EXHIBIT A-1

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	
Filing Date	
First Named Inventor	
Art Unit	
Examiner Name	
Attorney Docket Number	0331834.381

U.S.PATENTS

Examiner Initial*	Cite No	Patent Number	Kind Code[1]	Issue Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
	1	7786975		2010-08-31	Ording et al.	

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U.S.PATENT APPLICATION PUBLICATIONS

Examiner Initial*	Cite No	Publication Number	Kind Code[1]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear
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FOREIGN PATENT DOCUMENTS

Examiner Initial*	Cite No	Foreign Document Number[3]	Country Code[2] ¡	Kind Code[4]	Publication Date	Name of Patentee or Applicant of cited Document	Pages,Columns,Lines where Relevant Passages or Relevant Figures Appear	T[5]
	1	WO 01/29702	WO		2001-04-26	Van Den Hoven et al.		☐
	2	WO 03/081458	WO		2003-10-02	Lira		☐

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NON-PATENT LITERATURE DOCUMENTS

INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Not for submission under 37 CFR 1.99)		
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	Attorney Docket Number	0331834.381

Examiner Initials*	Cite No	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc), date, pages(s), volume-issue number(s), publisher, city and/or country where published.	T[5]
	1		☐

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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through a citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

[1]See Kind Codes of USPTO Patent Documents at www.USPTO.GOVor MPEP 901.04. [2]Enter office that issued the document, by the two-letter code (WIPO Standard ST.3). [3]For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [4]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [5]Applicant is to place a check mark here if English language translation is attached.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Application Number	
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CERTIFICATION STATEMENT

Please see 37 CFR 1.97 and 1.98 to make the appropriate selection(s):

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement. See 37 CFR 1.97(e)(1).

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☐ See attached certification statement.

☐ The fee set forth in 37 CFR 1.17 (p) has been submitted herewith.

☐ A certification statement is not submitted herewith.

SIGNATURE

A signature of the applicant or representative is required in accordance with CFR 1.33, 10.18. Please see CFR 1.4(d) for the form of the signature.

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This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 1 hour to complete, including gathering, preparing and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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EXHIBIT 3

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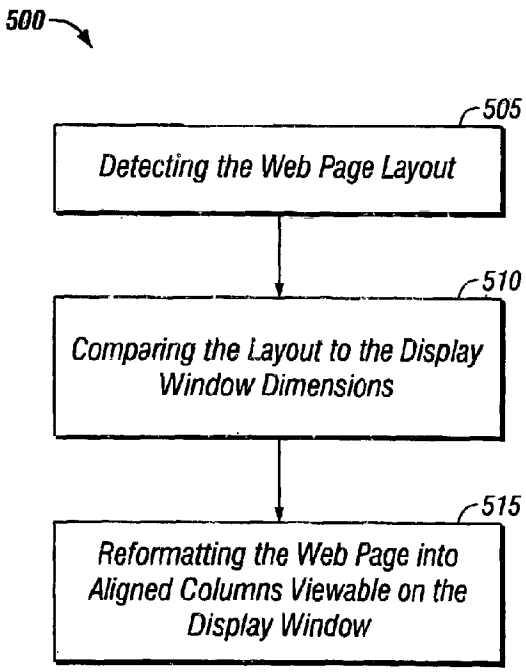
[Continued on next page]

(54) Title: CONTROLLING CONTENT DISPLAY



(57) Abstract: Viewing an electronic document in a display window of a display may include detecting a layout of the electronic document (505) and comparing the layout of the electronic document to a width of the display window (510). The electronic document may be reformatted into at least two columns, with each of the columns having a width that does not exceed a width of the display window (515). Navigating on the display may include tracking motion of an input tool on a display, comparing a motion of the input tool to a threshold, and changing a position of the visible portion of a page of information on the display if the input tool motion exceeds the threshold. The position of the visible portion of the page of information on the display may be constrained if the motion does not exceed the threshold. Navigating on a display also may include tracking coordinate information of an input tool on a display and moving a visible portion of a page of information on the display a distance equal to a change in the coordinate information of the input tool multiplied by a multiplier. Navigating on a display also may include providing a navigation control operable to change a viewable portion of a page of information on a display from a first view to a second view. In response to operation of the navigation control, the display may be animated to create an appearance of motion as the viewable portion of the page of information changes from the first view to the second view in response to operation of the navigation control.

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Published:

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

CONTROLLING CONTENT DISPLAY

TECHNICAL FIELD

The following description relates generally to a viewing and navigation aid for displaying information on an electronic device having limited display capability.

BACKGROUND

Web pages and other electronic documents generally are formatted for viewing and navigation in display windows of standard-sized or oversized displays, such as, for example, in a display window on a monitor for a desktop computer. The user of the computer can view the entire Web page on one screen display or can easily scroll a short distance to view other portions of the Web page. However, when content is displayed on an electronic device having a display window with smaller dimensions, such as, for example, the display window of a personal digital assistant ("PDA"), only a small portion of the Web page is displayed. This may render the document may be difficult to read.

SUMMARY

A document served to a device having a small display or a small display window, such as, for example, a PDA, a telephone, a handheld computer, or an electronic book, can be reformatted such that the width of the document is divided into columns, with each column being displayable across the entirety of the small display or display window. In this manner, the width of the small display or display window is used to display less than all of the width of the document. The columns may be defined based on the content within the document, as long as the column width does not exceed the width of the small display or display window. For instance, when the content corresponds to a hypertext markup language ("HTML") page, several natural or logical columns that are recognizable within the HTML page may be used to define the columns being served to the small display or display window, even if those columns don't have a uniform width.

In one general aspect, viewing an electronic document in a display window of a display includes detecting a layout of an electronic document and comparing the

layout of the electronic document to a width of the display window. The electronic document then is reformatted into at least two columns, with each of the columns having a width that does not exceed the width of the display window.

Implementations may include one or more of the following features. For example, detecting the layout of the electronic document may include detecting logical columns of the electronic document, and reformatting the electronic document may include reformatting each logical column to have a width that does not exceed the width of the display window. Detecting the layout of the electronic document also may include identifying a format code of the electronic document, such as a HTML format code (e.g., a header tag, a body tag, or a table tag).

Reformatting the electronic document into at least two columns may further include aligning the columns for viewing in the display window.

The display may be part of a client of a client/host architecture, and comparing the layout may further include notifying a host of the display window size from information residing at the client. A connection may be established between the client and the host. Notifying the host may include notifying the host once upon establishment of a connection between the client and the host. The host may be updated with information residing at the client at time intervals after establishing the connection between the client and the host. Reformatting the electronic document may further include requesting that the host reformat the electronic document in response to a command executed by the client.

The electronic document may be coded in hypertext markup language ("HTML"). Reformatting the electronic document may include recoding the electronic document in a language other than HTML.

The columns may be displayed on the display of an electronic device. The electronic device may be connected to the Internet, and may be, for example, a personal digital assistant, a mobile phone, an Internet-enabled television set-top box, or a computer of a small physical size for portability relative to a desktop computer and having a display size smaller than that of a desktop computer.

In another general aspect, navigating on a display includes tracking motion of an input tool on a display, comparing the motion of the input tool to a threshold, changing the position of the visible portion of a page of information on the display if the motion exceeds the threshold, and constraining the position of the visible portion of the page of information on the display if the motion does not exceed the threshold.

Implementations may include one or more of the following features and one or more of the features noted above. For example, the input tool may be a pen stylus or a finger, and tracking motion of the input tool may include tracking the pen or finger on the display surface.

The display may include a touch screen and tracking motion of the input tool may include tracking motion of the input tool on the touch screen. The touch screen may include, for example, a resistive sensor, a capacitive sensor, an acoustic wave sensor, or an infrared sensor. The touch screen may include a sensor activated by a touch activation force by the input tool on the display.

The motion may be separated into a horizontal component and a vertical component relative to the display, the horizontal component may be compared to the threshold, and horizontal movement of the visible portion of the page of information on the display may be constrained if the horizontal component does not exceed the threshold. Vertical motion may be left uncompared and unconstrained or comparing the motion also may include comparing the vertical component and constraining the vertical movement of the visible portion of the page of information on the display. Comparing the motion of the input tool to the threshold may include comparing the motion of the input tool to a user-defined threshold or to a system-defined threshold.

The page of information may include columns of information, and constraining the position of the page of information on the display may include constraining the position of the columns of information on the display or constraining the horizontal position of a column of information on the display. The columns of information may include logical columns, and constraining may include constraining the horizontal position of a logical column on the display.

In another general aspect, navigating on a display includes moving a stylus on a display to cause the display to change the viewable portion of the page of information on the display from a first page view to a second page view, tracking the motion of the stylus on the display, comparing a horizontal motion of the stylus on the display to a threshold, maintaining the viewable portion of the page of information at the first page view if the horizontal motion does not exceed the threshold, and positioning the viewable portion of the page of information at the second page view if the horizontal motion exceeds the threshold.

Implementations may include one or more of the features described above.

In another general aspect, navigating on a display includes tracking a motion of a stylus in contact with a display surface of a device that is operable to change a position of a visible portion of a page of information on the display from a first page position to a second page position in response to the motion of the stylus. A horizontal or vertical component of the motion of the stylus on the display surface is compared to a threshold, and the visible portion of the page of information on the display is repositioned to a horizontal or vertical position corresponding to the first page position after the pen stylus is removed from the display surface if the horizontal or vertical component does not exceed the threshold.

Implementations may include one or more of the features described above.

In another general aspect, navigating on a display includes tracking coordinate information of an input tool of a device having a display. The device is operable to move a page of information on the display in response to the coordinate information, and a visible portion of the page of information on the display is moved a distance equal to a change in the coordinate information of the input tool multiplied by a multiplier having a value other than one.

Implementations may include one or more following features and one or more of the features described above. For example, the input tool may include a stylus, a mouse, or a finger. The display may include a touchscreen on which the input tool may be tracked. The touchscreen may include, for example, a resistive sensor, a capacitive sensor, an acoustic wave sensor, or an infrared sensor.

Tracking the coordinate information of the input tool may include tracking vertical coordinates and horizontal coordinates of the input tool, and moving the visible portion of the page of information on the display may include moving the page of information on the display a vertical distance equal to the change in the vertical coordinates multiplied by the multiplier and a horizontal distance equal to the change in the horizontal coordinates of the input tool multiplied by the multiplier. The multiplier may be defined by the user. The multiplier may be less than or greater than one. Different multipliers may be provided for horizontal and vertical movement.

The coordinate information may include pixel coordinates on the display, tracking may include tracking pixel coordinates of the position of the input tool on the display, and moving may include moving the page of information a distance equal to a change in the pixel coordinates of the input tool multiplied by the multiplier. Moving the page of information may include moving the page a distance equal to a change in the coordinate information of the input tool multiplied by a factor based on the acceleration or the velocity of the input tool.

In another general aspect, positioning a reference marker on a display with an input tool includes positioning an input tool on a display, determining a first coordinate position from the position of the input tool on the display, moving the reference marker to the first coordinate position, and tracking movement of the pointer device to a second coordinate position on the display. The reference marker on the display then is moved in a direction defining a vector pointing from the first coordinate position to the second coordinate position and a distance equal to the difference between the second coordinate position and the first coordinate position multiplied by a multiplier.

Implementations may include one or more of the features described above.

In another general aspect, navigating on a display includes providing a navigation control operable to change a viewable portion of a page of information on a display from a first view to a second view. The display is animated to create an appearance of motion as the viewable portion of the page of information changes

from the first view to the second view in response to operation of the navigation control.

Implementations may include one or more of the following features and one or more of the features described above. For example, the navigation control may include a screen icon that changes the display from the first view to the second view. A first screen icon may correspond to the first view and a second screen icon may correspond to the second view. The first view may include a first discrete area of the page of information and the second view may include a second discrete area of the page of information. Actuation of the first screen icon may position the viewable portion of the page of information to view the first discrete area and actuation of the second screen icon may position the viewable portion of the page of information to view the second discrete area.

The page of information may include more than one column of information. Actuating a screen icon that corresponds to a column of information may result in showing the corresponding column of information on the display. Animating the display may include shifting the viewable portion of the page of information on the display in a horizontal direction.

Reformatting may include reformatting the page of information into more than one logical column with each logical column having a corresponding screen icon. Operation of the navigation control may include actuating the screen icon to view the corresponding logical column. The navigation control may include a mouse, a stylus, a touchscreen, or voice control.

Animating the display may include slowly scrolling the display to give the display an appearance of slow motion, illustrating a visible portion of the page of information moving continuously on the display from the first view to the second view, drawing a line from the first view to the second view, gradually shifting content on the page of information from the first view to the second view, or opening a window on the display that shows a reference marker moving from the first view to the second view. The page of information may include a Web page coded in HTML.

The animation may be defined by a user control. The user-defined control may allow selection of a time interval to change the viewable portion of the page of information from the first view to the second view, selection of a constant velocity at which to change the viewable portion of the page of information from the first view to the second view, or selection of an acceleration at which to change the viewable portion of the page from the first view to the second view. The velocity or the acceleration may be variable or constant during the change in the viewable portion of the page from the first view to the second view.

Implementations of the techniques described may include a method or process, an apparatus or system, or computer software on a computer-accessible medium. The techniques may be used in conjunction with devices such as, for example, PDAs, telephones, including wireless and web phones, handheld computers, monitors, games, and electronic books. The details of one or more implementations are set forth in the accompanying drawings and the description below. Other features will be apparent from the description, the drawings, and the claims.

DESCRIPTION OF DRAWINGS

Figs. 1A-1D are screen shots of a page on display windows of varying dimensions.

Fig. 2 illustrates a display window superimposed onto a page.

Fig. 3 illustrates a display window superimposed onto a column of information from a page.

Figs. 4A and 4B illustrates reformatting of a page.

Fig. 5 is a flow chart of a method of reformatting a page.

Fig. 6 illustrates a display window and pen stylus superimposed onto a page.

Fig. 7 illustrates a display window with navigation buttons.

Figs. 8A-8C illustrate display windows superimposed onto a page.

Figs. 9 and 10 each illustrate a display window superimposed onto a page.

Fig. 11 is a flow chart of a method of navigating on a display window.

Figs. 12, 13, 14A and 14B each illustrate a display window superimposed onto a page.

Fig. 15 is a flow chart of a method of constraining the scrolling of information on a display window.

Fig. 16 illustrates a display window superimposed onto a page.

Figs. 17A and 17B each illustrate a display window and a stylus.

Fig. 18 is a block diagram of a computer and communications system.

Like reference symbols in the various drawings indicate like elements.

DETAILED DESCRIPTION

Pages coded according to hypertext markup language ("HTML") are designed for display in display windows of different sizes. On smaller displays, a width of a display window often corresponds to a width of a display minus a width of a window frame and a width of a vertical scroll bar, and may be constrained to be no larger. On larger displays, the width of a display window may constitute a smaller portion of the entire width of the display. In some cases, a display window may constitute the entirety of the display (i.e., there may be no window frame or scroll bar). In other cases, the display window may be purposefully sized to be substantially smaller than the overall size of the display. For example, a user of a desktop system with a large display may open a small display window to view a particular page.

Typically, a page expands or shrinks to match the width of the display window. Fig. 1A illustrates a page 100 in a wide display window 105 having a window frame 106 and a scroll bar 107. The display window 105 may be, for example, the window that would be displayed on the monitor of a desktop computer. As shown, the page 100 expands to fit the window width 108.

Fig. 1B shows the page 100 on a device having a smaller display window 110. As shown, the page width is reduced to fit the width of the display window 110 by reducing the width of columns 115, 120 and 125 presented in the display window 100 relative to the width of corresponding columns 130, 135 and 140 in the display window 105. In particular, the center column 120 in the display window 110 is

substantially narrower than the corresponding center column 135 in the display window 105.

The width of the columns may only be reduced until a minimum width for the page is reached. Fig. 1C shows the page 100 in a display window 145 that is narrower than the established minimum width of the page 100 such that the page 100 exceeds the bounds of the display window 145 and only a portion of the page 100 is displayed by display window 145. As shown, the entire width of the center column 150 is displayed, while only portions of the left column 155 and the right column 160 are displayed. The display window 145 also includes a horizontal scroll bar 165 and a vertical scroll bar 170 for use in selecting and viewing the columns and the portions thereof that are displayed.

In some cases, the display window is narrower than the width of a single column. For example, Fig. 1D shows the page 100 in a display window 175 of a portable electronic device, such as, for example, an Internet-enabled cellular telephone. As shown, only a portion of a single column 180 is displayed. As a result, the user must scroll back and forth horizontally, using, for example, a scroll bar 185, to read each line of text.

Fig. 2 illustrates a display window 200 superimposed onto the page 100. The display window 200 is representative of the display of, for example, a PDA. Since the page and column are each larger than the display window 200, the user must scroll back and forth to read each line of text. PDA browsers may use various reformatting methods to enhance the readability of the page. Reformatting may include scaling down images, text size, and other page components.

Fig. 3 shows the page 100 reformatted as a single column 300. In particular, the columns of the page 100 are stacked to form the single column 300, the width of the column 300 is limited to the width of the display window 200, and word wrapping is used to provide continuity/readability. The display window 200 stays centered on the column as the user scrolls down the page to read the text.

Figs. 4A and 4B show that a page 400 (Fig. 4A) having elements 402, 404, 406 and 408 of differing widths and sized to fit a wide window width 410 may be

reformatted as a page 415 (Fig. 4B) having elements 417, 419, 421 and 423 with widths corresponding to the width 425 of a narrow display (e.g., a PDA display). The elements 417, 419, 421 and 423 are readable columns of information that each fit within the width 425 of the display window or can be reduced to a width that does not exceed the width of the display window 425. The elements 417, 419, 421 and 423 are aligned to correspond with the topology of the page 400. Thus, even though the page 415 exceeds the viewing boundaries of the display window, the user can view various portions of the page 415 with a better sense of the orientation of the content on the page 415 and can navigate on the page 415 more easily. Each column of text can be read without requiring the user to scroll back and forth horizontally. Instead, the user scrolls down as if reading a newspaper column.

Reformatting a page requires identification of the page topology from the page format coding. As shown in Fig. 4, a common HTML page topology includes a header 430 with no logical columns, a body including one or more logical column elements 402, 404, 406 and 408, and a colophon 435 with no logical columns. Other variations of this topology include a header, a first body having N columns, another header, a second body having M columns, with M being the same as or different from N, and a colophon; a header, multiple bodies, and a colophon; a header, a body, and no colophon; no header, a body, and no colophon; or a header, no body, and no colophon.

The topologies described above have some common features. For example, the headers usually do not contain long paragraphs of text. Thus, headers seldom need to be reformatted for the display window of the PDA viewing device. In the event that the header is wider than the display window, navigation through the header is not difficult for the user. Similarly, the colophon usually does not contain long paragraphs of text and may be easily navigated. Typically, the body or bodies are laid out in one or more columns. The columns can be constrained to the window width to enhance readability, as described with respect to Figs. 3, 4A and 4B. Based on these topologies, most HTML pages are readily reformatted into constrained sets of logical columns, with no column exceeding the display width.

Referring to Fig. 5, a process 500 for enabling viewing of a page on a display includes detecting the page layout (step 505), comparing the layout to the dimensions of the display window (step 510), and reformatting the page into aligned columns that are viewable on the display (step 515). In one implementation, the page layout is detected (step 505) by separating the layout of the page into components and then analyzing those components. The page coding may be identified to recognize formatting codes. For example, HTML code includes identifiable header, body, or table tags. Once the HTML tags are identified, the page may be recoded in a language other than HTML for easier viewing on the small display window.

The width of each logical column is less than or equal to the display window width. The logical columns may be produced by comparing the width of each column of the page to a width of the display window and establishing a new column width that does not exceed the display window width. Typically, the new column width is smaller than the original column width. However, in some implementations, a column that is narrower than the display window width may be widened to have a new width that does not exceed the display window width. The logical columns then are aligned for viewing on the display.

When the display is part of a client of a client/host architecture, the host may be notified of the display window size from information residing at the client or residing at the client. For example, the host may be notified upon establishment of a connection between the client and the host, at time intervals after establishing the connection between the client and the host, or after any change in the display window size. The host then may reformat the page based on the display window size prior to delivery to the client. Alternatively, the client may perform the reformatting.

Typically, PDA navigation is performed by using scroll bars to move on or between pages of information on the display.

Referring to Fig. 6, another common PDA navigation feature is the capability to scroll the display window by placing a stylus 600 on the display window 605 and then dragging the stylus 600. However, such "touch-and-drag" scrolling can result in information 610 that is positioned in the display window 605 but is difficult to view

or read since the user may inadvertently navigate to a position where only a portion of a column or an image is visible in the PDA display window 605.

Referring to Fig. 7, to aid user navigation to view a desired text column, a display window 700 includes small icons 705, 710, and 715 that represent navigation buttons. Each of navigation buttons 705, 710 and 715 represents a logical column of the page currently being viewed. The navigation buttons 705, 710 and 715 provide the user with a graphical representation of the number of logical columns 700 available on the page. In other implementations, the navigation buttons correspond to columns of predetermined absolute or relative position within the page (e.g., leftmost column, rightmost column, left adjacent column, right adjacent column or center column). Each button also is used to properly position the display window 700 on the corresponding column of text when the user selects the icon. For example, referring to the tri-column display of Fig. 8A, when the user selects the left-most navigation button 705, the window 700 is positioned on the left-most or first logical column 805 of a page 800. Referring to Fig. 8B, when the user selects the central navigation button 710, the window 700 is positioned on the second logical column 810 of the page 800. Referring to Fig. 8C, when the user selects the right-most navigation button 715, the window 700 is positioned on the third or right logical column 815 of the page 800.

The number of navigation buttons can vary according to the number of logical columns. For example, if a page displayed in the window 700 has just one column, then the display includes one column navigation icon. If the page being displayed has two columns, then the display includes two column navigation icons. Depending upon the display limitations of the window, any number of icons can be displayed to correspond with the number of columns. When the element displayed in the window is one that has no logical column, such as, for example, a header or a colophon, the icons for the following or preceding logical columns may be displayed depending on the user's preference.

As the number of logical columns increases, the user has more options for jumping discretely between columns. This can cause the user to become disoriented

concerning the position of the page relative to the display window, which may result in the user selecting an incorrect scrolling direction to view other parts of the page. For example, referring to Fig. 9, the user may begin viewing a page 900 by selecting a first column 905 of columns 905, 910 and 915 for display in the window 920. The user then may decide to jump to the third text column 915 to view the information in that column. Subsequently, the user may decide to return to the previously viewed first column 905. However, since the appearance of the display window 920 changed instantaneously when the used jumped discretely between the text columns 905 and 915, the user may not recall the position of the previously-viewed text column relative to the currently-displayed column.

Referring to Fig. 10, as the user navigates to various positions on the page 900, animation effects 925 are provided to give the user a better sense of direction and position. The animation effects add a sense of motion to the content being displayed. For example, in one implementation, when the user actuates a navigation button 930 to move to a new location on the page 900, the user sees the page 900 slowly scrolling across the display window, as represented by the series of arrows 935 in Fig. 10, until the new location is centered on the display window 920. Animation also may be provided in response to a stylus or finger used on a display window with a touchscreen. The touchscreen may include, for example, a resistive sensor, a capacitive sensor, an acoustic wave sensor, or an infrared sensor.

Referring to Fig. 11, a procedure 1100 for supporting navigation on a display includes providing a navigation control operable to change a viewable portion of a page of information on a display from a first view to a second view (step 1105), permitting operation of the navigation control to change the display from the first view to the second view (step 1110), and animating the display to create an appearance of motion as the viewable portion of the page of information changes from the first view to the second view (step 1115). Operation of the navigation control may include operation of a device such as a mouse or trackball, use of a stylus, or use of a voice command.

Animation on the display may include one or more animation effect. For example, animating the display (step 1115) may include slowly scrolling or shifting the display content to give the display an appearance of slow motion. In another implementation, animating the display (step 1115) includes illustrating a visible portion of the page of information moving continuously on the display from the first view to the second view. In a further implementation, animating the display (step 1115) includes drawing a line from the first view to the second view. In still a further implementation, animation (step 1115) includes displaying a reference marker moving from the first view to the second view. This may be done, for example, using a separate window or portion of the display. In one implementation, the user selects a velocity at which to change the viewable portion of the page from the first view to the second view. In another implementation, the user selects an acceleration at which to change the viewable portion of the page of information from the first view to the second view. The user also may select a constant or variable velocity or acceleration. For example, the user may select a variable velocity that begins scrolling the display slowly, picks up speed, and then slows down again as the displayed portion approaches the second view.

Referring to Fig. 12, on a stylus-based PDA, the user can use a stylus 1200 to scroll a display window 1205 vertically down a page 1210 in order to read a column 1215, 1220 or 1225 of text of the page 1205. However, referring to Fig. 13, vertical touch-and-drag scrolling has a drawback in that slight horizontal motion or "wobbling" of the pen 1200, as represented by the series of arrows 1230, can cause the text column 1125, 1220, or 1225 to become misaligned on the display 1205, resulting in a misalignment between the column 1215, 1220, or 1225 and the display window 1205. To correct for this and to view a desired one of the columns 1215, 1220, or 1225 in one view, the user manually centers the desired column in the display window 1205 by making one or more left or right corrections to the stylus 1200.

Referring to Fig. 14A, a vertical alignment control, as represented by the vertical bars 1400, can minimize wobble of the display 1205 during vertical scrolling with the pen 1200. As the user scrolls the page up or down with the stylus 1200, the

vertical alignment control ignores slight horizontal motion such that the text column 1220 remains aligned in the display window 1205. This is based on the assumption that, when the window 1205 is positioned over a logical column 1220 and the user drags the pen up or down without significant horizontal motion, the intention of the user is to view only the logical column 1220. Based on this assumption, the alignment control constrains screen scrolling to the vertical direction as long as the stylus stays between the bars 1400.

The user can define the sensitivity of the vertical alignment control. For example, the user may specify a horizontal motion threshold (i.e., the spacing between the bars 1400). If the threshold is not exceeded, any horizontal motion by the pen 1200 on the screen is ignored. If the threshold is exceeded, the displayed text moves left or right accordingly. In one implementation, the user can adjust the sensitivity of the horizontal motion by establishing a threshold for a parametric number of pixels. The two vertical bars 1400 represent the threshold of horizontal motion, measured as the parametric amount of pixels, which must be exceeded to scroll the display window 1205 left or right. The vertical alignment controls may be enabled or disabled by the user.

Referring to Fig. 14B, in another implementation, the vertical alignment control is enabled when the user lifts the pen 1200 from the display 1205. This causes the logical column 1220 to snap into alignment with the display window 1205 as the user stops scrolling. The user can adjust the snap sensitivity by, for example, setting the alignment control to snap to the nearest logical column based on a user-defined snap threshold. If the user's scrolling does not exceed the threshold, which indicates an intention to continue to view the text column 1220, the display 1205 centers the logical column 1210 as the pen 1200 is lifted from the screen. If the user's scrolling exceeds the threshold, which indicates an intention to move beyond the boundary of the logical column 1220, the display is snapped to the adjacent or repositioned column. In other implementations, no snapping occurs when the user's scrolling exceeds the threshold. The snap-on-column feature can also be animated to provide an appearance of movement as the display scrolls to the correct column-viewing position.

A similar horizontal alignment control also may be provided. Such a control may be used to limit vertical movement when scrolling horizontally in, for example, a spreadsheet application.

Referring to Fig. 15, a procedure 1500 for supporting navigation on a display includes tracking user motion of an input tool for a display (step 1505), comparing a motion of the input tool to a threshold (step 1510), and constraining the position of the visible portion of the page of information on the display if the user motion does not exceed the threshold (step 1515). The input tool may be a stylus 1200 or finger used on a display window 1205 with a touchscreen. The touchscreen may include, for example, a resistive sensor, a capacitive sensor, an acoustic wave sensor, or an infrared sensor.

The method 1500 may include separating the user motion of the input tool into a horizontal component and a vertical component. The horizontal component may be compared to the threshold to constrain horizontal motion of the page 1210 in the display window 1205 if the horizontal component does not exceed the threshold. Vertical motion may be left unconstrained, or may be compared to the same or a different threshold. In other implementations, only vertical motion may be constrained.

Referring to Fig. 16, touch-and-drag scrolling of a display window 1600 may be limited to the width and length of the display window. For example, as the user scrolls from left to right across the entire width 1605 of the display 1600, the document slides across the screen a distance that is equal to the width 1605 of the display 1600. Thus, movement up, down, left, or right is limited to a distance that is equal to the length 1610 or width 1605 of the display 1600. The user must then lift the pen or stylus from the screen and repeat the scrolling operation.

Typical desktop computers can associate movement of the operating system cursor with movement of the pointing device. In these systems, the cursor is both a software variable to detect user intentions and a graphic representation to provide the user with the location of the cursor. On a PDA, however, the cursor is not displayed

on the screen because the tip of the pen already defines the location of the cursor. This location is forwarded to the application software by the operating system.

The operating system uses drivers that convert the movement or the position of the pointing device, which may be expressed in centimeters, to the movement of the cursor, which may be expressed in pixels. PDAs usually follow a paradigm inherited from the desktop computer, in that movement between the cursor is equivalent to movement of the document. Thus, the page scrolls an amount equal to the distance of the pen movement. For example, when the cursor moves 10 pixels, the document scrolls 10 pixels.

On a PDA or other device with a small display, scrolling the width or length of the display area provides viewing of only a small amount of document data. The user often must repeat the scrolling operation until the desired text comes into view.

A scrolling multiplier allows the user to specify movement of the document on the display as a multiplier or percentage of the physical movement of the stylus on the display. For example, referring to Fig. 17A, when the proportional movement is set to 200%, document scrolling 1700 on a display 1705 is 20 pixels for each 10 pixels of stylus or other input movement 1710. When the proportional movement is set to 50%, the document scrolling is 5 pixels for each 10 pixels of stylus or other input movement on the display. Referring to Fig. 17B, when the proportional movement is set to 300%, the document scrolling 1715 is 30 pixels for each 10 pixels of stylus or other input movement 1720 on the display 1725.

As shown in Fig. 17A, when the proportional movement is set to 200% and a new display 1730 is centered around the endpoint 1735 of the maximum potential document scrolling, the user has the capability to scroll a document area that is nine times the area of the display window 1705. Similarly, as shown in Fig. 17B, when the proportional movement is set to 300% and a new display 1740 is centered around the endpoint 1745 of the maximum potential document scrolling, the user has the capability to scroll a document area that is 16 times the area of the display window 1725. By contrast, when proportional movement is set to 100%, the user is able to scroll a document area that is four times the area of the display window. Thus,

increasing proportional movement provides the user with the capability to scroll through several pages of the document with a single point-and-drag action. Alternatively, the user can make very fine position adjustments by setting a multiplier that is less than one.

An additional benefit is the enhancement in the perceived responsiveness and scroll speed capability of the application software. Since with the same action there is additional scrolling, the scrolling action appears to occur at a higher velocity. Stated more simply, the motion of the document is perceived to be zippy instead of sluggish. In another implementation, the user may set the multiplier based on the speed or acceleration of the pointing device. For example, a higher stylus velocity translates into a higher multiplier to generate the appropriate number of pixels to move the cursor. In yet another implementation, different multipliers may be used for horizontal and vertical movement.

For illustrative purposes, Fig. 18 describes a communications system for implementing a navigation aid to display information on an electronic device having limited display capability. For brevity, several elements in Fig. 18 are represented as monolithic entities. However, as would be understood by one skilled in the art, these elements each may include numerous interconnected computers and components designed to perform a set of specified operations and/or dedicated to a particular geographical region.

Referring to Fig. 18, a communications system 1800 is capable of delivering and exchanging data between a client system 1805 and a host system 1810 through a communications link 1815. The client system 1805 typically includes one or more client devices 1820 and/or client controllers 1825, and the host system 1810 typically includes one or more host devices 1830 and/or host controllers 1835. For example, the client system 1805 or the host system 1810 may include one or more general-purpose computers (e.g., personal computers), one or more special-purpose computers (e.g., devices specifically programmed to communicate with each other and/or the client system 1805 or the host system 1810), or a combination of one or more general-purpose computers and one or more special-purpose computers. The client system

1805 and the host system 1810 may be arranged to operate within or in concert with one or more other systems, such as, for example, one or more LANs ("Local Area Networks") and/or one or more WANs ("Wide Area Networks").

The client device 1820 (or the host device 1830) is generally capable of executing instructions under the command of a client controller 1825 (or a host controller 1835) and is capable of processing instructions or queries from the host system 1810. For example, the host system 1810 may query the client system 1805 as to the display size of the PDA device. The query may occur when the client 1805 and the host 1810 are connected or at periodic time intervals. The client device 1820 (or the host device 1830) is connected to the client controller 1825 (or the host controller 1835) by a wired or wireless data pathway 1840 or 1845 capable of delivering data.

Each of the client device 1820, the client controller 1825, the host device 1830, and the host controller 1835 typically includes one or more hardware components and/or software components. An example of a client device 1820 or a host device 1830 is a general-purpose computer (e.g., a personal computer) capable of responding to and executing instructions in a defined manner. Other examples include a special-purpose computer, a workstation, a server, a device, a component, other physical or virtual equipment or some combination thereof capable of responding to and executing instructions. Often, the client device 1820 is implemented as a PDA or a mobile telephone.

An example of client controller 1825 or a host controller 1835 is a software application loaded on the client device 1820 or the host device 1830 for commanding and directing communications enabled by the client device 1820 or the host device 1830. Other examples include a program, a piece of code, an instruction, a device, a computer, a computer system, or a combination thereof, for independently or collectively instructing the client device 1820 or the host device 1830 to interact and operate as described. The client controller 1825 and the host controller 1835 may be embodied permanently or temporarily in any type of machine, component, physical or virtual equipment, storage medium, or propagated signal capable of providing instructions to the client device 1820 or the host device 1830.

The communications link 1815 typically includes a delivery network 1850 making a direct or indirect communication between the client system 1805 and the host system 1810, irrespective of physical separation. Examples of a delivery network 1850 include the Internet, the World Wide Web, WANs, LANs, analog or digital wired and wireless telephone networks (e.g., PSTN, ISDN, and xDSL), radio, television, cable, satellite, and/ or any other delivery mechanism for carrying data. The communications link 1850 may include communication pathways 1855, 1860 that enable communications through the one or more delivery networks 1850 described above. Each of the communication pathways 1855, 1860 may include, for example, a wired, wireless, cable or satellite communication pathway.

The described processes and techniques may be performed by a browser running on the client system 1805 (e.g., a PDA). The processes and techniques also may be performed at a host or other remote device (e.g., a server) through which a web page is passed or from which a web page is received. The processes and techniques may be applied both to large displays and to small displays, to display windows that occupy varying portions of a display, and to full screen displays.

A number of implementations have been described. Nevertheless, it will be understood that various modifications may be made. Accordingly, other implementations are within the scope of the following claims.

WHAT IS CLAIMED IS:

1. A method of viewing an electronic document in a display window of a display, the method comprising:

detecting a layout of an electronic document having at least two columns;

comparing the layout of the electronic document to a width of the display window; and

reformatting the electronic document into at least two columns, with each of the columns having a width that does not exceed the width of the display window.

2. The method of claim 1 wherein:

detecting the layout of the electronic document includes detecting logical columns of the electronic document; and

reformatting the electronic document includes reformatting each logical column to have a width that does not exceed the width of the display window.

3. The method of claim 1 wherein detecting the layout of the electronic document includes identifying a format code of the electronic document.

4. The method of claim 3 wherein identifying the format code includes identifying a HTML format code.

5. The method of claim 1 wherein reformatting the electronic document into at least two columns further includes aligning the columns for viewing in the display window.

6. The method of claim 1 wherein the display is part of a client in a client/host architecture and comparing further includes notifying a host of the display window size from information residing at the client.

7. The method of claim 6 further comprising establishing a connection between the client and the host.

8. The method of claim 7 wherein notifying the host includes notifying the host once upon establishment of a connection between the client and the host.

9. The method of claim 7 wherein notifying the host includes updating the host with information residing at the client at time intervals after establishing the connection between the client and the host.

10. The method of claim 1 wherein the display is part of a client of a client/host architecture and reformatting the electronic document further includes requesting that the host reformat the electronic document in response to a command executed by the client.

11. The method of claim 1 wherein the electronic document is coded in HTML.

12. The method of claim 11 wherein reformatting further includes recoding the electronic document in a language other than HTML.

13. The method of claim 1 further comprising displaying the columns on the display of an electronic device.

14. The method of claim 13 wherein the electronic device is connected to the Internet.

15. The method of claim 13 wherein the electronic device comprises a personal digital assistant.

16. The method of claim 13 wherein the electronic device comprises a mobile phone.

17. A method of viewing an electronic document on a display, the method comprising:

detecting a layout of an electronic document having at least two columns;

comparing the layout of the electronic document to a width of the display; and

reformatting the electronic document into at least two columns, with each of the columns having a width that does not exceed the width of the display.

18. The method of claim 17 wherein:

detecting the layout of the electronic document includes detecting logical columns of the electronic document; and

reformatting the electronic document includes reformatting each logical column to have a width that does not exceed the width of the display.

19. The method of claim 17 wherein reformatting the electronic document into at least two columns further includes aligning the columns for viewing in the display window.

20. A system for viewing an electronic document, the system comprising:

a display; and

a processor connected to the display and programmed to:

detect a layout of an electronic document having at least two columns;

compare the layout of the electronic document to a width of a display window of the display;

reformat the electronic document into at least two columns, with each of the columns having a width that does not exceed the width of the display window; and

display a column of the electronic document in the display window of the display.

21. The system of claim 20 wherein the processor is programmed to:

detect logical columns of the electronic document; and

reformat each logical column to have a width that does not exceed the width of the display window.

22. The system of claim 20 wherein the processor is programmed to align the columns for viewing in the display window.

23. A system for viewing an electronic document, the system comprising:

means for detecting a layout of an electronic document having at least two columns;

means for comparing the layout of the electronic document to a width of a display window of a display;

means for reformatting the electronic document into at least two columns, with each of the columns having a width that does not exceed the width of the display window; and

means for displaying a column of the electronic document in the display window of the display.

24. The system of claim 23 wherein the means for reformatting includes:

means for detecting logical columns of the electronic document; and

means for reformatting each logical column to have a width that does not exceed the width of the display window.

25. The system of claim 23 wherein means for reformatting includes means for aligning the columns for viewing in the display window.

26. A method of navigating on a display, the method comprising:

tracking motion of an input tool on a display;

comparing a motion of the input tool to a threshold;

changing a position of the visible portion of a page of information on the display if the motion exceeds the threshold; and

constraining the position of the visible portion of the page of information on the display if the motion does not exceed the threshold.

27. The method of claim 26 wherein the input tool is a stylus and tracking motion of the input tool includes tracking the stylus on a display surface.

28. The method of claim 26 wherein the display includes a touchscreen and tracking motion of the input tool includes tracking motion of the input tool on the touchscreen.

29. The method of claim 28 wherein the touchscreen includes a sensor activated by touch and tracking motion includes tracking a touch activation force by the input tool on the display.

30. The method of claim 29 wherein the input tool includes a stylus having a resistive property and the touchscreen includes a resistive sensor operable to detect

the resistive property of the stylus such that tracking includes tracking the stylus with the resistive sensor.

31. The method of claim 26 further comprising separating the motion into a horizontal component and a vertical component relative to the display, wherein comparing the user motion of the input tool to the threshold includes comparing the horizontal component to the threshold and constraining the position of the visible portion of the page of information on the display includes constraining horizontal movement of the visible portion of the page of information on the display if the horizontal component does not exceed the threshold.

32. The method of claim 31 wherein constraining the position includes leaving vertical motion unconstrained.

33. The method of claim 26 further comprising separating the motion into a horizontal component and a vertical component relative to the display, wherein comparing the user motion of the input tool to the threshold includes comparing the vertical component to the threshold and constraining the position of the visible portion of the page of information on the display includes constraining vertical movement of the visible portion of the page of information on the display if the vertical component does not exceed the threshold.

34. The method of claim 26 wherein comparing the user motion of the input tool to the threshold includes comparing the user motion of the input tool to a user-defined threshold.

35. The method of claim 26 wherein comparing the user motion of the input tool to the threshold includes comparing the user motion of the input tool to a system-defined threshold.

36. The method of claim 26 wherein the page of information includes at least one column of information and constraining the position of the page of information on the display includes constraining the position of the column of information on the display.

37. The method of claim 36 wherein constraining the position of the page of information on the display includes constraining the horizontal position of the column of information on the display.

38. The method of claim 37 wherein:

the column of information includes a logical column; and

constraining the position of the page of information on the display includes constraining the horizontal position of the logical column on the display.

39. A method of navigating on a display, the method comprising:

tracking motion of a stylus on a display;

comparing a component of motion of the stylus on the display in one direction to a threshold; and

correcting a position of a page of information on the display if the motion in the one direction does not exceed the threshold.

40. The method of claim 39 wherein the component of motion comprises horizontal motion, the one direction comprises a horizontal direction, and correcting the position of the page comprises correcting a horizontal position of the page.

41. The method of claim 40 wherein the page of information includes at least one column of information such that correcting the horizontal position of the page of information on the display includes correcting the horizontal position of the column of information on the display.

42. The method of claim 41 wherein the first column of information includes a logical column having a width not exceeding a width of the display such that correcting the original horizontal position includes correcting the original horizontal position of the logical column on the display.

43. The method of claim 39 wherein the component of motion comprises vertical motion, the one direction comprises a vertical direction, and correcting the position of the page comprises correcting a vertical position of the page.

44. A method of navigating on a display, the method comprising:

tracking motion of a stylus in contact with a display surface;

comparing a component of motion of the stylus on the display surface in one direction to a threshold; and

repositioning a visible portion of a page of information on the display to an original position after the stylus is removed from the display surface if the component of motion in the one direction does not exceed the threshold.

45. The method of claim 44 wherein the component of motion comprises horizontal motion, the one direction comprises a horizontal direction, and repositioning comprises repositioning the visible portion of the page of information on the display to an original horizontal position.

46. The method of claim 45 wherein the page of information includes at least one column of information such that correcting the original horizontal position includes correcting the original horizontal position of the column of information on the display.

47. The method of claim 46 wherein the column of information includes a logical column having a width not exceeding a width of the display such that repositioning includes repositioning the logical column on the display.

48. The method of claim 46 wherein the page of information includes at least one column of information such that repositioning the visible portion of the page includes correcting the original horizontal position of the column of information on the display.

49. The method of claim 46 wherein the column of information includes a logical column having a width not exceeding a width of the display such that repositioning includes repositioning the logical column on the display.

50. The method of claim 44 wherein the component of motion comprises vertical motion, the one direction comprises a vertical direction, and repositioning comprises repositioning the visible portion of the page of information on the display to an original vertical position.

51. A system for navigating on a display, the system comprising:

a stylus; and

a device with a display surface having a touchscreen and a processor operable to compare a horizontal motion of the stylus on the display surface to a threshold and reposition the visible portion of the page of information on the display to a first horizontal position after the stylus is removed from the display surface if the horizontal motion does not exceed the threshold.

52. The system of claim 51 wherein the page of information includes a column of information such that correcting the first horizontal position includes correcting the first horizontal position of the column of information on the display.

53. The system of claim 52 wherein the column of information includes a logical column having a width not exceeding a width of the display such that correcting the first horizontal position includes correcting the first horizontal position of the logical column on the display.

54. The system of claim 51 wherein the processor is operable not to reposition the visible portion of the page of information on the display to the first horizontal position after the pen stylus is removed from the display surface if the horizontal motion exceeds the threshold.

55. A method of navigating on a display, the method comprising:

tracking coordinate information of an input tool on a display, and

moving a visible portion of a page of information on the display a distance equal to a change in the coordinate information of the input tool multiplied by a multiplier having a value other than one.

56. The method of claim 55 wherein the input tool includes a stylus and the display includes a touchscreen such that tracking includes tracking coordinate information of the stylus on the touchscreen.

57. The method of claim 55 wherein the input tool includes a mouse such that tracking includes tracking coordinate information of the mouse.

58. The method of claim 55 wherein:

tracking the coordinate information of the input tool includes tracking vertical coordinates of the input tool; and

moving the visible portion of the page of information on the display includes moving the page of information on the display a vertical distance equal to a change in the vertical coordinates multiplied by a vertical multiplier having a value other than one.

59. The method of claim 58 wherein:

tracking the coordinate information of the input tool includes tracking horizontal coordinates of the input tool; and

moving the visible portion of the page of information on the display includes moving the page of information on the display a horizontal distance equal to a change in the horizontal coordinates multiplied by a horizontal multiplier having a value other than one.

60. The method of claim 55 wherein:

tracking the coordinate information of the input tool includes tracking horizontal coordinates of the input tool; and

moving the visible portion of the page of information on the display includes moving the page of information on the display a horizontal distance equal to a change in the horizontal coordinates multiplied by a horizontal multiplier having a value other than one.

61. The method of claim 55 further comprising defining the multiplier in response to input from the user.

62. The method of claim 55 wherein the multiplier is less than one such that moving the visible portion of the page of information on the display includes moving the page of information a distance less than the change in the coordinate information of the input tool.

63. The method of claim 55 wherein the multiplier is greater than one such that moving the visible portion of the page of information on the display includes

moving the page of information a distance greater than the change in the coordinate information of the input tool.

64. The method of claim 55 wherein:

the coordinate information includes pixel coordinates on the display;

tracking includes tracking pixel coordinates of the position of the input tool on the display; and

moving includes moving the page of information a distance equal to a change in the pixel coordinates of the input tool multiplied by the multiplier.

65. The method of claim 55 wherein moving includes moving the page of information a distance equal to a change in the coordinate information of the input tool multiplied by a factor based on the acceleration of the input tool.

66. The method of claim 55 wherein moving includes moving the page of information a distance equal to a change in the coordinate information of the input tool multiplied by a factor based on the velocity of the input tool.

67. A system for navigating on a display, the system comprising:

a display surface having a touch screen;

a stylus detectable by contact with the touchscreen; and

a processor operable to:

track coordinate information of the stylus on the display; and

move a visible portion of a page of information on the display a distance equal to a change in the coordinate information of the stylus multiplied by a multiplier.

68. The system of claim 67 wherein the system further comprises a personal digital assistant including the processor and the display.

69. The system of claim 67 wherein the system further comprises a web phone having the display.

70. The system of claim 67 wherein the system further comprises a hand held computer including the processor and the display.

71. The system of claim 67 wherein the system further comprises a monitor including the processor and the display.

72. The system of claim 67 wherein the system further comprises an e-book including the processor and the display.

73. The system of claim 67 further comprising a database storage unit coupled to the processor, the database storage unit being operable to store the coordinate information.

74. A method of positioning a reference marker on a display with an input tool, the method comprising:

positioning an input tool on a display;

determining a first coordinate position from the position of the input tool on the display;

moving the reference marker to the first coordinate position;

tracking movement of the pointer device to a second coordinate position on the display; and

moving the reference marker on the display in a direction defining a vector pointing from the first coordinate position to the second coordinate position and a distance equal to the difference between the second coordinate position and the first coordinate position multiplied by a multiplier.

75. A method of navigating on a display, the method comprising:

providing a navigation control operable to change a viewable portion of a page of information on a display from a first view to a second view; and

in response to operation of the navigation control, animating the display to create an appearance of motion as the viewable portion of the page of information changes from the first view to the second view in response to operation of the navigation control.

76. The method of claim 75 wherein the navigation control includes a screen icon and operation of the navigation control includes actuation of the screen icon to change the display from the first view to the second view.

77. The method of claim 76 wherein:

the screen icon includes a first screen icon corresponding to the first view and a second screen icon corresponding to the second view; and

actuation of the first screen icon positions the viewable portion of the page of information at the first view and actuation of the second screen icon positions the viewable portion of the page of information at the second view.

78. The method of claim 77 wherein the first view includes a first discrete area of the page of information and the second view includes a second discrete area of the page of information such that actuation of the first screen icon positions the viewable portion of the page of information to view the first discrete area and actuation of the second screen icon positions the viewable portion of the page of information to view the second discrete area.

79. The method of claim 76 wherein:

the page of information includes more than one column of information;

the screen icon includes a column icon corresponding to each column of information; and

actuating a column icon positions the corresponding column of information on the display.

80. The method of claim 75 wherein animating the display includes shifting the viewable portion of the page of information on the display in a horizontal direction.

81. The method of claim 80 further comprising reformatting the page of information into more than one logical column with each logical column having a corresponding screen icon such that operation of the navigation control includes actuating the screen icon to view the corresponding logical column.

82. The method of claim 75 wherein operation of the navigation control includes clicking a mouse.

83. The method of claim 75 wherein operation of the navigation control includes touching a stylus to a touchscreen.

84. The method of claim 75 wherein animating the display includes slowly scrolling the display to give the display an appearance of slow motion.

85. The method of claim 75 wherein animating the display includes illustrating a visible portion of the page of information moving continuously on the display from the first view to the second view.

86. The method of claim 75 wherein animating the display includes drawing a line from the first view to the second view.

87. The method of claim 75 further comprising opening a window on the display that shows a reference marker moving from the first view to the second view.

88. The method of claim 75 further comprising operating the navigation control in response to enunciation of a voice command.

89. The method of claim 75 wherein the page of information includes a Web page coded in HTML such that operating the navigation control changes the viewable portion of the Web page on the display from the first view to the second view.

90. The method of claim 75 wherein animating the display includes gradually shifting content on the page of information from the first view to the second view.

91. The method of claim 75 further comprising providing a user defined control such that animating the display further includes controlling the animation with the user defined control.

92. The method of claim 91 wherein controlling animation with the user-defined control includes selecting a time interval to change the viewable portion of the page of information from the first view to the second view.

93. The method of claim 91 wherein controlling animation with the user-defined control includes selecting a velocity to change the viewable portion of the page of information from the first view to the second view.

94. The method of claim 93 wherein selecting the velocity includes selecting a constant velocity during the change in the viewable portion of the page from the first view to the second view.

95. The method of claim 93 wherein selecting the velocity includes selecting a variable velocity during the change in the viewable portion of the page from the first view to the second view.

96. The method of claim 91 wherein controlling animation with the user-defined control includes selecting an acceleration to change the viewable portion of the page of information from the first view to the second view.

97. The method of claim 96 wherein selecting the acceleration includes selecting a constant acceleration during the change in the viewable portion of the page from the first view to the second view.

98. The method of claim 96 wherein selecting the acceleration includes selecting a variable acceleration during the change in the viewable portion of the page from the first view to the second view.

99. A system for navigating on a display, the system comprising:

a display surface;

a navigation control on the display; and

a processor operable to:

change the viewable portion of a page of information on the display from a first view to a second view when the navigation control is operated; and

animate the display to create an appearance of motion as the page of information changes from the first view to the second view.

100. The system of claim 99 wherein:

the navigation control includes a screen icon; and

the processor is operable to change the viewable portion of the display by actuating the screen icon.

101. The system of claim 100 wherein:

the screen icon includes a first screen icon corresponding to the first view and a second screen icon corresponding to the second view; and

the processor is operable to position the visible portion of the page of information on the display at the first view when the first screen icon is actuated and at the second view when the second screen icon is actuated.

102. The system of claim 99 wherein:

the page of information includes more than one column of information, and

the screen icon includes a column icon corresponding to each column of information; and

the processor is operable to position the column of information on the display when the corresponding column icon is actuated.

103. The system of claim 99 wherein the processor is operable to move the visible portion of the page of information in a horizontal direction on the display to change from the first view to the second view when the navigation control is operated.

104. The system of claim 99 wherein the processor is operable to:

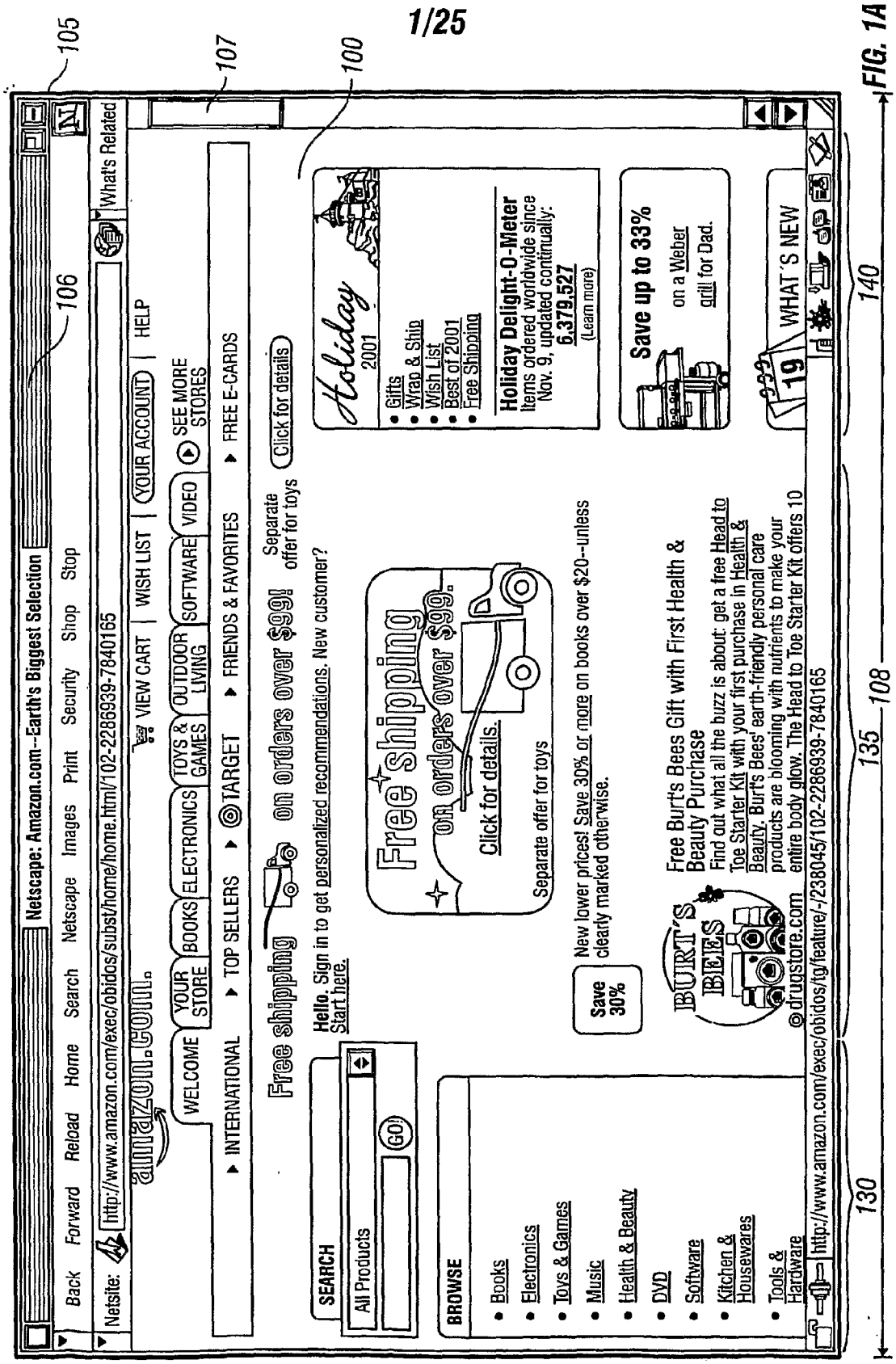
reformat the page of information into more than one logical column each having a corresponding screen icon, the logical column having a width not exceeding a width of the display; and

position the logical column for viewing on the display when the screen icon corresponding to the logical column is actuated.

105. The system of claim 99 wherein the processor is operable to animate the display by illustrating the visible portion of the page of information moving continuously on the display from the first view to the second view

106. The system of claim 99 wherein the system further includes a personal digital assistant including the processor and the display.

107. The system of claim 99 wherein the system further includes a hand-held computer including the processor and the display.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WHAT'S NEW
130
135
108
140

FIG. 1A

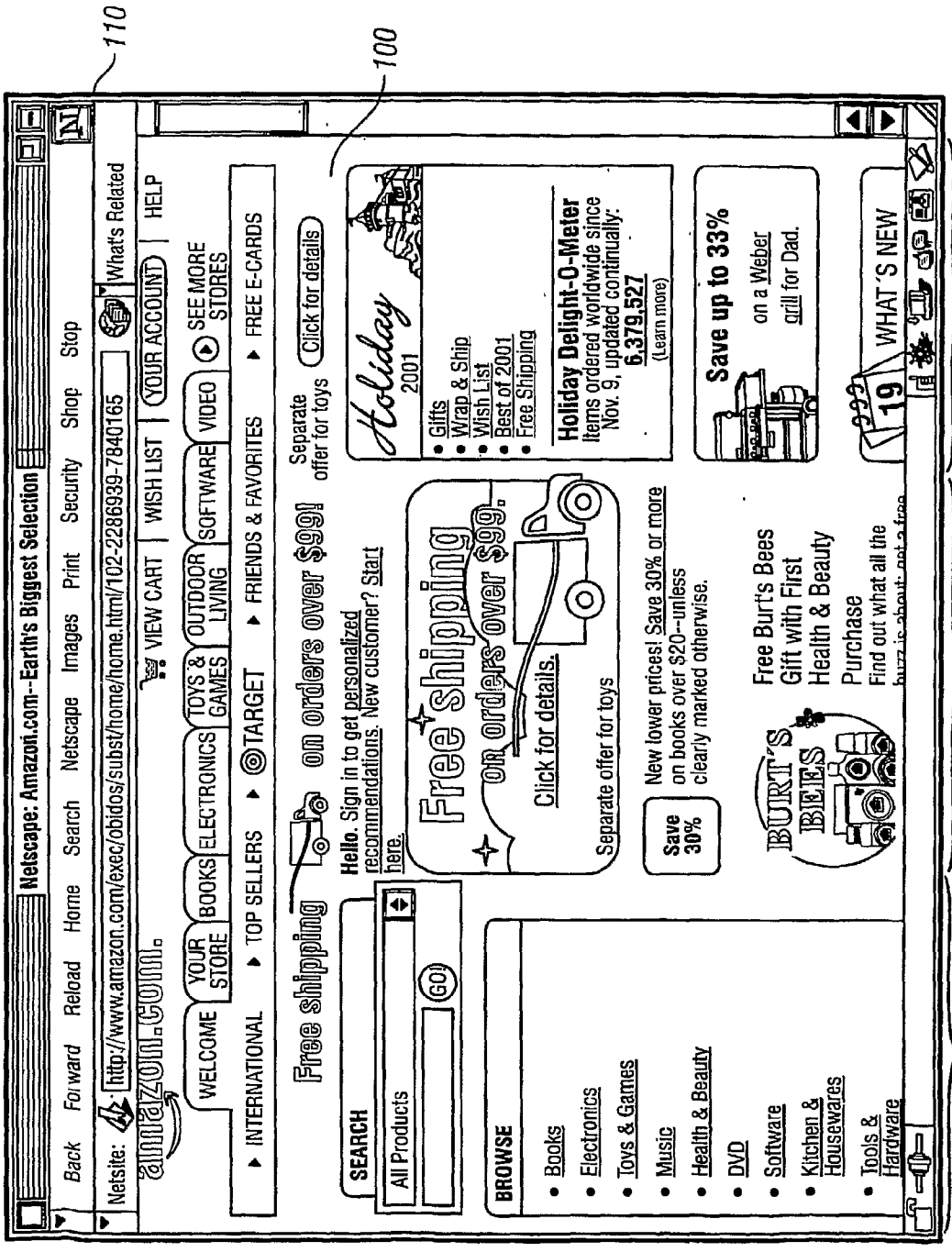
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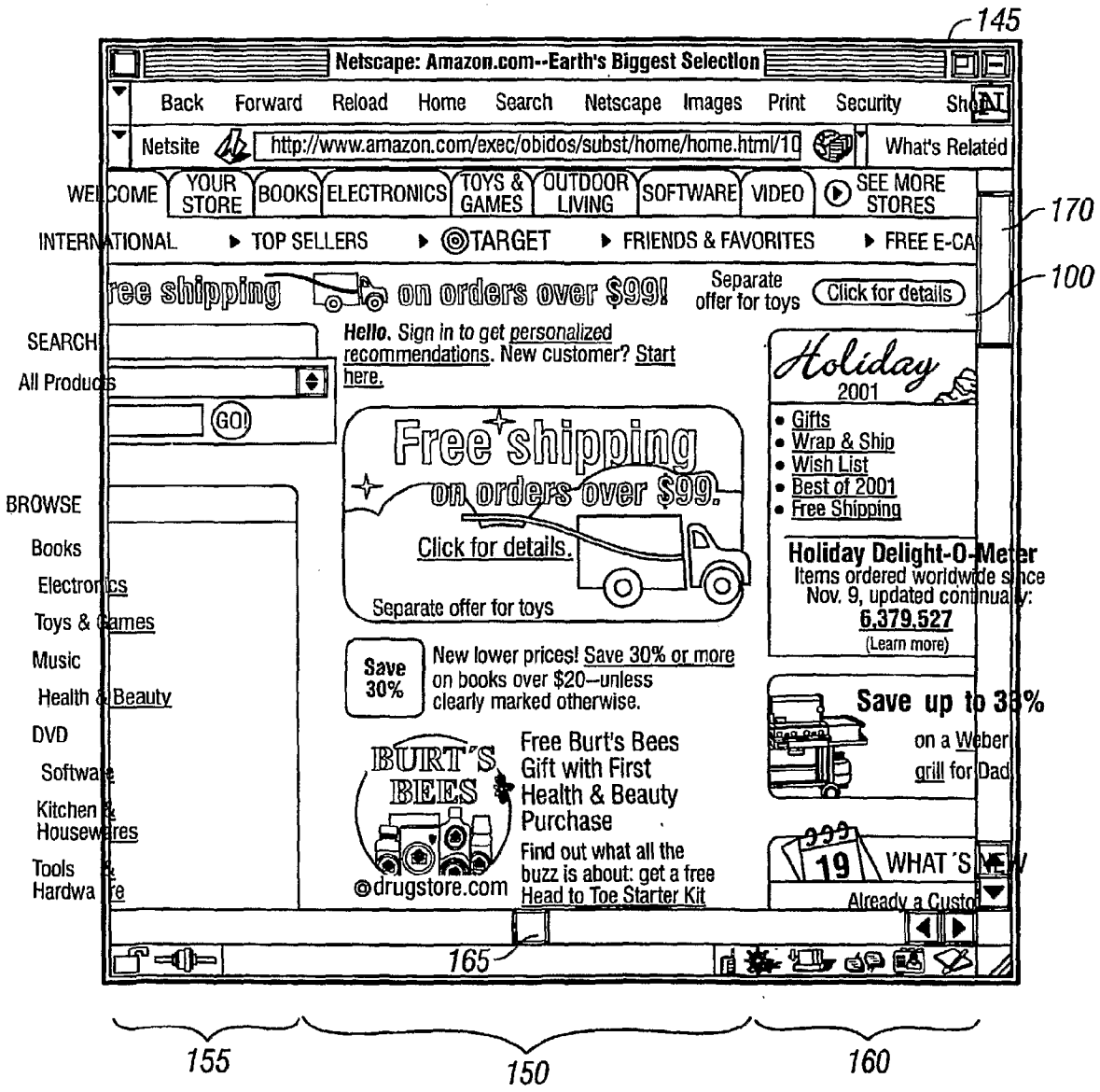
FIG. 1B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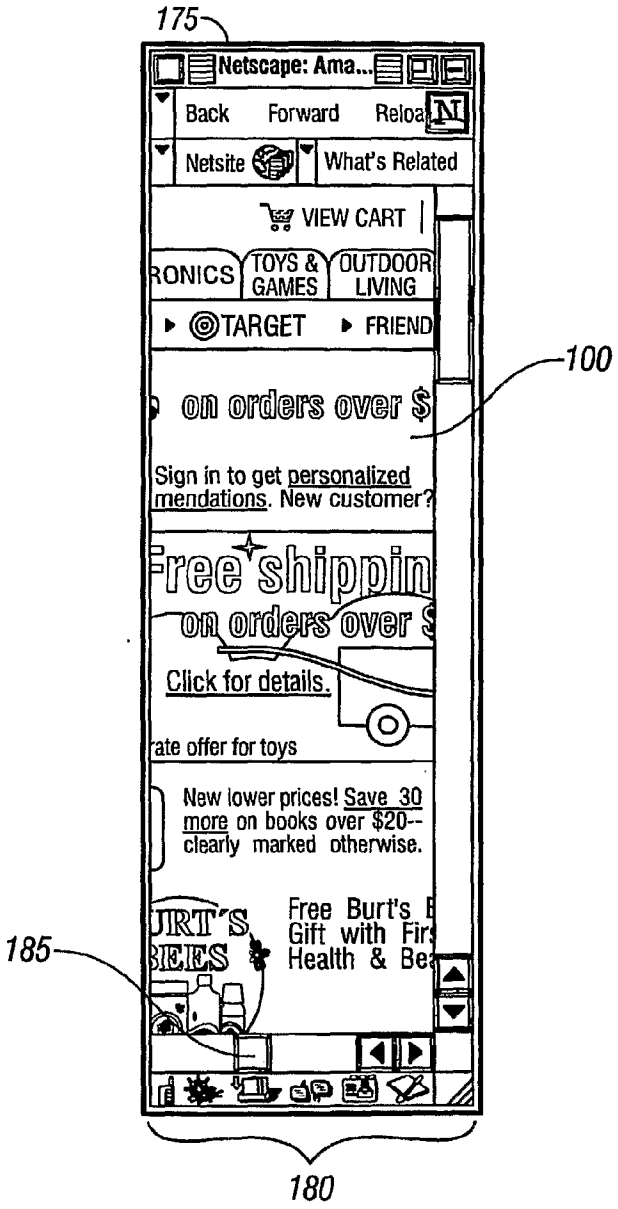
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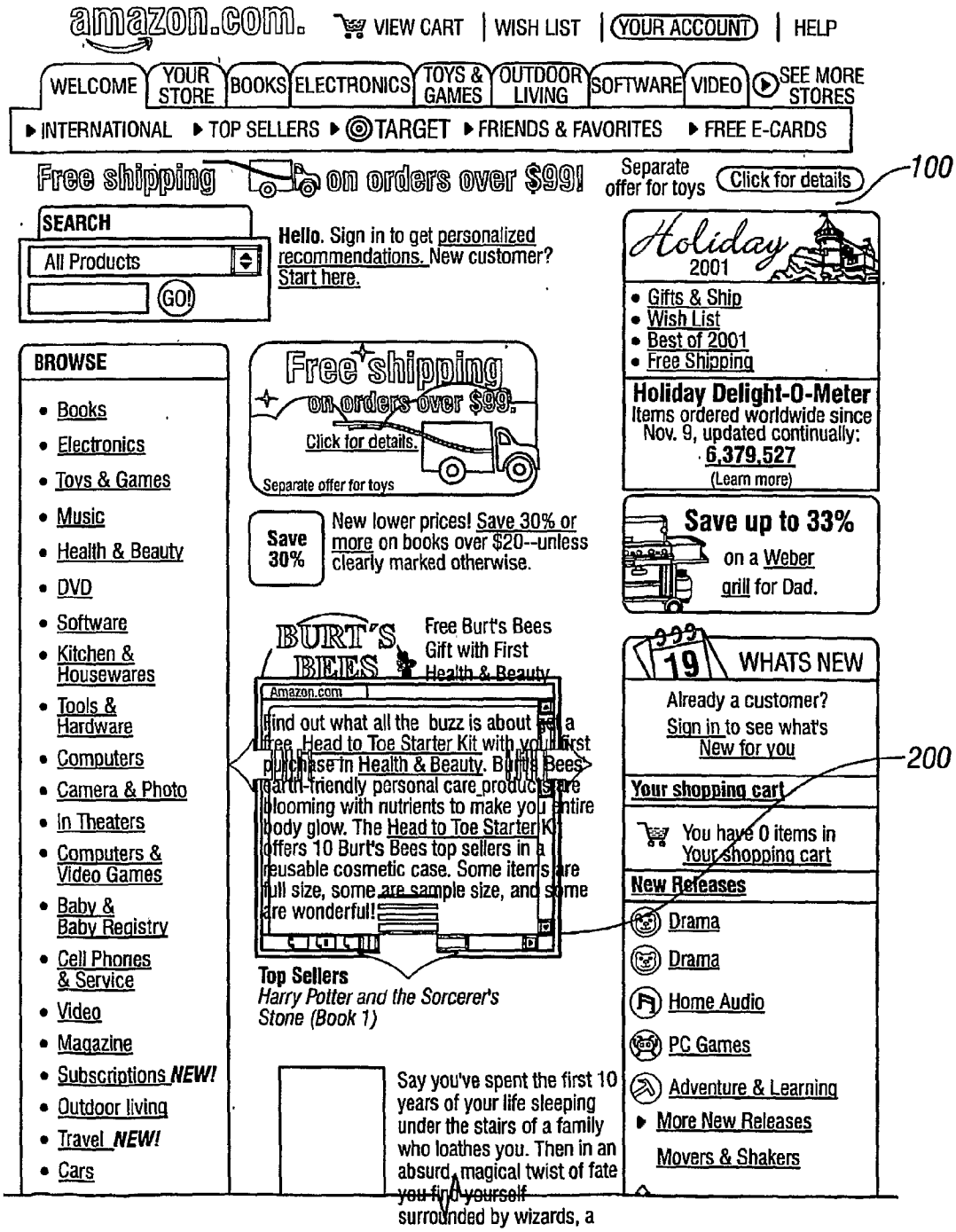
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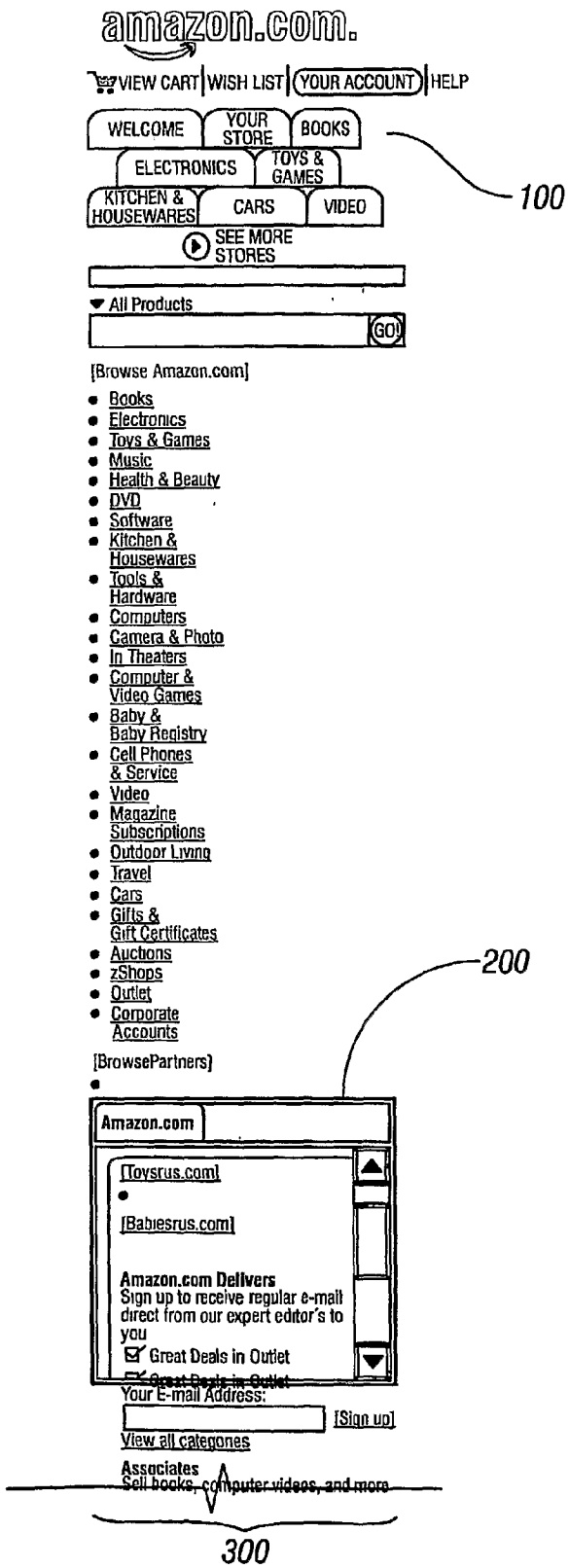
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FIG. 3

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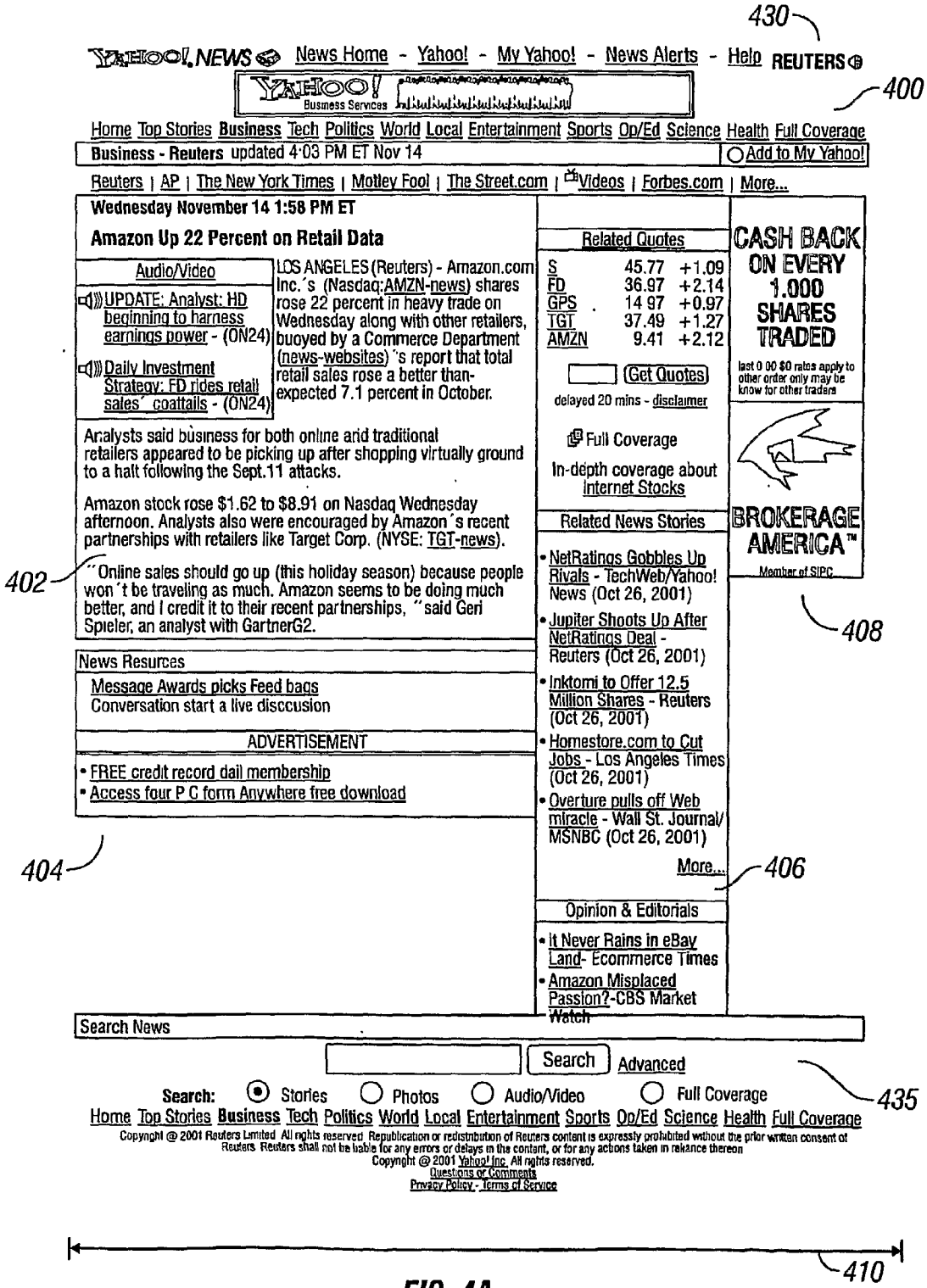
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UPDATE: Analyst: HD beginning to harness earnings power - (ON24)
Daily Investment Strategy: FD rides retail sales' coattails - (ON24)
LOS ANGELES (Reuters) - Amazon.com Inc.'s (Nasdaq:AMZN-news) shares rose 22 percent in heavy trade on Wednesday along with other retailers, buoyed by a Commerce Department (news-websites)'s report that total retail sales rose a better than-expected 7.1 percent in October.
Analysts said business for both online and traditional retailers appeared to be picking up after shopping virtually ground to a halt following the Sept.11 attacks.
Amazon stock rose $1.62 to $8.91 on Nasdaq Wednesday afternoon. Analysts also were encouraged by Amazon's recent partnerships with retailers like Target Corp. (NYSE: TGT-news).
"Online sales should go up (this holiday season) because people won't be traveling as much. Amazon seems to be doing much better, and I credit it to their recent partnerships," said Geri Spieler, an analyst with GartnerG2.
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FIG. 4A

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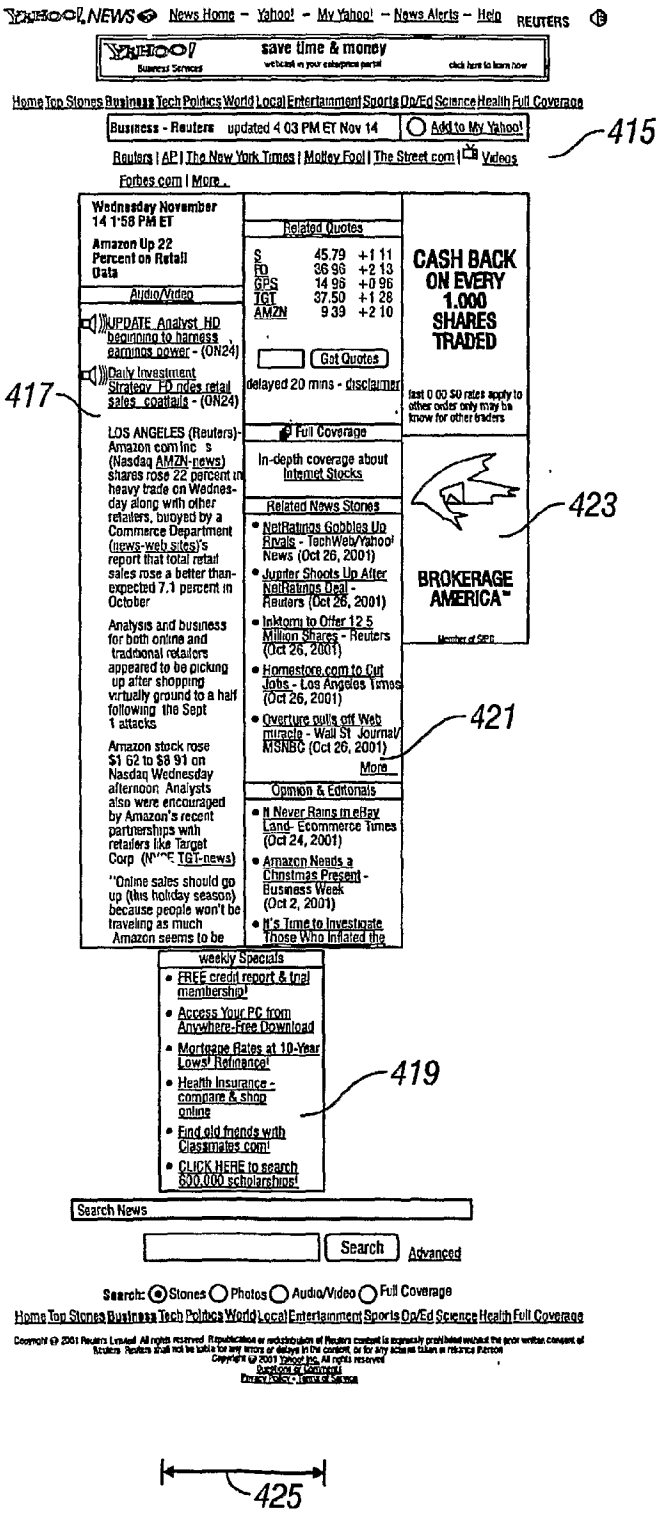
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Homestore.com to Cut Jobs - Los Angeles Times (Oct 26, 2001)
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Amazon Needs a Christmas Present - Business Week (Oct 2, 2001)
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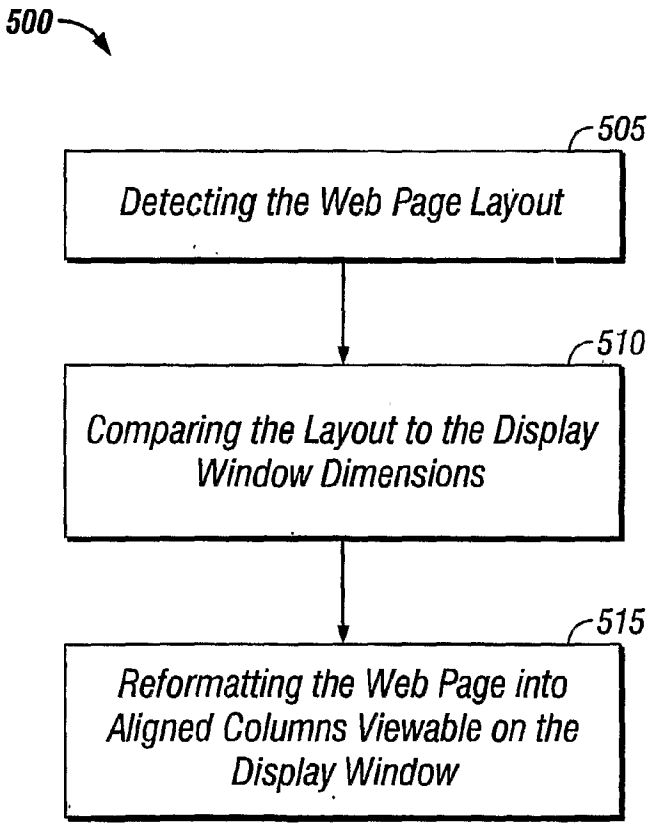
FIG. 4B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505
Detecting the Web Page Layout
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Comparing the Layout to the Display Window Dimensions
515
Reformatting the Web Page into Aligned Columns Viewable on the Display Window

FIG. 5

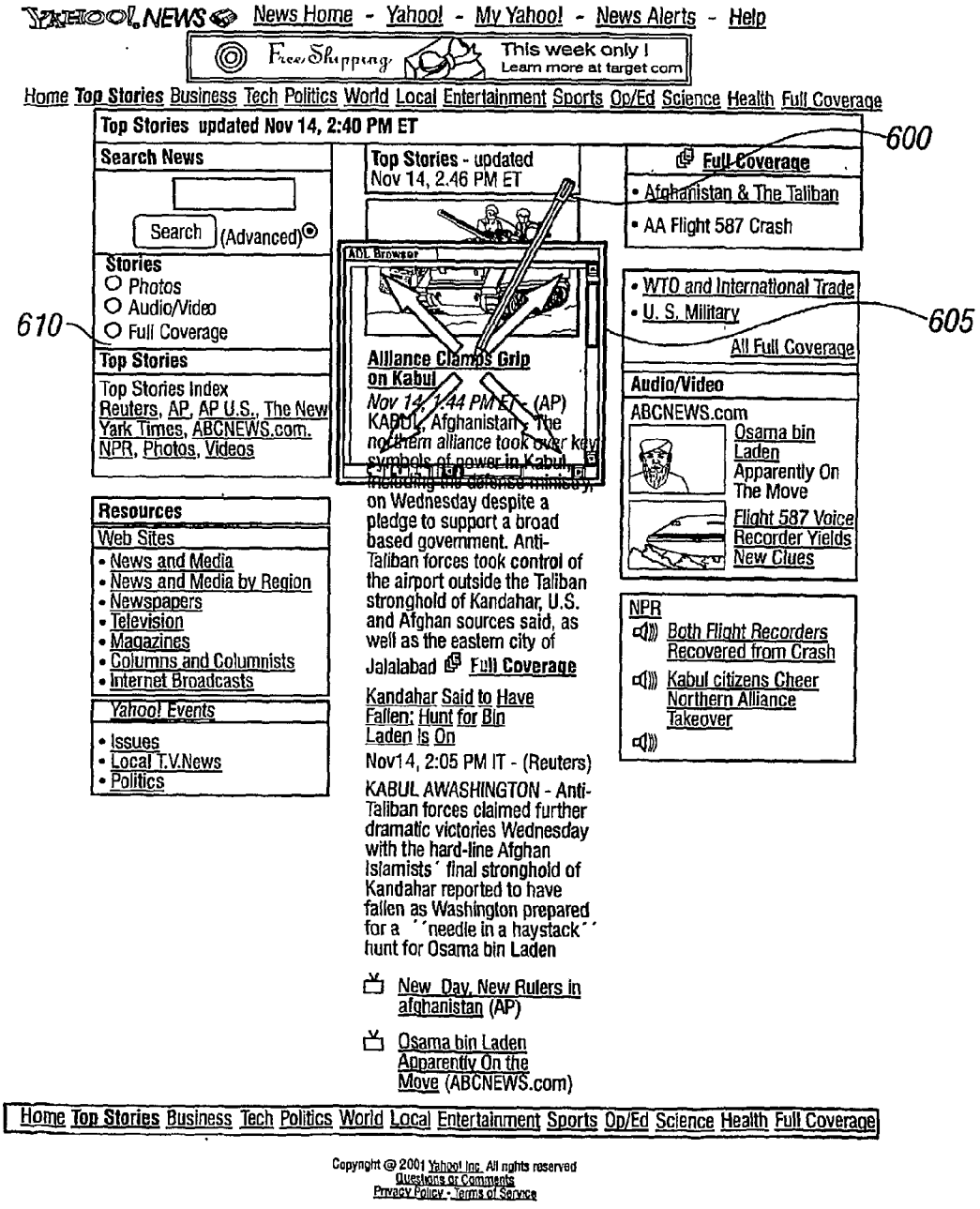
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FIG. 6

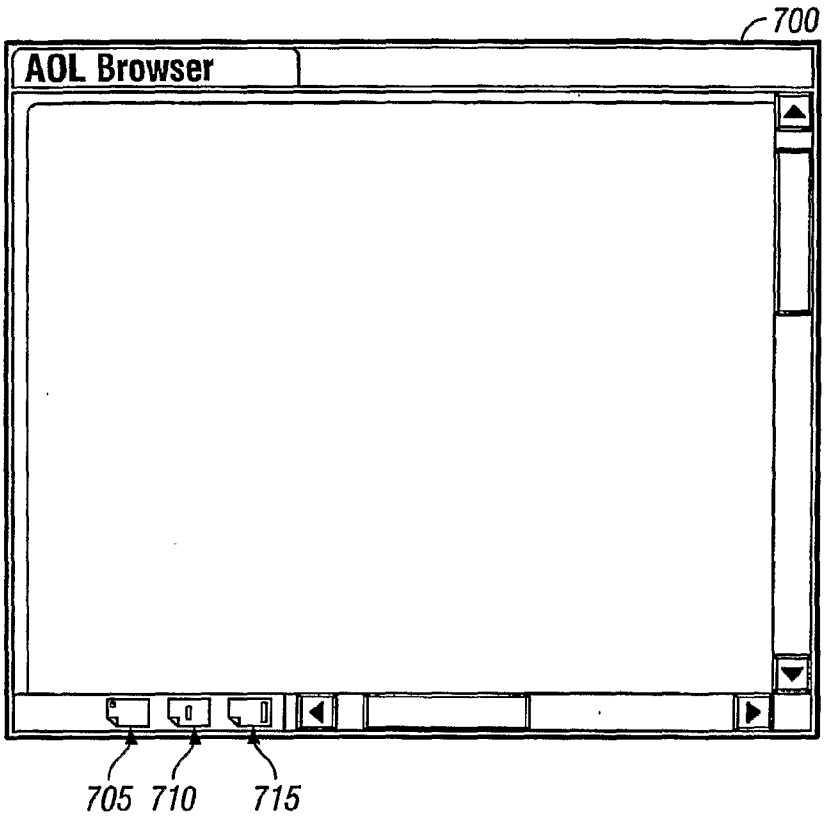

FIG. 7

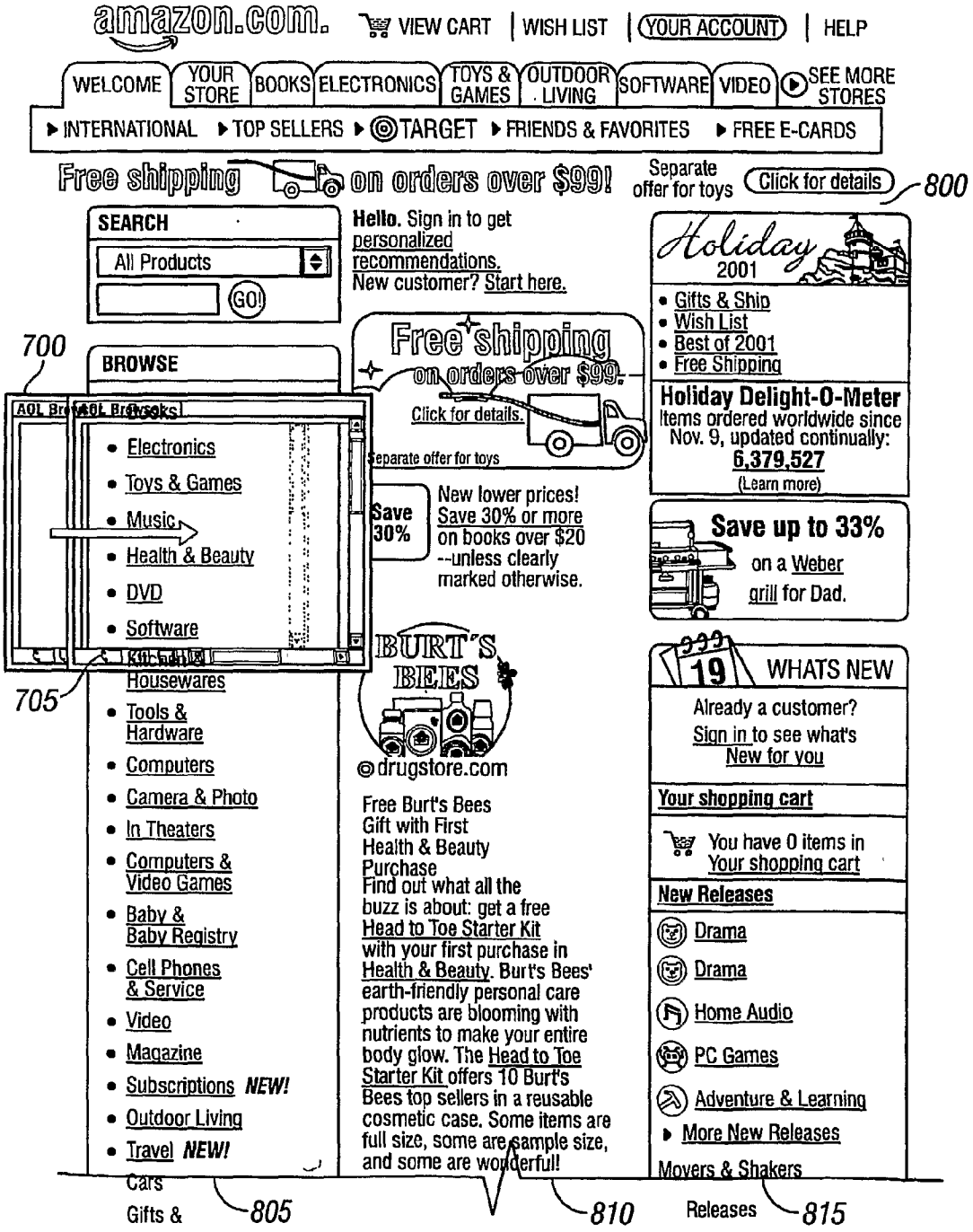
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FIG. 8A

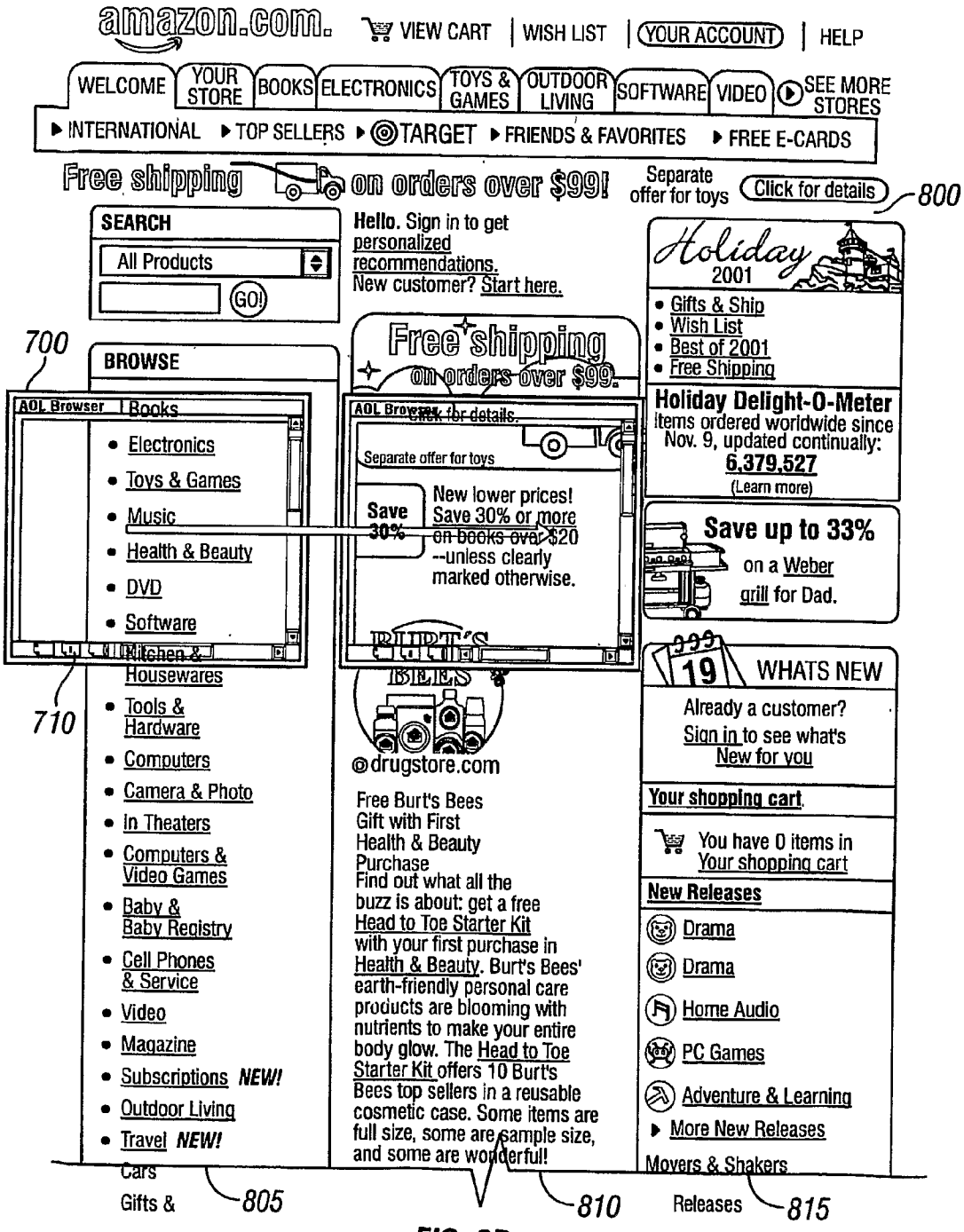
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FIG. 8B

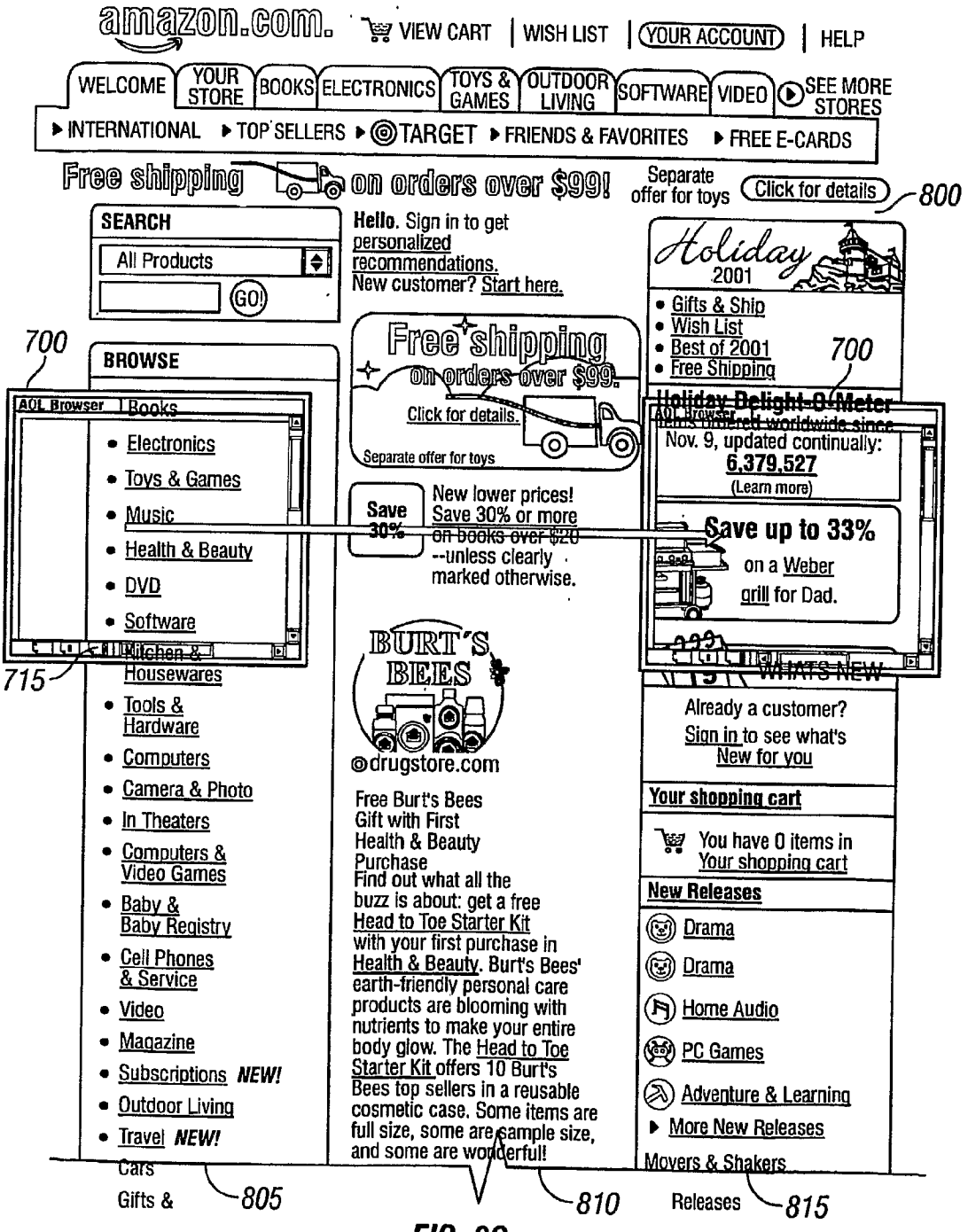
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FIG. 8C

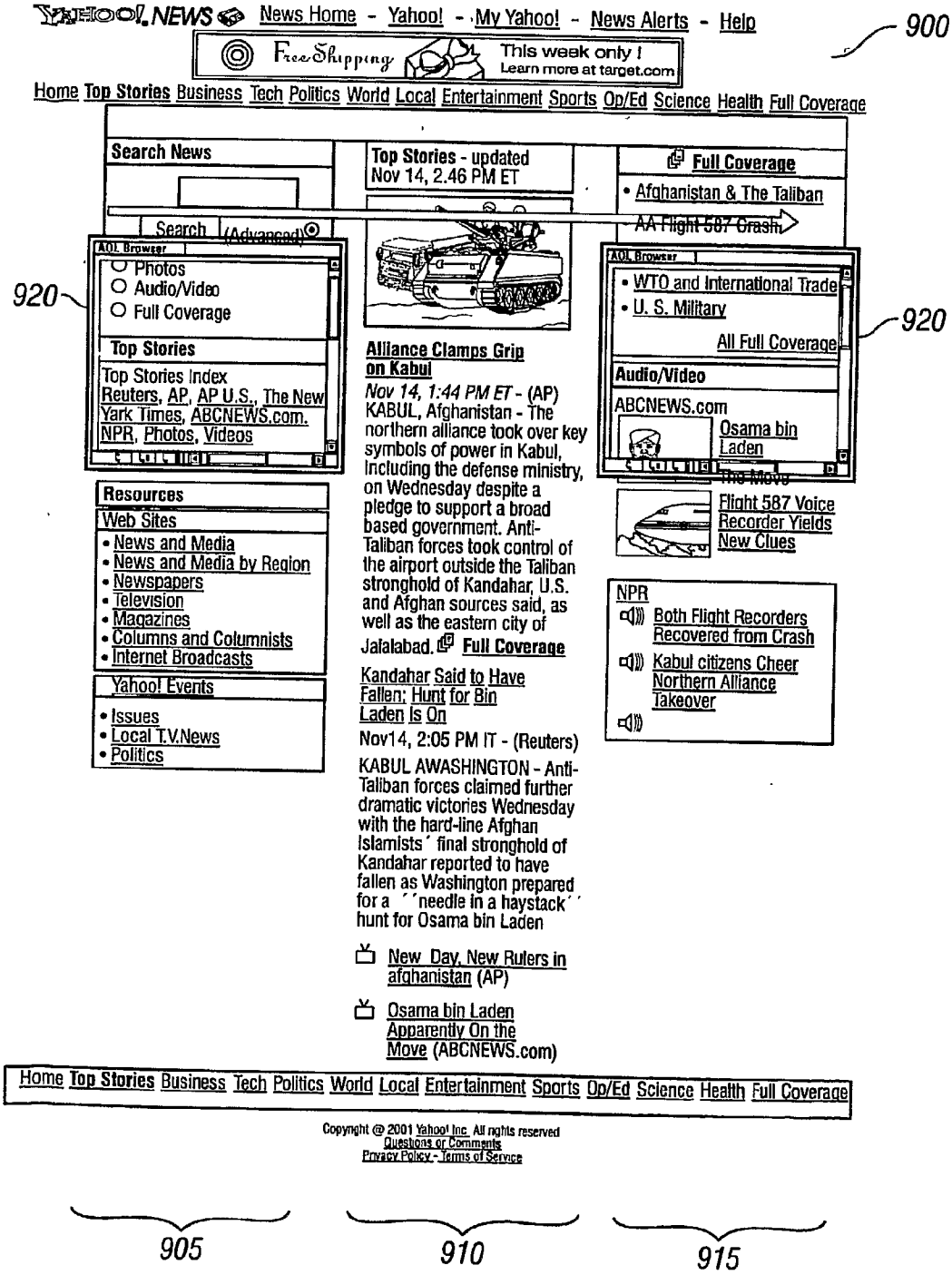
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FIG. 9

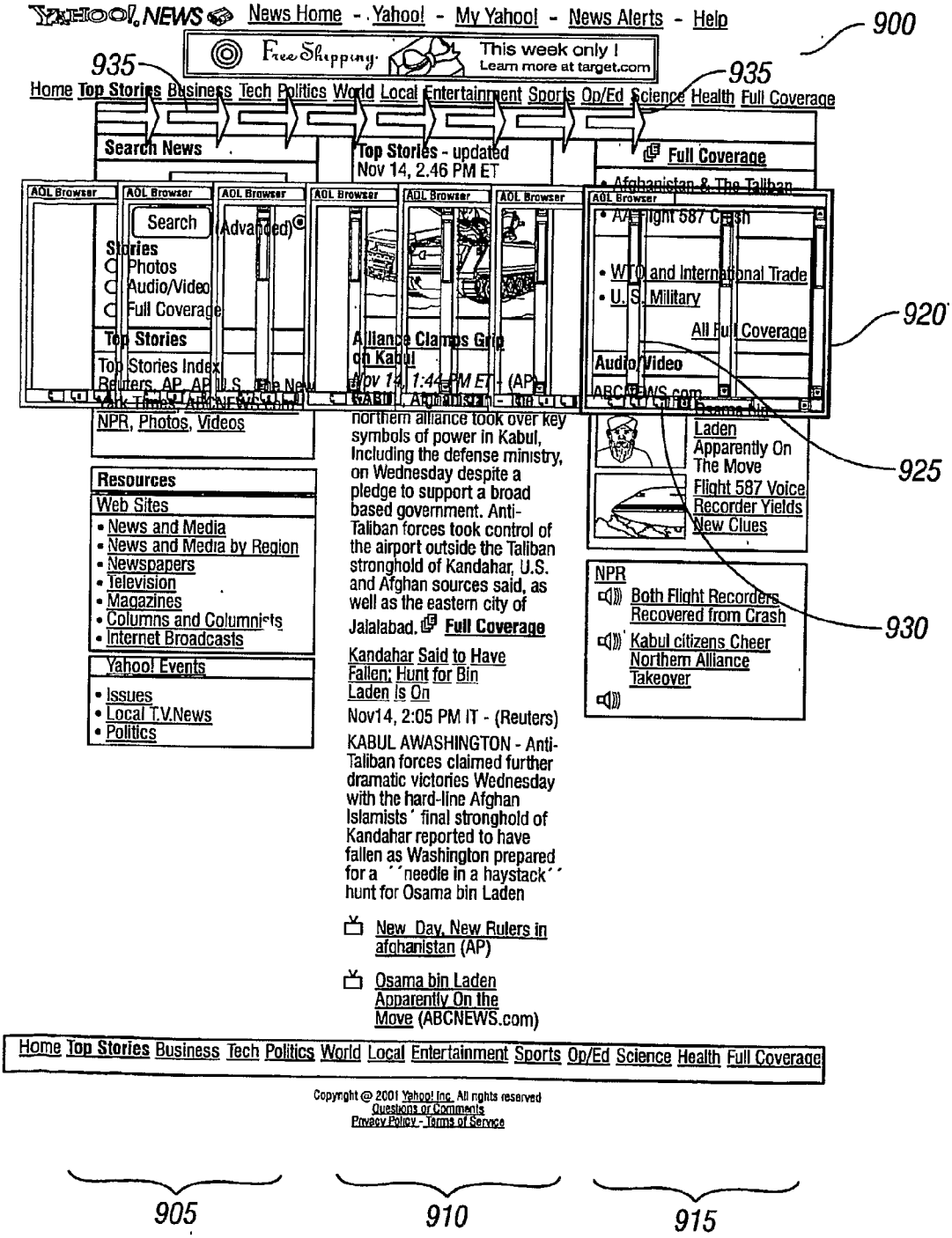
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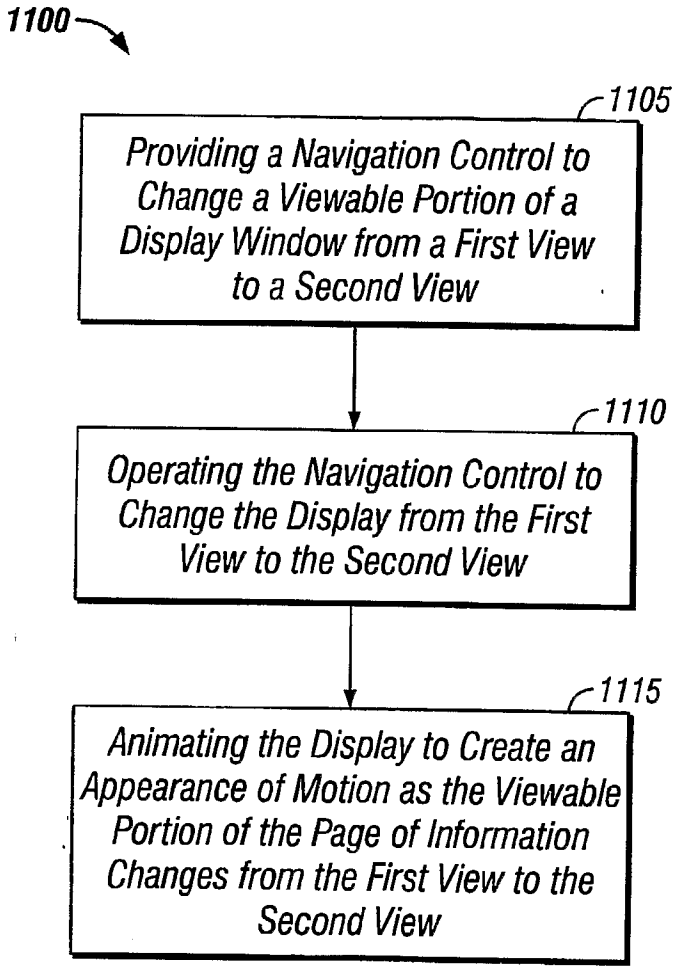
FIG. 10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Providing a Navigation Control to Change a Viewable Portion of a Display Window from a First View to a Second View
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Operating the Navigation Control to Change the Display from the First View to the Second View
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Animating the Display to Create an Appearance of Motion as the Viewable Portion of the Page of Information Changes from the First View to the Second View

FIG. 11

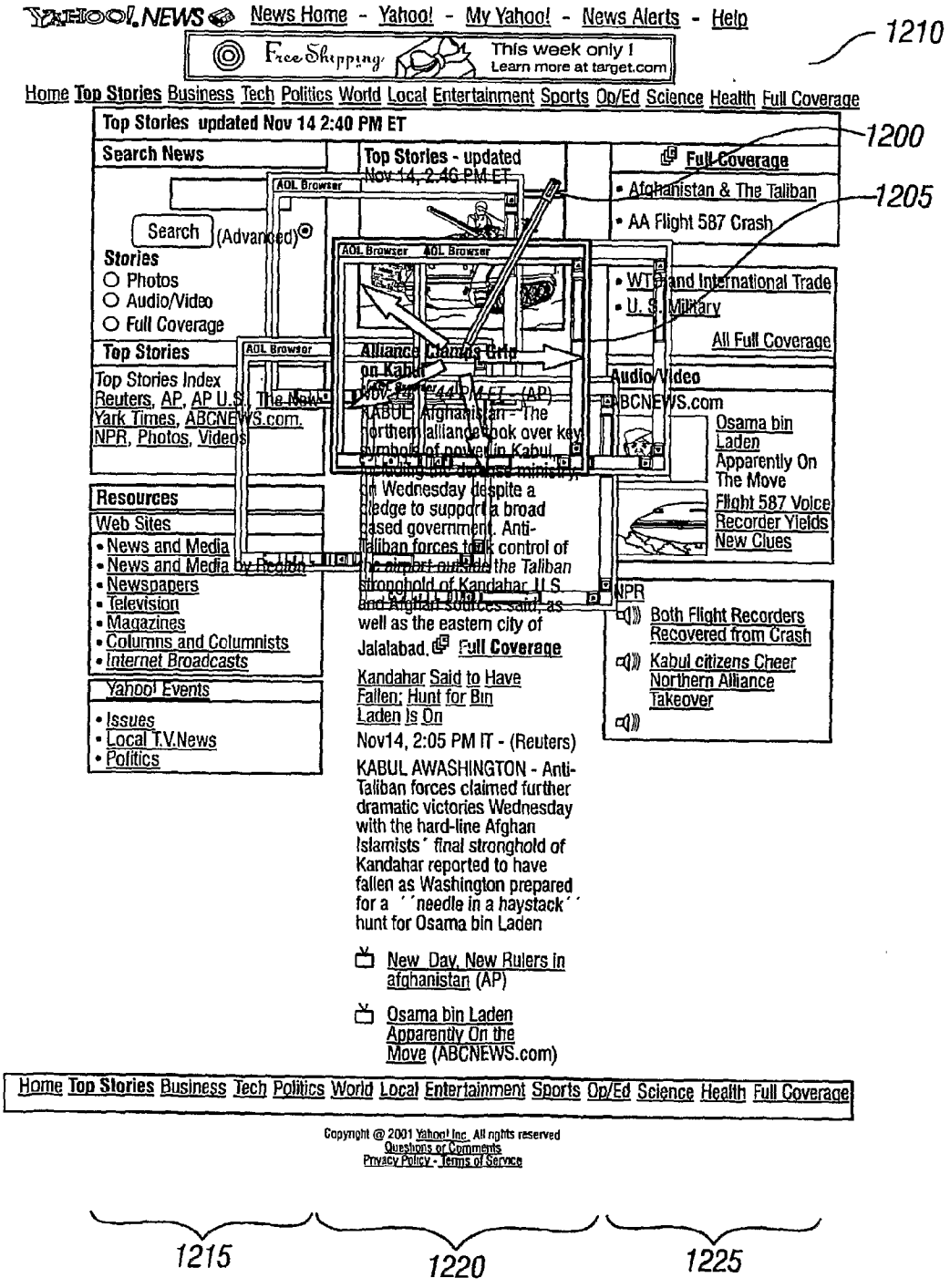
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FIG. 12

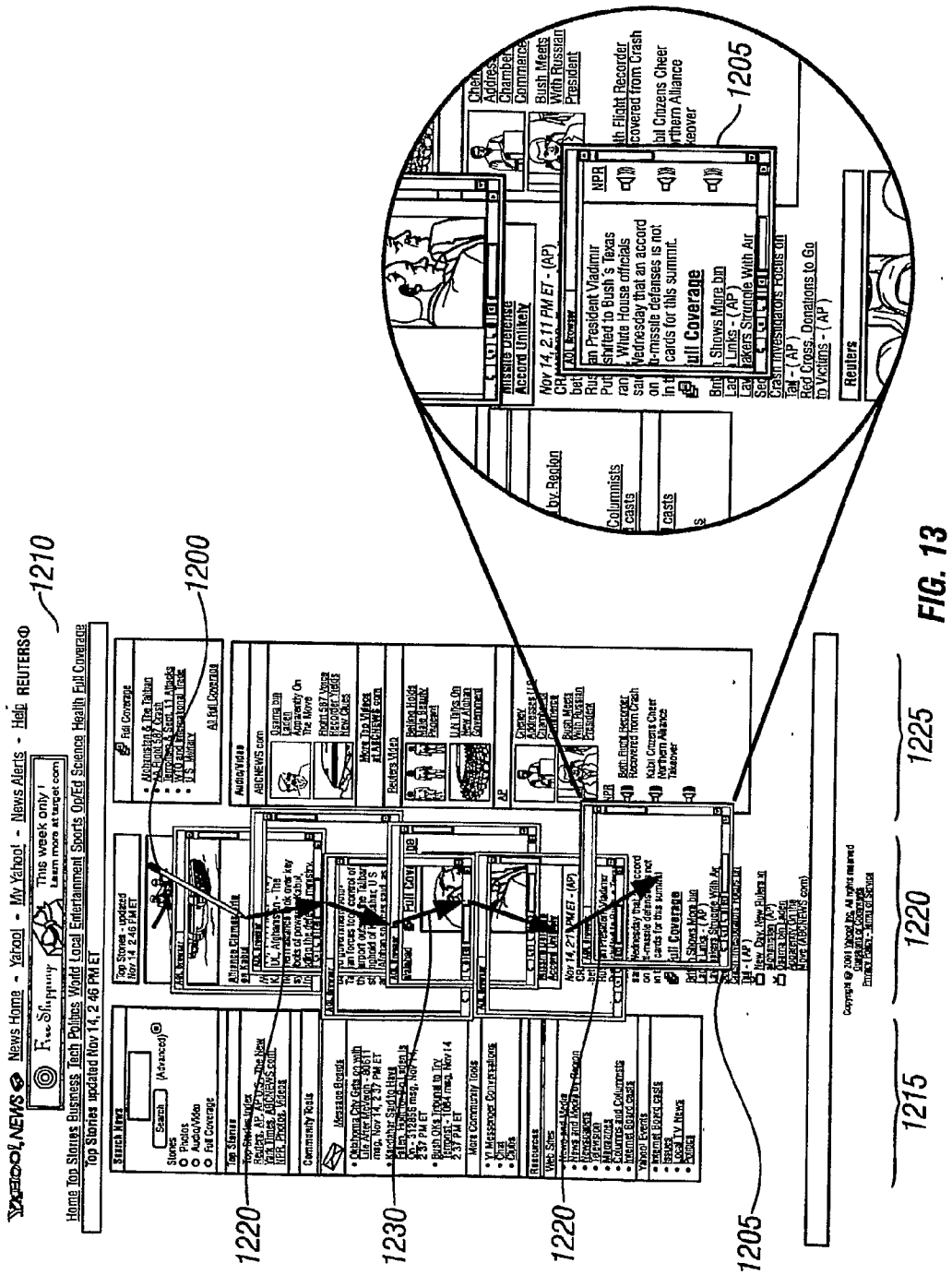
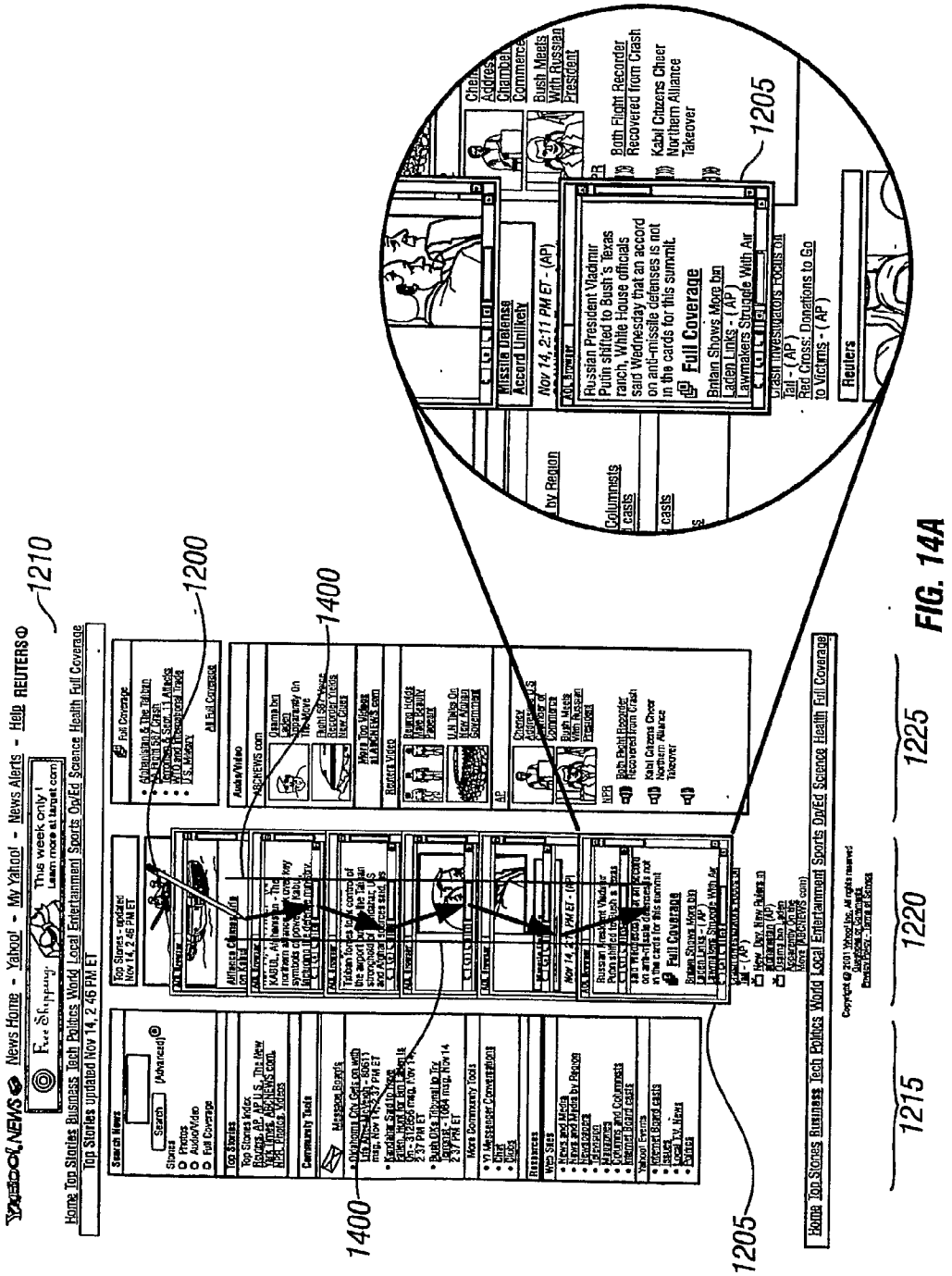


FIG. 13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Russian President Vladimir Putin shifted to Bush's Texas ranch, White House officials said Wednesday that an accord on anti-missile defenses is not in the cards for this summit.
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FIG. 14A

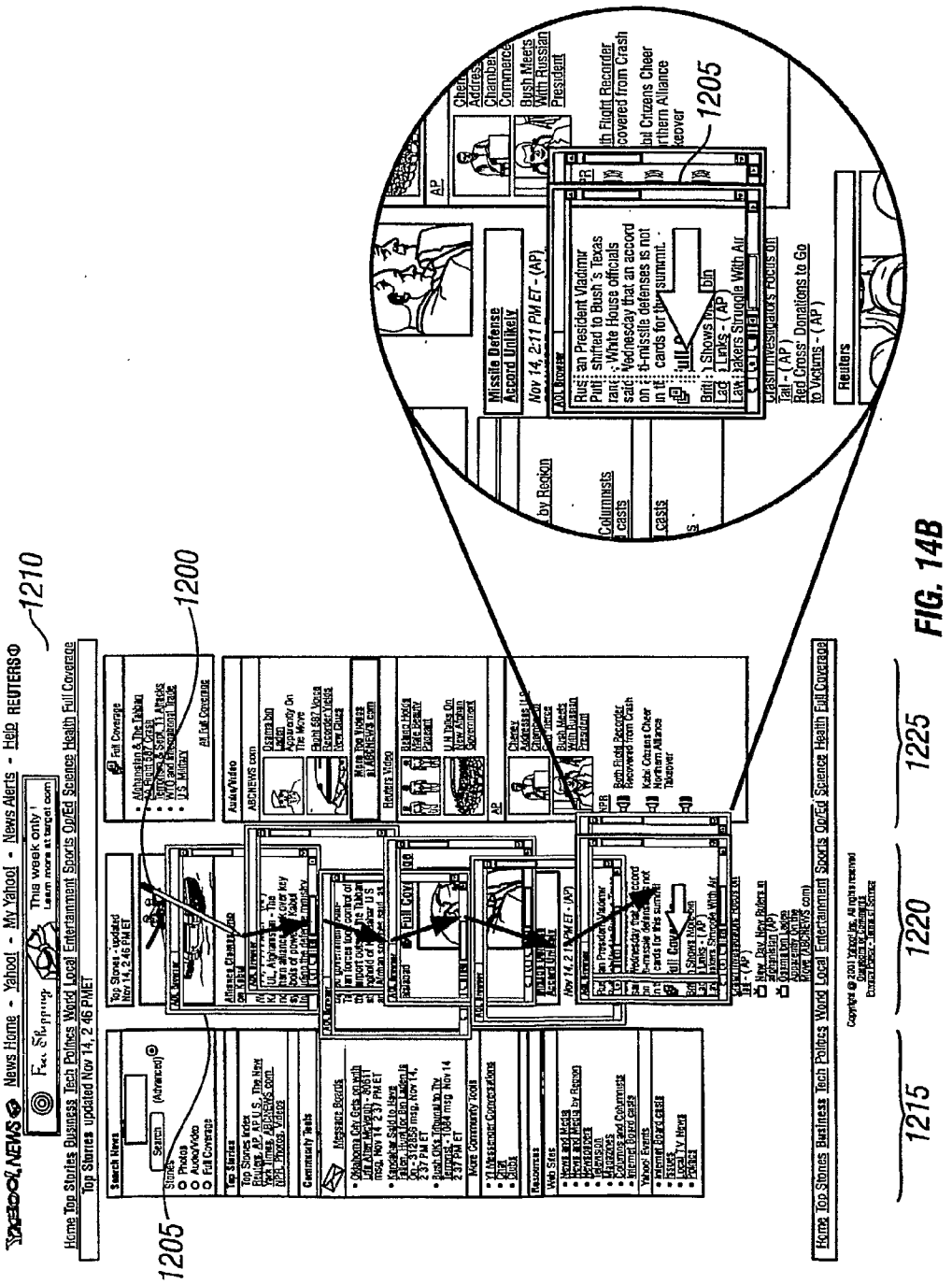
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FIG. 14B

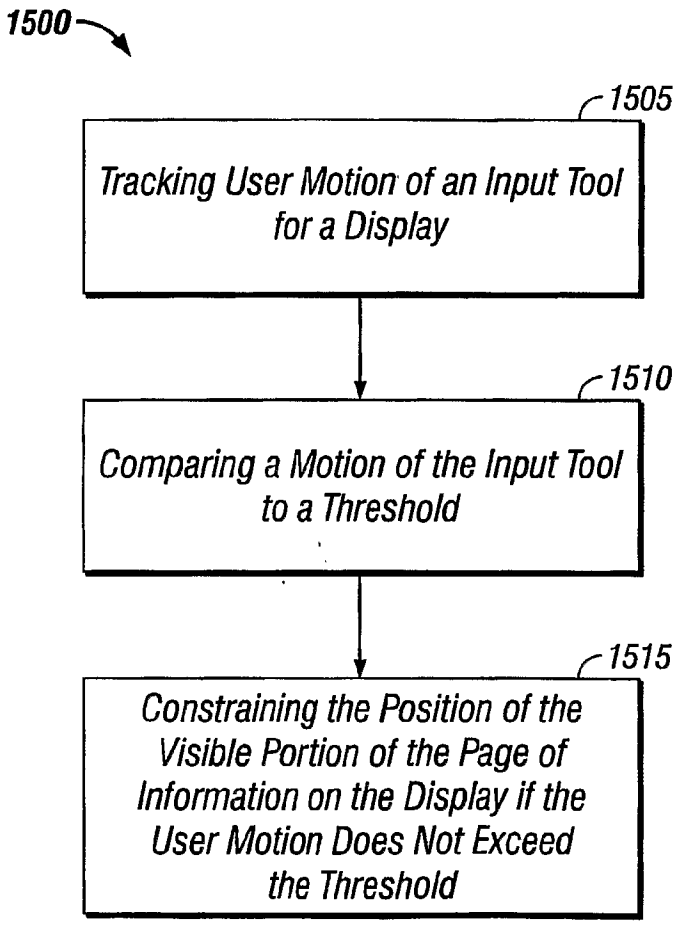
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FIG. 15

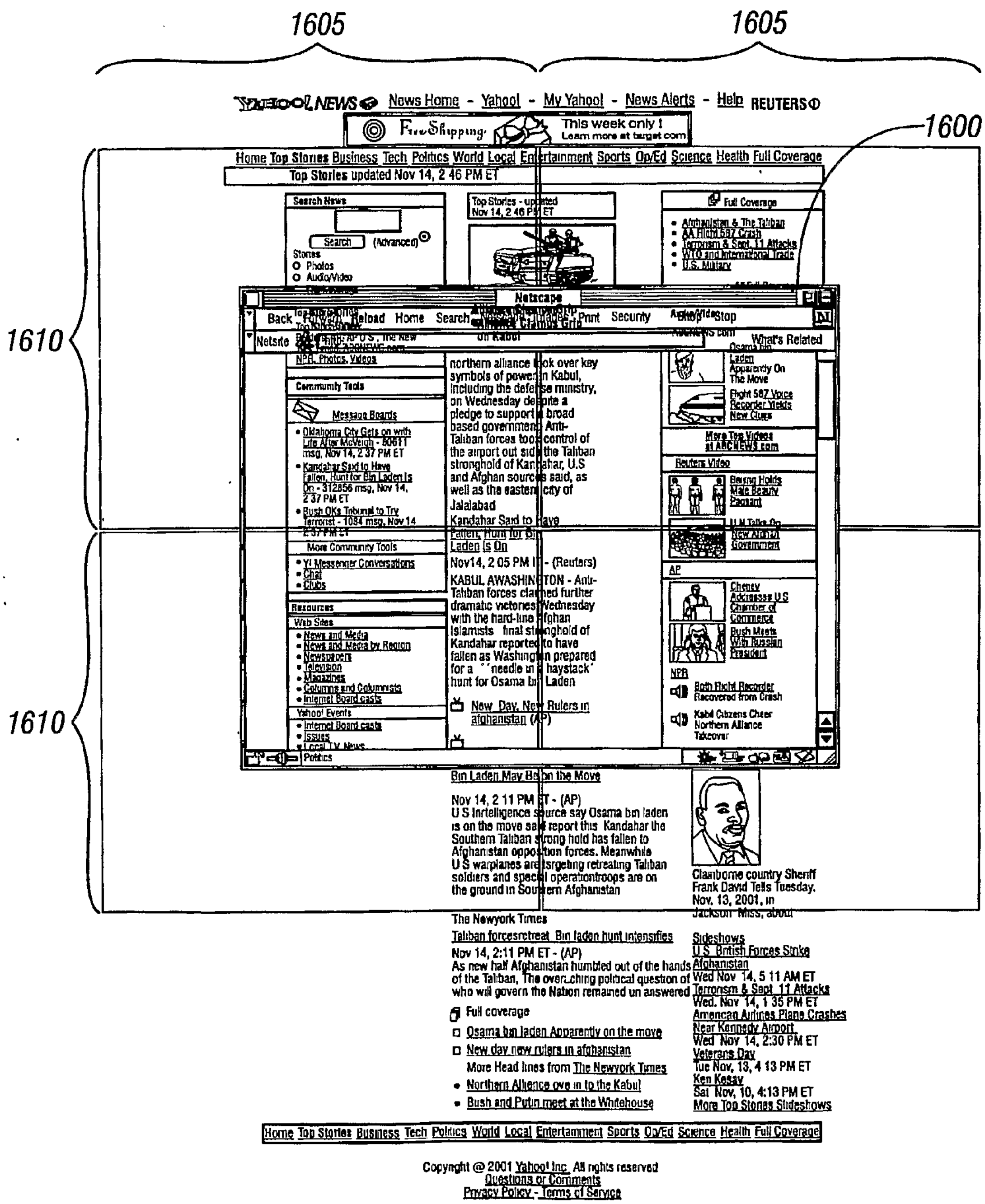
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FIG. 16

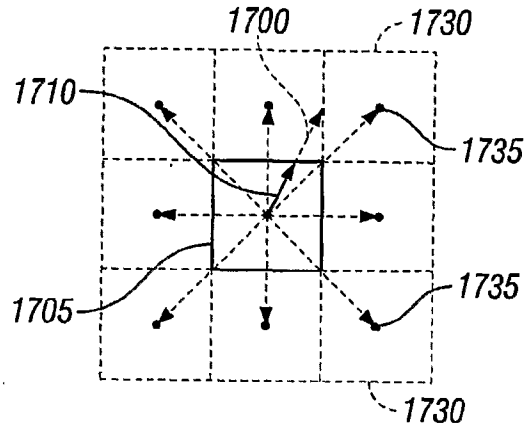

FIG. 17A

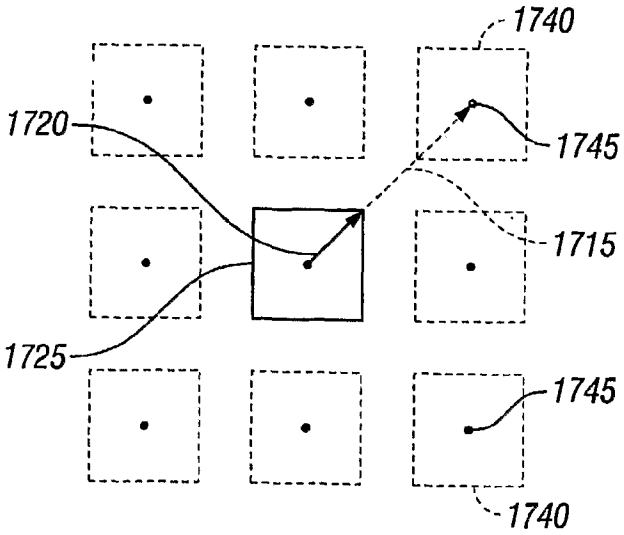

FIG. 17B

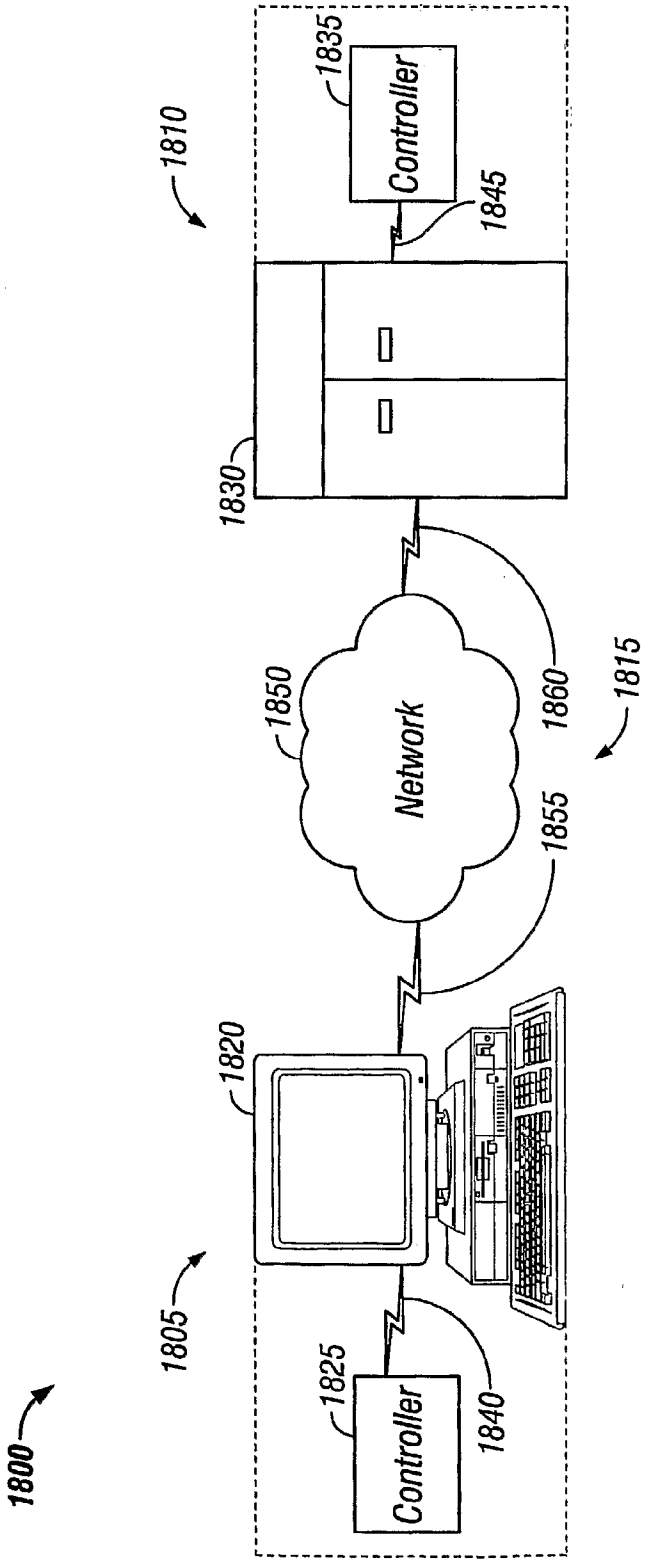
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FIG. 18

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US03/08400

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G06F 17/21
US CL : 715/513

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)
U.S. : 715/513, 503

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A,P	US 6,456,307 B1 (BATES et al) 24 September 2002 (24.09.2002) ✓	75-107
A	US 5,038,138 A (AKIYAMA et al) 06 August 1991 (06.08.1991) ✓	26-66
A	US 6,211,877 B1 (STEELE et al) 03 April 2001 (03.04.2001) ✓	1-107
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☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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Form PCT/ISA/210 (second sheet) (July 1998)

EXHIBIT 4

US007786975B2

(12) **United States Patent**
Ording et al.

(10) **Patent No.: US 7,786,975 B2**
(45) **Date of Patent: Aug. 31, 2010**

(54) **CONTINUOUS SCROLLING LIST WITH ACCELERATION**

(75) Inventors: **Bas Ording**, San Francisco, CA (US); **Scott Forstall**, Mountain View, CA (US); **Greg Christie**, San Jose, CA (US); **Stephen O. Lemay**, San Francisco, CA (US); **Imran Chaudhri**, San Francisco, CA (US)

(73) Assignee: **Apple Inc.**, Cupertino, CA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 807 days.

(21) Appl. No.: **11/322,551**

(22) Filed: **Dec. 23, 2005**

(65) **Prior Publication Data**

US 2007/0146337 A1 Jun. 28, 2007

(51) **Int. Cl.**
G09G 5/00 (2006.01)

(52) **U.S. Cl.** **345/156**; 715/702

(58) **Field of Classification Search** 345/156–179; 715/700

See application file for complete search history.

(56) **References Cited**

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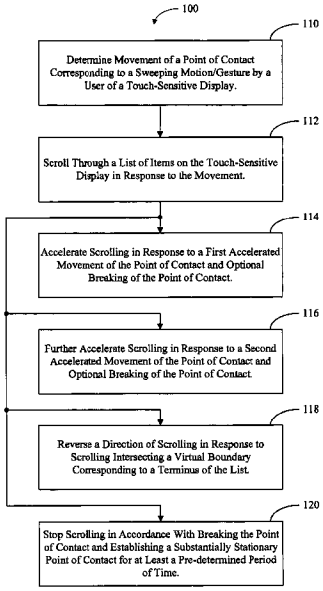
Primary Examiner—Alexander Eisen
Assistant Examiner—Kenneth B Lee, Jr.
(74) *Attorney, Agent, or Firm*—Morgan, Lewis & Bockius LLP

(57) **ABSTRACT**

Movement of a point of contact by a user of a touch-sensitive display is determined. In response to the movement, a list of items on the touch-sensitive display is scrolled through. The scroll through is accelerated in response to an accelerated movement of the point of contact. The scroll through and acceleration of the scroll through may be in accordance with a simulation of a physical device having friction.

16 Claims, 19 Drawing Sheets



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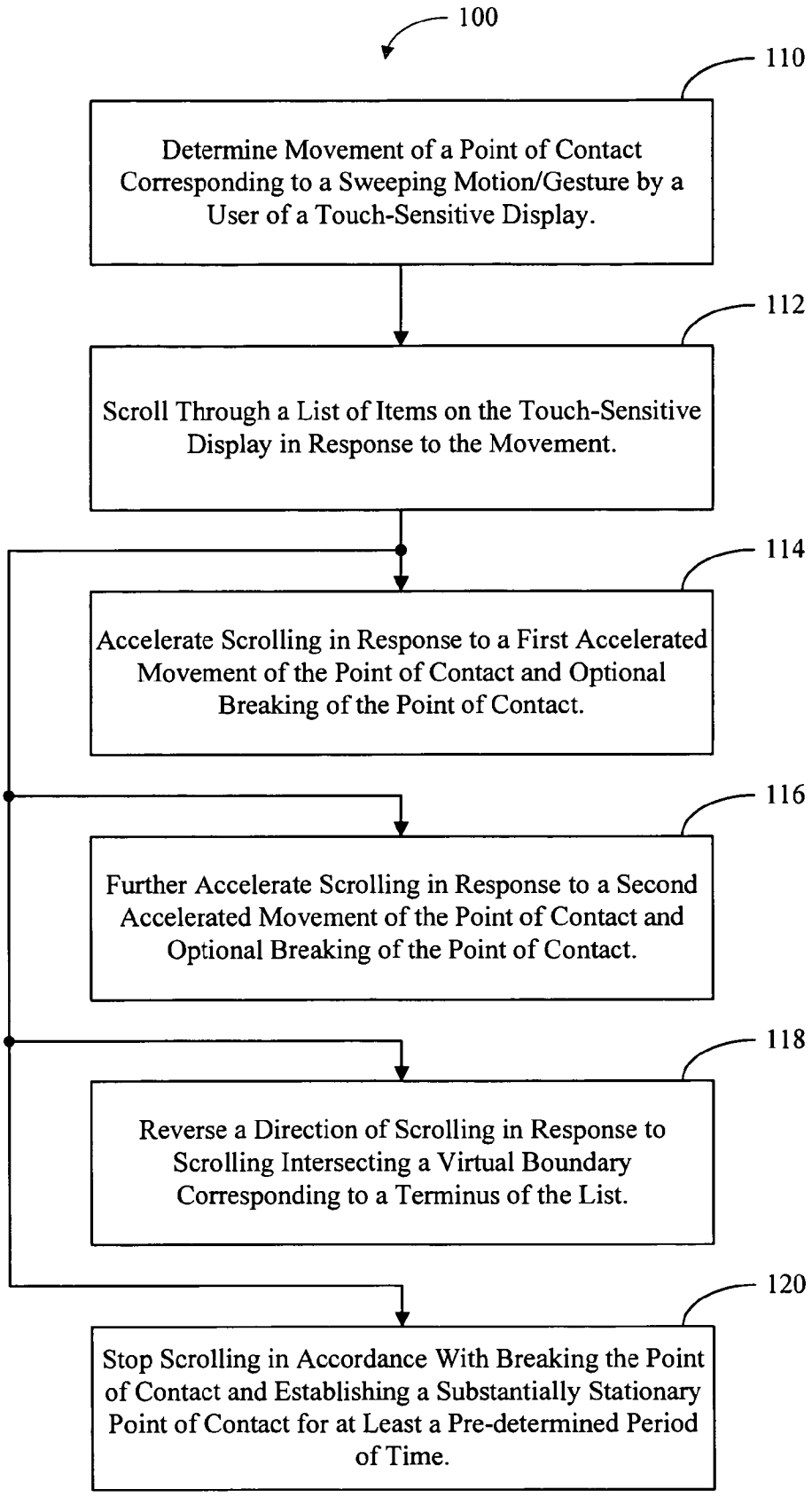
100
110
Determine Movement of a Point of Contact Corresponding to a Sweeping Motion/Gesture by a User of a Touch-Sensitive Display.
112
Scroll Through a List of Items on the Touch-Sensitive Display in Response to the Movement.
114
Accelerate Scrolling in Response to a First Accelerated Movement of the Point of Contact and Optional Breaking of the Point of Contact.
116
Further Accelerate Scrolling in Response to a Second Accelerated Movement of the Point of Contact and Optional Breaking of the Point of Contact.
118
Reverse a Direction of Scrolling in Response to Scrolling Intersecting a Virtual Boundary Corresponding to a Terminus of the List.
120
Stop Scrolling in Accordance With Breaking the Point of Contact and Establishing a Substantially Stationary Point of Contact for at Least a Pre-determined Period of Time.

Figure 1

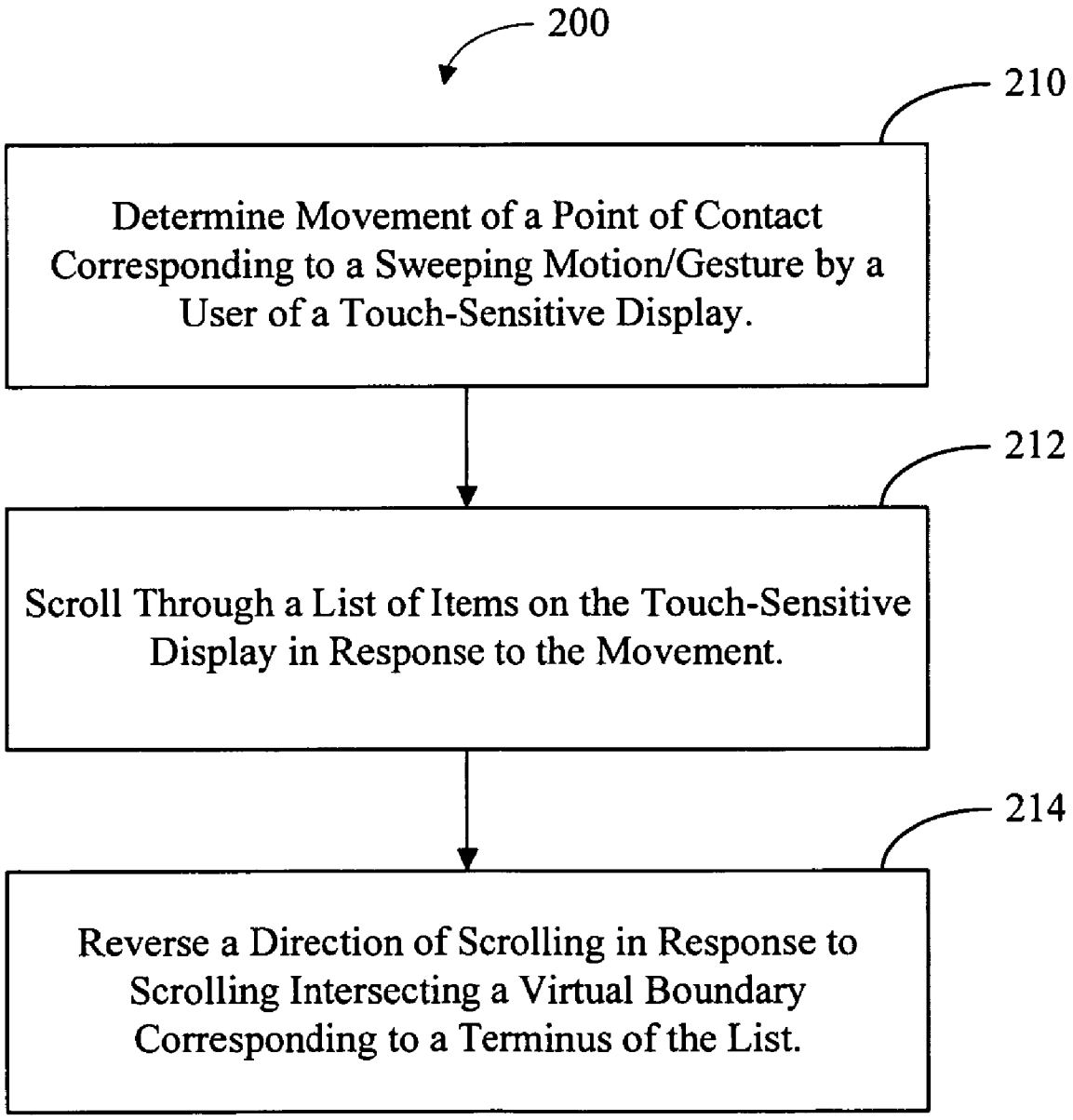
200
210
Determine Movement of a Point of Contact Corresponding to a Sweeping Motion/Gesture by a User of a Touch-Sensitive Display.
212
Scroll Through a List of Items on the Touch-Sensitive Display in Response to the Movement.
214
Reverse a Direction of Scrolling in Response to Scrolling Intersecting a Virtual Boundary Corresponding to a Terminus of the List.

Figure 2

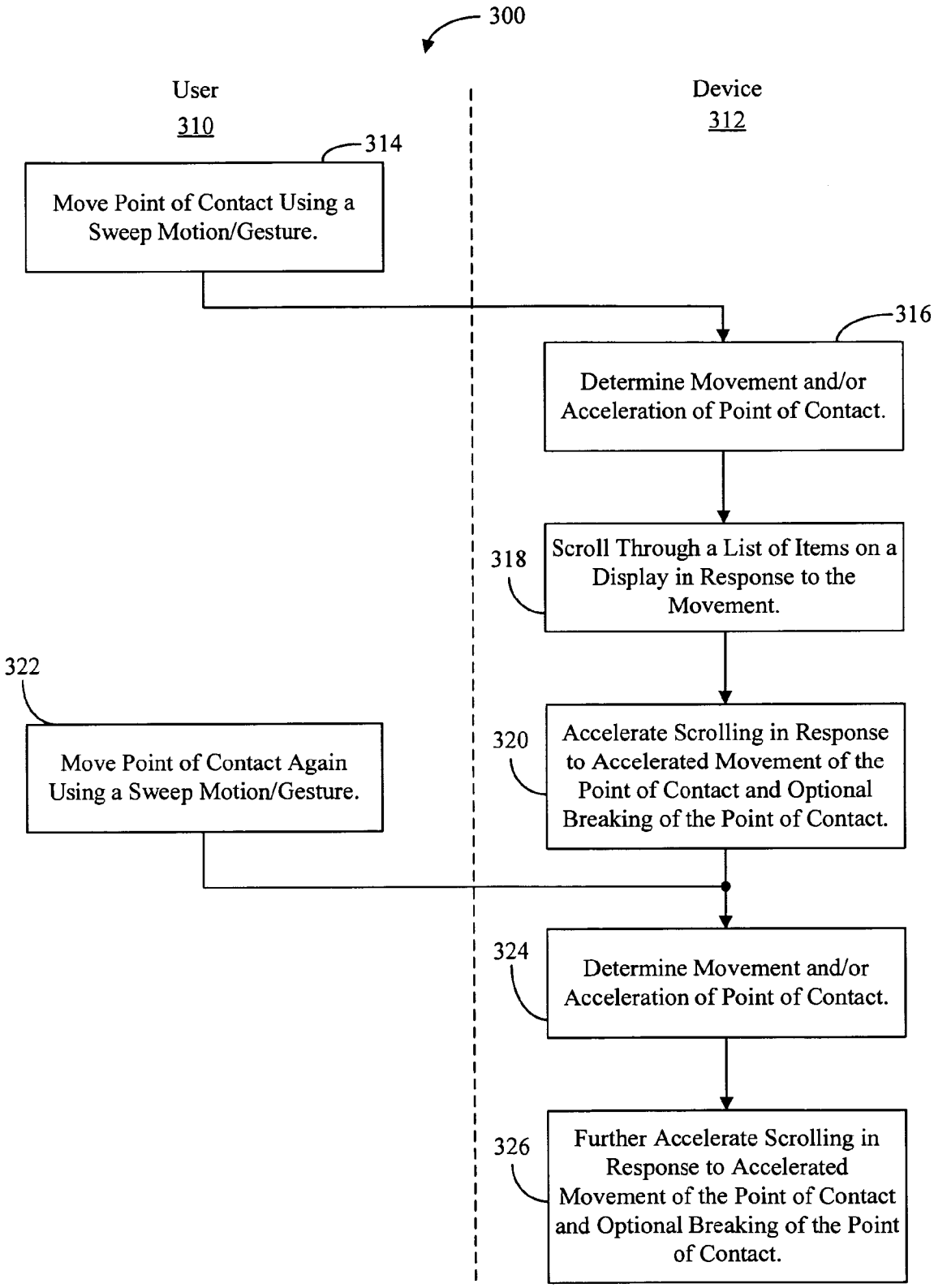
300
User
310
Device
312
314
Move Point of Contact Using a Sweep Motion/Gesture.
316
Determine Movement and/or Acceleration of Point of Contact.
318
Scroll Through a List of Items on a Display in Response to the Movement.
322
Move Point of Contact Again Using a Sweep Motion/Gesture.
320
Accelerate Scrolling in Response to Accelerated Movement of the Point of Contact and Optional Breaking of the Point of Contact.
324
Determine Movement and/or Acceleration of Point of Contact.
326
Further Accelerate Scrolling in Response to Accelerated Movement of the Point of Contact and Optional Breaking of the Point of Contact.

Figure 3

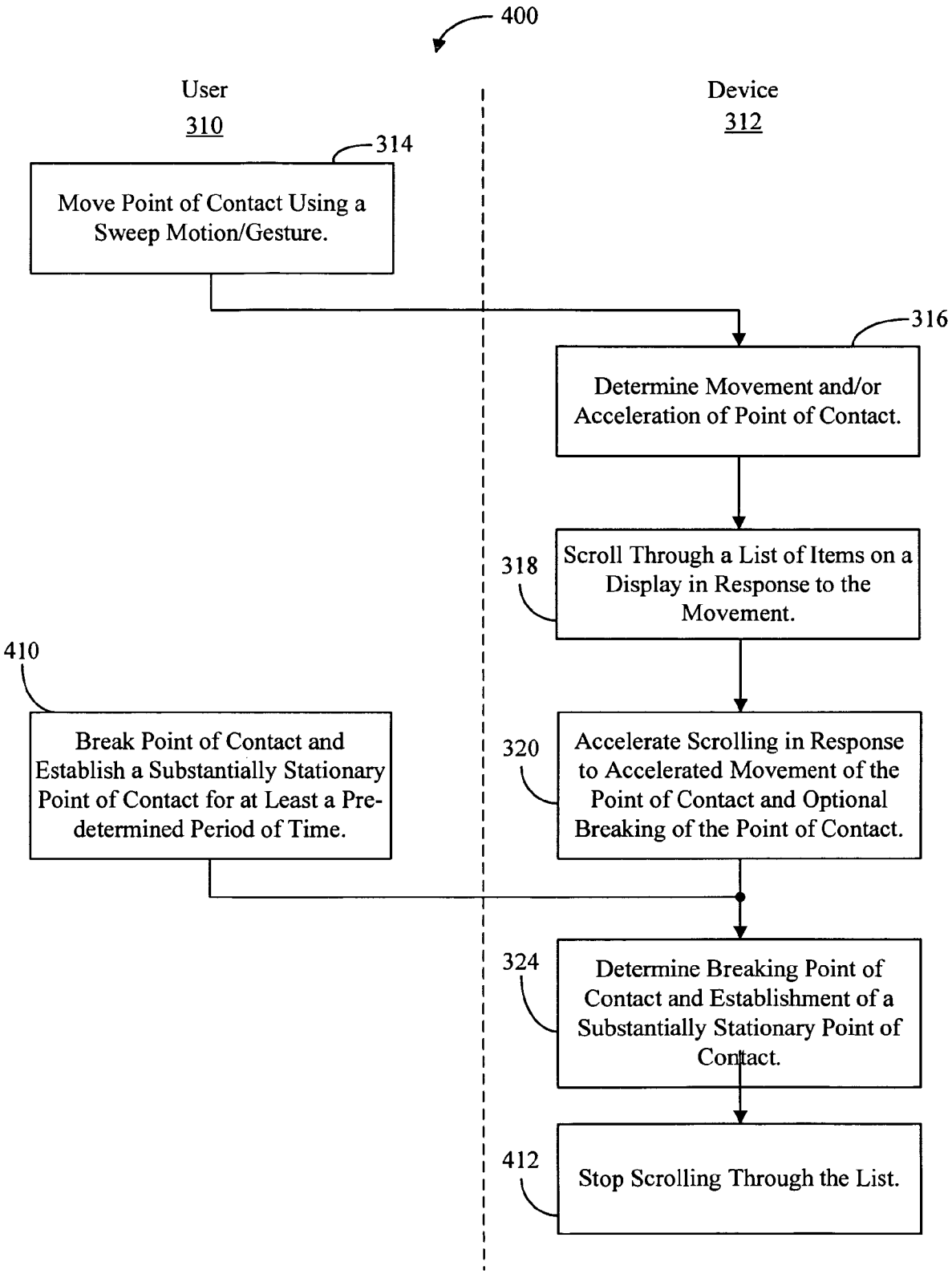
400
User
310
Device
312
314
Move Point of Contact Using a Sweep Motion/Gesture.
316
Determine Movement and/or Acceleration of Point of Contact.
318
Scroll Through a List of Items on a Display in Response to the Movement.
410
Break Point of Contact and Establish a Substantially Stationary Point of Contact for at Least a Pre-determined Period of Time.
320
Accelerate Scrolling in Response to Accelerated Movement of the Point of Contact and Optional Breaking of the Point of Contact.
324
Determine Breaking Point of Contact and Establishment of a Substantially Stationary Point of Contact.
412
Stop Scrolling Through the List.

Figure 4

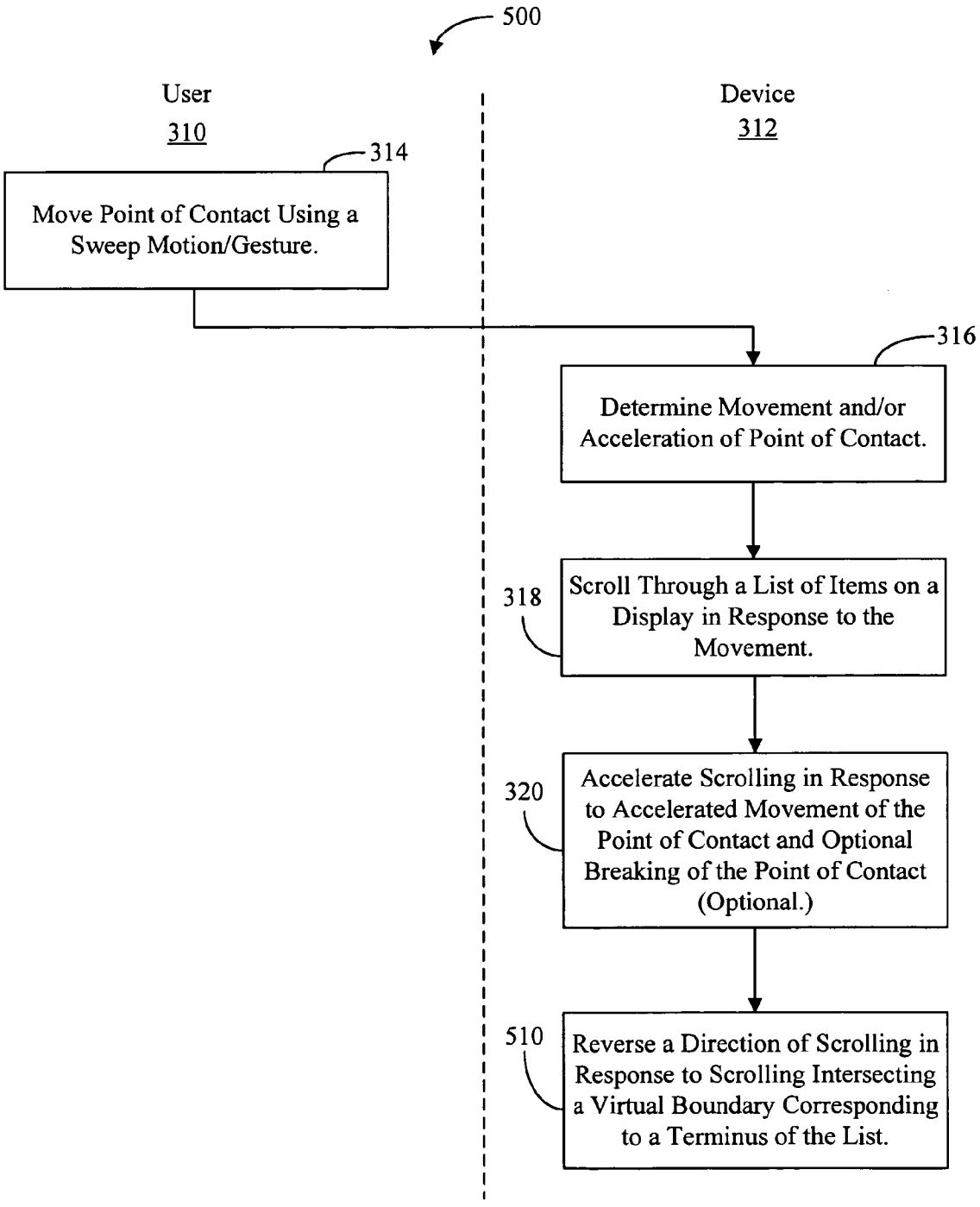
500
User
310
Device
312
314
Move Point of Contact Using a Sweep Motion/Gesture.
316
Determine Movement and/or Acceleration of Point of Contact.
318
Scroll Through a List of Items on a Display in Response to the Movement.
320
Accelerate Scrolling in Response to Accelerated Movement of the Point of Contact and Optional Breaking of the Point of Contact (Optional.)
510
Reverse a Direction of Scrolling in Response to Scrolling Intersecting a Virtual Boundary Corresponding to a Terminus of the List.

Figure 5

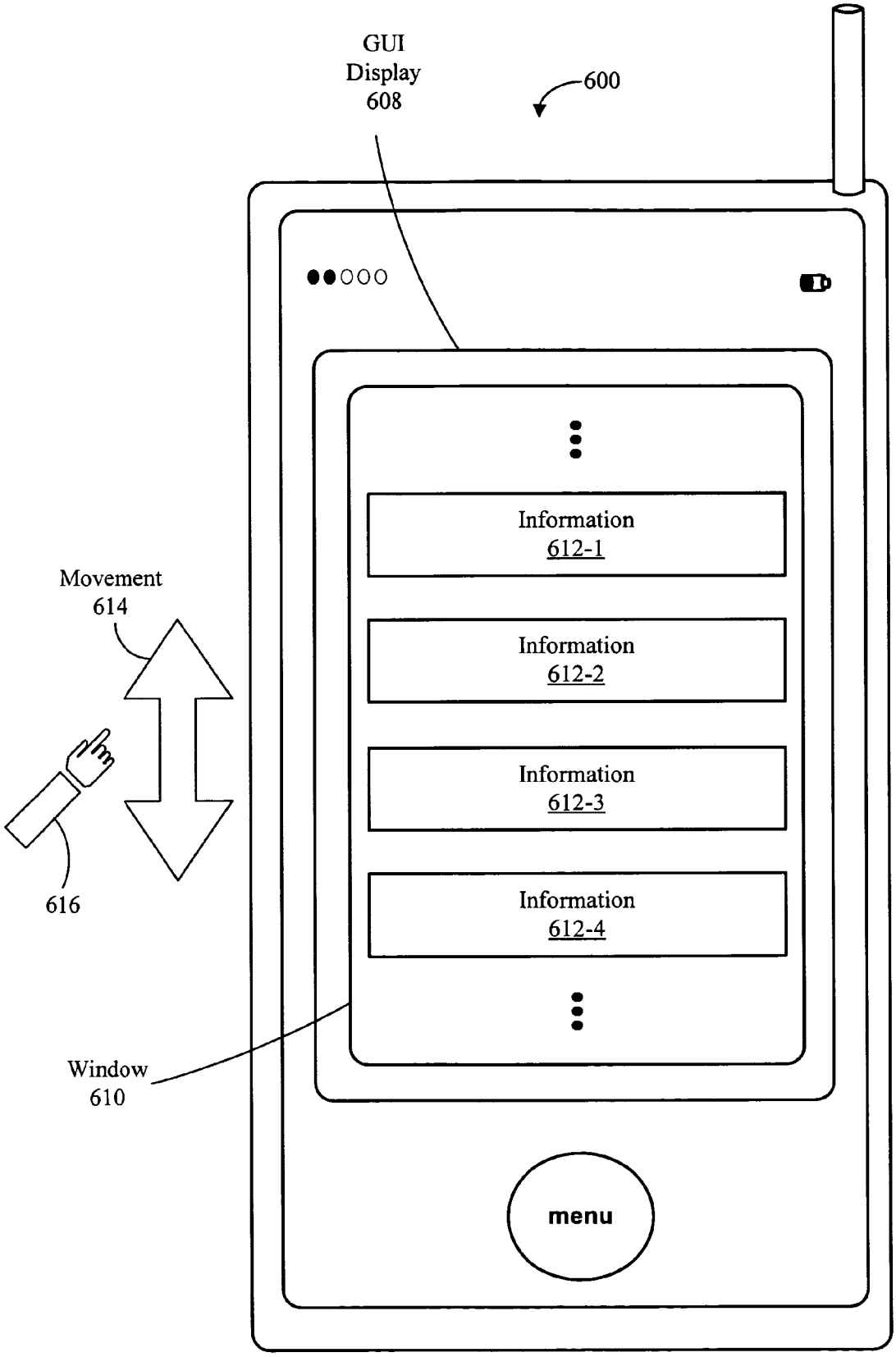
GUI
Display
608
600
Information
612-1
Information
612-2
Information
612-3
Information
612-4
Movement
614
616
Window
610
menu

Figure 6

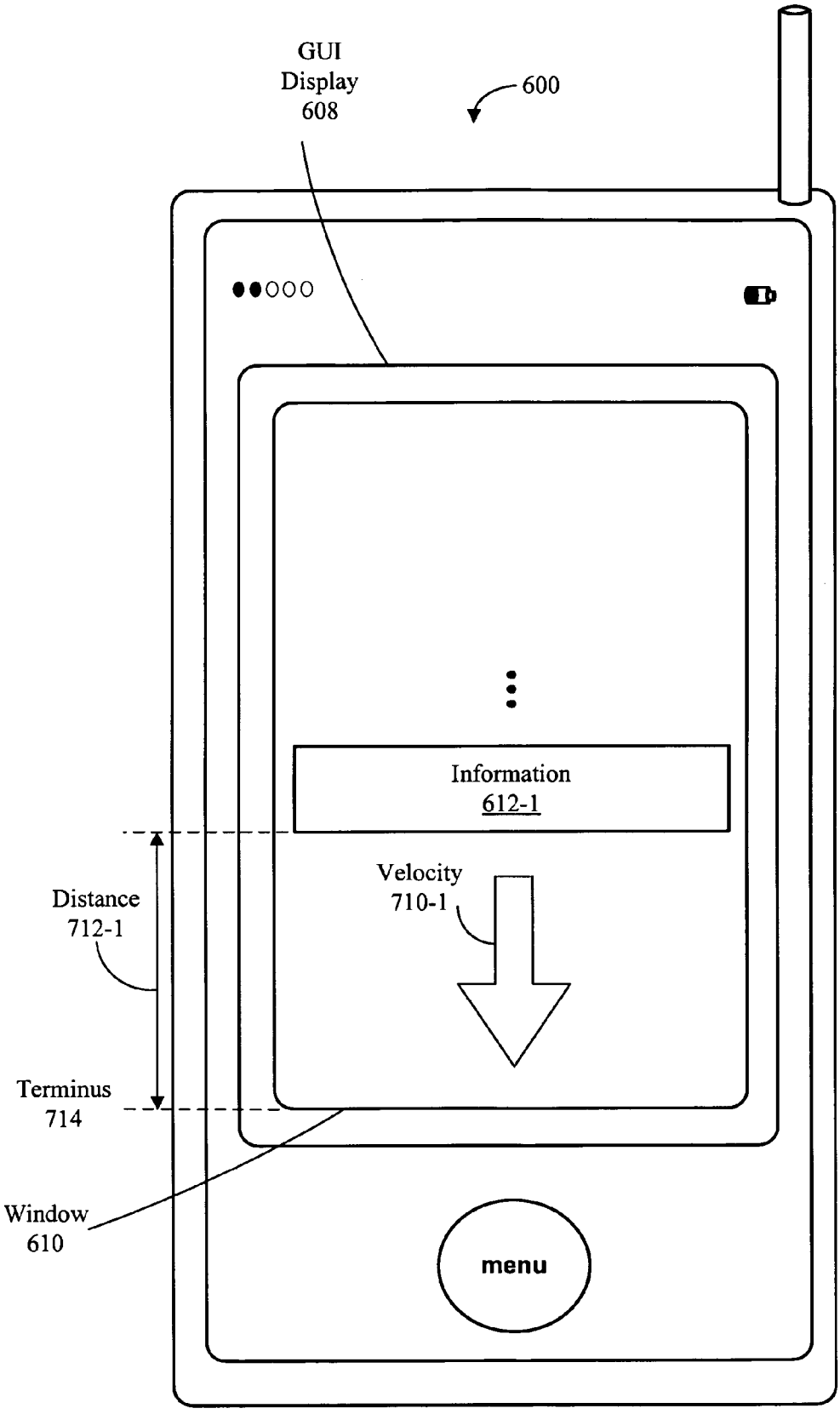
GUI
Display
608
600
Information
612-1
Velocity
710-1
Distance
712-1
Terminus
714
Window
610
menu

Figure 7A

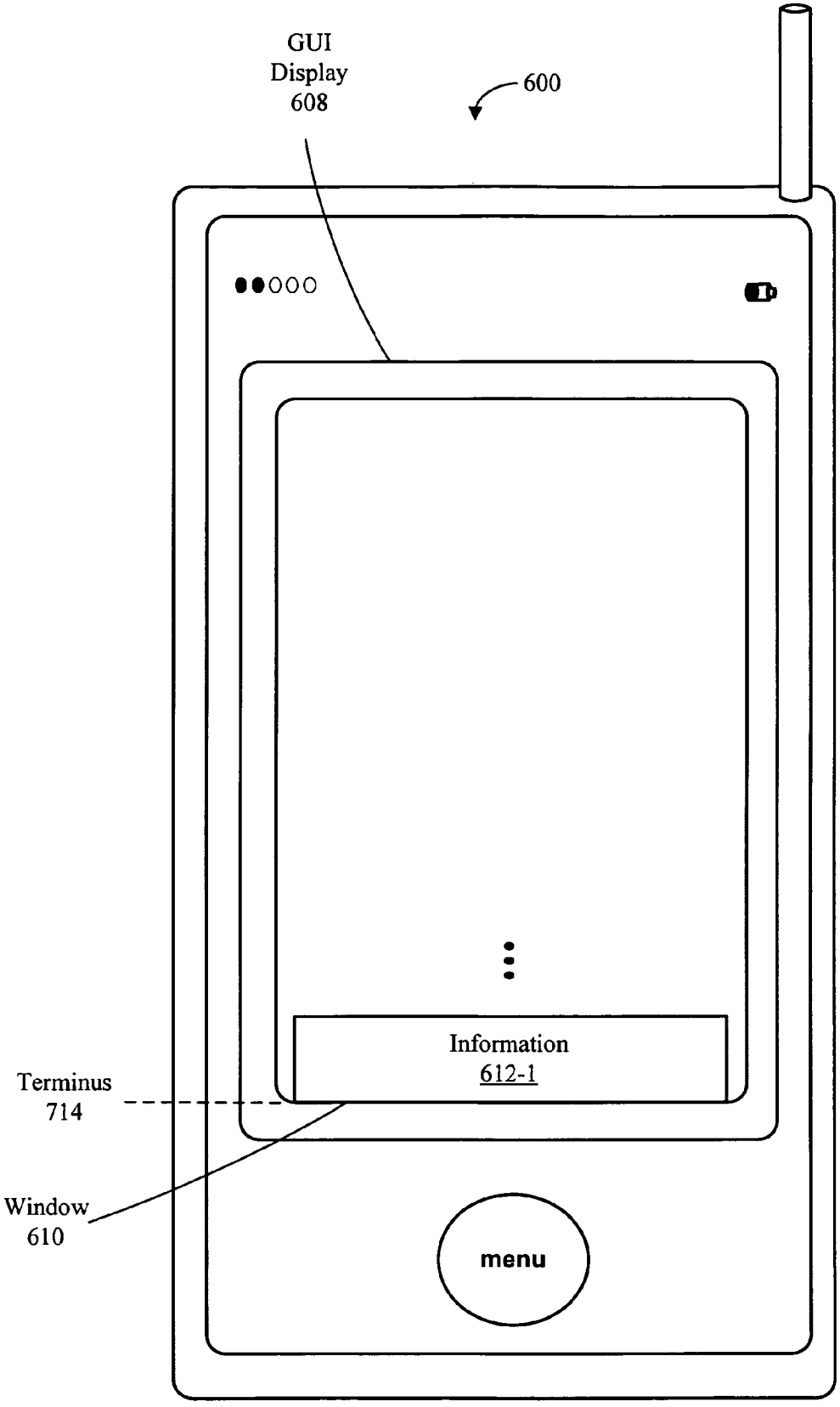
GUI
Display
608
600
Information
612-1
Terminus
714
Window
610
menu

Figure 7B

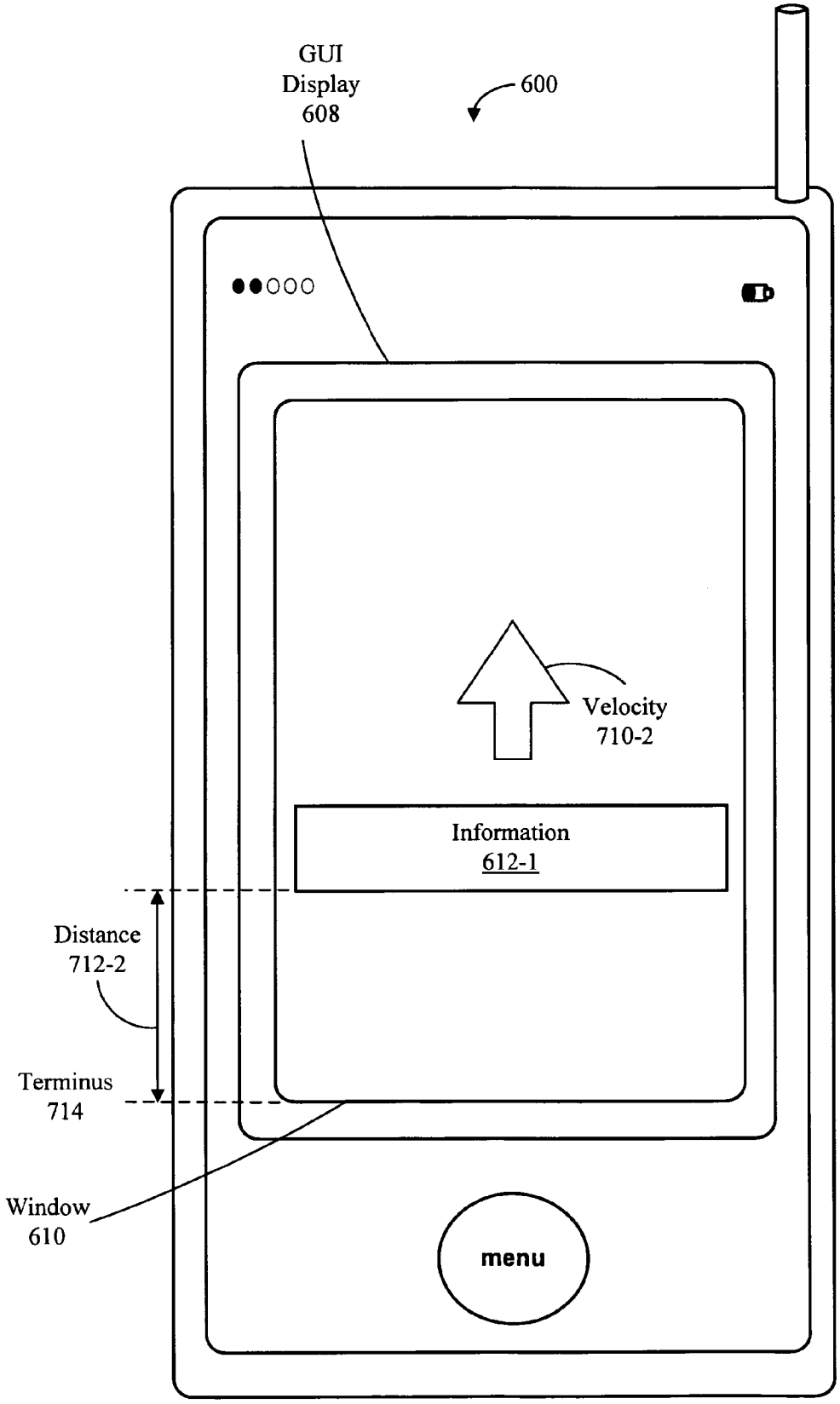
GUI
Display
608
600
Velocity
710-2
Information
612-1
Distance
712-2
Terminus
714
Window
610
menu

Figure 7C

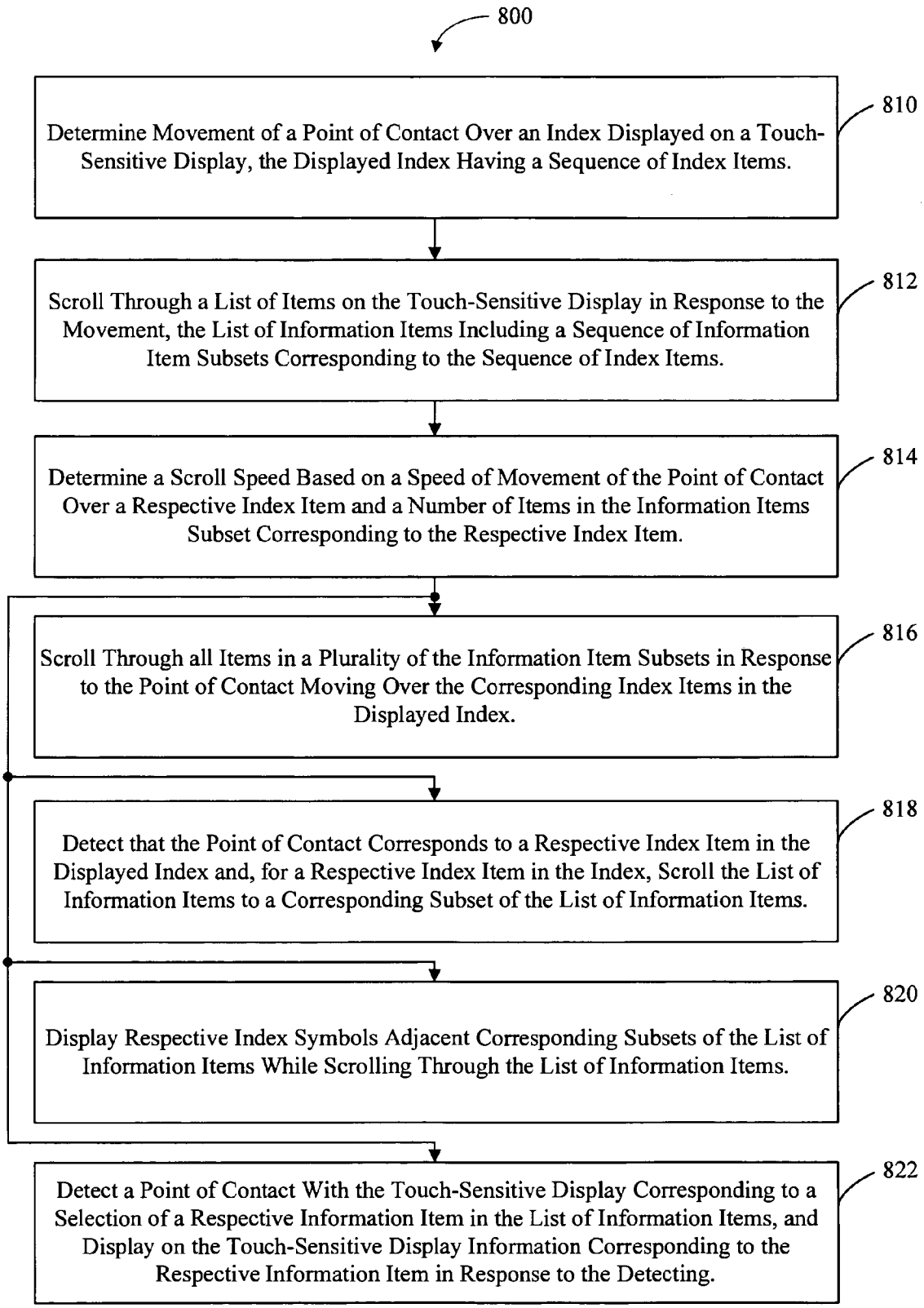
800
Determine Movement of a Point of Contact Over an Index Displayed on a Touch-Sensitive Display, the Displayed Index Having a Sequence of Index Items.
810
Scroll Through a List of Items on the Touch-Sensitive Display in Response to the Movement, the List of Information Items Including a Sequence of Information Item Subsets Corresponding to the Sequence of Index Items.
812
Determine a Scroll Speed Based on a Speed of Movement of the Point of Contact Over a Respective Index Item and a Number of Items in the Information Items Subset Corresponding to the Respective Index Item.
814
Scroll Through all Items in a Plurality of the Information Item Subsets in Response to the Point of Contact Moving Over the Corresponding Index Items in the Displayed Index.
816
Detect that the Point of Contact Corresponds to a Respective Index Item in the Displayed Index and, for a Respective Index Item in the Index, Scroll the List of Information Items to a Corresponding Subset of the List of Information Items.
818
Display Respective Index Symbols Adjacent Corresponding Subsets of the List of Information Items While Scrolling Through the List of Information Items.
820
Detect a Point of Contact With the Touch-Sensitive Display Corresponding to a Selection of a Respective Information Item in the List of Information Items, and Display on the Touch-Sensitive Display Information Corresponding to the Respective Information Item in Response to the Detecting.
822

Figure 8

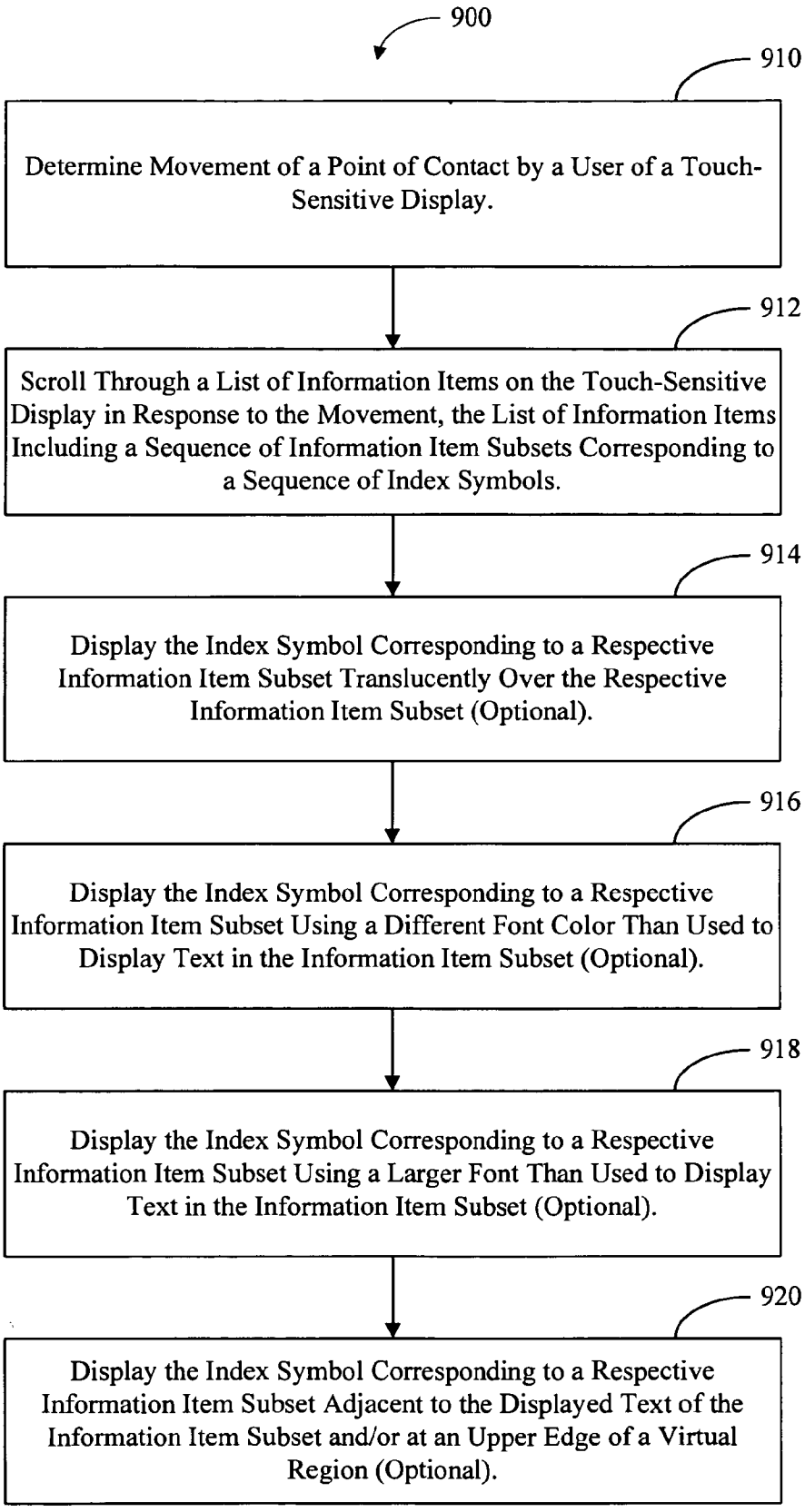
900
910
Determine Movement of a Point of Contact by a User of a Touch-Sensitive Display.
912
Scroll Through a List of Information Items on the Touch-Sensitive Display in Response to the Movement, the List of Information Items Including a Sequence of Information Item Subsets Corresponding to a Sequence of Index Symbols.
914
Display the Index Symbol Corresponding to a Respective Information Item Subset Translucently Over the Respective Information Item Subset (Optional).
916
Display the Index Symbol Corresponding to a Respective Information Item Subset Using a Different Font Color Than Used to Display Text in the Information Item Subset (Optional).
918
Display the Index Symbol Corresponding to a Respective Information Item Subset Using a Larger Font Than Used to Display Text in the Information Item Subset (Optional).
920
Display the Index Symbol Corresponding to a Respective Information Item Subset Adjacent to the Displayed Text of the Information Item Subset and/or at an Upper Edge of a Virtual Region (Optional).

Figure 9

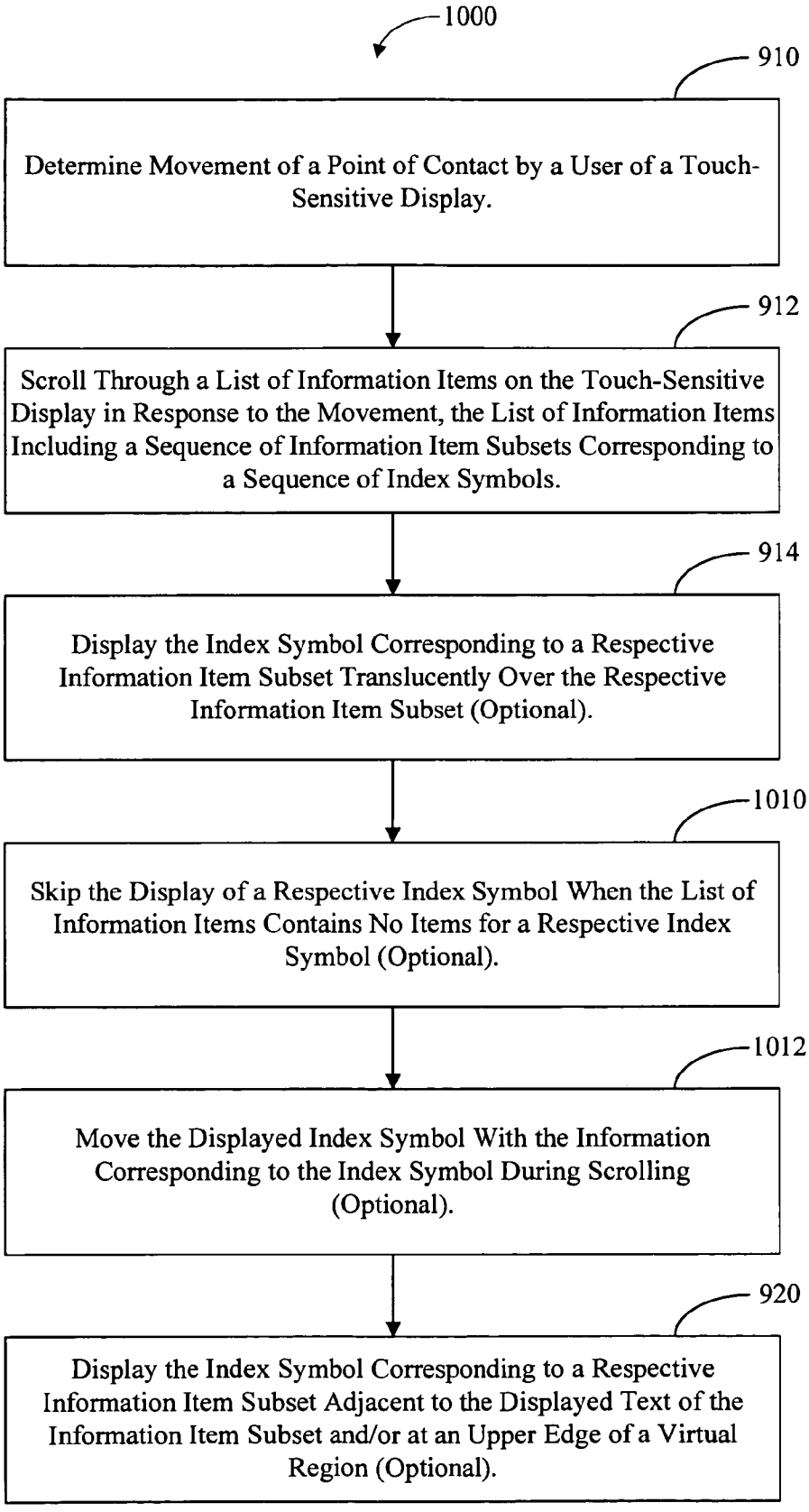
1000
910
Determine Movement of a Point of Contact by a User of a Touch-Sensitive Display.
912
Scroll Through a List of Information Items on the Touch-Sensitive Display in Response to the Movement, the List of Information Items Including a Sequence of Information Item Subsets Corresponding to a Sequence of Index Symbols.
914
Display the Index Symbol Corresponding to a Respective Information Item Subset Translucently Over the Respective Information Item Subset (Optional).
1010
Skip the Display of a Respective Index Symbol When the List of Information Items Contains No Items for a Respective Index Symbol (Optional).
1012
Move the Displayed Index Symbol With the Information Corresponding to the Index Symbol During Scrolling (Optional).
920
Display the Index Symbol Corresponding to a Respective Information Item Subset Adjacent to the Displayed Text of the Information Item Subset and/or at an Upper Edge of a Virtual Region (Optional).

Figure 10

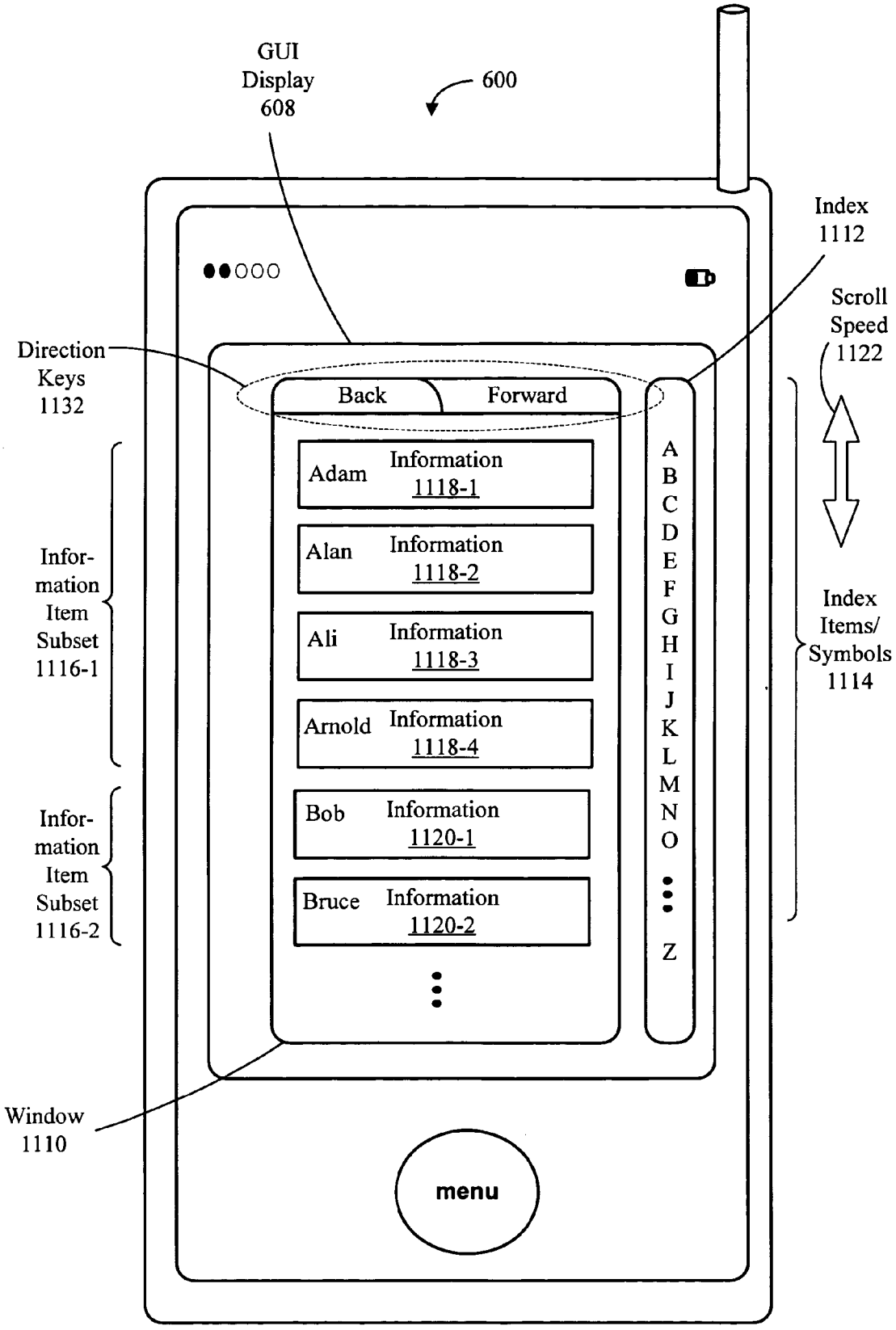
GUI Display 608
600
Index 1112
Scroll Speed 1122
Direction Keys 1132
Back
Forward
Adam Information 1118-1
Alan Information 1118-2
Ali Information 1118-3
Arnold Information 1118-4
Bob Information 1120-1
Bruce Information 1120-2
A B C D E F G H I J K L M N O Z
Information Item Subset 1116-1
Information Item Subset 1116-2
Index Items/ Symbols 1114
Window 1110
menu

Figure 11A

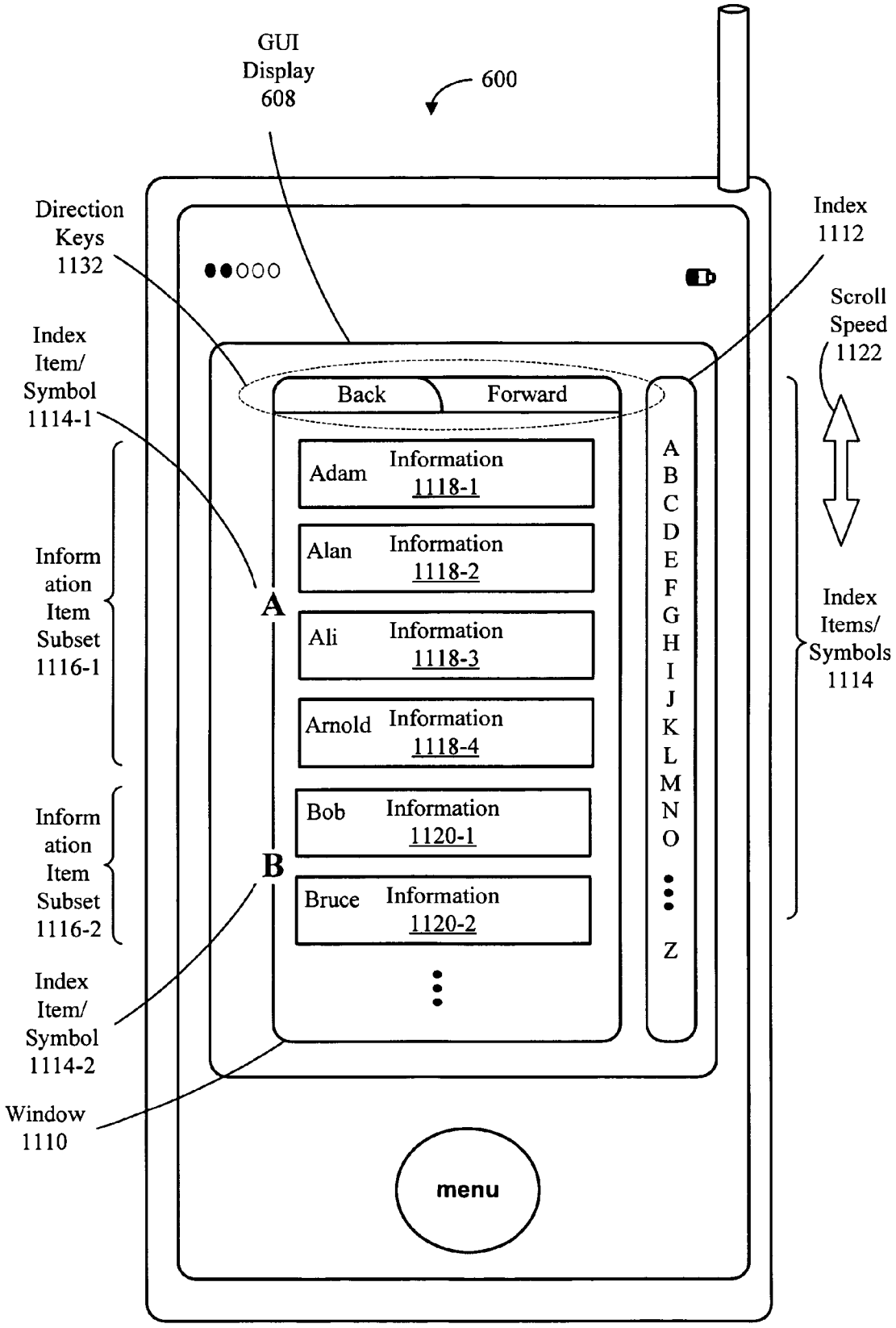
GUI Display 608
600
Direction Keys 1132
Index 1112
Scroll Speed 1122
Index Item/ Symbol 1114-1
Back
Forward
Adam Information 1118-1
Alan Information 1118-2
Ali Information 1118-3
Arnold Information 1118-4
Bob Information 1120-1
Bruce Information 1120-2
A
B
A B C D E F G H I J K L M N O ... Z
Information Item Subset 1116-1
Information Item Subset 1116-2
Index Items/ Symbols 1114
Index Item/ Symbol 1114-2
Window 1110
menu

Figure 11B

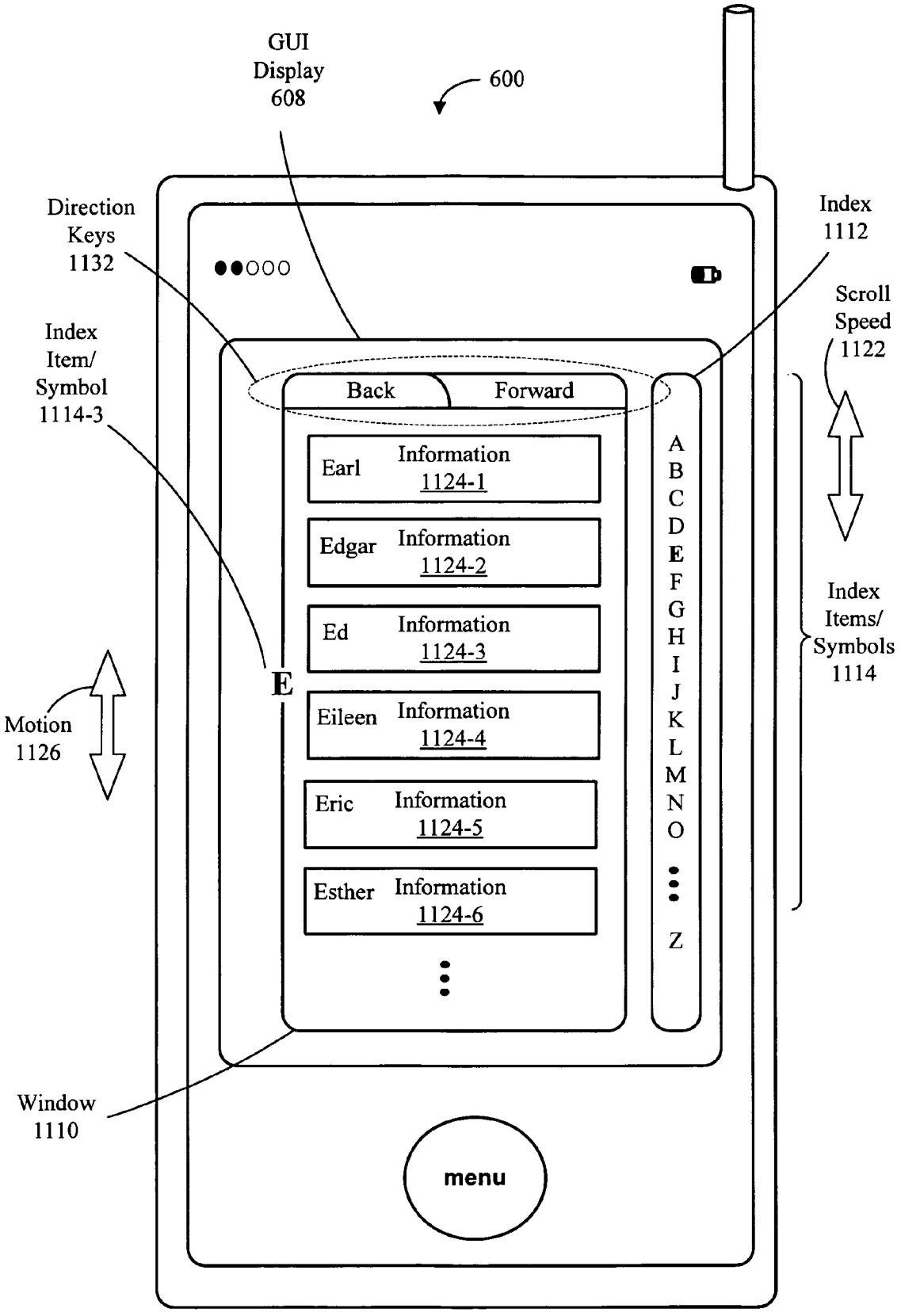
GUI Display 608
600
Direction Keys 1132
Index 1112
Scroll Speed 1122
Index Item/ Symbol 1114-3
Back
Forward
Earl Information 1124-1
Edgar Information 1124-2
Ed Information 1124-3
Eileen Information 1124-4
Eric Information 1124-5
Esther Information 1124-6
E
A B C D E F G H I J K L M N O Z
Index Items/ Symbols 1114
Motion 1126
Window 1110
menu

Figure 11C

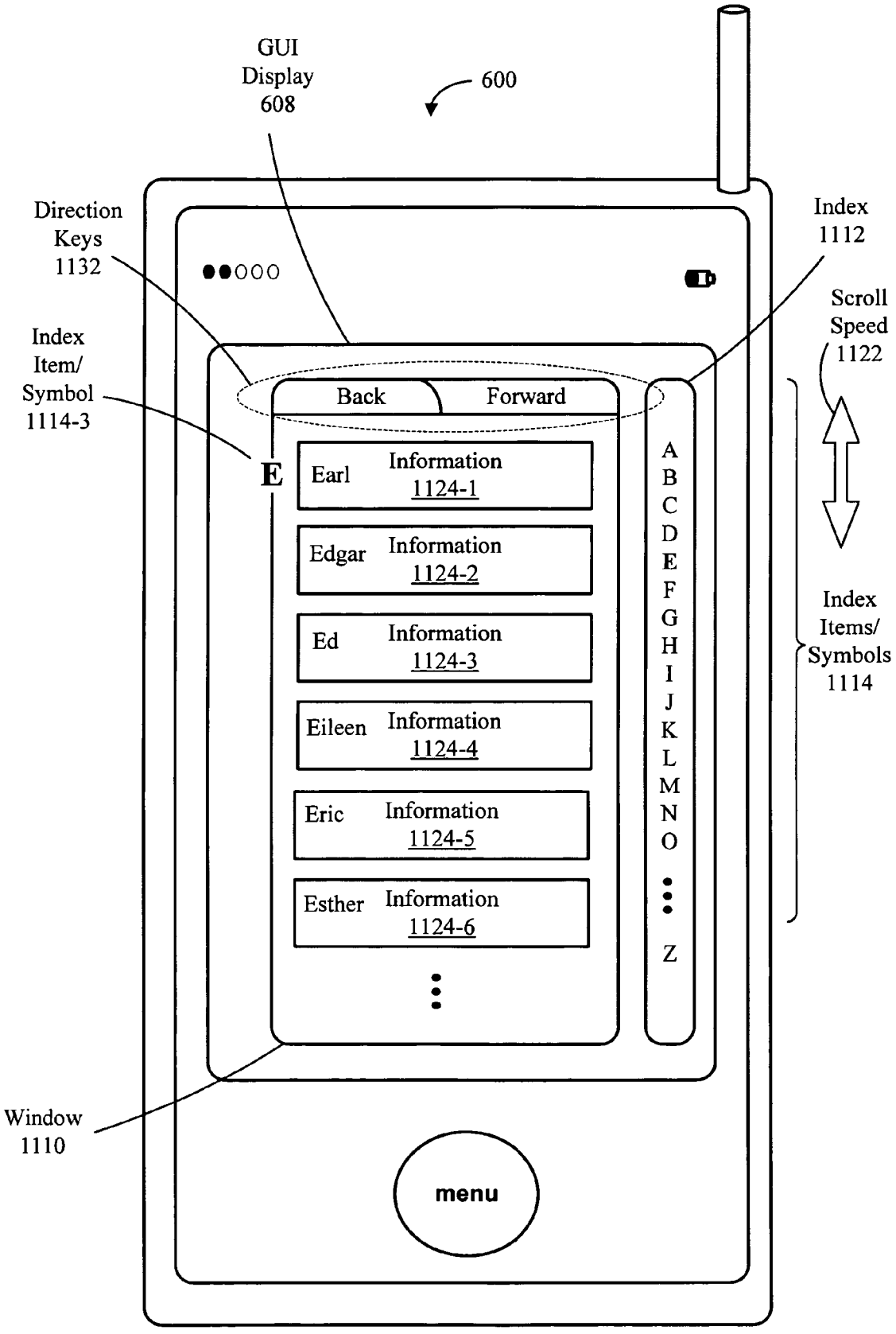
GUI
Display
608
600
Direction
Keys
1132
Index
1112
Scroll
Speed
1122
Index
Item/
Symbol
1114-3
Back
Forward
E
Earl Information
1124-1
Edgar Information
1124-2
Ed Information
1124-3
Eileen Information
1124-4
Eric Information
1124-5
Esther Information
1124-6
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
Z
Index
Items/
Symbols
1114
Window
1110
menu

Figure 11D

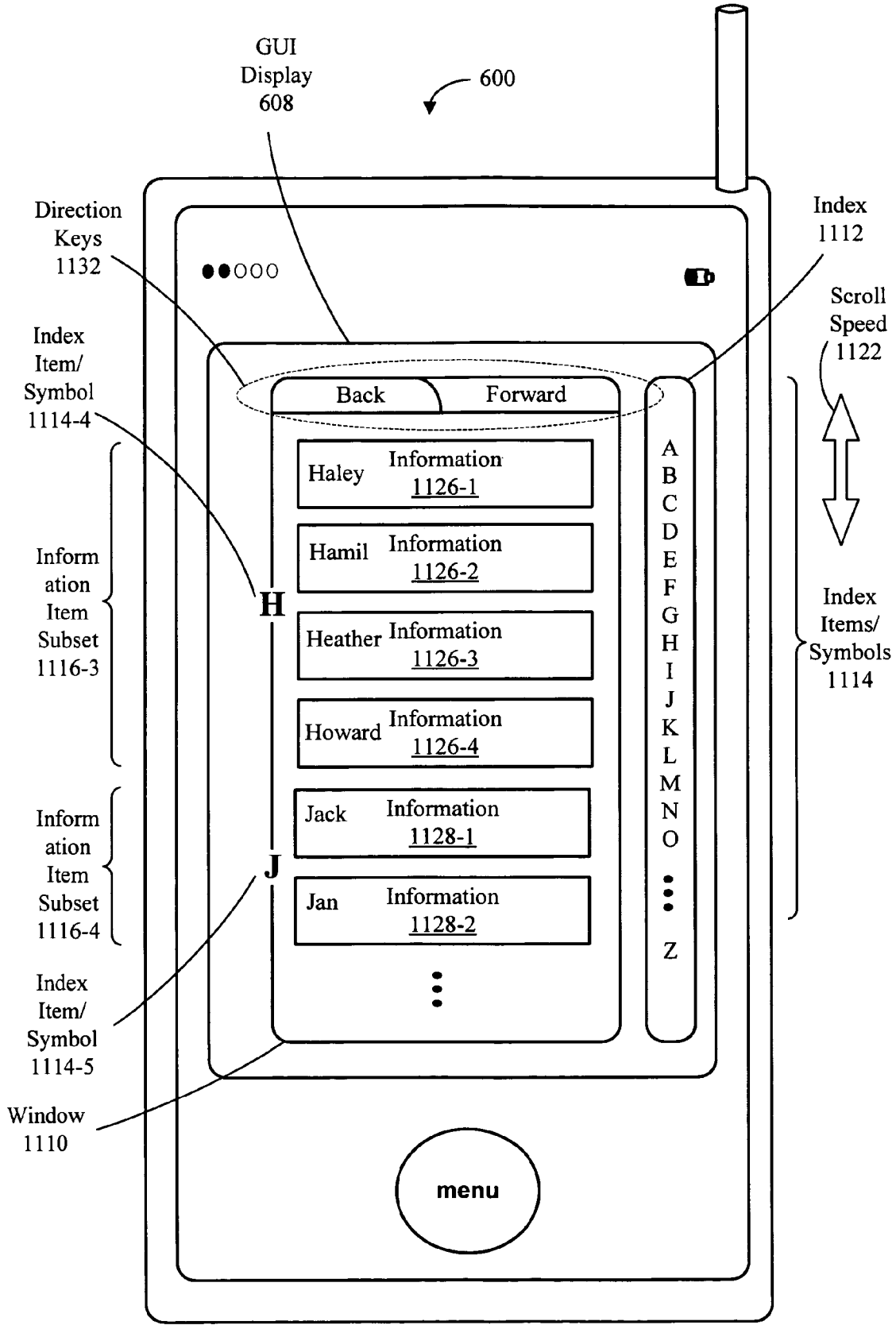
GUI Display 608
600
Direction Keys 1132
Index 1112
Scroll Speed 1122
Index Item/ Symbol 1114-4
Back
Forward
Haley Information 1126-1
Hamil Information 1126-2
Heather Information 1126-3
Howard Information 1126-4
Jack Information 1128-1
Jan Information 1128-2
H
J
A B C D E F G H I J K L M N O Z
Information Item Subset 1116-3
Information Item Subset 1116-4
Index Items/ Symbols 1114
Index Item/ Symbol 1114-5
Window 1110
menu

Figure 11E

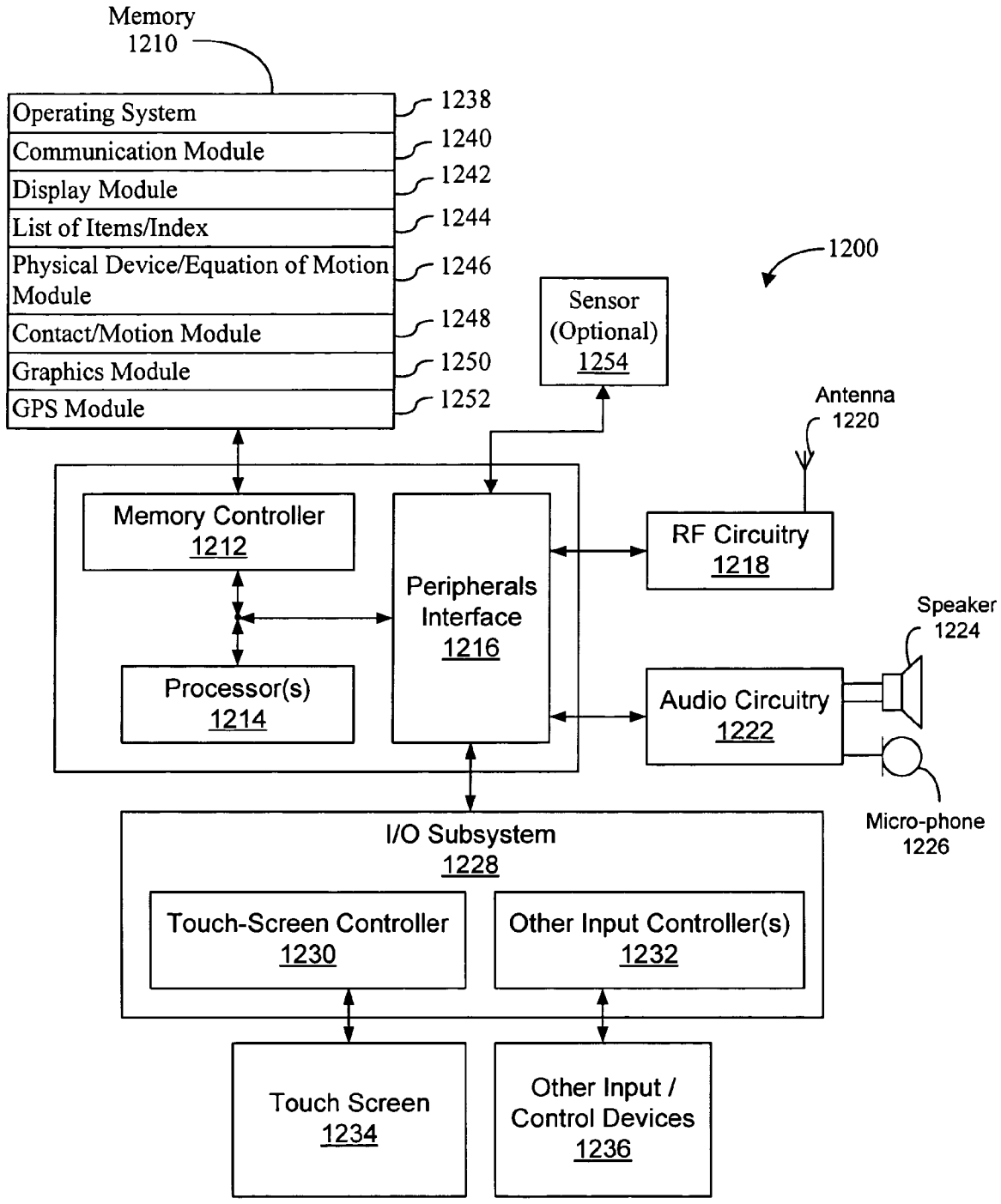
Memory
1210
Operating System
1238
Communication Module
1240
Display Module
1242
List of Items/Index
1244
Physical Device/Equation of Motion Module
1246
Contact/Motion Module
1248
Graphics Module
1250
GPS Module
1252
1200
Sensor (Optional) 1254
Antenna 1220
Memory Controller 1212
Peripherals Interface 1216
RF Circuitry 1218
Speaker 1224
Processor(s) 1214
Audio Circuitry 1222
Micro-phone 1226
I/O Subsystem 1228
Touch-Screen Controller 1230
Other Input Controller(s) 1232
Touch Screen 1234
Other Input / Control Devices 1236

Figure 12

List of Items Data Structure 1300

1312 Items	1314 Address	1316 Telephone Number(s)	1318 Photograph (Optional)	
Individual 1	Address 1	Telephone Number 1	Photograph 1	1310-1
Individual 2	Address 2	Telephone Number 2	Photograph 2	1310-2
⋮	⋮	⋮	⋮	
Individual N	Address N	Telephone Number N	Photograph N	1310-3

Figure 13

CONTINUOUS SCROLLING LIST WITH ACCELERATION

RELATED APPLICATIONS

This application is related to U.S. patent application Ser. No. 11/322,553, filed Dec. 23, 2005, entitled "List Scrolling in Response to Moving Contact Over List of Index Symbols," which application is incorporated by reference herein in its entirety.

This application is related to U.S. patent application Ser. No. 11/322,547, filed Dec. 23, 2005, entitled "Scrolling List With Floating Adjacent Index Symbols," which application is incorporated by reference herein in its entirety.

FIELD OF THE INVENTION

The present invention relates generally to user interfaces that include employ touch-sensitive displays, and more specifically to user interfaces having lists that may be scrolled through.

BACKGROUND

The utility, ease of use, and ultimately, popularity of many electronic devices, including portable devices such as cellular telephones, is often gated by industrial design, including the user interface. The user interface is the gateway through which users receive not only content but also responses to user actions or behaviors, including user attempts to access a device's features or tools. As such, the user interface is integral to an overall user experience.

Unfortunately, there are limitations associated with existing user interfaces, especially the user interfaces for small, handheld devices. Existing user interfaces are often complicated. For example, the user interfaces of many mobile phones require a user to traverse a complex tree structure of menus to access device features and content. In addition, existing user interfaces are often counterintuitive, requiring a user to either read instructions in a manual or to engage in frustrating trial and error attempts to locate device features or content. As a consequence, attempts to add additional functionality to such devices are often hampered by the complexity of the user interface.

There is a need therefore, for improved user interfaces for devices, and particularly for small, handheld devices.

SUMMARY

Movement of a point of contact by a user of a touch-sensitive display is determined. In response to the movement, a list of items on the touch-sensitive display is scrolled. Scrolling of the list is accelerated in response to an accelerated movement of the point of contact.

The accelerated movement of the point of contact may include an accelerated movement of the point of contact followed by a breaking of the point of contact. In some embodiments, the scrolling may be stopped when the user breaks the point of contact and then establishes a substantially stationary point of contact with the touch-sensitive display.

The accelerated movement of the point of contact may include a first sweeping motion of the point of contact along a predefined axis of the touch-sensitive display. In some embodiments, the scrolling is accelerated in response to a second sweeping motion of the point of contact along the predefined axis of the touch-sensitive display.

The accelerated movement of the point of contact may include a first user gesture oriented along a predefined axis of the touch-sensitive display. In some embodiments, the scroll through is further accelerated in response to a second user gesture oriented along the predefined axis of the touch-sensitive display.

In some embodiments, a direction of the scroll through is reversed in response to the scrolling list intersecting a virtual boundary corresponding to a terminus of the list. The display of the scrolling list reversal may correspond to a damped motion.

In some embodiments, a determination is made if the movement of the point of contact corresponds to a displacement greater than a pre-determined magnitude. When the movement corresponds to the displacement greater than the pre-determined magnitude, scrolling through the list occurs. An offset in the point of contact may be included when scrolling through the list of items. The offset corresponds to the pre-determined magnitude of the displacement and allows the scrolling to commence smoothly, i.e., without an abrupt jump or discontinuity on a displayed image corresponding to the list.

The aforementioned methods may be performed by a portable electronic device having a touch-sensitive display, a processor, memory and one or more programs or sets of instructions stored in the memory for performing these methods. In some embodiments, the portable electronic device provides a plurality of functions, including wireless communication.

Instructions for performing the aforementioned methods may be included in a computer program product configured for execution by one or more processors.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the invention, reference should be made to the following Description of Embodiments taken in conjunction with the accompanying drawings, in which:

FIG. **1** is a flow diagram illustrating an embodiment of a method of scrolling through a list.

FIG. **2** is a flow diagram illustrating an embodiment of a method of scrolling through a list.

FIG. **3** is a flow diagram illustrating an embodiment of a method of scrolling through a list.

FIG. **4** is a flow diagram illustrating an embodiment of a method of scrolling through a list.

FIG. **5** is a flow diagram illustrating an embodiment of a method of scrolling through a list.

FIG. **6** is a schematic diagram of an embodiment of a user interface of a portable electronic device having a touch-sensitive display.

FIG. **7**A is a schematic diagram illustrating an embodiment of a user interface of a portable electronic device having a touch-sensitive display.

FIG. **7**B is a schematic diagram illustrating an embodiment of a user interface of a portable electronic device having a touch-sensitive display.

FIG. **7**C is a schematic diagram illustrating an embodiment of a user interface of a portable electronic device having a touch-sensitive display.

FIG. **8** is a flow diagram illustrating an embodiment of a method of scrolling through a list.

FIG. **9** is a flow diagram illustrating an embodiment of a method of scrolling through a list.

FIG. **10** is a flow diagram illustrating an embodiment of a method of scrolling through a list.

FIG. **11**A is a schematic diagram illustrating an embodiment of a user interface of a portable electronic device having a touch-sensitive display.

FIG. **11**B is a schematic diagram illustrating an embodiment of a user interface of a portable electronic device having a touch-sensitive display.

FIG. **11**C is a schematic diagram illustrating an embodiment of a user interface of a portable electronic device having a touch-sensitive display.

FIG. **11**D is a schematic diagram illustrating an embodiment of a user interface of a portable electronic device having a touch-sensitive display.

FIG. **11**E is a schematic diagram illustrating an embodiment of a user interface of a portable electronic device having a touch-sensitive display.

FIG. **12** is a block diagram illustrating an embodiment of a portable electronic device having a touch-sensitive display.

FIG. **13** is a block diagram of an embodiment of a data structure for a list of items.

Like reference numerals refer to corresponding parts throughout the drawings.

DESCRIPTION OF EMBODIMENTS

Reference will now be made in detail to embodiments, examples of which are illustrated in the accompanying drawings. In the following detailed description, numerous specific details are set forth in order to provide a thorough understanding of the present invention. However, it will be apparent to one of ordinary skill in the art that the present invention may be practiced without these specific details. In other instances, well-known methods, procedures, components, and circuits have not been described in detail so as not to unnecessarily obscure aspects of the embodiments.

Embodiments of a portable device having a user interface are described. The portable device may be a handheld computer, a tablet computer, a personal digital assistant, a cellular telephone and/or a combination of two or more of these items. The portable device includes a touch-sensitive display. The display may be sensitive to haptic and/or tactile contact with a user. In an exemplary embodiment, a point of contact between the touch-sensitive display and the user corresponds to one or more digits of the user. In other embodiments, the point of contact may correspond to a stylus. The touch-sensitive display may use LCD (liquid crystal display) technology, or LPD (light emitting polymer display) technology, although other display technologies may be used in other embodiments. The touch-sensitive display may furthermore include proximity sensor arrays or other elements for determining one or more points of contact with the touch-sensitive display. The touch-sensitive display is analogous to the multi-touch sensitive tablets described in the following U.S. Pat. No. 6,323,846 (Westerman et al.), U.S. Pat. No. 6,570,557 (Westerman et al.), and/or U.S. Pat. No. 6,677,932 (Westerman), and/or U.S. Patent Publication 2002/0015024A1, each of which is hereby incorporated by reference. However, the touch-sensitive display displays visual output from the portable device, whereas the touch sensitive tablets do not provide visual output.

The touch-sensitive display may include a GUI with one or more windows. The one or more windows may be used to display a list of items or information items. In an exemplary embodiment, the list of items may include contact information, such as names, addresses, photographs, and/or telephone numbers, for a plurality of individuals (sometimes referred to as a user's contact list or address book). In response to a determined movement of the point of contact, the list may be scrolled. Determining movement of the point of contact may include determining speed (magnitude), velocity (magnitude and direction), and/or an acceleration (including magnitude and/or direction) of the point of contact. Scrolling through the list may be accelerated in response to an accelerated movement of the point of contact. In some embodiments, the scrolling and acceleration of the scrolling may be in accordance with a simulation of a physical device having friction, i.e., damped motion. For example, the scrolling may correspond to a simulation of a force law or equation of motion having a mass or inertial term, as well as a dissipative term. In some embodiments, the simulation may correspond to a cylinder rotating about its axis.

In some embodiments, accelerated movement of the point of contact may include an accelerated movement of the point of contact followed by a breaking of the point of contact. For example, the user may make contact with the touch-sensitive display, swipe or sweep one or more of his or her fingers along the display (i.e., move and/or accelerate the point of contact), and optionally, break the point of contact with the display, i.e., move the one or more fingers away from the display. The swipe or sweep may be along a predefined axis of the touch-sensitive display. In other embodiments, the accelerated movement of the point of contact may include a first user gesture oriented along a predefined axis of the touch-sensitive display.

Scrolling through the list of items may be further accelerated in response to a second sweeping motion of the point of contact along the predefined axis of the touch-sensitive display and/or a second user gesture oriented along the predefined axis of the touch-sensitive display. For example, the user may swipe one or more of his or her fingers along the touch-sensitive display two or more times.

The scrolling through the list of items may be stopped in accordance with the user breaking the point of contact and then establishing a substantially stationary point of contact with the touch-sensitive display for at least a pre-determined period of time. For example, after swiping one or more of his or her fingers along the touch-sensitive display and breaking the point of contact, the user may touch the display and hold the one or more fingers that are touching the display stationary (or approximately stationary) for one or more seconds, or fractions of a second.

The direction of scrolling through the list of items may be reversed in response to the scrolling intersecting a virtual boundary corresponding to a terminus of the list. The scrolling reversal may correspond to a damped motion. For example, during scrolling, a displayed portion of the list of items may appear to bounce off of a boundary of the window in the touch-sensitive display when a beginning or an end of the list of items is reached. The apparent bounce may correspond to a simulation of a viscous or elastic ball having momentum in a first direction striking an immovable and/or inelastic object, such as a wall. The subsequent motion of the ball may be damped, for example, by including a friction or dissipative term in the simulation. A parameter corresponding to the friction term in the simulation may be adjustable, allowing the ball to reach equilibrium in contact with the wall, i.e., the virtual boundary, or displaced from the wall.

As described below with reference to FIGS. **8-11**, in some embodiments movement of the point of contact by the user over an index on the touch-sensitive display may be determined. In some embodiments, the index may be displayed in a first region or a first window of the touch-sensitive display while the list of items or information items during the scrolling may be displayed in a second region or a second window of the touch-sensitive display. The displayed index may have

a sequence of index items. In an exemplary embodiment, the sequence of index items may include letters in the alphabet, i.e., the index may include an alphabetical index. The list of information items may include an alphabetically ordered list of information items. The alphabetically ordered list of information items may include contact information, for example, in a user's contact list or address book.

In response to movement of the user's point of contact over a displayed index, the list of information items on the touch-sensitive display may be scrolled. The list of information items may include a sequence of information item subsets corresponding to the sequence of index items. The subsets may include one or more categories. For example, a respective category may include contact information for one or more individuals whose first and/or last names begin with one or more respective letters, such as the letter 's'. In an exemplary embodiment, there is a subset corresponding to each letter in the alphabet that has one or more entries. In some embodiments, the scrolling may be in accordance with a simulation of an equation of motion having friction.

The scrolling may include scrolling through a respective information item subset if the point of contact moves over a corresponding respective index item in the index items. The scrolling may have an associated scroll speed based on a speed of movement of the point of contact over the respective index item and the number of items in the information item subset corresponding to the respective index item. For example, the scroll speed may be faster for subsets that have more entries than subsets with fewer entries. The scrolling may include scrolling through all items in a plurality of the information item subsets in response to the point of contact moving over the corresponding index items in the displayed index.

If it is determined that the point of contact with the index corresponds to a respective index item in the index, the list of information items may be scrolled to a corresponding subset of the list of information items. For example, if the user selects an index item, such as the letter 'R', in the set of index symbols, the list of items may be smoothly scrolled to the corresponding subset for the letter 'R' in the list of items. Alternatively, the displayed list of information items jump directly from a current scroll position to a scroll position in which information items corresponding to the index item 'R' are displayed.

If the point of contact with the touch-sensitive display corresponds to a user selection of a respective information item in the list of information items, information corresponding to the respective information item may be displayed on the touch-sensitive display. For example, if the user selects a respective name, the corresponding contact information may be displayed.

While scrolling through respective information subsets, an index symbol may displayed in conjunction with each respective information item subset. In some embodiments, respective index symbols may be displayed adjacent to corresponding subsets (such as displayed text) of the list of information items. In some embodiments, a respective index symbol may be displayed at an upper edge of a window containing the displayed text of the respective information item subset.

The index symbol corresponding to a respective information subset may be translucently displayed over the respective information item subset. The translucently displayed index symbol may have a different font color than that used to display text in the information item subset, and/or it may be displayed using a larger font than the font used to display text in the information item subset.

If the list of information items contains no items for a particular index symbol, i.e., no entries for a particular subset, a first index symbol preceding a particular index symbol and a second index symbol following the index symbol may be displayed in conjunction with scrolling through the list of information items from the information subset corresponding to the first index symbol to the information subset corresponding to the second index symbol. The particular index symbol may not be displayed in conjunction with the displayed text of the list of information items during the scroll through. For example, display of a respective index symbol may be skipped when the list of information items contains no items for the particular index symbol.

Attention is now given to embodiments of a method of continuously scrolling a list with acceleration. FIG. **1** is a flow diagram illustrating an embodiment of a method **100** of scrolling through a list. Movement of a point of contact corresponding to a sweeping motion or gesture by a user of a touch-sensitive display is determined (**110**). For instance, the movement of the point of contact may be in the same direction that the list is to be scrolled. Thus, if the user wants the list to scroll upwards, the user sweeps a finger (or stylus or the like) in contact with and in an upward direction on the touch-sensitive display. Scrolling the list upward will typically scroll the list to later entries in the list, for instance scrolling from items in category "A" to items in category "B". To scroll the list downward, the user sweeps a finger in a downward direction on the touch-sensitive display. In some embodiments, such as a user interface that simulates a rolodex or a list in inverse alphahetical order, an upward movement of a point of contact causes earlier entries in the list to be displayed, whereas a downward movement of the point of contact causes later entries in the list to be displayed. In this description, the terms "upward" and "downward" are directions relative to the top and bottom of a GUI on the touch-sensitive display.

In some embodiments, the list scrolling method described here operates without displaying a scroll bar. The user's sweeping motion on the touch-sensitive display operation may be performed directly on top of the displayed list, and may include a sweeping or gliding motion, in contact with the display's surface, along a path anywhere within a display window in which the list is displayed. While a scroll bar could potentially be displayed in conjunction with the displayed list, the scrolling method described here can be independent of any such scroll bar. If a scroll bar is used, then an upward movement of a point of contact on the scroll bar may cause earlier entries in the list to be displayed, whereas a downward movement of the point of contact on the scroll bar may cause later entries in the list to be displayed.

A list of items on the touch-sensitive display is scrolled in response to the movement (**112**). One or more of the following operations may occur. In response to a first accelerated movement of the point of contact and optional breaking of the point of contact, the scrolling may accelerate (**114**). In response to a second accelerated movement of the point of contact and optional breaking of the point of contact, the scrolling may further accelerate (**116**). A direction of the scrolling may reverse when the scrolling list intersects a virtual boundary corresponding to a terminus of the list (**118**). For example, when the list is scrolled to its beginning or end, the scrolling list may appear to bounce again at a boundary and reverse direction. After the bounce or scrolling direction reversal, the scrolling may automatically stop so as to leave the first or last item of the list in view on the touch-sensitive display. The scrolling may stop when the user breaks the point of contact (e.g., by lifting his/her finger off the display) and then establishing a substantially stationary point of contact

for at least a pre-determined period of time (**120**). In other embodiments, the method **100** may include fewer operations or additional operations. In addition, two or more operations may be combined and/or an order of the operations may be changed.

In some embodiments, scrolling may be in accordance with a speed of movement of the point of contact. The speed may be a time average of values determined during several time intervals. In an exemplary embodiment, the speed, velocity and/or acceleration may be determined over five time intervals, where a respective time interval corresponds to an inverse of a frame rate, such as 0.0167 s, of a display. In some embodiments, the speed velocity and/or acceleration may be determined even when a variahle frame rate is used, such as when one or more frames are skipped or not displayed. In these embodiments, the speed, velocity and/or acceleration may be determined two or more times for the respective time interval and/or may be projected based on values determined in a preceding and/or a subsequent time interval.

In some embodiments, the scrolling after a user optionally breaks the contact may be in accordance with the change in the acceleration and the speed or the velocity in one or more time intervals prior to the breaking of the contact. For example, the velocity v_f of scrolling one or more time intervals after breaking contact may be determined using

$$v_f = v_o + a\Delta t,$$

where v_o is a current value of the velocity when the contact is broken, a is a current value of the acceleration when the contact is broken and Δt is an elapsed time, such as one time interval. The velocities and/or acceleration in such a calculation may be projected along an axis or direction of the scrolling. In some embodiments, in subsequent time intervals following the determination of the velocity based on the acceleration and/or the velocity in one or more time intervals prior to the breaking of the contact, the velocity of the scrolling may be tapered. For example, in each successive time interval the velocity may be decreased by 5%. When the velocity crosses a lower threshold, it may be set to zero.

FIG. **2** is a flow diagram illustrating an embodiment of a method **200** of scrolling through a list. Movement of a point of contact corresponding to a sweeping motion or gesture by a user of a touch-sensitive display is determined (**208**). A determination is made if the movement of the point of contact corresponds to a displacement greater than a pre-determined magnitude (**210**). A list of items on the touch-sensitive display is scrolled in response to the movement (**212**). A direction of the scrolling may reverse when the scrolled list intersects a virtual boundary corresponding to a terminus of the list (**214**). In other embodiments, the method **200** may include fewer operations or additional operations. In addition, two or more operations may be combined and/or an order of the operations may be changed.

Determining if the point of contact corresponds to a displacement greater than the pre-determined value (**210**) allows small variations, such as less than 0.5, 1 or 2 mm, in the point of contact to occur without scrolling the list of items (**212**). For example, when the user taps on the touch sensitive screen there may be small, unintentional changes in the point of contact. When the movement corresponds to a displacement greater than the pre-determined magnitude, the scrolling (**212**) commences smoothly. For example, an offset in the point of contact may be included when scrolling through the list of items. The offset corresponds to the pre-determined magnitude of the displacement. The offset may prevent or reduce an abrupt jump or discontinuity in a displayed image corresponding to the list.

FIG. **3** is a flow diagram illustrating an embodiment of a method **300** of scrolling through a list. A user **310** moves a point of contact using a sweep motion or gesture (**314**) on the touch-sensitive display of a device. The device **312** determines movement and/or acceleration of the point of contact (**316**), and scrolls a list of items on its display in response to the movement (**318**). The device accelerates the scrolling in response to accelerated movement of the point of contact and optional breaking of the point of contact (**320**). The user **310** may move the point of contact again using the sweep motion/gesture (**322**). The device **312** again determines movement and/or acceleration of the point of contact (**324**), and further accelerates the scrolling in response to the accelerated movement of the point of contact and optional breaking of the point of contact (**326**). In other embodiments, the method **300** may include fewer operations or additional operations. In addition, two or more operations may be combined and/or an order of the operations may be changed.

FIG. **4** is a flow diagram illustrating an embodiment of a method **400** of scrolling through a list. A user **310** moves a point of contact using a sweep motion or gesture (**314**) on the touch-sensitive display of a device. The device **312** determines movement and/or acceleration of the point of contact (**316**), and scrolls a list of items on its display in response to the movement (**318**). The device accelerates the scrolling in response to accelerated movement of the point of contact and optional hreaking of the point of contact (**320**). The user **310** may break the point of contact and establish a substantially stationary point of contact for at least a pre-determined period of time (**410**). The device **312** determines the breaking of the point of contact and the establishment of a substantially stationary point of contact (**412**), and responds by stopping the scrolling (**414**). In other embodiments, the method **400** may include fewer operations or additional operations. In addition, two or more operations may be combined and/or an order of the operations may be changed.

FIG. **5** is a flow diagram illustrating an embodiment of a method **500** of scrolling through a list. Operations **314** through **320** are as described above, and furthermore the accelerated scrolling operation **320** may be skipped when the user does not move a point of contact in an accelerated manner. When the scrolling list intersects a virtual boundary corresponding to a terminus of the list, the direction of scrolling is reversed (**510**), at least momentarily. In some embodiments, the scrolling reverses and then comes to a stop in a damped fashion when the terminus of the list is reached. In other embodiments, the method **500** may include fewer operations or additional operations. In addition, two or more operations may be combined and/or an order of the operations may be changed.

FIG. **6** is a schematic diagram illustrating an embodiment of a user interface of a portable electronic device **600** having a touch-sensitive display **608**. The display **608** may include a window **610**. The window **610** may include one or more displayed objects, such as information objects **612-1** to **612-4**. In an exemplary embodiment, the information objects **612** may correspond to contact information for one or more individuals in a list of items. The displayed objects may be moved in response to detecting or determining movement **614** of a point of contact with the display, such as that associated with one or more digits **616** of a user (which are not drawn to scale in FIG. **6**). In some embodiments, movement of the displayed objects may be accelerated in response to detecting or determining accelerated movement of the point of contact. While

embodiment **600** includes one window **610**, in other embodiments there may be two or more display windows. In addition, while embodiment **600** illustrates movement **614** in a particular direction, in other embodiments movement of the displayed objects may be in response to movement **614** in one or more other directions, or in response to a scalar (i.e., a determined or detected movement independent of the direction).

FIGS. **7**A-**7**B illustrate the scrolling of a list of items to a terminus of the list, at which point one or more displayed items at the end of the list smoothly bounce off the end of the display, reverse direction, and then optionally come to a stop. FIG. **7**A is a schematic diagram illustrating an embodiment of a user interface of a portable electronic device **600** having a touch-sensitive display. One or more displayed objects, such as information object **612-1** may be a distance **712-1** from a terminus **714** of the list of items and may be moving with a velocity **710-1** while the list is being scrolled. Note that the terminus **714** is a virtual boundary associated with the displayed objects, as opposed to a physical boundary associated with the window **610** and/or the display **608**. As illustrated in FIG. **7**B, when the one or more displayed objects, such as the information object **612-1**, reach or intersect with the terminus **714**, the movement corresponding to the scrolling may stop, i.e., the scrolling velocity may be zero at an instant in time. As illustrated in FIG. **7**C, the one or more displayed objects, such as the information **612-1**, may subsequently reverse direction. At a time after the intersection with the terminus **714**, the information object **612-1** may have velocity **710-2** and may be a distance **712-2** from the terminus **714**. In some embodiments, the magnitude of velocity **710-2** may be less than the magnitude of velocity **710-1** when the distance **712-2** equals the distance **712-1**, i.e., the motion of the one or more displayed objects is damped after the scrolling list reaches and "bounces" at its terminus.

Attention is now given to embodiments of an index for the list of items or information items. FIG. **8** is a flow diagram illustrating an embodiment of a method **800** of scrolling through a list. Movement of a point of contact over an index displayed on a touch-sensitive display is determined (**810**). The displayed index may have a sequence of index items. A list of items on the touch-sensitive display is scrolled in response to the user's movement of the point of contact over the index (**812**). The list of information items may include a sequence of information item subsets corresponding to the sequence of index items. For instance, if the index includes index items A, B, C and D, the sequence of information items may include a subset of items corresponding to index item A, another subset of items corresponding to index item B, another subset of items corresponding to index item C, and yet another subset of items corresponding to index item D. To be even more specific, in one example, each subset of index items contain the same first letter or symbol.

A scroll speed based on the speed of movement of the point of contact over a respective index item and the number of items in the information item subset corresponding to a respective index item may be determined (**814**). One or more of the following operations may occur. Items in a plurality of the information item subsets may be scrolled through the display, at the determined scroll speed, in response to the point of contact moving over the corresponding index items in the displayed index (**816**). When the point of contact corresponds to a respective index item in the displayed index, that positioning of the point of contact is detected, and the list of information items is smoothly scrolled to a corresponding subset of the list of information items (**818**).

In some embodiments, respective index symbols may be displayed adjacent to corresponding subsets of the list of information items while scrolling through the list of information items (**820**). When the point of contact with the touch-sensitive display corresponds to a selection of a respective information item in the list of information items, that positioning of the point of contact is detected, and information corresponding to the respective information item is displayed in response (**822**). In other embodiments, the method **800** may include fewer operations or additional operations. In addition, two or more operations may be combined and/or an order of the operations may be changed.

FIG. **9** is a flow diagram illustrating an embodiment of a method **900** of scrolling through a list. Movement of a point of contact by a user of a touch-sensitive display is determined (**910**). A list of information items on the touch-sensitive display is scrolled in response to the movement (**912**). The list of information items may include a sequence of information item subsets corresponding to a sequence of index symbols. In some embodiments, the index symbol corresponding to a respective information item subset is displayed translucently over the respective information item subset (**914**). The index symbol corresponding to a respective information item subset may be optionally displayed using a different font color than used to display text in the information item subset (**916**). The index symbol corresponding to a respective information item subset may be optionally displayed using a larger font than used to display text in the information item subset (**918**). The index symbol corresponding to a respective information item subset may be optionally displayed adjacent to the displayed text of the information item subset and/or at an upper edge of a virtual region (**920**). In other embodiments, the method **900** may include fewer operations or additional operations. In addition, two or more operations may be combined and/or an order of the operations may be changed.

FIG. **10** is a flow diagram illustrating an embodiment **1000** of a method of scrolling through a list. Movement of a point of contact by a user of a touch-sensitive display is determined (**910**). A list of information items on the touch-sensitive display is scrolled in response to the movement (**912**). The list of information items may include a sequence of information item subsets corresponding to a sequence of index symbols. The index symbol corresponding to a respective information item subset may be optionally displayed translucently over the respective information item subset (**914**). The display of a respective index symbol may be skipped when the list of information items contains no items for a respective index symbol (**1010**). The displayed index symbol may be optionally moved with the information corresponding to the index symbol while the list is scrolled (**1012**). The index symbol corresponding to a respective information item subset may be optionally displayed adjacent to the displayed text of the information item subset and/or at an upper edge of a virtual region (**920**). In other embodiments, the method **1000** may include fewer operations or additional operations. In addition, two or more operations may be combined and/or an order of the operations may be changed.

FIG. **11**A is a schematic diagram illustrating an embodiment of a user interface of a portable electronic device **600** having a touch-sensitive display **608**. The display **608** may include a window **1110** containing a plurality of objects corresponding to a list of information items, such as information objects **1118** and **1120**. The information objects **1118** and **1120** may be part of an alphabetically ordered list (e.g., arranged according to the first and/or the last name). The information objects **1118** and **1120** may be grouped into

information item subsets **1116**, for example, each information item subset **1116** may be based on one or more letters of the alphabet.

The display **608** may also include an index **1112** in a separate window. The index **1112** may include a sequence of index items or index items/symbols **1114**, such as letters of the alphabet. The index **1112** may be used to scroll through the information item subsets **1116**. Motion of a point of contact with the display **608** over the index **1112** results in scrolling through the information item subsets **1116**. In some embodiments, the information items are scrolled at a speed **1122** that is based both on the speed, velocity and/or acceleration of movement of the point of contact and the number of items in the information item subsets corresponding to the index items over which the point of contact moves.

In some embodiments, if the user moves the point of contact to a respective index item/symbol in the index **1112**, the list of information items is quickly and smoothly scrolled to the corresponding information item subset. In some other embodiments, if the user makes a point over contact over a respective index item/symbol, items from the corresponding information item subset are displayed, i.e., there may be a jump to that subset of the information items.

If the user makes a point of contact, i.e., touches the display **608**, over one of the information items, such as information **1118-1**, corresponding contact information may be displayed in a the window **1110**. The user may also change to or from viewing such contact information using the forward and back navigation keys **1132**.

In some embodiments, index symbols may be displayed in an index **1112**, and also adjacent to corresponding subsets of information items. Several implementations are illustrated in FIGS. **11**B-**11**D. In FIG. **11**B index items/symbols **1114-1** and **1114-2** are displayed adjacent to corresponding information items subsets **1116-1** and **1116-2**. As the list of information items is scrolled, the index items/symbols **1114-1** and **1114-2** may move up and/or down in conjunction with the information **1118** and **1120**. The index items/symbols **1114-1** and **1114-2** may be translucent, use a different font size than the displayed text for the information **1118** and **1120**, and/or use a different font color than the displayed text for the information **1118** and **1120**.

In some embodiments, an index item/symbol is displayed approximately adjacent to information and at a mid-point of the window **1110**. As illustrated in FIG. **11**C, index item/symbol **1114-3** is displayed adjacent to information **1124** and at a mid-point of the window **1110**. The index item/symbol **1114-3** may move up and down about the mid-point during scrolling of the list of information items. In other embodiments, the index item/symbol **1114-3** may be displayed at or near an upper edge of the window **1110**, as illustrated in FIG. **11**D. In other embodiments, the index item/symbol **1114** may be displayed at or near an upper edge of the window **1110** in a banner.

The index item/symbol **1114-3** may remain adjacent to a first displayed item of a respective information item subset. When scrolling up through the list of information items (e.g., in response to an upward swipe on the touch sensitive display by the user), the index item/symbol **1114-3** may move from a lower edge of the window to the upper edge of the window **1110**. As the scrolling continues, the index item/symbol **1114-3** may remain there until the end of the respective information item subset is reached, at which time the index item/symbol **1114-3** may be replaced with a subsequent index item/symbol.

When scrolling down through the list of information items (e.g., in response to an downward swipe on the touch sensitive display by the user), the index item/symbol **1114-3** may remain at the upper edge of the window **1110** until the beginning of the respective information item subset is reached, at which time the index item/symbol **1114-3** may scroll from the upper edge of the window **1110** to the lower edge of the window **1110**. Simultaneously, a preceding index item or symbol may be displayed at the upper edge of the window **1110**.

In some embodiments, one or more of the index item/symbols **1114** may not be displayed, i.e., may be skipped, if the corresponding one or more of the information item subsets **1116** are empty, i.e., do not contain any information entries. This is illustrated in FIG. **11**E, in which an index item/symbol for the letter 'I' has been skipped. Index item/symbols **1114-4** and **1114-5** are displayed since there is corresponding information **1126** and **1128**.

Attention is now directed to embodiments of devices. FIG. **12** is a block diagram illustrating an embodiment of a device **1200**, such as a portable electronic device having a touch-sensitive display **1234**. The device **1200** may include a memory controller **1212**, one or more data processors, image processors and/or central processing units **1214** and a peripherals interface **1216**. The memory controller **1212**, the one or more processors **1214** and/or the peripherals interface **1216** may be separate components or may be integrated, such as in one or more integrated circuits. The various components in the device **1200** may be coupled by one or more communication buses or signal lines.

The peripherals interface **1216** may be coupled to an optional sensor **1254**, such as CMOS or CCD image sensor, RF circuitry **1218**, audio circuitry **1222** and/or an input/output (I/O) subsystem **1228**. The audio circuitry **1222** may be coupled to a speaker **1224** and a micro-phone **1226**. The device **1200** may support voice recognition and/or voice replication. The RF circuitry **1218** may be coupled to one or more antennas **1220** and may allow communication with one or more additional devices, computers and/or servers using a wireless network. The device **1200** may support a variety of communications protocols, including code division multiple access (CDMA), global system for mobile communications (GSM), Enhanced Data GSM Environment (EDGE), Wi-Fi (such as IEEE 802.11a, IEEE 802.11b, IEEE 802.11g and/or IEEE 802.11n), Bluetooth, Wi-MAX, a protocol for email, instant messaging, and/or a simple message system (SMS), or any other suitable communication protocol, including communication protocols not yet developed as of the filing date of this document. In an exemplary embodiment, the device **1200** may be, at least in part, a cellular telephone.

The I/O subsystem **1228** may include a touch screen controller **1230** and/or other input controller(s) **1232**. The touch-screen controller **1230** may be coupled to a touch-sensitive screen **1234**. The touch screen **1234** and touch screen controller **1230** may detect contact and any movement or break thereof using any of a plurality of touch sensitivity technologies, including but not limited to capacitive, resistive, infrared, and surface acoustic wave technologies, as well as other proximity sensor arrays or other elements for determining one or more points of contact with the touch screen **1234**. The touch-sensitive screen **1234** may have a resolution in excess of 100 dpi. In an exemplary embodiment, the touch screen **1234** has a resolution of approximately 168 dpi. The other input controller(s) **1232** may be coupled to other input/control devices **1236**, such as one or more buttons, a keyboard, infrared port, USB port, and/or a pointer device such as a mouse. The one or more buttons (not shown) may include an up/down button for volume control of the speaker **1224** and/or the micro-phone **1226**. The one or more buttons (not shown)

may include a push button. A quick press of the push button (not shown) may disengage a lock of the touch screen **1234**. A longer press of the push button (not shown) may turn power to the device **1200** on or off. The user may be able to customize a functionality of one or more of the buttons. The touch screen **1234** may be used to implement virtual or soft buttons and/or a keyboard.

In some embodiments, the device **1200** may include circuitry for supporting a location determining capability, such as that provided by the global positioning system (GPS). In some embodiments, the device **1200** may be used to play back recorded music, such as one or more files, such as MP3 files or AAC files. In some embodiments, the device **1200** may include the functionality of an MP3 player, such as an iPod (trademark of Apple Computer, Inc.). The device **1200** may, therefore, include a 36-pin connector that is compatible with the iPod.

The memory controller **1212** may be coupled to memory **1210**. Memory **1210** may include high-speed random access memory and/or non-volatile memory, such as one or more magnetic disk storage devices, one or more optical storage devices, and/or flash memory. Memory **1210** may store an operating system **1238**, such as Darwin, RTXC, LINUX, UNIX, OS X, WINDOWS, or an embedded operating system such as VxWorks. The operating system **1238** may include procedures (or sets of instructions) for handling basic system services and for performing hardware dependent tasks. Memory **1210** may also store communication procedures (or sets of instructions) in a communication module **1240**. The communication procedures may be used for communicating with one or more additional devices, one or more computers and/or one or more servers. The memory **1210** may include a display module (or a set of instructions) **1242**, a list of items/index **1244**, a physical device/equation of motion module (or a set of instructions) **1246** (for governing the scrolling of a list on the display **1234**), contact/motion module (or a set of instructions) **1248** to determine the point of contact and/or its movement, a graphics module (or a set of instructions) **1250**, and/or a GPS module **1252**. The graphics module **1250** may support widgets, i.e., modules or applications with embedded graphics. The widgets may be implemented using JavaScript, HTML, or other suitable languages.

Each of the above identified modules and applications corresponds to a set of instructions for performing one or more functions described above. These modules (i.e., sets of instructions) need not be implemented as separate software programs, procedures or modules. The various modules and sub-modules may be rearranged and/or combined. Memory **1210** may include additional modules and/or sub-modules, or fewer modules and/or sub-modules. Memory **1210**, therefore, may include a subset or a superset of the above identified modules and/or sub-modules. Various functions of the device **1200** may be implemented in hardware and/or in software, including in one or more signal processing and/or application specific integrated circuits.

Attention is now directed towards data structures for implementing the list of items or information items. FIG. **13** is a block diagram illustrating an embodiment of a data structure **1300** for a list of items. The data structure **1300** includes a plurality of item entries **1310**. In some embodiments, each item entry **1310** includes an item name or identifier **1312**, one or more addresses **1314**, one or more telephone numbers **1316**, one or more optional photographs **1318**, and/or one or more fields with miscellaneous information **1320** about the item.

The foregoing descriptions of specific embodiments of the present invention are presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the invention to the precise forms disclosed. Rather, it should be appreciated that many modifications and variations are possible in view of the above teachings. The embodiments were chosen and described in order to best explain the principles of the invention and its practical applications, to thereby enable others skilled in the art to best utilize the invention and various embodiments with various modifications as are suited to the particular use contemplated.

What is claimed is:

1. A method, comprising:

at a portable electronic device with a touch-sensitive display:

determining a movement of a point of contact by a user on the touch-sensitive display;

scrolling through a list of items on the touch-sensitive display in response to the movement; and

accelerating the scrolling in response to an accelerated movement of the point of contact,

wherein determining the movement of the point of contact includes determining the accelerated movement of the point of contact over a predefined number of time intervals and, when data for movement of the point of contact is missing for a respective time interval,

the accelerated movement of the point of contact in the respective time interval is determined by projecting accelerated movement of the point of contact in a time interval preceding the respective time interval.

2. The method of claim **1**, wherein the scrolling and accelerating are in accordance with a simulation of a physical device having friction.

3. The method of claim **1**, wherein the accelerated movement of the point of contact comprises a first sweeping motion of the point of contact along a predefined axis of the touch-sensitive display;

the method further comprising:

further accelerating the scrolling in response to a second sweeping motion of the point of contact along the predefined axis of the touch-sensitive display.

4. The method of claim **1**, wherein the accelerated movement of the point of contact comprises a first user gesture oriented along a predefined axis of the touch-sensitive display;

the method further comprising:

further accelerating the scrolling in response to a second user gesture oriented along the predefined axis of the touch-sensitive display.

5. The method of claim **1**, further comprising reversing a direction of scrolling in response to the scrolling intersecting a virtual boundary corresponding to a terminus of the list.

6. The method of claim **5**, wherein the reversing corresponds to a damped motion.

7. The method of claim **1**, wherein the accelerated movement of the point of contact includes an accelerated movement of the point of contact followed by a breaking of the point of contact.

8. The method of claim **1**, further comprising stopping the scrolling in accordance with the user breaking the point of contact and then establishing a substantially stationary point of contact with the touch-sensitive display for at least a predetermined period of time.

9. The method of claim **1**, further comprising displaying respective index symbols adjacent corresponding subsets of the list of items while scrolling the list of items.

10. The method of claim 1, further comprising:

displaying a set of index symbols in a first region of the touch-sensitive display while displaying the scrolling list of items in a second region of the touch-sensitive display; and

upon detecting that the point of contact is in the first region of the touch-sensitive display and corresponds to a respective index symbol of the set of index symbols, scrolling the list of items to a corresponding subset of the list of items.

11. The method of claim 1, further comprising:

determining if the movement of the point of contact corresponds to a displacement greater than a pre-determined magnitude, wherein the scrolling occurs when the movement corresponds to the displacement greater than the pre-determined magnitude.

12. The method of claim 11, further comprising:

including an offset in the point of contact when scrolling through the list of items, wherein the offset corresponds to the pre-determined magnitude of the displacement, and wherein the offset allows the scrolling to commence smoothly.

13. A portable electronic device, comprising:

a touch-sensitive display;

one or more processors;

a memory; and

one or more programs, wherein the one or more programs are stored in the memory and configured to be executed by the one or more processors, the one or more programs including:

instructions for determining a movement of a point of contact by a user on the touch-sensitive display;

instructions for scrolling through a list of items on the touch-sensitive display in response to the movement; and

instructions for accelerating the scrolling in response to an accelerated movement of the point of contact,

wherein determining the movement of the point of contact includes determining the accelerated movement of the point of contact over a predefined number of time intervals and, when data for movement of the point of contact is missing for a respective time interval,

the accelerated movement of the point of contact in the respective time interval is determined by projecting accelerated movement of the point of contact in a time interval preceding the respective time interval.

14. A portable electronic device, comprising:

touch-sensitive display means;

processor means;

memory means; and

one or more programs mechanisms, wherein the one or more program mechanisms are stored in the memory means and configured to be executed by the processor means, the one or more program mechanisms including:

instructions for determining a movement of a point of contact by a user on the touch-sensitive means;

instructions for scrolling through a list of items on the touch-sensitive means in response to the movement; and

instructions for accelerating the scrolling in response to an accelerated movement of the point of contact,

wherein determining the movement of the point of contact includes determining the accelerated movement of the point of contact over a predefined number of time intervals and, when data for movement of the point of contact is missing for a respective time interval,

the accelerated movement of the point of contact in the respective time interval is determined by projecting accelerated movement of the point of contact in a time interval preceding the respective time interval.

15. A graphical user interface on a portable electronic device with a touch-sensitive display, a memory, and one or more processors to execute one or more programs stored in the memory, the graphical user interface comprising:

a list of items on the touch sensitive display that scrolls in response to determining a movement of a point of contact by a user on the display,

wherein determining the movement of the point of contact includes determining the accelerated movement of the point of contact over a predefined number of time intervals and, when data for movement of the point of contact is missing for a respective time interval,

the accelerated movement of the point of contact in the respective time interval is determined by projecting accelerated movement of the point of contact in a time interval preceding the respective time interval.

16. A computer readable storage medium storing one or more programs, the one or more programs comprising instructions, which when executed by a portable electronic device with a touch-sensitive display, cause the portable electronic device to perform a method comprising:

determining a movement of a point of contact by a user on the touch-sensitive display;

scrolling through a list of items on the touch-sensitive display in response to the movement; and

accelerating the scrolling in response to an accelerated movement of the point of contact,

wherein determining the movement of the point of contact includes determining the accelerated movement of the point of contact over a predefined number of time intervals and, when data for movement of the point of contact is missing for a respective time interval, the accelerated movement of the point of contact in the respective time interval is determined by projecting accelerated movement of the point of contact in a time interval preceding the respective time interval.

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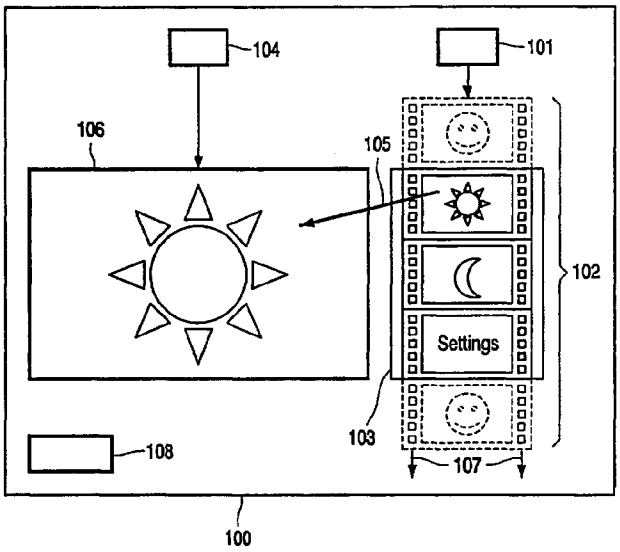
(54) Title: DEVICE AND METHOD OF BROWSING AN IMAGE COLLECTION



(57) Abstract: A device (100) for browsing an image collection shows a continuously scrolling sequence (102) of representations (200, 202, 204, 206, 208) of images and commands in a browsing area (103). A user can select (105) a representation, which results in the full image being shown in a display area (106), or in the command being executed. Speed and direction of the scrolling (107) can be varied with an input stroke in the browsing area (103). The representations (200, 202, 204, 206, 208) could be shown together with border areas (201, 203, 205, 207, 209), which when selected limit the sequence (102) to the representations (200, 202, 204, 206, 208) belonging to the same category as the representation whose border area was selected. A general purpose computer can be programmed to function as the device (100) by means of a computer program product.

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Device and method of browsing an image collection

The invention relates to a device for browsing an image collection, comprising browsing means for showing a sequence of representations in a browsing area, each representation corresponding to an image from the image collection, and display means for showing, in response to a selection of a representation from said sequence, in a display area an image from the image collection corresponding to the selected representation.

The invention further relates to a method of browsing an image collection, comprising showing a sequence of representations in a browsing area, each representation corresponding to an image from the image collection, and showing, in response to a selection of a representation from said sequence, in a display area an image from the image collection corresponding to the selected representation.

A lot of people have image collections, usually stored as a collection of photos in a photo book. However, browsing the photos in a photo book is very time-consuming, since it is essentially a linear process. As more and more people have access to devices such as Photo CD viewers and computers, it seems logical to digitize these photos so they can be managed, sorted and browsed on the computer or on a television screen. Several photo development shops already offer the service of creating a CD-ROM with digital versions of the developed photos.

These digital images can be browsed using an image browsing device. This can be a standalone device, but also a part of another device. For example, it could be a computer program which runs on a general purpose computer and which can read images from a CD-ROM and show them on the computer's display device.

To show the available images to a user, conventional image browsing devices typically operate using thumbnails or other representations of images in the image collection. Such a representation is usually smaller than the actual image, so that a whole sequence of representations can be shown at once on the computer or television screen, rather than just one or two images at a time. A user can select a representation from the sequence using a mouse, keyboard or other input device, and then see the corresponding image.

However, this approach is not very effective when the number of representations in the sequence is too large to fit on one screen. Sometimes the representations and one actual image are shown together on the screen, leaving even less room for the sequence to be shown. To facilitate such large collections, image browsing devices typically use a metaphor borrowed from physical photo books. A portion of a sequence of representations is shown in some arrangement, typically a mosaic, and buttons are provided to go to the next "page in the photo book". Pressing such a button then results in another portion of the sequence being shown. This way, a user can browse through his digital photo collection just like he would browse through his physical photo collection.

A disadvantage of this approach is that it is not very easy to use. Physical photo books do not have buttons to turn to the next page. A user merely has to turn the page, which is an intuitive and well-known mechanism. Mixing the metaphor of a book with interface elements that are not logical to put in a book makes the device not very easy to use.

It is an object of the invention to provide a device according to the preamble, which allows for an easy, simple and intuitive way to browse an image collection.

This object is achieved in a device which is characterized in that the browsing means is arranged to show the sequence by continuously scrolling the sequence in the browsing area. When the sequence is scrolling by next to the display area, it is immediately obvious that a user can select an image from the scrolling sequence and have it shown on the display area. The sequence can be scrolled with varying degrees of smoothness. For example, the sequence can be scrolled by fits and starts, or by simply bumping the lower- or uppermost representation from the screen, moving the others down or up, respectively, and showing a next representation at the space thusly freed. Since the sequence is scrolling automatically, it is very easy to use, as no buttons need to be pressed or other action needs to be taken to view more representations than would fit on a display. The user can simply select images by e.g. clicking on the representations and view them on the display area as they scroll by.

Although scrolling is often implemented as showing portions of a sequence in a linear fashion, this does not necessarily have to be the case. The browsing area could be positioned in a circular fashion around the display area, so that the sequence could be scrolled around the image being shown. Scrolling in nonlinear directions could also be used, for example by making the sequence follow a predetermined path, or a path input by a user.

In an embodiment a representation is shown together with a border area, and the browsing means is arranged to show, in response to a selection of a border area of a representation, representations in the sequence belonging to the same category as the representation whose border area is selected. An advantage of this embodiment is that a border area can be used as an intuitive indicator of things associated with a representation. Selecting a border area then simply means "this type of image". The device can then filter out the representations which do not belong to the thusly selected category, and so limit the user's choices. This is particularly efficient for large image collections with many categories, as now an illustrative image can be shown for each category, and selecting that category immediately gives access to all the images in that category. Alternatively, the category could comprise subcategories, each indicated by a further illustrative image, so that hierarchically organized image collections can also be browsed efficiently.

In a further embodiment the selection of a representation comprises dragging the representation from the browsing area to the display area. Dragging a representation to an area where the corresponding image can be shown is a very intuitive way of manipulating images. The same action can also be used to apply other actions to the image, such as deleting it by dragging it to a trashcan. This provides a consistent interface for the device.

In a further embodiment a speed of the scrolling of the sequence is varied in accordance with a speed of an input stroke in the browsing area. An advantage of this embodiment is that it provides an intuitive way of varying the scrolling speed. A user now gets the impression that the scrolling can be accelerated or decelerated just like a wheel. The resulting speed may depend on whether the input stroke ends within or outside the browsing area. In the former case, the acceleration may be temporary and succeeded by a deceleration and eventual halting of the scrolling. The browsing means may simulate inertia and friction, for example, by gradually decreasing the scrolling speed, instead of instantaneously stopping the scrolling, in response to the user touching the browsing area. Similarly, the induced speed increase may be gradual, thus strengthening the impression of spinning a wheel.

In a further embodiment a direction of the scrolling of the sequence is varied in accordance with a direction of an input stroke in the browsing area. An advantage of this embodiment is that it provides an intuitive way of changing the direction of the scrolling. A user now gets the impression that the scrolling can be manipulated just like a wheel. Making the input stroke in a direction opposite to the current direction of the scrolling will reverse it. For nonlinear scrolling techniques the direction should be adapted to follow the direction of the input stroke.

In a further embodiment the browsing means is arranged to show interleaved in the sequence a representation of a command, and the device is arranged to execute the command when the representation of the command is selected. An advantage of this embodiment is that it does away with the need for a special-purpose menu bar, list of icons or buttons or other command selection tool. As the user will already turn to the browsing area for selecting an image, the browsing area is the most logical place to provide access to commands as well. Possible suitable commands could be turning the device off, changing a background color or other configuration setting, or to navigate between categories or category levels. For instance, a representation of the text "Back" could be shown, and selecting it would result in the browsing area showing a higher-level category.

It is an object of the invention to provide a method according to the preamble, which allows for an easy, simple and intuitive way to browse an image collection.

This object is achieved in a method which is characterized in that the sequence is shown by continuously scrolling the sequence in the browsing area.

The invention further relates to a computer program product enabling a programmable device when executing said computer program product to function as a device according to the invention.

These and other aspects of the invention will be apparent from and elucidated with reference to the embodiments shown in the drawing, in which:

Figure 1 schematically shows a device according to the invention; and

Figure 2 schematically shows a sequence of representations.

Throughout the figures, same reference numerals indicate similar or corresponding features. Some of the features indicated in the drawings are typically implemented in software, and as such represent software entities, such as software modules or objects.

Figure 1 shows a device 100 for browsing an image collection, comprising browsing means 101 for showing a sequence 102 of representations in a browsing area 103, each representation corresponding to an image from the image collection. The device 100 further comprises display means 104 for showing in a display area 106 an image from the

image collection. When a user makes a selection 105 from the sequence 102, the image corresponding to the selected representation is shown in the display area 106.

The image collection can comprise a collection of photos, pictures or drawings, where for each photo, picture or drawing a representation is provided. This representation could be an icon or thumbnail, either generated automatically by software or generated manually by a user or operator. The image collection could also comprise one or more video streams. In that case, the representations could be key frames corresponding to portions of the video stream or streams. Selecting a representation will then result in a corresponding moving image, i.e. the corresponding portion of a video stream, being shown.

The browsing area 103 and the display area 106 can for instance be two graphical windows on a computer screen, or be portions of the same window. Using two separate windows allows independent manipulation of the size and the position of each. In hand-held devices such as digital cameras only limited display screen space is available, so there the same display screen is used for both the browsing area 103 and the display area 106, presented next to each other. It may also be useful to present the browsing area 103 and the display area 106 in a wholly or partially overlapping fashion.

The browsing means 101 is arranged to show the sequence 102 by continuously scrolling 107 the sequence 102 in the browsing area 103. The sequence 102 is usually too large to fit in the browsing area 103 completely. This is indicated in Figure 1 by showing the portions of the sequence 102 that do not fit in the browsing area 103 in a dashed form. The scrolling 107 will result in those portions being shown eventually.

A typical way of implementing scrolling 107 is by presenting the representations in a linear list, either horizontally or vertically, which is moved in an appropriate direction. For a vertical list, as shown in Figure 1, the sequence 102 is moved downward. Of course, other directions are also possible. It is not even necessary for the representations to be presented as a linear list. The browsing area 103 could be positioned in a curved form around the display area 106, so that the sequence 102 is scrolled around the display area 106. The browsing area 103 could also be positioned at the straight or curved edge of the device, so that it is easy to locate and use for a user. The scrolling 107 could also follow a semi-random pattern in the browsing area 103.

In a vertical list, a number of representations from the sequence 102 are shown in the browsing area 103. Typically, these representations move down at a certain speed, and the lowermost representation currently being shown is gradually hidden from view. At the same time, a previously hidden representation, which in the sequence follows the uppermost

representation currently being shown, is gradually brought into view. The scrolling 107 of the sequence 102 can be made infinitely long by letting the first representation in the sequence 102 follow the last representation, or by automatically reversing the direction of the scrolling 107. Alternatively, the representations could move down by fits and starts instead of moving down gradually.

Instead of gradually moving down the representations at a certain speed, the complete set of representations currently being shown could also be moved down at regular intervals, so that the lowermost representation completely falls outside the browsing area 103. This gives an available space at the top of the browsing area 103, in which a previously hidden representation can then be shown.

It should be clear that the above techniques can easily be adapted for situations in which horizontal or nonlinear scrolling is desired.

The selection 105 of a representation preferably comprises dragging the representation from the browsing area 103 to the display area 106. It could also comprise clicking with a mouse pointer or other input device on the representation, or a voice command identifying a representation. It could also comprise an instruction from another device, connected to the device 100, which controls the device 100.

The speed of the scrolling 107 should be low enough to allow a user to browse the image collection. However, different users have different opinions on what constitutes "low enough". To accommodate this, the device 100 allows a user to enter an input stroke in the browsing area 103. This input stroke could be made with a finger, or with a stylus or other input device. The speed of the scrolling 107 of the sequence 102 is varied in accordance with the speed of said input stroke. If the stroke was made very quickly, this is an indicator that the speed of the scrolling 107 should be increased, and similarly for slow strokes the speed should be decreased. The pressure exerted by the user could be measured, and a acceleration or de-acceleration in dependence of the measured pressure could be performed. If the user enters the input stroke with a stroking gesture into the flow direction, the flow speed increases whereby the acceleration depends on the speed of the input stroke. If the stroke ends outside the browsing area 103, the flow speed remains at the higher level, or, in an alternative embodiment, gradually decreases to the original level. If the stroking gesture ends inside the flow zone 102, the flow stops or de-accelerates, dependent on whether friction is simulated.

Similarly, the direction of an input stroke in the browsing area 103 can be used to vary the direction of the scrolling 107 of the sequence 102. If the input stroke is in the

direction opposite to the direction of the scrolling 107, the scrolling 107 should now go in the reverse direction. The speed of the scrolling 107 can be made dependent on the speed of the input stroke, as described above.

The device 100 could be arranged to learn from the user's behavior. For instance, the default direction and speed of the scrolling 107 could be changed when the user provides the appropriate input stroke. This way, the user has to change the speed and direction only once to have the device 100 suit his or her tastes. If the device 100 is further equipped with user identification means 108 , the default direction and speed of the scrolling 107 could be changed whenever another user is identified, so that each user can use the device 100 according to his or her own tastes.

To facilitate the execution of commands, the browsing means 101 can be arranged to show interleaved in the sequence 102 a representation of a command. In the sequence 102 as shown in Figure 1, the representation of the command "Settings" is shown. When the representation of the command is selected, the command will be executed. In this case, a settings menu will come up. This settings menu can be presented in the display area 106, or it can be presented as a new sequence of commands in the browsing area 103, interleaved with representations of images or with the representations removed from view.

In Figure 2, a more detailed view of the sequence 102 of representations is shown. Note that in Figure 1, portions of the sequence were shown dashed to indicate that they were not presently being shown on the display area 103. Figure 2 shows the sequence 102, comprising representations of images 200, 202, 204 and 208. These are shown together with respective border areas 201, 203, 205 and 209. The border area is in this embodiment presented to look like the edges of a roll of film, with appropriate holes for a reel. This makes the display of the sequence 102 easy to recognize for a user. Of course other presentations are also possible.

Interleaved with the representations of images 200, 202, 204 and 208 is the representation 206 of a command, in the shown example the command "Settings". When this representation 206 is selected, a settings configuration menu will be shown by the device, as described above with reference to Figure 1.

When border areas are used, the user can in addition to selecting a representation 200, 202, 204, 208, also select the border area 201, 203, 205, 209 of one such representation. When this happens, the browsing means 101 determines which category the representation whose border area is selected belongs to, and then shows only the representations belonging to that category. The representation 206 of a command may also

have a border area 207, if only to provide a consistent presentation of the whole sequence 102. Selecting the border area 207 may have the same effect as selecting the representation 206 of a command, or may show all available commands. The available commands can be seen as a category of some kind, so it is logical to have the category selection mechanism work this way for commands.

When there are many categories and many images, it is now possible to show an illustrative image for each category. Selecting that category then gives access to all the images in that category. A hierarchical organization of categories and subcategories also becomes possible. Each subcategory could be indicated by a further illustrative image, and selecting the border area of the illustrative image will show the corresponding subcategory. In this case, a means should be provided to navigate to a hierarchically higher-level category, for instance by providing a representation of a command such as "Back" or "Up" interleaved the sequence 102.

An alternative way to present categories is to employ images of photo rolls, each roll corresponding to a category or an image collection. Selecting a roll allows browsing the corresponding image collection using the browsing area 103. Since the metaphor of the photo roll is already used to present a single image collection, the metaphor of multiple photo rolls for multiple image collections is very suitable.

Although the invention has been described with reference to particular illustrative embodiments, variants and modifications are possible within the scope of the inventive concept. Thus, for example, "continuously scrolling" comprises scrolling in a variety of ways, such as scrolling smoothly, by fits and starts, or by moving the sequence 102 at regular intervals. The invention can be implemented by means of hardware comprising several distinct elements, and by means of a suitably programmed computer, in the device claim enumerating several means, several of these means can be embodied by one and the same item of hardware. Thus, for example, the browsing means 101 and the display means 104 could be formed by one and the same piece of hardware or as a single computer program which comprises code for executing the functions of both.

The word "comprising" does not exclude the presence of other elements or steps than those listed in a claim. In the claims, any reference signs placed between parentheses shall not be construed as limiting the claim.

A "computer program" is to be understood as any software product stored on a computer-readable medium, such as a floppy disk, downloadable via a network such as the Internet, or marketable in any other manner.

CLAIMS:

1. A device (100) for browsing an image collection, comprising browsing means (101) for showing a sequence (102) of representations (200, 202, 204, 208) in a browsing area (103), each representation (200, 202, 204, 208) corresponding to an image from the image collection, and display means (104) for showing, in response to a selection (105) of a representation (200, 202, 204, 208) from said sequence (102), in a display area (106) an image from the image collection corresponding to the selected representation (200, 202, 204, 208), characterized in that the browsing means (101) is arranged to show the sequence (102) by continuously scrolling (107) the sequence (102) in the browsing area (103).

2. A device (100) as claimed in claim 1, characterized in that a representation (200, 202, 204, 208) is shown together with a border area (201, 203, 205, 209), and the browsing means (101) is arranged to show, in response to a selection (105) of a border area (201, 203, 205, 209) of a representation (200, 202, 204, 208), representations (200, 202, 204, 208) in the sequence (102) belonging to the same category as the representation (200, 202, 204, 208) whose border area (201, 203, 205, 209) is selected.

3. A device (100) as claimed in claim 1, characterized in that the selection (105) of a representation (200, 202, 204, 208) comprises dragging the representation (200, 202, 204, 208) from the browsing area (103) to the display area (106).

4. A device (100) as claimed in claim 1, characterized in that a speed of the scrolling (107) of the sequence (102) is varied in accordance with a speed of an input stroke in the browsing area (103).

5. A device (100) as claimed in claim 1, characterized in that a direction of the scrolling (107) of the sequence (102) is varied in accordance with a direction of an input stroke in the browsing area (103).

6. A device (100) as claimed in claim 1, characterized in that the browsing means (101) is arranged to show interleaved in the sequence (102) a representation (206) of a command, and the device (100) is arranged to execute the command when the representation (206) of the command is selected.

7. A method of browsing an image collection, comprising showing a sequence (102) of representations (200, 202, 204, 208) in a browsing area (103), each representation (200, 202, 204, 208) corresponding to an image from the image collection, and showing, in response to a selection (105) of a representation (200, 202, 204, 208) from said sequence (102), in a display area (106) an image from the image collection corresponding to the selected representation (200, 202, 204, 208), characterized in that the sequence (102) is shown by continuously scrolling (107) the sequence (102) in the browsing area (103).

8. A computer program product enabling a programmable device when executing said computer program product to function as a device (100) as defined in any one of the claims 1-6.

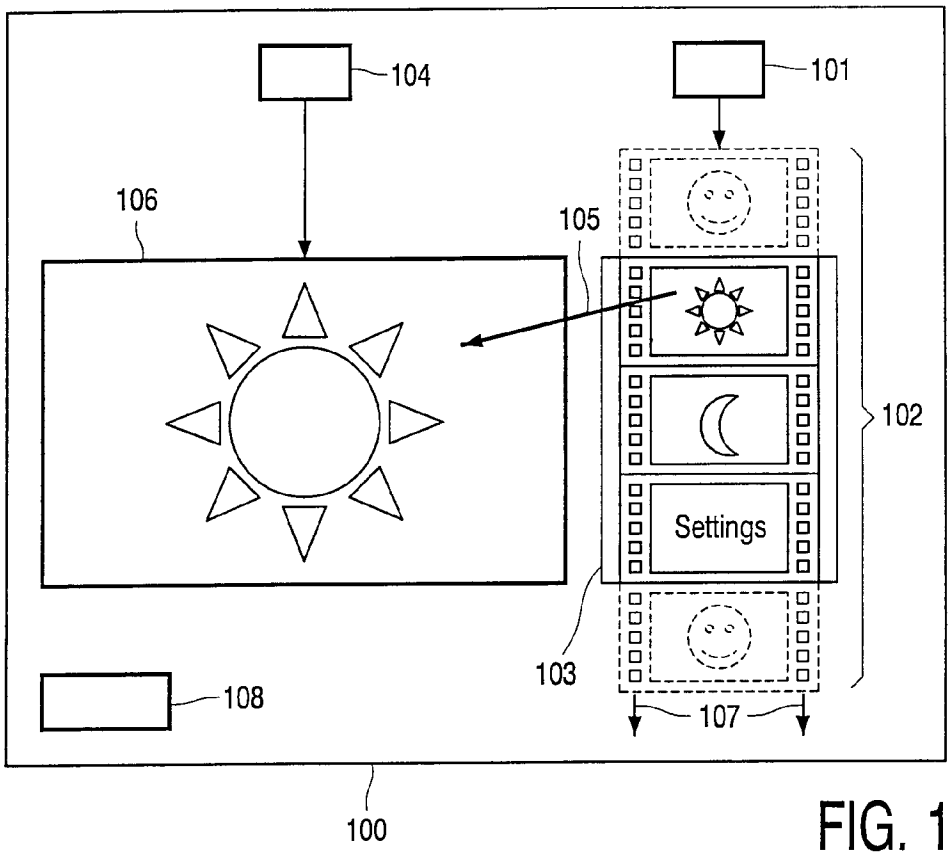

104
101
106
105
102
Settings
103
108
107
100

FIG. 1

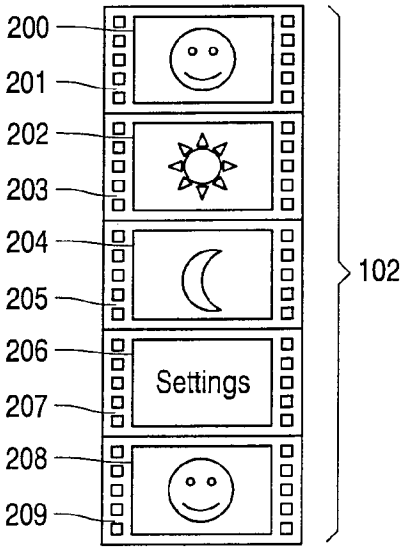

200
201
202
203
204
205
206
207
208
209
102
Settings

FIG. 2

CLAIMS 1-14, 16, 19 AND 20 OF THE '381 PATENT SHOULD BE REJECTED UNDER 35 U.S.C. § 102(B) AS ANTICIPATED BY *LIRA* PCT PUBLICATION WO 03/081458

U.S. Patent No. 7,469,381 ("the '381 Patent")

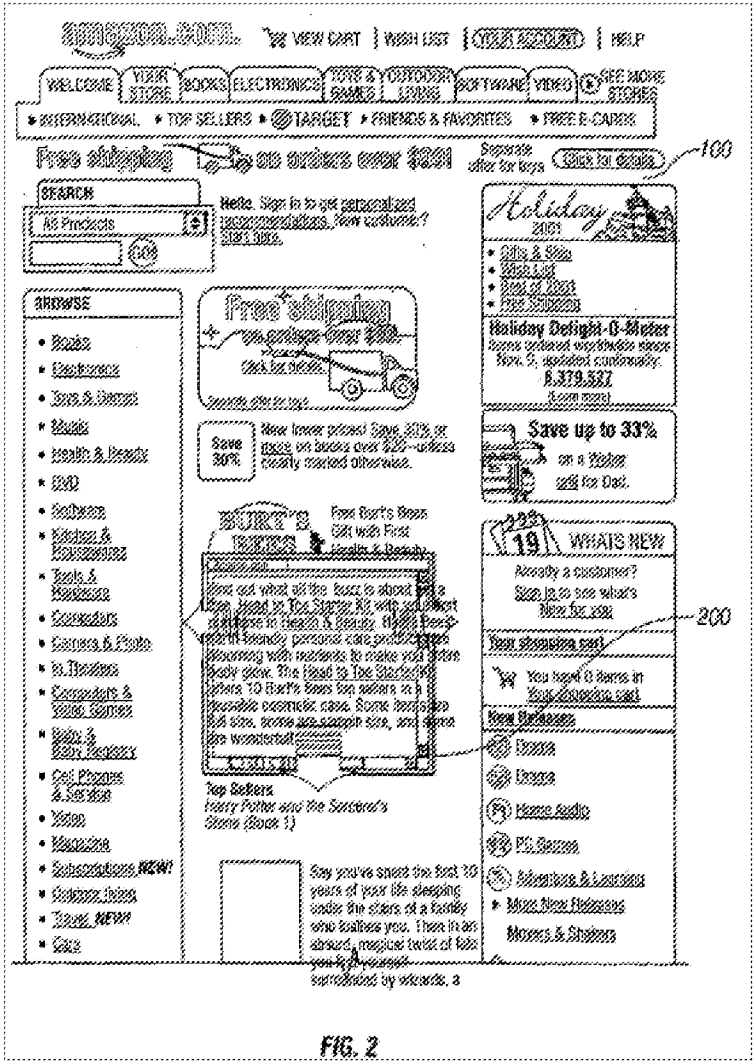
Earliest Possible Priority Date/Effective Filing Date: January 7, 2007

Reference

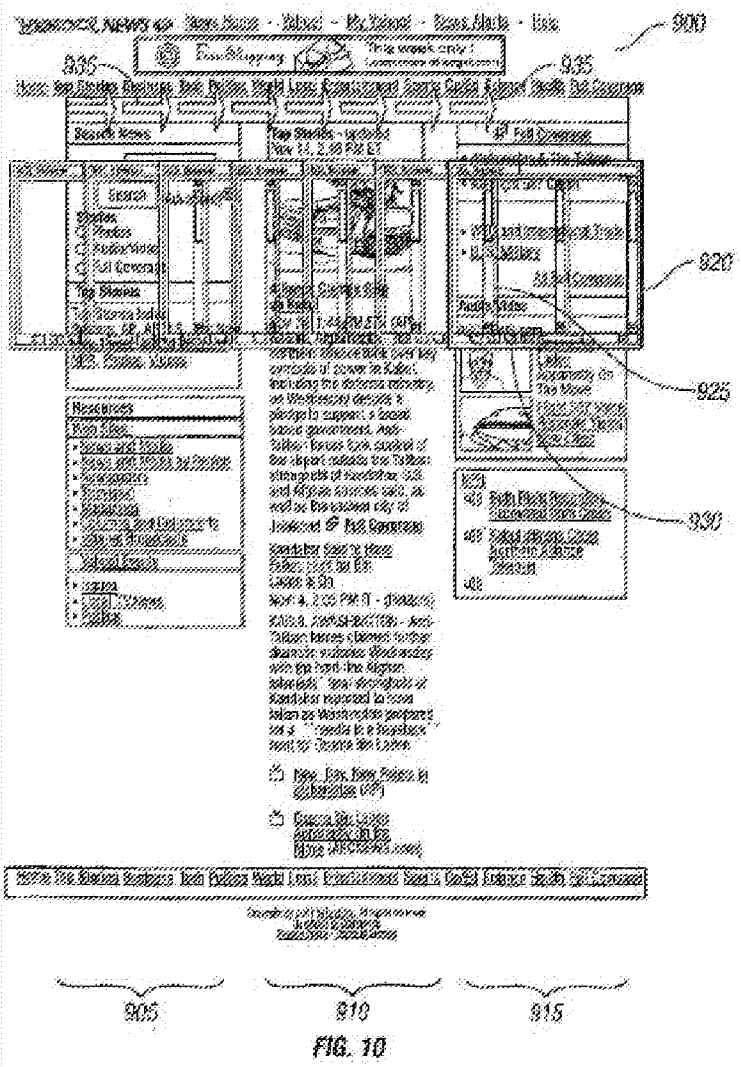
Reference: PCT Publication No. WO 03/081458 ("*Lira*")
Publication Date: October 2, 2003

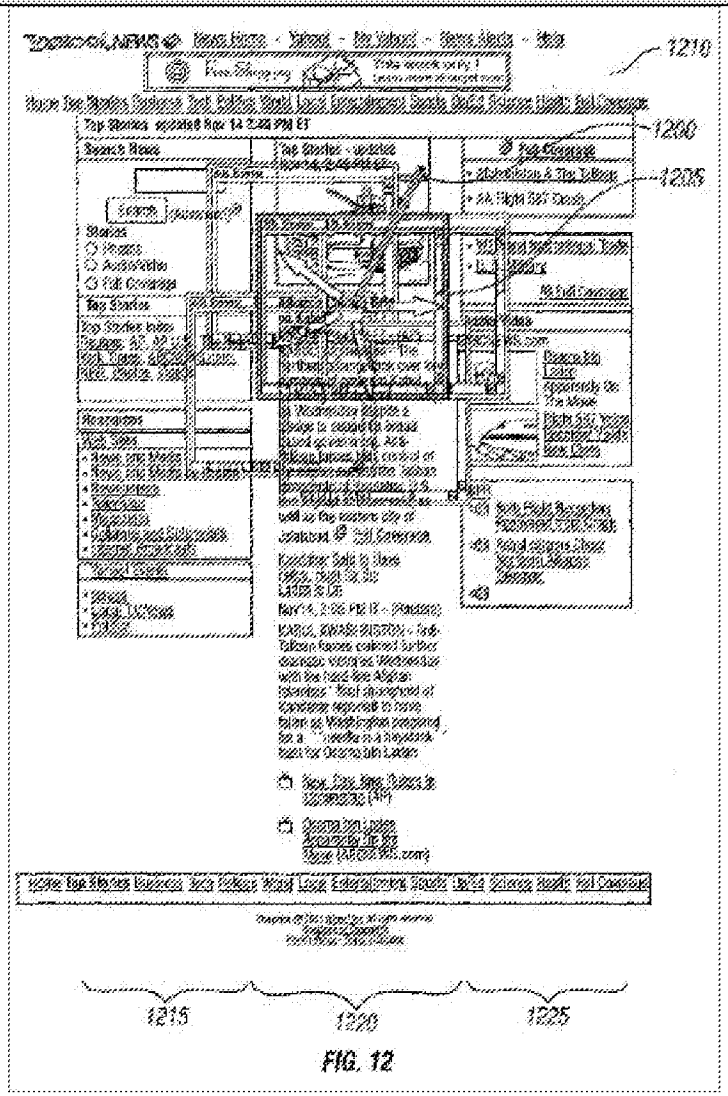
The '381 Patent Claims	Disclosure in *Lira*
1. A computer-implemented method, comprising:	*Lira* discloses a computer-implemented method. *Lira* discloses "a device having a small display or a small display window, such as, for example, a PDA, a telephone, a handheld computer, or an electronic book." *Lira*, p. 1, lns. 16-18. *Lira* explains that there is a "software application loaded on the client device 1820 or the host device 1830 for commanding and directing communications enabled by the client device 1820 or the host device 1830. Other examples include a program, a piece of code, an instruction, a device, a computer, a computer system, or a combination thereof, for independently or collectively instructing the client device 1820 or the host device 1830 to interact and operate as described." *Lira*, p. 19, lns. 21-27.
(a) at a device with a touch screen display:	*Lira* discloses a computer-implemented method at a device with a touch screen. *See, e.g.:* "The display may include a touch screen and tracking motion of the input tool may include tracking motion of the input tool on the touch screen." *Lira*, p. 3, lns. 10-11.
(b) displaying a first portion of an electronic document;	*Lira* discloses displaying a first portion of an electronic document. *Lira* discloses an electronic device for browsing an electronic document. As explained and illustrated in *Lira*, a display screen can be thought of as a small field-of-view window over a large image or

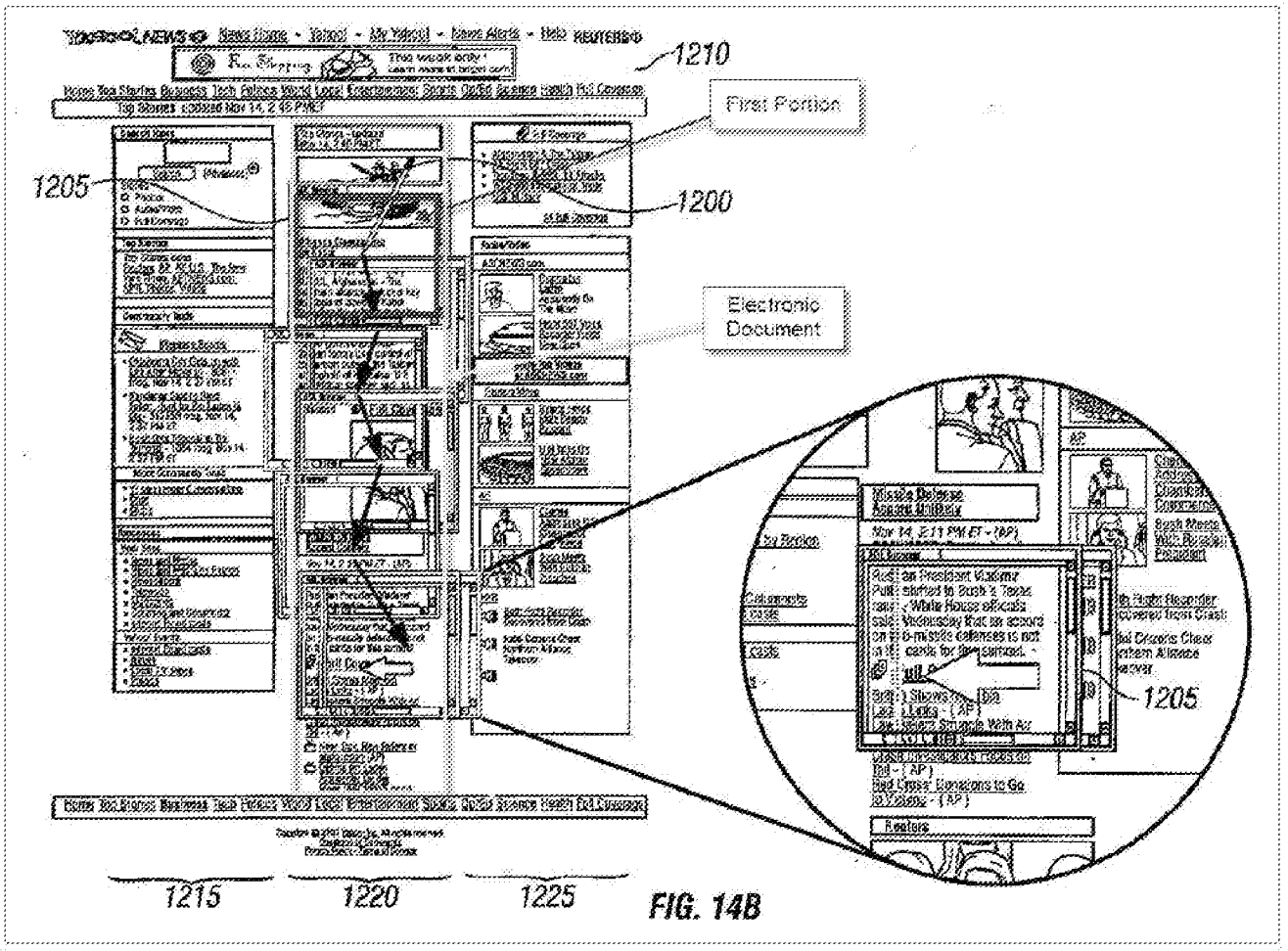
The '381 Patent Claims	Disclosure in *Lira*
	electronic document. For example: "A document served to a device having a small display or a small display window, such as, for example, a PDA … can be reformatted such that the width of the document is divided into columns, with each column being displayable across the entirety of the small display or display window." *Lira*, p. 1, lns. 16-20. As disclosed in *Lira*, the electronic document may be a web page with structured elements such as columns. Each logical column may be further treated as an electronic document as discussed further below, where each logical column (*e.g.*, items 1215, 1220, and 1225 shown in Figure 14) are sub-documents in a larger electronic document: the web page. As part of the browsing of an electronic document such as a web page, *Lira* will display a first portion of the electronic document. More details illustrating this follow. *Lira* illustrates the steps of scrolling an electronic document in its figures.

The '381 Patent Claims	Disclosure in *Lira*
	 FIG. 2 Figure 2 of *Lira* shows a web page (item 100) that is too large to display in its entirety on the relatively small screen of a device such as a PDA. Instead, only a portion of the web page can be readably displayed in the PDA's browser window at any given time. This is illustrated in Figure 2 by a display window (item 200) superimposed onto the web page. Since web page 100 is larger than display window 200, the

The '381 Patent Claims	Disclosure in *Lira*
	user must scroll back and forth along two dimensions (indicated in Figure 2 by arrows that indicate potential scrolling directions) to view different areas of the web page. *Lira* discloses scrolling through this web page by illustrating the position over time of one browser window performing a panning operation. In Figure 10, *Lira* illustrates a horizontal scrolling operation by showing multiple display windows that represent the path of a single window scrolling horizontally through the web page:

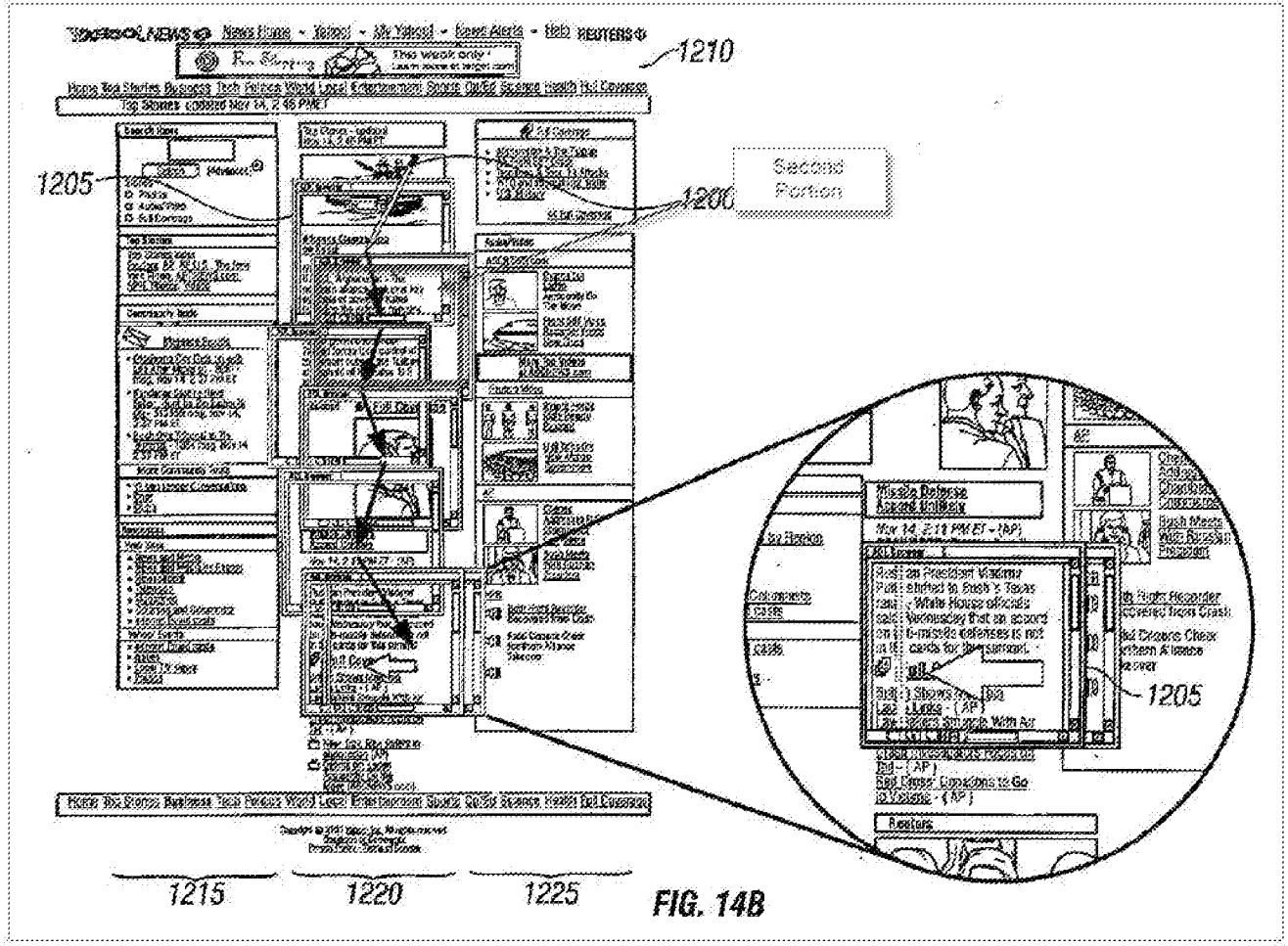
The '381 Patent Claims	Disclosure in *Lira*
	 FIG. 10 Figure 12 likewise illustrates scrolling this window in horizontal, vertical, or diagonal directions using a stylus pen:

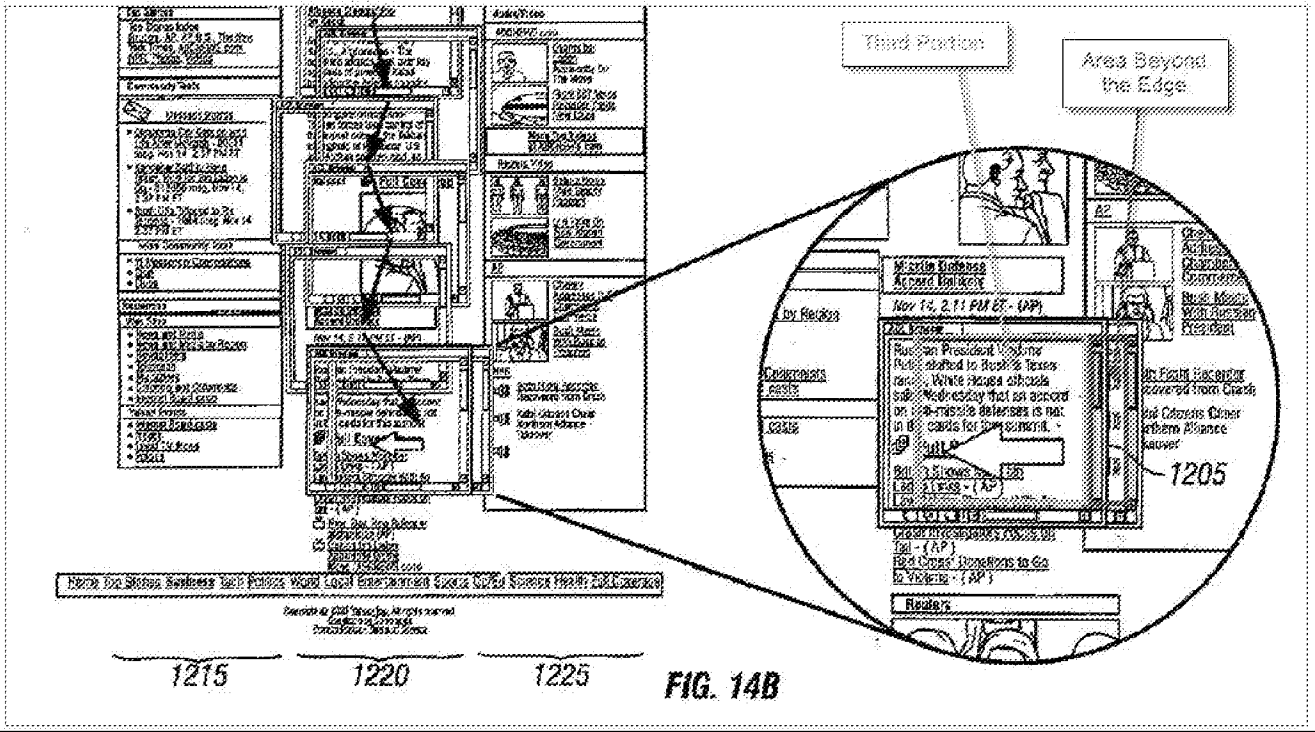
The '381 Patent Claims	Disclosure in *Lira*
	 FIG. 12 "Referring to Fig. 12, on a stylus-based PDA, the user can use a stylus 1200 to scroll a display window …" *Lira*, p. 14, lns. 18-20.

The '381 Patent Claims	Disclosure in *Lira*
	Figure 14B of *Lira* also shows how *Lira* displays a first portion of an electronic document. Figure 14B shows a path along which the user moves an input tool (*e.g.*, the above-reference stylus) to pan display window 1205 through portions of the underlying web page. This series of windows in Figure 14B depicts the positions over time of a single window as the window vertically scrolls through an underlying web page.  FIG. 14B As shown in the annotated figure, the logical column 1220 is an electronic document. For example,

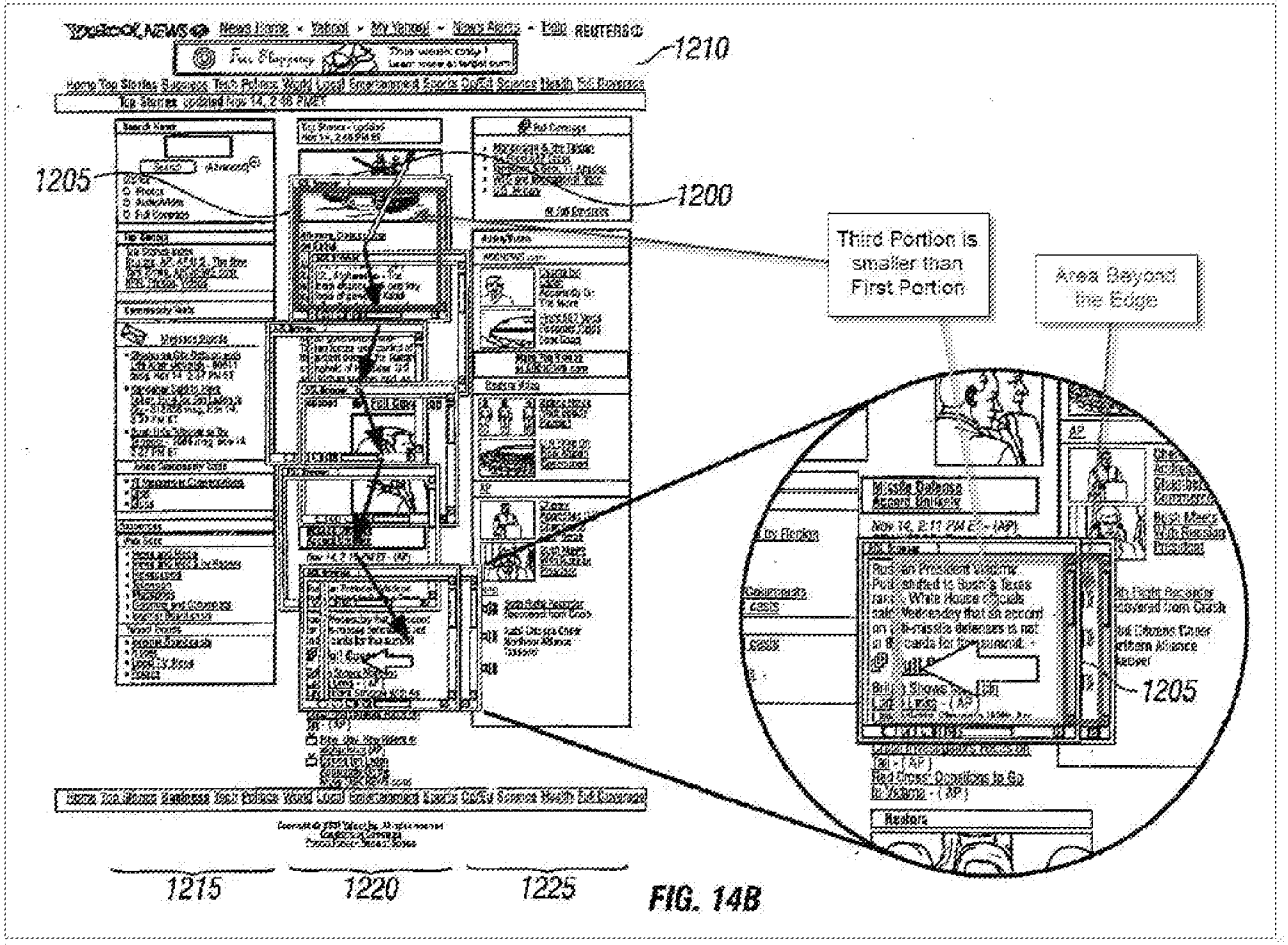
The '381 Patent Claims	Disclosure in *Lira*
	this logical column 1220 has boundaries. *See, e.g.*: If the user's scrolling exceeds the threshold, which indicates an intention to move beyond the boundary of the logical column 1220, the display is snapped to the adjacent or repositioned column. In other implementations, no snapping occurs when the user's scrolling exceeds the threshold. The snap-on-column feature can also be animated to provide, an appearance of movement as the display scrolls to the correct column-viewing position. *Lira*, p. 15, lns. 25-31. Logical columns 1215 and 1225 are likewise each electronic documents. All of these logical columns 1215, 1220, and 1225 are sub-documents in a larger electronic document: the web page. Each of these sub-documents is displayed on the display screen. Figure 14B illustrates several different portions of the electronic document 1220 being displayed in the display window over time. Any one of these displayed area of the logical column 1220 is a *portion* of that electronic document. Accordingly, an example of a first portion of an electronic document 1220 displayed by *Lira* is the portion highlighted in the annotated Figure 14 as reproduced above. *Lira* therefore discloses displaying a first portion of an electronic document.
(c) detecting a movement of an object on or near the touch screen display; in response to detecting the movement, translating the electronic document displayed on the touch screen display in a first direction to display a second portion of the electronic document, wherein the second portion is different from	*Lira* discloses detecting a movement of an object on the touch screen display and, in response, translating the electronic document to display a second portion of the electronic document that is different from the first. *See, e.g.*: In another general aspect, navigating on a display includes tracking motion of an input tool on a display, comparing the motion of the input tool to a threshold, changing the position of the visible portion of a page of information on the display if the motion exceeds the threshold, and constraining the position of the visible portion of the page of information on the display if the motion does not exceed the threshold. … The display may include a touch screen and tracking motion of the input tool may include tracking

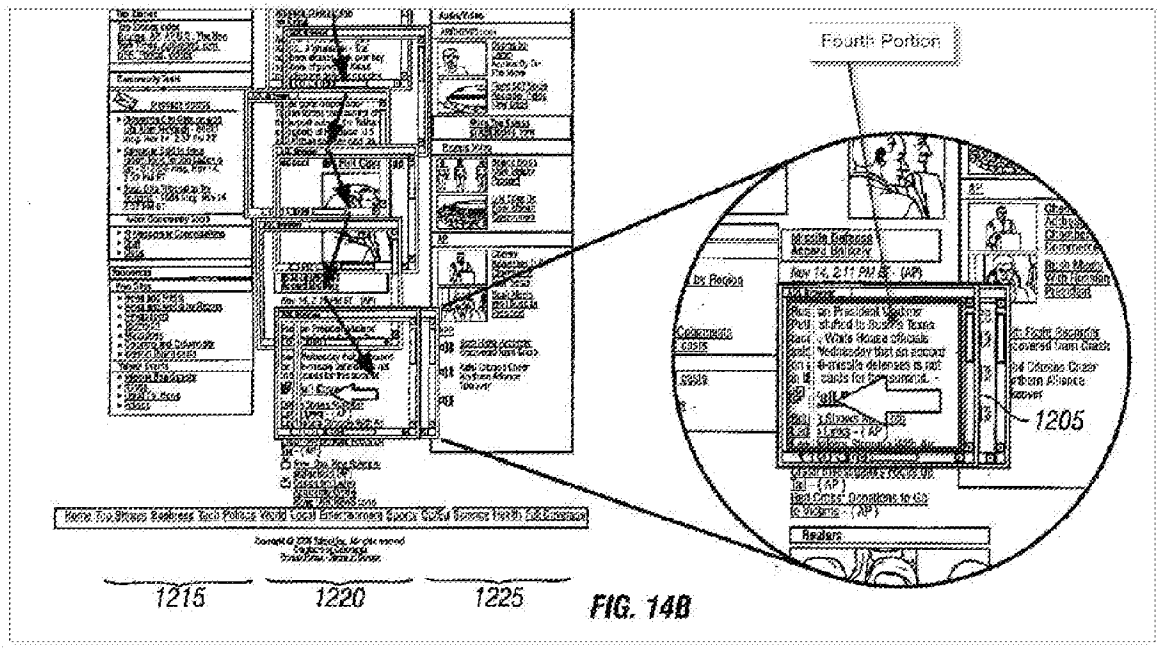
The '381 Patent Claims	Disclosure in *Lira*
the first portion;	motion of the input tool on the touch screen. The touch screen may include, for example, a resistive sensor, a capacitive sensor, an acoustic wave sensor, or an infrared sensor. The touch screen may include a sensor activated by touch activation force by the input tool on the display. *Lira*, p. 3, lns. 1-14. *Lira* further discloses "touch-and-drag" scrolling, where the user can "scroll the display window by placing a stylus 600 on the display window 605 and then dragging the stylus 600." *Lira*, p. 11, lns. 27-29. *See also Lira*, p. 14, ln. 29 - p. 15, ln. 30 & Figure 12. As the user drags the display window to scroll in a first direction, the electronic document is translated in the display so that a second portion of the electronic document that is different than the first portion of the electronic document will be displayed, as illustrated and highlighted in the annotated Figure 14B below.

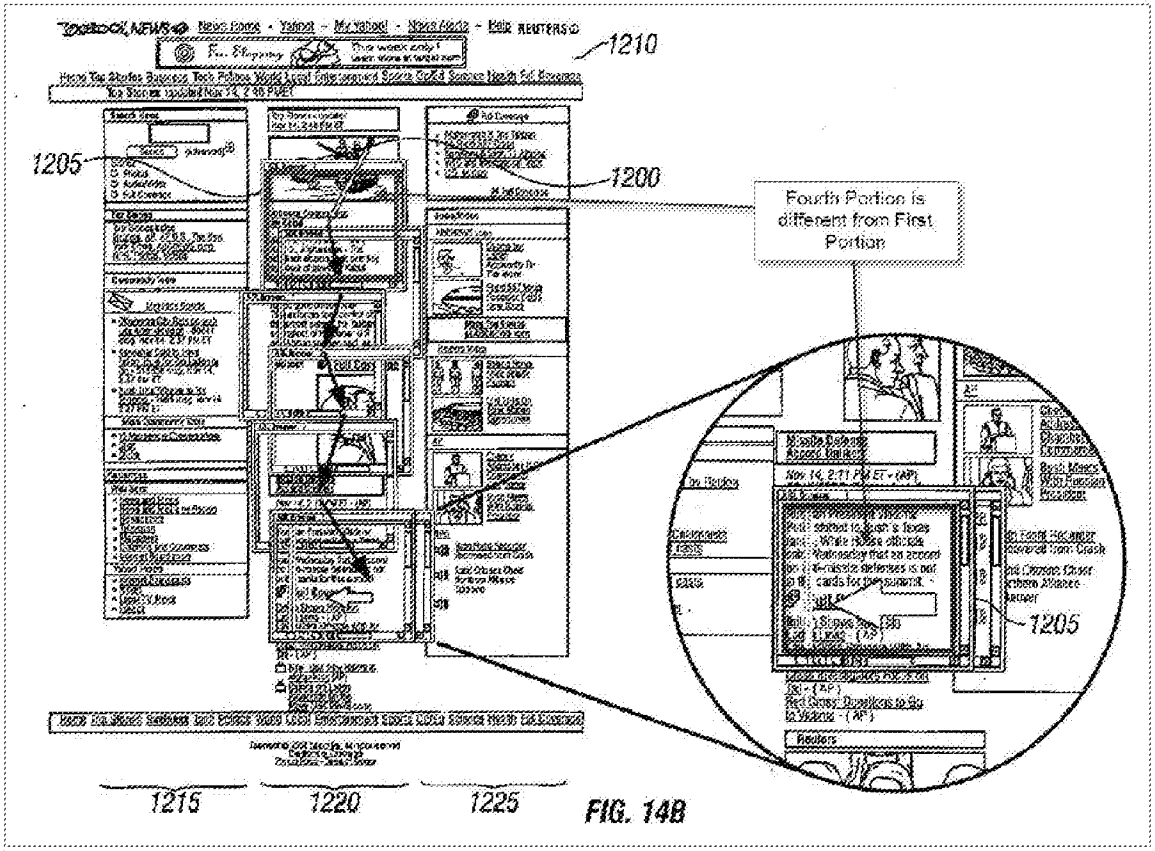
The '381 Patent Claims	Disclosure in *Lira*
	 FIG. 14B
(d) in response to an edge of the electronic document being reached while translating the electronic document in the first direction while the object is	*Lira* discloses in response to an edge of the electronic document being reached while translating the electronic document in the first direction while the object is still detected on the touch screen: displaying an area beyond the edge of the document, and a third portion that is smaller than the first portion. For example, in one mode described in *Lira*, if the user moves the screen away from the column being read (thus translating the document), an area beyond the edge of the column will be displayed.

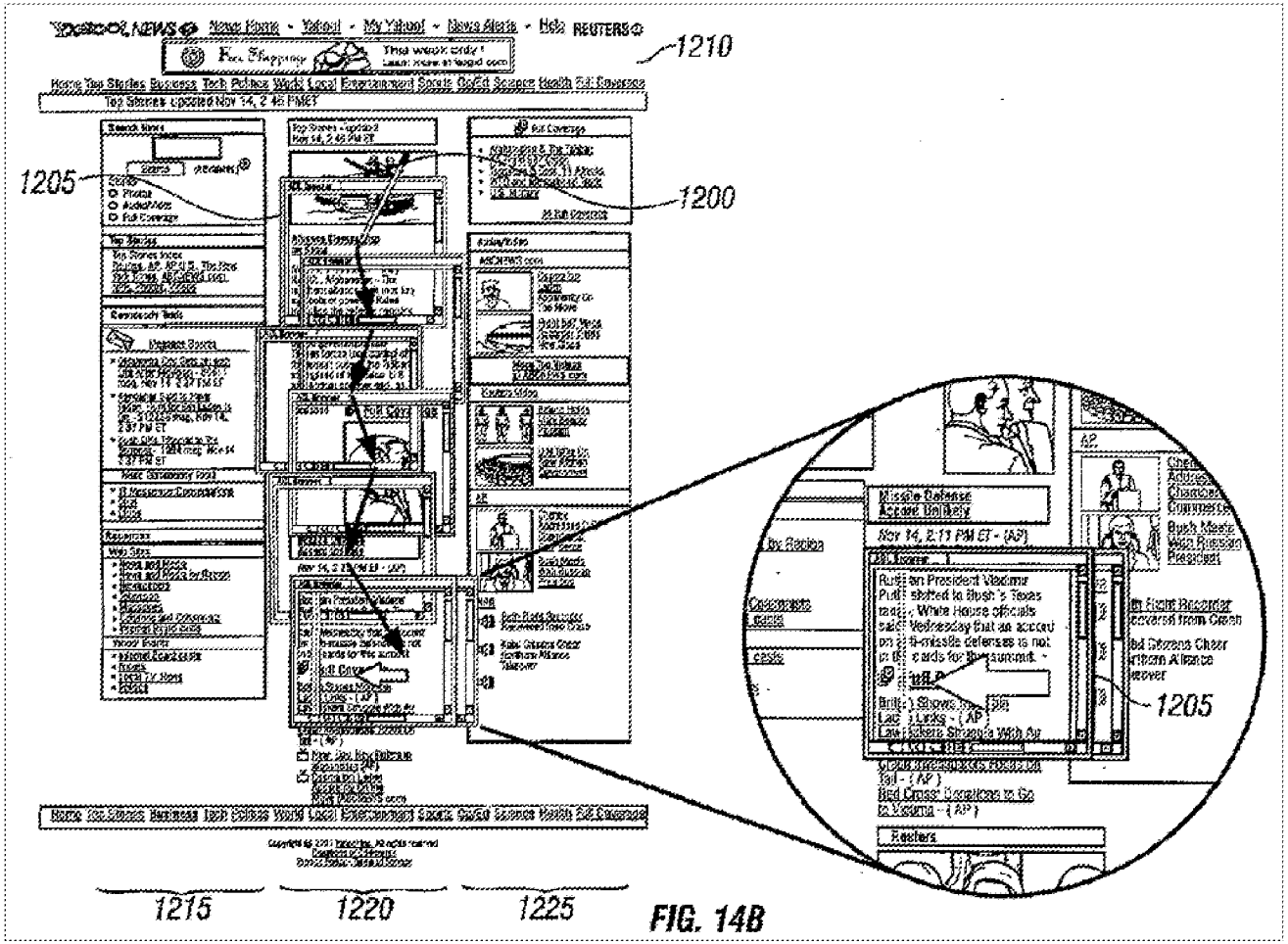
The '381 Patent Claims	Disclosure in *Lira*
still detected on or near the touch screen: displaying an area beyond the edge of the document, and displaying a third portion of the electronic document, wherein the third portion is smaller than the first portion; and	*Lira* discloses "vertical alignment control" which will align the display window to an edge of the electronic document. In one embodiment, *see e.g.*: "the vertical alignment control is enabled when the user lifts the pen 1200 from the display 1205," which causes the column "to snap into alignment with the display window as the user stops scrolling." *Lira*, p. 15, lns. 18-31. An annotated Figure 14B illustrates this "snap-to" behavior, including the conditions that trigger this "snap" behavior. As highlighted in the figure, the display window 1205 is displaying an area beyond the edge of the logical column 1220. Specifically, the display window 1205 is displaying an area of logical column 1220 and also displaying an area of logical column 1225 (a separate electronic document).  FIG. 14B

The '381 Patent Claims	Disclosure in *Lira*
	This same behavior is part of the continuation of the act of scrolling down the page described in the previous two steps. As the user continues to scroll the display window (at an angle to true vertical) down over the column and reaching an edge of the document, an area beyond the edge of the document is displayed. *Lira* discloses displaying a third portion of the electronic document that is smaller than the first portion. Continuing the example from the previous steps, as the user continues to drag the display window beyond the edge of the logical column 1220, the display window will increasingly pan over areas of logical column 1225. When this occurs, because the display window is only devoting a portion of its display area to the display of logical column 1220, the third portion of the column 1220 being displayed is smaller than the first portion of column 1220. The annotated Figure 14B below highlights an exemplary third-portions of the electronic document and an exemplary area beyond the edge of the document.

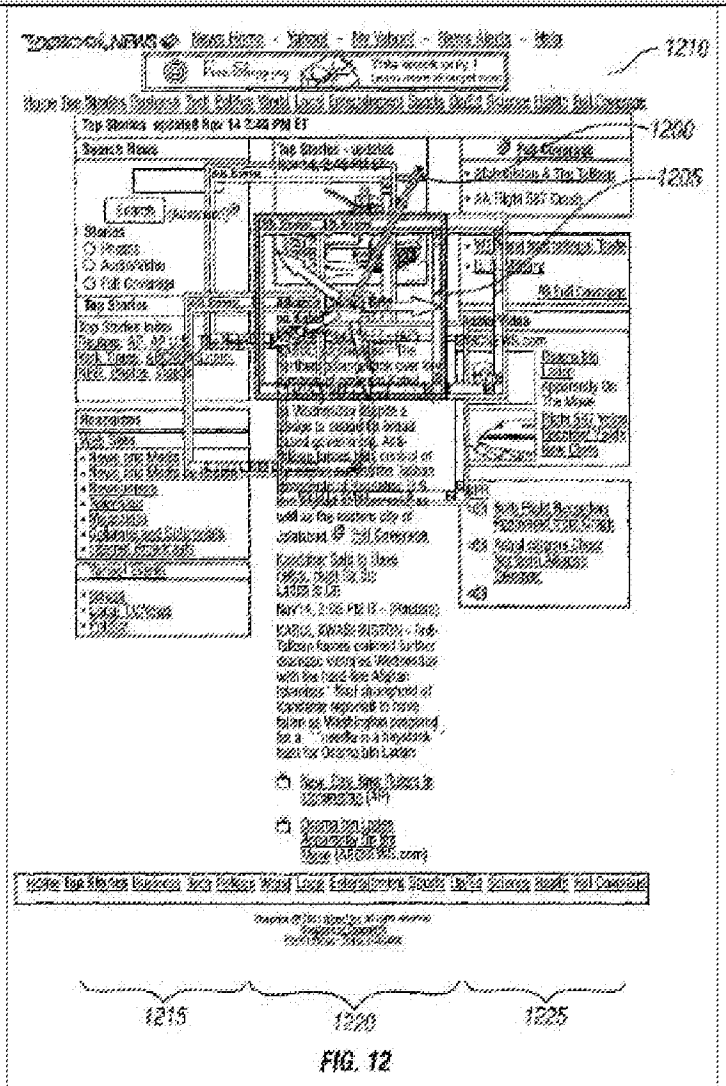
The '381 Patent Claims	Disclosure in *Lira*
	 FIG. 14B
(e) in response to detecting that the object is no longer on or near the touch screen display, translating the electronic document in a second direction until the area beyond the edge of the	*Lira* discloses in response to detecting that the object is no longer on or near the touch screen display, translating the electronic document in a second direction until the area beyond the edge of the electronic document is no longer displayed to display a fourth portion that is different from the first portion of the electronic document. *See, e.g.*: "as the pen 1200 is lifted from the screen" certain actions occur depending on whether the panning operation moving the display from column 1220 to column 1225 has exceeded some threshold.

The '381 Patent Claims	Disclosure in *Lira*
electronic document is no longer displayed to display a fourth portion of the electronic document, wherein the fourth portion is different from the first portion.	Specifically, when the user lifts the stylus or finger from the screen, "the logical column 1220 [will] snap into alignment with the display window 1205 as the user stops scrolling. The user can adjust the snap sensitivity by, for example, setting the alignment control to snap to the nearest logical column based on a user-defined threshold. If the user's scrolling does not exceed the threshold, which indicates an intention to continue to view the text column 1220, the display 1205 centers the logical column 1210 as the pen 1200 is lifted from the screen." *Lira*, p. 15, lns. 19-25. This snap-to function will move the document in a second direction, as indicated by the arrow in annotated Figure 14B, until the area beyond the edge of the column is no longer displayed. This will result in a fourth portion of the column 1220 being displayed, and will also result in no area of column 1225 being displayed, as shown in Figure 14B:  FIG. 14B *Lira* discloses the fourth portion is different from the first portion. *See, e.g.*:

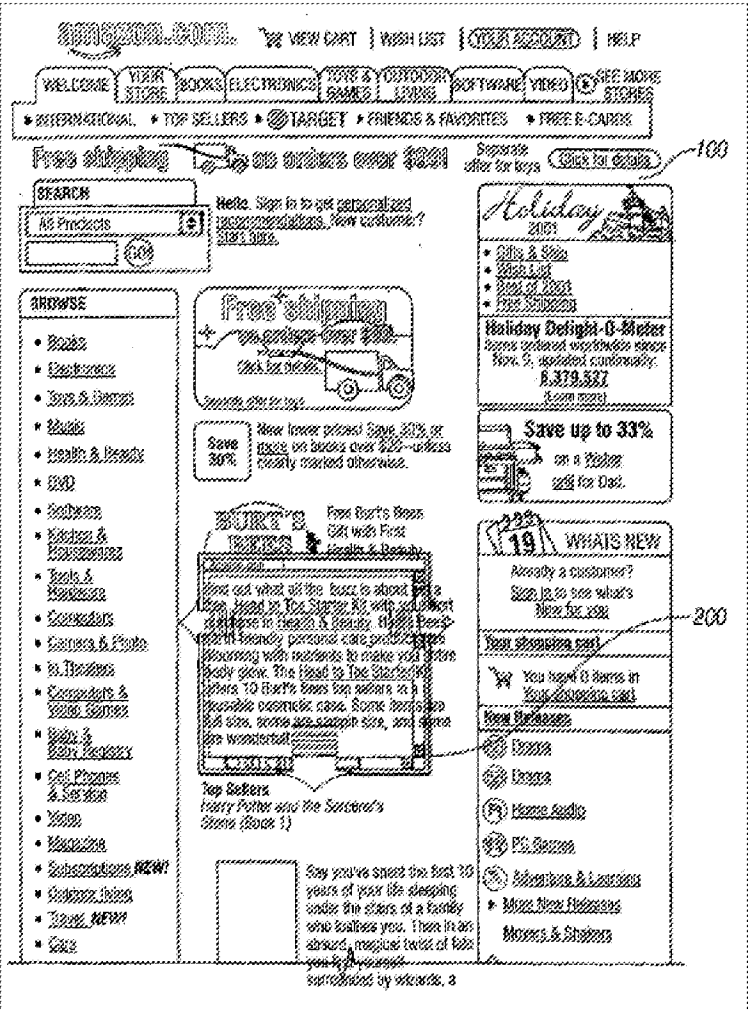
The '381 Patent Claims	Disclosure in *Lira*
	 FIG. 14B As shown in annotated Figure 14B, the highlighted fourth portion will be different from the highlighted first portion because the user has scrolled down through the electronic document.
2. The computer-implemented method of claim 1, wherein the first portion of the electronic document, the second portion of the electronic	*Lira* discloses the first portion of the electronic document, the second portion of the electronic document, the third portion of the electronic document, and the fourth portion of the electronic document are displayed at the same magnification. *See* claim 1; *see also*, *e.g.*:

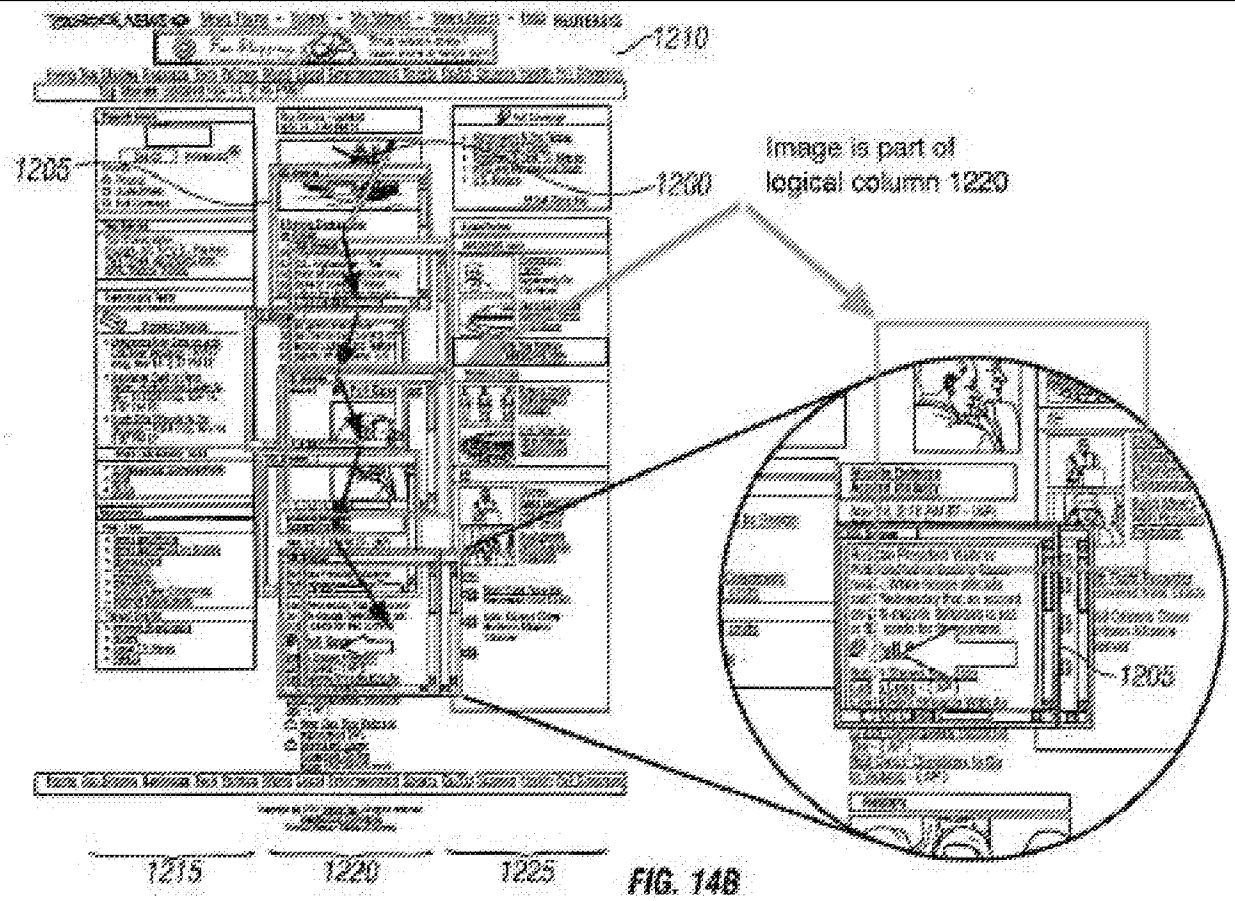
The '381 Patent Claims	Disclosure in *Lira*
document, the third portion of the electronic document, and the fourth portion of the electronic document are displayed at the same magnification.	 FIG. 14B As Figure 14B illustrates, the magnification of the web page (*i.e.*, the electronic document) is not changed as the user browses through the page; instead, the underlying web page is displayed at the same magnification as window 1205 moves to display the different first, second, third and fourth portions illustrated above.
3. The computer	*Lira* discloses that the movement of the object is on the touch screen display.

The '381 Patent Claims	Disclosure in *Lira*
implemented method of claim 1, wherein the movement of the object is on the touch screen display.	*Lira* discloses that the touch screen input occurs in response to the user touching or pressing the touch screen display, either through a finger or a stylus pen (*i.e.*, the object). *See* claim 1 and *Lira*, p. 3, lns. 6-9; *see also, e.g.*: The display may include a touch screen and tracking motion of the input tool may include tracking motion of the input tool on the touch screen. The touch screen may include, for example, a resistive sensor, a capacitive sensor, an acoustic wave sensor, or an infrared sensor. The touch screen may include a sensor activated by touch activation force by the input tool on the display. *Lira*, p. 3, lns. 10-14.
4. The computer-implemented method of claim 1, wherein the object is a finger.	*Lira* discloses that the user can operate the touch screen using his finger. *See, e.g.*: "the input tool may be a pen stylus or a finger, and the tracking motion of the input tool may include tracking the pen or finger on the display surface." *Lira*, p. 3, lns. 6-9.
5. The computer-implemented method of claim 1, wherein the first direction is a vertical direction, a horizontal direction, or a diagonal direction.	*Lira* discloses that the first direction is a vertical direction, a horizontal direction, or a diagonal direction. *Lira* discloses that the direction of scrolling (*i.e.*, the first translation direction) can be horizontal, vertical, or diagonal, such that the first direction can be any direction as shown by the arrows depicted in Figures 12 & 14B. *See* also claim 1, as well as *e.g.*: "vertical alignment control" that can be used to minimize wobble "during vertical scrolling." *Lira*, p. 14, lns. 29-30. *See also* Figures 12 & 14B.

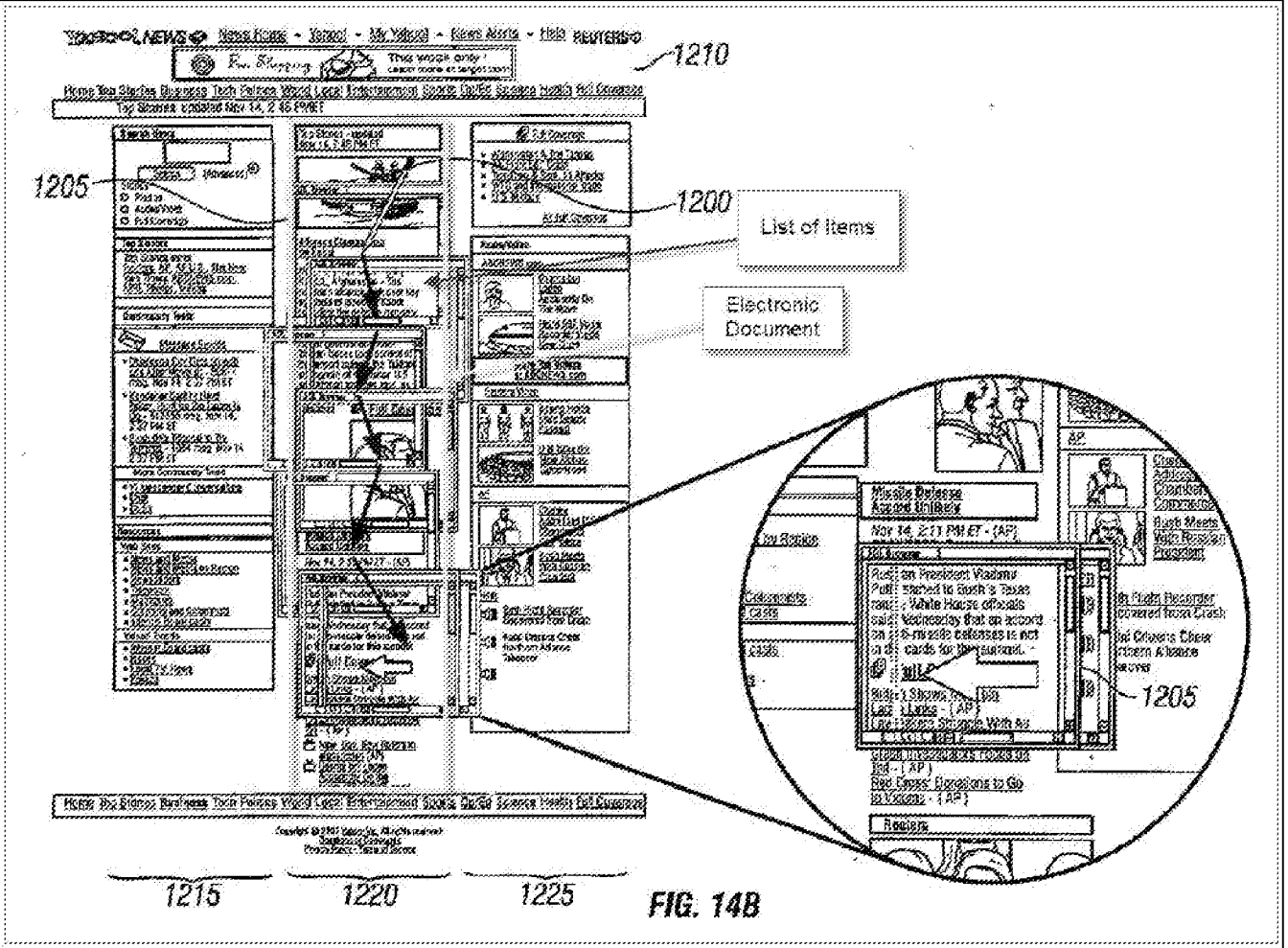
The '381 Patent Claims	Disclosure in *Lira*
	 FIG. 12
6. The computer-implemented method of claim 1, wherein the electronic document is a	*Lira* discloses that the electronic document is a web page. *See* claim 1(b). *See also, e.g.*:

The '381 Patent Claims	Disclosure in *Lira*
web page.	Pages encoded according to hypertext markup language ("HTML") are designed for display in display windows of different sizes... In some cases, a display window may constitute the entirety of the display.... In other cases, the display window may be purposefully sized to be substantially smaller than the overall size of the display. *Lira*, p. 8, lns. 10-18. *See also*: "The electronic document may be coded in hypertext markup language ('HTML')." *Lira*, p. 2, lns. 22-23. *Lira* discloses that the electronic document that the user views through the device is a web page (*e.g.*, item 100 in Figure 2 or item 1210 in Figure 14B). Moreover, in the Background section, *Lira* states "[t]he user of the computer can view the entire Web page on one screen display or can easily scroll a short distance to view other portions of the Web page.... [W]hen content is displayed on ... the display window of a personal digital assistant ("PDA"), only a small portion of the Web page is displayed." *Lira*, p. 1, lns. 8-13.
7. The computer-implemented method of claim 1, wherein the electronic document is a digital image.	*Lira* discloses that the electronic document includes a digital image. More specifically, the web pages disclosed in *Lira* include images. *See*, *e.g.*, *Lira,* Figures 2, annotated 14B (showing web pages that include images such as items 100 and 1210).

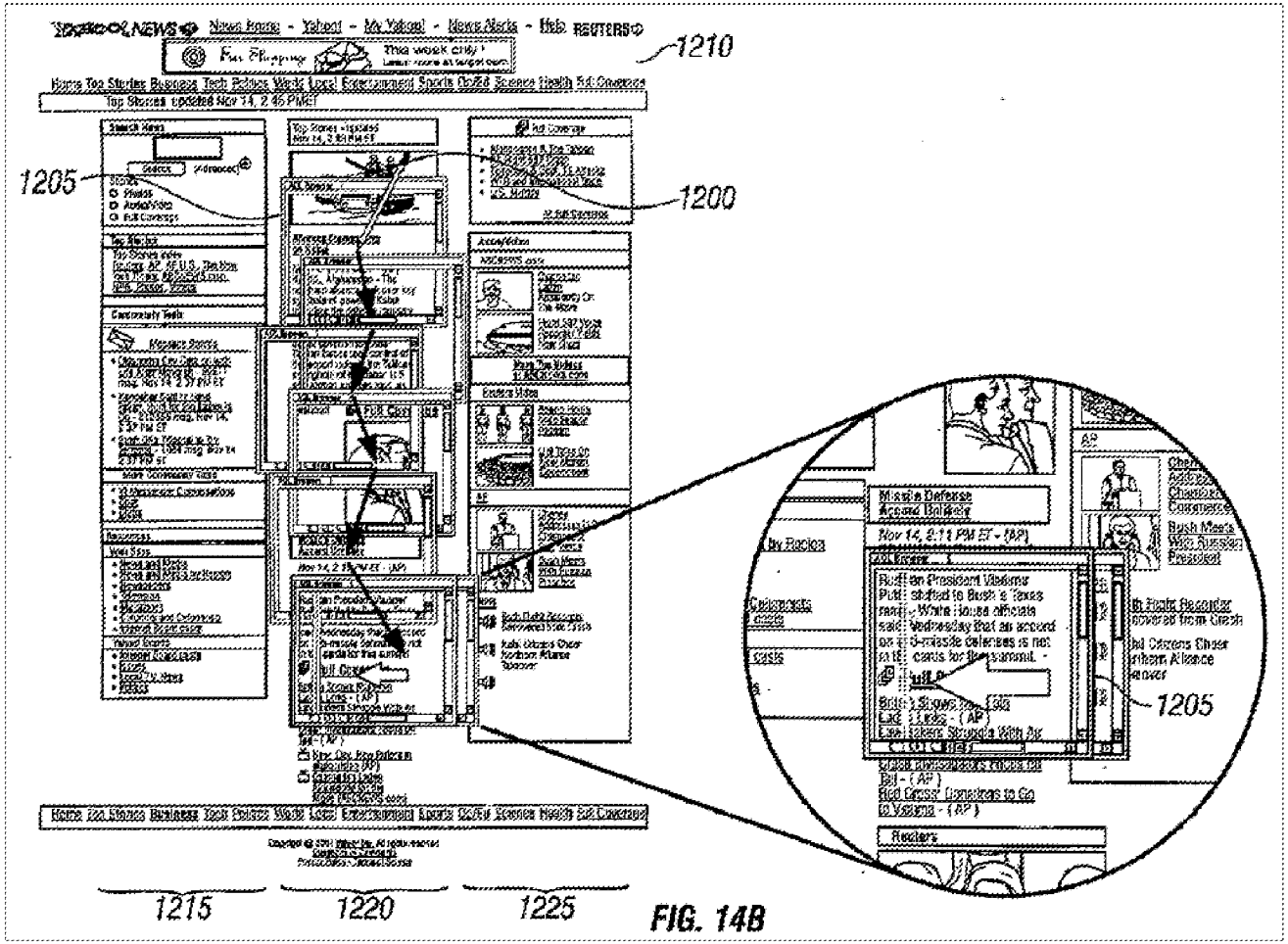
The '381 Patent Claims	Disclosure in *Lira*
	 FIG. 2

The '381 Patent Claims	Disclosure in *Lira*
	 FIG. 14B
8. The computer-implemented method of claim 1, wherein the electronic document is a word processing, spreadsheet, email or presentation document.	*Lira* discloses that the electronic document is a presentation document or a spreadsheet. *Lira* discloses applying the methods discussed in it to a presentation document. *See, e.g.*: "other electronic documents ... formatted for viewing and navigation." *Lira*, p.1, ln 7. *Lira* also discloses applying the methods discussed in it to a spreadsheet document: "Such a control may be used to limit vertical movement when scrolling horizontally in, for example, a spreadsheet application." *Lira*, p. 16, lns. 1-3.

The '381 Patent Claims	Disclosure in *Lira*
	The example above shows that *Lira* discloses that the electronic document is a spreadsheet or presentation document, thereby meeting the limitation for which the showing of any single one of a spreadsheet, presentation document, word processing or email is sufficient.
9. The computer-implemented method of claim 1, wherein the electronic document includes a list of items.	*Lira* discloses the electronic document includes a list of items. For example, as shown in annotated Figure 14B, the highlighted logical columns of the web page as disclosed by *Lira* include lists of items.

The '381 Patent Claims	Disclosure in *Lira*
	 FIG. 14B
10. The computer-implemented method of claim 1, wherein the second direction is opposite the first direction.	*Lira* discloses that the second direction is opposite the first direction. As noted above (*see* claim 5), *Lira* discloses that the first direction can be horizontal, vertical, or diagonal, such that the first direction can be any direction – including the opposite direction of the "snap to" operation. The goal of *Lira*'s snap-to function is to "cause[] the logical column 1220 to snap into alignment with the display window 1205 as the user stop scrolling." *Lira*, p. 15, lns. 19-21.

The '381 Patent Claims	Disclosure in *Lira*
	Accordingly, in the case where the first direction is a horizontal translation only to the right, then the second direction is opposite the first direction (*i.e.*, a horizontal translation to the left). *See also* claim 1.
11. The computer-implemented method of claim 1, wherein translating in the first direction prior to reaching an edge of the document has an associated speed of translation that corresponds to a speed of movement of the object.	*Lira* discloses translating in the first direction prior to reaching an edge of the document has an associated speed of translation that corresponds to a speed of movement of the object. *See, e.g.*: "[m]oving the page of information may include moving the page a distance equal to a change in the coordinate information of the input tool multiplied by a factor based on the acceleration or the velocity of the input tool." *Lira*, p. 5, lns. 13-15. For example, *Lira*'s "touch-and-drag" scrolling, where the user can "scroll the display window by placing a stylus 600 on the display window 605 and then dragging the stylus 600." *Lira*, p. 11, lns. 27-29, *see also Lira* at p. 14, ln. 29 – p. 15, ln. 30 & Figure 12. As the user drags the display window to scroll in a first direction, the electronic document is translated in the display so that a second portion of the electronic document that is different than the first portion of the electronic document will be displayed, as illustrated in Figure 14B. *See also* claim 1, including claim 1(c).
12. The computer-implemented method of claim 1, wherein translating in the first direction is in accordance with a simulation of an equation of motion having friction.	*Lira* discloses translating in the first direction is in accordance with a simulation of an equation of motion having friction. *See, e.g.*: "For example, the user may select a variable velocity that begins scrolling the display slowly, picks up speed, and then slows down again as the displayed portion approaches the second view." *Lira*, p. 14, lns 15 – 17 (disclosing translation of the document so that the translation speed is slower at the beginning and end of the translations, thus simulating friction and inherently relying on some equation to calculate this variable speed).
13. The computer-implemented method of claim 1, wherein the area beyond the edge of the document is black, gray, a solid color, or white.	*Lira* discloses that the area beyond the edge of the document displayed is black, gray, a solid color, or white. The area beyond the edge will be dictated by the particular web page column (*i.e.*, document) being scrolled in *Lira*. For example, in Figure 14B, if the background of the web page is a solid color (*e.g.* white), that will be the color of the area beyond the edge of the document, given that the area beyond the edge will be a portion of the neighboring column 1225. Thus, under this example, the area beyond the edge of the column displayed is a solid color, *e.g.* white.

The '381 Patent Claims	Disclosure in *Lira*
	 FIG. 14B
14. The computer-implemented method of claim 1, wherein the area beyond the edge of the document is visually	*Lira* discloses the area beyond the edge of the document is visually distinct from the document For example, Figure 14B shows the neighboring column displayed beyond the edge of the document, which is visually distinct from the document. *See also* claim 1(d) (showing the area beyond the edge of the document).

The '381 Patent Claims	Disclosure in *Lira*
distinct from the document.	
16. The computer-implemented method of claim 1, wherein changing from translating in the first direction to translating in the second direction until the area beyond the edge of the document is no longer displayed makes the edge of the electronic document appear to be elastically attached to an edge of the touch screen display or to an edge displayed on the touch screen display.	*Lira* discloses changing from translating in the first direction to translating in the second direction until the area beyond the edge of the document is no longer displayed makes the edge of the electronic document appear to be elastically attached to an edge of the touch screen display. For example, *Lira*'s snap-to function "causes the logical column 1220 to snap into alignment with the display window 1205 as the user stop scrolling." *Lira*, p. 15, lns. 19-21. This snap-to-align function therefore makes the edge of the electronic document appear to be elastically attached to an edge of the touch screen display. *See also* claim 1.
19. A device, comprising:	*Lira* discloses a device. *See* claim 1 preamble.
(a) a touch screen display;	*Lira* discloses a device comprising a touch screen display. *See* claim 19 preamble and claim 1(a).
(b) one or more processors;	*Lira* discloses a device comprising one or more processors. *See* claim 1 preamble. *See also, e.g.*: "The client system 1805 typically includes one or more client devices and/or client controllers..... For example, the client system 1805 or the host system 1810 may include one or more general-purpose computers (*e.g.*, personal computers), one or more special-purpose computers (*e.g.*, devices specifically programmed to communicate with each other and/or the client system 1805 or the host system 1810), or a combination of one or more general-purpose computers and one or more special-purpose computers." *Lira*, p. 18, lns. 23-30.

The '381 Patent Claims	Disclosure in *Lira*
(c) memory; and	*Lira* discloses a device comprising memory. "The client controller 1825 and the host controller 1835 may be embodied permanently or temporarily in any type of machine, component, physical or virtual equipment, storage medium..." *Lira*, p. 19, lns. 27-29.
(d) one or more programs, wherein the one or more programs are stored in the memory and configured to be executed by the one or more processors, the programs including:	*Lira* discloses a device comprising one or more programs in the form of software, code and/or instructions stored in memory and configured to be executed by the processor(s). *See* claims 1 and 20 preambles.
(e) instructions for displaying a first portion of an electronic document;	*Lira* discloses instructions for displaying a first portion of an electronic document. *See* claims 1(b) and 19(d).
(f) instructions for detecting a movement of an object on or near the touch screen display; instructions for translating the electronic document displayed on the touch screen display in a first direction to display a second portion of the electronic document, wherein the second portion is different from the first portion, in response to detecting the movement;	*Lira* discloses instructions for detecting a movement of an object on the touch screen display and, in response, translating the electronic document to display a second portion of the electronic document that is different from the first. *See* claims 1(c) and 19(d).

The '381 Patent Claims	Disclosure in *Lira*
(g) instructions for displaying an area beyond an edge of the electronic document and displaying a third portion of the electronic document, wherein the third portion is smaller than the first portion, in response to the edge of the electronic document being reached while translating the electronic document in the first direction while the object is still detected on or near the touch screen display; and	*Lira* discloses instructions for, in response to an edge of the electronic document being reached while translating the electronic document in the first direction while the object is still detected on the touch screen: displaying an area beyond the edge of the document, and a third portion that is smaller than the first portion. *See* claims 1(d) and 19(d).
(h) instructions for translating the electronic document in a second direction until the area beyond the edge of the electronic document is no longer displayed to display a fourth portion of the electronic document, wherein the fourth portion is different from the first portion, in response to detecting that the object is no longer on or near the touch screen display.	*Lira* discloses instructions for, in response to detecting that the object is no longer on or near the touch screen display, translating the electronic document in a second direction until the area beyond the edge of the electronic document is no longer displayed to display a fourth portion that is different from the first portion of the electronic document. *See* claims 1(e) and 19(d).
20. A computer readable storage medium having	*Lira* discloses a computer readable storage medium having stored therein instructions, which when executed by a device with a touch screen display.

The '381 Patent Claims	Disclosure in *Lira*
stored therein instructions, which when executed by a device with a touch screen display, cause the device to:	*See* preamble of claims 1 and 19, as well as claims 1(a) and 19(d). *Lira* states that "[t]he client controller 1825 and the host controller 1835 may be embodied permanently or temporarily in any type of machine, component, physical or virtual equipment, storage medium, or propagated signal capable of providing instructions to the client device 1820 or the host device 1830." *Lira*, p. 19, lns. 27-30.
(a) display a first portion of an electronic document;	*Lira* discloses displaying a first portion of an electronic document *See* claim 1(b).
(b) detect a movement of an object on or near the touch screen display; translate the electronic document displayed on the touch screen display in a first direction to display a second portion of the electronic document, wherein the second portion is different from the first portion, in response to detecting the movement;	*Lira* discloses detecting a movement of an object on the touch screen display and, in response, translating the electronic document to display a second portion of the electronic document that is different from the first. *See* claim 1(c).
(c) display an area beyond an edge of the electronic document and display a third portion of the electronic document, wherein the third portion is smaller than the first portion, if the edge of the electronic document is reached while translating the electronic document in	*Lira* discloses in response to an edge of the electronic document being reached while translating the electronic document in the first direction while the object is still detected on the touch screen: displaying an area beyond the edge of the document, and a third portion that is smaller than the first portion. *See* claim 1(d).

The '381 Patent Claims	Disclosure in *Lira*
the first direction while the object is still detected on or near the touch screen display; and	
(d) translate the electronic document in a second direction until the area beyond the edge of the electronic document is no longer displayed to display a fourth portion of the electronic document, wherein the fourth portion is different from the first portion, in response to detecting that the object is no longer on or near the touch screen display.	*Lira* discloses in response to detecting that the object is no longer on or near the touch screen display, translating the electronic document in a second direction until the area beyond the edge of the electronic document is no longer displayed to display a fourth portion that is different from the first portion of the electronic document. *See* claim 1(e).

CLAIMS 7, 13-15, 17 AND 18 OF THE '381 PATENT SHOULD BE REJECTED UNDER 35 U.S.C. § 103 AS RENDERED OBVIOUS BY *LIRA* PCT PUBLICATION WO 03/081458

U.S. Patent No. 7,469,381 ("the '381 Patent")

Earliest Possible Priority Date/Effective Filing Date: January 7, 2007

Reference

Reference: PCT Publication No. WO 03/081458 ("*Lira*")
Publication Date: October 2, 2003

The '381 Patent Claims	**Disclosure in *Lira***
1. A computer-implemented method, comprising: (a) at a device with a touch screen display: (b) displaying a first portion of an electronic document; (c) detecting a movement of an object on or near the touch screen display; in response to detecting the movement, translating the electronic document displayed on the touch screen display in a first direction to display a second portion of the electronic document, wherein the second portion is different from the first portion; (d) in response to an edge of the electronic document being reached while translating the electronic document in the first direction while the object is still detected on or near the touch screen: displaying an area beyond the edge of the document, and displaying a third portion of the electronic document, wherein	*See* Exhibit 6, Part A, claim 1.

The '381 Patent Claims	Disclosure in *Lira*
the third portion is smaller than the first portion; and (e) in response to detecting that the object is no longer on or near the touch screen display, translating the electronic document in a second direction until the area beyond the edge of the electronic document is no longer displayed to display a fourth portion of the electronic document, wherein the fourth portion is different from the first portion.	
7. The computer-implemented method of claim 1, wherein the electronic document is a digital image.	*Lira* discloses this feature. *See* Exhibit 6, Part A, claim 7. However, even assuming for the sake of argument that *Lira* does not explicitly disclose applying its methods to a digital image, it would have been obvious to do so for a number of reasons. For example, it was well known in the art at the time of the invention that images could be included within a web page which is an electronic document disclosed by *Lira*. In fact, the web page shown in *Lira* includes digital images. *See*, *e.g.*, *Lira,* Figures 2, 14B (showing web pages that include images such as items 100 and 1210).

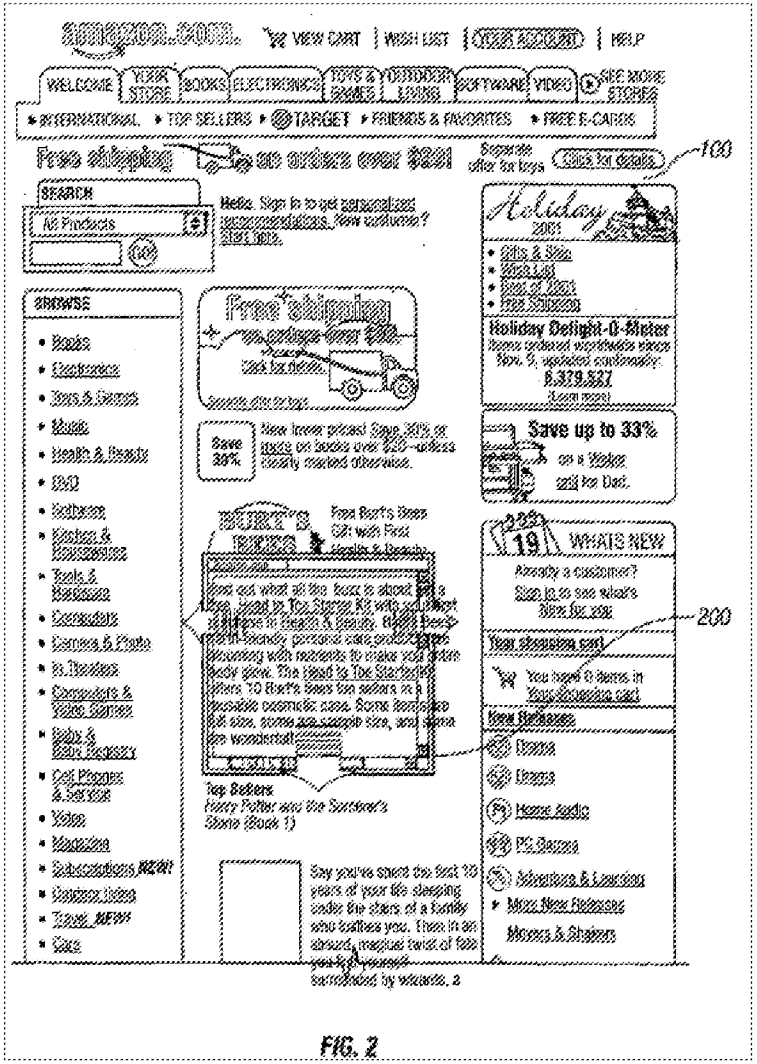
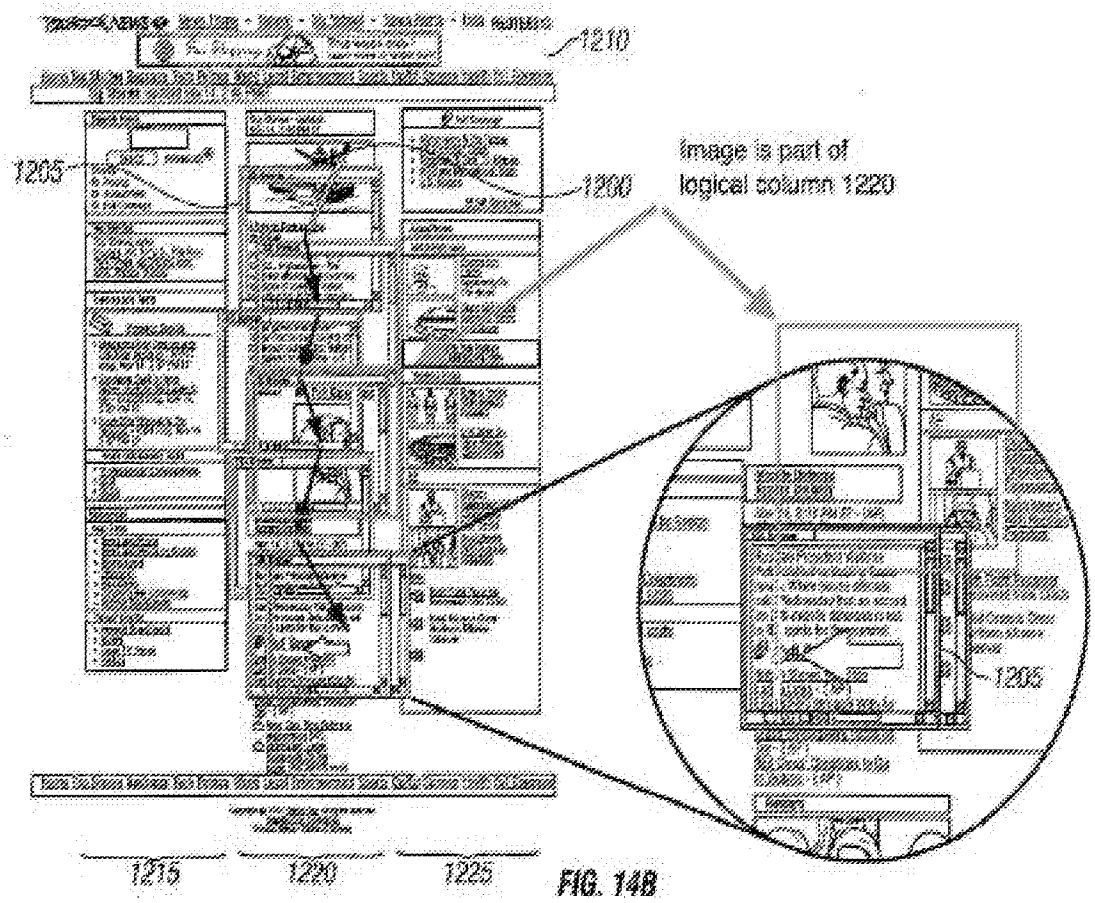
The '381 Patent Claims	Disclosure in *Lira*
	

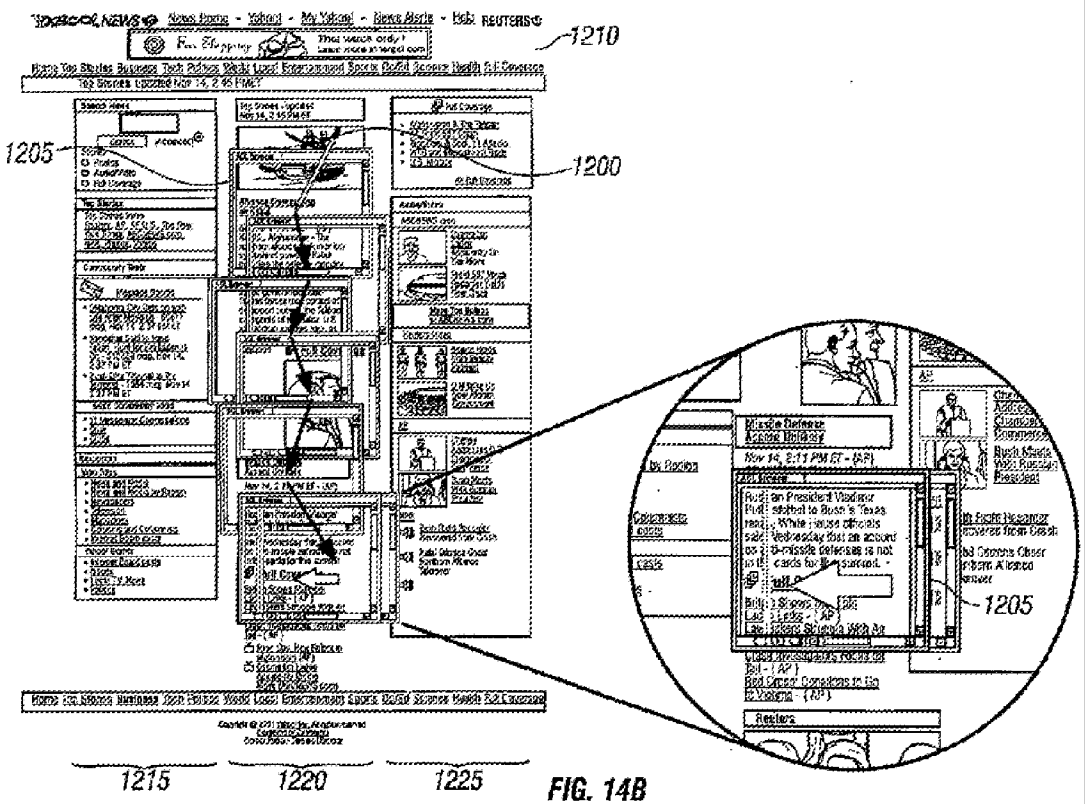
FIG. 2

The '381 Patent Claims	Disclosure in *Lira*
	The annotated version of Figure 14B below highlights images contained in the exemplary electronic document disclosed in *Lira*.  *See, e.g.*: Pages encoded according to hypertext markup language ("HTML") are designed for display in display windows of different sizes... In some cases, a display window may constitute the entirety of the display.... In other cases,

The '381 Patent Claims	Disclosure in *Lira*
	the display window may be purposefully sized to be substantially smaller than the overall size of the display. *Lira*, p. 8, lns. 10-18. *See also*: "The electronic document may be coded in hypertext markup language ("HTML")." *Lira*, p. 2, lns. 22-23. One of ordinary skill in the art would understand that many web pages are coded in HTML. In the Background section, *Lira* states "[t]he user of the computer can view the entire Web page on one screen display or can easily scroll a short distance to view other portions of the Web page.... [W]hen content is displayed on ... the display window of a personal digital assistant ("PDA"), only a small portion of the Web page is displayed." *Lira*, p. 1, lns. 8-13. Based on the foregoing, *Lira* explicitly discloses that its techniques apply to electronic documents that include digital images. Thus it would have been obvious to one of ordinary skill in the art to apply the teaching of *Lira* to an electronic document which is a digital image. Moreover, the user interface features identified above as anticipating claim 1 of the '381 Patent operate independently of the nature of the underlying electronic document. In other words, the user can utilize these same techniques to manipulate any document displayed on the screen, regardless of whether the document is a list of items or a digital image or any other kind of electronic document. Additionally, because digital images are commonly displayed on computing devices, one of skill in the art would be motivated to modify *Lira* so that its user interface features operated on digital images. Having a digital image as an electronic document would have been a simple design choice representing a trivial and predictable variation. As the '381 Patent admits, digital images were a common and well-known document type in the art long before the priority date of the '381 Patent, as were other document types including

The '381 Patent Claims	Disclosure in *Lira*
	word processing documents, spreadsheets, and presentation documents. *See* '381 Patent col. 2: 14-23; 27:5-12.[1] Thus, it would have been obvious to one of ordinary skill in the art to apply the disclosure of *Lira* to digital images. A person of ordinary skill would have been motivated to use the techniques disclosed in *Lira* to improve navigation in any number of electronic documents, including digital images. *Lira* discloses support for many well known and complex document types including web pages and their associated documents. Thus, *Lira* clearly was designed to support many document types. Moreover, a person of ordinary skill in the art would have viewed the exemplary web page described in *Lira* as interchangeable with other types of electronic documents, including digital images. Substituting one document type (such as an image) for another document type (such as a web page that includes an image) would have been a modification yielding a predicable result based on known elements, and would be viewed as a mere design choice by one of ordinary skill.
13. The computer-implemented method of claim 1, wherein the area beyond the edge of the document is black, gray, a solid color, or white.	*Lira* discloses this feature. *See* Exhibit 6, Part A, claim 13. However, even assuming for the sake of argument that *Lira* does not explicitly state that the area beyond the edge of the displayed column is white, black, gray, or any other solid color, requiring that the edge of the document be a solid color or shade does not add anything of patentable significance to the alleged invention. The area beyond the edge will be dictated by the particular web page column (*i.e.*, document) being scrolled in *Lira*. For example, in Figure 14B, if the background of the web page is a solid color (*e.g.,* white), that will be the color of the area beyond the edge of the document, given that the area beyond the edge will be a portion of the neighboring column 1225. Thus, under this example, the area beyond the edge of the column displayed is a solid color, *e.g.,* white.

[1] M.P.E.P. 2217 III and 2258 I. F 1-2 state that, during reexamination, "an admission by the patent owner of record in the file or in a court record may be utilized in combination with a patent or printed publication". "An admission as to what is in the prior art is simply that, an admission, and requires no independent proof. It is an acknowledged, declared, conceded, or recognized fact or truth".

The '381 Patent Claims	Disclosure in *Lira*
	 FIG. 14B Moreover, making the area beyond the edge of the document white, black, gray, or any other solid color would have been a simple design choice representing a trivial and predictable variation. A person of ordinary skill would have viewed the use of these colors as obvious and a mere design choice; they were not novel colors, and their use here would have been entirely predictable to a person of ordinary skill. Colors have been well-known in the graphic user interface art, and it is merely a design choice to select or replace one color for another among the limited color choices for areas beyond the edge of the document.
14. The computer-implemented method of claim 1, wherein the area beyond the edge of	*Lira* discloses this feature. *See* Exhibit 6, Part A, claim 14. However, even assuming for the sake of argument that *Lira* does not explicitly state that the area

The '381 Patent Claims	Disclosure in *Lira*
the document is visually distinct from the document.	beyond the edge of the document is visually distinct from the document, requiring that the area beyond the edge of the document be visually distinct from the electronic document does not add anything of patentable significance to the alleged invention. It would have been obvious to choose any color that has a sharp contrast from the document background to clarify to the user that the end of the document has been reached, since an edge can be better conveyed by the application of contrast. Coloring the area beyond the edge of the document a single shade so as to display some contrast with the edge of the document is a simple design choice representing trivial and predictable variation, dependent on the designer's aesthetic preference. Visual distinctions were not novel in user interfaces, and their use here would have been entirely predictable to a person of ordinary skill. *See also* claim 13.
15. The computer-implemented method of claim 1, wherein translating the document in the second direction is a damped motion.	It would have been obvious to one of ordinary skill in the art to modify *Lira* such that the translating the document in the second direction is a damped motion. *Lira* discloses a "snap-to" function that moves the document in the second direction so that when the user lifts the stylus or finger from the screen, "the logical column 1220 [will] snap into alignment with the display window 1205 as the user stops scrolling" by for example "snap[ping] to the nearest logical column." *Lira*, p. 15, lns. 19-25. In addition, "the user may select a variable velocity that begins scrolling the display slowly, picks up speed, and then slows down again as the displayed portion approaches the second view." *Lira*, p. 14, lns. 15-17. Here, the "snap-to" transition is an approach to such a view. Such varying of scrolling velocities amounts to damped motion. It would have been obvious to modify the "snap-to" motion in the second direction to include such a dampening feature. One of ordinary skill in the art would have been motivated to do so in order to provide a smoother transition between the document portions as the area beyond the edge is no longer displayed, since *Lira*

The '381 Patent Claims	Disclosure in *Lira*
	discloses improving readability and enabling users to get a better sense of their position in the document through scrolling animation effects. *See, e.g.*: > However, when content is displayed on an electronic device having a display window with smaller dimensions, such as, for example, the display window of a personal digital assistant ("PDA"), only a small portion of the Web page is displayed. This may render the document may be difficult to read. *Lira*, p. 1, lns. 10-14. > As the number of logical columns increases, the user has more options for jumping discretely between columns. This can cause the user to become disoriented concerning the position of the page relative to the display window, which may result in the user selecting an incorrect scrolling direction to view other parts of the page. For example, referring to Fig. 9, the user may begin viewing a page 900 by selecting a first column 905 of columns 905, 910 and 915 for display in the window 920. The user then may decide to jump to the third text column 915 to view the information in that column. Subsequently, the user may decide to return to the previously viewed first column 905. However, since the appearance of the display window 920 changed instantaneously when the used jumped discretely between the text columns 905 and 915, the user may not recall the position of the previously-viewed text column relative to the currently-displayed column. Referring to Fig. 10, as the user navigates to various positions on the page 900, animation effects 925 are provided to give the user a better sense of direction and position. The animation effects add a sense of motion to the content being displayed. *Lira*, p. 12, ln. 29 – p. 13, ln. 13. Such an implementation amounts to nothing more than an application of a known technique (*e.g.*, the dampening) to another technique (*e.g.*, the snap-to function) - both of which are taught by the same reference - to achieve a predictable result.
17. The computer-implemented method of	*Lira* discloses translating in the first direction prior to reaching the edge of the

The '381 Patent Claims	Disclosure in *Lira*
claim 1, wherein translating in the first direction prior to reaching the edge of the electronic document has a first associated translating distance that corresponds to a distance of movement of the object prior to reaching the edge of the electronic document; and	electronic document has a first associated translating distance that corresponds to a distance of movement of the object prior to reaching the edge of the electronic document. *Lira* discloses that the page can scroll (*i.e.*, translate) an amount equal to the distance of movement of a stylus pen (*i.e.*, object). *See, e.g.*: > PDAs usually follow a paradigm inherited from the desktop computer, in that movement between the cursor is equivalent to movement of the document. Thus, the page scrolls an amount equal to the distance of the pen movement. For example, when the cursor moves 10 pixels, the document scrolls 10 pixels. *Lira*, p. 17, lns. 5-9. *Lira* also discloses a scrolling multiplier that can change the ratio between the movement of the stylus and the amount of document translation. *See, e.g.*: > A scrolling multiplier allows the user to specify movement of the document on the display as a multiplier or percentage of the physical movement of the stylus on the display. For example, referring to Fig. 17A, when the proportional movement is set to 200%, document scrolling 1700 on a display 1705 is 20 pixels for each 10 pixels of stylus or other input movement 1710. When the proportional movement is set to 50%, the document scrolling is 5 pixels for each 10 pixels of stylus or other input movement on the display. Referring to Fig. 17B, when the proportional movement is set to 300%, the document scrolling 1715 is 30 pixels for each 10 pixels of stylus or other input movement 1720 on the display 1725. *Lira*, p.17, lns. 13-21. Thus, *Lira* discloses that the first translating distance in the first direction prior to reaching the edge of the document corresponds to the distance of movement of the object. *See also* Exhibit 6, Part A, claims 1(c)-(d).

The '381 Patent Claims	Disclosure in *Lira*
(a) wherein displaying an area beyond the edge of the electronic document comprises translating the electronic document in the first direction for a second associated translating distance,	*Lira* discloses displaying an area beyond the edge of the electronic document comprises translating the electronic document in the first direction for a second associated translating distance. *Lira* discloses the display of the area beyond the edge of the document comprises translating the electronic document in a first direction. *Lira* also discloses that this translation is for a second translating distance that is associated with the direction of translation. For example, as also discussed in connection with the independent claims, *Lira* discloses a "vertical alignment control" or "snap-to" function that aligns the display window to an edge of the electronic document, after the object is lifted from the screen. *See, e.g.*: > Referring to Fig. 14B, in another implementation, the vertical alignment control is enabled when the user lifts the pen 1200 from the display 1205. This causes the logical column 1220 to snap into alignment with the display window 1205 as the user stops scrolling. The user can adjust the snap sensitivity by, for example, setting the alignment control to snap to the nearest logical column based on a user-defined snap threshold. If the user's scrolling does not exceed the threshold, which indicates an intention to continue to view the text column 1220, the display 1205 centers the logical column 1210 as the pen 1200 is lifted from the screen. If the user's scrolling exceeds the threshold, which indicates an intention to move beyond the boundary of the logical column 1220, the display is snapped to the adjacent or repositioned column. In other implementations, no snapping occurs when the user's scrolling exceeds the threshold. The snap-on-column feature can also be animated to provide an appearance of movement as the display scrolls to the correct column-viewing position. *Lira*, p. 15, lns. 18-31. As the display window moves between logical columns of the document, an area beyond the edge is displayed. *Lira* allows the user to define a threshold between columns, which when crossed, the display window will "snap" forward by translating in the first direction to align with the next logical column, rather than

The '381 Patent Claims	Disclosure in *Lira*
	"snap" back by translating in a second direction to align with the original column. *See, e.g.*: This causes the logical column 1220 to snap into alignment with the display window 1205 as the user stops scrolling. The user can adjust the snap sensitivity by, for example, setting the alignment control to snap to the nearest logical column based on a user-defined snap threshold. *Lira*, p. 15, lns. 19-23. Thus, the electronic document can be translated in the same direction for a second associated translating distance which corresponds to the threshold between logical columns. *See also* Exhibit 6, Part A, claim 1(d)-(e).
(b) wherein the second associated translating distance is less than a distance of movement of the object after reaching the edge of the electronic document.	It would have been obvious for the second translating distance to be less than the distance of movement of the stylus (*i.e.*, object) after reaching the edge of the electronic document. *Lira* discloses a scrolling multiplier that can change the ratio between the distance of movement of the stylus (*i.e.*, object) and the amount of document translation. *See, e.g.*: A scrolling multiplier allows the user to specify movement of the document on the display as a multiplier or percentage of the physical movement of the stylus on the display. For example, referring to Fig. 17A, when the proportional movement is set to 200%, document scrolling 1700 on a display 1705 is 20 pixels for each 10 pixels of stylus or other input movement 1710. When the proportional movement is set to 50%, the document scrolling is 5 pixels for each 10 pixels of stylus or other input movement on the display. Referring to Fig. 17B, when the proportional movement is set to 300%, the document scrolling 1715 is 30 pixels for each 10 pixels of stylus or other input movement 1720 on the display 1725. *Lira*, p.17, lns. 13-21.

The '381 Patent Claims	Disclosure in *Lira*
	For example, when the multiplier is set such that "the proportional movement is set to 200%, document scrolling 1700 on a display 1705 is 20 pixels for each 10 pixels of stylus" movement. *Id.* Similarly, by adjusting the multiplier such that proportional movement is 50%, the translating distance of the document is less than the distance of movement of the stylus. Since this multiplier is merely a variable, it would have been obvious to decrease the multiplier (hence the proportional movement) from the set value, as the user translates the display window outside the original logical column (*i.e.*, beyond the edge of the electronic document). One of ordinary skill in the art would have been motivated to decrease this multiplier after reaching the edge (*i.e.*, when the user might be scrolling from one column to another) in order to prevent the user from inadvertently "snapping-to" the next logical column, thereby constraining the position of the visible portion of the displayed electronic document. *See, e.g.*: > [A] procedure 1500 for supporting navigation on a display includes tracking user motion of an input tool for a display (step 1505), comparing a motion of the input tool to a threshold (step 1510), and constraining the position of the visible portion of the page of information on the display if the user motion does not exceed the threshold (step 1515). *Lira,* p. 16, lns. 4-8. By providing a user-defined snap threshold, *Lira* allows the user to set a boundary which the system can use to evaluate the user's gestures and determine his/her intention to "snap" from one column to another. *See, e.g.*: > The vertical alignment control is enabled when the user lifts the pen 1200 from the display 1205. This causes 20 the logical column 1220 to snap into alignment with the display window 1205 as the user stops scrolling. The user can adjust the snap sensitivity by, for example, setting the alignment control to snap to the nearest logical column based on a user-defined snap threshold. If the user's scrolling exceeds the threshold, which indicates an intention to move beyond the boundary of the logical column 1220, the display is

The '381 Patent Claims	Disclosure in *Lira*
	snapped to the adjacent or repositioned column. *Lira*, p. 15, lns. 19-27. Similarly, preventing the user from easily/inadvertently "snapping" from column to column would help further capture and confirm the user's intention as to whether to snap to the next column, which is one of *Lira*'s stated goals. *Id.* Thus, one of ordinary skill in the art would have been motivated to decrease the multiplier disclosed in *Lira* after reaching the edge of the document in order to further the stated goal in *Lira*. Modifying such an existing variable disclosed in *Lira* would have amounted to nothing more than an application of a known technique to achieve the predictable result of decreasing the translation distance in response to the object's movement.
18. The computer-implemented method of claim 1, wherein translating in the first direction prior to reaching the edge of the electronic document has a first associated translating speed that corresponds to a speed of movement of the object, and	*Lira* discloses translating in the first direction prior to reaching the edge of the electronic document has a first associated translating speed that corresponds to a speed of movement of the object. *Lira* states that "[m]oving the page of information may include moving the page a distance equal to a change in the coordinate information of the input tool multiplied by a factor based on the acceleration or the velocity of the input tool." *Lira*, p. 5, lns. 13-15. Thus, the speed of translation in the first direction prior to reaching the edge corresponds to a speed of movement of the input tool (*i.e.*, object). *See also* Exhibit 6, Part A, claim 1(c).
(a) wherein displaying an area beyond the edge of the electronic document comprises translating the electronic document in the first direction at a second associated translating speed,	It would have been obvious to translate the document at a second speed that is slower than the first translating speed when displaying the area beyond the edge of the electronic document. *Lira* discloses a speed multiplier that can change the ratio between the movement of

The '381 Patent Claims	Disclosure in *Lira*
	the stylus (*i.e.*, object) and the amount of document translation, based upon the speed of the object. *See, e.g.*: Moving the page of information may include moving the page a distance equal to a change in the coordinate information of the input tool multiplied by a factor based on the acceleration or the velocity of the input tool. *Lira*, p. 5, lns. 13-15. Thus, for example, by adjusting this speed multiplier such that the proportional value is 50%, the translating distance of the document is reduced for a given input object speed. This, in turn reduces the speed of translation, since speed is proportional to distance (*i.e.*, v=s/t). Since this multiplier is merely a variable, it would have been obvious to decrease the multiplier as the user translates the display window outside the original logical column (*i.e.*, beyond the edge of the electronic document). One of ordinary skill in the art would have been motivated to decrease this multiplier after reaching the edge (*i.e.*, when the user might be scrolling from one column to another) in order to prevent the user from inadvertently "snapping-to" the next logical column, thereby constraining the position of the visible portion of the displayed electronic document. *See, e.g.*: [A] procedure 1500 for supporting navigation on a display includes tracking user motion of an input tool for a display (step 1505), comparing a motion of the input tool to a threshold (step 1510), and constraining the position of the visible portion of the page of information on the display if the user motion does not exceed the threshold (step 1515). *Lira,* p. 16, lns. 4-8. By providing a user-defined snap threshold, *Lira* allows the user to set a boundary which the system can use to evaluate the user's gestures and determine his/her intention to "snap" from one column to another. *See, e.g.*: The vertical alignment control is enabled when the user lifts the pen 1200

The '381 Patent Claims	Disclosure in *Lira*
	from the display 1205. This causes 20 the logical column 1220 to snap into alignment with the display window 1205 as the user stops scrolling. The user can adjust the snap sensitivity by, for example, setting the alignment control to snap to the nearest logical column based on a user-defined snap threshold. If the user's scrolling exceeds the threshold, which indicates an intention to move beyond the boundary of the logical column 1220, the display is snapped to the adjacent or repositioned column. *Lira*, p. 15, lns. 19-27. Similarly, preventing the user from easily/inadvertently "snapping" from column to column would help further capture and confirm the user's intention as to whether to snap to the next column, which is one of *Lira's* stated goals. *Id.* Thus, one of ordinary skill in the art would have been motivated to decrease the multiplier disclosed in *Lira* after reaching the edge of the document in order to further the stated goal in *Lira*. Modifying such an existing variable disclosed in *Lira* would have amounted to nothing more than an application of a known technique to achieve the predictable result of decreasing the translation speed in response to the object's movement.
(b) wherein the second associated translating speed is slower than the first associated translating speed.	*See* claim 18(a).

CLAIMS 15, 17 AND 18 OF THE '381 PATENT SHOULD BE REJECTED UNDER 35 U.S.C. § 103 AS RENDERED OBVIOUS BY *LIRA* PCT PUBLICATION WO 03/081458 IN VIEW OF *VAN DEN HOVEN* PCT PUBLICATION WO 01/029702

U.S. Patent No. 7,469,381 ("the '381 Patent")

Earliest Possible Priority Date/Effective Filing Date: January 7, 2007

Primary Reference

Reference: PCT Publication No. WO 03/081458 ("*Lira*")
Publication Date: October 2, 2003

Secondary Reference

Reference: PCT Publication No. WO. 01/029702 ("*Van Den Hoven*")
Publication Date: April 26, 2001

The '381 Patent Claims	**Disclosure in *Lira***	**Disclosure in *Van Den Hoven***
1. A computer-implemented method, comprising: (a) at a device with a touch screen display: (b) displaying a first portion of an electronic document; (c) detecting a movement of an object on or near the touch screen display; in response to	*Lira* discloses every limitation of the method of claim 1. *See* Exhibit 6, Part A, claim 1.	

The '381 Patent Claims	Disclosure in *Lira*	Disclosure in *Van Den Hoven*
detecting the movement, translating the electronic document displayed on the touch screen display in a first direction to display a second portion of the electronic document, wherein the second portion is different from the first portion; (d) in response to an edge of the electronic document being reached while translating the electronic document in the first direction while the object is still detected on or near the touch screen: displaying an area beyond the edge of the document, and displaying a third portion of the electronic document, wherein the third portion is smaller than the first		

The '381 Patent Claims	Disclosure in *Lira*	Disclosure in *Van Den Hoven*
portion; and (e) in response to detecting that the object is no longer on or near the touch screen display, translating the electronic document in a second direction until the area beyond the edge of the electronic document is no longer displayed to display a fourth portion of the electronic document, wherein the fourth portion is different from the first portion.		
15. The computer-implemented method of claim 1, wherein translating the document in the second direction is a damped motion.	*Lira* discloses all the features recited in claim 1. *See* Exhibit 6, Part A, claim 1. *Lira* discloses a "snap-to" function that moves the document in the second direction so that when the user lifts the stylus or finger from the screen, "the logical column 1220 [will] snap into alignment with the display window 1205 as the user stops scrolling" by for example "snap[ping] to the nearest logical column." *See, e.g.*:	*Van Den Hoven* discloses translating the document in the second direction is a damped motion. For example, *Van Den Hoven* discloses that the motion of the images (*i.e.*, translation of the document) through the browsing area "may simulate inertia and friction." *Van Den Hoven,* p. 3, ln. 24. This application of inertia or friction "gradually decreas[es] the scrolling speed, instead of instantaneously stopping [it]." *See, e.g.*: The browsing means may simulate inertia and

The '381 Patent Claims	Disclosure in *Lira*	Disclosure in *Van Den Hoven*
	The vertical alignment control is enabled when the user lifts the pen 1200 from the display 1205. This causes 20 the logical column 1220 to snap into alignment with the display window 1205 as the user stops scrolling. The user can adjust the snap sensitivity by, for example, setting the alignment control to snap to the nearest logical column based on a user-defined snap threshold. If the user's scrolling exceeds the threshold, which indicates an intention to move beyond the boundary of the logical column 1220, the display is snapped to the adjacent or repositioned column. *Lira*, p. 15, lns. 19-27. It would have been obvious to modify *Lira*'s "snap-to" motion in the second direction to include a frictional/inertial feature (*i.e.*, a damped motion) as disclosed in *Van Den Hoven*. One of ordinary skill in the art would have been motivated to implement *Van Den Hoven*'s dampening feature with *Lira*'s "snap-to" motion in order to provide a smoother transition between the document portions as the area beyond the edge is no longer displayed. Indeed, both *Lira* and *Van Den Hoven* are concerned with enhancing the user's experience in, and facilitating, the viewing of documents using touch screen displays. For example, *Lira* discloses improving readability and enabling users to get a better sense of their position in the	friction, for example, by gradually decreasing the scrolling speed, instead of instantaneously stopping the scrolling, in response to the user touching the browsing area. Similarly, the induced speed increase may be gradual, thus strengthening the impression of spinning a wheel. *Van Den Hoven,* p. 3, lns. 24-27. As described in the '381 Patent such a simulation of inertia and friction applied to the scrolling speed amounts to a "damped motion." *See, e.g.*: In some embodiments, the scrolling and acceleration of the scrolling, or translation and acceleration of the translation, may be in accordance with a simulation of a physical device having friction, i.e., damped motion. For example, the scrolling or translation may correspond to a simulation of a force law or equation of motion having a mass or inertial term, as well as a dissipative term. '381 Patent, col. 20:43-49. As another example, *Van Den Hoven* discloses smoothing the scrolling of the image sequence. *See, e.g.*: The sequence can be scrolled with varying degrees of smoothness. For example, the sequence can be scrolled by fits and starts, or by simply bumping the lower- or uppermost representation from the screen, moving the others down or up, respectively, and showing next representation at the space thusly freed.

The '381 Patent Claims	Disclosure in *Lira*	Disclosure in *Van Den Hoven*
	document through scrolling animation effects. *See, e.g.*: > However, when content is displayed on an electronic device having a display window with smaller dimensions, such as, for example, the display window of a personal digital assistant ("PDA"), only a small portion of the Web page is displayed. This may render the document may be difficult to read. *Lira*, p. 1, lns. 10-14; > As the number of logical columns increases, the user has more options for jumping discretely between columns. This can cause the user to become disoriented concerning the position of the page relative to the display window, which may result in the user selecting an incorrect scrolling direction to view other parts of the page. For example, referring to Fig. 9, the user may begin viewing a page 900 by selecting a first column 905 of columns 905, 910 and 915 for display in the window 920. The user then may decide to jump to the third text column 915 to view the information in that column. Subsequently, the user may decide to return to the previously viewed first column 905. However, since the appearance of the display window	*Van Den Hoven*, p. 2, ln. 22-25.

The '381 Patent Claims	Disclosure in *Lira*	Disclosure in *Van Den Hoven*
	920 changed instantaneously when the used jumped discretely between the text columns 905 and 915, the user may not recall the position of the previously-viewed text column relative to the currently-displayed column. Referring to Fig. 10, as the user navigates to various positions on the page 900, animation effects 925 are provided to give the user a better sense of direction and position. The animation effects add a sense of motion to the content being displayed. *Lira*, p. 12, ln. 29 – p. 13, ln. 13. Such an implementation of *Van Den Hoven*'s dampening feature to *Lira*'s snap to scrolling feature would have amounted to nothing more than an application of a known method (*e.g.*, scrolling with inertia and frictional simulation) to achieve the predictable result of providing for smoother/slower scrolling transitions.	
17. The computer-implemented method of claim 1, wherein translating in the first direction prior to reaching the edge of the electronic document has a first associated	*Lira* discloses all the features recited in claim 1. *See* Exhibit 6, Part A, claim 1. *Lira* discloses translating in the first direction prior to reaching the edge of the electronic document has a first associated translating distance that corresponds to a distance of movement of the object prior to reaching the edge of the electronic document.	

The '381 Patent Claims	Disclosure in *Lira*	Disclosure in *Van Den Hoven*
translating distance that corresponds to a distance of movement of the object prior to reaching the edge of the electronic document; and	*Lira* discloses that the page can scroll (*i.e.*, translate) an amount equal to the distance of movement of a stylus pen (*i.e.*, object). *See, e.g.*: PDAs usually follow a paradigm inherited from the desktop computer, in that movement between the cursor is equivalent to movement of the document. Thus, the page scrolls an amount equal to the distance of the pen movement. For example, when the cursor moves 10 pixels, the document scrolls 10 pixels. *Lira*, p. 17, lns. 5-9. *Lira* also discloses a scrolling multiplier that can change the ratio between the movement of the stylus and the amount of document translation. *See, e.g.*: A scrolling multiplier allows the user to specify movement of the document on the display as a multiplier or percentage of the physical movement of the stylus on the display. For example, referring to Fig. 17A, when the proportional movement is set to 200%, document scrolling 1700 on a display 1705 is 20 pixels for each 10 pixels of stylus or other input movement 1710. When the proportional movement is set to 50%, the	

The '381 Patent Claims	Disclosure in *Lira*	Disclosure in *Van Den Hoven*
	document scrolling is 5 pixels for each 10 pixels of stylus or other input movement on the display. Referring to Fig. 17B, when the proportional movement is set to 300%, the document scrolling 1715 is 30 pixels for each 10 pixels of stylus or other input movement 1720 on the display 1725. *Lira*, p. 17, lns. 13-21. Thus, *Lira* discloses that the first translating distance in the first direction prior to reaching the edge of the document corresponds to the distance of movement of the object. *See also* Exhibit 6, Part A, claim 1(c)-(d).	
(a) wherein displaying an area beyond the edge of the electronic document comprises translating the electronic document in the first direction for a second associated translating distance,	*Lira* discloses displaying an area beyond the edge of the electronic document comprises translating the electronic document in the first direction for a second associated translating distance. *Lira* discloses the display of the area beyond the edge of the document comprises translating the electronic document in a first direction. *Lira* also discloses that this translation is for a second translating distance that is associated with the direction of translation. For example, as also discussed in connection with the independent claims, *Lira* discloses a "vertical alignment control" or "snap-to" function that aligns the display window to an edge of the electronic	

The '381 Patent Claims	Disclosure in *Lira*	Disclosure in *Van Den Hoven*
	document, after the object is lifted from the screen. *See, e.g.*: Referring to Fig. 14B, in another implementation, the vertical alignment control is enabled when the user lifts the pen 1200 from the display 1205. This causes the logical column 1220 to snap into alignment with the display window 1205 as the user stops scrolling. The user can adjust the snap sensitivity by, for example, setting the alignment control to snap to the nearest logical column based on a user-defined snap threshold. If the user's scrolling does not exceed the threshold, which indicates an intention to continue to view the text column 1220, the display 1205 centers the logical column 1210 as the pen 1200 is lifted from the screen. If the user's scrolling exceeds the threshold, which indicates an intention to move beyond the boundary of the logical column 1220, the display is snapped to the adjacent or repositioned column. In other implementations, no snapping occurs when the user's scrolling exceeds the threshold. The snap-on-column feature can also be animated to provide an appearance of movement as the display scrolls to the correct column-viewing position. *Lira*, p. 15, lns. 18-31.	

The '381 Patent Claims	Disclosure in *Lira*	Disclosure in *Van Den Hoven*
	As the display window moves between logical columns of the document, an area beyond the edge is displayed. *Lira* allows the user to define a threshold between columns, which when crossed, the display window will "snap" forward by translating in the first direction to align with the next logical column, rather than "snap" back by translating in a second direction to align with the original column. *See, e.g.*: > This causes the logical column 1220 to snap into alignment with the display window 1205 as the user stops scrolling. The user can adjust the snap sensitivity by, for example, setting the alignment control to snap to the nearest logical column based on a user-defined snap threshold. *Lira*, p. 15, lns. 19-23. Thus, the electronic document can be translated in the same direction for a second associated translating distance which corresponds to the threshold between logical columns. *See also* Exhibit 6, Part A, claim 1(d)-(e).	
(b) wherein the second associated translating distance is less than a distance of movement of the object after reaching the edge of the	*Lira* discloses that the scrolling velocity of an electronic document may be varied (*e.g.*, slowed down) as the document displayed within a browsing window approaches a particular view. *See, e.g.*: > For example, the user may select a	*Van Den Hoven* also discloses that the speed of translation in the first direction can be accelerated or slowed. *See, e.g.*: > The resulting speed may depend on whether the input stroke ends within or outside the browsing area. In the former case, the acceleration may be

The '381 Patent Claims	Disclosure in *Lira*	Disclosure in *Van Den Hoven*
electronic document.	variable velocity that begins scrolling the display slowly, picks up speed, and then slows down again as the displayed portion approaches the second view. *Lira*, p. 14, lns. 15-17. It would have been obvious to combine *Lira* with *Van Den Hoven* so that a user input applied to the *Lira* browsing window that remained inside the current logical column without exceeding the threshold at the edge of the document would result in a temporary acceleration (*i.e.*, a first translating speed) followed by a deceleration period (*i.e.*, a second slower translating speed) as described in *Van Den Hoven.* Thus, causing the document to be scrolled to the threshold rather than proceed past the threshold to the next logical column. Applying this deceleration feature to the user motion at the edge of the logical column (*i.e.*, the edge of the electronic document) would have the effect of shortening the translation (*i.e.*, decreasing the translating distance) relative to the distance of movement of the object (*e.g.*, stylus). Thus, the second associated translating distance is less than a distance of movement of the object after reaching the edge of the electronic document. One of ordinary skill in the art would have been motivated to decelerate the scrolling velocity upon reaching the edge of the document (*i.e.*, when the user might be scrolling from one	temporary and succeeded by a deceleration and eventual halting of the scrolling. The browsing means may simulate inertia and friction, for example, by gradually decreasing the scrolling speed, instead of instantaneously stopping the scrolling, in response to the user touching the browsing area. *Van Den Hoven*, p. 3, lns 21-26; If the user enters the input stroke with a stroking gesture into the flow direction, the flow speed increases whereby the acceleration depends on the speed of the input stroke. If the stroke ends outside the browsing area 103, the flow speed remains at the higher level, or, in an alternative embodiment, gradually decreases to the original level. If the stroking gesture ends inside the flow zone 102, the flow stops or de-accelerates, dependent on whether friction is simulated. *Van Den Hoven*, p. 6, lns. 27-32. *Van Den Hoven* further states that such acceleration/slowing down can be triggered as a function of the endpoint of the user's input relative to a threshold, namely, the edge of a browsing area. *Van Den Hoven*, p. 3, lns 21-26. For example, a user input stroke that ends inside the browsing area may have a temporary acceleration; hence a first translating speed, followed by a deceleration period; hence a second slower translating speed. *Id.*

The '381 Patent Claims	Disclosure in *Lira*	Disclosure in *Van Den Hoven*
	column to another) in order to prevent the user from inadvertently "snapping-to" the next logical column, thereby constraining the position of the visible portion of the displayed electronic document. *See, e.g.*: > [A] procedure 1500 for supporting navigation on a display includes tracking user motion of an input tool for a display (step 1505), comparing a motion of the input tool to a threshold (step 1510), and constraining the position of the visible portion of the page of information on the display if the user motion does not exceed the threshold (step 1515). *Lira,* p. 16, lns. 4-8. By providing a user-defined snap threshold, *Lira* allows the user to set a boundary which the system can use to evaluate the user's gestures and determine his/her intention to "snap" from one column to another. > The vertical alignment control is enabled when the user lifts the pen 1200 from the display 1205. This causes 20 the logical column 1220 to snap into alignment with the display window 1205 as the user stops scrolling. The user can adjust the snap sensitivity by, for example, setting the alignment control to snap to the nearest logical column based on a user-defined snap threshold. If the user's	

The '381 Patent Claims	Disclosure in *Lira*	Disclosure in *Van Den Hoven*
	scrolling exceeds the threshold, which indicates an intention to move beyond the boundary of the logical column 1220, the display is snapped to the adjacent or repositioned column. *Lira*, p. 15, lns. 19-27. Similarly, preventing the user from easily/inadvertently "snapping" from column to column would help further capture and confirm the user's intention as to whether to snap to the next column, which is one of *Lira*'s stated goals. *Id.* Thus, one of ordinary skill in the art would have been motivated to slow the scrolling velocity disclosed in *Lira* according to a user input within the user's defined threshold in order to further the stated goal in *Lira*. Such triggering of the scroll deceleration feature disclosed in *Lira* based on the endpoint of the user's gesture as disclosed in *Van Den Hoven,* would have amounted to nothing more than an application of known methods (*e.g.*, scroll deceleration) to achieve the predictable result of stopping the scrolling motion before reaching the threshold disclosed in *Lira.*	
18. The computer-implemented method of claim 1, wherein translating in the first direction prior	*Lira* discloses all the features recited in claim 1. *See* Exhibit 6, Part A, claim 1. *Lira* discloses translating in the first direction prior to reaching the edge of the electronic	

The '381 Patent Claims	Disclosure in *Lira*	Disclosure in *Van Den Hoven*
to reaching the edge of the electronic document has a first associated translating speed that corresponds to a speed of movement of the object, and	document has a first associated translating speed that corresponds to a speed of movement of the object. *Lira* states that "[m]oving the page of information may include moving the page a distance equal to a change in the coordinate information of the input tool multiplied by a factor based on the acceleration or the velocity of the input tool." *Lira*, p. 5, lns. 13-15. Thus, the speed of translation in the first direction prior to reaching the edge corresponds to a speed of movement of the input tool (*i.e.*, object). *See also* Exhibit 6, Part A, claim 1(c).	
(a) wherein displaying an area beyond the edge of the electronic document comprises translating the electronic document in the first direction at a second associated translating speed,	*Lira* discloses that the scrolling velocity of an electronic document may be varied (*e.g.*, slowed down) as the document displayed within a browsing window approaches a particular view. *See, e.g.*: > For example, the user may select a variable velocity that begins scrolling the display slowly, picks up speed, and then slows down again as the displayed portion approaches the second view. *Lira*, p. 14, lns. 15-17. It would have been obvious to combine *Lira* with *Van Den Hoven* so that a user input applied	*Van Den Hoven* also discloses that the speed of translation in the first direction can be accelerated or slowed. *See, e.g.*: > The resulting speed may depend on whether the input stroke ends within or outside the browsing area. In the former case, the acceleration may be temporary and succeeded by a deceleration and eventual halting of the scrolling. The browsing means may simulate inertia and friction, for example, by gradually decreasing the scrolling speed, instead of instantaneously stopping the scrolling, in response to the user touching the browsing area. *Van Den Hoven*, p. 3., lns 21-26;

The '381 Patent Claims	Disclosure in *Lira*	Disclosure in *Van Den Hoven*
	to the *Lira* browsing window that remained inside the current logical column without exceeding the threshold at the edge of the document would result in a temporary acceleration (*i.e.*, a first translating speed) followed by a deceleration period (*i.e.*, a second slower translating speed) as described in *Van Den Hoven.* Thus, causing the document to be scrolled to the threshold rather than proceed past the threshold to the next logical column. Applying this deceleration feature to the user motion at the edge of the logical column (*i.e.*, the edge of the electronic document) would have the effect of decreasing the scrolling velocity relative to the velocity of the object (*e.g.*, stylus). Thus, the second associated translating speed is less than the first translating speed at the edge of the document. One of ordinary skill in the art would have been motivated to decelerate the scrolling velocity upon reaching the edge of the document (*i.e.*, when the user might be scrolling from one column to another) in order to prevent the user from inadvertently "snapping-to" the next logical column, thereby constraining the position of the visible portion of the displayed electronic document. > [A] procedure 1500 for supporting navigation on a display includes tracking user motion of an input tool for a display (step 1505), comparing a motion of the	> If the user enters the input stroke with a stroking gesture into the flow direction, the flow speed increases whereby the acceleration depends on the speed of the input stroke. If the stroke ends outside the browsing area 103, the flow speed remains at the higher level, or, in an alternative embodiment, gradually decreases to the original level. If the stroking gesture ends inside the flow zone 102, the flow stops or de-accelerates, dependent on whether friction is simulated. *Van Den Hoven*, p. 6, lns. 27-32. *Van Den Hoven* further states that such acceleration/slowing down can be triggered as a function of the endpoint of the user's input relative to a threshold, namely, the edge of a browsing area. *Van Den Hoven*, p. 3, lns 21-26. For example, a user input stroke that ends inside the browsing area may have a temporary acceleration; hence a first translating speed, followed by a deceleration period; hence a second slower translating speed. *Id.*

The '381 Patent Claims	Disclosure in *Lira*	Disclosure in *Van Den Hoven*
	input tool to a threshold (step 1510), and constraining the position of the visible portion of the page of information on the display if the user motion does not exceed the threshold (step 1515). *Lira,* p. 16, lns. 4-8. By providing a user-defined snap threshold, *Lira* allows the user to set a boundary which the system can use to evaluate the user's gestures and determine his/her intention to "snap" from one column to another. The vertical alignment control is enabled when the user lifts the pen 1200 from the display 1205. This causes 20 the logical column 1220 to snap into alignment with the display window 1205 as the user stops scrolling. The user can adjust the snap sensitivity by, for example, setting the alignment control to snap to the nearest logical column based on a user-defined snap threshold. If the user's scrolling exceeds the threshold, which indicates an intention to move beyond the boundary of the logical column 1220, the display is snapped to the adjacent or repositioned column. *Lira*, p. 15, lns. 19-27. Similarly, preventing the user from easily/inadvertently "snapping" from column to column would help further capture and confirm	

The '381 Patent Claims	Disclosure in *Lira*	Disclosure in *Van Den Hoven*
	the user's intention as to whether to snap to the next column, which is one of *Lira*'s stated goals. *Id.* Thus, one of ordinary skill in the art would have been motivated to slow the scrolling velocity disclosed in *Lira* according to a user input within the user's defined threshold in order to further the stated goal in *Lira*. Such triggering of the scroll deceleration feature disclosed in *Lira* based on the endpoint of the user's gesture as disclosed in *Van Den Hoven,* would have amounted to nothing more than an application of known methods (*e.g.*, scroll deceleration) to achieve the predictable result of stopping the scrolling motion before reaching the threshold disclosed in *Lira.*	
(b) wherein the second associated translating speed is slower than the first associated translating speed.	*See* claim 18(a).	*See* claim 18(a).

CLAIMS 1-5, 7-13 and 15-20 OF THE '381 PATENT SHOULD BE REJECTED UNDER 35 U.S.C. § 102(E) AS ANTICIPATED BY *ORDING* U.S. PATENT 7,786,975

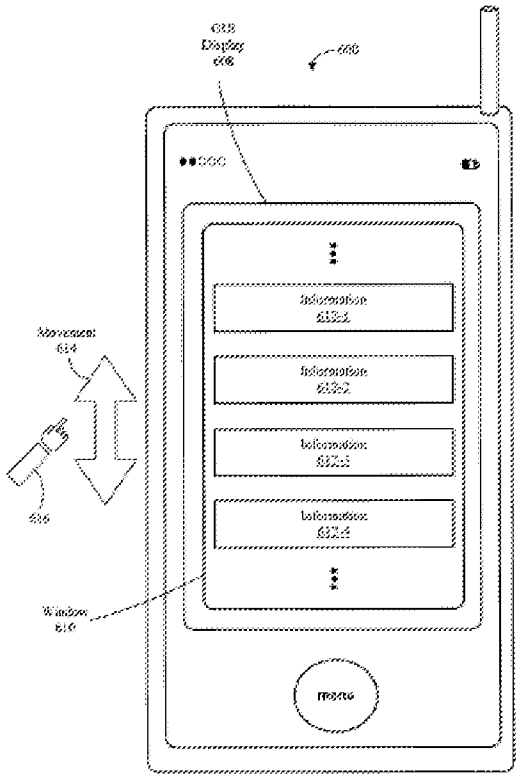
U.S. Patent No. 7,469,381 ("the '381 Patent")

Earliest Possible Priority Date/Effective Filing Date: January 7, 2007

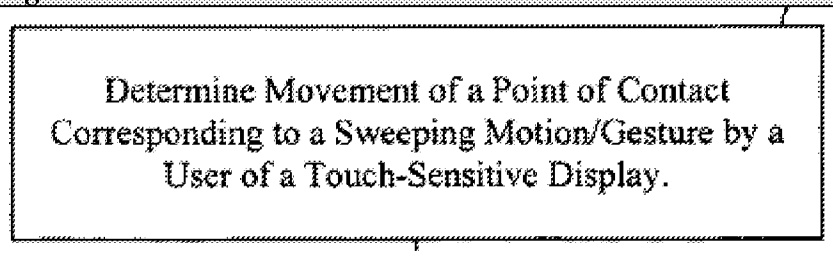
Reference

Reference: U.S. Patent No. 7,786,975 ("*Ording*")
Filing Date: December 23, 2005

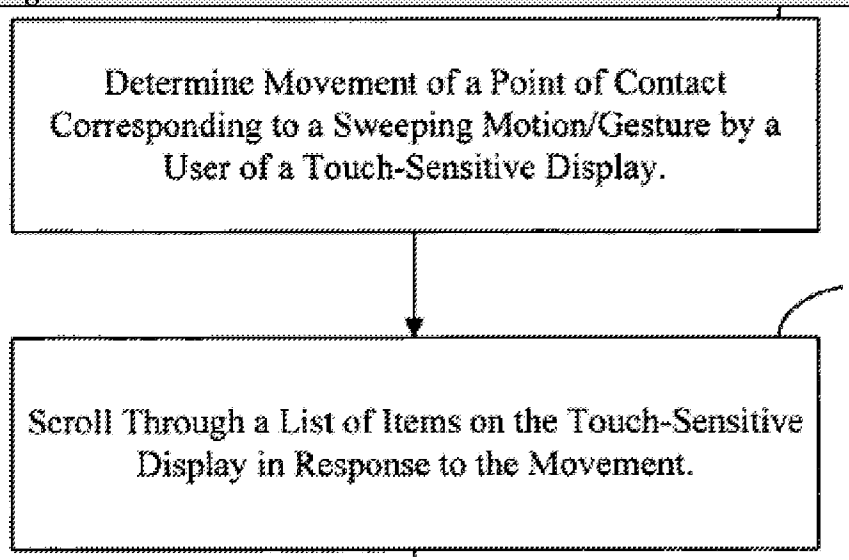
The '381 Patent Claims	Disclosure in *Ording*
1. A computer-implemented method, comprising:	*Ording* discloses a computer-implemented method. *See, e.g.*: "the [i]nstructions for performing the aforementioned methods may be included in a computer program product configured for execution by one or more processors." *Ording*, col. 2:30-32.
(a) at a device with a touch screen display:	*Ording* discloses a computer-implemented method at a device with a touch screen. *See, e.g.*: "[t]he aforementioned methods may be performed by a portable electronic device having a touch sensitive display." *Ording*, col. 2:23-24.
(b) displaying a first portion of an electronic document;	*Ording* discloses displaying a first portion of an electronic document. *Ording* discloses that the touch-sensitive display can display an electronic document. An example of an electronic document that a user may view through the device is a list. *See, e.g.*,: Movement of a point of contact by a user of a touch-sensitive display is determined. In response to the movement, a list of items on the touch-sensitive display is scrolled through. *Ording*, abstract. For example, items such as contact information/address book or photographs may be included in the list

The '381 Patent Claims	Disclosure in *Ording*
	displayed in *Ording*'s touch-sensitive display. *See, e.g.*,: The touch-sensitive display may include a GUI with one or more windows. The one or more windows may be used to display a list of items or information items. In an exemplary embodiment, the list of items may include contact information, such as names, addresses, photographs, and/or telephone numbers, for a plurality of individuals (sometimes referred to as a user's contact list or address book). *Ording*, col. 3:60-66, *See also*, Figure 6.  Figure 6

The '381 Patent Claims	Disclosure in *Ording*
	Figure 6 illustrates how the "first portion" of the electronic document may be displayed on the device. A "first portion" may be displayed as the electronic document is first brought into view on the device or after the display reaches a quiescent state upon the completion of display operations (*e.g.*, translation) arising from a user input (contact, remove, complete translation). For example, window **610** may show any of four information items from a larger list, of which items **612-2**, **612-3**, **612-4** and **612-5** could comprise the "first portion" (instead of pictured items **612-1 - 612-4),** after a series of completed user inputs **614** scrolled information item **612-1** off of the display and item **612-5** onto the display.
(c) detecting a movement of an object on or near the touch screen display; in response to detecting the movement, translating the electronic document displayed on the touch screen display in a first direction to display a second portion of the electronic document, wherein the second portion is different from the first portion;	*Ording* discloses detecting a movement of an object on the touch screen display and, in response, translating the electronic document to display a second portion of the electronic document that is different from the first. *Ording* discloses detecting a movement of an object - namely, a user's finger/point of contact on the touch screen display. For example, *Ording* discloses that the movement of a user's point contact on a touch-sensitive display (*i.e.* touch screen) is determined. *See, e.g.*,: Movement of a point of contact by a user of a touch sensitive display is determined. In response to the movement, a list of items on the touch-sensitive display is scrolled. *Ording*, col. 1:51-52. In some embodiments, accelerated movement of the point of contact may include an accelerated movement of the point Of contact followed by a breaking of the point of contact. For example, the user may make contact with the touch-sensitive display, swipe or sweep one or more of his or her fingers along the display (*i.e.*, move and/or accelerate the point of contact), and optionally, break the point of contact with the display, *i.e.*, move the one or more fingers away from the display. *Ording*, col. 4:14-21. In fact, the first step in the process depicted in Figure 1 of *Ording* pertains to detecting the object on the touch screen:

The '381 Patent Claims	Disclosure in *Ording*
	 *Ording* discloses translating the electronic document in a first direction in response to detecting the movement. For example, *Ording* discloses that the list (*i.e.*, electronic document) may be scrolled (*i.e.*, translated) in response to the determined movement. *See, e.g.*,: > Movement of a point of contact by a user of a touch sensitive display is determined. In response to the movement, a list of items on the touch-sensitive display is scrolled. *Ording*, col. 1:51-52. > In response to a determined movement of the point of contact, the list may be scrolled. Determining movement of the point of contact may include determining speed (magnitude), velocity (magnitude and direction), and/or an acceleration (including magnitude and/or direction) of the point of contact. *Ording*, col. 3:66 - col. 4:5. In fact, the second step in the process depicted in Figure 1 pertains to scrolling the list in response to the detected movement:

The '381 Patent Claims	Disclosure in *Ording*



Ording also shows that the second portion is different from the first portion. According to *Ording*, the list may be scrolled in a direction corresponding to the user's motion (*i.e.*, a first direction). *See, e.g.*,:

> Movement of a point of contact corresponding to a sweeping motion or gesture by a user of a touch-sensitive display is determined (110). For instance, the movement of the point of contact may be in the same direction that the list is to be scrolled.

Ording, col. 6:17-21.

For example, an upward movement on the touch screen causes the list to translate upward, thereby causing earlier entries in the list to be displayed. *See, e.g.*,:

> Thus, if the user wants the list to scroll upwards, the user sweeps a finger (or stylus or the like) in contact with and in an upward direction on the touch-sensitive display. Scrolling the list upward will typically scroll the list to later entries in the list, for instance scrolling from items in category "A" to items in category "B".

Ording, col. 6:21-24.

Similarly, a downward movement causes the list to translate downwards, thereby causing later entries

The '381 Patent Claims	Disclosure in *Ording*
	to be displayed. *See, e.g.*,:

> To scroll the list downward, the user sweeps a finger in a downward direction on the touch-sensitive display. In some embodiments, such as a user interface that simulates a rolodex or a list in inverse alphabetical order, an upward movement of a point of contact causes earlier entries in the list to be displayed, whereas a downward movement of the point of contact causes later entries in the list to be displayed.

Ording, col. 6:26-33

See also, Figures 6 and 7A-C (illustrating the scrolling of the document from portion to portion)

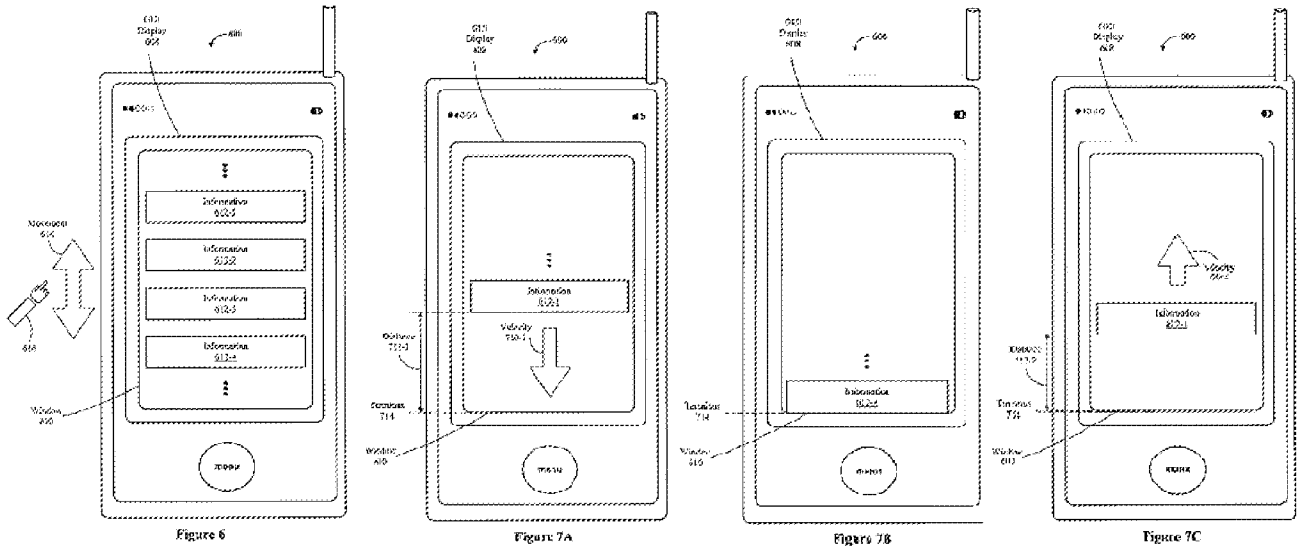
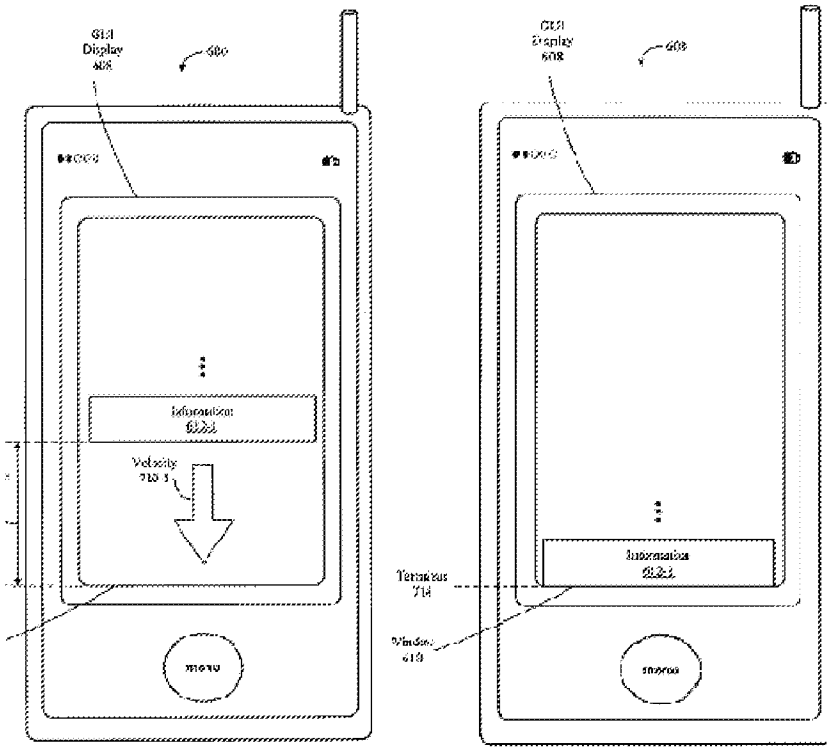


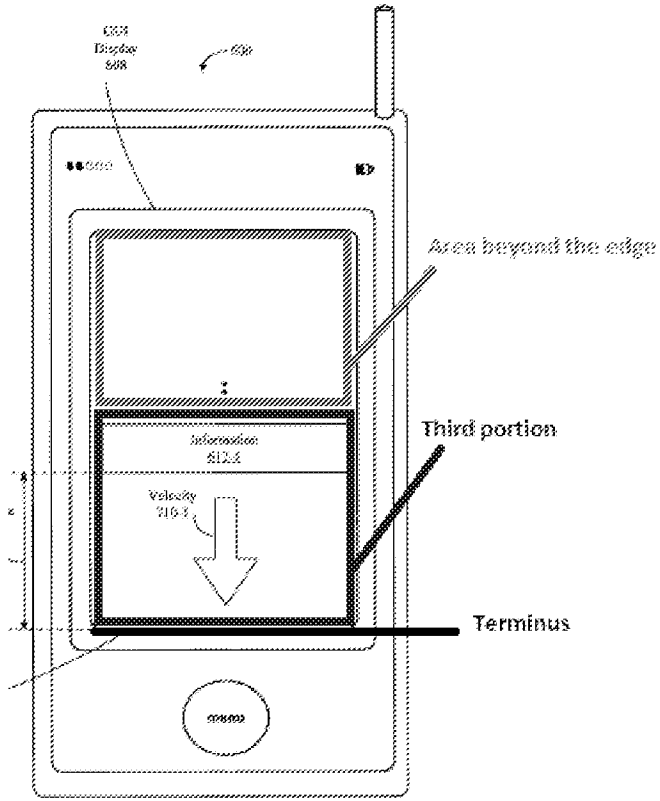
Figure 6 Figure 7A Figure 7B Figure 7C

Thus, according to *Ording*, a second portion of the list that is different than the first portion is displayed in response to the detected movement. This is because the entries shown in each portion are not the same given that a different entry (*e.g.*, an earlier or later entry) is displayed when the list is scrolled.

Figure 6 illustrates how different portions of the electronic document may be displayed on the device. As stated in connection with the description of limitations 1(b), 19(e) and 20(a) above, a "first portion" shown in window **610** provides for the display of four information items from a larger list, namely **612-**

The '381 Patent Claims	Disclosure in *Ording*
	2, **612-3**, **612-4** and **612-5**. The "second portion" is displayed as an intermediate graphical output arising from an ongoing user input **614** from finger/object **616** (*e.g.,* contact has not been broken). Information item **614-1** may be partially or completely scrolled onto the display, while item **612-5** may be partially or completely scrolled off the display and items **612-2**, **612-3**, **612-4** will be translated up/down the display. Since no previously displayed information item is in the same position now as in the first portion, and since the items shown in window **610** have changed from **612-2** through **612-5** to **612-1** through **612-4**, the second portion is different than the first portion.
(d) in response to an edge of the electronic document being reached while translating the electronic document in the first direction while the object is still detected on or near the touch screen: displaying an area beyond the edge of the document, and displaying a third portion of the electronic document, wherein the third portion is smaller than the first portion; and	*Ording* discloses in response to an edge of the electronic document being reached while translating the electronic document in the first direction while the object is still detected on the touch screen: displaying an area beyond the edge of the document, and a third portion that is smaller than the first portion. *Ording* discloses in response to an edge of the electronic document being reached (while translating the document in the first direction and while the object is still detected on the touch screen): displaying an area beyond the edge of the document. *Ording* discloses that each list has a beginning and an end or a first and last item. *See, e.g.,*: > For example, when the list is scrolled to its beginning or end, the scrolling list may appear to bounce again at a boundary and reverse direction. After the bounce or scrolling direction reversal, the scrolling may automatically stop so as to leave the first or last item of the list in view on the touch-sensitive display. *Ording*, col. 6:60-65. Thus, it follows that there is no item before the first item and no item after the last item. Given that there are no items located at the top of the display, and thus no item to display when a user keeps scrolling beyond the first list item, what is displayed above the first item is an area beyond the edge of the list (*i.e.*, electronic document). In fact, in discussing embodiments of methods "of scrolling through a list," *Ording*, col. 10:13; col. 10:37-40. *Ording* even refers to a "virtual region" in which a symbol may be displayed as an alternative to displaying the symbol adjacent to list items (*i.e.,* in the list itself). *See, e.g.,*: > The index symbol corresponding to a respective information item subset may be optionally displayed adjacent to the displayed text of the information item subset and/or at an upper edge

The '381 Patent Claims	Disclosure in *Ording*
	of a virtual region. *Ording* col. 10:29-33; col. 10:51-55. Given that the virtual region is an alternative location and thus different than any portions of the list (*i.e.,* electronic document), it would follow that the virtual region would be separate from, and outside of (*e.g.,* above or below), the electronic document. Such a virtual region may therefore be considered to be an area beyond the edge of the document that is displayed while translating the document (*i.e.,* during scrolling). *Ording* Figures 7A-B illustrate the state of the display as a list is scrolled and first item **612-1** is scrolled toward the terminus.  Figure 7A Figure 7B

The '381 Patent Claims	Disclosure in *Ording*
	As first item **612-1** moves downwards, the area above the item increases in size while the area below decreases in size. Thus, *Ording* discloses that as the first item moves downwards towards the terminus, the area above the first item (*i.e.,* the area beyond the edge) is [already] displayed and increases in size as the list is scrolled. The below annotated version of Figure 7A highlights an exemplary third portion of the electronic document along with an area beyond the edge of the document.  Figure 7A *Ording* also discloses displaying a third portion of the electronic document that is smaller than the first portion. Continuing the example illustrated in the same annotated figure herein, as the user scrolls

The '381 Patent Claims	Disclosure in *Ording*
	beyond the edge of the document/list, the displayed portion of the list (*e.g.*, the area that includes and is below item **612-1)** gets smaller as the area beyond the edge increases in size because the screen is only devoting a portion of its display area to the list contents. This displayed portion of the list contents correspond to a third portion and is smaller in size than the first portion which would include only list contents as discussed in connection with limitations 1(b), 19(e) and 20(a). The foregoing demonstrates that *Ording* discloses, in response to an edge of the electronic document being reached while translating the electronic document in the first direction while the object is still detected on the touch screen, displaying an area beyond the edge of the document, and a third portion that is smaller than the first portion.
(e) in response to detecting that the object is no longer on or near the touch screen display, translating the electronic document in a second direction until the area beyond the edge of the electronic document is no longer displayed to display a fourth portion of the electronic document, wherein the fourth portion is different from the first portion.	*Ording* discloses in response to detecting that the object is no longer on or near the touch screen display, translating the electronic document in a second direction until the area beyond the edge of the electronic document is no longer displayed to display a fourth portion that is different from the first portion of the electronic document. For example, the relevant list as disclosed in *Ording* includes six information items (*e.g.*, **612-1**, **612-2**, **612-3**, **612-4**, **612-5**, and **612-6**) whereas the window is capable of displaying four information items at once. *See Ording*, Fig 6.

The '381 Patent Claims	Disclosure in *Ording*

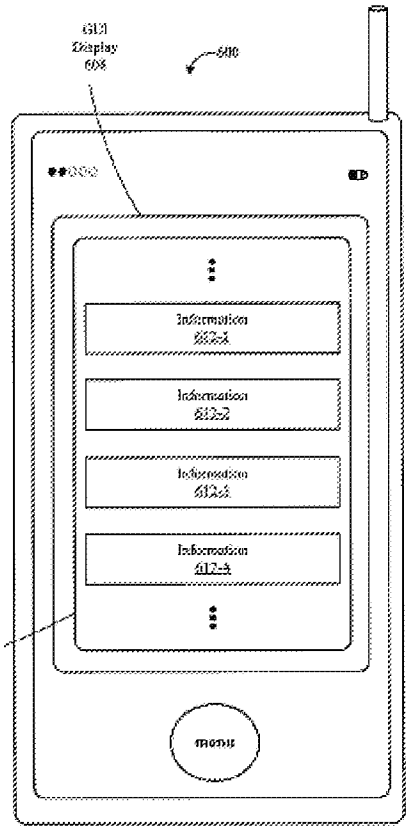


Figure 6

To scroll the list, the user issues a downward stroke (*i.e.,* a movement) on the touch screen display with a finger (*i.e.,* object), and the displayed information items change until the first item, list item **612-1,** and the corresponding edge of the document is reached, in which case an area beyond the edge of the electronic document is displayed. *See* claim 1(d).

Ording teaches that scrolling (*i.e.*, translation) may be stopped in response to the establishment of a substantially stationary point of contact on the touch screen display. *See, e.g.*,:

> The user 310 may break the point of contact and establish a substantially stationary point of

The '381 Patent Claims	Disclosure in *Ording*
	contact for at least a pre-determined period of time (410). The device 312 determines the breaking of the point of contact and the establishment of a substantially stationary point of contact (412), and responds by stopping the scrolling (414). *Ording*, col. 8:30-36. Although the cessation of scrolling is disclosed as part of the breaking and re-establishment of contact on the touch screen, *Ording* further teaches that some operations may be omitted, added, combined or reordered. *See, e.g.*,: FIG. 4 is a flow diagram illustrating an embodiment of a method 400 of scrolling through a list. A user 310 moves a point of contact using a sweep motion or gesture (314) on the touch-sensitive display of a device. The device 312 determines movement and/or acceleration of the point of contact (316), and scrolls a list of items on its display in response to the movement (318). The device accelerates the scrolling in response to accelerated movement of the point of contact and 30 optional breaking of the point of contact (320). The user 310 may break the point of contact and establish a substantially stationary point of contact for at least a pre-determined period of time (410). The device 312 determines the breaking of the point of contact and the establishment of a substantially stationary point of contact (412), and responds by stopping the scrolling (414). In other embodiments, the method 400 may include fewer operations or additional operations. In addition, two or more operations may be combined and/or an order of the operations may be changed. *Ording*, col. 8:22-39. As a result of either the displacement or velocity of the user's input movement, list item **612-1** can now come into contact with the terminus as illustrated in *Ording*, Figure 7B.

The '381 Patent Claims	Disclosure in *Ording*

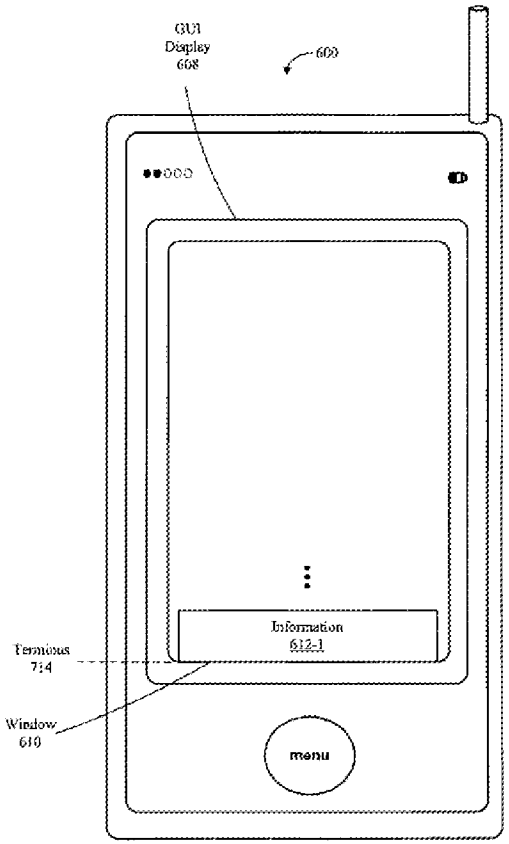


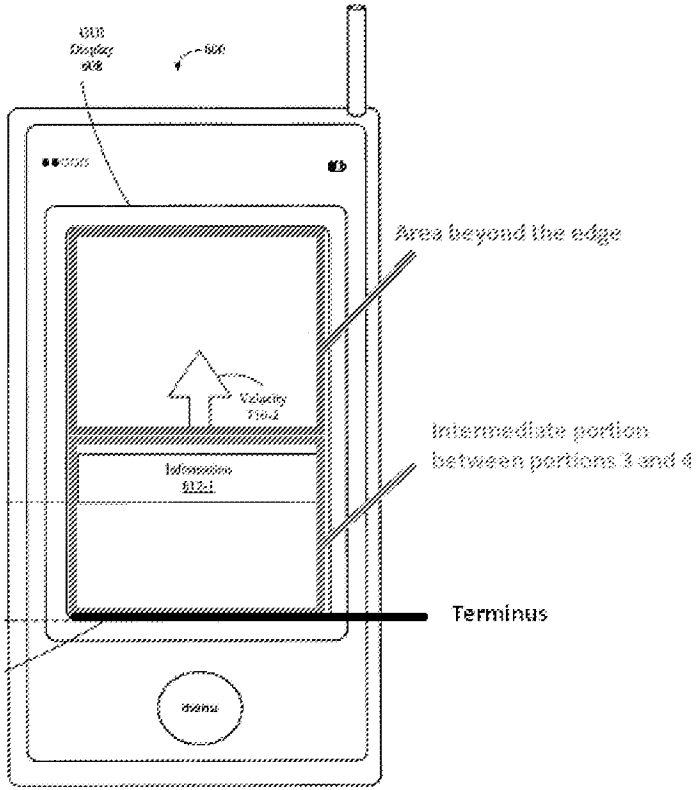
Figure 7B

As the first item in the list approaches the terminus, the displayed list may bounce off the virtual boundary and reverse direction. *See, e.g.*,:

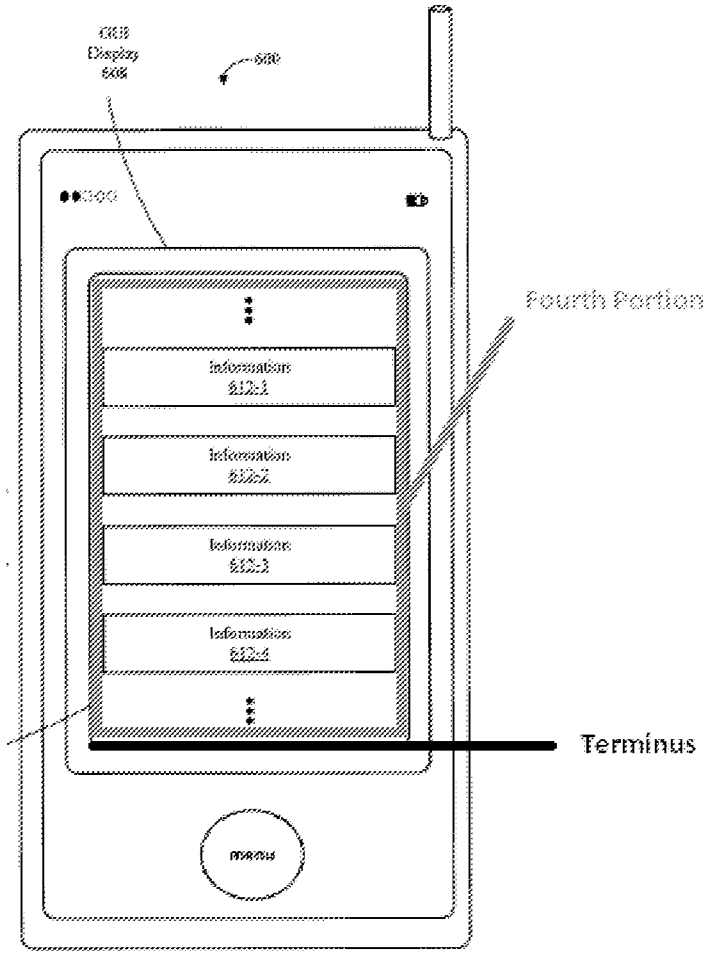
> The direction of scrolling through the list of items may be reversed in response to the scrolling intersecting a virtual boundary corresponding to a terminus of the list. The scrolling reversal may correspond to a damped motion. For example, during scrolling, a displayed portion of the list of items may appear to bounce off of a boundary of the window in the touch-sensitive display when a beginning or an end of the list of items is reached.

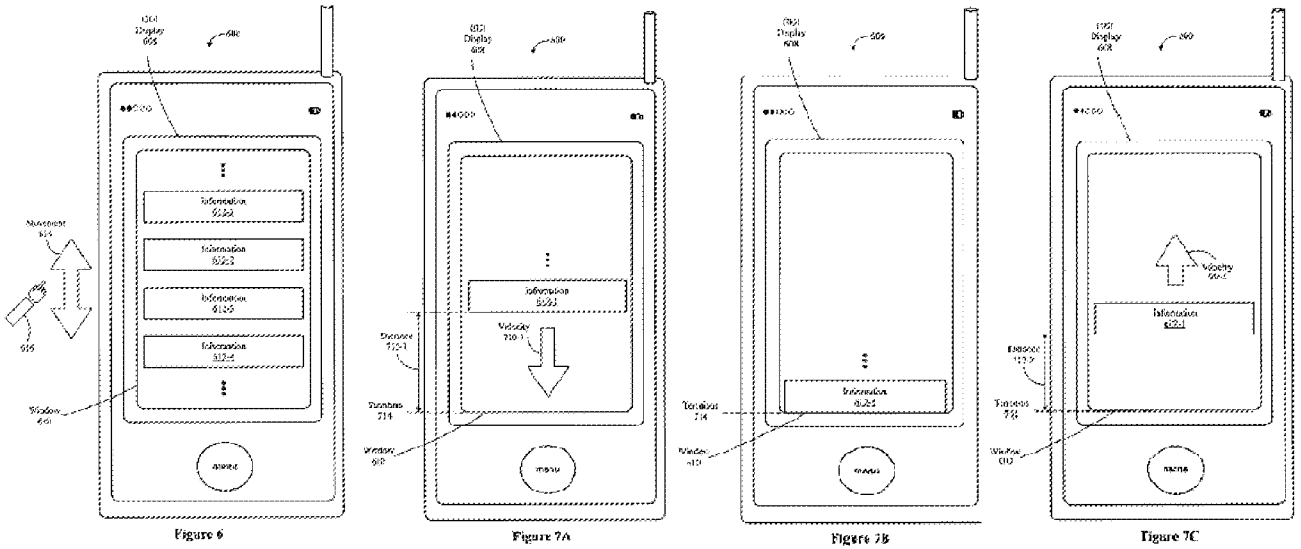
Ording, 4:44-51.

The '381 Patent Claims	Disclosure in *Ording*
	Although contact with the terminus by a first list item such as item **612-1** can cause the direction of scrolling to reverse as in *Ording* Figures 7B-7C, precedence to the user's continued contact with the touch screen may be instead given so as to cause information item **621-1** to remain at the terminus. *See, e.g.*,: > The user 310 may break the point of contact and establish a substantially stationary point of contact for at least a pre-determined period of time (410). The device 312 determines the breaking of the point of contact and the establishment of a substantially stationary point of contact (412), and responds by stopping the scrolling (414). *Ording*, col. 8:30-36. Precedence can be given to the user's contact with the screen over the item's contact with the terminus, since *Ording* discloses that some operations may be omitted, added, combined or reordered in the context of discussing the terminus and reversing the direction of scroll. *See, e.g.*,: > FIG. 5 is a flow diagram illustrating an embodiment of a method 500 of scrolling through a list. Operations 314 through 320 are as described above, and furthermore the accelerated scrolling operation 320 may be skipped when the user does not move a point of contact in an accelerated manner. When the scrolling list intersects a virtual boundary corresponding to a terminus of the list, the direction of scrolling is reversed (510), at least momentarily. In some embodiments, the scrolling reverses and then comes to a stop in a damped fashion when the terminus of the list is reached. In 50 other embodiments, the method 500 may include fewer operations or additional operations. In addition, two or more operations may be combined and/or an order of the operations may be changed. *Ording*, col. 8:40-53. Accordingly, in response to the user breaking contact with the touch screen (*i.e.*, removing the object so that it is no longer detected), the override on the scroll reversal is cancelled and the document is free to scroll in the opposite direction (*i.e.,* move in a second direction) since item **621-1** remains in contact with or has touched the terminus. *See, e.g.*,: > [T]he one or more displayed objects, such as the information 612-1, may subsequently reverse direction. At a time after the intersection with the terminus. *Ording*, col. 9:25-27.

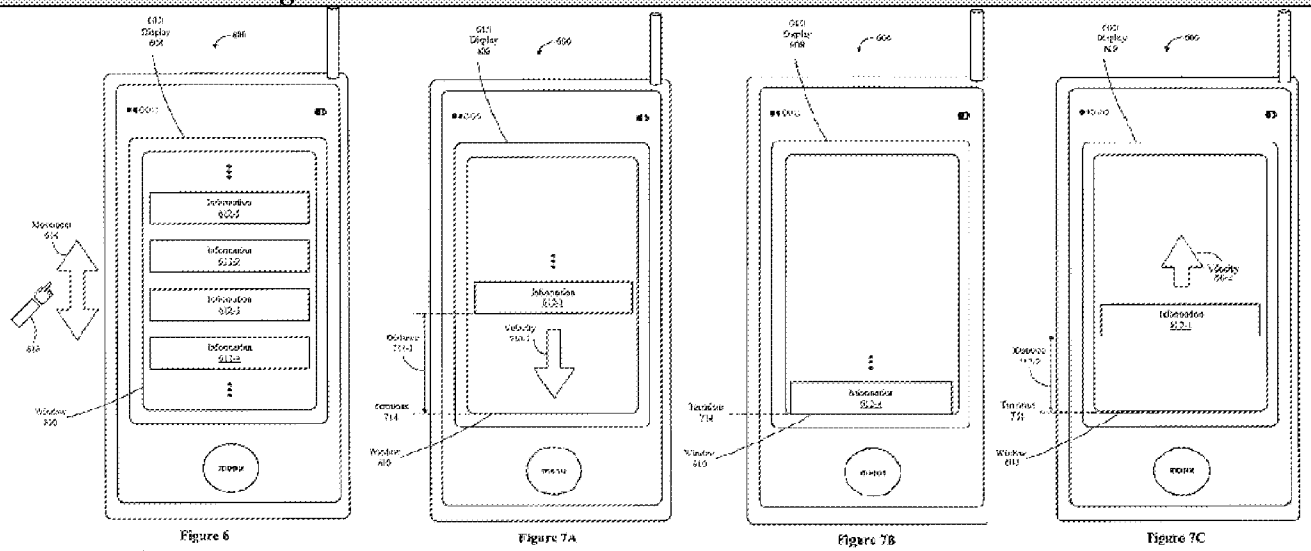
The '381 Patent Claims	Disclosure in *Ording*
	The annotated figure below depicts the state of the display after first item **612-1** has reached the terminus and has started to translate in the opposite direction (information items **612-2 - 612-6** are not shown but would sit below item **612-1** as in Figure 6). The highlighted area beyond the edge will decrease in size until it disappears as the first item reaches the top of the display.  Figure 7C According to *Ording*, "[a]fter the … scrolling direction reversal, the scrolling may automatically stop so as to leave the first or last item of the list in view on the touch-sensitive display." *See, e.g.*,: A list of items on the touch-sensitive display is scrolled in response to the movement (112).

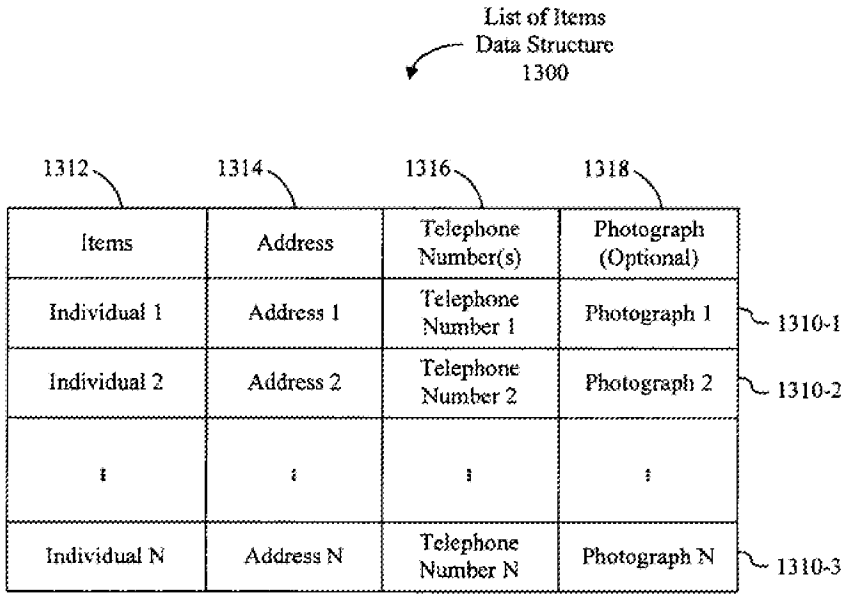
The '381 Patent Claims	Disclosure in *Ording*
	One or more of the following operations may occur. In response to a first accelerated movement of the point of contact and optional breaking of the point of contact, the scrolling may accelerate (114). In response to a second accelerated movement of the point of contact and optional breaking of the point of contact, the scrolling may further accelerate (116). A direction of the scrolling may reverse when the scrolling list intersects a virtual boundary corresponding to a terminus of the list (118). For example, when the list is scrolled to its beginning or end, the scrolling list may appear to bounce again at a boundary and reverse direction. After the bounce or scrolling direction reversal, the scrolling may automatically stop so as to leave the first or last item of the list in view on the touch-sensitive display. *Ording*, col. 6:50-65. Thus, as a result of automatically stopping the movement in the second direction when the first or last item is in view, either information item **612-1** or **612-6** will be displayed. Since neither information item **612-1** nor item **612-6** were displayed with the first portion (which displayed items **612-2 - 612-5**), the reversal will result in a fourth displayed portion that is different from the first portion shown in the discussion pertaining to limitations 1(b), 19(e) and 20(a). The annotated figure below highlights the display returning to a quiescent state, an exemplary fourth portion of the electronic document, the area beyond the edge no longer being displayed and information item **612-1** now in view.

The '381 Patent Claims	Disclosure in *Ording*
	 Figure 6 The foregoing demonstrates that *Ording* discloses that, in response to detecting that the object is no longer on the touch screen display, translating the electronic document in a second direction until the area beyond the edge of the electronic document is no longer displayed to display a fourth portion that is different from the first portion of the electronic document.

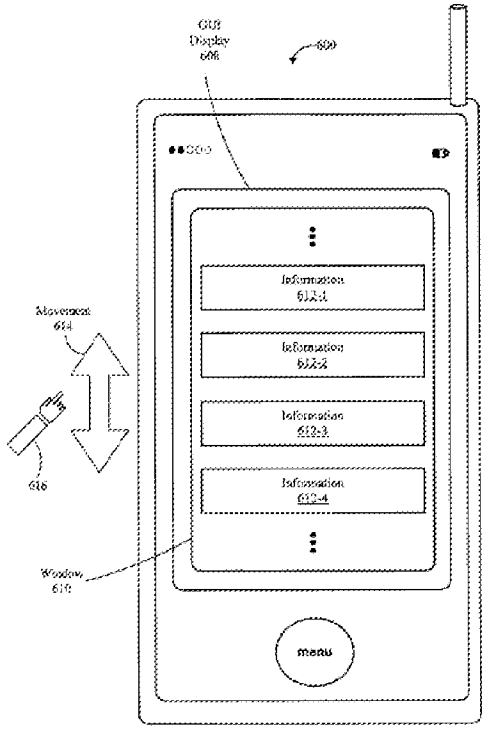
The '381 Patent Claims	Disclosure in *Ording*
2. The computer-implemented method of claim 1, wherein the first portion of the electronic document, the second portion of the electronic document, the third portion of the electronic document, and the fourth portion of the electronic document are displayed at the same magnification.	*Ording* discloses the first portion of the electronic document, the second portion of the electronic document, the third portion of the electronic document, and the fourth portion of the electronic document are displayed at the same magnification. *See* claim 1; *See also*, *e.g.*:  Figure 6 Figure 7A Figure 7B Figure 7C As seen in *Ording* Figures 6, and 7A-7C, the relative size of the list items, and therefore the list or electronic document itself, remain the same as the user scrolls through the list, thereby showing that the first, second, third and fourth portions discussed above in connection with the independent claim 1 are displayed at the same magnification.
3. The computer implemented method of claim 1, wherein the movement of the object is on the touch screen display.	*Ording* discloses that the movement of the object is on the touch screen display. *Ording* discloses that the movement is detected with reference to the user's point of contact such as a finger (*i.e.*, the object) with the touch-sensitive display. *See* claim 1 and *Ording*, col. 1:51-55; *see also, e.g.*:

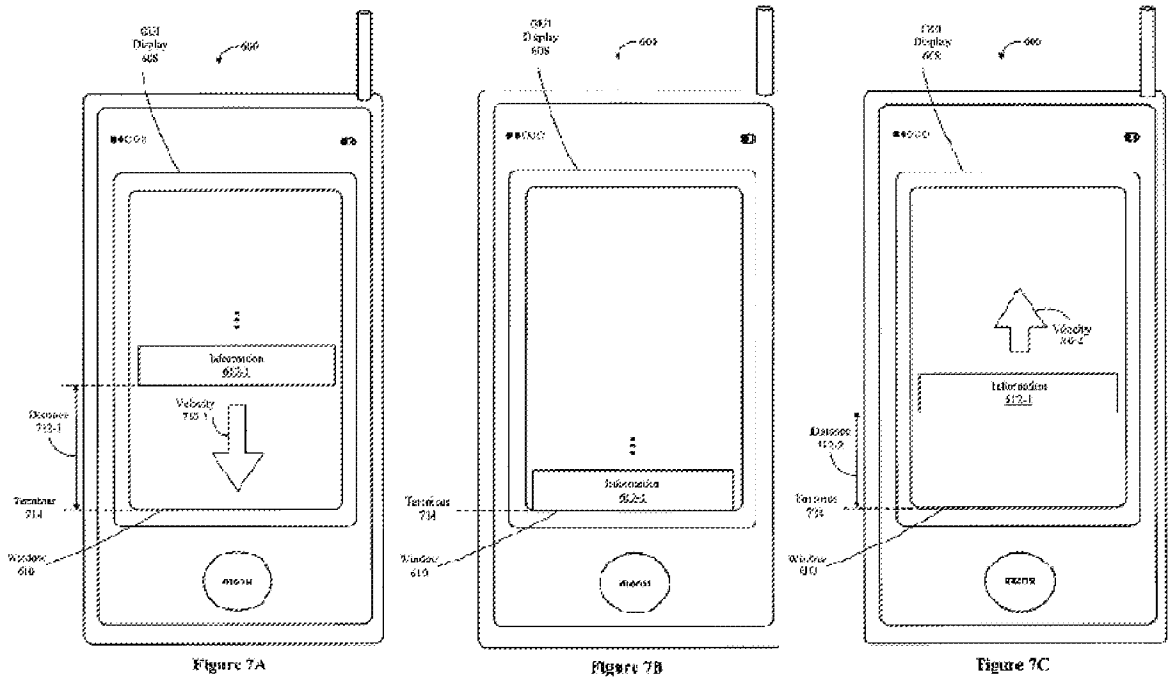
The '381 Patent Claims	Disclosure in *Ording*
	In an exemplary embodiment, a point of contact between the touch-sensitive display and the user corresponds to one or more digits of the user. In other embodiments, the point of contact may correspond to a stylus. *Ording*, col. 3:41-44 For example, the user may make contact with the touch-sensitive display, swipe or sweep one or more of his or her fingers along the display (*i.e.*, move and/or accelerate the point of contact) *Ording*, col. 4:16-19.
4. The computer-implemented method of claim 1, wherein the object is a finger.	*Ording* discloses that the user can operate the touch screen using his finger. *See, e.g.*: [T]he user may make contact with the touch-sensitive display, swipe or sweep one or more of his or her fingers along the display (*i.e.*, move and/or accelerate the point of contact). *Ording*, col. 4:16-19.
5. The computer-implemented method of claim 1, wherein the first direction is a vertical direction, a horizontal direction, or a diagonal direction.	*Ording* discloses that the first direction is a vertical direction, a horizontal direction, or a diagonal direction. *Ording* discloses that the direction of scrolling (*i.e.*, the first translation direction) can be in the same direction as the detected user's movement. Furthermore, the user can make upwards or downward sweeps (*i.e.*, vertically) with an object on the touch-sensitive screen and have the list scroll in the same direction on the display. *See, e.g.*: For instance, the movement of the point of contact may be in the same direction that the list is to be scrolled. Thus, if the user wants the list to scroll upwards, the user sweeps a finger (or stylus or the like) in contact with and in an upward direction on the touch-sensitive display. *Ording*, col. 6:19-24 *See also*, *Ording* Figures 6 and 7A-C (illustrating the displayed list being translated vertically).

The '381 Patent Claims	Disclosure in *Ording*
	 Figure 6 Figure 7A Figure 7B Figure 7C The example above shows that *Ording* discloses that the first direction is a vertical direction, thereby meeting the limitation for which the showing of any single one of a vertical, horizontal or diagonal direction is sufficient.
7. The computer-implemented method of claim 1, wherein the electronic document is a digital image.	*Ording* discloses that the electronic document includes a digital image. *Ording* discloses that the list of items (*i.e.,* document) may contain a photograph (*i.e.*, digital image). *See, e.g.*: > In an exemplary embodiment, the list of items may include contact information, such as names, addresses, photographs, and/or telephone numbers, *Ording*, col. 3:62-66. *See also*, *Ording*, col. 2:17-22 (describing the list itself as an image). > An offset in the point of contact may be included when scrolling through the list of items. The offset corresponds to the pre-determined magnitude of the displacement and allows the

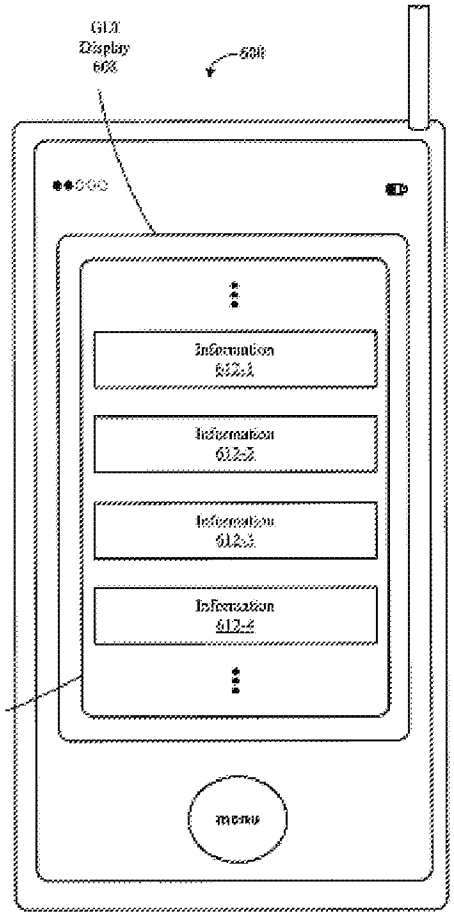
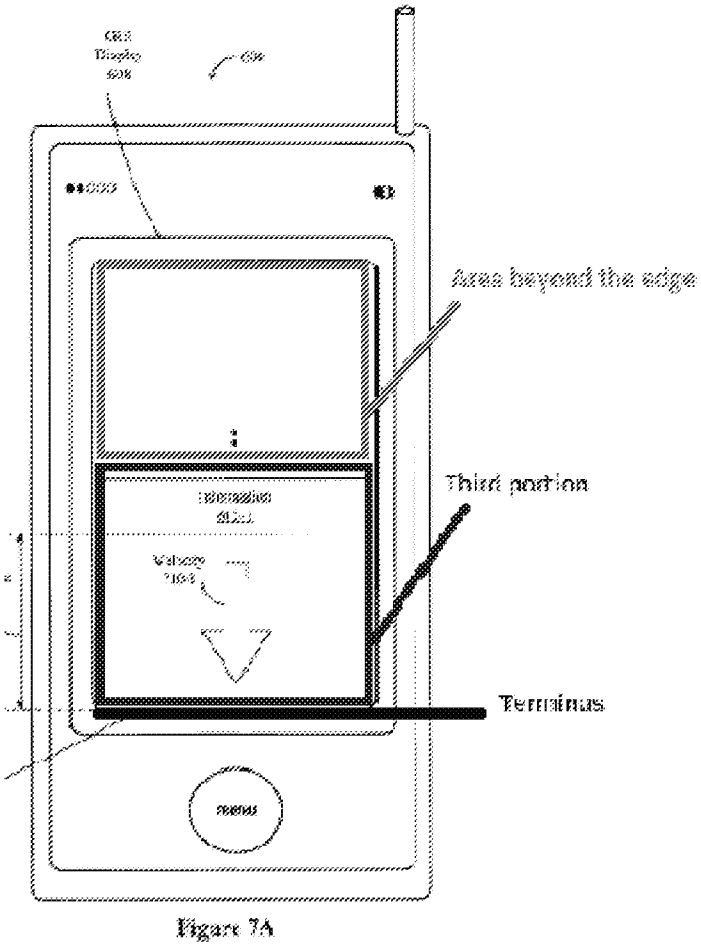
The '381 Patent Claims	Disclosure in *Ording*
	scrolling to commence smoothly, *i.e.*, without an abrupt jump or discontinuity on a displayed image corresponding to the list.
8. The computer-implemented method of claim 1, wherein the electronic document is a word processing, spreadsheet, email or presentation document.	*Ording* discloses that the electronic document is a spreadsheet. *Ording* discloses that a list of items (*i.e.*, document) may have a number of subsets, where each subset may have a number of categories. *See, e.g.*: The list of information items may include a sequence of information item subsets corresponding to the sequence of index items. The subsets may include one or more categories. *Ording,* col. 5:10-16; *See also*, *Ording*, Figure 13 (illustrating list item data as a series of rows and columns as in a spreadsheet) Thus, the list of may take on the appearance of a spreadsheet.  **Figure 13**

The '381 Patent Claims	Disclosure in *Ording*
	Ording further discloses that the translation of displayed documents can occur in multiple directions. Thus allowing the user to easily scroll through horizontally and vertically aligned categories on a spreadsheet. *See, e.g.*: In addition, while embodiment 600 illustrates movement 614 in a particular direction, in other embodiments movement of the displayed objects may be in response to movement 614 in one or more other directions, or in response to a scalar (*i.e.*, a determined or detected movement independent of the direction). *Ording*, col. 9:2-8. The example above shows that *Ording* discloses that the electronic document is a spreadsheet, thereby meeting the limitation for which the showing of any single one of a spreadsheet, word processing, email or presentation document is sufficient.
9. The computer-implemented method of claim 1, wherein the electronic document includes a list of items.	*Ording* discloses the electronic document includes a list of items. *Ording* discloses that the electronic document may include a list of items (*e.g.*, names, addresses, photographs, contact information). *See, e.g.*: The one or more windows may be used to display a list of items or information items. In an exemplary embodiment, the list of items may include contact information, such as names, addresses, photographs, and/or telephone numbers, for a plurality of individuals (sometimes referred to as a user's contact list or address book). *Ording*, col. 3:61-66. *See also*, *Ording*, Figure 6 (illustrating the display of document containing a list of items).

The '381 Patent Claims	Disclosure in *Ording*
	 Figure 6
10. The computer-implemented method of claim 1, wherein the second direction is opposite the first direction.	*Ording* discloses that the second direction is opposite the first direction. *Ording* discloses that when the endpoint (*i.e.* beginning or end) of a list reaches the terminus, the direction of scrolling may be reversed (*i.e.*, the movement is in an opposite direction). *See, Ording*, col. 4:44-46 ("scrolling through the list of items may be reversed in response to the scrolling intersecting a virtual boundary corresponding to a terminus of the list.") *See also*: A direction of the scrolling may reverse when the scrolling list intersects a virtual boundary corresponding to a terminus of the list (118). For example, when the list is scrolled to its

The '381 Patent Claims	Disclosure in *Ording*
	beginning or end, the scrolling list may appear to bounce again at a boundary and reverse direction. *Ording*, col. 6:56-62. *See also*, *Ording* Figures 7A-7C (illustrating the initial translating direction and the subsequent movement in the opposite direction upon the first item (*i.e.*, edge of the document) reaching the terminus)  Figure 7A Figure 7B Figure 7C
11. The computer-implemented method of claim 1, wherein translating in the first direction prior to reaching an edge of the document	*Ording* discloses translating in the first direction prior to reaching an edge of the document has an associated speed of translation that corresponds to a speed of movement of the object. *Ording* discloses that the scrolling speed can be correlated with the kinematics of the detected input movement. *See, e.g.*:

The '381 Patent Claims	Disclosure in *Ording*
has an associated speed of translation that corresponds to a speed of movement of the object.	In response to a determined movement of the point of contact, the list may be scrolled. Determining movement of the point of contact may include determining speed (magnitude), velocity (magnitude and direction), and/or an acceleration (including magnitude and/or direction) of the point of contact. Scrolling through the list may be accelerated in response to an accelerated movement of the point of contact. *Ording*, col. 3:66 - col. 4:6. For example, *Ording* discloses that the scrolling speed may be in accordance with estimates of speed, velocity and acceleration of the input movement acquired over a time interval. *See, e.g.*: In some embodiments, scrolling may be in accordance with a speed of movement of the point of contact. The speed may be a time average of values determined during several time intervals. In an exemplary embodiment, the speed, velocity and/or acceleration may be determined over five time intervals, where a respective time interval corresponds to an inverse of a frame rate, such as 0.0167 s, of a display. *Ording*, col. 7:6-12. Thus, the speed of translation in the first direction prior to reaching the edge corresponds to a speed of the movement of the user's finger (*i.e.*, the object).
12. The computer-implemented method of claim 1, wherein translating in the first direction is in accordance with a simulation of an equation of motion having friction.	*Ording* discloses translating in the first direction is in accordance with a simulation of an equation of motion having friction. *See, e.g.*: "[T]he scrolling may correspond to a simulation of a force law or equation of motion having a mass or inertial term, as well as dissipative term." *Ording*, col. 4:9-12. *Ording* also discloses that "the scrolling and acceleration of the scrolling may be in accordance with a simulation of a physical device having friction, *i.e.*, damped motion." *Ording*, col. 4:6-9. Thus, *Ording* discloses that the translation is in accordance with a simulation of an equation of motion having friction.
13. The computer-implemented method of	*Ording* discloses that the area beyond the edge of the document displayed is black, gray, a solid color, or white.

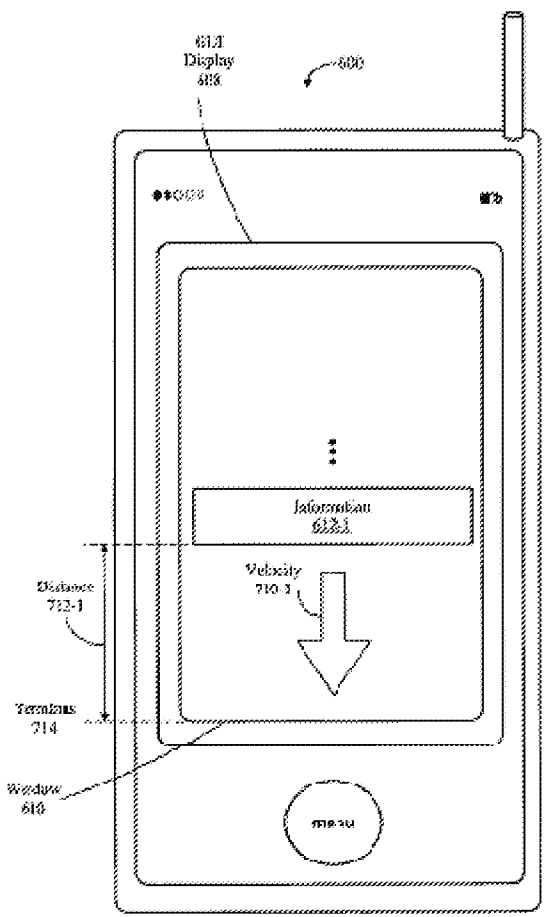
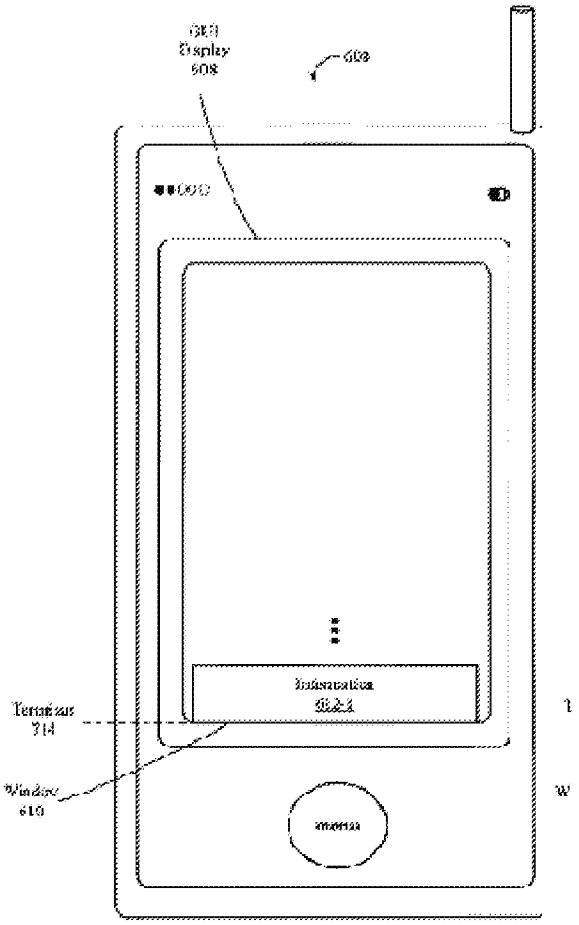
The '381 Patent Claims	Disclosure in *Ording*
claim 1, wherein the area beyond the edge of the document is black, gray, a solid color, or white.	The annotated version of Figure 7A illustrates the state of the display as the highlighted area beyond the edge of the document is on the screen. The figure shows that the color of the area beyond the edge could be a solid color similar to the space between information items (*e.g.*, white). *See, e.g.*: *Ording*, Figures 6-7A.  Figure 6  Figure 7A

The '381 Patent Claims	Disclosure in *Ording*
	See also claim 1(d).
15. The computer-implemented method of claim 1, wherein translating the document in the second direction is a damped motion.	*Ording* discloses the method of claim 1, wherein translating the document in the second direction is a damped motion. *Ording* discloses that after the direction of scrolling reverses (*i.e.,* translation in a second direction), the scrolling ceases as a result of damped motion. *See, e.g.*: > When the scrolling list intersects a virtual boundary corresponding to a terminus of the list, the direction of scrolling is reversed (510), at least momentarily. In some embodiments, the scrolling reverses and then comes to a stop in a damped fashion when the terminus of the list is reached. *Ording*, col. 8:45-49. *Ording* also discloses that the scrolling (*i.e.*, translation) in the second direction may be damped via the simulation of an elastic collision. *See, e.g.*: > The direction of scrolling through the list of items may be reversed in response to the scrolling intersecting a virtual boundary corresponding to a terminus of the list. The scrolling reversal may correspond to a **damped motion**. For example, during scrolling, a displayed portion of the list of items may appear to bounce off of a boundary of the window in the touch-sensitive display when a beginning or an end of the list of items is reached. The apparent bounce may correspond to a simulation of a viscous or elastic ball having momentum in a first direction striking an immovable and/or inelastic object, such as a wall. **The subsequent motion of the ball may be damped**, for example, by including a friction or dissipative term in the simulation. A parameter corresponding to the friction term in the simulation may be adjustable, allowing the ball to reach equilibrium in contact with the wall, *i.e.*, the virtual boundary, or displaced from the wall. *Ording*, col. 4:47-56 (emphasis added). Additionally, *Ording* discloses that the magnitude of the velocity of translation in the second direction may be damped with respect to (*e.g.*, be less than) the magnitude of the immediately prior velocity in the first direction at the same location on the display. *See, e.g.*: > At a time after the intersection with the terminus 714, the information object 612-1 may have

The '381 Patent Claims	Disclosure in *Ording*
	velocity 710-2 and may be a distance 712-2 from the terminus 714. In some embodiments, the magnitude of velocity 710-2 may be less than the magnitude of velocity 710-1 when the distance 712-2 equals the distance 712-1, *i.e.*, the motion of the one or more displayed objects is damped after the scrolling list reaches and "bounces" at its terminus. *Ording*, col. 9:29-35.
16. The computer-implemented method of claim 1, wherein changing from translating in the first direction to translating in the second direction until the area beyond the edge of the document is no longer displayed makes the edge of the electronic document appear to be elastically attached to an edge of the touch screen display or to an edge displayed on the touch screen display.	*Ording* discloses changing from translating in the first direction to translating in the second direction until the area beyond the edge of the document is no longer displayed makes the edge of the electronic document appear to be elastically attached to an edge of the touch screen display. *Ording* discloses that information objects can be scrolled into the terminus and "bounce" in the opposite direction. *See, e.g.*: As illustrated in FIG. 7B, when the one or more displayed objects, such as the information object 612-1, reach or intersect with the terminus 714, the movement corresponding to the scrolling may stop, *i.e.*, the scrolling velocity may be zero at an instant in time. As illustrated in FIG. 7C, the one or more displayed objects, such as the information 612-1, may subsequently reverse direction. At a time after the intersection with the terminus 714, the information object 612-1 may have velocity 710-2 and may be a distance 712-2 from the terminus 714. In some embodiments, the magnitude of velocity 710-2 may be less than the magnitude of velocity 710-1 when the distance 712-2 equals the distance 712-1, *i.e.*, the motion of the one or more displayed objects is damped after the scrolling list reaches and "bounces" at its terminus. *Ording*, col. 9:22-35 Thus, as the beginning/end of the list (*i.e.*, edge of the electronic document) is translated into a terminus, the bouncing effect gives the impression that the edge of the document is elastically attached to the display edge on the far side of the terminus, since the document will rebound in that direction as if on a rubber-band. Here, the terminus indicating the apparent end of the slack of the rubber-band. Accordingly, the change in translation direction in *Ording* makes the edge of the document appear to be elastically attached to a display edge. *See also* claim 1(d), claim 1(e), claim 15.

The '381 Patent Claims	Disclosure in *Ording*
17. The computer-implemented method of claim 1, wherein translating in the first direction prior to reaching the edge of the electronic document has a first associated translating distance that corresponds to a distance of movement of the object prior to reaching the edge of the electronic document; and	*Ording* discloses that translating in the first direction prior to reaching the edge of the electronic document has a first associated translating distance that corresponds to a distance of movement of the object prior to reaching the edge of the electronic document. *Ording* discloses that the list of items (*i.e.,* electronic document) may be scrolled when the movement of the finger/point of contact (*i.e.,* object) exceeds a pre-determined displacement threshold, and that the electronic document is scrolled (*i.e.,* translated) in response to the distance of the contact's movement. *See, e.g.*: Movement of a point of contact corresponding to a sweeping motion or gesture by a user of a touch-sensitive display is determined (208). A determination is made if the movement of the point of contact corresponds to a displacement greater than a pre-determined magnitude (210). A list of items on the touch-sensitive display is scrolled in response to the movement (212). *Ording*, col. 7:44-49. Thus, based on the foregoing and on the discussion above pertaining to claim 1(c), *Ording* discloses translating the document a first associated distance in the first direction prior to reaching the edge of the electronic document. Moreover, *Ording* discloses that the first translating distance corresponds to the distance of movement. For example, *Ording* discloses that "scrolling may be in accordance with a speed of movement of the point of contact." *Ording*, col. 7:6-7. As another example, *Ording* discloses that "[s]crolling of the list is accelerated in response to an accelerated movement of the point of contact." *Ording*, col. 1:51-55. Thus, since the scrolling speed (or acceleration) corresponds to the speed of movement (or acceleration) of the point of contact (*i.e.*, object), then the resulting translating distance also will correspond to the movement of the object (and therefore its distance). *See also* claim 1(c).
(a) wherein displaying an area beyond the edge of the electronic document comprises translating the electronic document in the	*Ording* discloses displaying an area beyond the edge of the electronic document comprises translating the electronic document in the first direction for a second associated translating distance. *Ording* discloses the displaying the area beyond the edge comprises translating the list (*i.e.*, electronic document) in a first direction. *See* claim 1(d).

The '381 Patent Claims	Disclosure in *Ording*
first direction for a second associated translating distance,	*Ording* also discloses that this translation of the electronic document is for a second translating distance that is associated with the direction of translation. More specifically, *Ording* discloses that the second translating distance is associated with the placement of the terminus, a virtual boundary. *See, e.g.*: > One or more displayed objects, such as information object 612-1 may be a distance 712-1 from a terminus 714 of the list of items and may be moving with a velocity 710-1 while the list is being scrolled. Note that the terminus 714 is a virtual boundary associated with the displayed objects, as opposed to a physical boundary associated with the window 610 and/or the display 608. As illustrated in FIG. 7B, when the one or more displayed objects, such as the information object 612-1, reach or intersect with the terminus 714, the movement corresponding to the scrolling may stop *Ording*, col. 9:16-24. Thus, as the beginning/end of the list is moving in the first direction and approaches the terminus, the displayed area beyond the edge of the list (*i.e.,* electronic document) grows in relation to the size of the list's displayed area. *See, Ording*, Figures 7A-B.

The '381 Patent Claims	Disclosure in *Ording*
	 Figure 7A  Figure 7B As Fig 7B illustrates, when the terminus is placed at the bottom edge of the display, the second associated translating distance will be longer, the area the area beyond the edge of the document will encompass most of the display, and the document display itself is left with the smaller remainder. However, when the terminus is placed in the middle of the display, the second associated translating distance will be shorter, and the displayed area of the document will be approximately equal to the area beyond the edge. Thus, the document can be translated for a second associated distance that is dependent on the placement of the terminus.

The '381 Patent Claims	Disclosure in *Ording*
(b) wherein the second associated translating distance is less than a distance of movement of the object after reaching the edge of the electronic document.	*Ording* discloses that the second associated translating distance is less than a distance of movement of the object after reaching the edge of the electronic document. *See* claim 12. *Ording* discloses motion damping that can alter the relationship between scrolling and user movement input. *Ording* discloses that "the scrolling and acceleration of the scrolling may be in accordance with a simulation of a physical device having friction, *i.e.*, damped motion," by using motion equations having mass, inertial and dissipative (*i.e.*, frictional) terms. *Ording*, col. 4:6-12. Moreover, *Ording* discloses that these frictional terms are adjustable. *See, e.g.*: > The subsequent motion of the ball may be damped, for example, by including a friction or dissipative term in the simulation. A parameter corresponding to **the friction term in the simulation may be adjustable**, allowing the ball to reach equilibrium in contact with the wall, *i.e.*, the virtual boundary, or displaced from the wall. *Ording,* col. 4:54-59 (emphasis added). If one of these frictional terms is adjusted, then either additional or less user input would be required to achieve the same scrolling output. If the adjustment is made to increase any of these terms such that more user input is required, then a given finger movement distance will result in a smaller associated translating distance. Increasing these frictional terms as taught by *Ording* as the edge of the document is reached would require more user input to translate the list (*i.e.*, electronic document) and results in having the (second) translating distance be less than the distance of movement of the finger (*i.e.*, object). Thus, *Ording* discloses that the second associated translating distance is less than a distance of movement of the object after reaching the edge of the electronic document.
18. The computer-implemented method of claim 1, wherein translating in the first direction prior to reaching	*Ording* discloses translating in the first direction prior to reaching the edge of the electronic document has a first associated translating speed that corresponds to a speed of movement of the object. *See* claim 11.

The '381 Patent Claims	Disclosure in *Ording*
the edge of the electronic document has a first associated translating speed that corresponds to a speed of movement of the object, and	
(a) wherein displaying an area beyond the edge of the electronic document comprises translating the electronic document in the first direction at a second associated translating speed,	*Ording* discloses displaying an area beyond the edge of the electronic document comprises translating the electronic document in the first direction at a second associated translating speed. *Ording* discloses translating the document at a second speed that is slower than the first translating speed. *See, e.g.*: > In some embodiments, in subsequent time intervals following the determination of the velocity based on the acceleration and/or the velocity in one or more time intervals prior to the breaking of the contact, the velocity of the scrolling may be tapered. For example, in each successive time 40 interval the velocity may be decreased by 5%. When the velocity crosses a lower threshold, it may be set to zero. *Ording*, col. 7:35-42. Thus, as the document continues to scroll in the first direction, the translation speed will decrease, resulting in second associated translating speeds that are slower than the first translating speed.
(b) wherein the second associated translating speed is slower than the first associated translating speed.	*Ording* discloses the second associated translating speed is slower than the first associated translating speed. *See* claim 18(a).
19. A device, comprising:	*Ording* discloses a device. *See* claim 1 preamble.
(a) a touch screen display;	*Ording* discloses a device comprising a touch screen display. *See* claim 19 preamble and claim 1(a).

The '381 Patent Claims	Disclosure in *Ording*
(b) one or more processors;	*Ording* discloses a device comprising one or more processors. *See e.g.,*: "The aforementioned methods may be performed by a portable electronic device having a touch-sensitive display, a processor, memory and one or more programs or sets of instructions stored in the memory for performing these methods." *Ording*, col. 2:23-25. *Ording* also discloses there device may comprise more than one processor. *See e.g.,*: The device 1200 may include a memory controller 1212, one or more data processors, image processors and/or central processing units 1214 and a peripherals interface 1216. The memory controller 1212, the one or more processors 1214 and/or the peripherals interface 1216 may be separate components or may be integrated, such as in one or more integrated circuits. *Ording*, col. 12:20-26.
(c) memory; and	*Ording* discloses a device comprising memory. *See* claim 19(b).
(d) one or more programs, wherein the one or more programs are stored in the memory and configured to be executed by the one or more processors, the programs including:	*Ording* discloses a device comprising one or more programs in the form of software, code and/or instructions stored in memory and configured to be executed by the processor(s). *Ording* discloses that there are one or more programs stored in the memory for execution on one or more processors. According to *Ording,* the "memory may store an operating system," which is a type of program. *Ording*, col. 13:22-23. Also, the memory may store programs such as procedures, modules and sets of instructions. Among other examples, modules disclosed in *Ording* include modules for communicating with other devices or computers, modules "for governing the scrolling of a list on the display", and modules that "determine the point of contact and/or its movement". *See e.g.,*: Memory 1210 may also store communication procedures (or sets of instructions) in a communication module 1240. The communication procedures may be used for communicating with one or more additional devices, one or more computers and/or one or more servers. The memory 1210 may include a display module (or a set of instructions) 1242, a list of items/

The '381 Patent Claims	Disclosure in *Ording*
	index 1244, a physical device/equation of motion module (or a set of instructions) 1246 (for governing the scrolling of a list on the display 1234), contact/motion module (or a set of instructions) 1248 to determine the point of contact and/or its movement, a graphics module (or a set of instructions) 1250, and/or a GPS module 1252. *Ording*, col. 13:28-38. Thus, *Ording* discloses one or more programs stored in the memory. As discussed above, *Ording* also states that these programs are executed on, and the corresponding methods are performed by, the one or more processors. *See* claim 19(b).
(e) instructions for displaying a first portion of an electronic document;	*Ording* discloses instructions for displaying a first portion of an electronic document. *See* claims 1(b) and 19(d).
(f) instructions for detecting a movement of an object on or near the touch screen display; instructions for translating the electronic document displayed on the touch screen display in a first direction to display a second portion of the electronic document, wherein the second portion is different from the first portion, in response to detecting the movement;	*Ording* discloses instructions for detecting a movement of an object on the touch screen display and, in response, translating the electronic document to display a second portion of the electronic document that is different from the first. *See* claims 1(c) and 19(d).
(g) instructions for displaying an area beyond an edge of the electronic document and displaying a	*Ording* discloses instructions for, in response to an edge of the electronic document being reached while translating the electronic document in the first direction while the object is still detected on the touch screen: displaying an area beyond the edge of the document, and a third portion that is smaller than the first portion.

The '381 Patent Claims	Disclosure in *Ording*
third portion of the electronic document, wherein the third portion is smaller than the first portion, in response to the edge of the electronic document being reached while translating the electronic document in the first direction while the object is still detected on or near the touch screen display; and	*See* claims 1(d) and 19(d).
(h) instructions for translating the electronic document in a second direction until the area beyond the edge of the electronic document is no longer displayed to display a fourth portion of the electronic document, wherein the fourth portion is different from the first portion, in response to detecting that the object is no longer on or near the touch screen display.	*Ording* discloses instructions for, in response to detecting that the object is no longer on or near the touch screen display, translating the electronic document in a second direction until the area beyond the edge of the electronic document is no longer displayed to display a fourth portion that is different from the first portion of the electronic document. *See* claims 1(e) and 19(d).
20. A computer readable storage medium having stored therein instructions, which when executed by a device with a touch screen display, cause the device	*Ording* discloses a computer readable storage medium having stored therein instructions, which when executed by a device with a touch screen display. *See* claim 1 preamble, claim 19 preamble, claim 19(d). Thus, the foregoing demonstrates that the methods disclosed by *Ording* can be included in a computer

The '381 Patent Claims	Disclosure in *Ording*
to:	program product for execution on a portable device having a touch sensitive (*i.e.*, touch screen) display.
(a) display a first portion of an electronic document;	*Ording* discloses displaying a first portion of an electronic document *See* claim 1(b).
(b) detect a movement of an object on or near the touch screen display; translate the electronic document displayed on the touch screen display in a first direction to display a second portion of the electronic document, wherein the second portion is different from the first portion, in response to detecting the movement;	*Ording* discloses detecting a movement of an object on the touch screen display and, in response, translating the electronic document to display a second portion of the electronic document that is different from the first. *See* claim 1(c).
(c) display an area beyond an edge of the electronic document and display a third portion of the electronic document, wherein the third portion is smaller than the first portion, if the edge of the electronic document is reached while translating the electronic document in the first direction while the object is still detected on or	*Ording* discloses in response to an edge of the electronic document being reached while translating the electronic document in the first direction while the object is still detected on the touch screen: displaying an area beyond the edge of the document, and a third portion that is smaller than the first portion. *See* claim 1(d).

The '381 Patent Claims	Disclosure in *Ording*
near the touch screen display; and	
(d) translate the electronic document in a second direction until the area beyond the edge of the electronic document is no longer displayed to display a fourth portion of the electronic document, wherein the fourth portion is different from the first portion, in response to detecting that the object is no longer on or near the touch screen display.	*Ording* discloses in response to detecting that the object is no longer on or near the touch screen display, translating the electronic document in a second direction until the area beyond the edge of the electronic document is no longer displayed to display a fourth portion that is different from the first portion of the electronic document. *See* claim 1(e).

EXHIBIT 7

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN JOSE DIVISION

APPLE, INC., a California corporation, Plaintiff and Counterdefendant, v. SAMSUNG ELECTRONICS CO., LTD., A Korean corporation; SAMSUNG ELECTRONICS AMERICA, INC., a New York corporation; SAMSUNG TELECOMMUNICATIONS AMERICA, LLC, a Delaware limited liability company, Defendants and Counterclaimants.	Case No.: 11-CV-01846-LHK ORDER CONSTRUING DISPUTED CLAIM TERMS OF U.S. PATENT NOS. 7,698,711; 6,493,002; 7,469,381; 7,663,607; 7,812,828; 7,844,915; and 7,853,891

Plaintiff Apple brings this suit against Samsung Electronics Co., Ltd., Samsung Electronics America, Inc., and Samsung Telecommunications America, LLC (collectively, "Samsung"). Apple asserts, among other things, that several of Samsung's products infringe Apple's patents. Samsung counterclaims that several of Apple's products infringe Samsung's patents. The parties now seek construction of eight[1] disputed terms used in the claims of the following patents-in-suit: U.S. Patent Nos. 7,698,711 ("'711 Patent"); 6,493,002 ("'002 Patent"); 7,469,381 ("'381 Patent"); 7,663,607 ("'607 Patent"); 7,812,828 ("'828 Patent"); 7,844,915 ("'915 Patent"); and 7,853,891 ("'891 Patent"). The Court held a technology tutorial on January 17, 2012, and a claim construction hearing on January 20, 2012. The Court has reviewed the claims, specifications, and other relevant

[1] Initially, the parties identified ten claim terms to be construed. In the course of claim construction briefing, Apple and Samsung stipulated to the construction of the term "symbol" in Samsung's U.S. Patent No. 7,200,792. *See* Apple's Responsive Claim Construction Br. at 2 ("Apple's Resp."). Accordingly, the Court construes the term "symbol" to mean, as the parties stipulated: "a modulated signal representing a number of bits specified according to the modulation technique." Additionally, after the tutorial, but before the Claim Construction hearing, the parties reached an agreement regarding the term "starting a timer" in the '891 Patent. Accordingly, the Court construes "starting a timer" to mean, as the parties have stipulated, "initiating a time keeping process." *See* ECF No. 650.

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evidence, and has considered the briefing and arguments of the parties. The Court now construes the terms at issue.

I. LEGAL STANDARD

Claim construction is a question of law to be determined by the court. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995) (en banc), *aff'd* 517 U.S. 370 (1996). "Ultimately, the interpretation to be given a term can only be determined and confirmed with a full understanding of what the inventors actually invented and intended to envelop with the claim." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005) (en banc) (internal quotation marks omitted). Accordingly, a claim should be construed in a manner that "stays true to the claim language and most naturally aligns with the patent's description of the invention." *Id.*

In construing disputed terms, the court looks first to the claims themselves, for "[i]t is a 'bedrock principle' of patent law that 'the claims of a patent define the invention to which the patentee is entitled the right to exclude.'" *Id.* at 1312 (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). Generally, the words of a claim should be given their "ordinary and customary meaning," which is "the meaning that the term[s] would have to a person of ordinary skill in the art in question at the time of the invention." *Id.* at 1312-13. In some instances, the ordinary meaning to a person of skill in the art is clear, and claim construction may involve "little more than the application of the widely accepted meaning of commonly understood words." *Id.* at 1314.

In many cases, however, the meaning of a term to a person skilled in the art will not be readily apparent, and the court must look to other sources to determine the term's meaning. *Id.* Under these circumstances, the court should consider the context in which the term is used in an asserted claim or in related claims, bearing in mind that "the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Id.* at 1313. Indeed, the specification is "'always highly relevant'" and "'[u]sually [] dispositive; it is the single best guide to the meaning of a disputed term.'" *Id.* at 1315 (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)). Where the specification reveals that the

patentee has given a special definition to a claim term that differs from the meaning it would ordinarily possess, "the inventor's lexicography governs." *Id.* at 1316. Likewise, where the specification reveals an intentional disclaimer or disavowal of claim scope by the inventor, the inventor's intention as revealed through the specification is dispositive. *Id.*

The court may also consider the patent's prosecution history, which consists of the complete record of proceedings before the United States Patent and Trademark Office ("U.S. PTO" or "PTO") and includes the cited prior art references. The court may consider prosecution history where it is in evidence, for the prosecution history "can often inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it otherwise would be." *Id.* at 1317 (internal citations omitted).

Finally, the court is also authorized to consider extrinsic evidence in construing claims, such as "expert and inventor testimony, dictionaries, and learned treatises." *Markman*, 52 F.3d at 980 (internal citations omitted). Expert testimony may be particularly useful in "[providing] background on the technology at issue, [explaining] how an invention works, [ensuring] that the court's understanding of the technical aspects of the patent is consistent with that of a person of skill in the art, or [establishing] that a particular term in the patent or the prior art has a particular meaning in the pertinent field." *Phillips*, 415 F.3d at 1318. Although the court may consider evidence extrinsic to the patent and prosecution history, such evidence is considered "less significant than the intrinsic record" and "less reliable than the patent and its prosecution history in determining how to read claim terms." *Id.* at 1317-18 (internal quotation marks and citation omitted). Thus, while extrinsic evidence may be useful in claim construction, ultimately "it is unlikely to result in a reliable interpretation of patent claim scope unless considered in the context of the intrinsic evidence." *Id.* at 1319. Any expert testimony "that is clearly at odds with the claim construction mandated by the claims themselves, the written description, and the prosecution history" will be significantly discounted. *Id.* at 1318 (internal quotation marks and citation omitted).

II. DISCUSSION

A. "applet"

The disputed term "applet" appears in Samsung's '711 Patent. The '711 Patent, entitled "Multi-tasking Apparatus and Method in Portable Terminal," discloses "an apparatus and method capable of performing multiple tasks in a portable terminal . . . in which menu functions of the portable terminal can be implemented while continuing to play the music." '711 Patent Abstract. The apparatus includes a controller for implementing "at least one menu function while playing a music file," and also includes "a display unit for displaying an indication that the music file is being played during the implementation of the menu function." *Id.* The application for the '711 Patent was filed on July 16, 2007, and the patent issued on April 13, 2010. It is a continuation of a prior application, which dates back to March 28, 2006. Further, the Patent claims the benefit of a Korean patent application filed on August 30, 2005.

Samsung's Proposed Construction	**Apple's Proposed Construction**
"A small application designed to run within another program"	"An operating system-independent computer program that runs within an application module"

The term "applet" appears in Claims 1, 9, and 17 of the '711 Patent. For example, Independent Claim 1 of the '711 Patent recites:

> 1. A multi-tasking method in a pocket-sized mobile communication device including an MP3 playing capability, the multi-tasking method comprising:
>
> generating a music background play object, wherein the music background play object includes an application module including at least one **applet**;
>
> providing an interface for music play by the music background play object;
>
> selecting an MP3 mode in the pocket-sized mobile communication device using the interface;
>
> selecting and playing a music file in the pocket-sized mobile communication device in the MP3 mode;
>
> switching the MP3 mode to a standby mode while the playing of the music file continues;

displaying an indication that the music file is being played in the standby mode;

selecting and performing at least one function of the pocket-sized mobile communication device from the standby mode while the playing of the music file continues; and

continuing to display the indication that the music file is being played while performing the selected function.

'711 Patent at 7:1-23 (emphasis added).

Samsung argues that a person of ordinary skill in the art[2] would understand that an "applet" is a "small application designed to run within another program." Samsung's Opening Br.[3] at 13. Apple argues that an "applet" is "[a]n operating system-independent computer program that runs within an application module." Essentially, the parties dispute[4] whether an "applet" is "operating system-independent," and whether an "applet" runs within "an application module" or within "another program." *See* Apple's Resp. at 3.

1. Claim Language/Specification

As the above exemplar from the claim language shows, the claims themselves do not define the term "applet." Thus, the Court turns to the specification for further guidance.

The term "applet" appears only once in the specification. That portion states:

---

[2] With respect to the '711 Patent, Samsung defines a person of ordinary skill in the art as someone with "a Bachelor's Degree in computer science/engineering and several years of experience in multi-tasking systems and computer programming, or a Master's Degree with less relevant experience, or a person with equivalent industry experience." *See* ECF No. 650. Apple defines a person of ordinary skill in the art as having "at least a bachelor's degree in computer science/engineering or similar discipline and several years' relevant industry or academic research experience in the areas of multitasking systems, embedded systems or programming for handheld devices. Alternatively, the ordinary artisan would have had a more advanced degree in computer science/engineering or a similar field with somewhat less additional work or research experience." *See* ECF No. 650. The dispute between the parties appears to center around whether the person of ordinary skill in the art must have experience with embedded systems or handheld devices. Apple has not supported its more narrow definition of a person of ordinary skill in the art with evidence or argument as to why more specialized skills are necessary. The Court therefore adopts Samsung's definition of a person of ordinary skill in the art. In any event, it does not appear that the definition of a person of ordinary skill in the art necessarily impacts the construction of the disputed term.

[3] When referencing the '711 Patent, Samsung's Opening Claim Construction Brief will be referred to as "Samsung's Opening Br."; Apple's Responsive Claim Construction Brief will be referred to as "Apple's Resp."; and Samsung's Reply Claim Construction Brief will be referred to as "Samsung's Reply."

[4] Additionally, the parties disputed whether an "applet" must also be "small," as Samsung urged in its proposed claim construction. However, Samsung's expert, Mr. Cole, subsequently acknowledged that he did not know what the term "small" means in the context of an applet. *See* Cole Dep. at 57-58. Indeed, the parties agreed at the *Markman* hearing that the additional limitation that an applet be "small" was not supported by the evidence.

> FIG.1 is a block diagram of a portable terminal according to an exemplary embodiment of the present invention, in which an MP3 music control processor is not included. Application modules of the portable terminal include at least one **applet** and each of the application modules, that is each menu of the portable terminal, independently performs multi-tasking.

'711 Patent at 3:8-14 (emphasis added).

Thus, both the claim language and specification generally support Apple's construction that an "applet" runs within "an application module" rather than within "another program" as urged by Samsung. Both the claim language and the specification recite that an "application module" includes at least one "applet." In contrast, Samsung has not identified any intrinsic evidence establishing that an "applet" must run within "another program." Accordingly, the claim language and specification support Apple's construction that an "applet" runs within "an application module."

2. Extrinsic Evidence[5]

While extrinsic evidence is often less useful to claim construction than intrinsic evidence, *Phillips*, 415 F.3d at 1317, the Court is not obligated to consider the sources in any particular order. *Id*. at 1324. Because the parties' disagreement over the extrinsic evidence is useful in order to understand their arguments about the prosecution history of the '711 Patent, the Court begins by considering the extrinsic evidence.

The parties rely heavily on extrinsic evidence, particularly the testimony of experts; the testimony of the inventor of the '711 Patent, Moon-Sang Jeong; and technical dictionary definitions, to support their arguments regarding "the meaning that the term[s] would have to a person of ordinary skill in the art in question at the time of the invention," in August 2005. *Id*. at 1312-13. At the heart of their dispute is whether a person of ordinary skill in the art would have understood the term "applet" as requiring operating system-independence.[6]

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[5] Apple moved to strike from the record certain extrinsic evidence relied upon by Samsung's expert Mr. Cole. *See* ECF No. 627. For the reasons stated on the record at the January 20, 2012 hearing, Apple's Motion to Strike is DENIED.

[6] Dr. Givargis describes an operating system-independent application as: "[t]hat is, in software systems where a first application executes within the context of a second 'host' application, the first application can be run independent of the platform on which the host application is executing. The host application provides the complete execution environment for the first application independently of the platform, including the operating system." Givargis Decl. ¶ 20.

In support of its broad construction of "applet" as including both operating system dependent and independent applets Samsung offers the declaration of its expert, Joe Tipton Cole. Mr. Cole stated that "the term *applet* is used in conjunction with many different programming languages, and some of those *applets* are operating system dependent." Cole Decl. ¶ 65. Cole went on to explain that "[a]t best it can be said that Java *applets* can be operating system independent, but there are instances where that is not the case. . . . One skilled in the art would not so limit the term *applet* as to *require* operating system independence." Cole Decl. ¶ 66.

Mr. Cole relies on dictionary definitions, including Wiley's Electrical and Electronics Engineering Dictionary (2004), to support his conclusion that an "applet" is "a small application designed to run within another program." Cole Decl. ¶ 43. Moreover, Mr. Cole supports his conclusion with evidence that in 2005, operating system-dependent "applets" were known to persons skilled in the art. For example, Microsoft control panel tools appeared to have been "applets" that were operating system-dependent. Cole Decl. ¶ 51. Similarly, the named inventor, Mr. Jeong,[7] testified that he was familiar with the operating system-dependent applet because he had previously worked on such applets for the Qualcomm platform. Briggs Decl. Ex. R.

In support of its narrow construction of "applet" as an application which is operating system-independent, Apple submitted the expert declaration of Dr. Tony Givargis. Dr. Givargis explained that as of August 2005, a person of ordinary skill in the art would have understood "applet" to be "an operating system-independent program." Givargis Decl. ¶ 55. Dr. Givargis testified that a person of ordinary skill in the art understood that most applets are Java applets, because they are the most common types of applets. Givargis Dep. at 30-31. Java applets are almost exclusively operating system-independent. *See* Givargis Decl. ¶¶ 43-44; Cole Dep. at 70. Dr. Givargis supports this opinion with a number of publications that define "applet" generally as a program or an application "typically written in Java," and thus independent of an operating system.

[7] The Court recognizes that little weight is given to named inventor testimony. *Bell & Howell DMP Co. v. Altek Sys.*, 132 F.3d 701, 706 (Fed. Cir. 1997). However, the inventor testimony does provide some context for the expert's opinion that an "applet" can include both operating system-dependent and independent applications.

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See Givargis Decl. ¶¶ 42-54. However, Dr. Givargis also admitted that as a general matter, applets *may* be operating system-dependent or independent. *See* Givargis Dep. at 29.

The extrinsic evidence establishes that in 2005, there was no universally agreed upon definition of the term "applet." While "applets" could have been either operating system-independent or operating system-dependent, it appears as though both experts agreed that the most common "applet" was a Java applet, which is operating system-independent. Nonetheless, there is no intrinsic evidence that the "applet" in the '711 Patent was a web-based applet, a Java applet, or otherwise operating system-independent. Nor is it clear that a person of ordinary skill in the art would limit his or her understanding of the term "applet" to *only* operating system-independent applets. Therefore, it is inappropriate to include the limitation of operating system-independence urged by Apple.

3. Prosecution History

"The court must always consult the prosecution history, when offered in evidence, to determine if the inventor surrendered disputed claim coverage." *SanDisk Corp. v Memorex Prods., Inc.*, 415 F.3d 1278, 1286 (Fed. Cir. 2005). When a patentee amends the language of the claims in order to overcome a rejection because of prior art, the patentee disclaims what was eliminated from the patent. *See Omega Eng'g, Inc., v. Raytek Corp.*, 334 F.3d 1314, 1324 (Fed. Cir. 2003). Thus, "[w]hile there are times that the prosecution history 'lacks the clarity' of other intrinsic sources, the prosecution history may be given substantial weight in construing a term where that term was added by amendment." *Bd. of Regents of the Univ. of Texas Sys. v. BENQ Am. Corp.*, 533 F.3d 1362, 1369 (Fed. Cir. 2008) (internal citations omitted). Nevertheless, "[a] disclaimer must be 'clear and unmistakable,' and unclear prosecution history cannot be used to limit claims." *Cordis Corp. v. Boston Scientific Corp.*, 561 F.3d 1319, 1329 (Fed. Cir. 2009) (citing *Free Motion Fitness, Inc. v. Cybex Int'l, Inc.*, 423 F.3d 1343, 1353 (Fed. Cir. 2005)).

In its briefing, and at the *Markman* hearing, Apple argued that the prosecution history supports its position that the term "applet," as it is used in the '711 Patent, is limited to only operating system-independent applets.

During the prosecution of the '711 Patent, the U.S. Patent and Trademark Office Examiner ("Examiner") initially indicated that the claims of the '711 Patent were obvious in light of U.S. Patent No. 7,123,945 ("*Kokubo*"). *Kokubo* disclosed "a task display switching method, a portable apparatus and a portable communications apparatus which, when a plurality of application software are activated and processed in parallel, make it possible to switch a display between each of the application software with ease." *Kokubo* Abstract. The Examiner rejected Independent Claims 1, 9 and 17 because the Examiner believed that "a music background play object" was disclosed by *Kokubo*. Ex. O at 6. In response, the Patentee amended the patent, changing the language of the claims to include the limitation "wherein the music background play object includes an application module including at least one applet" as suggested by the Examiner to overcome the *Kokubo* prior art. *Id.* at 8. The Patentee did not believe that *Kokubo* disclosed a "background play object" as used in the '711, *id.* at 6, but nonetheless adopted the claim language suggested by the Examiner. *Id.* at 7.

Apple argues that because the claim language was amended in order to overcome the prior art, and the claim was subsequently allowed, the limitation of operating system-independence can be *implied* based on the Examiner's claim allowance. Apple's Resp. at 8-9. In support of its argument, Apple explains that *Kokubo* teaches operating system-dependent application programs. *See* Kokubo 6:52-7:2; 10:54-62. In contrast, an "applet," as explained above, is often operating system-independent. Apple argues that construing the term "applet" as being operating system-independent gives meaning to the claim amendment incorporated by Samsung. Apple's Resp. at 9. Conversely, Apple contends that, were the Court to adopt Samsung's construction of "applet," the Examiner's allowance in light of the amended language would be meaningless. *Id.*

Apple's theory, however, requires a construction that strays too far from the text of the prosecution history. Indeed, Apple has failed to identify any reference to operating system-independence or operating system-dependence in *Kokubo*, the communications between Samsung and the Examiner, or any other part of the prosecution history. The Court cannot assume that the Examiner used the term "applet" in its proposed amendment to imply system-independence simply because "applets" were *often* operating system-independent in 2005. *See Cordis Corp.*, 561 F.3d at

1329 ("However, the examiner did not say so, and we cannot simply suppose that the claims were allowed based on an assumed identity of numbering systems."); Givargis Dep. at 29; Givargis Decl. ¶¶ 42-54. Apple's argument is also inconsistent with Federal Circuit precedent, "which holds that courts may presume the patent examiner gave terms the broadest reasonable interpretation consistent with the specification." *CNET Networks, Inc. v. Etilize, Inc.*, 547 F. Supp. 2d 1055, 1071 (N.D. Cal. 2008) (citing *Rexnord Corp. v. Laitram Corp.*, 274 F.3d 1336, 1347 (Fed. Cir. 2001)). The Examiner did not explicitly require the proposed limitation in granting the claim allowance. It is safe to assume that "if the examiner wanted to hinge patentability upon [operating system-independence], he would have said so." *See Rexnord*, 274 F.3d at 1347. Thus, the prosecution history falls short of the "clear and unmistakable" disclaimer needed to limit the scope of the claim term. *See Cordis Corp.*, 561 F.3d at 1328-29; *cf. Dealertrack, Inc. v. Huber*, __ F.3d __, 2012 WL 164439, at *6 (Fed. Cir. Jan. 20, 2012) (an examiner's amendment, without an explicit reason for the amendment, is not a sufficient basis for a waiver of claim scope).

Moreover, Apple's argument is not the only reasonable interpretation of the prosecution history. The Examiner rejected the independent claims at issue because the Examiner believed that *Kokubo* disclosed "an icon [which] reads on Applicant's background music play object." Ex. O at 9. In the Patentee's response to the Examiner's rejection, the Patentee explained that it believed that the amended claim language was distinguishable from the *Kokubo* reference:

> The generating of the icon by Kokubo is not a disclosure of generating a music background play object, wherein the music background play object includes an application module including at least one applet. That is, **Kokubo makes no disclosure that the icon includes an application module,** or that the application module includes at least one applet as [is] instantly claimed.

Ex. O at 9-10 (emphasis added). The Patentee believed that the *Kokubo* reference did not disclose an object which includes an application module. Thus, even accepting Apple's arguments regarding the nature of an "applet," it is not clear that the claim was allowed based on the term "applet." Based on the statements made by the Patentee, an alternative interpretation of the prosecution history is that the language "wherein the music background play object includes an application module" was added to overcome the *icon* generated by *Kokubo*. Under that interpretation, the additional limitations were added to distinguish a "music background play

object" from an icon. Thus, the term "applet" may not have been, in and of itself, necessary to the claim allowance. Because the prosecution history is amenable to multiple interpretations, it is not the type of "clear and unmistakable" disclaimer which can limit the claims. *See Cordis Corp.*, 561 F.3d at 1328-29.

Accordingly, the Court construes "applet" to mean "**An application designed to run within an application module**."

B. "the first window region . . . that appears on top of application programming windows that may be generated"

The disputed term "the first window region . . ." appears in Apple's '002 Patent. The '002 Patent, entitled "Method and Apparatus for Displaying and Accessing Control and Status Information in a Computer System," discloses "[a]n interactive computer-controlled display system having a processor, a data display screen, a cursor control device for interactively positioning a cursor on the data display screen, and a window generator that generates and displays a window on a data display screen," where this window region provides status and control information in one or more data display areas. '002 Patent Abstract. While computers were often capable of displaying multiple windows, these windows could become partially or completely obscured. *See generally* '002 Patent col. 1. The '002 patent teaches an invention which allows a window to provide status and control information in a manner more consistently visible to a user. *Id.* The application for the '002 Patent was filed on March 20, 1997, and the patent was issued on December 10, 2002. It is a continuation of a prior application filed on September 30, 1994.

Apple's Proposed Construction	Samsung's Proposed Construction
No construction necessary.	"The first window and the plurality of independent display areas are never obscured by any portion of any application windows that are generated or capable of being generated."

The term "the first window region and the plurality of independent display areas implemented in a window layer that appears on top of application programming windows that may be generated" appears in independent claims 1, 14, 21, 25, 26, 39, 46, and 50 of the '002 Patent. Independent Claim 1, for example, recites:

> An interactive computer-controlled display system comprising:
>
> a processor;
>
> a data display screen coupled to the processor;
>
> a cursor control device coupled to said processor for positioning a cursor on said data display screen;
>
> a window generation and control logic coupled to the processor and data display screen to create an operating environment for a plurality of individual programming modules associated with different application programs that provide status and/or control functions, wherein the window generation and control logic generates and displays a first window region having a plurality of display areas on said data display screen, wherein the first window region is independently displayed and independently active of any application program, and wherein each of the plurality of display areas is associated with one of the plurality of individual programming modules, **the first window region and the plurality of independent display areas implemented in a window layer that appears on top of application programming windows that may be generated**; and
>
> an indicia generation logic coupled to the data display screen to execute at least one of the plurality of individual programming modules to generate information for display in one of the plurality of display areas in the first window region, wherein at least one of the plurality of display areas and its associated programming module is sensitive to user input, and further wherein the window generation and control logic and the indicia generation logic use message-based communication to exchange information to coordinate activities of the indicia generation logic to enable interactive display activity.

'002 Patent at 22:11-43 (emphasis added).

Apple argues that the term should be given its full scope and accuses Samsung of improperly excising "window layer" and importing a negative limitation that requires that the first window "never be obscured" by any portion of any application windows. Apple's Opening Br.[8] at 4. Samsung, on the other hand, argues that the claim language requires that the control panel

[8] When discussing the Apple Patents (the '002 Patent, the '381 Patent, the '607 Patent, the '828 Patent, the '915 Patent, and the '891 Patent), Apple's Opening Claim Construction Brief will be referred to as "Apple's Opening Br."; Samsung's Responsive Claim Construction Brief will be referred to as "Samsung's Resp."; and Apple's Reply Claim Construction Brief will be referred to as "Apple's Reply."

always appear on top of any application windows and that Apple explicitly disclaimed its construction of the term in the prosecution history of the '002 Patent.[9] Samsung's Resp. at 3-5.

1. Claim language

First, Samsung offers no argument as to why "a window layer" should be read out of the claim language. Given that "[c]laims must be interpreted with an eye toward giving effect to all terms in the claim," *Becton, Dickinson & Co. v. Tyco Healthcare Grp., LP*, 616 F.3d 1249, 1257 (Fed. Cir. 2010) (internal quotation marks omitted), the Court declines to read "a window layer" out of the claim.

Second, the claim language supports Apple's argument that the claim term should be given its full scope, without a limitation that the application programming windows never obscure the first window and the plurality of independent display areas. Indeed, the words "never obscured by any portion of any application windows" do not appear in the claims of the '002 Patent.

Samsung argues that the claim language states that the "first window" is "implemented in a window layer that appears on top of application programming windows that may be generated." *See* Samsung's Resp. at 2. Thus, Samsung argues, the claim language implicitly requires that the "first window" must appear on top of both presently generated application windows or any application windows that are generated in the future. According to Samsung, if application windows that are generated in the future may appear above the "first window," the term "appears on top of" is effectively read out of the claim language.

However, dependent claims 12 and 13, which depend from claim 1, recite:

> 12. The display system defined in claim 1 wherein the first window region always appears in front of[10] application windows.
>
> 13. The display system defined in claim 1 wherein the first window region is implemented in a private window layer that appears in front of windows for all applications [sic] layers.

[9] The parties essentially agree that for this term, a person of ordinary skill in the art would have a bachelor's degree in computer science (or equivalent industry experience) and at least two years of experience in the area of computer programming and/or operating systems. *See* ECF No. 650.

[10] The parties have not argued that there is a difference between "on top of" and "in front of." Nor have they argued that such a difference, if any, is material to the construction of the disputed term.

'002 Patent at 23:4-9. Under the claim differentiation doctrine, there is a presumption that dependent claims are narrower than the independent claims from which they depend. *Phillips*, 415 F.3d at 1314-15. Dependent claims 12 and 13 require that the first window region *always* appear in front of application windows. Conversely, then, the claim differentiation doctrine supports Apple's construction of the independent claim that the first window region need not *always* appear in front of application windows.

2. Specification

The specification teaches several embodiments of the invention. In some embodiments, the first window region is visible, and in other embodiments, it is not. For example, in one embodiment:

> [T]he control strip[11] is implemented in a private window layer that appears in front of the windows of all the application layers. That is, the control strip window appears on top of all [the] application programming windows that may be generated as part of the execution of an application program. This prevents other windows from obscuring it.

'002 Patent at 6:41-46. In contrast, another embodiment discloses that the user may hide the first window region:

> The user may also hide the control strip. In one embodiment, to make the control strip disappear completely, the user can click the Hide button in the control strip control panel, as described later in conjunction with FIG. 3.

'002 Patent at 7:29-32.

The specification discloses an invention that allows the first window region, otherwise known as the "control strip," to either never be obscured by application windows or to be hidden by the user. To the extent that Samsung's proposed construction, in which the first window region is "never obscured," is interpreted to preclude a first window region that can be hidden by the user, such an interpretation reads out one of the embodiments of the claimed invention.

At the *Markman* hearing, urging its own construction of the disputed term, Samsung argued that it is not uncommon for a claim construction to read out an embodiment disclosed in the specification. However, as a general rule, "there is a strong presumption against a claim construction that excludes a disclosed embodiment." *See In re Katz Interactive Call Processing*

[11] The parties agree that the "first window region" refers to a control strip as shown in figures 2A and 2B of the '002 Patent. *See* Apple's Opening at 2-3; Samsung's Resp. at 2.

Patent Litig., 639 F.3d 1303, 1324 (Fed. Cir. 2011). Nonetheless, several exceptions to this presumption apply. For example, a claim may be interpreted to exclude embodiments "where those embodiments are clearly disclaimed in the specification . . . or prosecution history." *Oatey Co. v. IPS Corp.*, 514 F.3d 1271, 1277 (Fed. Cir. 2008). Similarly, where the disputed term is not present in the other independent claims of the patent-in-suit, it is permissible to construe the term so as to exclude an embodiment. This is because the other claim terms "leave[] open the possibility that claims not at issue in [the claim construction] encompass omitted embodiments." *Helmsderfer v. Bobrick Washroom Equip., Inc.*, 527 F.3d 1379, 1383 (Fed. Cir. 2008). Otherwise, "where claims can reasonably to [sic] interpreted to include a specific embodiment, it is incorrect to construe the claims to exclude that embodiment, absent probative evidence on [sic] the contrary." *Oatey Co.*, 514 F.3d at 1277.

In this case, Apple's construction of the disputed claim term is not plainly inconsistent with the disclosed embodiment that allows the control strip to be hidden by the user. It is not unreasonable that "the first window region . . . that appears on top of application programming windows that may be generated" may also be hidden from the user's view. Moreover, the disputed term "the first window region and the plurality of independent display areas implemented in a window layer that appears on top of application programming windows that may be generated" appears in each of the independent claims. Because the disputed claim term appears in all of the independent claims, the embodiment Samsung seeks to read out of the specification cannot be covered by another independent claim. Given that the claim language can reasonably be interpreted to include the disclosed embodiment that allows the user to hide the control strip, the Court turns to the prosecution history to determine if the prosecution history supports Samsung's argument.

3. Prosecution History

The prosecution history of a patent is instructive because it can establish "whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it otherwise would be." *Phillips*, 415 F.3d at 1317 (internal citations omitted). Federal Circuit precedent requires that the alleged disavowing actions or statements made during prosecution be

both "clear and unmistakable." *Omega Eng'g, Inc.*, 334 F.3d at 1326. Samsung argues that in distinguishing prior art, the Patentee narrowed the scope of the disputed term to require that the first window region is *never* obscured by any portion of any application windows. *See* Briggs Decl. Ex. C at APLNDC00028083.

Samsung points to the Patentee's Response to Final Office Action, in which the Patentee distinguished the *Hansen* patent, a prior art reference with a "dashboard interface" that could be obscured by application windows. *See* U.S. Patent No. 5,659,693 ("*Hansen*"), FIG. 18, Briggs Decl. Ex. D. *Hansen* "only allow[ed] the user an unobstructed view of the system if a button is selected." *See* Apple's Resp. to Final Office Action, Briggs Decl. Ex. C at APLNDC00028084; *see also Hansen* 4:45-51 ("Currently, box 97 shows that the dashboard interface will toggle between going to the front of all other windows on the display and going to the back of all other windows on the display. Another possibility that may be selected is that the dashboard interface will always go to the front of all other windows on the display when the short cut key is selected or when the mouse shortcut is performed."). In distinguishing *Hansen*, the Patentee argued that:

> [T]he present invention as claimed includes having a window region with its independent display areas in a window that appears on top of application window programs that may be generated. Therefore, by implication, those window areas that are generated after the generation of the window layer will still not appear on top of the control/status window in the present invention as claimed when they are active. This allows the user to have an unobstructed view of the system/controller area regardless of the window that's selected as being active (even when the windows overlap each other). Thus, the **window may be always visible to the user**. The Examiner believes that this is clearly shown in *Hansen*, specifically referring to the dashboard interface. However, *Hansen* only allows the user an unobstructed view of the system if a button is selected (col. 4, lines 45-51). Thus, Applicant believes that one familiar with the art would not look to *Hansen* to arrive at the present invention because the present invention is directed at using individual programming modules that generate displays that are always visible on a top layer.

Patentee's Response to Final Office Action, Briggs Decl. Ex. C at APLNDC00028083-84.

The Patentee took the position that either the *Hansen* dashboard feature was either obscured by application windows that were subsequently opened, or the user could select a button to maintain an unobstructed view of the dashboard feature. *See also* Ahn Decl. Ex. R at APLNDC00028976 ("However, Hansen only allows the user an unobstructed view of the system if a button is selected."). In other words, the dashboard function in *Hansen* was either sometimes

obstructed by application windows, or it was never obstructed by application windows. In comparison, the Patentee argued that the claimed invention in the '002 Patent allowed the view of the first window region to be unobstructed by subsequently opened application windows. However, the Patentee appears to have left open the possibility that the user could completely obscure or hide the first window region when it argued that the "window *may be* always visible to the user." Taken as a whole, in light of this ambiguity, it does not appear that the Patentee clearly disavowed the scope of the claim coverage asserted by Samsung.[12] *York Prods., Inc. v. Central Tractor Farm & Family Ctr.*, 99 F.3d 1568, 1575 (Fed. Cir. 1996).

The claim language and specification favor Apple's view that "the first window region . . . that appears on top of application programming windows that may be generated" need not be limited in the manner proposed by Samsung. Moreover, there was no clear and unmistakable disavowal of claim coverage such that the first window region of the patented invention must always appear on top of application windows and may never be hidden from view. Accordingly, the Court construes the term "the first window region . . . that appears on top of application programming windows that may be generated" to have its plain and ordinary meaning and **does not limit the term** to mean "the first window region and the plurality of independent display areas are never obscured," as is urged by Samsung.

C. "edge of [an or the] electronic document"

The disputed term "edge of [an or the] electronic document" appears in Apple's '381 Patent. The '381 Patent, entitled "List Scrolling And Document Translation, Scaling, And Rotation On A Touch-Screen Display," discloses a method for displaying when a user has gone beyond the edge of an electronic document. '381 Patent Abstract. The application for the '381 Patent was filed on December 14, 2007, and the patent issued on December 23, 2008.

Users of portable electronic devices frequently need to view electronic documents at a magnification such that the entire document cannot be displayed. Thus, in order to view off-screen

[12] Samsung also argues that the claim differentiation doctrine is overridden by the prosecution history disclaimer. Samsung's Resp. at 5. Because the Court finds that Apple's position during the prosecution history did not clearly and unmistakably preclude the user from hiding the control strip, this additional argument is unpersuasive.

portions of the electronic document, a user needs a way to scroll the display window. However, conventional user interfaces were awkward because the display did not necessarily reflect the user's intent. '381 Patent col 2. The '381 Patent reduces user interface limitations by "provid[ing] for easy and intuitive scrolling of lists and translating of electronic documents on a device with a touch screen display." '381 Patent at 8:26-28. The claims at issue concern a method for responding to a user's scroll beyond the edge of an electronic document.

Apple's Proposed Construction	Samsung's Proposed Construction
No construction necessary.	"A boundary of the electronic document"

The term "edge of the electronic document" or "edge of the document" appears in Claims 1, 11, 13, 14, and 16-20 of the '381 Patent. For example, Claim 1 recites:

> A computer-implemented method, comprising:
> At [sic] a device with a touch screen display:
>
> displaying a first portion of an electronic document;
>
> detecting a movement of an object on or near the touch screen display;
> in response to detecting the movement, translating the electronic document displayed on the touch screen display in a first direction to display a second portion of the electronic document, wherein the second portion is different from the first portion;
>
> in response to an **edge of the electronic document** being reached while translating the electronic document in the first direction while the object is still detected on or near the touch screen display:
>
> > displaying an area beyond the **edge of the document**, and
> > displaying a third portion of the electronic document wherein the third portion is smaller than the first portion; and
> >
> > in response to detecting that the object is no longer on or near the touch screen display, translating the electronic document in a second direction until the area beyond the **edge of the electronic document** is no longer displayed to display a fourth portion of the electronic document, wherein the fourth portion is different from the first portion.

'381 Patent at 35:33-58 (emphasis added).

Apple argues that "edge of an electronic document" is a plain, non-technical term that should be given its ordinary meaning, and that this ordinary meaning precludes the possibility of "internal" edges. For example, Apple argues that when images are embedded within a webpage,

the webpage is the electronic document. In that context, the images within the webpage cannot also be electronic documents.

In contrast, Samsung urges the Court to construe the term as "boundary of an electronic document." Samsung originally argued that the edge of an electronic document was "[a] boundary of the electronic document that distinguishes it from another electronic document, other content, or a background area." Samsung's Resp. at 5. However, at the *Markman* hearing, Samsung agreed to change its proposed definition to "boundary of the electronic document" in light of dependent claim 14. Markman Hr'g Tr. at 88, 94. Dependent claim 14 discloses the "method of claim 1, wherein the area beyond the edge of the document is visually distinct from the document." '381 Patent 36:25-27. Thus, the dispute centers around whether "edge of an electronic document" can refer to edges that are within an electronic document or whether "edge of an electronic document" refers only to an external boundary.[13]

At the *Markman* hearing, Apple suggested that the dispute over the scope of the claim term at issue should be resolved by a jury. It is clear from the briefing and the discussion at the hearing that there is a fundamental dispute over the scope of the claim term. The Court is bound by Federal Circuit precedent to resolve the dispute because the issue is one of claim construction. *See O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co., Ltd.*, 521 F.3d 1351, 1361-62 (Fed. Cir. 2008). Called on to resolve the dispute between the parties, the Court agrees with Samsung that an electronic document can be embedded in another electronic document, and therefore that "edge of an electronic document" is not limited to "external" edges.

1. Claim Language

[13] The parties do not agree on precisely who the person of ordinary skill in the art would be with respect to the '381 Patent. Apple believes a person of ordinary skill would have "a Bachelor's degree in computer science or electrical engineering or an equivalent, and one or more years experience working on designing and/or implementing user interfaces" while Samsung believes such a person would have "a Bachelor's Degree in computer science, and 3-5 years of software design and implementation experience, including experience with graphical user interface design, or would have equivalent educational and work experience." The parties agree that their arguments do not turn on the definition of a person of ordinary skill in the art, and the Court agrees that the differences between the two definitions (the number of years of work experience and whether an electrical engineering degree would be comparable) do not materially affect the construction of this term. Markman Hr'g Tr. at 24-25.

As an initial matter, Samsung's replacement of the term "edge" with the term "boundary" does not clarify the term in a way that justifies deviation from the plain language of the claims. Accordingly, the Court declines to adopt Samsung's proposed change.

Samsung argues that the doctrine of claim differentiation and the express language of the claims support its proposed construction. The Court does not agree that the doctrine of claim differentiation helps Samsung, but agrees that Apple's proposed construction is in tension with the express language of the claims.

Claim Differentiation. Dependent claim 13 states "[the] computer-implemented method of claim 1, wherein the area beyond the edge of the document is black, gray, a solid color, or white." '381 Patent at 36:23-25. Samsung argues that under the doctrine of claim differentiation, independent claim 1 must encompass more than dependent claim 13, suggesting that additional content, such as a webpage, can appear beyond the edge of the electronic document. Samsung's Resp. at 6 (citing *Phillips*, 415 F.3d at 1303). Although independent claim 1 is broader than dependent claim 13, it is not clear that claim 1 is broader in the way that Samsung proposes. For example, the area beyond the edge of the electronic document could be something other than black, gray, a solid color, or white, such as stripes, or dots, or some other pattern. It does not necessarily follow that claim 1 encompasses content beyond the edge of the document such as "another electronic document, other content, or a background area," as proposed by Samsung. *See Netcraft Corp. v. eBay, Inc.*, 549 F.3d 1394, 1399-1400 (Fed. Cir. 2008) (rejecting plaintiff's claim differentiation arguments because another difference between the dependent and independent claim already distinguished the two).

Express Claim Language. Under the express language of the claims, webpages and digital images are examples of electronic documents. *See* '381 Patent at 36:4-7 (claims 6 and 7). Noting that a webpage can contain multiple embedded digital images, Samsung argues that an electronic document can include other embedded electronic documents. Samsung's Resp. at 7. Thus, according to Samsung's reasoning, an edge of an electronic document can be internal. At the hearing, Apple disagreed that a digital image within a webpage would be an "electronic document." However, Apple has not offered a limiting principle, rooted in the intrinsic evidence,

to establish why an electronic document may not be nested in another electronic document and why an "edge of an electronic document" therefore may not be internal to the document in light of Samsung's example. Thus, the claim language supports Samsung's position. With this understanding, the Court looks to other evidence for guidance.

2. Specification

Apple argues that the specification demonstrates that an electronic document may not be embedded inside another electronic document, and thus an "edge" may not be internal to an electronic document. In support of its argument, Apple points to the embodiments described in Figures 7 and 8C. Apple's Opening Br. at 7-8; Apple's Reply at 3. The flowchart in Figure 7 describes displaying a gray, black, or solid white area beyond the edge of the document if the edge of the electronic document is reached, and otherwise taking no action. Similarly, Figure 8C depicts "Blocks" embedded within a webpage. When the user scrolls past the edge of the webpage (an electronic document), Figure 8C shows the device displaying a black color beyond the edge of the webpage. Figure 8C does not display a black area beyond the edge of the Blocks when the user scrolls past the edge of the Blocks. Thus, Apple argues, the specification only teaches "an edge of an electronic document" as being an "external" edge, not an internal edge. *See id.*

Apple's reliance on the embodiments described in Figures 7 and 8C to limit the scope of the claim is contrary to Federal Circuit precedent. The Federal Circuit has warned against limiting a claim to an embodiment disclosed in the specification. *Falana v. Kent State Univ.*, __ F.3d __, Case No. 11-1198, 2012 WL 171550, at *4 (Fed. Cir. Jan. 23, 2012); *Phillips*, 415 F.3d at 1323.

In Figure 8C the electronic document to which the snap back function is applied is the webpage as a whole. Accordingly, the flowchart in Figure 7 teaches a response to reaching the edge of the electronic document in this particular embodiment. Similarly, the specification is silent as to whether any Block in Figure 8C could also be an electronic document. Thus, while none of the Blocks in Figure 8C is an electronic document on which the snap back function is applied in this specific embodiment, nothing in the specification precludes any Block from being an electronic document in another embodiment. *Phillips,* 415 F.3d at 1323 (noting that "persons of ordinary skill in the art rarely would confine their definitions of terms to the exact representations

depicted in the embodiments"). Indeed, at the *Markman* hearing, Apple accepted the notion that a display window could contain two adjacent electronic documents for purposes of the '381 Patent when each document scrolled independently from the other. Markman Hr'g Tr. at 99-101. Apple's position with respect to the two adjacent electronic documents is inconsistent with its position that the scope of "electronic document" is strictly limited to the embodiments disclosed in Figure 8C.

Further, as Samsung also noted, nothing in the specification establishes the "external edge" versus "internal edge" distinction argued by Apple. Samsung's Resp. 7. Finding no such distinction in the specification, the Court looks to other evidence.

3. Prosecution History

Neither party relies on evidence from the prosecution history for the interpretation of this term. As such, the Court turns to the extrinsic evidence.

4. Extrinsic Evidence

While often less useful than intrinsic evidence, extrinsic evidence can be helpful in claim construction. *Phillips*, 415 F.3d at 1317. Both Apple and Samsung point to the opposing experts' depositions as support for their proposed constructions of "edge of an electronic document." Samsung argues that Apple's expert, Dr. Balakrishnan, recognized that the edge of an electronic document could include edges internal to the screen.[14] Apple argues that Samsung's expert, Dr. Van Dam, recognized that an edge of an electronic document indicates a boundary separating the electronic document from an area "further than [the electronic document] should go," and that past the edge "there is no new information to come into view." Apple's Reply at 4; Van Dam Dep. at 30.

[14] Apple contends that Dr. Balakrishnan was only following the instructions of Samsung's counsel and not agreeing with Samsung's construction. Apple's Reply at 5. Regardless of whether the drawings made at pp. 157-58 of the deposition transcript indicate agreement with Samsung's position, other passages clearly indicate that Dr. Balakrishnan believed that an electronic document could have edges internal to the screen, and that the primary consideration was what the relevant program considered to be an electronic document. Balakrishnan Dep. at 154.

Ultimately, the Court is not persuaded by Dr. Van Dam's construction of "edge of [an or the] electronic document." For one, expert opinions are less reliable than intrinsic evidence, and the Court gives the testimony little weight. *See Phillips*, 415 F.3d at 1318.

Moreover, Dr. Van Dam has not explained why a webpage beyond the edge of an embedded digital image is "new information," such that the snap back feature does not apply, while a wallpaper image beyond the edge of a digital image is not "new information," such that the snap back feature does apply. *See* '381 Patent at 27:36-39 (specification expressly discloses embodiments that display a "wallpaper image such as a picture or pattern" beyond the edge of the electronic document). Nor has Dr. Van Dam explained why this distinction would be apparent to a person skilled in the art.

Apple has not justified adopting a construction that would limit the claims to one embodiment in the specification. Alternatively, Samsung's construction is in harmony with the claim language and the specification. Accordingly, the Court construes "edge of [an or the] electronic document" to have its plain and ordinary meaning. Thus, the Court **does not limit the term** "edge of [an or the] electronic document" to mean only an external edge as is urged by Apple. An "edge" of an electronic document may be internal.

D. "glass member"

The disputed term "glass member" appears in Apple's '607 Patent. The '607 Patent, entitled "Multipoint Touchscreen," discloses a "touch panel having a transparent capacitive sensing medium configured to detect multiple touches or near touches that occur at the same time and at distinct locations in the plane of the touch panel." '607 Patent, Abstract. The application for the '607 Patent was filed on May 6, 2004, and the patent issued on February 16, 2010.

Apple's Proposed Construction	Samsung's Proposed Construction
"glass or plastic material"	Plain and ordinary meaning.

The term "glass member" appears in Claims 4, 5, and 10 of the '607 Patent. Of these, the only asserted claim is Claim 10, which recites:

10. A display arrangement comprising:

a display having a screen for displaying a graphical user interface; and

a transparent touch panel allowing the screen to be viewed therethrough and capable of recognizing multiple touch events that occur at different locations on the touch panel at a same time and to output this information to a host device to form a pixilated image;

wherein the touch panel includes a multipoint sensing arrangement configured to simultaneously detect and monitor the touch events and a change in capacitive coupling associated with those touch events at distinct points across the touch panel; and

wherein the touch panel comprises:

a first **glass member** disposed over the screen of the display;

a first transparent conductive layer disposed over the first **glass member**, the first transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths;

a second **glass member** disposed over the first transparent conductive layer;

a second transparent conductive layer disposed over the second **glass member**, the second transparent conductive layer comprising a plurality of spaced apart parallel lines having the same pitch and linewidths, the parallel lines of the second transparent conductive layer being substantially perpendicular to the parallel lines of the first transparent conductive layer;

a third **glass member** disposed over the second transparent conductive layer; and

one or more sensor integrated circuits operatively coupled to the lines.

'607 Patent at 22:23-55 (emphasis added).

Samsung argues that the plain and ordinary meaning of the term "glass member" is clear. Samsung's Resp. at 8. Apple, in contrast, argues that it acted as its own lexicographer and defined the term "glass member" to mean any suitable "glass or plastic material." Apple's Opening Br. at 9. The Federal Circuit "generally assigns claim terms their ordinary and customary meaning," and for the reasons explained below, the Court finds that Apple has not met its burden to overcome the ordinary meaning of "glass member."[15] *Agilent Techs., Inc. v. Affymetrix, Inc.*, 567 F.3d 1366, 1376 (Fed. Cir. 2009).

1. Claim Language

[15] The parties essentially agree that for this term, a person of ordinary skill in the art would have a bachelor's degree in electrical engineering, physics, computer engineering, or a related field and at least two years of experience working with input devices. *See* ECF No. 650.

The ordinary meaning of the term "glass member" limits such members to those made of glass. *See Phillips*, 415 F.3d at 1314 ("In some cases, the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges . . . ."). The claim language itself does not suggest that the term "glass member" also refers to plastic members. Apple argues that the common usage of the term "glass" includes objects that can be made of plastic. Apple's Opening Br. at 9-10. For example, eye glasses and wine glasses can commonly be made of either glass or plastic.

The Court, however, finds this reasoning unpersuasive. First, there is no indication in the claim language itself that Apple intended to use the term "glass" as a modifier in this way. Second, as Samsung notes, Apple's examples of the term "glass" used to describe plastic objects each use "glass" as a noun. In contrast, the claim language here uses "glass" as an adjective modifying the noun "member." Samsung's Resp. at n.7; Apple's Opening Br. at 9.

"Although the term . . . is a commonly understood word, [the Court must] still look to the intrinsic evidence for the proper construction." *Boss Indus., Inc. v. Yamaha Motor Corp. U.S.A., Inc.*, 333 Fed. App'x 531, 541 (Fed. Cir. 2009) (unpublished). Thus, the Court must turn to the specification to determine whether Apple provided an alternative definition that alters the plain meaning of the claim language.

2. Specification

Apple argues that it acted as its own lexicographer and "disclosed in the specification that the 'glass member' could be made of any suitable 'glass or plastic material.'" Apple's Opening Br. at 9. An inventor is permitted to act as his own lexicographer and to assign a unique meaning to a claim term used to describe his own invention. The inventor, however, must do so "with reasonable clarity, deliberateness, and precision." *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994); *see also Typhoon Touch Techs., Inc. v. Dell, Inc.*, 659 F.3d 1376, 1383 (Fed. Cir. 2011) (citing *Abbott Labs. v. Syntron Bioresearch Inc.*, 334 F.3d 1343, 1354 (Fed. Cir. 2003)); *Helmsderfer*, 527 F.3d at 1381 (concluding that in order to act as his own lexicographer, the patentee's intent to do so must be clear). The Court finds that Apple's disclosure within the '915

Patent's specification does not make adequately clear that Apple intended to redefine the term "glass" for purposes of the invention.

Apple relies on an excerpt from its description of Figure 10 in the specification: "Furthermore, each of the layers may be formed with various materials. By way of example, each particular type of layer may be formed from the same or different material. For example, any suitable glass or plastic material may be used for the glass members." '607 Patent at 16:43-47. Apple is correct that this statement provides a precise description of what a glass member may be. Nonetheless, Apple's attempt to redefine the term "glass member" lacks the other requirements of clarity and deliberateness necessary to establish that Apple was acting as its own lexicographer in defining the term "glass member" in the claim language.

First, the language Apple identifies falls within a description specifically labeled as just "one embodiment of the present invention."[16] '607 Patent at 15:25-26. The language chosen by the patentee of the '607 Patent does not carry the hallmarks of definition, such as quotations or the verb "is." *See Sinorgchem Co., Shandong v. Int'l Trade Comm'n*, 511 F.3d 1132, 1136 (Fed. Cir. 2007); *cf. TransWeb, LLC v. 3M Innovative Properties, Co.*, No. 10-cv-4412, 2011 WL 5825782 (D.N.J. Nov. 16, 2011) (finding that a patentee acted as his own lexicographer when he used the term "i.e." to define a term). Indeed, the language chosen "*for example*" and "*may be used*" do not strongly suggest that the patentee was redefining the term.

Second, in a description of another embodiment of the invention, the specification clearly states that: "In either case, the glass member is a relatively thick piece of clear glass." '607 Patent at 12:38-39. Although it does not appear that either phrase is definitional, the phrase "the glass member is a relatively thick piece of glass" is closer to meeting the Federal Circuit's lexicography test. In any event, even taking Apple's assertion as true, the patent has put forth two definitions within the same patent. Accordingly, Apple did not, with reasonable clarity, deliberateness, and

[16] Although the heading of the section in the patent in which the language was found is "Detailed Description of the Invention," the Patent makes clear after the heading that the discussion that follows refers to embodiments of the invention. '607 Patent at 4:10-14 ("Embodiments of the invention are discussed below with reference to FIGS. 2-19. However, those skilled in the art will readily appreciate that the detailed description given herein with respect to these figures is for explanatory purposes as the invention extends beyond those limited embodiments.").

precision redefine "glass member." *Cf. Edwards Lifesciences LLC v. Cook Inc.*, 582 F.3d 1322, 1329 (Fed. Cir. 2009) (adopting a definition that is different from the ordinary meaning when the specification uses the disputed term consistently).

As explained above with respect to the '002 Patent, the Federal Circuit has warned against reading an embodiment disclosed in the specification out of the scope of a claim. However, in this case it would be inappropriate to adopt the broader construction of "glass member" because doing so expands upon the limits of a claim term that otherwise has an unambiguous ordinary meaning. *See Rolls-Royce, PLC v. United Techs., Corp.*, 603 F.3d 1325, 1334-35 (Fed. Cir. 2010) (construing a claim that reads out an embodiment where there were two embodiments in the specification and a claim construction that embraced both alternative embodiments was "unreasonable" in light of the unambiguous claim term). While the specification is useful to understand the claims, it is the claims, and not the specification, that map the metes and bounds of the claimed invention.[17] *See, e.g., Kara Tech. Inc. v. Stamps.com, Inc.*, 582 F.3d 1341, 1347-48 (Fed. Cir. 2009); *TIP Sys., LLC v. Phillips & Brooks/Gladwin, Inc.*, 529 F.3d 1364, 1373 (Fed. Cir. 2008) (the mere fact that a construction excludes an alternative embodiment "does not outweigh the language of the claim, especially when the court's construction is supported by the intrinsic evidence").

Finally, to find that a reference referring to one embodiment is sufficient to inflate the meaning of "glass member" beyond its plain and ordinary meaning would undermine the public notice function of patents. *Cf. Halliburton Energy Sers., Inc. v. M-I LLC*, 514 F.3d 1244, 1253-54 (Fed. Cir. 2008) ("We note that where a claim is ambiguous as to its scope we have adopted a narrowing construction when doing so would still serve the notice function of the claims. . . . [A contrary] construction would undermine the notice function of the claims because it would allow [the patentee] to benefit from the ambiguity, rather than requiring [the patentee] to give proper notice of the scope of the claims to competitors."). If the Patentee had wanted to expand the scope

[17] Moreover, it is worth noting that "glass member" is not present in the other independent claim of the patent-in-suit. In similar situations, the Federal Circuit has found it permissible to construe disputed terms so as to exclude a disclosed embodiment. *Helmsderfer*, 527 F.3d at 1383.

of its claims, it could have done so through clearer drafting, *see Hoganas AB v. Dresser Indus., Inc.*, 9 F.3d 948, 951 (Fed. Cir. 1993), or clearer lexicography in the specification.

3. Prosecution History/Extrinsic Evidence

Neither party relies heavily on evidence from the prosecution history or extrinsic evidence for the interpretation of this term.[18] Because a court generally gives a term its plain and ordinary meaning, *see Agilent Techs.*, 567 F.3d at 1376, and the specification does not evidence a clear intent to act as a lexicographer, *see In re Paulsen*, 30 F.3d at 1480, the Court gives "glass member" its plain and ordinary meaning: **"a member made of glass."**

E. "mathematically fitting an ellipse to at least one of the pixel groups" . . . "mathematically fit an ellipse to at least one of the one or more pixel groups"

The disputed terms "mathematically fitting an ellipse . . ." and "pixel/pixel groups" (*see* Section F, below) are found in Apple's '828 Patent. The '828 Patent, entitled "Ellipse Fitting for Multi-touch Surfaces," discloses an apparatus and methods "for simultaneously tracking multiple finger and palm contacts as hands approach, touch, and slide across a proximity-sensing, multi-touch surface." '828 Patent, Abstract. The invention allows for the integration of various methods of manually inputting data and commands into a touchscreen device, including "typing, resting, pointing, scrolling, 3D manipulation, and handwriting." *Id.* "To take maximum advantage of multi-touch surface sensing, complex proximity image processing is necessary to track and identify the parts of the hand contacting the surface at any one time." *Id.* at 6:22-25. The '828 Patent's specification teaches that a proximity image is obtained from an "array of parallelogram-shaped electrodes." *Id.* at 18:3-4. The proximity image "provide[s] [a] clear indication[] of where the body contacts the surface." *Id.* at 6:25-27. The invention's method of processing proximity images improved upon the prior art methods, which were unable "to group exactly those electrodes which are covered by each distinguishable hand contact." *See id.* at 6:19-20. The application for the '828 Patent was filed February 22, 2007, and the patent issued October 12, 2010. It is a continuation of a series of patents, whose applications date back to January 25, 1999.

[18] In its Response, Samsung references briefly two inventor depositions. Samsung's Response at 9 n.7. Apple objects to these references in its reply. Apple's Reply at 5 n.2. The Court need not consider Apple's objection because the Court gives little to no weight to inventor testimony. *Bell & Howell DMP Co.*, 132 F.3d at 706.

Apple's Proposed Construction	Samsung's Proposed Construction
No construction necessary.	"For at least one of the pixel groups, applying a unitary transformation of the group covariance matrix of second moments of proximity data for all pixels in that pixel group to fit an ellipse."

The terms "mathematically fitting an ellipse to at least one of the pixel groups" and "mathematically fit an ellipse to at least one of the one or more pixel groups" appear in Claims 1, and 10, respectively. The use of the term in Claim 1 is representative:

> 1. A method of processing input from a touch-sensitive surface, the method comprising: receiving at least one proximity image representing a scan of a plurality of electrodes of the touch-sensitive surface; segmenting each proximity image into one or more pixel groups that indicate significant proximity, each pixel group representing proximity of a distinguishable hand part or other touch object on or near the touch-sensitive surface; and **mathematically fitting an ellipse to at least one of the pixel groups**.

'828 Patent at 9:5-15 (emphasis added).

Apple argues that the term requires no construction, as the ordinary meaning of the words adequately expresses what is covered by the claims. Apple states that the ordinary meaning of "mathematically fitting an ellipse" is "using calculations to determine the parameters of an ellipse that fits data." Apple's Opening Br. 13.

Samsung, on the other hand, proposes a construction that, as Apple notes, uses all of the words in the term with the exception of "mathematically." The question for the Court, therefore, is whether "mathematically" in the context of this claim term means "using [any] calculations to determine the parameters of an ellipse," or whether these calculations must include "applying a unitary transformation." Apple argues that Samsung's proposed construction improperly limits the scope of the term to one embodiment of the '828 Patent, which uses a set of equations, including some equations for applying a "unitary transformation." *See* '828 Patent at col. 26. Samsung argues that specification and prosecution history disclaimers properly limit the scope of the term to this embodiment.[19] The Court agrees with Apple.

[19] The parties are close to agreeing upon the definition of a person of ordinary skill in the art with respect to the '828 Patent. Essentially, the parties agree that such a person would have a Bachelor's degree in computer science, electrical engineering, or mathematics and several years of experience in the area of signal processing, human-computer interaction, or the design, use, or evaluation of touch-sensitive input devices. Apple's proposal also includes a degree in physics as being an equivalent degree. See ECF No. 650. In any event, the parties agree that their arguments do not turn on the definition of a person of ordinary skill in the art, and the Court agrees that the

1. Claim Language

Language from the '828 Patent's other claims suggests that "mathematically fitting an ellipse," defines certain parameters of an ellipse, including "position, shape, size, orientation, eccentricity, major radius, [and] minor radius." '828 Patent at 60:19-22. However, both parties recognize that there are several methods of mathematically fitting an ellipse to data. *See* Apple's Opening Br. at 13; Samsung's Resp. at 11. The claim language is unclear as to whether, in the context of the '828 Patent, a particular method must be used to determine the ellipse parameters for a given pixel group. The Court therefore turns to the specification for further guidance.

2. Specification

The term "mathematically fitting an ellipse" does not appear in the specification. Nevertheless, each party supports its arguments by citing to language in a section of the specification entitled "Description of the Preferred Embodiments." '828 Patent at 12:58-59. In this section, at column 26 of the '828 Patent, the specification lists several equations for mathematically fitting an ellipse. The parties agree that equations 12 through 14 are used to compute the size and the centroid parameters of the ellipse. *Id.* at 26:1-12. Equations 15-18 calculate a unitary transformation of the group covariance matrix of second moments. *Id.* at 26:24-33. Equations 19-21 use the eigen values of the covariance matrix to compute the major and minor axes and orientation parameters of the ellipse. *Id.* at 26:40-44. Equation 22 calculates the eccentricity parameter of the ellipse. *Id.* at 54. At column 27, the specification states that "if proximity images have low resolution, the orientation and eccentricity of small contacts are set to default values rather than their measured values, and total group proximity G_z is used as the primary measure of contact size instead of major and minor axis lengths." *Id.* at 27:1-8.

Samsung argues that the specification teaches only one preferred embodiment of mathematically fitting an ellipse and that a specification disclaimer properly limits the scope of this disputed claim term to the preferred embodiment. Samsung's Resp. at 12. Alternatively, Samsung argues that the '828 Patent's inventor acted as his own lexicographer and gave "mathematically

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difference between the two definitions (whether a physics degree is an equivalent degree) does not materially affect the construction of this term. Markman Hr'g Tr. at 24-25.

fitting an ellipse" a special, more limited definition. Samsung cites a sentence in the specification, which states, "The ellipse fitting procedure requires a unitary transformation of the group covariance matrix G_{eov} of second moments Q_{xx} [sic], Q_{xy} [sic], G_{yy}." '828 Patent at 26:18-20. Samsung argues that this sentence supports construing the disputed term to mean: "For at least one of the pixel groups, applying a unitary transformation of the group covariance matrix of second moments of proximity data for all pixels in that pixel group to fit an ellipse."

Apple acknowledges the sentence Samsung cites, but points to other language in the specification that suggests "mathematically fitting an ellipse" should be given its broader, ordinary meaning; that is, using *any* calculations to determine the shape, size, and position parameters of an ellipse that fits data. Apple's Opening Br. at 13 (citing '828 Patent at 19:8-12; 25:54-56 & Fig. 18). Apple maintains that Samsung's proposed construction does not actually fit an ellipse because merely applying a unitary transformation does not calculate sufficient parameters to define an ellipse. *See id.* at 15. Finally, Apple argues that the specification teaches two embodiments of mathematically fitting an ellipse and that Samsung's proposed construction would improperly read out the second embodiment. *Id.* at 16-17 (citing '828 Patent at 27:1-8).

As an initial matter, the Court agrees with Apple that Samsung's proposed construction cannot be correct because "applying a unitary transformation" alone does not appear to be sufficient to calculate all parameters of an ellipse. Specifically, "applying a unitary transformation" does not calculate the centroid, major and minor axes, orientation, or eccentricity parameters of an ellipse. To remedy this defect, the Court slightly tweaked Samsung's proposed construction of the disputed term and instead proposed the following at the *Markman* hearing: "For at least one of the pixel groups, applying a unitary transformation of the group covariance matrix of second moments of proximity data for all pixels in that pixel group *as part of mathematically fitting an ellipse to that pixel group*" (new proposed language in italics). At the hearing, Samsung found the Court's proposed change acceptable, and Apple acknowledged that the Court's proposed change would remedy the technical defect in Samsung's proposed construction. Nevertheless, Apple argued that the Court's suggested construction still would be legally impermissible because

it would improperly limit the scope of the claims to one preferred embodiment while excluding a second preferred embodiment.

The Court agrees with Apple that the '828 Patent's inventor did not act as his own lexicographer to give "mathematically fitting an ellipse" a special definition. An inventor is permitted to act as his own lexicographer and to assign a unique meaning to a claim term used to describe his own invention. The inventor, however, must do so "with reasonable clarity, deliberateness, and precision." *In re Paulsen*, 30 F.3d at 1480. Although column 26 states that "[t]he ellipse fitting procedure requires a unitary transformation of the group covariance matrix . . . ," this statement does not clearly define the term "mathematically fitting an ellipse." Moreover, where the inventor sought to define particular claim terms in the '828 Patent, he did so with "clarity, deliberateness and precision," *id.* at 1480, by, for example, placing the term in quotes and providing a clear definition. *See, e.g.*, '828 Patent at 14:28-29 ("The direction 'inner' means toward the thumb of a given hand.").

Whether column 26 contains a specification disclaimer, however, is a closer question. Where the specification reveals an intentional disclaimer or disavowal of claim scope by the inventor, the inventor's intention as revealed through the specification is dispositive. *Phillips*, 415 F.3d at 1316. "[E]ven where a patent describes only a single embodiment, claims will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using words or expressions of manifest exclusion or restriction." *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1117 (Fed. Cir. 2004) (quotation marks and citations omitted); *see also Abbott Labs v. Sandoz, Inc.*, 566 F.3d 1282, 1288 (Fed. Cir. 2009); *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 905 (Fed. Cir. 2004). The Court need not determine whether column 27 of the '828 Patent teaches a second embodiment, as Apple argues, because, even assuming there is only one embodiment, reading the limitation of the only embodiment onto the claim terms would still be improper in the absence of "words or expressions of manifest exclusion or restriction." *Innova/Pure Water, Inc.*, 381 F.3d at 1117.

The Court disagrees with Samsung's argument that the specification language disclaims all methods of mathematically fitting an ellipse that do not apply a unitary transformation of the group

covariance matrix. The case on which Samsung primarily relies, *ImageCUBE LLC v. Boeing Co.*, 431 Fed. App'x 905 (Fed. Cir. 2011), is inapposite.

In *ImageCube*, the Federal Circuit found that the use of the word "requires" in the specification limited the scope of the claim to the feature required by the specification. *Id.* at 908. Specifically, the specification of the patent at issue in *ImageCube* stated that "'homogenization' for purposes of the invention *requires* intimate mixing of at least two components with resultant formation of an alloy between the components." *Id.* (citing U.S. Reissue Patent No. 37,875, at 4:10–13) (emphasis added). The court concluded that the term "components" excluded metallurgical phases of a single alloy. *Id.*

In *ImageCube*, the word "requires" explicitly limited a claim term "for purposes of the invention." *Id.*; *accord Microsoft Corp. v. Multi-Tech Sys., Inc.*, 357 F.3d 1340, 1348 (Fed. Cir. 2004) (limiting claim scope because "statements, some of which are found in the 'Summary of the Invention' portion of the specification, are not limited to describing a preferred embodiment, but more broadly describe the overall invention[] . . . ."); *Aguayo v. Universal Instruments Corp.*, 356 F. Supp. 2d 699, 727 (S.D. Tex. 2005) (Where the "specification calls an embodiment 'the invention' or the 'present invention,' it is appropriate to limit the claims to that embodiment.") (citations omitted). Here, by contrast, the word "requires" merely describes a procedure that is required in *one* preferred embodiment of the invention rather than a procedure that is required in the invention itself. *Atmel Corp. v. Silicon Storage Tech., Inc.*, 76 Fed. App'x 298, 308-09 (Fed. Cir. 2003) ("While the specification may well indicate that certain embodiments are preferred, particular embodiments appearing in a specification will not be read into the claims when the claim language is broader than such embodiments."). This interpretation is supported by the fact that the term "requires" and the description of the procedure that is required appears under the heading "Description of the Preferred Embodiments." Additionally, the parties agree that mathematically fitting an ellipse is broader than the embodiment disclosed in column 26.

Accordingly, the Court declines to limit "mathematically fitting an ellipse" to require a "unitary transformation," solely based on the preferred embodiment disclosed in column 26. The Court turns to the prosecution history to determine whether the term should be so limited.

3. Prosecution History

Samsung argues that Apple disclaimed methods other than applying a "unitary transformation" during the prosecution of the '828 Patent. The Court disagrees.

When the '828 Patent's application was originally filed, Claims 1 and 10 did not explicitly require "mathematically fitting an ellipse." Indeed, Claims 1 and 10 recited merely "fitting an ellipse to at least one of the pixel groups," and "fit an ellipse to at least one of the one or more pixel groups," respectively. Briggs Decl. Ex. L at 3-4. The Examiner originally rejected the claims as being anticipated by U.S. Patent No. 5,825,352 A ("*Bisset*"). *Id.* at 9. The Examiner noted that *Bisset*'s "finger profile" disclosed "fitting an ellipse to at least one of the pixel groups," because the "area of contact of the tip of [a] finger with the touch sensor is an ellipse-like shape." *Id.* at 10-11. In response, the applicant amended the claims to recite "mathematically fitting an ellipse . . . ." *Id.* at 21. The Examiner indicated that this amendment would overcome the rejections. *Id.*

While it is true that Apple added "mathematically" to "fitting an ellipse" in order to overcome a rejection from the Examiner, Briggs Decl. Ex. L at 21, nowhere in the prosecution history does Apple clearly and unmistakably state that it was disavowing all methods other than those methods that applied a "unitary transformation." *See Omega Eng'g, Inc*, 334 F.3d at 1326 (requiring clear and unmistakable disavowal of claim scope for prosecution disclaimer to attach). Indeed, if Apple clearly and unmistakably disclaimed anything by adding "mathematically" to the claims, it disclaimed only the method of fitting an ellipse claimed in *Bisset*, which did not appear to use any mathematical calculations to fit an ellipse to data. Ahn Decl. Ex. P at 18. The Court declines to extrapolate from this prosecution history a clear and unambiguous disavowal of all methods of fitting an ellipse that do not use a unitary transformation.

Thus, the prosecution history does not support Samsung's proposed construction.

4. Extrinsic Evidence

The parties cite several pieces of extrinsic evidence, which is generally not dispositive to claim construction. Apple cites a passage from a textbook, the patent inventor's testimony, and expert testimony, while Samsung cites ITC proceedings and the patent inventor's testimony. The Court gives these sources little or no weight.

Apple's citation to E.R. Davies, Machine Vision: Theory, Algorithms, Practicalities (2d. ed. 1997), merely reinforces that upon which the parties agree: at the time the '828 Patent was invented, a person of ordinary skill in the art would understand that there are several ways of mathematically fitting an ellipse to data. Ahn Decl. Ex. L at 5-15 (describing the diameter bisection method, the chord tangent method, and the Hough transform method). Thus, the Court need not give this evidence any weight in order to construe the disputed term.

Both parties cite inventor testimony in support of their proposed constructions. Inventor testimony is entitled to little or no consideration. *Bell & Howell DMP Co.*, 132 F.3d at 706.

Apple cites the testimony of Mr. Westerman, one of the '828 Patent's inventors, to support its argument that applying a "unitary transformation" takes place before fitting an ellipse and does not actually fit an ellipse. Apple's Opening Br. at 15. As discussed above, the Court agrees that Samsung's proposed construction, as originally formulated, did not actually fit an ellipse. The Court altered Samsung's proposed construction to address this defect.

Samsung cites Mr. Westerman's deposition and hearing testimony in ITC proceedings to support its argument that the equations in column 26 of the specification constitute the only embodiment of mathematically fitting an ellipse. As discussed above, the Court need not and does not determine whether column 27 discloses a second embodiment, because importing the limitations of the only embodiment is improper in the absence of "words or expressions of manifest exclusion or restriction." *Innova/Pure Water, Inc.*, 381 F.3d at 1117. Accordingly, the Court gives no weight to Mr. Westerman's testimony, which is unnecessary to the Court's construction of the disputed terms.

Likewise, the Court gives no weight to the testimony of Apple's expert, Dr. Balakrishnan, which merely supports Apple's position that lines 1-8 of column 27 describes a second embodiment of mathematically fitting an ellipse. Apple's Reply at 9 (citing Ahn Reply Decl. Ex. U at APLNDC0001229687-688). As the Court does not decide whether column 27 is a second embodiment, it gives no weight to this citation to Dr. Balakrishnan's testimony.

Samsung also cites an ITC staff report to support its proposed construction, arguing that the ITC staff has adopted the construction Samsung proposes here in a case between Apple and

Motorola before the ITC. Samsung's Resp. at 15. ITC rulings are not binding, and a court "can attribute whatever persuasive value to the prior ITC decision that it considers justified." *Am. Honda Motor Co., Inc. v. Coast Distrib. Sys., Inc.*, No. C 06-04752-JSW, 2007 WL 672521, at *2 (N.D. Cal. Feb. 26, 2007) (citing *Tex. Instruments, Inc. v. Cypress Semiconductor Corp.*, 90 F.3d 1558, 1569 (Fed. Cir. 1996)). Given that Samsung cites a staff report and not an ITC *decision*, the Court gives this extrinsic evidence no weight.

Having considered the claim language, the specification, the prosecution history, and the extrinsic evidence, the Court declines to adopt Samsung's proposed construction or adopt a construction that requires applying a unitary transformation as part of "mathematically fitting an ellipse." The parties agree that, at the time of invention, a person of ordinary skill in the art would have been aware of many ways of mathematically fitting an ellipse to data. Samsung has failed to show that Apple clearly disclaimed, either in the specification or in the prosecution history, methods that did not use unitary transformations. The Court therefore gives "mathematically fitting an ellipse . . . ." its plain and ordinary meaning: **"using calculations to determine the parameters of an ellipse that fits data."**

F. "pixel"/ "pixel groups"

Apple's Proposed Construction	Samsung's Proposed Construction
Portion(s) of a proximity image that indicate(s) the proximity data measured at one or more electrodes.	Plain and ordinary meaning.

The term "pixel" or "pixel group" is used in claims 1, 4, 5, 6, 9, 10, 14, 16, 24, and 31 of the '828 Patent. For example, claim 1 recites:

> A method of processing input from a touch-sensitive surface, the method comprising: receiving at least one proximity image representing a scan of a plurality of electrodes of the touch-sensitive surface; segmenting each proximity image into one or more **pixel groups** that indicate significant proximity, each **pixel group** representing proximity of a distinguishable hand part or other touch object on or near the touch-sensitive surface; and mathematically fitting an ellipse to at least one of the **pixel groups**.

'828 Patent at 60:5-15 (emphasis added).

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At the hearing, the parties agreed that it is unnecessary for the Court to construe the term pixel group and that it is sufficient for the Court to construe only the term "pixel." The Court agrees that the "ordinary and customary" meaning of "group" would be well understood by a jury. *See Liquid Dynamics Corp. v. Vaughan Co.*, 355 F.3d 1361, 1367-68 (Fed. Cir. 2004). Accordingly, the Court will construe only the term "pixel."

Samsung contends that the ordinary meaning of pixel is "the smallest discernible part of an image." Samsung's Resp. at 16. Samsung argues that there is no clear definition of pixel in the specification, and thus that the ordinary meaning of pixel should control. *Id.* Apple argues, on the other hand, that it acted as its own lexicographer in the '828 Patent, defining "pixel" as an element of a proximity image. Apple's Opening Br. at 18. Apple argues that its special definition excludes the meaning of pixel as an element of a screen, camera, or other display device. *Id.* at 19. At the hearing, Samsung conceded that in the context of the '828 Patent pixel referred to an element of a proximity image. As explained below, the Court finds that Apple acted as its own lexicographer and therefore adopts Apple's construction of this term.

1. Claim Language

Neither side contends that the claim language explicitly provides or implies a definition of pixel.

2. Specification

"[T]he specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. In such cases, the inventor's lexicography governs." *Phillips*, 415 F.3d at 1316. The inventor, however, must do so "with reasonable clarity, deliberateness, and precision." *In re Paulsen*, 30 F.3d at 1480.

When discussing the word "pixel" for the first time, the '828 Patent states: "In the discussion that follows, the proximity data measured at one electrode during a particular scan cycle constitutes one 'pixel' of the proximity image." '828 Patent at 18:12-14. Setting a term off by quotation marks is often a strong indication of a definitional phrase. *See Sinorgchem Co., Shandong v. Int'l Trade Comm'n*, 511 F.3d 1132, 1136 (Fed. Cir. 2007) (citing *Cultor Corp. v. A.E. Staley Mfg. Co.*, 224 F.3d 1328, 1331 (Fed. Cir.2000)). Further, Apple consistently uses

quotations in the '828 Patent when defining other terms. *See* '828 Patent at 14:22-35 (defining "proximity," "horizontal," "vertical," "inner," "outer," and "contact," using quotations around the defined words). Thus, there is strong evidence in the specification that Apple sought to act as its own lexicographer and define "pixel" as an element of a proximity image. This presumption is bolstered by the consistent use of "pixel" throughout the specification as elements of a proximity image. *See* '828 Patent at 23:13-40; 25:63, 26:13; 26:15-16.

Thus, the Court finds that Apple clearly defined the term "pixel" in the specification, and that this definition overrides the term's plain and ordinary meaning. *See Phillips*, 415 F.3d at 1316.

3. Prosecution History

Neither side contends that there is relevant prosecutorial history. Accordingly, the Court turns to the extrinsic evidence for further guidance.

4. Extrinsic Evidence

Samsung cites several cases that define the word pixel, and argues that these cases reveal a plain and ordinary meaning of the term consistent with the specification—namely, "the smallest discernible part of an image." Samsung's Resp. at 16. However, extrinsic evidence is a less reliable guide than intrinsic evidence such as the specification. *See Phillips,* 415 F.3d at 1319. Moreover, at the hearing, Samsung abandoned these other courts' plain and ordinary definition of "pixel" and instead proposed the following more limited construction: "the smallest discernible part of a proximity image." In light of the clear lexicography in the '828 Patent's specification, the Court finds other courts' definitions of "pixel" unpersuasive. Accordingly, the Court construes "pixel" as **"portion of a proximity image that indicates the proximity data measured at one electrode."**

G. "scrolling a window having a view associated with the event object"

The disputed term "scrolling a window having a view . . ." is found in Apple's '915 Patent. The '915 Patent, entitled "Application Programming Interfaces For Scrolling Operations," discloses a method for operating through an application programming interface (API) that provides scrolling operations. '915 Patent, Abstract. "The API interfaces between the software applications and user interface software to provide a user of the device with certain features and operations."

'915 Patent at 1:34-36. The invention discloses APIs which "transfer function calls to implement scrolling, gesturing, and animating operations for a device." '915 Patent at 1:65-67. The application for the '915 Patent was filed January 7, 2007, and the patent issued November 30, 2010.

Apple's Proposed Construction	**Samsung's Proposed Construction**
No construction necessary.	"sliding a window in a direction corresponding to the direction of the user input over a view that is stationary relative to the window"

This term appears in Independent Claims 1, 8 and 15 of the '915 Patent. Independent Claim 1 recites a method, and Independent Claim 8 recites machine readable instructions to perform a method to distinguish between a scrolling operation and a gesture operation. Claim 8 of the '915 Patent is representative of how this claim term is used:

> 8. A machine readable storage medium storing executable program instructions which when executed cause a data processing system to perform a method comprising:
>
> receiving a user input, the user input is one or more input points applied to a touch-sensitive display that is integrated with the data processing system;
>
> creating an event object in response to the user input;
>
> determining whether the event object invokes a scroll or gesture operation by distinguishing between a single input point applied to the touch-sensitive display that is interpreted as the scroll operation and two or more input points applied to the touch-sensitive display that are interpreted as the gesture operation;
>
> issuing at least one scroll or gesture call based on invoking the scroll or gesture operation;
>
> responding to at least one scroll call, if issued, by **scrolling a window having a view associated with the event object**; and
>
> responding to at least one gesture call, if issued by scaling the view associated with the event object based on receiving the two or more input points in the form of the user input.

'915 Patent at 23:65-24:21 (emphasis added).

Apple argues that no construction is necessary, whereas Samsung proposes that the term means "sliding a window in a direction corresponding to the direction of the user input over a view that is stationary relative to the window." Essentially, the parties disagree about the direction in which the scroll function uncovers content. Samsung argues that its construction clarifies the plain meaning of the claim terms by establishing that "scrolling a window having a view" will cause the

content viewed through the window to move in the same direction as the user input. Samsung's Resp. at 18. In other words, "a finger swipe that is horizontal to the right should cause the next-rightmost portion of the content to appear under the window." Samsung's Resp. at 18. Apple disagrees and argues that the scroll function will perform in exactly the opposite manner: a finger swipe to the right will reveal the next-leftmost content.[20] *See* Apple's Reply at 11.

For the reasons explained below, the Court rejects Samsung's proposed construction, as the construction is not required by the claim language and is directly contradicted by the specification.

1. Claim Language

The claim language itself contains no reference to the direction of scrolling or the direction that the content is uncovered in relation to the user input. Nor do the terms that Samsung adds to its proposed construction appear in the claim language. Accordingly, the Court looks to the specification for guidance.

2. Specification

The specification teaches that "scrolling" is "the act of sliding a directional . . . presentation of content, such as text, drawings, or images, across a screen or display window." '915 Patent at 1:39-41. Moreover, a "window" is "a display region" that may have at least one "view (e.g., web, text, or image content.)" '915 Patent at 5:25-30. Samsung argues that because the claim language is "scrolling a window having a view" instead of "scrolling a view," the scroll function *must* slide the window instead of the content. In order to reach this conclusion, Samsung requires the term "window" to be "thought of as a small, see-through pane of glass sitting above a large piece of paper containing the window's content ('view')." Samsung's Resp. at 18. According to Samsung, "[s]crolling the window is simply the act of moving the window pane over the view in the direction of the scroll." *Id.* Because the claim term is "scrolling a window" instead of "scrolling a view"

[20] The parties do not agree on precisely who the person of ordinary skill in the art would be with respect to the '915 Patent. Apple believes a person of ordinary skill would have "a Bachelor's degree in computer science or electrical engineering or an equivalent, and one or more years experience working with electronic devices with touch screen displays" while Samsung believes such a person would have "a Bachelor's Degree in computer science (or equivalent industry experience), and at least two years of experience in the area of computer programming and/or operating systems." The parties agree that their arguments do not turn on the definition of a person of ordinary skill in the art, and the Court agrees that the differences between the two definitions do not materially affect the construction of this term. Markman Hr'g Tr. at 24-25.

Samsung argues that its interpretation is the correct interpretation. Thus, Samsung argues that the content is stationary below the window, and as a result, a scroll to the left will reveal content to the left of the window.

Samsung's construction, however, reads out several embodiments of the claimed invention. One embodiment demonstrates precisely the opposite of Samsung's construction. The specification teaches that "[a] user performs a vertically downward swipe gesture to scroll toward the top of the list." '915 Patent at 9:16-18. "As a result of detecting the vertically downward gesture in FIG. 6B the displayed emails have shifted down, such that the previous bottom displayed email from Kim Brook is no longer displayed, the previous top displayed email from Bruce Walker is now second from the top, and the email from Aaron Jones, which was not displayed in FIG. 6A, is now displayed at the top of the list." '915 Patent at 9:22-28 (internal references to figures omitted); *see also* FIGS. 4-6D. Thus, the specification teaches that content appears in the opposite direction of the user input.

Additionally, the specification also teaches that "while embodiment 400 illustrates movement 414 in a particular direction, in other embodiments movement of the displayed objects may be in response to movement 414 in one or more other directions, or in response to a scalar (i.e., a determined or detected movement independent of the direction)." '915 Patent at 8:20-25. Thus, additional disclosed embodiments do not appear to limit the direction in which the content is disclosed.

As with the '002 Patent, Samsung also argued at the *Markman* hearing that it was not improper to read out these disclosed embodiments from the '915 Patent. As previously explained, "there is a strong presumption against a claim construction that excludes a disclosed embodiment." *See In re Katz*, 639 F.3d at 1324. The Court cannot find that Samsung has overcome this presumption. Samsung has offered no evidence that the embodiments were clearly disclaimed in the specification or the prosecution history. S*ee Oatey Co.*, 514 F.3d at 1277. Moreover, the disputed claim term is present in each of the Independent Claims of the '915 Patent. Therefore, it is unlikely that claims not at issue encompass the potentially omitted embodiments. *See Helmsderfer*, 527 F.3d at 1383.

Unlike the term "glass member" described above, the term "scrolling a window having a view" does not have an unambiguous ordinary meaning. The disputed claim term can be reasonably interpreted to include uncovering content in the manner described by both Apple and Samsung. Therefore, it would be incorrect to adopt Samsung's proposed construction and to exclude several disclosed embodiments. *Oatey Co.*, 514 F.3d at 1277.

Additionally, Samsung's reading is at odds with the definition of "scrolling." "Scrolling," in the section entitled "Background of the Disclosure" is defined as "the act of sliding a directional . . . presentation of content, such as text, drawings, or images, across a screen or display window." '915 Patent at 1:39-41. The specification's definition of "scrolling" contradicts Samsung's construction because in Samsung's construction the content does not slide, but rather is stationary below the display window.

Accordingly, the Court construes "scrolling a window having a view associated with the event object" to have its plain and ordinary meaning. Thus, the Court **does not limit the term** to mean content viewed through the window must move in the same direction as the user input as is urged by Samsung.

H. "the first window has been displayed independent[ly] from a position of a cursor on the screen"

Apple's Proposed Construction	Samsung's Proposed Construction
No construction necessary.	"There is a mouse pointer or a similar icon that is controlled by a mouse, track ball, or touch pad visible on the screen and the user's movement of the mouse pointer or similar icon does not affect the location of the first window."

The term "the first window has been displayed independent[ly] from a position of a cursor on the screen" appears in Claims 1, 20, 26, 45, 51, and 70 of the '891 Patent. For example, Claim 1 reads:

> A method to display a user interface window for a digital processing system, the method comprising:
>
> displaying a first window in response to receiving a first input from a user input device of the digital processing system which is capable of displaying at least a portion of a second window concurrently with the first window on a screen;

starting a timer; and

closing the first window in response to a determination that the timer expired;

wherein the first window does not close in response to any input from a user input device of the digital processing system, wherein **the first window has been displayed independently from a position of a cursor on the screen**.

'891 Patent at 10:5-18 (emphasis added).

Samsung seeks to impose three additional limitations on the scope of the claim terms. Samsung argues that (1) the proposed construction "the user's movement of the mouse pointer does not affect the location of the first window" should replace "the first window is displayed independent[ly] from a position of a cursor;" (2) "cursor" should mean "a mouse pointer or a similar icon that is controlled by a mouse, track ball, or touch pad;" and (3) the cursor should be "visible on the screen." Apple argues that the claim terms should be given their full scope and that Samsung's proposed limitations should be rejected.[21]

1. Claim Language

First, Samsung proposes to construe the disputed terms to mean that "the user's movement of the mouse pointer or similar icon does not affect the location of the first window." Samsung has not offered a sufficient reason to adopt this alternative construction over the claim language, and indeed, the proposed construction appears to be contradicted by the claim language itself. According to the plain language of the claim term, the first window is "displayed independent[ly] from a position of a cursor," not from the user's movement of the cursor. Therefore, the Court declines to adopt Samsung's proposed clarifying language.

Second, the claim language in the '891 Patent does not support the limitations that Samsung seeks to import into the claim terms. Nothing in the claim language defines "cursor" or otherwise

[21] The parties do not agree on precisely who the person of ordinary skill in the art would be with respect to the '891 Patent. Apple believes a person of ordinary skill would have "a Bachelor's degree in computer science or electrical engineering or an equivalent, and one or more years experience working on designing and/or implementing user interfaces" while Samsung believes such a person would have "a Bachelor's Degree in computer science (or equivalent industry experience) and at least two years of experience in the area of computer programming and/or operating systems." ECF No. 650. The parties agree that their arguments do not turn on the definition of a person of ordinary skill in the art, and the Court agrees that the differences between the two definitions do not materially affect the construction of this term. Markman Hr'g Tr. at 24-25.

indicates that "cursor" means "a mouse pointer" or "a similar icon" that must be controlled by a "mouse, track ball or touchpad."

Third, the claim language does not explicitly require a "cursor" to be "visible on the screen." Instead, the claim language "the first window has been displayed independently from a position of a cursor on the screen," is open to multiple interpretations. '891 Patent at 10:17-18. The term "window is displayed independently of a position of a cursor on the screen," may mean that the window's location does not depend on where the cursor is on the screen, implying that a cursor must be present on the screen. Alternatively, the term may mean that the window is displayed independently of a cursor; in other words, the window does not depend on the existence or location of a cursor. In light of this ambiguity, the Court examines the terms' meanings with the assistance of the specification.

2. Specification

As it is used in the specification, the term "cursor" refers to an indicator that appears on a display through a user input device. *See* '891 Patent at 1:56-60. Samsung argues that the specification requires that a "cursor" must be a pointer or similar icon. Samsung points to Figures 16-18 and argues that "there is no blinking caret for text editing" disclosed in the specification. *See also* '891 Patent FIG 3; 1:56-60. Samsung, however, reads the specification too narrowly. Although the specification and figures establish that a pointer may be a "cursor," this does not preclude other symbols or indicators that may appear on a display screen from being a "cursor." Samsung's argument attempts to impermissibly import limitations into the claims from the specification. *Abbott Labs. v. Sandoz, Inc.*, 566 F.3d 1282, 1288 (Fed. Cir. 2009).

Similarly, Samsung argues that the specification limits a "cursor" to something that is controlled by "a mouse, track ball, or touch pad." Samsung's Resp. at 24. In support of its argument, Samsung identifies several places where the specification teaches that a "cursor" can be controlled by a mouse, track ball, or touch pad. Samsung's Resp. at 24. The language cited by Samsung, however, establishes that a mouse, track ball, or touch pad are *examples* of cursor control devices. '891 Patent at 2:16-19; 9:11-12; 1:41-43; 1:60-62; 7:55-60. A cursor control device may be a mouse, track ball, or touch pad, but the explicit language of the specification establishes that

the list of cursor control devices is not exhaustive. Therefore, the Court declines to further limit the term cursor to mean only cursors controlled by "a mouse, track ball, or touch pad."

The specification also does not require that the cursor "must be visible on the screen." Illustrative figures to which the '891 Patent refers indicate that there are several embodiments of the patent in which a cursor is not visible. '891 Patent FIGS. 7-11, 16-21. As explained above, when there are two reasonable interpretations of a claim term, the terms should not be construed in such a way as to read out an embodiment. *Oatey Co.*, 514 F.3d at 1277. As explained above, there are two reasonable interpretations regarding whether the cursor must be visible on the screen. Because Samsung's construction would read out an embodiment, but Apple's construction would not, there is a presumption that Samsung's construction is incorrect.

3. Prosecution History

Samsung argues that the prosecution history supports its argument that the term "the first window has been displayed independent[ly] from a position of a cursor on the screen" requires that a cursor be visible on the screen and that a cursor must be "something that can be moved around the screen to select a target." Samsung's Resp. at 23. The Court disagrees that the prosecution history requires such a narrow construction of the disputed claim term.

Samsung has identified U.S. Patent App. No. 2003/0016253 A1 ("*Aoki*") as a prior art reference that the Patentee distinguished in order to obtain claim allowance during the prosecution of the '891 Patent. *Aoki* discloses a feedback mechanism for use with graphical user interface systems where a user may locate and select a hyperlink target within an image map. *See Aoki* Abstract. *Aoki* teaches a feedback mechanism for cursor-less graphical user interfaces. *See Aoki* Abstract. The Examiner found that *Aoki* further teaches "applying conventional graphical user interface systems using a cursor control device, such as a mouse, a joystick, a keyboard, a touch pad, a trackball, or the like in place of a touch-screen." APLNDC00028805, Briggs Decl. Ex. X.[22]

[22] In a footnote, Apple moves to strike Samsung's Exhibit X, which contains excerpts of the prosecution history of the '891 Patent as this evidence was apparently not disclosed in the joint claim construction statement. First, justice favors deciding issues on the merits. *See Martinez v. Stanford,* 323 F.3d 1178, 1182 (9th Cir. 2003). Excluding this prosecution history which illuminates the construction of the term at issue would likely lead to an incomplete and incorrect construction. Second, it is not clear how introduction of Apple's own prosecution history would

The Examiner rejected the Patentee's claims in the '891 Patent because *Aoki* teaches displaying a first window in response to receiving a first input from a user input device, starting a timer for a predetermined time, and closing the first window in response to a determination that the timer has expired without any direction from a user input device. *See* APLNDC00028804-5, Briggs Decl. Ex. X.

The Examiner identified Figure 13 in *Aoki*, which shows "an exemplary pop-up text window with textual directional tips," *Aoki* at 0082, as establishing that *Aoki* anticipates the claims of the '891 Patent. Figure 13 shows the user's stylus touching the displayed image map, and in response a pop-up window appearing near the stylus point on the display screen. *See also* ALPND00028804, Briggs Decl. Ex. X (Examiner's statement that "in response to receiving a first input from a user input device (e.g. as a result of the user's gesture of touching the stylus 102 to the displayed image map 103 displayed on display 104)"). To distinguish *Aoki*, the Patentee included the disputed claim language "wherein the first window has been displayed independently from a position of a cursor on the screen." APLNDC00028844, Briggs Decl. Ex. X. The Patentee further explained that:

> Aoki discloses displaying an image map 103 and a pop-up window 115 that provides textual directional tips 114 to guide a user to a desired area in the image map 103 (Figure 13). In particular, Aoki discloses that "when the user'[s] gesture positions the stylus in contact with the displayed image map 103, directional tips in a pop-up text window 115 could appear . . . In particular, Aoki discloses that the "pop-up window . . . [indicates] to a user that the . . . active area . . . is "up" and "to the right" of the position at which the stylus 102 was placed within the displayed image map 103 by the user." (paragraph [0082]). In contrast amended claim 1 refers to displaying the first window independently from a position of a cursor on the screen. Aoki fails to disclose closing the first window in response to a determination that the timer expired; wherein the first window does not close in response to any input from a user input device of the digital processing system, wherein the first window has been displayed independently from a position of a cursor on the screen.

Id. (emphasis in original).

Contrary to Samsung's arguments, the disputed claim language was added to distinguish the '891 Patent from *Aoki* because the first window's position in *Aoki* was in response to the

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prejudice Apple. This intrinsic evidence is part of the public record and has been available to both parties. Similarly, Apple had the opportunity to respond to this evidence in its Reply. Accordingly, the Court DENIES Apple's motion.

location of the user input on the screen. In *Aoki*, the user input was a stylus. The Patentee overcame the rejection not because a cursor was not visible, but rather because the position of the window was in direct response to the position of the user input. Thus, this amendment does not require that a cursor appear on the screen.

Aoki also informs the parties' dispute regarding what devices constitute "cursor control devices," and what the definition of a cursor is. "[T]he record before the Patent and Trademark Office is often of critical significance in determining the meaning of the claims." *Vitronics Corp.*, 90 F.3d at 1582. "[P]rior art references are of record in the prosecution history and may be consulted in the process of claim construction for what they indicate about the state of the prior art." *Arlington Industs., Inc. v. Bridgeport Fittings, Inc.*, 345 F.3d 1318, 1330 (Fed. Cir. 2003) (citing *Tate Access Floors, Inc. v. Interface Architectural Res., Inc.*, 279 F.3d 1357, 1371 n.4 (Fed. Cir. 2002) ("Prior art cited in the prosecution history falls within the category of intrinsic evidence.")).

For example, the Examiner stated that *Aoki* "further teaches applying conventional graphical user interface systems using a cursor control device, such as a mouse, a joystick, a keyboard, a touch pad, a trackball, or the like." APLNDC00028805, Briggs Decl. Ex. X; *see also* *Aoki* ¶ 6 (describing a cursor control device as including "a mouse, a joystick, a keyboard, a touch pad, a trackball, or the like"). This additional evidence from the prosecution history suggests that the term "cursor," at the time of invention, was more broadly defined than merely "a mouse pointer or a similar icon that is controlled by a mouse, track ball, or touch pad." Moreover, *Aoki* itself provides guidance as to what the term "cursor" meant at the time of the '891 Patent's invention. *Aoki* suggests that the term was a general computing term that means an "indicator[] to help a user interact" with a display. *Aoki* ¶ 5 (describing a typical "cursor-based graphical user interface system" as providing "indicators to help a user interact with a displayed image"). *Aoki* and the prosecution history of the '891 Patent discussing *Aoki* support Apple's arguments regarding what a person of ordinary skill in the art would understand the term "cursor" and "cursor control device" to mean. This understanding is not inconsistent with the claim language and the specification of

the '891 Patent, and supports Apple's position that a cursor may be something other than a mouse pointer controlled by a mouse, track ball, or touch pad.

4. Extrinsic Evidence

Finally, Samsung points to the inventor testimony of Imran Chaudri, who testified that a cursor means "a mouse cursor." Samsung's Resp. at 24. This evidence, however, does not overcome the construction established by the intrinsic evidence. As explained above, inventor testimony is given little to no weight in claim construction, *Bell & Howell DMP Co.*, 132 F.3d at 706. *See* Samsung's Resp. at 24.[23]

Based on the claim terms and specification, and in light of the prosecution history and prior art, the Court construes "the first window has been displayed independent[ly] from a position of a cursor on the screen" to have its plain and ordinary meaning. Thus, the Court **does not limit the term** to mean that a cursor must be visible on the screen. The Court construes the term "cursor" to mean "**an indicator to help a user interact with a display**." Moreover, the Court rejects Samsung's limitation that a cursor is only "controlled by a mouse, track ball, or touchpad."

IT IS SO ORDERED.

Dated: April 4, 2012

LUCY H. KOH
United States District Judge

[23] Although Samsung cites this evidence in its brief, it appears that this page is missing from their exhibits. Even if Samsung had attached the exhibit, the extrinsic evidence would not overcome the intrinsic evidence provided by the specification and prosecution history.

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	LIST SCROLLING AND DOCUMENT TRANSLATION, SCALING, AND ROTATION ON A TOUCH-SCREEN DISPLAY
First Named Inventor/Applicant Name:	Bas Ording
Filer:	Joseph J. Richetti/Teresa Rodriguez
Attorney Docket Number:	0331834.381

Filed as Large Entity

ex parte reexam Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Request for ex parte reexamination	1812	1	2520	2520
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
		Total in USD ($)		**2520**

Electronic Acknowledgement Receipt

EFS ID:	12852206
Application Number:	90012304
International Application Number:	
Confirmation Number:	4807
Title of Invention:	LIST SCROLLING AND DOCUMENT TRANSLATION, SCALING, AND ROTATION ON A TOUCH-SCREEN DISPLAY
First Named Inventor/Applicant Name:	Bas Ording
Customer Number:	83559
Filer:	Joseph J. Richetti/Teresa Rodriguez
Filer Authorized By:	Joseph J. Richetti
Attorney Docket Number:	0331834.381
Receipt Date:	23-MAY-2012
Filing Date:	
Time Stamp:	21:07:40
Application Type:	Reexam (Third Party)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$2520
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Warnings:					
Information:					
2	Reexam Miscellaneous Incoming Letter	sb0057.pdf	486447 c4daad0bb55270cd2d7f372d17429b9b04c37586	no	3
Warnings:					
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3	Copy of patent for which reexamination is requested	Exhibit_1_07469381.pdf	4791129 58755e3b3e4ac183e738660420ffa18f3954c1cb	no	62
Warnings:					
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4	Information Disclosure Statement (IDS) Form (SB08)	Exhbiit_2_SB08.pdf	100899 578310b5126688eaa721dd2a8b5aa12389c74440	no	4
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
5	Foreign Reference	Exhibit_3_wo03081458.pdf	5637838 03d03bf6dcd6426a08efa31216d230bd9b09b59c	no	64
Warnings:					
Information:					
6	Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party	Exhibit_4_07786975.pdf	2236749 2c29f30a01ee6b1f5cf5f759809663d8d5d7c6f3	no	29
Warnings:					
Information:					
7	Foreign Reference	Exhibit_5_wo01029702.pdf	1157479 ba3d535729ce62baff71b9e824775e33642b9e5b	no	12
Warnings:					
Information:					

8	Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party	Exhibit_6_charts.pdf	4366592 0705ca1955a4bb4c4d2bedad5025a54ebed42ed8	no	101
Warnings:					
Information:					
9	Reexam - Affidavit/Decl/Exhibit Filed by 3rd Party	Exhibit_7_samsung.pdf	373750 514199d21c98caf4bc52c29d6aa4740005c57cfc	no	48
Warnings:					
Information:					
10	Fee Worksheet (SB06)	fee-info.pdf	30092 55f5850fcf63dd8dd598281c419b710aa721ff69	no	2
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