a*, **2***b* and **2***c*) and the preview cursor **34** (FIG. **3**) may be combined into a combined name and preview cursor **38**, as shown in FIG. **4**. The combined name and preview cursor **38** includes three components. First, the preview cursor **38** includes a pointing portion **28** for pointing to an object on the video display **20**, at least one name box **30** (two name boxes are used with a drag and drop operation, in a fashion analogous to that described above for the name cursor) for displaying the name of the object to which the pointing portion points and a preview portion **36** for holding a preview of the contents of the object to which the pointing portion points. In the example illustrated in FIG. **4**, the name box **30** displays the phrase "Book Cover", whereas the preview portion **36** displays the graphic of chess pieces flying through the air.

An additional variety of information cursor that is provided by the preferred embodiment of the present invention is a property cursor **40**, such as shown in FIG. **5**. A property cursor **40** includes the pointing portion **28** and a property box **42**. The property box **40** displays property information (often including the name of the object) regarding the object to which the pointer portion **28** points. In the example of FIG. **5**, the property cursor **40** serves as a help cursor that displays help information in the property box **42** for the object to which the pointing portion **28** points. In FIG. **5**, the pointer portion **28** points to a maximize button **44**. The text in the property box **42** identifies the nature of the maximize button **44** to which the pointer portion **28** points and displays relevant help information regarding this object.

The implementation of the preferred embodiment of the present invention will now be described with reference to the Microsoft WINDOWS, version 3.1, operating system. In particular, the operating system **22** is an embellished version of the Microsoft WINDOWS, version 3.1, operating system that supports the use of information cursors. The present invention is not limited to implementations with this operating system; rather, those skilled in the art will appreciate that the present invention may be implemented with other operating systems as well.

In explaining the implementation of the preferred embodiment of the present invention, it is helpful to consider the type of input device that is used. In the discussion that follows, it is assumed that the mouse **18** (FIG. **1**) is used as the input device for manipulating the position of the cursor on the video display **20**. It should, nevertheless, be appreciated that the present invention is not limited to the use of a mouse as the input device; rather, other input devices, such as a keyboard or a pointing device, may alternatively be used.

The operating system **22** (FIG. **1**) logically divides the user interface into a number of windows. In general, each window has a separate window procedure associated with it. The operating system **22** maintains a message queue for each program that generates windows. As a program may generate multiple windows, the message queue may hold messages for multiple windows. When an event occurs, the event is translated into a message that is put into the message queue for the program. The program retrieves and delivers the message to the proper window procedure by executing a block of code known as the "message loop". The window procedure that received the message then processes the message.

When a user positions a cursor with the mouse **18** over a window or clicks the mouse by depressing one of the mouse

buttons within the window, the procedure for the window receives a mouse message. The operating system **22** provides a number of predefined mouse messages. The mouse messages specify the status of mouse buttons and the position of the cursor within the window. The position of the cursor within the window is specified in (X, Y) coordinates relative to the upper left-hand cover of the window. The window procedure receives the mouse message and utilizes the information contained in the message to respond to the mouse activities. A new mouse message need not be generated for every single pixel position change of a mouse within a window; rather, a message may be generated each time the mouse moves more than a threshold number of pixels transversed by the mouse.

This message system plays a role in the implementation of information cursors described above. The appearance of the cursors on the video display **20** (FIG. **1**) is dictated by bitmaps stored within the operating system **22**. The role that the message loop serves in the implementation of the information cursors can be seen in the flowchart of FIG. **6**, which illustrates the steps performed by the system **10** (FIG. **1**) when the cursor moves into a window that is displayed on the video display **20**. Initially, the cursor position is moved by the mouse **18** or other input device to point within the window (step **48** in FIG. **6**). A message is generated and sent to the application program that is executing, which, in turn, forwards the message to the window procedure associated with the window (step **50**). The message specifies the position of the cursor in the window as described above. The window procedure then determines what is displayed at the cursor position within the window (step **52**). For instance, an object may be at the specified position or nothing of particular importance may be at the specified position. A determination is made whether the specified position corresponds to the position of an object with an identity (step **54**). In other words, a determination is made whether a named entity is present at the specified cursor position. If a named entity is present at the specified cursor position, the information regarding the object at the specified cursor position is displayed in the information cursor (step **56**). If, however, a named entity is not present at the specified cursor position, either a conventional cursor is displayed or the information containing portion (e.g., name box **30**, preview portion **36** or property box **40**) of the information cursor is shown in blank (step **57**). The choice between these options is controlled by the application program.

FIG. **7** is a flowchart showing in more detail the steps that must be performed in order to realize step **56** of FIG. **6**. After the window procedure has determined what is at the specified cursor position, the procedure passes a message to the operating system **22** (FIG. **1**) that tells the operating system what type of cursor to display and sets forth the contents and type of information to be displayed in the cursor (step **58** in FIG. **7**). Suppose that the application program desires to display a name cursor **26** (FIG. **2***a*). A message requesting that a name cursor be displayed is passed to the operating system **22** along with a text string for the name to be displayed in the name box **30**. However, if the cursor to be displayed is a preview cursor **34** (FIG. **3**), a message specifying that a preview cursor is required is sent. The message includes a pointer to a bitmap of graphical information that the operating system **22** should use in the preview portion **36**. Still further, a property cursor **46** may be requested in the message. The message, in such a case, includes a text string for the text of property information to be displayed in the property box **42**.

Whether the information cursor is displayed depends upon whether the information cursor is designated as "On" or "Off". The operating system checks whether the information cursor is "On" (step **60**). In certain instances, the user may have the option of specifying whether the information cursor is "On" or "Off". Alternatively, the information cursors may be programmed by the application program or operating system **22** (FIG. **1**) such that they are automatically turned "On" when the conventional cursor points to a named entity. This latter option provides an automatic mechanism for switching "On" or "Off" the information cursor. If the information cursor is not "On", a conventional cursor is displayed (step **64**). As an example, consider the name cursor **26**. If the name cursor **26** is "Off", the name box **30** is not displayed (FIG. **2***a*). Instead, a conventional cursor is displayed. On the other hand, if the name cursor is "On", the pointing portion **28** is displayed along with the appropriate name information (step **62**) to be used in the name box.

The name cursor **26** (FIG. **2***c*) that is shown during a drag and drop operation is somewhat unique relative to the other types of information cursors. FIG. **8** is a flowchart showing the steps performed by the preferred embodiment of the present invention to display the name cursor **26** during a drag and drop operation. The generation of messages from the mouse **18** and the response of window procedures are the same as described above for the single-name-box name cursor. In step **66**, the pointing portion **28** of the name cursor points to a source object, and the name of the source object is displayed in the first name box **30***a* (see FIG. **2***c*), such as described above for the single-name-box name cursor of FIGS. **2***a* and **2***b*. A user then depresses the mouse button while the pointing portion **28** of the name cursor points to the source-object icon (step **68**) and drags the source-object icon by moving the mouse and keeping the button depressed (step **70**) until the source-object icon is positioned over a destination-object icon.

The system performs a loop while the source-object icon is being dragged. In particular, the system checks whether the pointing portion **28** of the name cursor is positioned over a destination object (step **72**). if not, a blank is displayed for the destination object name in the second name box **30***b*. The system checks whether the mouse is released (step **76**). If not, the drag continues (step **70**). When the pointing portion is positioned over a destination object, the name of the destination object is then displayed in the second name box **30***b* (see FIG. **2***c*) of the name cursor **36** (step **72** of FIG. **8**). The loop continues until the mouse button is released to terminate the drag and drop operation.

While the present invention has been described with reference to a preferred embodiment thereof, those skilled in the art will appreciate that various changes and form of the detail may be made without departing from the scope of the present invention as defined by the appended claims.

What is claimed is:

1. In a data processing system having a video display and an input device, a method, comprising the steps of:

(a) displaying objects on the video display, said objects including an information cursor with a pointing portion for pointing to locations on the video display and an information portion for displaying information that is displayed in a selected relative position with respect to the pointing portion;

(b) in response to a user using the input device, positioning the information cursor so that the pointing portion of the information cursor points to one of the objects that is displayed and the information portion is in the selected relative position with respect to the pointing portion; and

(c) displaying currently undisplayed information on the video display about the object to which the pointing portion of the information cursor points in the information portion of the information cursor.

2. The method as recited in claim **1** wherein the step of displaying currently undisplayed information on the video display further comprises the step of displaying a name of the object to which the pointing portion of the information cursor points.

3. The method as recited in claim **2** wherein the step of displaying currently undisplayed information on the video display in the information portion of the information cursor further comprises the step of displaying a preview of contents of the object to which the pointing portion of the information cursor points in the information portion of the information cursor.

4. The method as recited in claim **1** wherein the step of displaying currently undisplayed information on the video display in the information portion of the information cursor further comprises the step of displaying a preview of contents of the object in the information portion of the information cursor to which the pointing portion of the information cursor points.

5. The method as recited in claim **1** wherein the step of displaying currently undisplayed information on the video display further comprises the step of displaying property information in the information portion of the information cursor about the object to which the pointing portion of the information cursor points.

6. The method as recited in claim **5** wherein the step of displaying property information further comprises the step of displaying help information in the information portion of the cursor regarding the object to which the pointing portion of the information cursor points.

7. The method as recited in claim **1** wherein the input device is a mouse and the step of positioning the cursor further comprises the steps of tracking movements of the mouse by the user and updating a position of the cursor on the video display.

8. The method as recited in claim **1**, further comprising the step of determining what information is associated with the object to which the pointing portion of the information cursor points.

9. The method as recited in claim **1** wherein the step of displaying currently undisplayed information on the video display further comprises the steps of:

(i) determining whether the information cursor is specified as "On"; and

(ii) in response to determining whether the information cursor is specified as "On", displaying currently undisplayed information on the video display about the object to which the pointing portion of the information cursor points when the information cursor is specified as "On".

10. In a data processing system having a mouse, having at least one button, and a video display, a method comprising the steps of:

(a) displaying a cursor, a source-object icon for a source object and a destination-object icon for a destination object on the video display;

(b) in response to movements of the mouse by a user, moving the cursor to point to the source-object icon;

(c) displaying on the video display a name of the source object as part of the cursor;

(d) in response to the user depressing the button of the mouse while the cursor points to the source object icon and moving the mouse while keeping the button depressed, dragging the source-object icon over the video display to where the destination-object icon is positioned so that the cursor points to the destination-object icon; and

(e) displaying a name of the destination object along with the name of the source object as part of the cursor.

11. A computer-readable medium whose contents cause a computer system having a visual display and a mouse with at least one button to perform the steps of:

displaying on the visual display a cursor, a source object icon for a source object, and a destination object icon for a destination object;

in response to movements of the mouse by a user, moving the cursor to point to the source object icon;

displaying on the visual display a name of the source object as part of the cursor;

in response to the user depressing the button of the mouse while the cursor points to the source object icon and moving the mouse while keeping the button depressed, dragging the source object icon over the visual display to where the destination object icon is positioned so that the cursor points to the destination-object icon; and

displaying a name of the destination object along with the name of the source object as part of the cursor.

12. A method in a data processing system having an input device and a display device for displaying information relating to a displayed visual element in a cursor used to select the visual element, the method comprising the steps of:

displaying the visual element and the cursor on the display device; and

in response to user input received from the input device:

moving the cursor into a region of the display device containing the visual element, and

displaying within the cursor presently undisplayed information relating to the displayed visual element.

13. The method of claim **12** further including the step of, in response to further user input received from the input device, moving the cursor within the region containing the visual element, such that the information displayed in the cursor is moved the same distance and in the same direction as the rest of the cursor.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

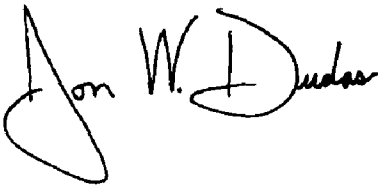
PATENT NO. : 6,437,800 B1
DATED : August 20, 2002
INVENTOR(S) : Mark A. Malamud et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title page,
Item [75], Inventors, please insert -- **Erik A. Gavriluk**, Hollywood Hills, CA -- and -- **Valerie Rozanne Horvath**, Redmond, WA --

Signed and Sealed this

Fourteenth Day of September, 2004



JON W. DUDAS
Director of the United States Patent and Trademark Office