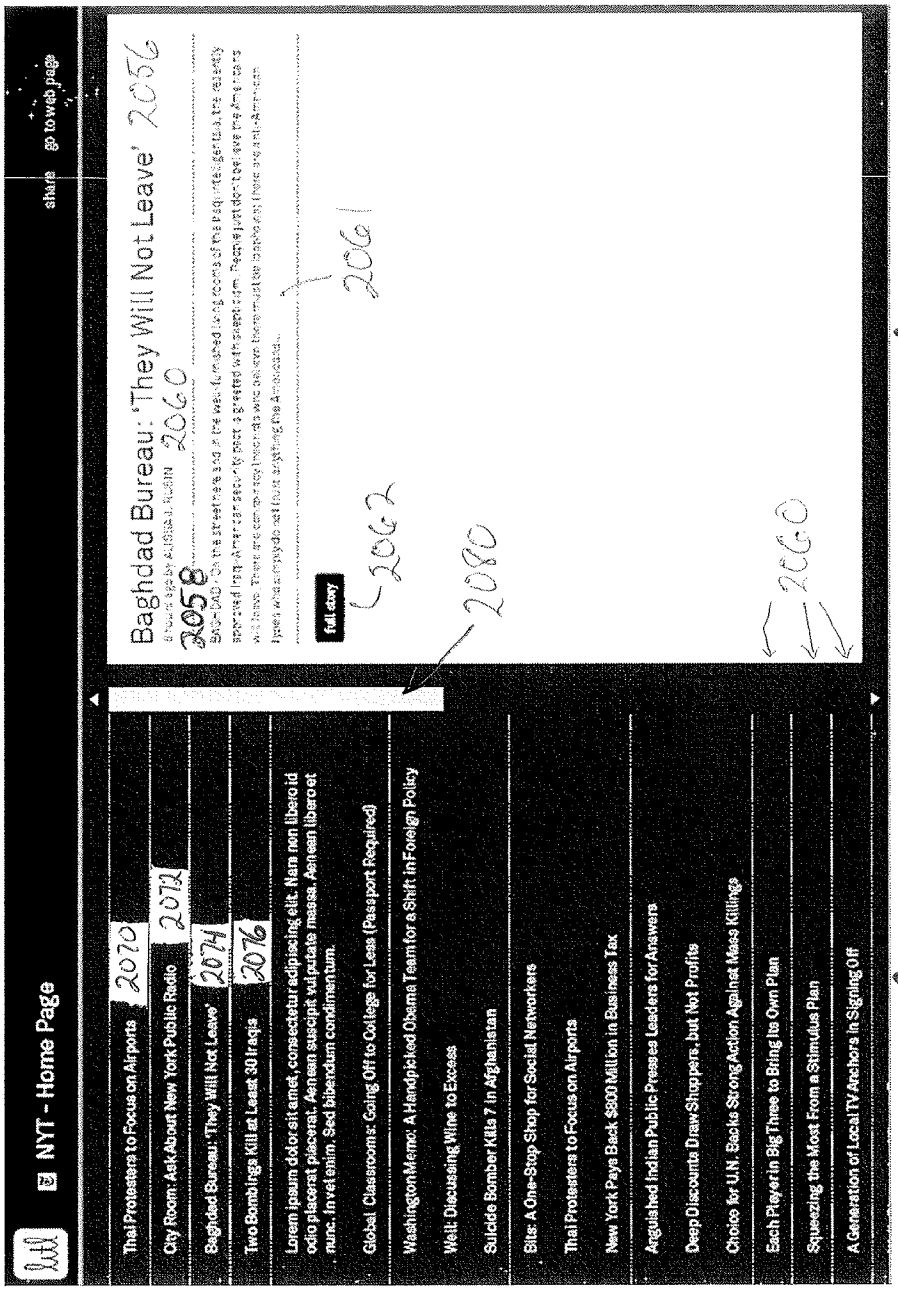

NYT - Home Page
share
go to web page
Thai Protesters to Focus on Airports
City Room: Ask About New York Public Radio
Baghdad Bureau: 'They Will Not Leave'
Two Bombings Kill at Least 30 Iraqis
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Nam non libero id odio placerat placerat. Aenean suscipit vulputate massa. Aenean liberoet nunc. Invetenim. Sed liberoNam condimentum.
Global Classrooms: Going Off to College for Less (Passport Required)
Washington Memo: A Handpicked Obama Team for a Shift in Foreign Policy
Well: Discussing Wine to Excess
Suicide Bomber Kills 7 in Afghanistan
Bits: A One-Stop Shop for Social Networkers
Thai Protesters to Focus on Airports
New York Pays Back $800 Million in Business Tax
Anguished Indian Public Pressures Leaders for Answers
Deep Discounts Draw Shoppers, but Not Profits
Choice for U.N. Backs Strong Action Against Mass Killings
Each Player in Big Three to Bring Its Own Plan
Squeezing the Most From a Stimulus Plan
A Generation of Local TV Anchors Is Signing Off
Baghdad Bureau: 'They Will Not Leave'
full story
2050
2070
2071
2074
2076
2058
2060
2062
2061
2080
2052
2054
2060

Fig. 20B


Stevens gives last Senate speech as staffers weep
"I only look forward and I still see the day when I can remove the cloud that currently surrounds me," Stevens said. The speech was a poignant coda to a...
Obama Wins
2100
2102

FIG. 21

FIG. 22

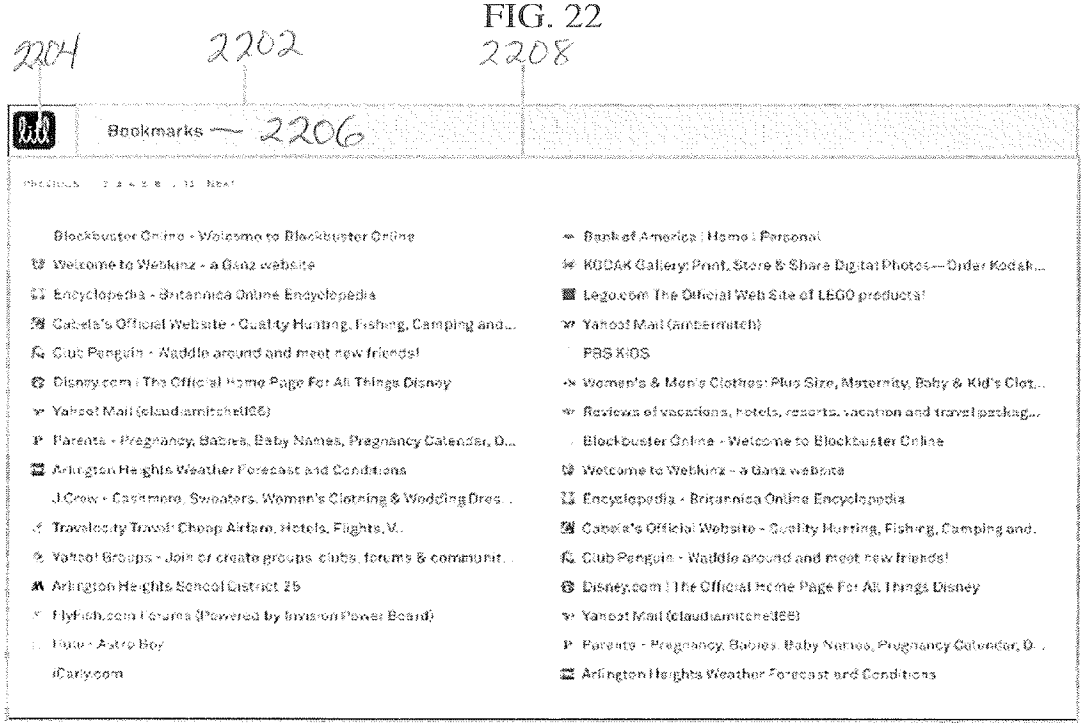

2204
2202
2208
Bookmarks
2206
Blockbuster Online - Welcome to Blockbuster Online
Welcome to Webkinz - a Ganz website
Encyclopedia - Britannica Online Encyclopedia
Cabela's Official Website - Quality Hunting, Fishing, Camping and...
Club Penguin - Waddle around and meet new friends!
Disney.com | The Official Home Page For All Things Disney
Yahoo! Mail (claudiamitchell68)
Parents - Pregnancy, Babies, Baby Names, Pregnancy Calendar, D...
Arlington Heights Weather Forecast and Conditions
J.Crew - Cashmere, Sweaters, Women's Clothing & Wedding Dres...
Travelocity Travel: Cheap Airfare, Hotels, Flights, V...
Yahoo! Groups - Join or create groups, clubs, forums & communit...
Arlington Heights School District 25
FlyFish.com Forums (Powered by Invision Power Board)
Astro Boy
iCarly.com
Bank of America | Home | Personal
KODAK Gallery: Print, Store & Share Digital Photos — Order Kodak...
Lego.com The Official Web Site of LEGO products!
Yahoo! Mail (amberrmitch)
PBS KIDS
Women's & Men's Clothes: Plus Size, Maternity, Baby & Kid's Clot...
Reviews of vacations, hotels, resorts, vacation and travel packag...
Blockbuster Online - Welcome to Blockbuster Online
Welcome to Webkinz - a Ganz website
Encyclopedia - Britannica Online Encyclopedia
Cabela's Official Website - Quality Hunting, Fishing, Camping and...
Club Penguin - Waddle around and meet new friends!
Disney.com | The Official Home Page For All Things Disney
Yahoo! Mail (claudiamitchell68)
Parents - Pregnancy, Babies, Baby Names, Pregnancy Calendar, D...
Arlington Heights Weather Forecast and Conditions

FIG. 23

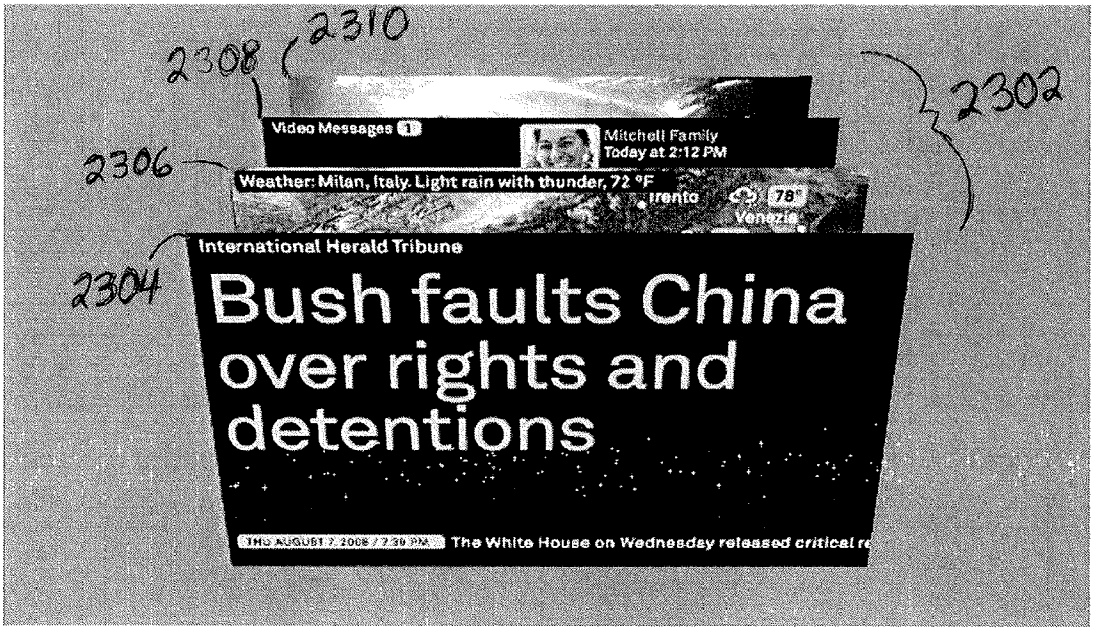

2308
2310
2302
2306
2304
Video Messages 1
Mitchell Family
Today at 2:12 PM
Weather: Milan, Italy. Light rain with thunder, 72 °F
Trento
78°
Venezia
International Herald Tribune
Bush faults China over rights and detentions
THU AUGUST 7, 2008 / 7:30 PM
The White House on Wednesday released critical r

FIG. 24

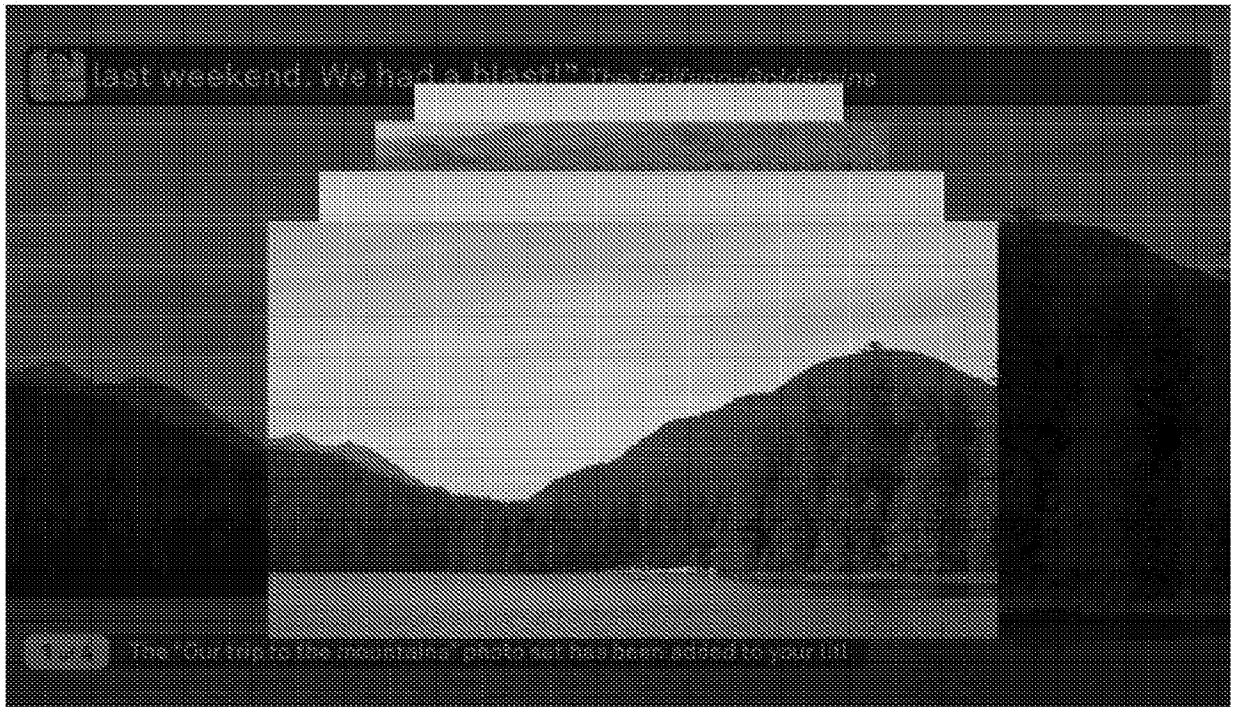


FIG. 25A

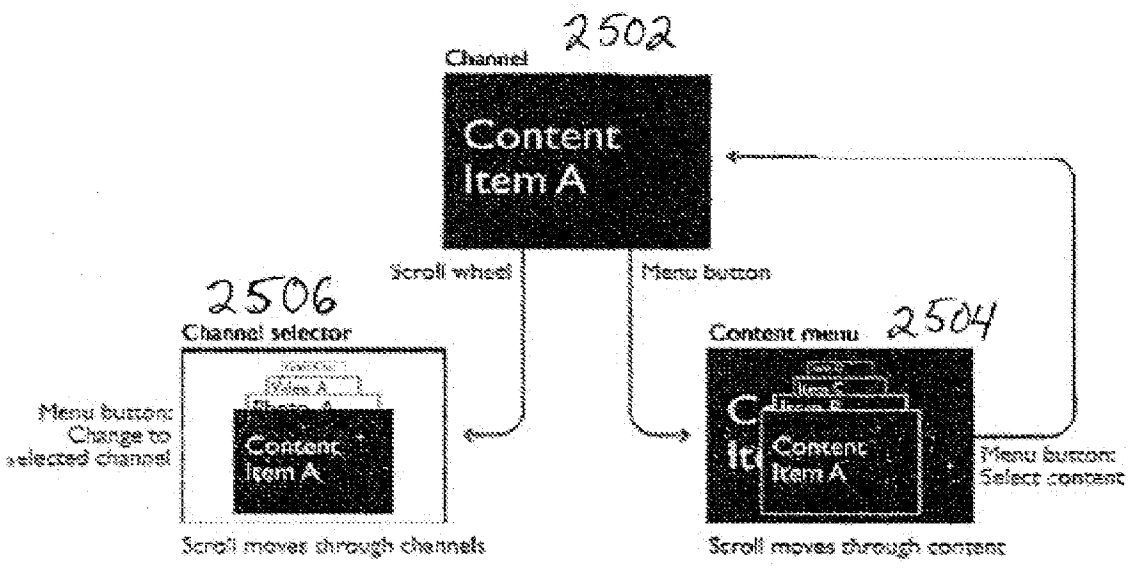
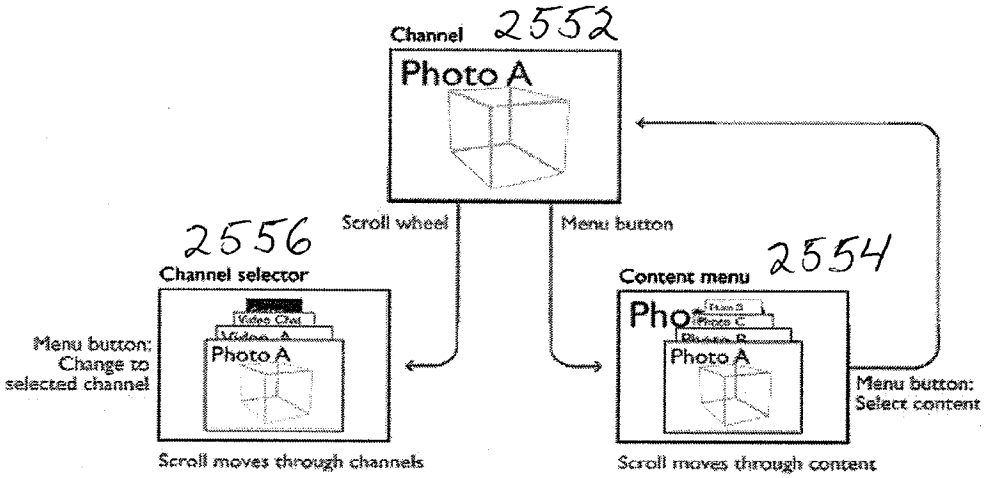


FIG. 25B



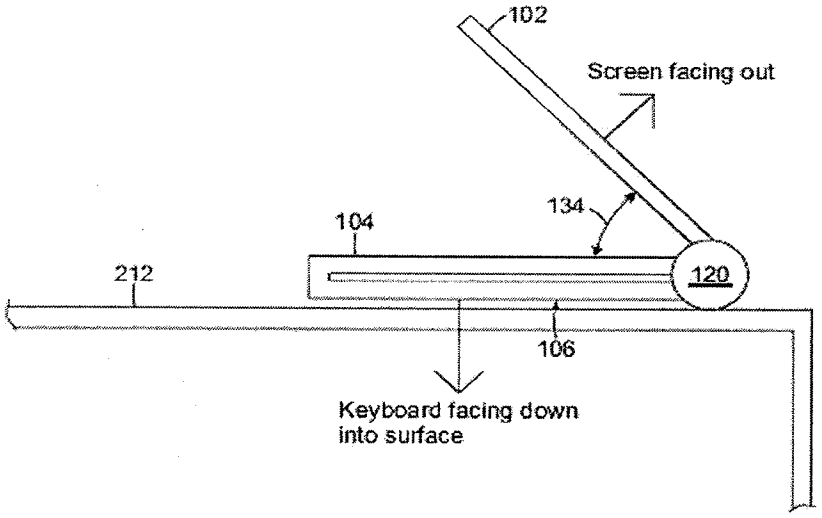


FIG. 26

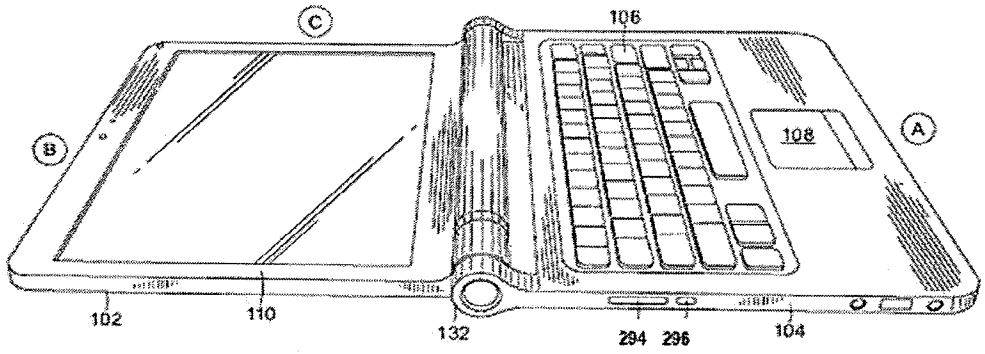

C
106
B
A
108
102
110
132
294
296
104

FIG. 27

FIG. 28

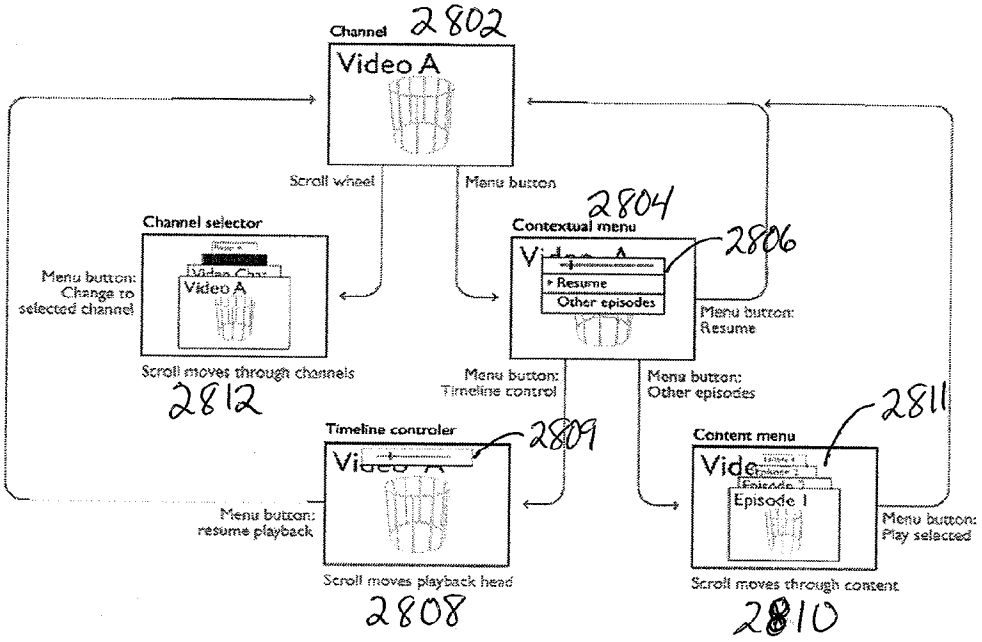

Channel
2802
Video A
Scroll wheel
Menu button
Channel selector
Menu button:
Change to
selected channel
Video A
Scroll moves through channels
2812
2804
Contextual menu
2806
Resume
Other episodes
Menu button:
Resume
Menu button:
Timeline control
Menu button:
Other episodes
Timeline controler
2809
Menu button:
resume playback
Scroll moves playback head
2808
Content menu
2811
Episode 1
Menu button:
Play selected
Scroll moves through content
2810

FIG. 29A

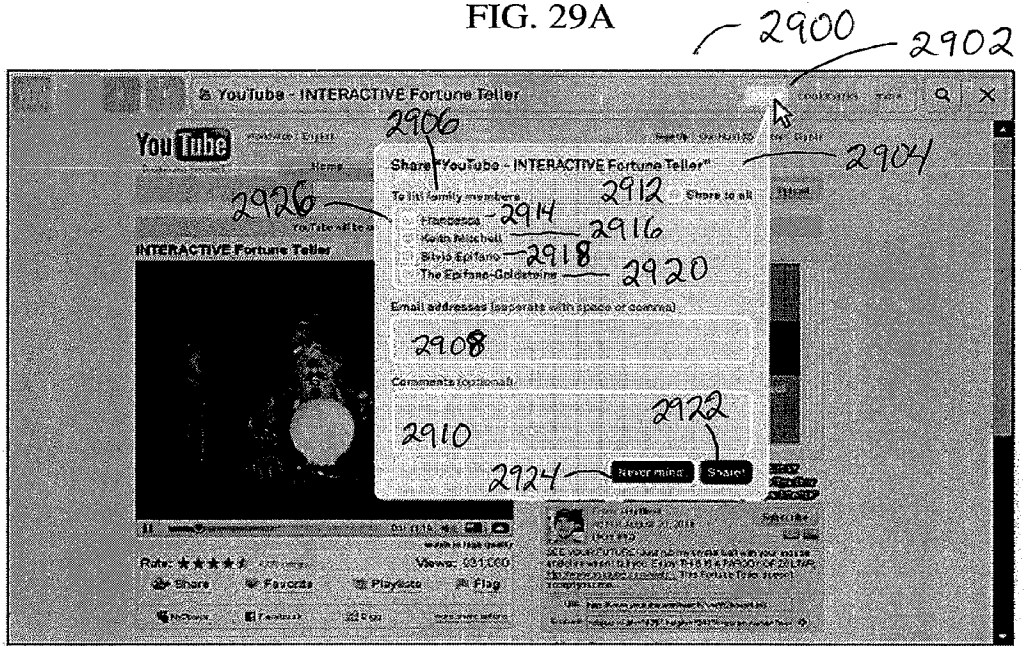


FIG. 29B

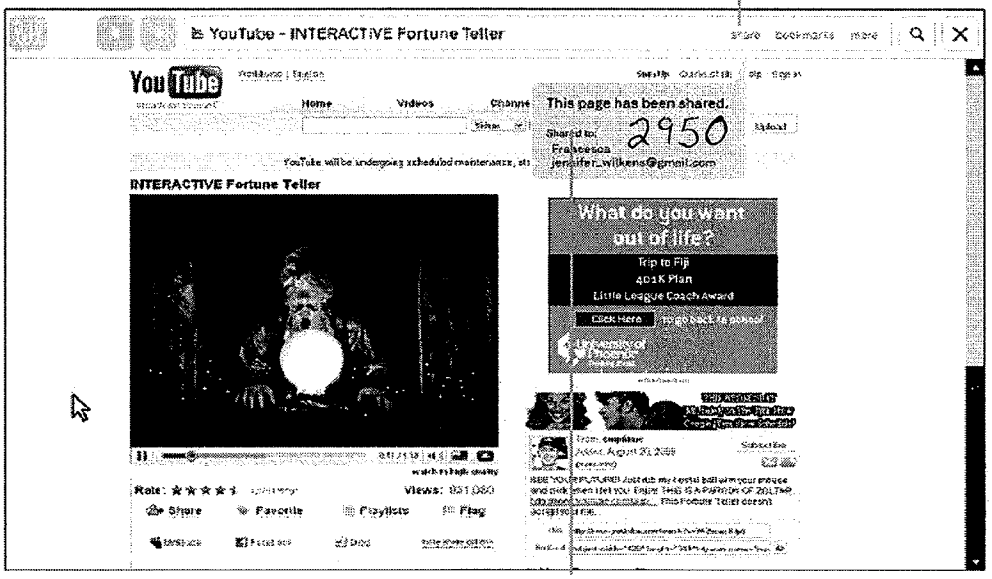


FIG. 30

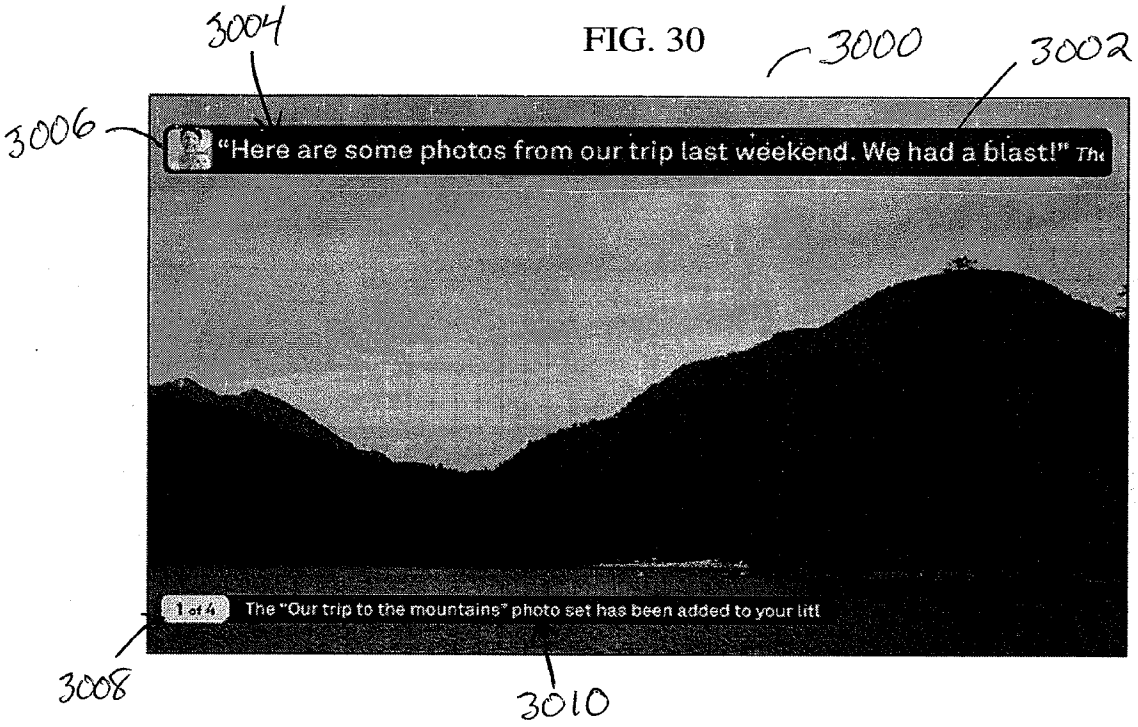

3004
3000
3002
3006
"Here are some photos from our trip last weekend. We had a blast!" Th
1 of 4
The "Our trip to the mountains" photo set has been added to your litl
3008
3010

FIG. 31

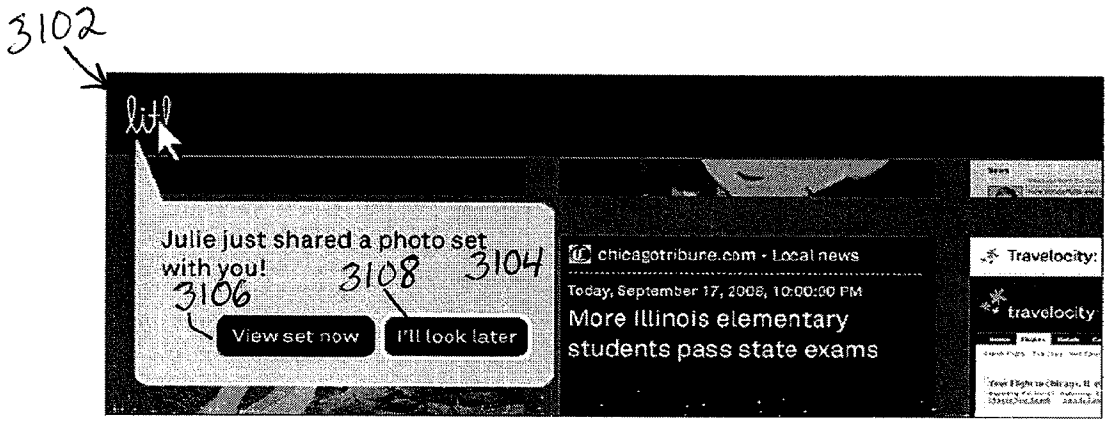

3102
litl
Julie just shared a photo set with you!
3106
3108
3104
View set now
I'll look later
chicagotribune.com - Local news
Today, September 17, 2008, 10:00:00 PM
More Illinois elementary students pass state exams
Travelocity:
travelocity

FIG. 32

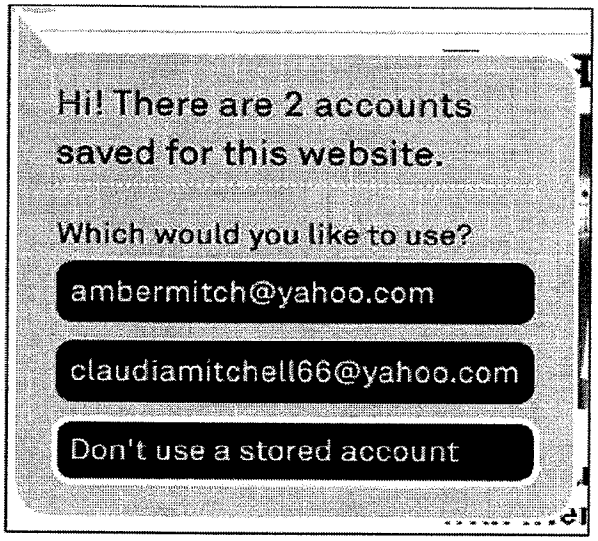

Hi! There are 2 accounts saved for this website.
Which would you like to use?
ambermitch@yahoo.com
claudiamitchell66@yahoo.com
Don't use a stored account

FIG. 33


3302
litl chicagotribune.com
3304
2 channels and 1 web card have been shared to you.
Use the litl wheel to view the new channels. Return to litl home to view the web card.
3308
3306
View first item
I'll look later

FIG. 34

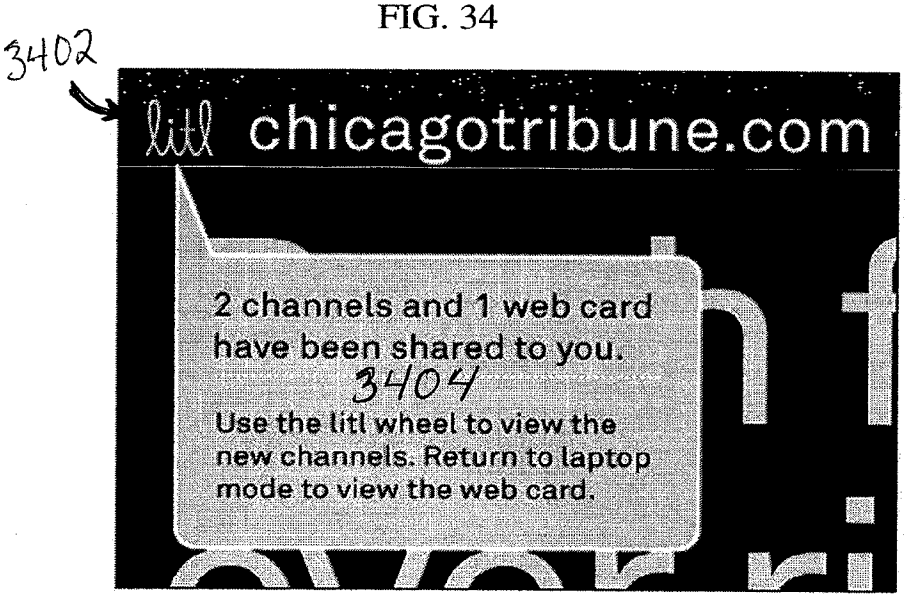

3402
litl chicagotribune.com
2 channels and 1 web card have been shared to you.
3404
Use the litl wheel to view the new channels. Return to laptop mode to view the web card.

FIG. 35

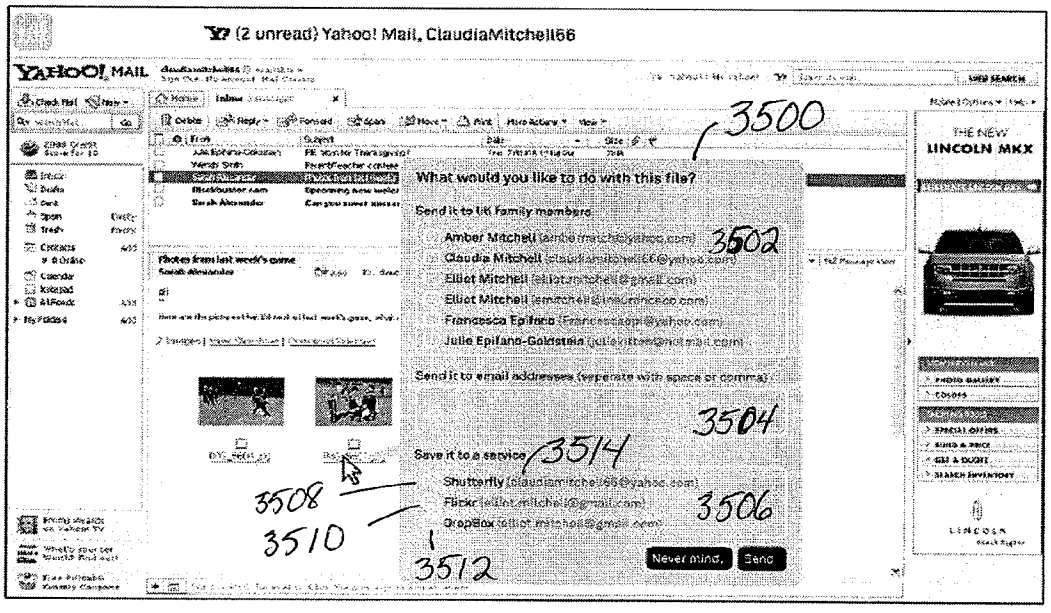
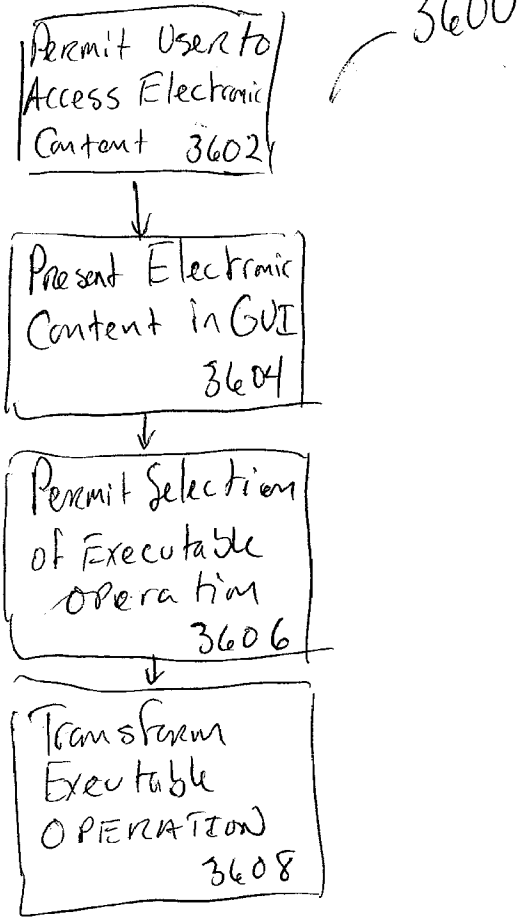

(2 unread) Yahoo! Mail, ClaudiaMitchell66
YAHOO! MAIL
3500
What would you like to do with this file?
Send it to IM family members
Amber Mitchell
Claudia Mitchell
Elliot Mitchell
Elliot Mitchell
Francesca Epifano
Julie Epifano-Goldstein
3502
Send it to email addresses (separate with space or comma)
3504
Save it to a service
3514
Shutterfly
Flickr
3506
3508
3510
3512
Never mind
Send
THE NEW LINCOLN MKX

FIG 36


Permit User to Access Electronic Content 3602
3600
Present Electronic Content in GUI 3604
Permit Selection of Executable Operation 3606
Transform Executable OPERATION 3608

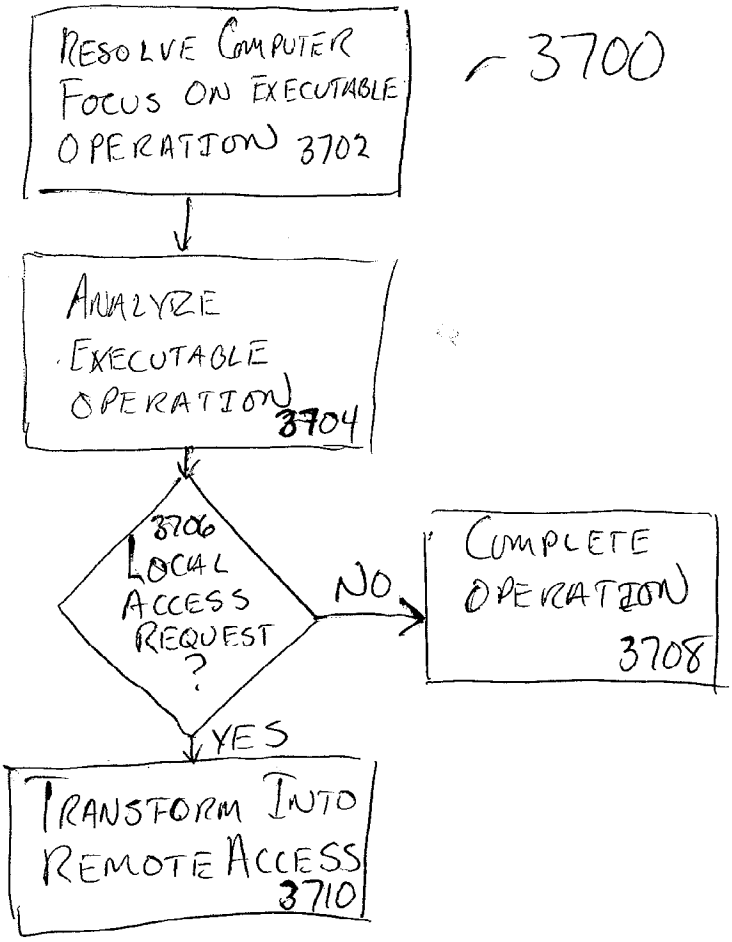
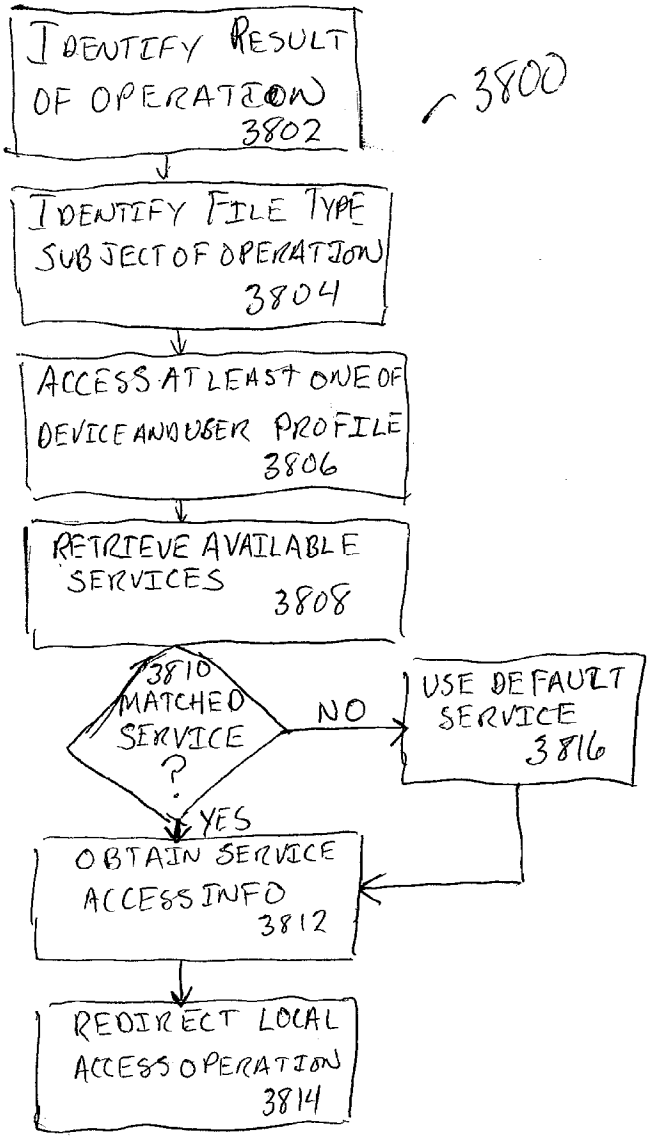

RESOLVE COMPUTER FOCUS ON EXECUTABLE OPERATION 3702
3700
ANALYZE EXECUTABLE OPERATION 3704
3706 LOCAL ACCESS REQUEST ?
NO
COMPLETE OPERATION 3708
YES
TRANSFORM INTO REMOTE ACCESS 3710

FIG. 37

FIG. 38


IDENTIFY RESULT OF OPERATION 3802
3800
IDENTIFY FILE TYPE SUBJECT OF OPERATION 3804
ACCESS AT LEAST ONE OF DEVICE AND USER PROFILE 3806
RETRIEVE AVAILABLE SERVICES 3808
3810 MATCHED SERVICE ?
NO
USE DEFAULT SERVICE 3816
YES
OBTAIN SERVICE ACCESS INFO 3812
REDIRECT LOCAL ACCESS OPERATION 3814

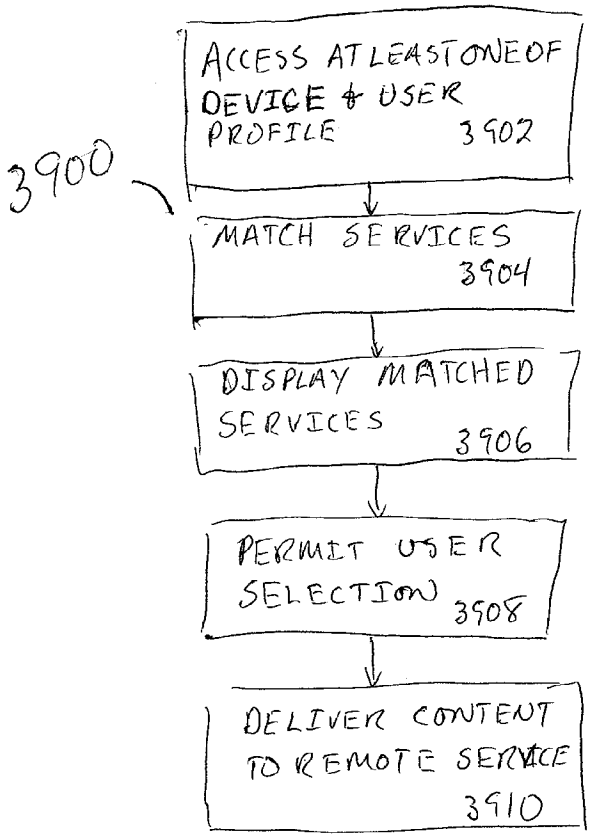

3900
ACCESS AT LEAST ONE OF DEVICE & USER PROFILE 3902
MATCH SERVICES 3904
DISPLAY MATCHED SERVICES 3906
PERMIT USER SELECTION 3908
DELIVER CONTENT TO REMOTE SERVICE 3910

FIG 39

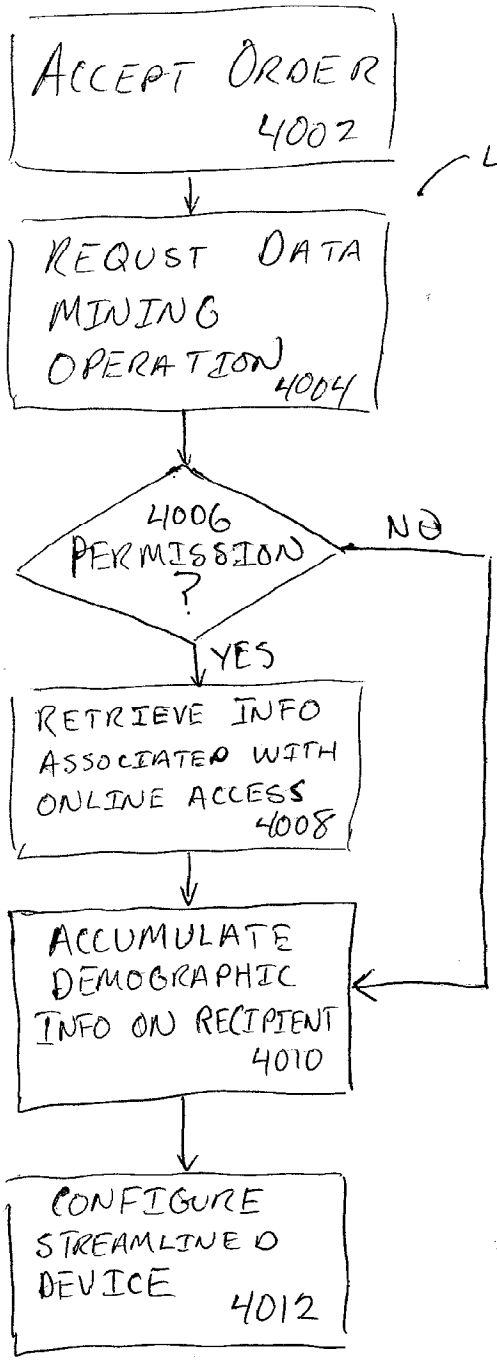

ACCEPT ORDER
4002
4000
REQUST DATA MINING OPERATION
4004
4006
PERMISSION ?
NO
YES
RETRIEVE INFO ASSOCIATED WITH ONLINE ACCESS
4008
ACCUMULATE DEMOGRAPHIC INFO ON RECIPIENT
4010
CONFIGURE STREAMLINED DEVICE
4012

FIG. 40

FIG. 41A

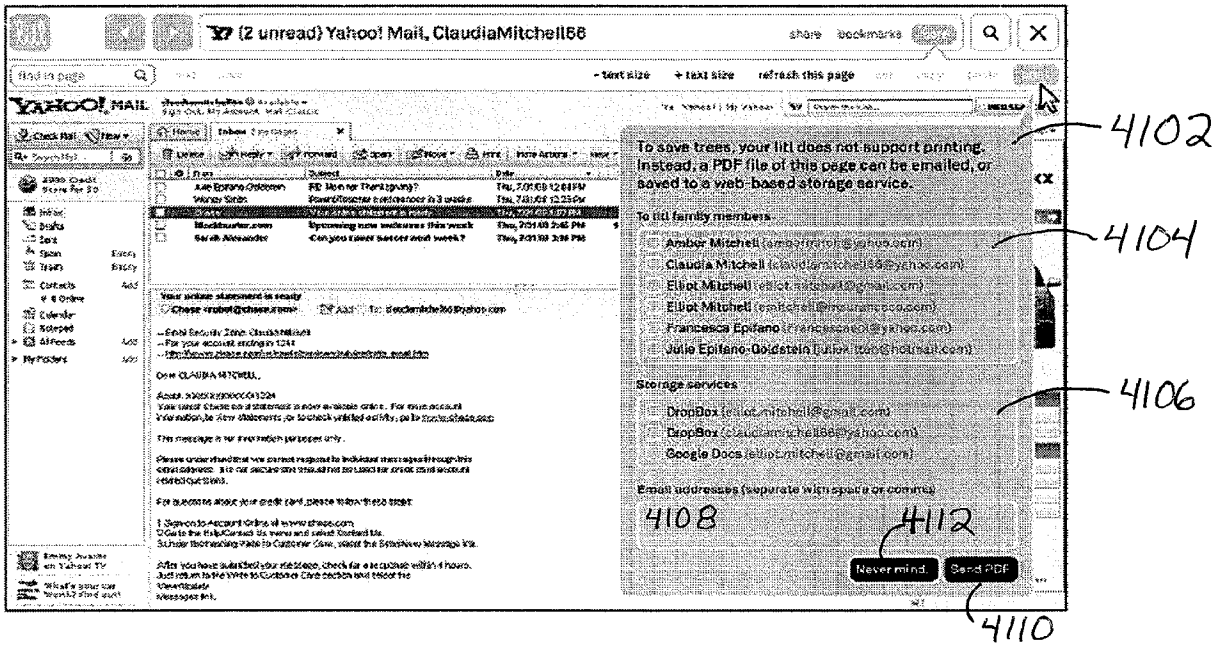
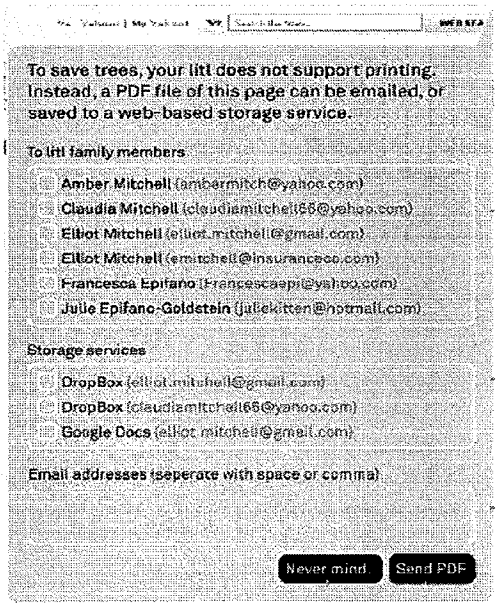


FIG. 41B



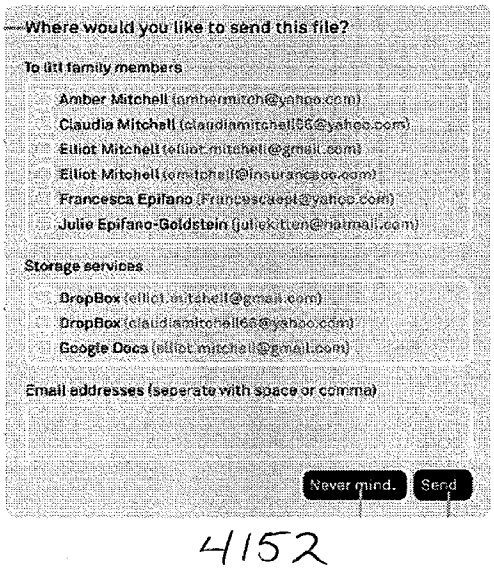
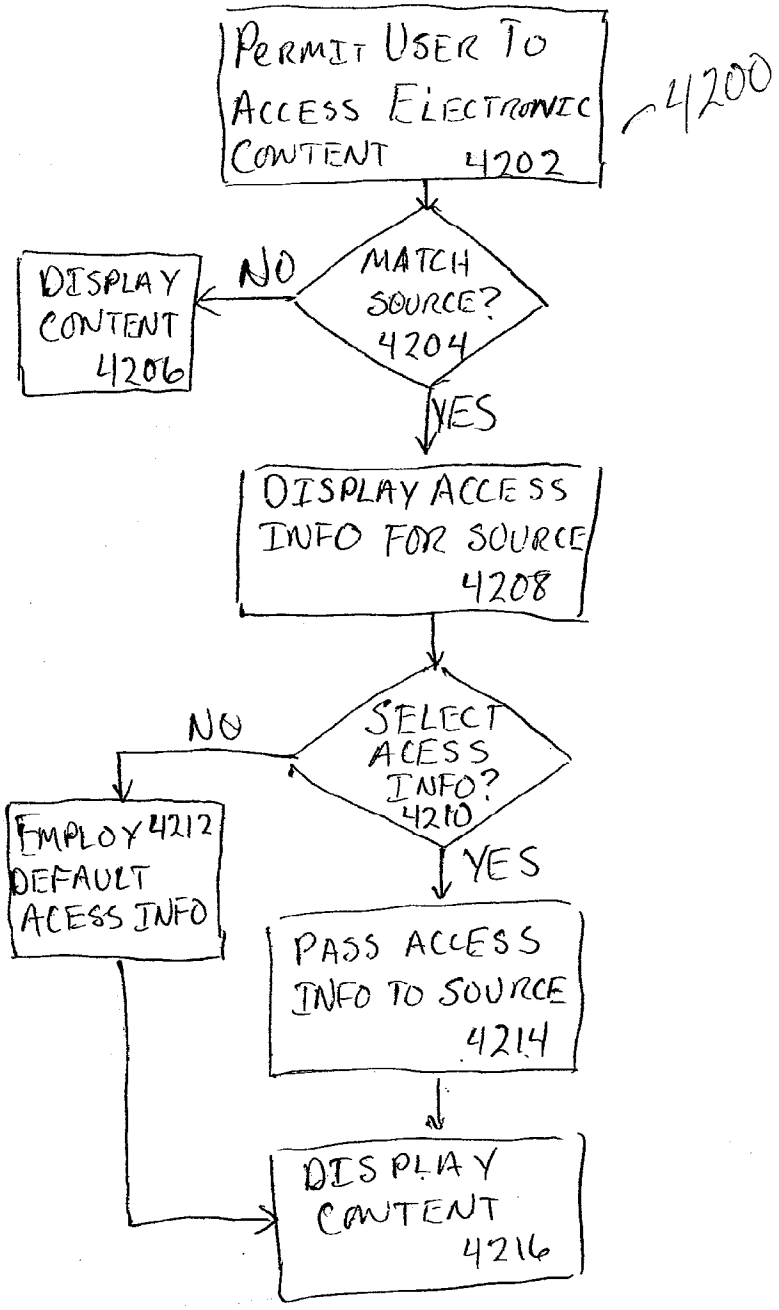


FIG 42


PERMIT USER TO ACCESS ELECTRONIC CONTENT 4202
4200
MATCH SOURCE? 4204
NO
DISPLAY CONTENT 4206
YES
DISPLAY ACCESS INFO FOR SOURCE 4208
SELECT ACESS INFO? 4210
NO
EMPLOY 4212 DEFAULT ACESS INFO
YES
PASS ACCESS INFO TO SOURCE 4214
DISPLAY CONTENT 4216

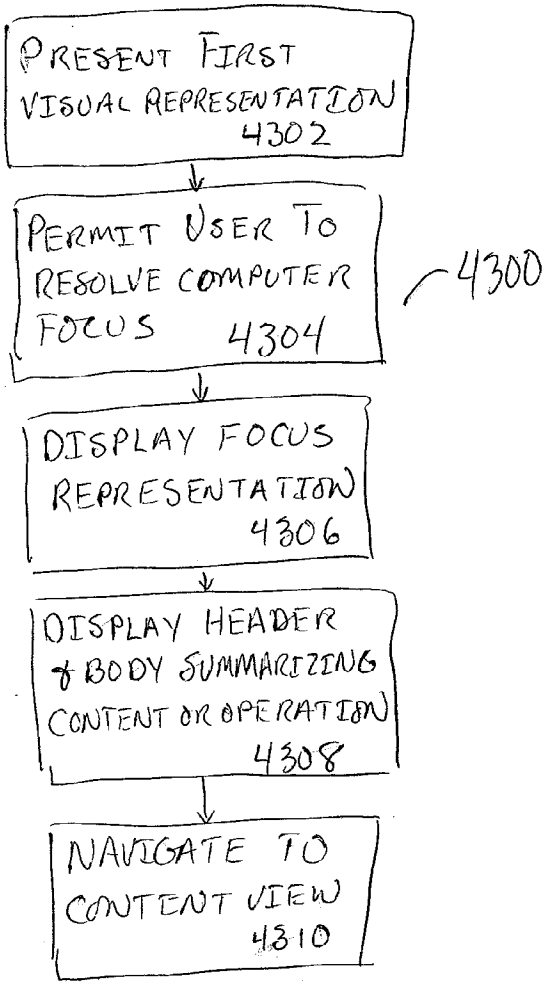

PRESENT FIRST VISUAL REPRESENTATION 4302
PERMIT USER TO RESOLVE COMPUTER FOCUS 4304
4300
DISPLAY FOCUS REPRESENTATION 4306
DISPLAY HEADER & BODY SUMMARIZING CONTENT OR OPERATION 4308
NAVIGATE TO CONTENT VIEW 4310

FIG. 43

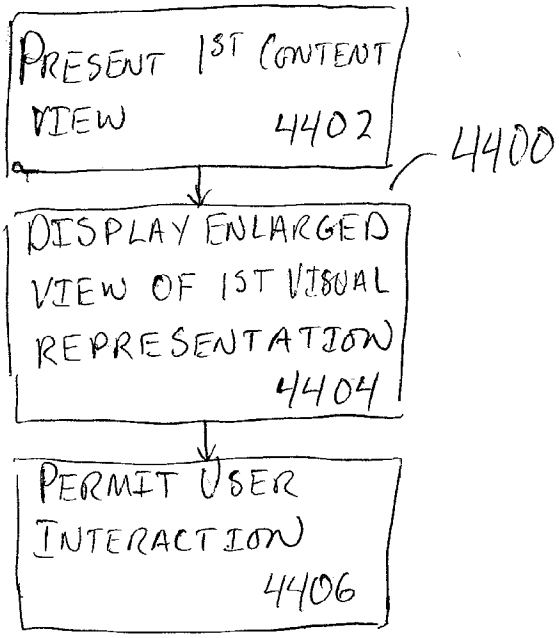


FIG. 44

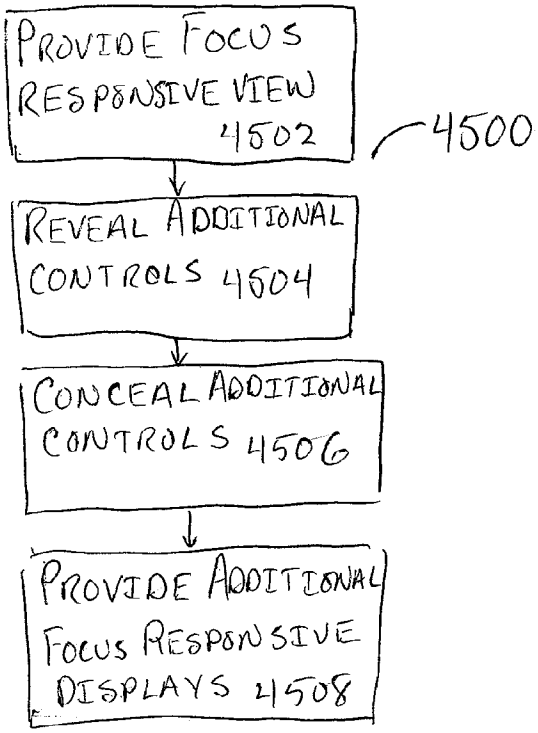


FIG. 45

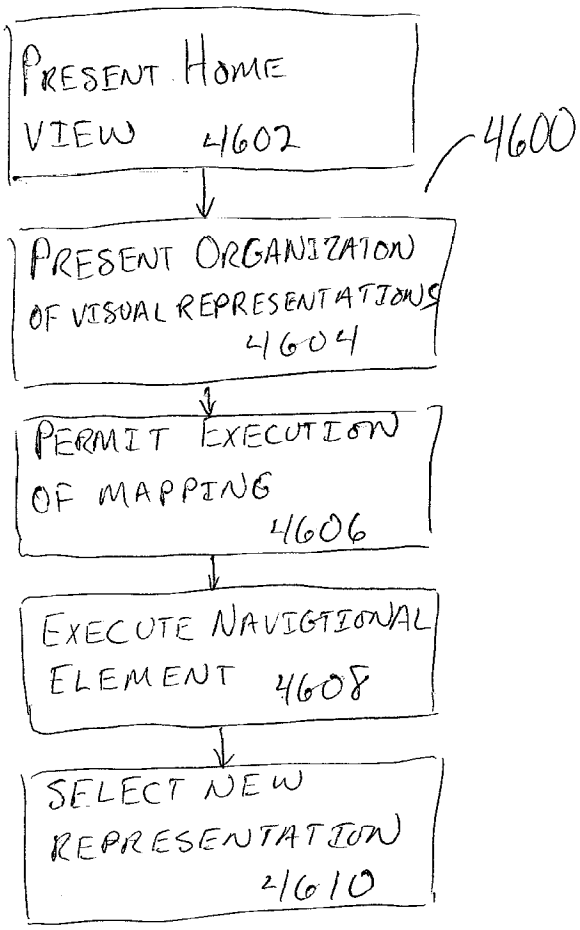


FIG. 46

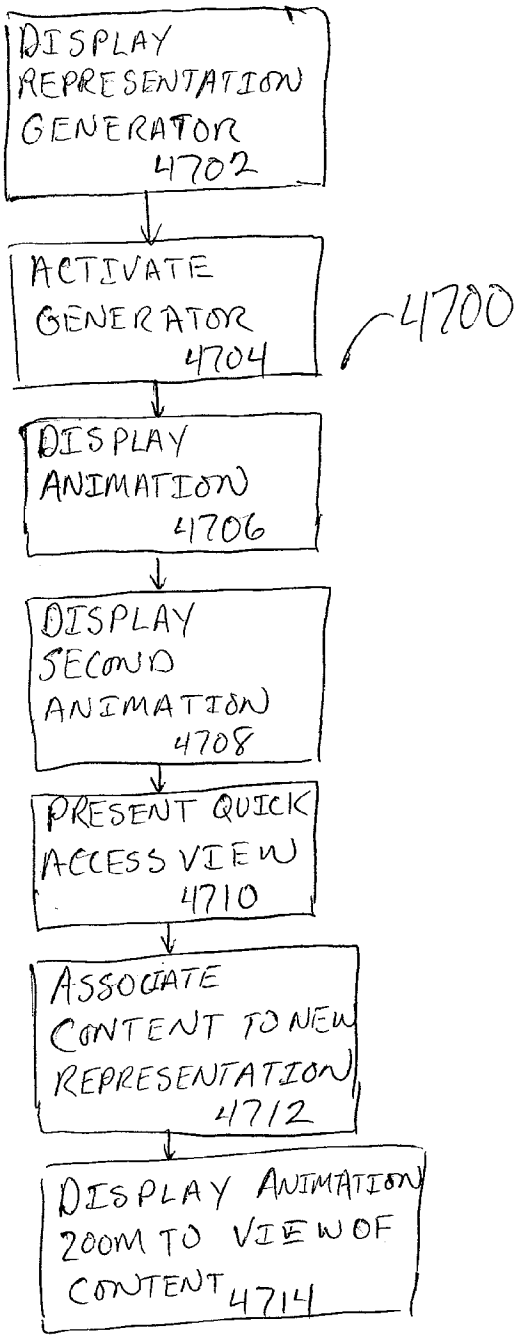


FIG. 47A

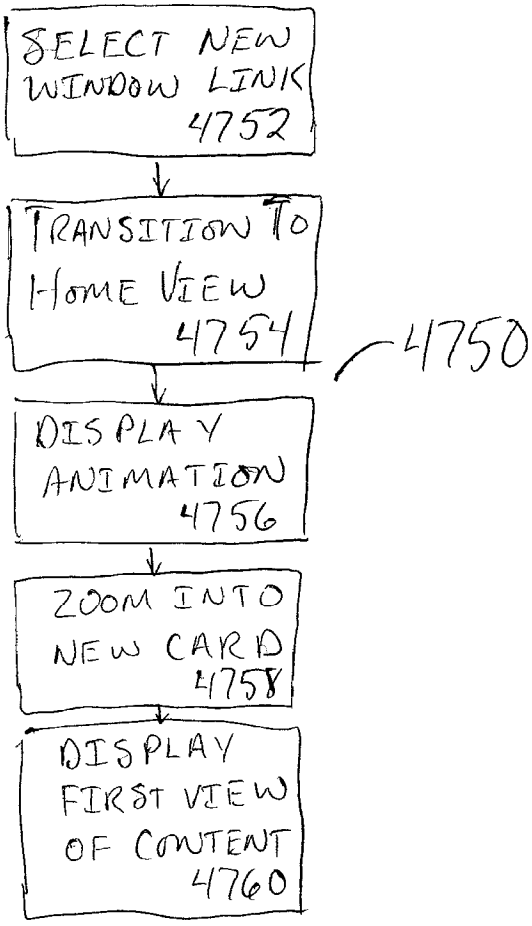


FIG. 47B

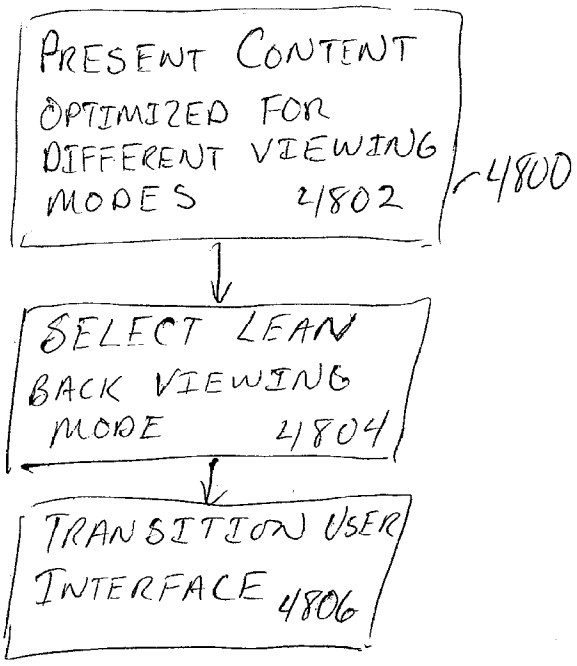


FIG. 48

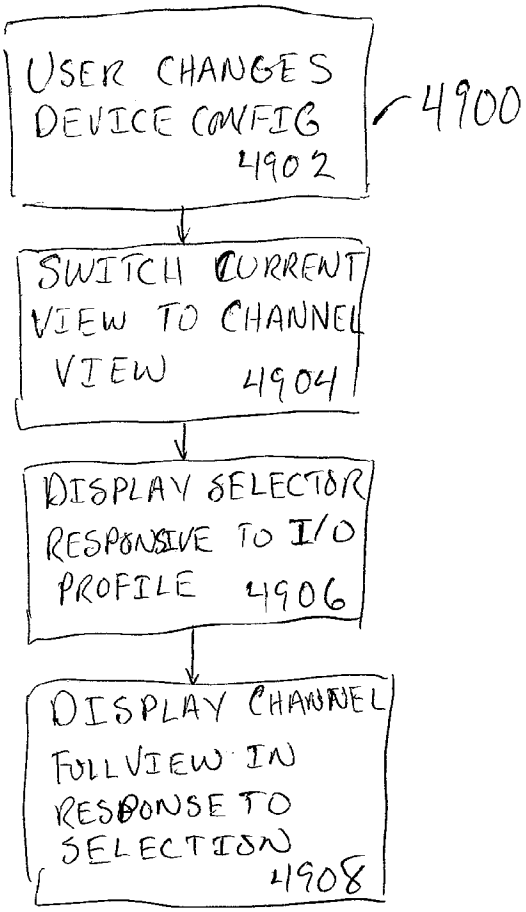


FIG. 49A

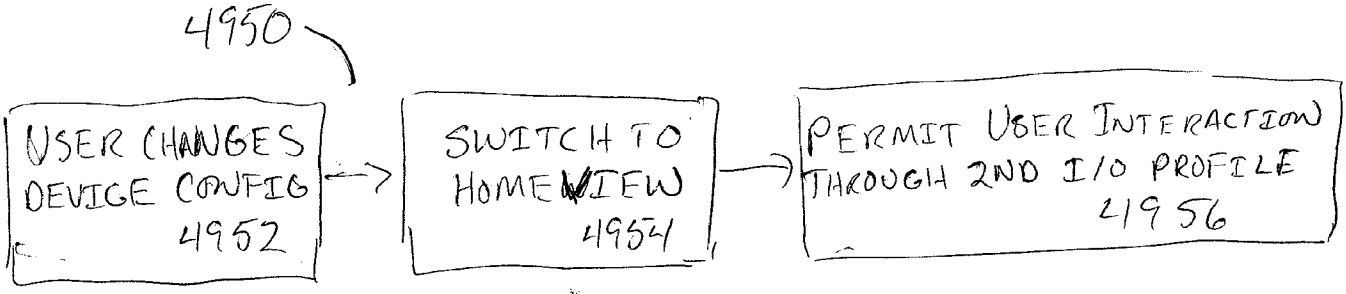


FIG. 49B

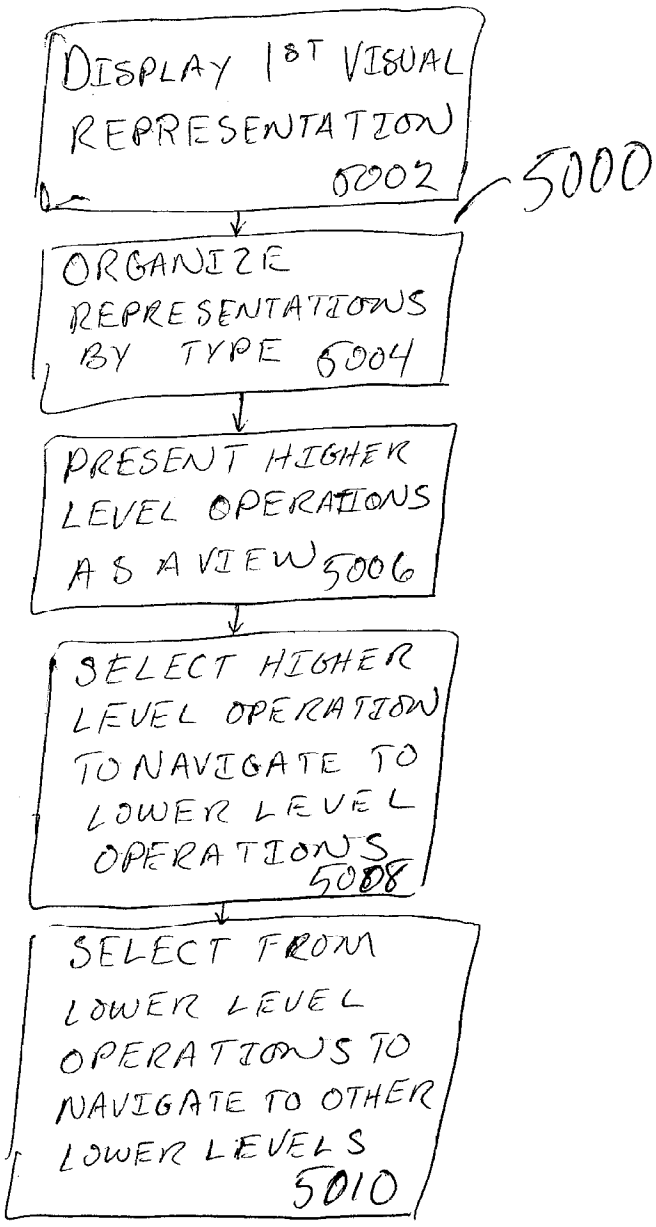

DISPLAY 1ST VISUAL REPRESENTATION 5002
5000
ORGANIZE REPRESENTATIONS BY TYPE 5004
PRESENT HIGHER LEVEL OPERATIONS AS A VIEW 5006
SELECT HIGHER LEVEL OPERATION TO NAVIGATE TO LOWER LEVEL OPERATIONS 5008
SELECT FROM LOWER LEVEL OPERATIONS TO NAVIGATE TO OTHER LOWER LEVELS 5010

FIG. 50

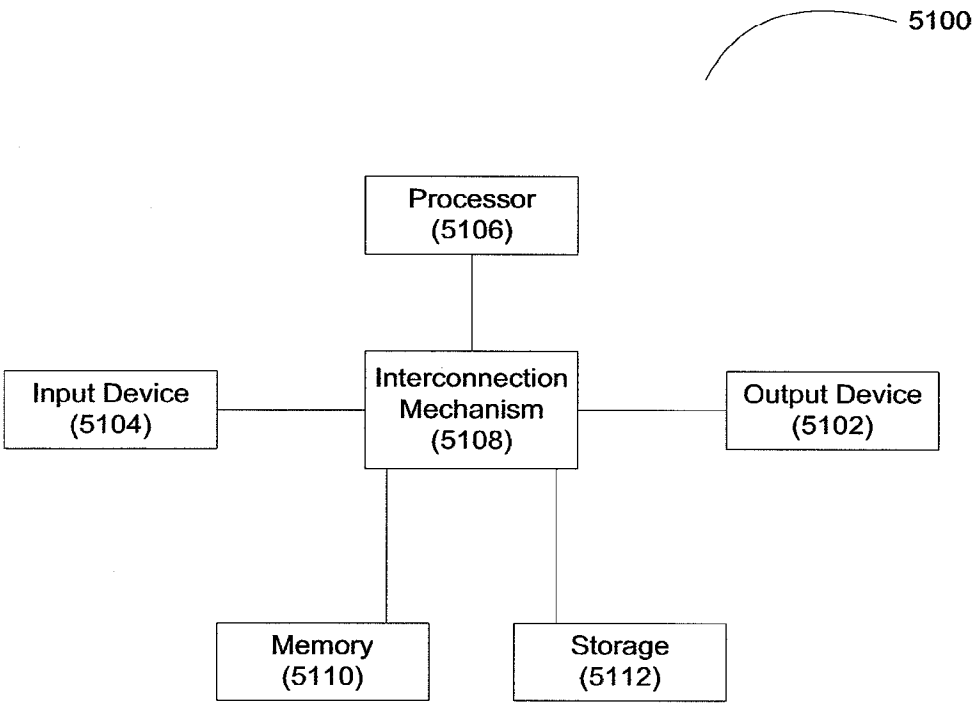

5100
Processor
(5106)
Input Device
(5104)
Interconnection
Mechanism
(5108)
Output Device
(5102)
Memory
(5110)
Storage
(5112)

FIGURE 51

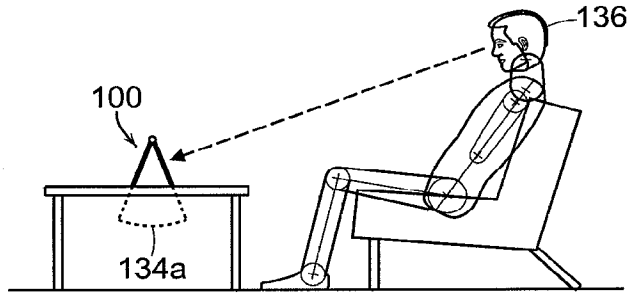


FIG. 52A

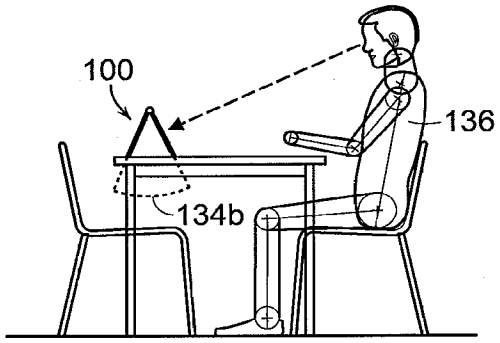


FIG. 52B

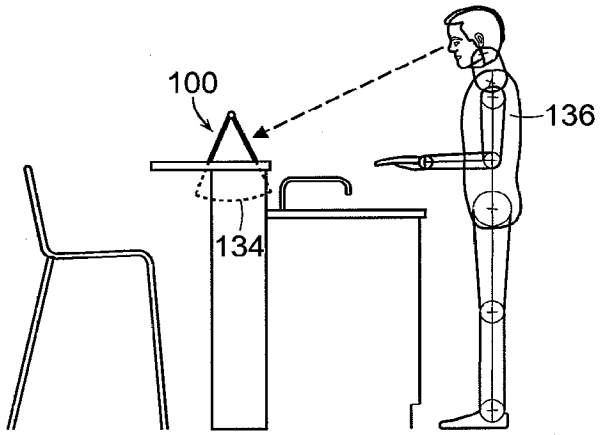


FIG. 52C

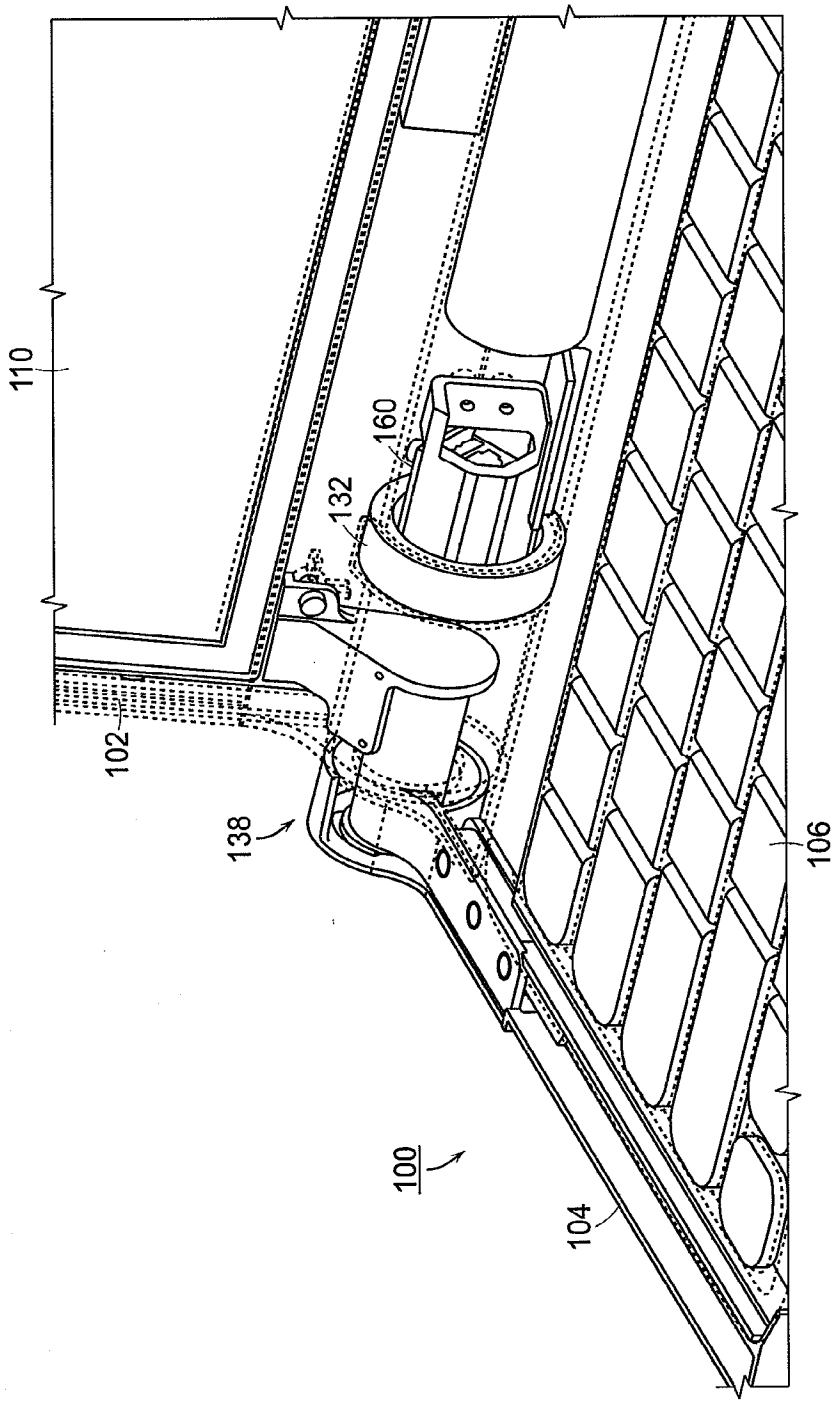


FIG. 53A

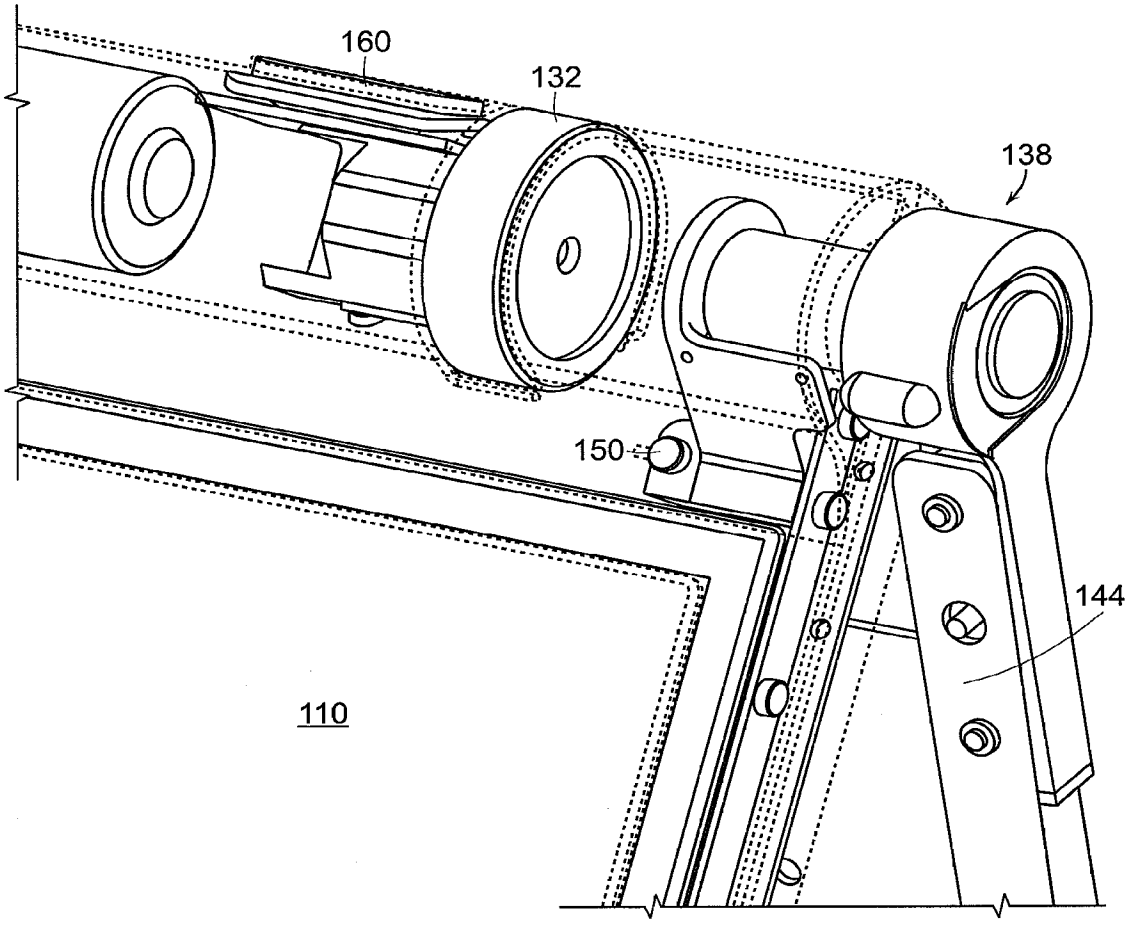


FIG. 53B

METHODS AND APPARATUS FOR MANAGING DIGITAL MEDIA CONTENT

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation-in-part of, and claims priority under 35 U.S.C. § 120 to, U.S. Patent Application Serial Number 12/170,951 entitled "PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS," filed on July 10, 2008; which claims priority under 35 U.S.C. § 119(e) to U.S. Provisional Application Serial No. 61/041,365, entitled "PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS," filed April 1, 2008, both of which are herein incorporated by reference in their entirety. Furthermore, this application is a continuation-in-part of, and claims priority under 35 U.S.C. § 120 to U.S. Patent Application Serial Number 12/170,939, entitled "PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS," filed on July 10, 2008; which claims priority under 35 U.S.C. 119(e) to U.S. Provisional Application Serial No. 61/041,365, entitled "PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS," filed April 1, 2008, both of which applications are herein incorporated by reference in their entirety. Furthermore, this application is a continuation-in-part of, and claims priority under 35 U.S.C. §120 to U.S. Patent Application No. 12/416,479, filed on April 1, 2009 and entitled "SYSTEM AND METHOD FOR STREAMLINING USER INTERACTION WITH ELECTRONIC CONTENT," which claims priority under 35 U.S.C. 119(e) to U.S. Provisional Application Serial No. 61/041,365, entitled "PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS," filed April 1, 2008, both of which applications are herein incorporated by reference in their entirety.

BACKGROUND

Field of Invention

The present invention is in the field of computer systems and, more particularly, is directed to methods and apparatus for managing computer-based digital media libraries.

Discussion of Related Art

Much of the advancement in contemporary computer systems and services stems from the significant increases in computing power. Hand in hand with those increases, enhanced features sets have developed designed to utilize that computing power. Conventional wisdom suggests that the more features that can be provided to a particular computer user, the better the user's experience will be. As computers have become more powerful and capable of providing

more and more features, however, ordinary/typical computer users have not been able to keep up with availability of features and services. Users may become frustrated by the inability to navigate the myriad (sometime unending) configurations and options provided in order to achieve something useful and/or workable to their ordinary use. Many users simply don't take advantage of provided features. Some outright ignore options and features that would simplify the use of their computer system; in some instances because the user lacks experience with new features and doesn't know the feature can be useful.

User frustration is felt not only with respect to the newer more powerful computer systems being offered today, but also frustration abounds with respect to their computer's interaction with the Internet. The present movement on the Internet, often referred to as Web 2.0, also subscribes to conventional thinking in that more and more features are being packed into each and every aspect of the web experience. Often, these on-line services provide very useful opportunities for the users who know how to take advantage of them - online photo management/sharing, online financial services, online marketplaces, online exchanges, web hosting, web development, dating services, social networking to name only a few. However, computer users often simply can't take advantage of all the functionality offered, either the services and features offered by their own computer, or the services and features offered by online providers. The complexity of the interface (both hardware and software) hampers adoption, as does the volume of features offered.

With the proliferation of digital cameras, digital music players and digital video players, more and more people are turning to digital audio and video media. For example, many people have replaced, or at least greatly supplemented, printed photograph albums with digital photos stored on their computer and/or using an online photo service. Similarly, many people use digitally stored music and videos rather than, or in addition to, traditional media such as records, compact discs, video cassettes, etc. However, due to the complexity and volume of digital photography features, services, etc., many users are not taking full advantage of the capabilities and services available to them.

SUMMARY OF INVENTION

Accordingly, aspects and embodiments are directed to methods and apparatus for managing digital media content that may provide a user-friendly, streamlined user experience.

Various aspects and embodiments are directed to a streamlined computer device and a graphical user interface that organizes interface elements into views of computer content for

presentation to a user. Various views of digital media content permits users to easily and efficiently access various digital media content. Different views are used to provide an interface that is responsive to configurations of the device and responsive to activity being performed by the user. Aspects include permitting the user to maintain and manage digital media content libraries. According to some embodiments, the libraries comprise user digital media content and references digital media content. Functionality provided to a user can be tailored to the type of content displayed, accessed and/or managed. According to various aspects, methods and systems are provided for accessing and managing digital media libraries on a streamlined computing device with a plurality selectable I/O profiles. According to some embodiments, the methods may include displaying a GUI on a device, wherein the GUI comprises at least a plurality of views of digital media content, providing for transition between the plurality of views in response to selection of an I/O profile and in response to activation of a view selector component by a user, executing an association with the at least one of the plurality of visual representations with digital media content in response to selection, transitioning a display on the computing device to a view of the digital media content, and providing for display of user digital media content and referenced digital media content in the view of the digital media content.

According to one aspect of the present invention, a method for accessing and managing digital media libraries on a streamlined computing device with a plurality selectable I/O profiles is provided. The method comprises displaying a graphical user interface on a computing device, wherein the graphical user interface comprises at least a plurality of views of digital media content, providing for transition between the plurality of views in response to selection of an I/O profile, providing for transition between the plurality of views in response to activation of a view selector component configured to permit a user to select one of the plurality of views, associating at least one of a plurality of visual representations with digital media content, executing the association with the at least one of the plurality of visual representations with digital media content in response to selection, transitioning a display on the computing device to a view of the digital media content in response to the act of executing the association, and providing for display of user digital media content and referenced digital media content in the view of the digital media content. According to one embodiment of the present invention, the method further comprises an act of displaying in the view user digital media content and referenced digital media content in response to the act of executing the association with the at least one of the plurality of visual representations. According to another

embodiment of the invention, the act of displaying in the view user digital media content and referenced digital media content includes an act of accessing a reference to remote digital content not controlled by the user in order to display referenced digital content. According to another embodiment of the invention, the method further comprises an act of associating the at least one of the plurality of visual representations with a remote service provider. According to another embodiment of the invention, the method further comprises an act storing the association between the at least one visual representation with the remote service provider in at least one of a device profile and a user profile.

According to one embodiment of the present invention, the method further comprises acts of configuring access to a remote service, and integrating operations provided by the remote service provider into the view of the digital media content. According to another embodiment of the invention, the view comprises at least one of an album view and a timeline view. According to another embodiment of the invention, the method further comprises an act of displaying digital media content in a body portion of the view. According to another embodiment of the invention, the method further comprises an act of displaying a toggle element in a header portion of the view, wherein the toggle element transitions the computing device display between the album view and the timeline view upon selection by a user. According to another embodiment of the invention, the method further comprises acts of displaying emulation controls responsive to selection by the user, and emulating standard computer operations for referenced digital media content displayed in the view, wherein the act of emulating standard computer operations includes an act of determining if the user has authority to perform the standard computer operations, determining the user does not have the authority to perform the standard computer operation on a source of the referenced digital media content, and wherein the act of displaying the emulation controls occurs in response to the determination that the user does not have the authority. According to another embodiment of the invention, the standard computer operation includes an act of deleting digital media content, and the method further comprises an act of altering the view of the digital media content so the digital media content marked for deletion is not displayed within the view.

According to one embodiment of the present invention, the method further comprises an act of generating a state entry, associated with at least one of the view and the source of the referenced digital media content. According to another embodiment of the invention, the method further comprises acts of accessing any state entry for at least one of the view and the source of referenced digital media content, and displaying referenced digital media content

according to any state entry requirement. According to another embodiment of the invention, the standard computer operation includes an act of editing referenced digital media content, and the method further comprises an act of generating a state entry reflecting any edits made to the referenced digital media content. According to another embodiment of the invention, the method further comprises acts of providing an aggregation component configured to permit the user to select a plurality of digital media content, displaying the plurality of digital media content in the body of the view, and permitting the user to perform operations on the plurality of digital media content. According to another embodiment of the invention, the act of permitting the user to perform operations on the plurality of digital media content includes at least one of a share operation, a create channel operation, and an order prints operation. According to another embodiment of the invention the at least one operation is a share operation, and the method further comprises acts of identifying any state entries for the plurality of digital media content, identifying any remote service settings for the plurality of digital media content, and transmitting a visual representation associated with the plurality of digital media content, any state settings, and any remote service settings to another streamlined device user.

According to one embodiment of the present invention, the method further comprising acts of permitting the user to share the at least one visual representation, including any associated digital media content with another user, storing shared information in response to an act of sharing by the user, and updating any associated digital media automatically for the another user, wherein the act of updating any associated digital media includes acts of identifying any changes in shared digital media content, wherein changes include at least one of addition of digital media content associated with the at least one visual representation, deletion of digital media content associated with the at least one visual representation, edits of digital media content associated with the at least one visual representation, and updates of information associated with digital media content associated with the at least one visual representation. According to another embodiment of the invention, the method further comprising acts of permitting the user to share the at least one visual representation, including any associated digital media content with another user, transmitting the at least one visual representation associated with the digital media content, any state settings, and any remote service settings to another streamlined device user. According to another embodiment of the invention, he method further comprises an act of permitting the user to update date information associated with the digital media content. According to another embodiment of the invention,

the method further comprises acts of generating an offset for the updated date information associated with the digital media content, and applying the offset to similar digital media content.

According to one embodiment of the present invention, the view is a time view and the method further comprises displaying a timeline navigation control in the body of the view, wherein the timeline navigation control is configured to provide organization segments, the organization segments providing a visual indication of a number of digital media content items in each segment. According to another embodiment of the invention, the timeline navigation control further comprises a handle responsive to a pointer displayed on the computer device, wherein the handle is further responsive to select and drag operations. According to another embodiment of the invention, the act of displaying the user interface includes providing a plurality of views of the plurality of visual representations of computer content, and associating the plurality of visual representations of computer content with at least one of the plurality of views, and wherein the each of the plurality of visual representations is responsive to focus and execution, wherein execution includes selection of the visual representation. According to another embodiment of the invention, the act of providing for transition between the plurality of views in response to selection of an I/O profile includes permitting the user to rotate a display element about a longitudinal axis running along an interface between the display component and a base of the streamlined computing device, wherein rotating the display component about the longitudinal axis up to approximately 180 degrees from the closed mode configures the portable computer into a laptop mode with one of the plurality of views as a default display, and wherein rotating the display component about the longitudinal axis beyond approximately 180 degrees from the closed mode configures the portable computer into an easel mode with another one of the plurality of views as a default display.

According to one aspect of the present invention, a computer-readable medium having computer-readable instructions stored thereon that as a result of being executed by a computer, instruct the computer to perform the method for accessing and managing digital media libraries on a streamlined computing device with a plurality selectable I/O profiles, wherein the method comprises displaying a graphical user interface on a computing device, wherein the graphical user interface comprises at least a plurality of views of digital media content, providing for transition between the plurality of views in response to selection of an I/O profile, providing for transition between the plurality of views in response to activation of a view selector component configured to permit a user to select one of the plurality of views, associating at

least one of a plurality of visual representations with digital media content, executing the association with the at least one of the plurality of visual representations with digital media content in response to selection, transitioning a display on the computing device to a view of the digital media content in response to the act of executing the association, and providing for display of user digital media content and referenced digital media content in the view of the digital media content. According to another embodiment of the invention, the method further comprises an act of displaying in the view user digital media content and referenced digital media content in response to the act of executing the association with the at least one of the plurality of visual representations. According to another embodiment of the invention, the act of displaying in the view user digital media content and referenced digital media content includes an act of accessing a reference to remote digital content not controlled by the user in order to display referenced digital content.

According to one embodiment of the present invention, the method further comprises an act of associating the at least one of the plurality of visual representations with a remote service provider. According to another embodiment of the invention, the method further comprises an act storing the association between the at least one visual representation with the remote service provider in at least one of a device profile and a user profile. According to another embodiment of the invention, the method further comprises acts of configuring access to a remote service, and integrating operations provided by the remote service provider into the view of the digital media content. According to another embodiment of the invention, the view comprises at least one of an album view and a timeline view. According to another embodiment of the invention, the method further comprises an act of displaying digital media content in a body portion of the view. According to another embodiment of the invention, the method further comprises an act of displaying a toggle element in a header portion of the view, wherein the toggle element transitions the computing device display between the album view and the timeline view upon selection by a user. According to another embodiment of the invention, the method further comprises acts of displaying emulation controls responsive to selection by the user, and emulating standard computer operations for referenced digital media content displayed in the view, wherein the act of emulating standard computer operations includes an act of determining if the user has authority to perform the standard computer operations, determining the user does not have the authority to perform the standard computer operation on a source of the referenced digital media content, and wherein the act of displaying

the emulation controls occurs in response to the determination that the user does not have the authority.

According to one embodiment of the invention, the standard computer operation includes an act of deleting digital media content, and the method further comprises an act of altering the view of the digital media content so the digital media content marked for deletion is not displayed within the view. According to another embodiment of the invention, the method further comprises an act of generating a state entry, associated with at least one of the view and the source of the referenced digital media content. According to another embodiment of the invention, the method further comprises an acts of accessing any state entry for at least one of the view and the source of referenced digital media content, and displaying referenced digital media content according to any state entry requirement. According to another embodiment of the invention, the standard computer operation includes an act of editing referenced digital media content, and the method further comprises an act of generating a state entry reflecting any edits made to the referenced digital media content. According to another embodiment of the invention, the method further comprises acts of providing an aggregation component configured to permit the user to select a plurality of digital media content, displaying the plurality of digital media content in the body of the view, and permitting the user to perform operations on the plurality of digital media content. According to another embodiment of the invention, the act of permitting the user to perform operations on the plurality of digital media content includes at least one of a share operation, a create channel operation, and an order prints operation. According to another embodiment of the invention, the at least one operation is a share operation, and the method further comprises acts of identifying any state entries for the plurality of digital media content, identifying any remote service settings for the plurality of digital media content, and transmitting a visual representation associated with the plurality of digital media content, any state settings, and any remote service settings to another streamlined device user.

According to one embodiment of the present invention, the method further comprises acts of permitting the user to share the at least one visual representation, including any associated digital media content with another user, storing shared information in response to an act of sharing by the user, and updating any associated digital media automatically for the another user, wherein the act of updating any associated digital media includes acts of identifying any changes in shared digital media content, wherein changes include at least one of addition of digital media content associated with the at least one visual representation,

deletion of digital media content associated with the at least one visual representation, edits of digital media content associated with the at least one visual representation, and updates of information associated with digital media content associated with the at least one visual representation. According to another embodiment of the invention, the method further comprises acts of permitting the user to share the at least one visual representation, including any associated digital media content with another user, transmitting the at least one visual representation associated with the digital media content, any state settings, and any remote service settings to another streamlined device user. According to another embodiment of the invention, the method further comprises an act of permitting the user to update date information associated with the digital media content. According to another embodiment of the invention, the method further comprises an acts of generating an offset for the updated date information associated with the digital media content, and applying the offset to similar digital media content.

According to one embodiment of the present invention, the view is a time view and the method further comprises displaying a timeline navigation control in the body of the view, wherein the timeline navigation control is configured to provide organization segments, the organization segments providing a visual indication of a number of digital media content items in each segment. According to another embodiment of the invention, the timeline navigation control further comprises a handle responsive to a pointer displayed on the computer device, wherein the handle is further responsive to select and drag operations. According to another embodiment of the invention, the act of displaying the user interface includes providing a plurality of views of the plurality of visual representations of computer content, and associating the plurality of visual representations of computer content with at least one of the plurality of views, and wherein the each of the plurality of visual representations is responsive to focus and execution, wherein execution includes selection of the visual representation. According to another embodiment of the invention, the act of providing for transition between the plurality of views in response to selection of an I/O profile includes permitting the user to rotate a display element about a longitudinal axis running along an interface between the display component and a base of the streamlined computing device wherein rotating the display component about the longitudinal axis up to approximately 180 degrees from the closed mode configures the portable computer into a laptop mode with one of the plurality of views as a default display, and wherein rotating the display component about the longitudinal axis beyond

approximately 180 degrees from the closed mode configures the portable computer into an easel mode with another one of the plurality of views as a default display.

According to one aspect of the present invention, a system for accessing and managing digital media libraries with a plurality selectable I/O profiles is provided. The system comprises a display component configured to display a graphical user interface, wherein the graphical user interface comprises at least a plurality of views of digital media content, wherein the plurality of views include at least one of a plurality of visual representations, an execution component configured to transition the graphical user interface between the plurality of views in response to selection of an I/O profile, a view selector component configured to transition between the plurality of views in response to activation, a storage component configured to store an association between at least one of a plurality of visual representations and digital media content, wherein the execution component is further configured to execute the association with the at least one of the plurality of visual representations with digital media content in response to selection and transition the display to a view of the digital media content in response to the act of executing the association, and wherein the display component is configured to display user digital media content and referenced digital media content in the view of the digital media content. According to one embodiment of the present invention, the display component is further configured to display in the view user digital media content and referenced digital media content in response to the act of execution of the association with the at least one of the plurality of visual representations. According to another embodiment of the invention, the execution component is further configured access a reference to remote digital content not controlled by the user in order to permit display of referenced digital content. According to another embodiment of the invention, the storage component further comprises an association between the at least one of the plurality of visual representations and a remote service provider. According to another embodiment of the invention, the storage component includes the association in at least one of a device profile and a user profile. According to another embodiment of the invention, the storage component is further configured to store access information for a remote service and wherein the execution component if further configured to integrate operations provided by the remote service provider into the view of the digital media content.

According to one embodiment of the present invention, the view comprises at least one of an album view and a timeline view. According to another embodiment of the invention, the display component is further configured to display digital media content in a body portion of

the view. According to another embodiment of the invention, the display component is further configured to display a toggle element in a header portion of the view, wherein the toggle element transitions the computing device display between the album view and the timeline view upon selection by a user. According to another embodiment of the invention, the execution component is further configured determine if the user has authority to perform a set of standard computer operations, and wherein the displaying component is further configured to display emulation controls configured to emulate the set of standard computer operations upon a determination that the user does not have the authority to perform the set of standard operations. According to another embodiment of the invention, the standard computer operation includes an act of deleting digital media content, and the method further comprises an act of altering the view of the digital media content so the digital media content marked for deletion is not displayed within the view. According to another embodiment of the invention, the storage component is further configured to store a state entry associated with at least one of the view and the source of the referenced digital media content. According to another embodiment of the invention, the execution component is further configured to access any state entry for at least one of the view and the source of referenced digital media content, and wherein the display component is configured to display referenced digital media content according to any state entry requirement. According to another embodiment of the invention, the standard computer operation includes an editing operation for referenced digital media content, and the storage component is further configured to store a state entry reflecting any edits made to the referenced digital media content. According to another embodiment of the invention, the display component is further configured to display an aggregation element configured to permit the user to select a plurality of digital media content, display the plurality of digital media content in the body of the view, and permit the user to perform operations on the plurality of digital media content.

According to one embodiment of the present invention, the display component is further configured to permit at least one of a share operation, a create channel operation, and an order prints operation. According to another embodiment of the invention, the execution component is further configured to identify any state entries for the plurality of digital media content, identifying any remote service settings for the plurality of digital media content, and transmit a visual representation associated with the plurality of digital media content, any state settings, and any remote service settings to another streamlined device user. According to another embodiment of the invention, the system further comprises a share component

configured to permit the user to share the at least one visual representation, including any associated digital media content with another user, and an update component update any digital media associated with the shared at least one visual representation automatically for the another user. According to another embodiment of the invention, the execution component is further configured to transmit at least one visual representation associated with the digital media content, any state settings, and any remote service settings to another streamlined device user. According to another embodiment of the invention, the execution component is further configured to permit the user to update date information associated with the digital media content. According to another embodiment of the invention, the execution component is further configured to generate an offset for the updated date information associated with the digital media content, and apply the offset to similar digital media content. According to another embodiment of the invention, the view is a time view and the display component is further configured to display a timeline navigation control in the body of the view, wherein the timeline navigation control is configured to provide organization segments, the organization segments providing a visual indication of a number of digital media content items in each segment. According to another embodiment of the invention, the timeline navigation control further comprises a handle responsive to a pointer displayed on the computer device, wherein the handle is further responsive to select and drag operations.

According to one embodiment of the present invention, the display component is further configured to provide a plurality of views of the plurality of visual representations of computer content and the storage components is configured to store an association between the plurality of visual representations of computer content and at least one of the plurality of views, wherein the each of the plurality of visual representations is responsive to focus and execution, and wherein execution includes selection of the visual representation. According to another embodiment of the invention, the system comprises a portable computer system and the portable computer system further comprises a display component including a display screen, a base, a hinge assembly at least partially housed within the base and configured to pivotably couple the display component to the base, wherein the display component is rotatable about a longitudinal axis running along an interface between the display component and the base, wherein, in the closed mode, the display screen is disposed substantially against the base, wherein rotating the display component about the longitudinal axis up to approximately 180 degrees from the closed mode configures the portable computer into the laptop mode, and wherein rotating the display component about the longitudinal axis beyond approximately 180

degrees from the closed mode configures the portable computer into the easel mode. According to another embodiment of the invention, the single axis is a longitudinal axis running along an interface between the display component and the base; and wherein the display component is rotatable about the longitudinal axis. According to another embodiment of the invention, the system further comprises a display orientation module configured to control an orientation of the content displayed on the display screen, wherein the orientation of the content displayed on the display screen is configurable among a plurality of orientations relative to the longitudinal axis.

According to one embodiment of the present invention, the plurality of orientations comprises a first orientation relative to the longitudinal axis and a second orientation relative to the longitudinal axis, and wherein when display orientation module is configured to automatically display the content in the first orientation when the portable computer is configured into the laptop mode and in the second orientation when the portable computer is configured into the easel mode. According to another embodiment of the invention, the plurality of display modes further comprises a flat mode in which the display component is disposed at an angle of approximately 180 degrees, measured about the longitudinal axis, relative to the base. According to another embodiment of the invention, the plurality of orientations comprises a first orientation relative to the longitudinal axis, a second orientation relative to the longitudinal axis, and a third orientation relative to the longitudinal axis, and wherein, in the flat mode, the orientation of the content displayed on the display screen is configurable among the first, second and third orientations responsive to a user input. According to another embodiment of the invention, the second orientation is 90 degrees relative to the first orientation, and wherein the third orientation is 180 degrees relative to the first orientation. According to another embodiment of the invention, the system further comprises a mode sensor configured to detect a degree of rotation of the display component relative to the base and to provide information representative of the degree of rotation, and wherein the display orientation module is configured to automatically adjust the orientation of the content displayed on the display screen responsive to the information from the mode sensor.

According to one embodiment of the invention, the display orientation module is configured to automatically display the content in a first orientation relative to the longitudinal axis responsive to the information indicating that the degree of rotation of the display component is less than approximately 180 degrees relative to the base, and automatically

display the content in a second orientation relative to the longitudinal axis responsive to the information indicating that the degree of rotation of the display component is greater than approximately 180 degrees relative to the base, wherein the second orientation is at approximately 180 degrees relative to the first orientation. According to another embodiment of the invention, the system further comprises a mode sensor configured to detect a current display mode of the portable computer; and wherein the display orientation module selects the orientation of the content displayed on the display screen from one of the plurality of orientations relative to the longitudinal axis responsive to the current display mode detected by the mode sensor. According to another embodiment of the invention, wherein the plurality of display modes further comprises a closed mode, and wherein, in the closed mode, the display screen is disposed substantially against the base. According to another embodiment of the invention, rotating the display component about the longitudinal axis up to approximately 180 degrees from the closed mode configures the portable computer into the laptop model, and wherein rotating the display component about the longitudinal axis beyond approximately 180 degrees from the closed mode configures the portable computer into the easel mode.

According to one embodiment of the present invention, the display component is rotatable about the longitudinal axis up to approximately 320 degrees from the closed mode. According to another embodiment of the present invention, the longitudinal axis comprises multiple parallel axes, and wherein the hinge assembly is configured to permit rotation of the display component about any of the multiple parallel axes to configure the portable computer between the plurality of display modes. According to another embodiment of the present invention, the system further comprises a scroll wheel disposed at least partially within the base and rotatable about the longitudinal axis, the scroll wheel configured to permit a user to control at least one of operating parameters of the portable computer and the content displayed on the display screen. According to another embodiment of the present invention, the system further comprises a first navigation button disposed on one of the base and the display component and configured to permit the user to manipulate selected content displayed on the display screen. According to another embodiment of the present invention, the display screen is configured to display at least one of a plurality of modes of content, and wherein the navigation button is configured to permit the user to select for display one of the plurality of modes of content.

According to one embodiment of the invention, the first navigation button is user-accessible in each of the laptop mode and the easel mode. According to another embodiment

of the present invention, the system further comprises a second navigation button, wherein the first navigation button is disposed on a major surface of the base, and wherein the second navigation button is disposed on a minor surface of the base. According to another embodiment of the invention, the scroll wheel is configured to permit the user to select a mode of content for display on the display screen. According to another embodiment of the invention, the scroll wheel is configured to permit the user to control a volume of sound played by the portable computer. According to another embodiment of the invention, the system further comprises a hinge assembly at least partially housed within the base and configured to rotatably couple the display component to the base. According to another embodiment of the invention, the scroll wheel is disposed at least partially within the hinge assembly. According to another embodiment of the invention, the system further comprises a foot disposed along at least a portion of the base and configured to support the portable computer when in the easel mode.

Still other aspects, embodiments, and advantages of these exemplary aspects and embodiments, are discussed in detail below. Moreover, it is to be understood that both the foregoing information and the following detailed description are merely illustrative examples of various aspects and embodiments, and are intended to provide an overview or framework for understanding the nature and character of the claimed aspects and embodiments. Any embodiment disclosed herein may be combined with any other embodiment in any manner consistent with at least one of the objects, aims, and needs disclosed herein, and references to "an embodiment," "some embodiments," "an alternate embodiment," "various embodiments," "one embodiment" or the like are not necessarily mutually exclusive and are intended to indicate that a particular feature, structure, or characteristic described in connection with the embodiment may be included in at least one embodiment. The appearances of such terms herein are not necessarily all referring to the same embodiment.

BRIEF DESCRIPTION OF THE DRAWINGS

Various aspects of at least one embodiment are discussed below with reference to the accompanying figures, which are not intended to be drawn to scale. The figures are included to provide illustration and a further understanding of the various aspects and embodiments, and are incorporated in and constitute a part of this specification, but are not intended as a definition of the limits of the invention. Where technical features in the figures, detailed description or any claim are followed by references signs, the reference signs have been

included for the sole purpose of increasing the intelligibility of the figures, detailed description, and/or claims. Accordingly, neither the reference signs nor their absence are intended to have any limiting effect on the scope of any claim elements. In the figures, each identical or nearly identical component that is illustrated in various figures is represented by a like numeral. For purposes of clarity, not every component may be labeled in every figure. In the figures:

FIG. 1 is an illustration of one example of a portable computer, according to aspects of the invention, in a "laptop" configuration;

FIG. 2 is a block diagram of one example of a computer system;

FIG. 3 is a block diagram of one example of a computer user interface architecture, according to aspects of the invention;

FIG. 4 is an illustration of another example of a portable computer, according to aspects of the invention;

FIG. 5 is a block diagram of one example of a view of digital media content, according to aspects of the invention;

FIG. 6 is a block diagram of another example view of digital media content with responsive controls, according to aspects of the invention;

FIGS. 7A-B are block diagrams of examples of single album views of digital media content, according to aspects of the invention;

FIG. 8 is a block diagram of one example of a view of digital media content, according to aspects of the invention;

FIG. 9 is an illustration of an example component of a view of digital media content, according to aspects of the present invention;

FIG. 10 is a block diagram of one example of a view of digital media content, according to aspects of the invention;

FIG. 11 is an illustration of an example responsive component of a view of digital media content, according to aspects of the present invention;

FIG. 12 is a block diagram of one example of a view of digital media content, according to aspects of the invention;

FIGS. 13A-C are illustrations of examples of a control element displayed in embodiments of views of digital media content, according to aspects of the invention;

FIG. 14 is an illustration of an example responsive component of a view of digital media content, according to aspects of the present invention;

FIG. 15 is an illustration of an example of a control element displayed in an embodiment of a view of digital media content, according to aspects of the invention;

FIG. 16 is a block diagram of one example of a view including cards associated with digital media content, according to aspects of the invention;

FIGS. 17A-B are illustrations of examples of views of the back side of a card and associated controls, according to aspects of the invention;

FIG. 18A is a block diagram of one example view of digital media content including a lens control, according to aspects of the invention;

FIG. 18B is a block diagram of one example view of digital media content including an example lens selection control, according to aspects of the invention;

FIG. 19 is a block diagram of one example of a view of digital media content, according to aspects of the invention;

FIG. 20A is a block diagram of one example of a view of digital media content including an example content control, according to aspects of the invention;

FIG. 20B is a block diagram of one example of a view of digital media content including a contextual control, according to aspects of the invention;

FIGS. 21A-B are examples of logical diagrams of the behavior for an example view of digital media content, according to aspects of the invention;

FIG. 22 is a perspective view of the portable computer of FIG. 1 in the easel mode, according to aspects of the invention;

FIG. 23 is an illustration of the portable computer configured into a "frame" mode, according to aspects of the invention;

FIG. 24 is a block diagram of an example of a page view of a camera card including a progress indicator of an upload in progress, according to aspects of the invention;

FIG. 25 is a block diagram of an example an intermediate view of a camera card, according to aspects of the invention;

FIG. 26 is a block diagram of a thumbnail view of a camera card, according to aspects of the invention;

FIG. 27 is a block diagram of a organizational view of digital media content, according to aspects of the invention;

FIG. 28 is an illustration of an example view of user controls for digital media content, according to aspects of the invention;

FIG. 29 is an example of a logical diagram of the behavior for an example view of digital media content, according to aspects of the invention; and

FIG. 30 is an illustration of the portable computer configured into a "flat" mode, according to aspects of the invention

DETAILED DESCRIPTION

Synergy between services providers can be found and exploited by even the most novice user through streamlined computer systems and user interface presentation. According to one aspect, the interplay between various third party services and computer features can be readily appreciated by even a novice user because the various functionality and features sets are easily accessible through the streamlined access controls and consistent user interfaces. In particular, methods and apparatus are provided to facilitate users leveraging online digital media services offered by third party service providers, as discussed in detail below. For example, aspects and embodiments may allow users to create and manage a digital photography library by providing tools to upload content to an Internet "cloud" and to consume aggregated content from the cloud on their computing device, as discussed further below.

It is to be appreciated that embodiments of the methods and apparatus discussed herein are not limited in application to the details of construction and the arrangement of components set forth in the following description or illustrated in the accompanying figures. The methods and apparatus are capable of implementation in other embodiments and of being practiced or of being carried out in various ways. Examples of specific implementations are provided herein for illustrative purposes only and are not intended to be limiting. In particular, acts, elements and features discussed in connection with any one or more embodiments are not intended to be excluded from a similar role in any other embodiments.

Also, the phraseology and terminology used herein is for the purpose of description and should not be regarded as limiting. Any references to embodiments or elements or acts of the systems and methods herein referred to in the singular may also embrace embodiments including a plurality of these elements, and any references in plural to any embodiment or element or act herein may also embrace embodiments including only a single element. References in the singular or plural form are not intended to limit the presently disclosed systems or methods, their components, acts, or elements. The use herein of "including," "comprising," "having," "containing," "involving," and variations thereof is meant to encompass the items listed thereafter and equivalents thereof as well as additional items.

References to "or" may be construed as inclusive so that any terms described using "or" may indicate any of a single, more than one, and all of the described terms. Any references to front and back, left and right, top and bottom, and upper and lower are intended for convenience of description, not to limit the present systems and methods or their components to any one positional or spatial orientation.

According to one embodiment, methods and apparatus are provided for creating and managing digital media libraries and, in particular, online digital media libraries. The digital media libraries may include, for example, digital photograph collections, digital video collections, digital music collections, etc. The tools and capability for creating and managing these digital media libraries are provided via a computing device, for example, a streamlined device, having a graphical user interface, as discussed below. For example, various aspects may be implemented as specialized software executing in one or more computer systems. In one embodiment, the digital media content (e.g., the photographs, videos and/or audio files) are stored online, and the graphical user interface provides the user with access to services, including online storage of digital media, and features offered by third party service providers, as discussed below.

One example of a streamlined device includes a portable computer that is configurable between a laptop mode (in which the portable computer has a conventional laptop appearance) and an easel mode in which the base of the computer and its display component stand upright forming an inverted "V," as discussed further herein. Certain aspects and embodiments are directed to a portable computer that is configurable between different operating modes, including a laptop mode (in which the portable computer has a conventional laptop appearance), a flat mode, a frame mode, and an easel mode in which the base of the computer and its display component stand vertically forming an inverted "V," as discussed further herein. Reference to modes of the computer, modes of the device and intended to include the physical configuration of the portable computer/device. The portable computer is capable of different display formats and functionality in the different modes, and includes a graphical user interface that may work seamlessly with the computer hardware to provide a unified, comfortable, holistic user experience.

Referring to FIG. 1, there is illustrated one example of a portable computer according to aspects of the invention upon and using which methods and apparatus for managing digital media content may be implemented. In FIG. 1, the portable computer 100 is illustrated in the "laptop" mode, with the display component 102 inclined at a viewing angle from the base 104.

The display component 102 is pivotably coupled to the base 104 by a hinge assembly (not shown) that allows the display component to be rotated with respect to the base. The hinge assembly may include a single or multiple hinges, which may be any of a variety of hinge types, including, but not limited, to single-axis hinges, multiple-axis hinges, geared hinges, etc. In one example, the hinge assembly allows the display component 102 to be rotated (or tilted) about a longitudinal axis 101 running along an interface between the display component 102 and the base 104, as illustrated in FIG. 1 and discussed further below. The base 104 includes a keyboard 106 and internal electronic components (not shown), such as a central processing unit, memory, and other components necessary to operate the portable computer, as known to those skilled in the art. In some embodiments, the base 104 may also include a touch pad 108 or trackball (not shown) for receiving user commands, as known to those skilled in the art.

In one embodiment, the display component 102 includes a display screen 110, and may also include a camera 112, microphone 114, and infrared receiver 116, as discussed further below. It is to be appreciated that the locations of the camera 112, microphone 114 and infrared receiver 114 are not limited to the example illustrated in FIG. 1, and may be placed in other locations on the display component 102 and/or base 104, as would be recognized by those skilled in the art. The display component 102 may also include cushions 118 that provide soft contact points between the base 104 and the display component 102 when the portable computer is closed. In one example, the cushions 118 are made of rubber. However, it is to be appreciated that the invention is not so limited, and the cushions 118 may comprise materials other than rubber, including, for example, a polymer, felt, or other suitable materials as would be recognized by those skilled in the art.

FIG. 2 illustrates a block diagram of some components of an example of the portable computer 100, in which various aspects of the present invention may be practiced. For example, various aspects of the invention may be implemented as specialized software executing in one or more computer systems including multiple computer systems communicating over network. As depicted in FIG. 2, the computer 100 includes a processor 210, a memory 220, an interface 240 and a storage system 250. Components of the portable computer 100 may be coupled by an interconnection element 230. The interconnection mechanism 230 enables communications (e.g., data, instructions) to be exchanged between system components of the computer system 100. The interconnection mechanism 230 may include one or more physical busses (for example, busses between components that are integrated within a same machine), or may include any communication coupling between

system elements including specialized or standard computing bus technologies such as IDE, SCSI, PCI and InfiniBand. In one example, computer system 100 is implemented without hard drive devices.

The processor 210, which may include one or more microprocessors or other types of controllers, can perform a series of instructions that result in manipulated data. The processor 210 may be a commercially available processor such as an Intel PENTIUM, Motorola PowerPC, SGI MIPS, Sun UltraSPARC, or Hewlett-Packard PA-RISC processor, but may be any type of processor or controller as many other processors and controllers are available. The processor may also execute an operating system that manages at least a portion of the hardware elements included in computer 100. The operating system may be, among others, a Windows-based operating system (for example, Windows NT, Windows 2000 (Windows ME), Windows XP, or Windows Vista) available from the Microsoft Corporation, a MAC OS System X operating system available from Apple Computer, one of many Linux-based operating system distributions (for example, the Enterprise Linux operating system available from Red Hat Inc.), a Solaris operating system available from Sun Microsystems, or a UNIX operating systems available from various sources. Many other operating systems may be used, and embodiments are not limited to any particular operating system. As shown, the processor 210 is connected to other system elements, including a memory 220, by the interconnection mechanism 230.

The memory 220 may be used for storing programs and data during operation of the computer system 200. Thus, the memory 220 may be a relatively high performance, volatile, random access memory such as a dynamic random access memory (DRAM) static memory (SRAM), or Flash memory; however, the memory 220 may include any device for storing data, including a non-volatile storage device. Various embodiments in accord with the present invention can organize the memory 220 into particularized and, in some cases, unique structures to perform the aspects and functions disclosed herein.

Still referring to FIG. 2, the computer 100 also includes one or more interface devices 240 such as input devices, output devices and combination input/output devices. The interface devices 240 may receive input and/or provide output. More particularly, output devices may render information for external presentation. Input devices may accept information from external sources. Examples of interface devices include, among others, the keyboard 106, mouse devices, trackballs, microphone 114, touch screens, printing devices, display screen 110, speakers, network interface cards, etc. The interface devices 240 allow the computer

system 200 to exchange information and communicate with external entities, such as users and other systems.

The storage system 250 may include a computer readable and writeable nonvolatile storage medium in which instructions are stored that define a program to be executed by the processor. The storage system 250 also may include information that is recorded, on or in, the medium, and this information may be processed by the program. The instructions may be persistently stored as encoded signals, and the instructions may cause a processor to perform any of the functions described herein. The medium may, for example, be a flash memory. Typically, in operation, the processor causes data to be read from the nonvolatile recording medium into another memory that allows for faster access to the information by the processor than does the medium. This memory is typically a volatile, random access memory such as a dynamic random access memory (DRAM) or static memory (SRAM). The memory may be located in storage 250 as shown, or in memory system 220. The processor 210 generally manipulates the data within the memory 220, and then copies the data to the medium associated with storage 250 after processing is completed. A variety of mechanisms are known for managing data movement between the medium and integrated circuit memory element and the invention is not limited thereto. The invention is not limited to a particular memory system or storage system.

In one embodiment, the computer system does not incorporate mass storage (i.e. a hard drives), instead the system is configured to employ RAM and Flash memory storage. The capacity of the flash memory may be significantly less than traditional mass storage options. Thus in some embodiments, traditional features such a download, have been configured to operate differently for the computer 100. According to another aspect, various operations provides on conventional systems are adapted for streamlined processing. In on example, operations that require large amounts of computer storage are transformed into remote storage requests. In one embodiment, a streamlined device is configured to identify local storage request and transform them into a storage request to an on-line service provider identified in a user and/or device profile. In another embodiment, the system prompts a user to identify a service provider in response to a local request. Various operations may be transformed, including download and print operations, among others.

The computer system may include specially-programmed, special-purpose hardware, for example, an application-specific integrated circuit (ASIC). Aspects of the invention may be implemented in software executing on hardware, hardware or firmware, or any combination

thereof. Further, such methods, acts, systems, system elements and components thereof may be implemented as part of the computer system described above or as an independent component.

Although the portable computer 100 is shown by way of example as one type of computer system upon which various aspects and functions may be practiced, aspects of the invention are not limited to being implemented on the computer system as shown in FIGS. 1 and 2. Various aspects and functions in accord with the present invention may be practiced on one or more computers having a different architectures or components than those shown in FIG. 2.

Computer system 100 may programmable using a high-level computer programming language. Computer system 100 may be also implemented using specially programmed, special purpose hardware. The processor 210 and operating system together define a computer platform for which application programs in high-level programming languages are written. It should be understood that the invention is not limited to a particular computer system platform, processor, operating system, or network. Also, it should be apparent to those skilled in the art that the present invention is not limited to a specific programming language or computer system. Further, it should be appreciated that other appropriate programming languages and other appropriate computer systems could also be used.

One or more portions of the computer system may be distributed across one or more computer systems coupled to a communications network. For example, various aspects of the invention may be distributed among one or more computer systems (e.g., servers) configured to provide a service to one or more client computers, or to perform an overall task as part of a distributed system. For example, various aspects of the invention may be performed on a client-server or multi-tier system that includes components distributed among one or more server systems that perform various functions according to various embodiments of the invention. In one embodiment, an Internet cloud is maintained on server systems accessible from a plurality of devices. These components may be executable, intermediate (e.g., IL) or interpreted (e.g., Java) code which communicate over a communication network (e.g., the Internet) using a communication protocol (e.g., TCP/IP). It should be appreciated that the invention is not limited to executing on any particular system or group of systems. Also, it should be appreciated that the invention is not limited to any particular distributed architecture, network, or communication protocol.

According to one embodiment, streamlining user interactions with the computer system/device includes representing computer based content in visual representations that render computer operations/behavior in a consistent manner. These visual representations may be rendered as cards, as discussed in more detail below. Different types of cards may be employed to render different types of available content. For example, web based content, may be rendered as a web card that is associated with a mapping to web content. Some web cards map directly to web pages and in response to selection of the web card the computer device executes the mapping and displays a web view of the content. Other cards may be used to provide interactive displays selectable by a user. In another example, system operations are displayed as system cards, which are associated with mappings to system operations, for example communications configurations, and may comprise a settings card, among other system options. Another type of card includes a channel card configured to stream web based content in a manner that allows for summarization of content, while still providing the ability to fully appreciate the summarized content.

Using channel cards according to aspects and embodiments, summarized content may be presented in a manner that permits appreciation and interaction with the summarized content itself. In another example, channel card are configured to present a streamlined view that cannot only be appreciated and interacted, but may be transitioned from one mode of viewing to another without loss of the ability to appreciate and interact with the streamlined view. A more detailed discussion of embodiments and examples of a card-based system for rendering computer based content in visual representations is discussed in U.S. Patent Application No. 12/416,479, filed on April 1, 2009 and entitled "SYSTEM AND METHOD FOR STREAMLINING USER INTERACTION WITH ELECTRONIC CONTENT," which is incorporated herein by reference in its entirety.

As discussed above, according to one embodiment, methods and apparatus are provided for managing digital media libraries via, for example, the computer 100. In one example, the computer 100 includes a streamlined graphical user interface that provides access to the digital media libraries. According to another embodiment, there is a community aspect to the digital media libraries, which includes sharing of digital content, configurations and customizations between users. In particular, sharing may involve the transmission of user interface elements to other users. In one example, a user may share a card and any of its configurations with another user. Access to the shared user interface elements, in some embodiments, facilitates communal computer usage. Content and context retention by user interface elements that can

be shared provides unique advantages to the users of the streamlined devices, as discussed further below.

Referring to FIG. 3, there is illustrated a block diagram of one example of an architecture of the portable computer 100 including a streamlined user interface. The user interface includes a "home" screen 310 that displays a plurality of modes of content 320. In the illustrated example, the home screen 310 contains five modes of content 320; however, it is to be appreciated that the home screen may include more or fewer than five modes of content and that the modes of content may differ from the examples discussed below. According to one example, the modes of content 320 accessible via the home screen 310 may include "media" 321, "connect" 322, "web" 323, "applications" 324, and "channels" 325. Using the streamlined user interface, also referred to as a "map" interface, information, programs, features and applications may be grouped into the various modes of content 320. By selecting any mode of content 320, the user may access the content organized within that mode. For example, the media mode 321 may provide access to a media player to play, view, search and organize digital media such as music, video, photos, etc. The web mode 323 may provide access to internet browsing and searching. The channels mode 325 may provide access to different functionality of the portable computer, with the different functions or features defined as different channels. For example, a channel may include a "photo frame" channel in which the portable computer may be configured to display a pre-selected image or set of images, etc. from a digital media library. Some or all of the modes of content 320 may access, retrieve and/or store information on an Internet cloud 330.

From the home screen 310, the user may navigate among the different modes of content 320 and, once a particular mode of content is selected, may navigate within that mode of content. In one example, the home view 310 is comprised of various cards, each card providing access to computer based content. According to one aspect, cards can be thought of as the building blocks of the user interface, providing access to a plurality of views and/or content. Indeed, cards as elements of the graphical user interface, are configured to be shared across users and across other streamlined devices. The ability to employ the features and functions of card based elements may be limited to streamlined devices, although cards and settings may be shared with traditional devices.

Navigation from the home view in and among different modes of content may be accomplished using traditional interfaces, such as the keyboard 106, touchpad 108, a mouse, trackball, joystick, or other interface device. In one embodiment, the portable computer 100

may include additional navigation devices, including a scroll wheel and one or more navigation buttons, as shown, for example, in FIG. 4. In the example illustrated in FIG. 4, the portable computer 100 includes a scroll wheel 120 and two navigation buttons 122, 124. In one example, the scroll wheel 120 is positioned, as shown in FIG. 4, such that it is rotatable about the longitudinal axis 101 (see FIG. 1) running along the interface between the display component 102 and the base 104. According to one embodiment, the portable computer 100 is configurable into various different configuration modes including the laptop mode shown in FIGS. 1 and 4, and an "easel" mode in which the base 104 and the display component 102 stand upright forming an inverted "V," as discussed further below. Accordingly, positioning the scroll wheel 120 on the longitudinal axis 101 may have certain advantages, including providing accessibility to the scroll wheel in the different configuration modes of the portable computer; however, it is to be appreciated that the scroll wheel may be placed in any convenient or suitable location on the portable computer, not limited to the position shown in FIG. 4. Similarly, positioning the navigation button 122 on the side of the base 104, as shown in FIG. 4, may also provide accessibility in the different configuration modes of the portable computer 100; however it is to be appreciated that the navigation button 122 may be placed in a variety of locations, not limited to the location illustrated in FIG. 4.

As discussed above, in one example, the media mode of content 321 may provide access to a media player to play, view, search and organize digital media such as music, video, photos, etc. Thus, a user may use the media mode of content 321 to create and manage digital media libraries including, for example, collections of digital photographs. According to one embodiment, methods, tools and interfaces are provided to allow users to store, organize, edit, view and share digital photograph collections, as well as video and/or audio collections. These collections may be presented to the user as if stored on local storage associated with the portable computer 100; however, as discussed above, in at least some examples, the digital media content is stored remotely in the cloud 330 (see FIG. 3). Therefore, the portable computer software may include the ability to interact with third party online service providers, as discussed further below. In addition, as discussed above, in one example, the portable computer 100 includes a camera 112 and therefore, methods, tools and interfaces may be provided to allow the user to take and manage photographs and/or video using the camera 112. The portable computer 100 may also be configured to allow an external digital camera (not shown) to be connected to the computer, such that the user may extract photographs and/or

videos from the external camera, to store, manage and share using the computer, as discussed further below.

According to one embodiment, the computer 100 is integrated with remote content storage and/or access in the cloud 330. The integration may be provided through third party service providers, in one example photo service FLICKR is integrated with various aspects of the device and/or the device's user interface to provide seamless access to photo content stored by the third party provider. Thus, digital content items, such as photographs, videos, etc. may be displayed on the portable computer, as discussed below, but stored remotely. The integration with remote storage services permits reduced storage capacity on the user device, for example, a portable computer. Reducing and/or eliminating the need for non volatile memory in the computer system is advantageous in that the device itself may be reduced in complexity and any associated cost. In some embodiments, a streamlined device do not incorporate a hard disk drive for storage, providing for any local storage requirement through RAM and Flash memory.

Content may be added to the user's digital medial library in a variety of different ways. For example, digital content items added to the user's account with any online hosting service (e.g., FLICKR, SHUTTERFLY, etc.) the user has registered with the portable computer 100 may be automatically added to the user's digital media library. If a person shares an album with the user via a registered online hosting service, and subsequently updates the shared album to include new items, the new items may be automatically added to the user's digital media library. The user may add content items, such as photographs, directly from web pages using, for example, a "save image" control in the web browser toolbar. In one example, clicking and holding on a particular image on a web page opens a contextual menu providing options for the user to save one or more photographs. For example, clicking a "save multiple photos" option in the contextual menu may prompt the user to click on all displayed images that he/she wishes to save and then click a "done" or "save" control to complete the action. The user may similarly save photographs from an email. As discussed above, in one embodiment, the portable computer 100 does not include local mass storage; instead the digital media content items are stored by an online hosting service. Accordingly, saving of photos from a web page or email may be implemented through the hosting service. The user may also add content items by uploading them from a camera, card reader or USB device, as discussed further below. In one example, the portable computer 100 may be pre-loaded with a selection of stock images that automatically appear in the user's digital media library. The user may

delete these stock images; however, if the user's digital media library eve becomes empty, the stock images may be automatically re-added to the library.

According to one embodiment, collections of digital content items, including photographs and videos, may be displayed in any of a plurality of different views. These views may include a time view, an album view, a page view, an intermediate view, and a lens view, each of which is discussed further below. Each view may offer the user particular interaction options, features and benefits, as also discussed below. In the time view, an entire digital media library may be displayed with content items arranged chronologically, regardless of whether or not the content items (e.g., individual photographs or videos) have been assigned to an album. In the album view, individual albums of content items may be displayed. In the album view, those content items not assigned to an album are not displayed. The time view and the album view may be considered the "workhorses" of the digital media aspect of the portable computer 100, allowing a user to quickly and easily locate individual content items and perform actions, such as, share content with others, create channels, and order photograph prints from online service providers. The lens view may offer the user a variety of interactions with the digital media content, as discussed further below. In one example, for some photograph editing functions, such as correcting red-eye, cropping, adjusting contrast, etc., interfaces to online service providers may be supplied, allowing the user to leverage existing features of their online photograph service provider.

Referring to FIG. 5, there is illustrated a block diagram of one example of an album view. In the album view, the screen may include a body portion 550 in which the albums are displayed, and a header 555. In the illustrated example, in the album view, the albums 510 are displayed as a list in the body portion 550, with a scroll bar 515 that allows the user to scroll down to see additional albums that do not fit within the page view. In one example, the list of albums may be sorted by earliest photograph creation date, with the newest on top; however, it will be readily appreciated that numerous other organizations of the albums 510 are possible. A header caption 525 identifies the number of albums present and the total number of photographs contained within the albums. In one example, each album 510 includes a title 530 that identifies the album. The title 530 may be created by the user and may be descriptive of the photographs contained within the album. Each album 510 may also include a caption 535 that identifies information about the album. For example, the caption 535 may indicate the number of photographs in the album as well as the date range of the photographs in the album. For each album 510 there may be displayed a preview photograph 540, which may be, for

example, a photograph selected by the user (e.g., a representative or favorite photograph), or a default selected photograph, for example, the first photograph in the album. Each photograph in the album may be displayed as a thumbnail 545. In the header 555, there may be displayed user-selectable "buttons" 560, 565 which allow the user to select between the time view and the album view, for example, by clicking (e.g., using a mouse, the touchpad, the scroll wheel, or a navigation button) on the button corresponding to the desired view.

According to one embodiment, the album view allows the user to access and view albums of their own photographs, as well as albums shared with them by other users, for example, through an online photo-sharing service. As discussed above, in one embodiment, only photographs (or other digital content items) that have been assigned an album by the user will be displayed in the album view. The computer 100 may include software that automatically creates a default album for any unsorted/unassigned photographs found on the computer. In one example, this default album is not displayed in the album view. Many online photo hosting services require the use of albums and do not allow a photo to be saved to the service without being assigned to an album. However, this requirement may not be meaningful to users who are used to having many photographs in the real world which are not associated with an album. Accordingly, the digital media system may automatically create the default album to store otherwise unsorted content items.

Still referring to FIG. 5, the thumbnails 545 provide the user with a preview of the individual photographs contained in the album. In one embodiment, when the user "hovers" over a particular thumbnail 545, the preview photograph 540 changes to display that thumbnail. The thumbnail may also increase slightly. Hover indicates the movement of a pointer, typically represented by a white arrow on the computer system display, over a particular item on the display screen, such as a thumbnail 545.

In one example, when the user hovers over a thumbnail, album controls may appear, as shown in FIG. 6. Referring to FIG. 6, the album controls 610 may include options to share an album (e.g., control 612), and to edit the album using a third party service provider (e.g., control 614). In one example, albums that are shared from within the album view may be shared as channel cards, but may also appear in the recipient's album view. As discussed above, in one example in which the photographs are stored on the cloud 330 (see FIG. 3), using a third party service provider website (for example, FLICKR; SHUTTERFLY; SNAPFISH, etc.), the control 614 for editing the album may automatically display the name of the service provider. If selected (e.g., clicked on) by the user, the edit control 614 may automatically open

a web card to the album on the service where it is stored. In one example, the edit control 614 may only appear for albums of the users own photographs, and not for albums that have been shared with the user by another user, for which the user may not have editing privileges. The album controls 610 may also include a control 616 for "dissolving" the album and a control 618 for deleting the album. Selecting the dissolve control 616 may remove the album, but retain the album contents in the user's digital media library. If the user selects the delete album control 618, the album and its contents may be deleted from the user's digital media library, after a warning/confirmation message is displayed to the user. In one example, if the user selects the share control 612 to share an album with another person, any changes the user has made to the album (e.g., removing a content item) are retained when the other person views the shared album.

According to one embodiment, when the user clicks on (or otherwise selects) an individual photograph thumbnail 545, or on the preview photograph 540 in a particular album 510, a single album view may be displayed. In one example of the single album view, the album thumbnails 545 in the selected album 510 grow larger and arrange themselves in a horizontal list, as shown in FIG. 7A. In the single album view illustrated in FIG. 7A, the user sees larger previews 710 of the photographs in the selected album. The user may navigate back and forth among the items in the album by hovering over the left or right edges of the list, optionally over a scroll indicator 720, to scroll the list of preview images 710. In one example, the speed of the scrolling depends on where the cursor is in the active area. For example, the closer the cursor is to the edge of the screen, the faster the scroll. In one embodiment, when the user is scrolling left or right through the album, the horizontal list of previews 710 tilts to show perspective, as shown in FIG. 7B. In one example, in the tilted view, the images scroll automatically and the speed of the scrolling action corresponds to the maximum scrolling speed that would be available manually, e.g., if the cursor were as close to the edge of the screen as possible. In another example, the degree of tilt corresponds to the scrolling speed. For example, the more tilted the view, the faster the scroll. A scroll indicator 720 may indicate the direction of the scroll. Clicking on an individual item in the single album view may zoom that item into an intermediate view, as discussed further below. In the intermediate view, the user may still see hints of the other images in the album in the background, thus providing context for the zoomed-in item. Clicking on the item in the intermediate view may enlarge the item into a full screen view, as discussed further below.

In one embodiment, clicking on the background 730 returns the user to the album view shown in FIG. 5. In one example, the background 730 includes the users other albums. Thus, clicking on the background may mean clicking on another album; however, even in this case, clicking on the other album in the background 730 may still return the user to the album view, rather than to a single album view of the clicked-on album in the background. This may simply navigation for the user, particularly where the majority of the background belongs to other albums, such that if clicking on one of the background albums jumped to that album, the user would find it difficult to return to the overall album view of FIG. 5.

As discussed above, an alternative to the album view is the time view. According to one embodiment, in the time view, the entire contents of the user's digital media library is displayed, even if items are not organized into albums. The digital content items in the digital media library may be arranged chronologically (e.g., in the order they were taken for photos and videos) in columns from top to bottom, left to right, or in rows from left to right, top to bottom. It is to be appreciated that other arrangements of the digital content items may also be implemented. An example of the time view is illustrated in FIG. 8. Similar to the album view, the time view may comprise a body portion 810 and a header 820. As shown in FIG. 8, in the body portion 810 of the time view, preview images 830 of each item in the digital media library is displayed. As discussed above, the preview images are arranged in columns and rows. A timeline 840 may supply a navigation control that allows the user quick access to the content in the digital media library and a visual indication of the number of items in the library. In one embodiment, the digital content items in the user's digital media library are stored, using a service offered by a third party service provider (e.g., FLICKR, SHUTTERFLY, SNAPFISH, etc.) in the cloud 330 (see FIG. 3). Thus, the preview images displayed in the time view may be visual representations of remotely stored content.

Referring to Fig. 9, there is illustrated an example of the timeline 840 that may be displayed in the time view. In the illustrated example, the timeline includes three rows of tick marks 910 that correspond to the three rows of preview images 830 displayed in the body portion 810 of the time view illustrated in FIG. 8. It is to be appreciated, however, that the preview images 830 may be displayed in any number of rows, not limited to three rows, and therefore, the timeline 840 may include any corresponding number of rows of tick marks 910, not limited to three rows. Scroll controls 920 may be provided to allow the user to scroll through the timeline using a cursor. In one example, superimposed over the timeline 840 are markers 930 for individual months and years, as shown in FIG. 9. In addition, the timeline

may include a "handle" 940 which indicates the section of timeline that corresponds to the preview images 830 displayed in the body portion 810. In one example, clicking anywhere on the timeline 840 moves the handle 940 to that point in time and changes the display of preview images 830 accordingly. According to one embodiment, the timeline 840 is not linear. Instead, the length between tick marks 910 on the timeline corresponds to the number of digital content items in the digital media library for that period of time. Thus, the spacing between markers 930 for different months or years may provide a visual indication of the number of content items in that month or year. For example, if the media library contains 300 content items (e.g. photographs and/or videos) for March 2007 and 100 content items for April 2007, the space allocated to March 2007 on the timeline 840 may be three times greater than the space allocated to April 2007.

The timeline 840 may also provide a visual indication of new content recently added to the digital media library. For example, when another person shares an album with the user, or when the user uploads new photographs and/or videos from a camera, a new content indicator 950 may be displayed in the timeline 840. In one example, the new content indicator 950 includes highlighting or changing the color of the tick marks 910 corresponding to the newly added content items. The new content indicator 950 may persist for a predetermined time period, or until the user acknowledges the new content. For example, when an album is shared with the user, the new content indicator 950 may persist until the user acknowledges the shared card notification, as discussed further below. In another example, when the user uploads new content to the library, the new content indicator 950 may persist until the user closes/cancels an "upload complete" notification, as also discussed further below.

There may be multiple ways in which a user can navigate in the time view. For example, if the user hovers over the left or right edge of the timeline 840, the timeline may scroll to reveal more of the timeline. In one example, if this scrolling causes the handle 940 to bump against the edge of the visible timeline, the handle remains on the edge and the content in the body 810 displayed changes accordingly. In this manner, the handle 940 is always visible. As discussed above, clicking on the timeline 840 may bring the user directly to the corresponding time frame. In one example, if the user clicks on the timeline 840, thereby jumping to a new point in time, a brief animation, such as the "wall" of preview images 830 in the body 810 tilting and scrolling, may be displayed. The user may also click on and drag the handle 940 to scroll through the preview images 830. In one example, clicking and dragging the handle 940 will similarly cause the wall of preview images 830 to tilt and scroll. As

discussed above with reference to the album view, the degree of tilt may correspond to the speed of the scroll, and the direction of the tilt may correspond to the direction of the scroll.

As discussed above with reference to the single album view, clicking on a particular preview image 710 or 830 may cause the display to navigate to the intermediate view. In one example, in the intermediate view, the selected image is enlarged and comes to the foreground of the screen, while the remaining preview images 710, 830, recede into the background. Referring to FIG. 10, in one example, the unselected preview images slide left and right so that a few may be seen at the edges of the screen, providing context for the selected image, as discussed above. The enlarging of the selected image and receding of the remaining images may be animated, providing the user with a visual experience as the view changes to the intermediate view. To return to the previous view, i.e., either time view or single album view, the user may click anywhere on the background 1010, even on one of the receded images 1015.

Referring to FIG. 10, in one example, the intermediate view includes a caption area that displays a caption 1020 for the item 1025. The caption 1020 may be editable if the item 1025 belongs to the user. If the user has not yet entered a caption for the item, a message, such as "click here to enter a caption for this photo/video," may be displayed in the caption area. If the item belongs to another person, i.e., is in an album that has been shared with the user, the caption 1020 may be set by the other person and therefore may not be editable by the user. The date the item was taken may also be displayed in a date area 1030. The intermediate view may include navigation controls 1035 which allow the user to step through items in the digital media library or album, for example, depending on whether the user entered the intermediate view from the time view or single album view, while remaining in the intermediate view. The intermediate view may also include a toolbar 1040 that provides access to a number of actions that may be performed on the item 1025. In one example, the contents of the toolbar 1040 depends on whether the item belongs to the user or is an item that has been shared with the user, and on the type of item (e.g., whether the item is a photograph or video).

In one embodiment, clicking on the item 1025 in the intermediate view further zooms into the image, presenting it a full-screen view. If the item 1025 is a video, the video may start playing automatically. Moving the cursor may cause a control bar to be displayed, as discussed above, to allow the user to stop and start the video, and to navigate forwards and backwards within the video. The control bar may disappear if the cursor remains still for a predetermined period of time, for example, a few seconds. In one example, in the full screen view, only the image (photo or video) is shown; that is, the view does not include a header or

other information which may distract the user from the image itself. If the item 1025 is a photograph, by default, the full screen view may include no controls, and no indication whether comments are available. In one example, if the user moves the pointer (e.g., using a mouse) to the edge of the screen, the left/right navigation control indicators appear as in other views. The user may also use the arrow keys or other keyboard keys or other input devices to cycle through images in the full screen view. In one example, clicking anywhere on the photo or video (or using another input mechanism, for example, pressing the Escape key) will return to the intermediate view.

Historically and to present, the interface on digital cameras can be difficult to set or change and thus it is not uncommon for the date stamp of photographs and/or videos taken with the camera to appear incorrectly in the user's digital media library. Correct dates, however, may be critical to the success of time view and potentially also to many features of the digital media functionality of the portable computer 100. Therefore, in one example, the date setting may be adjustable for items in the digital media library. In one example, if the user hovers over the date area 1030 for an item in the intermediate view, an indication may be provided that the date is editable. For example, the color of the date may change, and/or the date area may be highlighted. Clicking the date may cause controls for editing the date to become available. For example, as shown in FIG. 11, the date area may display scrollable fields for the month (1045), day (1050), and year (1055), along with a save button 1060. The user may change the date by clicking the scroll arrows for each field, selecting a desired date for the item 1025. According to one embodiment, once the user makes the correction, the user may be prompted to adjust the dates for all items that were taken with the same camera and uploaded in the same session. Thus, the digital media program may identify all the items that are likely to have dates offset by the same amount as the item just corrected, and offer to correct the date(s) of these item(s) by the same offset. For example, a prompt to the user may read: "I have identified [#] other items taken with the same camera and saved at the same time as this [photo/video]. Would you like me to correct the date for these items as well?" with the options "Yes, please" and "No, thanks" for the user to select. In one example, "No, thanks" is the default.

According to one embodiment, for content items that belong to the user, date corrections may propagate throughout their computer network. Thus, if the user corrects the date on a content item that has previously been shared with another user, the corrected date is reflected on the other user's display. This propagation of corrections may be effected because

the digital content items, and associated data, such as date, caption, etc., may be stored in the cloud 330, as discussed above. Thus, when the other user views the shared content item, they are viewing a visual representation of digital content stored in the cloud, rather than a locally stored digital content item. Some online digital photograph and/or video services do not permit editing of dates associated with the stored photographs and/or videos. In addition, a user may wish to edit the date associated with a shared item, for which they may not have editing privileges. Thus, although in some instances it may be preferable to save date corrections to the hosting photo/video service, if this is not possible, date corrections may be locally stored on the portable computer 100 for display purposes. In this instance, date corrections will be reflected when the user views the digital content item on the portable computer 100, but will not propagate to other users viewing shared items.

Referring again to FIG. 10, as discussed above, the intermediate view includes a toolbar 1040 that includes one or more controls 1065 that may be used to manipulate the item 1025. In one embodiment, the toolbar 1040 contains controls 1065 including "add to pick list," "add/view comments," and "rotate." The "add to pick list" and "add/view comments" controls are discussed below. The rotate control rotates the item 1025 90 degrees, either clockwise or anti-clockwise. The direction of rotation may be pre-set (i.e., rotation is always in the same direction) or may be user-selectable. If possible, the rotation may be stored with the item 1025 on the appropriate online photo/video hosting service, bur if not, the change may be stored locally and affects only the user's view of the item 1025. If the item 1025 belongs to the user, the toolbar may further include an edit control 1070 and a delete control 1075.

In general, photo editing can be grouped into two broad categories, namely editing that alters the content of an image (such as cropping, red-eye, removal, and adjusting the contrast), and editing that alters the display of an image (such as rotation, creation date, and view/hide). In one embodiment, the digital media aspect of the portable computer 100 may encourage users to leverage existing services (offered by their online photo hosting service) for the former, via the edit control 1070, while supplying tools for the latter. In one example, the edit control 1070 may display a message similar to "edit on [service]," where the [service] is the name of the third party hosting service that stores the user's digital media library in the cloud 330 (for example, FLICKR). Clicking on the edit control 1070 may open a web card for the item 1025 on the user's hosting service, allowing the user to edit the item, as discussed further below. In some instances, the user will not have the appropriate access to perform either type of editing operations on many of the images in their media library, either because the particular

image does not belong to the user, or because the photo hosting service does not support the particular editing action. According to one embodiment, the digital media aspect of the portable computer 100 allows the user to perform display edits on any digital content item in their digital media library regardless of whether or not that edit function is available via the library hosting service. For example, the user may rotate any photo or video in their digital media library, using the rotate control discussed above, even if this rotation is only available on the user's display on the portable computer 100 and does not affect the underlying data stored in the cloud 330.

Similarly, the function of the delete control 1075 may vary depending on various factors. If the item 1025 belongs to the user, the delete control 1075 may allow the user to delete the item from their digital media library. If the item 1025 does not belong to the user, the delete control 1075 may be replaced in the toolbar 1040 by a "remove" control (not shown). The remove control allows the user to remove items from their digital media library that do not belong to them, without affecting the underlying data in the cloud. Thus, the underlying data may remain in the cloud, since the user does not have permission to actually delete the item), but the item is removed from the user's view on the portable computer 100. Thus, the user may make local changes to their own data that are not reflected on the underlying media library hosting service, thus allowing the user to customize and enhance their own viewing experience.

Still referring to FIG. 10, if the item 1025 is a video, the toolbar 1040 may include additional video controls (not shown), such as "play" and "stop" or "pause." The video controls may also include a video play timeline with a click-and-drag "scrubber" that identifies the current playpoint in the video in relation to the length of the view, and also allows the user to navigate through the video.

As discussed above, in one embodiment, one of the controls 1065 in the toolbar 1040 is a "comments" control, that allows the user to add and/or view comments associated with the item 1025. If comments are available for the item 1025, a comments icon 1080 may be displayed on the item, for example, in an upper corner of the item. In one example, in the intermediate view, the comments icon 1080 shows the number of comments available for the item 1025. If the user clicks the comments control in the toolbar 1040 of the intermediate view, the item 1025 turns over to reveal a "back side" showing existing comments and allowing the user to add/edit comments. In one example, an animation of the item 1025 turning over is provided.

Referring to FIG. 12 there is illustrated one example, of a "back view" of the item 1025. The back view includes a preview image 1210 of the item 1025, along with an "add comments" area 1220 where the user can type a new comment. Comments may also be added by persons with whom the user (or someone else) has shared the item 1025. Thus, existing comments 1230 may be displayed, along with a user image 1240 selected by the person leaving the comment and an identifier 1250 which provides identifying information for the comment, such as the name of the person who left the comment and the date and time the comment was left. In one example, the back view includes a "from" selector 1260 which allows the user to select to display only comments from a particular person or group of persons. If the user types a comment into the add comments area 1220, an "add comment" button 1270 may be displayed. Clicking the add comment button 1270 may add the user's comment to the item 1025. Clicking a "done" button 1280 may turn the item 1025 back over, returning the user to the intermediate view. In one example, the navigation controls 1035 remain available in the back side view, allowing the user to navigate backwards and forwards through the digital medial library, displaying the back side (comments) view for each item. In one example, clicking in the background 1010 turns the item 1025 back over and then exits the intermediate view, returning the user to either the single album view or time view. An animation of these steps occurring may be displayed during the transition from the comments view, through the intermediate view, to the single album or time view.

In one example, a small comments icon 1080 is also displayed in the corner of those preview images 710 (in the single album view) or 810 (in the time view) for which comments are available. Clicking on the comments icon 1080 may bring up the comments view for the associated content item. In one example, clicking on the comments icon 1080 in one of these views causes an animation to be displayed, the animation including zooming into the intermediate view for the selected preview image 710, 810, and turning the item 1025 over, as discussed above.

As discussed above, in one embodiment, one of the controls 1065 in the toolbar 1040 is an "add to pick list" control. The pick list is an organization tool that allows the user to gather together a group of digital content items for a particular action. For example, in the pick list, the user may collect content items to be shared with another user, used to create a custom channel, as discussed further below, or for which the user wishes to buy prints or access some other service provided by the online library hosting service. According to one embodiment, the pick list appears when the user adds a content item to the pick list, and may remain visible

until the user clears the list. For example, FIG. 13A illustrates an example of the single album view, with the pick list 1310 displayed across the top of the view. Similarly, FIG. 13B illustrates an example of the time view displaying the pick list 1310. It is to be appreciated that although the pick list 1310 is shown in FIGS. 13A and 13B located near the top of the screen, below the header 555, 820, its location is not limited to the illustrated example, and the pick list may be displayed elsewhere on the screen, for example, along the bottom of the screen, or vertically along one side of the screen.

According to one embodiment, the pick list 1310 comprises one or more thumbnails 1320 corresponding to the content items added to the pick list, as shown in FIGS. 13A and 13B. The thumbnails 1320 may be arranged in the order in which the content items were added to the pick list 1310. In one example, the thumbnails 1320 cannot be re-ordered by the user. Navigation controls 1330 allow the user to scroll through the pick list 1310. Referring to FIG. 13C, there is illustrated one example of a pick list 1310 including pick list controls 1340. The pick list controls 1340 may allow the user to perform any of a number of actions on the pick list 1310 and on the content items contained in the pick list. For example, the pick list controls 1340 may include options to order prints, to share the items in the pick list, to add a channel, and/or to clear and close the pick list. In one example, selecting the clear and close control empties the pick list 1310 and removes it from display; however, the content items in the pick list may not be deleted from the digital content library. Hovering over a particular thumbnail 1320a (as indicated by pointer 126) may increase the size of that thumbnail, as shown in FIG. 13C, and reveal a delete icon 1350. In one example, hovering on the delete item causes a tip to be displayed, indicating that clicking the delete icon 1350 will cause the content item to be deleted from the pick list. In one example, clicking on the delete icon 1350 deletes the content item from the pick list 1310, but not from the user's digital media library. Clicking elsewhere (i.e., not on the delete icon 1350) on the thumbnail 1320a may cause the associated content item to open in the intermediate view. If the user was in the time view (FIG. 13B), the timeline 840 may scroll in the background and the handle 940 moves as appropriate. If the user was in the album view and clicks a thumbnail 1320 in the pick list 1310, the background of the intermediate view may reflect the appropriate album. In one example, if the user is in the album view and clicks on a thumbnail 1320 in the pick list 1310 that happens to be unsorted (i.e., not associated with an album), the display may switch to the time view.

According to one embodiment, hovering on a preview image 710 (in the single album view) or 830 (in the time view) will cause the preview image to enlarge slightly and two

controls to appear, as shown in FIG. 14. The pointer 126 indicates the user hovering on the preview image 1410. These controls may include a delete icon 1420 and an "add to pick list" button 1430. If comments are available for the content item associated with the preview image 1410, the comments icon 1080 may also be displayed. Clicking on the "add to pick list" button 1430 adds the content item to the user's pick list 1310. Clicking on the delete icon 1420 deletes the content item from the user's digital media library. In one example, clicking the delete icon 1420 also causes an informational "bubble" (not shown) to appear, letting the user know that the content item has been deleted. The bubble may remain on the screen for certain time period, for example, a few seconds, and may include an undelete button, giving the user the ability to undo the deletion of the content item. Conventional "undo" actions, such as pressing "CTRL-z" may also undo the deletion of the content item. The effect of deleting a content item on the underlying data in the cloud 330 may depend on whether the content item belongs to the user, or is an item that has been shared with the user by someone else. For example, if the content item belongs to the user, then deleting it may also delete the content item from the library stored by the online hosting service. If the content item belongs to someone else, deleting it in the user's digital medial library may remove the "map" or reference to that item, such that it is no longer displayed in the user's media library, but does not affect the underlying data in the cloud 330.

Referring again to FIG. 13C, in one example, clicking a "share" button in the pick list controls 1340 Clicking the Share button in the Pick List launches a share bubble 1360, as shown in FIG. 15. The share bubble 1360 may include several fields, including a name field 1362 where the user may name the content item or group of content items to be shared, and fields where the user may either select from the pre-set list of persons (field 1364) those persons with whom the user wishes to share the items, or enter one or email addresses (field 1366) of persons with whom the items are to be shared. The share bubble 1360 may also include a comments field 1368 where the user may enter comments about the items being shared or a message to the person(s) with whom the content items are being shared. Clicking the "share" button 1370 may complete the share action. A "cancel" button 1372 may be provided to cancel the share action; alternatively, simply clicking anywhere not on the share bubble 1360 may also cancel the share action. A similar share bubble may also appear when the user selects the share album control 612 in the album view discussed above.

The pick list controls 1340 may also include an "order prints" button to allow the user to order prints of the photographs in the pick list 1310. According to one embodiment,

clicking "order prints" button from the pick list 1310 shows the user options for ordering (such as print size, number of prints, etc.), and then places the order using information previously collected from the user, for example, during initial configuration of the portable computer 100. According to another embodiment, clicking the "order prints" button from the pick list 1310 opens an ordering panel that provides the user with options for ordering prints from any of a variety of online photo service providers. The ordering panel may include weblinks that allow the user to navigate to the websites of the online photo service providers. The ordering panel may also include a "stop" or "cancel" button. In another embodiment, clicking the "order prints" button from the pick list 1310 automatically opens a webpage of the online photo hosting service where the user's digital media library is stored. Thus, the user may order the desired prints (or other merchandise) directly from the hosting service on which they are stored. In one example, using the "order prints" control does not clear the content items from the pick list 1310 in case the user wishes to perform another action with the items.

According to one embodiment, the pick list controls 1340 may also include a control to create or add a channel. In one example, selecting the create a channel control in the pick list 1310 creates a channel card containing the content items in the pick list. As discussed above, according to one aspect, streamlining the presentation and integration of features and services available through the portable computer 100 includes developing consistent visual representations of available content (whether on the computer 100 or from third party service providers). In one embodiment, system features and web features are consistently presented as cards for the user to interact with to achieve their computer objectives. In some embodiments, cards comprise part of an interface layer between a computer user and a user's computer based objective and/or computer operation. Thus, the cards form a part of the structure of the graphical user interface between a computer system and the user to provide access to a plurality of views and/or content. In various embodiments, cards are configured to be context and/or content sensitive. Thus, the cards are selectable visual representations that are mapped either to computer functions or available computer content. Some examples of cards include web cards that map to views of web content including web pages, channel cards that map to customized views of content including web based content and picture and video content, and system cards that map to system functionality. In one example, system cards are configured to represent activities that have been specifically designed such as for example, a digital media card.

Referring to FIG. 16, in one embodiment, the home view 310 (see FIG. 3) is configured to manage and organize cards. Thus, in one example, the home view 310 includes a body 1610 in which a plurality of cards 1620 are arranged. The home view 310 may also include a header 1630 which displays a home indicator 1640, letting the user know that they are in the home view, 1640, and optionally includes a web search bar 1650, providing the user direct access to searching on the Internet. The home view 310 provides a simple and convenient mode of navigating through the features and content accessible through the device by organizing and managing cards. In some embodiments, channel cards provide additional features that enable a user to better interact with web based content, and in another example, channel cards provide interactive views by utilizing different content presentations provided by a web source. Thus, consistent user interfaces are used to access web based content, even content and applications provided by third parties.

According to one aspect, cards may have common features to promote user acceptance and improve adoption of different cards, while providing familiar a form. In one example, most cards are configured with a similar anatomy, and may comprise certain common elements described with reference to illustrated examples. According to one aspect, different cards types displayed in the home view are clearly defined by color scheme and appearance, while at the same time maintaining a similar format. For example the similar format includes header placement and sizing, display of tools, title and frame size. In one embodiment, a color scheme configured to differentiate card types provides for web cards with white headers with the content displayed on the web card showing as a thumbnail of the current state of the page. Channel cards may be configured with black headers, and the content presented in the channel card may comprise a simplified representation of the associated media or web content. System cards may be shown either with blue headers or grey headers.

According to one embodiment, the digital media aspect of the streamlined device is presented as and accessed through a system card 1620a. The digital media system card 1620 comprises a header 1660 running along the top of the card which identifies it as the digital media card, and a body 1670 which displays an image of one of the digital content items in the user's digital media library. In one example, the image displayed in the body 1670 is selected at random from the user's digital media library and may change periodically, for example, every few seconds or minutes. From the home view 310, selecting (e.g., by clicking) the digital media card 1620 navigates to either the time view or the album view of the user's

digital media library. The default view may be set in the card options, as discussed further below.

As discussed above, when the user selects the "create a channel" control in the pick list 1310, a channel card is created containing the content items in the pick list. The channel creation process may be animated. In one example, when the user clicks the control button, the system zooms out of the digital media library view to the home view 310, scrolls to the end of the displayed cards 1620 (if necessary), and shows the new channel card appearing, then scrolls back (if necessary) to where the digital media card 1620a is displayed in the home view, and zooms back into digital media view from which the user clicked on the control in the pick list 1310. The whole animation may take a brief time; short enough to not be too annoying to the user, but long enough not to cause the user any vertigo.

According to one embodiment, the user may also create channel from online photo services (such as SMUGMUG or KODAK GALLERY). In one example, when the user creates a channel from one of these services, the option may be given to save the photographs to the user's digital media library. If the user decides to add the photographs to the digital media library, new photographs subsequently added to the feed from the online service may also be added to the digital media library. This automatic updating stops (i.e., no more photographs are added) if the user deletes the channel card or transforms it into a web card. Similarly, the user may transform a web card of an online photo service (such as FLICKR or SHUTTERFLY) into a channel card using the card options discussed below. In one example, when the user creates a channel card from one of these photo services, the option is again given to add the contents of the channel card to the user's digital media library. This allows the user to get the benefit of an aggregated media library on the portable computer, but without automatically cluttering it up with unwanted images. Content subsequently added to the channel may also be added to user's digital media library. If the user deletes the channel card or transforms it back into a web card, new content is no longer added to the digital media library, but the existing content may not be removed.

Referring again to FIG. 16, the cards 1620 may include an "options" icon 1680 in the header 1660. In one embodiment, when card configurations and/or card options are selected by a user (if available), e.g., by clicking the card options icon 1680, a consistent animation is presented to the user. For example, selection of a card's options may cause an animation displaying the flipping of the card and the revelation of user selectable options. In one example, if the user clicks the card options icon 1680, there is presented a visualization of the

card turning over, similar to the animation/visualization of the item 1025 turning over to display the comments view discussed above. On the "back side" of the card 1620 the user may see various options which may differ depending on the type of card. Referring to FIG. 17A, there is illustrated one example of the back side of a card 1620. In the illustrated example, the card 1620 includes a header 1710 that displays an identifying field 1715 and optionally a logo or image 1720, to identify the card to the user. In an example of a web card, the identifying field 1715 may include the name of the associated website and optionally some description of the card. For example, a web card for an online news service may display the name of the news service along with a description such as "local news" or "news headlines" that identifies the card for the user. The available options for the card 1620 are shown in the body 1725 of the card.

In the illustrated example, the body 1725 of the back side of the web card 1620b shows an option 1730 for transforming the card into a channel card, and vice-versa. In the example of a web card, if the user checks the option 1730, the web card is recast into a channel card. Unchecking the option 1730 transforms the channel card back into a web card. The option 1730 may be displayed permanently checked for cards that are always available as channel cards (e.g., the digital media card 1620a, as shown in FIG. 17B), and may be missing for cards that are not available as channels, for example, some system cards. In the example of the digital media card 1620a, the option 1730 may include an option to show the card as a channel using a particular lens. Thus, for the digital media card 1620a, the control 1730 may read "Show as channel using [lens], as shown in FIG. 17B." A lens is a customized visualization for computer content, as discussed further below.

Still referring to FIG. 17A, channel cards may include an option 1735 to show the card in a screensaver. Typically the screensaver option 1735 is not an available option for other card types; however, the digital media system card 1620a does permit its content to be displayed in the screensaver. In one example, the digital media card 1620a is added to the screensaver mode by default. In the channel view (discussed below) and screensaver mode, the digital media system selects photographs randomly from the user's digital media library. This allows the portable computer 100 to function like a smart digital picture frame by default when the device is idle. According to one example, new channel cards are configured to not display in screensaver mode by default and therefore, the option 1735 is not checked for new channel cards.

The card options may also include share information/controls 1740. The shared information 1740 may include a "shared to/from" line which provides information on the user or device from which or with which the card was shared. Hovering over the "shared from" line causes the device to display an informational bubble with a list of people to whom the card was shared. Other options may be employed for displaying shared from information. Other options may include linking to a display list for share from information, and in some embodiments may include displaying the shared entities on the back of the card without selecting the "shared from" line. In such embodiments a maximum number of shared entities may be displayed before requiring selection of a more control. The more control expands on the list of shared entities to provide for listings that do not fit within the space provided on the back of a card. A "shared to" line may provide information about whether and to whom the card has been shared. According to one embodiment, system cards can not be shared, thus no shared to information is displayed. By default the "shared to" line does not display until a card has been shared. In one example, hovering over the shared to line causes the device to display an informational bubble with the list of people to whom the card has been shared. Other options may be employed for displaying shared to information. Other options may include linking to a display list for share to information, and in some embodiments may include displaying the shared entities on the back of the card without selecting the "shared to" line. In such embodiments a maximum number of shared entities may be displayed before requiring selection of a more control (not shown). The more control expands on the list of shared entities to provide for listings that do not fit within the space provided on the back of a card. Optionally the more control may cause the device to display an information bubble containing the remaining shared entities and/or all the shared entities. The share information 1740 may also display the number of times the card has been shared. As discussed above, the user may share content items from the pick list 1310 with other users. In one example, sharing items from the pick list operates similar to sharing a channel card that contains only photographs and videos. The recipient receives a channel card on their streamlined device (or an email with a link to the channel card on a website if the recipient does not have a streamlined device.

Still referring to FIG. 17A, for some cards the card options may further include a delete control 1745 which removes the card 1620 from the home view 310. The delete control 1745 is typically not available for system cards, which typically can not be deleted by the user. The card 1620 may also show a "last updated" field 1750 that displays update information. For example, for a web card that streams news or other online content, the update field 1750 may

display the last time the feed was updated, for example, "last updated 3 minutes ago" or "last updated at [date/time]." A "done" button 1755 may be provided that allows the user to turn the card 1620 back over to the front side view when the user is finished viewing/changing the card options. In one example, clicking the "done" button 1755 causes the system to display an animation of the card 1620 flipping over to show front side and zooming back out to the home view 310.

As discussed above, another view of the digital media library which may be offered to the user is the lens view. The lens view is a group of visualizations, or "lenses," that the user can choose from and which offer the user different ways in which to experience and interact with their digital media libraries. The content displayed and the interactions available may depend on the individual lens. In one example, all or at least some of the lenses allow the user to add a particular picture to the pick list 1310. The pick list may or may not be displayed in the lens view. In one example, lenses support passive viewing, i.e., they do not require user interaction to be effective since they can be applied to the channel view and screensaver mode.

According to one embodiment, by default, channel cards are displayed in the channel page view according to a pre-determined visualization. For channels that comprise photographs and videos, including the digital media card 1620a, and channels created from online photo services such as FLICKR or SHUTTERFLY, lenses are also available to modify the visualization of the channel. According to one embodiment, the channel page view is the zoomed-in computer implemented expression of a channel card. The channel page view may be invoked by clicking on the channel card. A channel page view may present a unique view into content made available through a website. The channel page view employs visualizations similar to corresponding visualization on channel cards but the large format of the view allows for a better display of content, and provides for increased interaction with users. The channel page view also comprises a mapping from the display content to the source from which the content is derived. The channel page view comprises a number of elements that are maintained across the channel page views of different content, although in some examples additional features may be provided to address unique aspects of the content being viewed. An example of a channel page view is the album view illustrated in FIG. 5.

As discussed above, and referring to FIG. 17B, for the digital media card, the channel control may read: "Show as channel using [lens]" to allow the user to select a particular lens. The lens button 1760 may display the name of the currently selected lens. Clicking the lens button 1760 reveals controls, for example, a drop-down menu, for selecting a lens. In one

example, when the user clicks on the drop-down menu to select a lens, the card 1620a and drop-down menu remain visible, but the rest of the home view 310 becomes obscured by a preview of the selected lens. Lenses may also be selected from any of the time view, album view, intermediate view, or lens view of the user's digital media library. For example, referring to FIG. 18A, there is illustrated an example of the time view showing the lens button 1760. The lens button 1760 displays the name of the currently selected lens. In one example, clicking on the lens button 1760 will switch to the lens view and show the current lens. Referring to FIG. 18B, there is illustrated an example of a lens view. The lens view includes a header 1810 and a body 1820 in which an image 1025 of the content item is displayed. The lens button is shown as a drop-down menu 1830, as discussed above, revealing a list of available lenses. The drop-down menu may be displayed responsive to the user clicking the arrow 1840 on the lens button. As the user moves through the list, an instant preview of the highlighted lens may appear in the body 1820 of the screen. Selecting a new lens from the list makes it the current lens, and changes the text on the lens button 1760 (see FIG. 18A) to match.

One example of a lens is the slideshow lens. In one embodiment, in a channel page view, the slideshow lens automatically shows random images from the user's digital media library in the full screen view. Each image may be displayed for a predetermined period of time, for example, a few seconds. In another example, the images are shown as a forward moving series, as shown in FIG. 19. In the example in FIG. 19, the front image 1910 is shown for a few seconds, then replaced with the next image 1920 and the series "shifts forward" with a new image being added at the back of the line. In one example, the images displayed are selected from a particular album, and the system automatically scans through all the images in the album, randomly or in sequence. The photo display restarts again at the beginning when the end of the photo content is reached. From the slideshow, the user may navigate to any image in the digital media library.

FIG. 21A, illustrates an example logical diagram of the behavior for the slideshow lens in the channel view. From channel page view 2110, selection of a menu button causes the device to display a content menu 2120, over the present channel page view. Selection of the menu button from the content menu, causes the device to display the selected content item in a channel page view 2502. The menu button may be a clickable button displayed on the screen (not shown in FIG. 19) or may be a hardware button, such as a button on the keyboard 106 (see FIG. 1) or one of the navigation buttons 122, 124 discussed above. In one example, from the

channel page view 2110, operation of the scroll wheel 120 (see FIG. 4), causes the device to display a channel selector view 2130. The channel selector may allow the user to select different albums or different channels for display. It is to be appreciated that the navigations discussed in reference to examples of navigating through photo content in the channel page view and slideshow lens may be similarly applied to channel page views of cards other than the digital media card, optionally using lenses other than the slideshow lens.

In one embodiment, if the user presses the menu button while looking at a particular item, a content menu for the album to which that item belongs is displayed, as shown in FIG. 20A. In one example, the content menu 2010 is configured to be responsive to manipulation of the embedded scroll wheel 120 discussed above. Manipulation of the scroll wheel 120 progress through the displayed content menu 2010, and in response the system displays the selected content in the full view with preview text appearing below. Manipulation of the scroll wheel 120 causes the system to scroll through the photos in the current album. In one embodiment, the content menu 2010 transitions between selections by rendering the apparent movement of the entire content menu either to the left of the right depending upon the orientation of the manipulation of the scroll wheel 120. Alternatively, the content menu is also responsive to arrow keys on the keyboard 106. Depressing an arrow key causes the system to display the apparent movement of the content menu 2010 to the next item. In one example, if the image 1025 belongs to more than one album, the system shows the content menu for the first album. If the item does not belong to any album, the system may show the content menu for unsorted images. In another example, pressing and holding the menu button may cause a content menu to be displayed, allowing the user to scroll through and select a particular album. A prompt 1930 may be displayed, as shown in FIG. 19, providing the user with instructions for changing the album.

According to one embodiment, if the user presses and holds the menu button, a contextual menu 2020 of all of the albums in the digital media library appears, as shown in FIG. 20B. The user may then use the scroll wheel 120 to navigate to any of the albums. The contextual menu 2020 may display the title of the albums, along with a representative, first or random thumbnail 2030 of a content item in the album. In one example, pressing the menu button opens the selected album, showing the first image in full screen and proceeding to show the rest as usual.

According to one embodiment, channels for displaying video content and/or audio content operate with a different logical flow. In one example, additional interactivity is

required to allow a user to, for example, stop a video, start a video from the middle, among other options. According to one embodiment, the streamlined device must be able to accommodate routine operations through manipulation of only a scroll wheel and a mouse, for example when the device is in an easel mode. It is to be appreciated that in other configurations the logical flow for the behavior of the channel view may be different, and may take advantage of addition input/output devices available in other device modes. Shown in FIG. 21B, is an example of a logical flow for device/UI functionality, during the normal operation of a channel view of video content. At 2140 shown is a channel page view of video content. Select of button (e.g. one of the navigation buttons 122, 124), causes the device to display a contextual menu 2145. The Contextual menu 2145 may include a visual representation of selectable options 2150. The selectable options 2150 rendered may include at least a rewind/fast forward selector, resume selection, other episodes, etc. Selection of the rewind/fast forward selector invokes a timeline controller 2155 shown in the content page view 2160. In one example, the time line controller 2155 is responsive to rotation of the scroll wheel 120, providing fast forward in one direction and rewind in the other. From 2160, selection of a navigation button causes the device to return the view to channel page view 2140. Selection of "resume" from the options 2150 also causes the device to return the view to channel page view 2140. Selection of other episodes from 2150 causes the device to invoke a content menu 2165, which provides a selector view of available content for the channel. Selection of content 2170 from the selector view 2165 causes the system to play the selected content in channel page view 2140. From channel page view 2140, the device displays a channel selector 2175, in response to operation of the scroll wheel 120. The logical flow illustrated may be used for interactions with audio content as well, for example, to control playing of .mp3 or other audio files.

As discussed above, in one embodiment, the portable computer is configurable into different modes, including a laptop mode (in which the portable computer has a conventional laptop appearance), a flat mode, a frame mode, and an easel mode in which the base of the computer and its display component stand vertically forming an inverted "V," as discussed above. It is be appreciated that different user interface architectures may be invoked in response to different device modes. For example, a portable computer in laptop mode may display a home view 310 as discussed with respect to FIG. 16, whereas when configured in Easel mode, user may be presented with a channel page view, for example, the slideshow view discussed above.

Referring to FIG. 22, there is illustrated an example of the portable computer 100 configured into the easel mode. To convert the portable computer 100 from the laptop mode (or closed position) into the easel mode, the display component 102 may be folded away from the base 104, in the same direction as to open the computer (i.e., to configure the computer from the closed position into the laptop mode) such that the base 104 and the display component 102 form an inverted "V" shape with the bottom of the base and the back of the display component face another, as illustrated in FIG. 22. In the easel mode, the display screen 110 is visible and accessible on one side of the portable computer 100 and the keyboard 106 (not shown in FIG. 22) is visible and accessible on the other side. Having the portable computer 100 be configurable between different modes supports the presentation of computer content using visual representation optimized for different viewing modes. In particular, ones of the visual representations are configured to display in a "lean forward" user viewing mode and a "lean backward" viewing mode. In one example, a lean forward user viewing mode includes a user typing at a keyboard of a laptop computer. In another example, a lean backward user viewing mode includes a user viewing a television from a distance. One should appreciate that the examples provided are illustrative and are not intended to be limiting. The configurable portable computer 100 permits a user to select a device configuration most suited to a particular user viewing mode. According to one embodiment, the easel mode of the device permits improved "lean back" interactions with computer content. In other words, the easel mode makes it easier to view the streamlined device's display from distances greater than conventionally used with laptop computers.

According to one embodiment, the function or display content and/or display orientation of the portable computer may vary when the portable computer is configured from the laptop mode into the easel mode, or vice versa. Thus, selection of a lean backward user viewing mode at triggers the portable computer 100 to transition to a content display that improves user interaction in that mode. For example, in response to configuring the device into the easel mode, the computer system display may transition to a channel viewing mode. The channel viewing mode is configured to present computer content, in large footprint displays, and further is designed to streamline user interaction with the streamlined device by permitting access through a first I/O profile associated with the streamlined device in easel mode. The first I/O profile in easel mode may consist of a scroll wheel and a selector button. In some embodiments, the first I/O profile may include a volume control. In another example, for at least some activities within at least some modes of content (e.g., viewing a photograph or

video), when the portable computer 100 is configured into the easel mode, the display may automatically adjust to "full screen view" (i.e., the displayed image or video is displayed on the full screen size, rather than in a window) to allow for comfortable viewing.

In addition, in one embodiment, when the portable computer 100 is configured into the easel mode, the visual display on the display screen 110 is automatically rotated 180 degrees such that the information appears "right-way-up," even through the display screen is upside-down compared to when the portable computer is in the laptop mode. Thus, a user may simply "flip" the portable computer 100 into the easel mode and immediately be able to comfortably view information on the display screen 110, without having to access display screen controls to adjust the orientation of the visual display. The ability to configure the portable computer 100 into either the laptop mode or the easel mode provides enhanced functionality. For example, when the portable computer 100 is not being actively used, the user may configure the portable computer into the easel mode, and program the portable computer to act as a digital photo frame, displaying one or more photos of the user's choice. In the easel mode, the portable computer 100 may occupy a smaller footprint on a surface than in the laptop or closed modes because the base 104 and display component 102 are upright, as illustrated in FIG. 22. In addition, because the portable computer can act as a passive information and/or entertainment device, such as a photo frame, as discussed above, the portable computer may provide a useful function even when not being actively used by the user, and may do so (in the easel mode) without taking up much surface area.

In another example, the portable computer 100 may be configured into a "frame" mode, as illustrated in FIG. 23, in which the portable computer is placed on a surface 2310 with the keyboard 106 "face down" on the surface 2310 and the display 110 facing upward. In the frame mode, the display component 102 may be at a similar orientation, and angle 2320, with respect to the base component 104 as in the easel mode. However, rather than the base component 104 and display component 102 being oriented vertically with respect to the surface 2310, as in the easel mode (in which the portable computer forms an inverted "V" as discussed above), in the frame mode, the base component 104 may lie flat on the surface 2310, as shown in FIG. 23. In one example, software and/or hardware protection may be provided for the keyboard to prevent keys from being pressed (or to prevent the portable computer from responding to pressed keys) when the portable computer is in the frame mode.

According to some embodiments, the streamlined computer system/device includes a plurality of I/O devices that a user needs to operate and transitions between modes (e.g. frame

and easel) triggers the presentation of different I/O profiles to the computer user. One should appreciate that the various I/O profiles can be selected through physical configuration of the device. By providing the user the ability to change from a first I/O profile to another, at will, improves the user experience and permits the user to dynamically select a preferred I/O profile best suited to the user's present need. According to one embodiment, user selection of I/O profile includes transitioning from a lean back mode to a lean forward mode and vice versa. In one embodiment, the user's computer device is configured to have multiple I/O profiles that can be selected by physically manipulating the orientation of the computer device itself.

According to one aspect, streamlining user interactions with the computer system/device includes representing computer based content in visual representations that render computer operations/behavior in a consistent manner. The visual representations are adapted to permit easy user interaction even upon selection of a first I/O profile or the change in selection of an I/O profile. According to one embodiment, the visual representations are rendered as cards. Different types of cards may be employed to render different types of available content. For example, web based content, may be rendered as a web card that associated with a mapping to web content. Some web cards map directly to web pages and in response to selection of the web card the computer device executes the mapping and displays a web view of the content. Other cards may be used to provide interactive displays selectable by a user. In another example, system operations are displayed as system cards, which are associated with mappings to system operations, for example communications configurations, and may comprise a settings card, among other system options. Another type of card includes a channel card configured to stream web based content in a manner that allows for summarization of content, while still providing the ability to fully appreciate the summarized content.

In one example, a streamlined hardware device provides for (in comparison to typical desktop and laptop systems) a reduced user input platform as a first I/O profile, comprising in one configuration a scroll wheel and a button interface. Other I/O profiles are available for user selection by manipulation of the device itself. In one embodiment, an easel mode presents the user with the first I/O profile and by rotating the computer device about a longitudinal axis; the user may select a second I/O profile, including a keyboard (e.g. laptop mode). The transition from one I/O profile to another may also cause the computer device to alter its display. In one example, the user interface provided to the user is responsive to selection of device mode and/or selection of I/O profile.

It is to be appreciated that reducing the number of I/O device achieves simplicity of design and ease of operation by the user, and at the same time may increase the complexity of the graphical user interfaces needed to support interaction with systems and third parties that anticipate, rely on, or expect additional I/O devices. Streamlining device operation by the user is balanced against sophistication of user the interface required to enable user interaction with the same features used with additional I/O devices. According to one embodiment, the user interface layer provides simplified accessibility based on the device's I/O platform, and for some embodiments, the user interface layer is responsive to device configurations that change the device's I/O capabilities. In other embodiments, the user interface is responsive to changes in the device's mode. In some examples, changes in device mode and changes I/O profile will occur together, however, in other examples a change in mode or a change in I/O profile will not require a corresponding change in profile or mode respectively.

Referring to FIG. 30, there is illustrated another configuration of the portable computer 100, referring to as the "flat" mode. In the flat mode, the display component 102 may be rotated (or opened) to approximately 180 degrees with respect to the base component 104, such that the base component and display component lay flat on a surface, with the keyboard 106 and display screen 110 exposed, as shown in FIG. 30. Unlike the easel and frame modes, in which the keyboard may be concealed and not easily accessible, in the flat mode, the keyboard is accessible and usable. In addition, as discussed above, the visual display on the display screen 110 may be automatically rotated to accommodate comfortable viewing of information by persons located in different positions relative to the base component 104 or display component 102. The visual display on the display screen 110 may also be manually adjusted by a user using, for example, the keyboard 106, touch pad 108 or mouse (not shown), scroll wheel 122 or navigation buttons (not shown). For example, if a user (located at position A) wishes to display information for a person located opposite the user (at position B), the visual display may be rotated (automatically or manually)180 degrees such that the information appears "right-way-up," to the person at location B, even through the display screen 110 is upside-down for that person. Similarly, in another example, the visual display may be rotated (automatically or manually) 90 degrees such that the information appears "right-way-up," for a person at location C. In one example, a user can "toggle" the visual display among various orientations. For example, a user at location A may have the visual display facing themselves while using the keyboard 106 or other controls to change or access information on the display,

then toggle the display orientation 180 or 90 degrees to display the information for persons at locations B or C.

According to another aspect, system and interface streamlining may be employed with devices of multiple configurations. In some embodiments, multiple configurations include a traditional configuration, for example, a configuration similar to a laptop device, and also include new configurations, for example, an easel mode. Some examples of streamlined devices have the ability to change between traditional configurations and other configurations. The change between configurations may change the I/O profile of the device and hence impact the user's interaction with the device itself and any content displayed on the device. In one embodiment, the user interface is responsive to changes in configuration. In another embodiment, the user interface is responsive to changes in I/O profile.

According to another aspect, the streamlining of the user's multi-media experience incorporates the device the user uses to interact with multi-media sources, whether the sources are on-line or provided by the device itself. Streamlining of the device includes developing consistent user interfaces for the user to access all features presented. The device's graphical user interface layer is customized to the I/O interfaces provided. In one example a device is provided in the form of a portable computer configurable between a laptop mode (in which the portable computer has a conventional laptop appearance) and an easel mode in which the base of the computer and its display component stand upright forming an inverted "V," a closed mode, a laptop mode, an easel mode, a flat mode and a frame mode. According to one embodiment, each of the display modes may employ different I/O profiles.

In some embodiments, multiple configurations include a traditional configuration, for example, a configuration similar to a laptop device, and also include new configurations, for example, an easel mode. Some examples of streamlined devices have the ability to change between traditional configurations and other configurations. The change between configurations may change the I/O profile of the device and hence impact the user's interaction with the device itself and any content displayed on the device. In one embodiment, the user interface is responsive to changes in configuration. In another embodiment, the user interface is responsive to changes in I/O profile.

Referring again to FIG. 16, the computer system may include various system cards that map to computer functionality. Functionality mapped to by system cards may include, for example, a communications card, for configuring wireless access of the device, bookmarks for presenting conventional styled web page bookmarks, and a camera card for providing for

configuration and operation of a camera, either embedded in the device upon construction, or incorporated through for example a USB port. According to one embodiment, a camera system card 1622 may provide a user with an easy way to get digital photographs and/or videos off their digital camera and stored safely in the cloud 330 with their online hosting service. The camera card may provide information and support during each stage of the process: before, during and after a digital camera is connected to the portable computer 100 and the content items uploaded to the cloud 330.

Digital cameras typically present themselves to computers as storage devices. In many cases, the portable computer 100 may not be able to distinguish between a digital camera, a memory card reader, a USB drive, or other attached storage devices. Therefore, according to one embodiment, the camera card treats all such devices in the same way. Thus, the camera card may support the upload of images and videos regardless of the type of devices on which they are stored. Accordingly, although the following discussion may refer primarily to a camera, the term "camera" is intended to be synonymous with digital camera, card reader, USB drive, or other attachable storage device.

According to one embodiment, when a camera is attached to the portable computer 100, the camera card becomes available in a channel view, where it displays images on the card using the slideshow lens. However, it will be appreciated that the camera card may also become available in the home view or another view, and may display the images using a lens and/or view other than the slideshow lens. When no camera is attached to the portable computer, the camera card may nonetheless be visible in the home view 310. Selecting the camera card may "open" the card into a "page view" (i.e., the card is viewed full screen) and may display instructions/information about connecting a camera to the portable computer 100. When a camera is first attached to the portable computer 100, the system may zoom into the camera card and present the user with several options. For example, the user may be able to upload all the images from the camera to the online photo hosting service, allowing the system to create default albums. Alternatively, the user can customize the upload by adjusting albums and selecting from multiple online services, as discussed further below. In another example, the user can simply view the images that are on the camera, without necessarily initiating an upload. In one embodiment, while photos and/or videos are being uploaded to the cloud 330, the user can continue to review images on the camera card. As discussed further below, the user may also see the upload progress both in the camera card and in the digital media card 1620a. The presence of a camera attached to the portable computer need not constrain the

user's access to the rest of the system. The user may simply navigate away from the camera card to interact normally with the portable computer and use its other functions.

Referring to FIG. 24, there is illustrated an example of a page view of a camera card 1622 showing an upload of images 2410 in progress. The camera card 1622 includes a header 2415 and a body 2420 in which the images 2410 are displayed. The header may include information that identifies the card 1622 as the camera card and, when a camera is connected to the portable computer 100, information 2425 that identifies the connected camera (e.g., a make/model of the camera). The header may also include status information 2430 that tells the user the current activity being performed by the camera card, for example, "saving new photos and/or videos." The header may also include a "stop" control 2435 that allows the user to stop the saving/upload process, as well as a display control 2440 that allows the user to, for example, cause the camera card to display the images 2410 using the slideshow lens. In the body 2420, a status indicator 2445 may inform the user of the progress of the save/upload process. For example, the status indicator 2445 may tell the user that 34 of 70 content items have been processed and the save is 50% complete.

In one embodiment, clicking on an individual image 2410 on the camera card 1622, regardless of the stage of the upload process, may bring the user to the intermediate view, as shown in FIG. 25. The other images re-arrange themselves to form a horizontal line of images sorted by the date the items were taken with older items to the left. The intermediate view for the camera card 1622 is similar to the intermediate view for the digital media card 1620a discussed above. In one example, in the intermediate view for the camera card 1622, the user options may include the ability to edit a caption for the selected image 2410a by typing into the caption field 2450. The date field 2455 displays the date of the image underneath the caption area. In one example, if the user clicks on the date field 2455, it becomes editable, allowing the user to correct the date in case the camera does not have the correct date, as discussed above. If the user corrects the date and saves the changes, the system may then prompt the user to see whether it should change the dates for the rest of the contents of the camera by the same offset. The intermediate view of the camera card 1622 may also include a rotate option 2460 which may allow the user to rotate the image 2410, as also discussed above. In one example, each click on the rotate button 2460 rotates the image (either clockwise or anti-clockwise) by 90 degrees, and the user may thus click as many times as necessary to rotate the image by the desired amount. A delete option 2465 deletes the item from the camera card, after prompting the user to confirm the delete. As in intermediate view in the digital media

application, the user can navigate between photos and videos by clicking on the left or right navigation bars 2470, or by using the arrow keys or other controls as would be recognized by those skilled in the art. In one example, clicking anywhere on the image 2410 shows the image full-screen. The header 2415 may also include controls for deleting items (control 2475), creating a new album (control 2480) and saving (control 2485), each of which is discussed further below.

When no camera is connected to the portable computer 100, or when the system does not see a camera, it may be in one of two states: normal or interrupted upload (discussed below). According to one embodiment, in the normal state, the camera card 1622 on the home view 310 displays a generic camera image, and selecting the camera card may display some helpful information about how to connect a camera to the portable computer, as discussed above. By placing the camera card on the home view 310, even when no camera is connected, the capabilities of the camera card application are highlighted. For example, a user, upon seeing the camera card, may be reminded to connect a camera to the portable computer, making it more likely that the user will use the portable computer for managing digital media content items.

According to one embodiment, when a user attaches a camera to the portable computer 100, the user sees an animation of the system going to the home view 310, scrolling as necessary to the page containing the camera card 1622 (which may show thumbnails of the content of the camera), then zooming into the camera card. In one example, if the user has already selected the camera card and is viewing the camera card in the page view prior to connecting the camera, this animation may not show. Once in the page view for the camera card, the user can see the contents of the attached camera, and may be given options for what can be done with the content on the camera. These options may be displayed, for example, in a bubble that appears over the line of images 2410. In one example, the options include a simple save and an advanced save. The simple save option may save the contents of the camera card to the user's online photo hosting service with automatically created albums. If the user has registered more than one online hosting service, the user may select the desired service from a drop-down menu. The advanced save option provides the user with the opportunity to manipulate the automatically saved sets, delete photos, and/or save photos to multiple online hosting services, as discussed further below.

In the page view, as shown for example in FIG. 24, the user can interact with the images on the camera. This interaction may be similar to interacting with digital content items

in the time view or album view discussed above. As discussed above, the user is free to interact normally with the entire system even when a camera is attached, and is not required to first complete any action associated with the camera card. For example, if the user returns to the home view 310 without initiating an upload of images, the camera card 1622 shows thumbnails 2620 of the images on the attached camera, as shown for example in FIG. 26. The header 2415 of the camera card may also display the number 2610 of new content items on the camera.

According to one embodiment, once a user has connected a camera to the portable computer 100 and is brought to the camera card, the user may rely on the system to create albums by selecting the simple save option. The upload process then begins, as discussed further below, using automatically-generated albums and saving images to the user's registered online photo hosting service. If there is more than one photo hosting service associated with the portable computer, the simple save option may default to the service that was used during the last upload. Some existing photo hosting services do not support video content. Accordingly, the portable computer may provide video storage services, either locally or through the cloud 330. Accordingly, users may have more than one service associated with the portable computer 100; however, the difference between the photo hosting service and the video hosting service may be seamlessly transparent to the user. In one example, in the simple save mode, by default, "delete items from the camera when they are safe" is checked. If a user prefers to leave the images on the camera, the user can uncheck this box before initiating the simple save option.

As discussed above, in one embodiment, the system may save the user time and effort by automatically organizing digital content items, including photos and videos, into albums. In one example, albums are created by date, with photos and videos taken on the same day going into a single album. If a set of photos are close in time (e.g., are taken within 90 minutes or so of each other) but span two days, the album may span those two days as well. For example, it may not be uncommon to see images taken just before and just after midnight on New Year's Day, and these images may be grouped into a single album. In one example, automatically generated albums may not contain fewer than a predetermined number of images, for example, five images. In the case that fewer than five photos for a single date are on the camera (or if there are fewer than 5 photos total on the camera), the photos may appear in the unsorted photos area discussed below. In one example, the default name of the automatically generated album is the date (or date range) on which the

content items were taken.

As discussed above, an alternative to the simple save option is the advanced save option. Selecting the advanced save option may bring the user to a "choose & organize" screen, an example of which is illustrated in FIG. 27. From the "choose & organize" screen, the user may organize digital content items before uploading them. Referring to FIG. 27, in one example, the "choose & organize" screen has four main areas, namely, albums 2710 which may appear at the top of the list and comprise automatically generated albums and/or albums that the user creates manually; unsorted photos 2715, videos 2720; and previously uploaded content 2725 which may appears at the end of the list. The "choose & organize" screen may also display a new content indicator 2730 which tells the user the number of new photos and videos on the camera. In one embodiment, automatically generated albums (discussed further below) are arranged in chronological order starting with the newest album at top. It is to be appreciated that although only one album 2710 is shown in FIG. 27, the "choose & organize" screen may display any number of albums. A scroll bar (not shown) may be used to scroll up and down the page if there are more albums than can be displayed at one time on the screen. In one example, if the user corrects the date of items in an automatically generated album, the album date may update to reflect the change, and the order of the albums in the list may be automatically updated. Each album 2710 includes an album title 2735 and thumbnails 2740 of the content items included in the album. When the user hovers over any part of an album 2710, that album may become active. When an album 2710 is active, the album title 2735 becomes an editable field, and a "dissolve album" button (not shown) is revealed. In one example, clicking the "dissolve album" button causes all the photos from that album to be placed into the unsorted photos area 2715.

According to one embodiment, "unsorted photos" (i.e., those not associated with an album) are displayed in the unsorted photos area 2715. The unsorted photos area 2715 includes a header 2745 identifying the area to the user, and also includes thumbnails 2740 of all items included in the unsorted photos area. In one example, when the camera is first attached, the unsorted photos area 2715 may be empty. A user can drag individual photos out of albums 2710 into the unsorted photos area 2715. As discussed above, a user can also click the "dissolve album" button (not shown) on an album 2710, thereby sending all the photos in that album to the unsorted photos area 2715. The user can also drag photos from the unsorted photos area 2715 into an album 2710. The videos area 2720 may similarly include a header 2745 identifying the area to a user, and thumbnails 2740 of an image of each video.

In one embodiment, if a user clicks the "new album" control button 2480 in the header 2415, a new album is added to the top of the list, pushing other albums down. When the new album appears, the title 2735 of the album may be pre-populated with "new album," but this title may also be selected/active so that the user can simply start typing to replace it. The user can then drag individual photos from other albums or from the unsorted photos area 2715 into the new album. The new album control 2480 may also be selected from the intermediate view, as shown in FIG. 25.

From the "choose & organize" screen a user may also delete items, such as, for example, out-of-focus or unflattering photos. In one example, the camera card supports batch deletion. This process may also provide the user with a safety net, making it more difficult to delete a content item by accident. In one example, when the user hovers over an individual thumbnail 2740, a check box labeled "delete" (or similar language) appears, and once the user checks the box, the image dims. The check box (without the "delete" label) may remain visible after it is checked, even if the user moves the cursor away from the item, making it very visually clear how to reverse the action. Un-checking the box may return the item to full saturation. When the user marks one or more items for deletion, the control buttons 2480 and 2485 in the header 2415 may be replaced with an "unmark all" option. The "delete all" control 2475 may remain or be replaced with "delete marked items." If user selects the "unmark all" control, all the items marked for deletion are unmarked. Selecting the delete control 2475 deletes the marked items and the thumbnails 2740 are removed from view. The remaining thumbnails 2740 may then rearrange themselves appropriately. The user can also delete items from the intermediate view shown in FIG. 24. In some cases, the camera (or other media device) that the user connects to the portable computer 100 may be locked or otherwise write-protected, making deletion impossible. In this case, the delete buttons (in the header 2415 and overlayed onto the thumbnails 2740) are dimmed, and information may be included in the header 2415 that indicates that the camera is locked. In this state, if the user hovers over the dimmed "delete all" button 2475 in the header 2415, a message may be displayed, such as "no deletion possible because the memory card is locked."

Still referring to FIG. 27, the user may move digital content items among different albums 2710 and to and from the unsorted photos area 2715. For example, the user can drag photos between albums 2710, from albums 2710 to the unsorted photos area 2715, or from the unsorted photos area into albums. When the user drags a photo, other thumbnails 2740 on the screen rearrange themselves to accommodate the added/removed item. In one example,

because videos are saved separately from photos, the user may not be able to drag videos from the video area 2720 into albums 2710. Similarly, the user may not drag a photo into the video area 2720. In one example, if the user attempts to drags a photo to an unavailable location (such as the videos area 2720 or previously uploaded items area 2725), the photo snaps back to its original location.

In one embodiment, if the user has previously uploaded items from a camera, but elected not to delete them, they appear in the "previously saved" area 2725. If there are no items that have been previously uploaded from the user's camera, the previously saved area 2725 may not appear. The previously saved area 2725 includes a header 2750 which identifies the area to the user, and may also display the number of previously uploaded content items that are on the camera. The previously saved area 2725 may initially not display thumbnails of the items, but instead display a "show items" button 2755. Clicking the "show items" button 2755 may reveal thumbnails of the previously uploaded items. The user may then select individual items to delete, or may drag photos from this area into albums 2710 or drag videos to the videos area 2720. If the user drags an item to an album 2710, the underlying behavior of the system on upload depends on the associated online photo hosting service. For services that use an "image stream" concept and therefore allow individual images to appear in multiple albums (e.g., FLICKR), the image may be added to the album using the camera card interface, but not uploaded again. For other services, the image may be uploaded again into the new album.

According to one embodiment, clicking on a thumbnail 2740 brings the user to the intermediate view, shown, for example, in FIG. 25. Clicking anywhere in the background may return the user to the standard view of the "choose & organize" screen. When the user has organized the digital content items to his/her satisfaction, the user may click the "save..." control 2485 in the header 2415. In one example, clicking the save control 2485 causes a modal page bubble 2810 to appear, providing the user with options for saving, as shown in FIG. 28. The user may elect to save or not save each individual album, as well as unsorted photos and videos using the check boxes 2815. In the illustrated example, a check box is included with each column header to allow the user to quickly select all items in that column. If the user has registered more than one photo or video host service, a column may be provided for each service, identified by name. The user may then elect to save each individual album to one, all, or none of the services, using the appropriate check boxes. In one example, the system warns the user about potential restrictions a photo host service may place on videos (e.g., size, format, etc.), allowing the user to use that information in selecting where the videos

are to be saved. A check box 2830 may be provided to given the user the option of whether or not the system will delete items from the attached camera after the items have been safely uploaded. In one example, deleting the items upon successful upload is selected by default. If the user does not select a service for a set of items (e.g., one or more albums, unsorted photos, or videos), the system will leave those items - they will not be uploaded, but they will also not be deleted from the camera. In this case, the information about the album (e.g., its contents and title) may be retained until the camera is disconnected from the portable computer. Thus, once the upload process for the rest of the items is complete and the user returns to the "choose & organize" screen, the album is still as the user arranged it. The bubble 2810 may further include a "cancel" button 2840 to allow the user the cancel the upload and return to the "choose & organize" screen, and a "save" button 2850 to initiate the upload process.

According to one embodiment, once the user initiates the upload process, by selecting either the simple save or advanced save option, the portable computer 100 begins uploading the digital content items to the cloud 330. As discussed above, the user may see the progress of the upload on the camera card. The user may also upload digital content items from within the digital media card 1620a. For example, the user may use the time view or album view to locate content items to upload, for example, to a social networking site or another online hosting service. In one example, the upload may be initiated from the user's pick list discussed above. Whether the upload is initiated from the camera card or the digital media card, the user may see information regarding the status of the upload, for example, whether each content item has been saved, how much progress has been made on the upload, which online hosting service the content item is being uploaded to, etc. In one example, during upload, the camera card displays the images being uploaded, with the current image shown enlarged. In one example, the user can interact with the images during the upload process. This interaction may behave similarly to the single album view in the digital media application discussed above.

In one example, all content uploaded on the user's behalf may be marked as "private" or the equivalent on their photo hosting service. This default behavior protects the user's privacy and keeps others from viewing the user's content without the user's permission. It is to be appreciated; however, that other default options may be implemented, and the user may be prompted to identify content as private or public, or equivalents thereof.

According to one embodiment, if the user has elected to have images deleted from the camera after upload, then each content item is deleted as soon as it is uploaded into the cloud 330. In one example, the user can still see the content items in the context of the camera card,

however, until the camera is disconnected from the portable computer 100. Referring to FIG. 24, in one example, if the user clicks the "Stop saving" button 2435 in the header 2415, the upload stops and the system then returns the user to the initial screen as though the camera had just been attached. In this instance, content items that have already been uploaded and deleted from the camera are no longer included. The content item that was in process when the user clicked the "Stop saving" button 2435 will not have been deleted from the camera yet and may therefore appear. In another example, if the user had elected not to delete content items from the camera (e.g., by unchecking box 2830, content items that have already been uploaded may appear in the previously saved area 2725.

Once the upload is complete (i.e. the digital content items are safely stored in the cloud 330), the system may display an informational bubble letting the user know it is safe to remove the camera. The user may then be returned to the camera card page view (if the simple save option was used) or to the "choose & organize" screen if the advanced save option was used. In either case, the system recognizes that the content items have been uploaded. If the content items have been deleted from the camera, they no longer appear in "choose & organize" screen, and if they have been left on the camera they appear in the previously saved area 2725. Once the camera is disconnected, or the user navigates away from the camera card after an upload, the newly uploaded content items may become indistinguishable from previously stored items in the digital media library.

In some instances, the upload process may be interrupted before it is complete. For example, the camera may run out of power, the portable computer may lose its connection to the cloud, or the user may disconnect the camera before the upload is complete. In one example, in the event of an interrupted upload, the camera card displays a warning and information about the state of the upload and/or camera. From the page view of the camera card, the user may elect to stop the upload or cancel the message, retuning the system to the "no camera connected" state. In one example, if the user elected to stop the upload and subsequently reconnects the camera, the camera card will behave as though it were the first time that camera is being connected. Alternatively, if the user elected instead to cancel the "saving interrupted" message, the camera card may resume uploading the digital content items the next time the user connects the camera. If the user has taken some new photos during the time when the camera was disconnected and then reconnected, the new photos may be automatically uploaded when the camera is reconnected. Alternatively, the use may be given the option to upload the new photos or not, or may navigate to the "choose & organize" screen

to select certain photos for upload. Any digital content items not uploaded may remain on the camera and be treated as new photos the next time the camera is connected to the portable computer.

As discussed above, in one embodiment the portable computer 100 is configurable into an easel mode. One example of the camera card behavior when a camera is connected to the portable computer in the easel mode is shown in diagrammatic form in FIG. 29. In this example, the camera card becomes the current channel 2910 and a camera menu 2920 is displayed to give the user the opportunity to save the contents of the camera (2930) or view the contents as a slideshow (2940). In one example, the save behavior is similar to the simple save behavior discussed above in that the system may save new items using automatically generated albums. In another example, if the user elects to save the contents of the camera, the upload begins. In one example, each content item is shown in full screen as it uploads, with an indication of its progress. In one example, the portable computer will not enter the screensaver mode during an upload. As in other examples discussed above, the user may continue to interact with the system during the upload. For example, the user may view other channels, and can navigate back to the camera card channel to view the progress of the upload. Once the upload is complete, a notification may be displayed to the effect that it is safe to disconnect the camera. In one example, this notification remains as long as the camera is still attached to the portable computer, but may be displayed in a corner or other unobtrusive location. In one example, when the user disconnects the camera, the camera card is no longer available as a channel. According to one embodiment, if an upload has been interrupted and the user reconnects the camera to the portable computer in the easel mode, the upload resumes in the background without notification. If there are no new images on the camera, the user may only be given the option to see a slideshow of the images on the camera.

Having thus described several aspects of at least one embodiment, it is to be appreciated various alterations, modifications, and improvements will readily occur to those skilled in the art. Such alterations, modifications, and improvements are intended to be part of this disclosure and are intended to be within the scope of the invention. Accordingly, the foregoing description and drawings are by way of example only, and the scope of the invention should be determined from proper construction of the appended claims, and their equivalents.

What is claimed is:

CLAIMS

1. A method for accessing and managing digital media libraries on a streamlined computing device with a plurality selectable I/O profiles, the method comprising:

displaying a graphical user interface on a computing device, wherein the graphical user interface comprises at least a plurality of views of digital media content;

providing for transition between the plurality of views in response to selection of an I/O profile;

providing for transition between the plurality of views in response to activation of a view selector component configured to permit a user to select one of the plurality of views;

associating at least one of a plurality of visual representations with digital media content;

executing the association with the at least one of the plurality of visual representations with digital media content in response to selection;

transitioning a display on the computing device to a view of the digital media content in response to the act of executing the association; and

providing for display of user digital media content and referenced digital media content in the view of the digital media content.

2. The method according to claim 1, further comprising an act of displaying in the view user digital media content and referenced digital media content in response to the act of executing the association with the at least one of the plurality of visual representations.

3. The method according to claim 2, wherein the act of displaying in the view user digital media content and referenced digital media content includes an act of accessing a reference to remote digital content not controlled by the user in order to display referenced digital content.

4. The method according to claim 1, further comprising an act of associating the at least one of the plurality of visual representations with a remote service provider.

5. The method of claim 4, further comprising an act storing the association between the at least one visual representation with the remote service provider in at least one of a device profile and a user profile.

6. The method according to claim 1 further comprising acts of:

configuring access to a remote service; and

integrating operations provided by the remote service provider into the view of the digital media content.

7. The method according to claim 1, wherein the view comprises at least one of an album view and a timeline view.

8. The method according to claim 7, further comprising an act of displaying digital media content in a body portion of the view.

9. The method according to claim 7, further comprising an act of displaying a toggle element in a header portion of the view, wherein the toggle element transitions the computing device display between the album view and the timeline view upon selection by a user.

10. The method according to claim 7, further comprising acts of:

displaying emulation controls responsive to selection by the user; and

emulating standard computer operations for referenced digital media content displayed in the view, wherein the act of emulating standard computer operations includes:

an act of determining if the user has authority to perform the standard computer operations,

determining the user does not have the authority to perform the standard computer operation on a source of the referenced digital media content, and wherein the act of displaying the emulation controls occurs in response to the determination that the user does not have the authority.

11. The method according to claim 10, wherein the standard computer operation includes an act of deleting digital media content, and the method further comprises an act of altering the view of the digital media content so the digital media content marked for deletion is not displayed within the view.

12. The method according to claim 11, further comprising an act of generating a state entry, associated with at least one of the view and the source of the referenced digital media content.

13. The method according to claim 12, further comprising an acts of:

accessing any state entry for at least one of the view and the source of referenced digital media content; and

displaying referenced digital media content according to any state entry requirement.

14. The method according to claim 10, wherein the standard computer operation includes an act of editing referenced digital media content, and the method further comprises an act of generating a state entry reflecting any edits made to the referenced digital media content.

15. The method according to claim 7, further comprising acts of:

providing an aggregation component configured to permit the user to select a plurality of digital media content;

displaying the plurality of digital media content in the body of the view; and

permitting the user to perform operations on the plurality of digital media content.

16. The method according to claim 15, wherein the act of permitting the user to perform operations on the plurality of digital media content includes at least one of a share operation, a create channel operation, and an order prints operation.

17. The method according to claim 16, wherein the at least one operation is a share operation, and the method further comprises acts of:

identifying any state entries for the plurality of digital media content;

identifying any remote service settings for the plurality of digital media content; and

transmitting a visual representation associated with the plurality of digital media content, any state settings, and any remote service settings to another streamlined device user.

18. The method according to claim 1, further comprising acts of:

permitting the user to share the at least one visual representation, including any associated digital media content with another user;

storing shared information in response to an act of sharing by the user; and

updating any associated digital media automatically for the another user, wherein the act of updating any associated digital media includes acts of:

identifying any changes in shared digital media content, wherein changes include at least one of addition of digital media content associated with the at least one visual representation, deletion of digital media content associated with the at least one visual representation, edits of digital media content associated with the at least one visual representation, and updates of information associated with digital media content associated with the at least one visual representation.

19. The method according to claim 1, further comprising acts of:

permitting the user to share the at least one visual representation, including any associated digital media content with another user;

transmitting the at least one visual representation associated with the digital media content, any state settings, and any remote service settings to another streamlined device user.

20. The method according to claim 1, further comprising an act of permitting the user to update date information associated with the digital media content.

21. The method according to claim 20, further comprising an acts of:

generating an offset for the updated date information associated with the digital media content; and

applying the offset to similar digital media content.

22. The method according to claim 7, wherein the view is a time view and the method further comprises:

displaying a timeline navigation control in the body of the view, wherein the timeline navigation control is configured to provide organization segments, the organization segments providing a visual indication of a number of digital media content items in each segment.

23. The method according to claim 22, wherein the timeline navigation control further comprises a handle responsive to a pointer displayed on the computer device, wherein the handle is further responsive to select and drag operations.

24. The method according to claim 1, wherein the act of displaying the user interface includes:

providing a plurality of views of the plurality of visual representations of computer content; and

associating the plurality of visual representations of computer content with at least one of the plurality of views, and wherein the each of the plurality of visual representations is responsive to focus and execution, wherein execution includes selection of the visual representation.

25. The method according to claim 1, wherein the act of providing for transition between the plurality of views in response to selection of an I/O profile includes:

permitting the user to rotate a display element about a longitudinal axis running along an interface between the display component and a base of the streamlined computing device;

wherein rotating the display component about the longitudinal axis up to approximately 180 degrees from the closed mode configures the portable computer into a laptop mode with one of the plurality of views as a default display; and

wherein rotating the display component about the longitudinal axis beyond approximately 180 degrees from the closed mode configures the portable computer into an easel mode with another one of the plurality of views as a default display.

26. A computer-readable medium having computer-readable instructions stored thereon that as a result of being executed by a computer, instruct the computer to perform the method for accessing and managing digital media libraries on a streamlined computing device with a plurality selectable I/O profiles, wherein the method comprises:

displaying a graphical user interface on a computing device, wherein the graphical user interface comprises at least a plurality of views of digital media content;

providing for transition between the plurality of views in response to selection of an I/O profile;

providing for transition between the plurality of views in response to activation of a view selector component configured to permit a user to select one of the plurality of views;

associating at least one of a plurality of visual representations with digital media content;

executing the association with the at least one of the plurality of visual representations with digital media content in response to selection;

transitioning a display on the computing device to a view of the digital media content in response to the act of executing the association; and

providing for display of user digital media content and referenced digital media content in the view of the digital media content.

27. A system for accessing and managing digital media libraries with a plurality selectable I/O profiles, the system comprising:

a display component configured to display a graphical user interface, wherein the graphical user interface comprises at least a plurality of views of digital media content, wherein the plurality of views include at least one of a plurality of visual representations;

an execution component configured to transition the graphical user interface between the plurality of views in response to selection of an I/O profile;

a view selector component configured to transition between the plurality of views in response to activation;

a storage component configured to store an association between at least one of a plurality of visual representations and digital media content;

wherein the execution component is further configured to execute the association with the at least one of the plurality of visual representations with digital media content in response to selection and transition the display to a view of the digital media content in response to the act of executing the association; and

wherein the display component is configured to display user digital media content and referenced digital media content in the view of the digital media content.

ABSTRACT

Various aspects and embodiments are directed to a streamlined computer device and a graphical user interface that organizes interface elements into views of computer content for presentation to a user. Various views of digital media content permits users to easily and efficiently access various digital media content. Different views are used to provide an interface that is responsive to configurations of the device and responsive to activity being performed by the user. Aspects include permitting the user to maintain and manage digital media content libraries. According to some embodiments, the libraries comprise user digital media content and references digital media content. Functionality provided to a user can be tailored to the type of content displayed, accessed and/or managed. According to various aspects, methods and systems are provided for accessing and managing digital media libraries on a streamlined computing device with a plurality selectable I/O profiles. According to some embodiments, the methods may include displaying a GUI on a device, wherein the GUI comprises at least a plurality of views of digital media content, providing for transition between the plurality of views in response to selection of an I/O profile and in response to activation of a view selector component by a user, executing an association with the at least one of the plurality of visual representations with digital media content in response to selection, transitioning a display on the computing device to a view of the digital media content, and providing for display of user digital media content and referenced digital media content in the view of the digital media content.

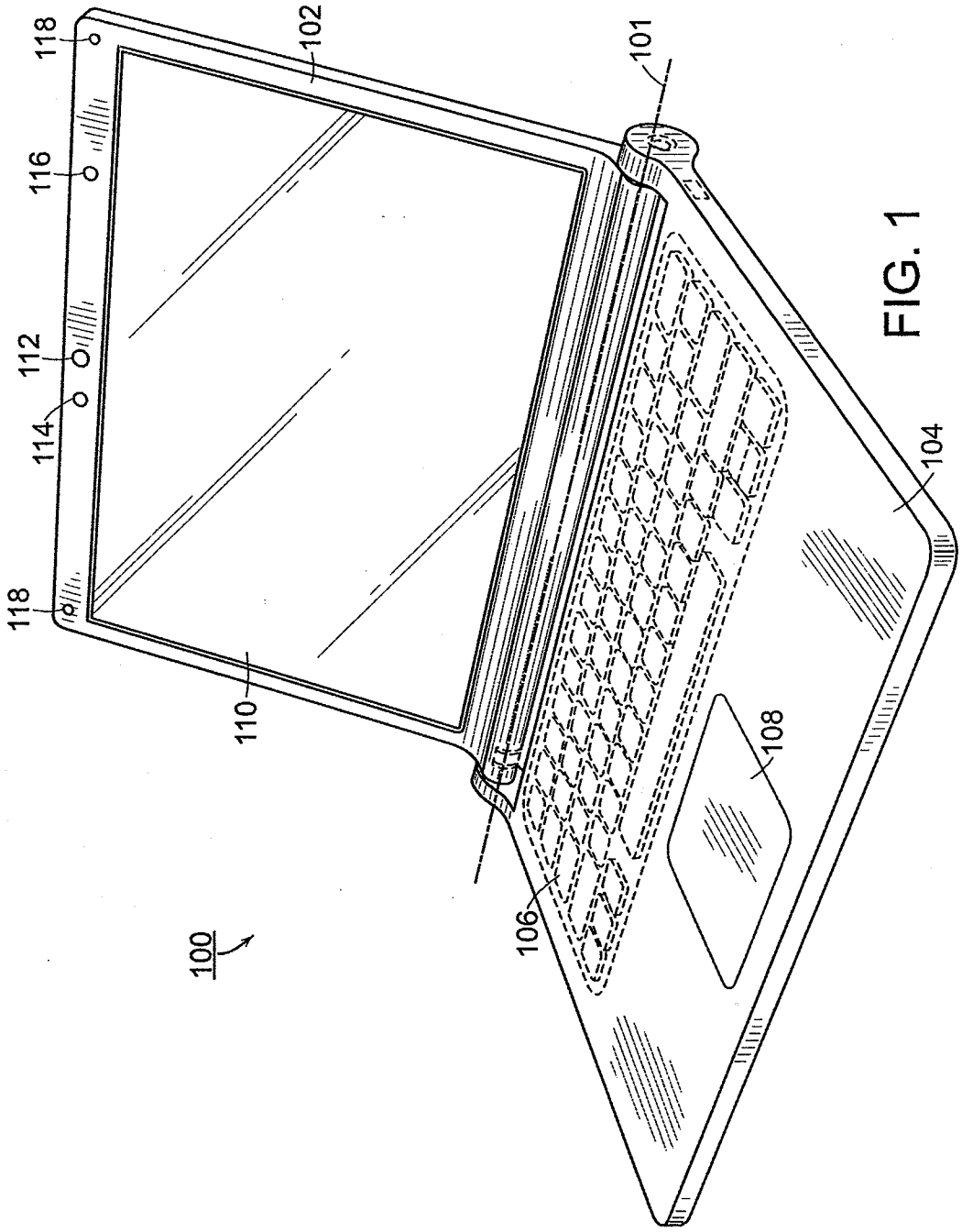


FIG. 1

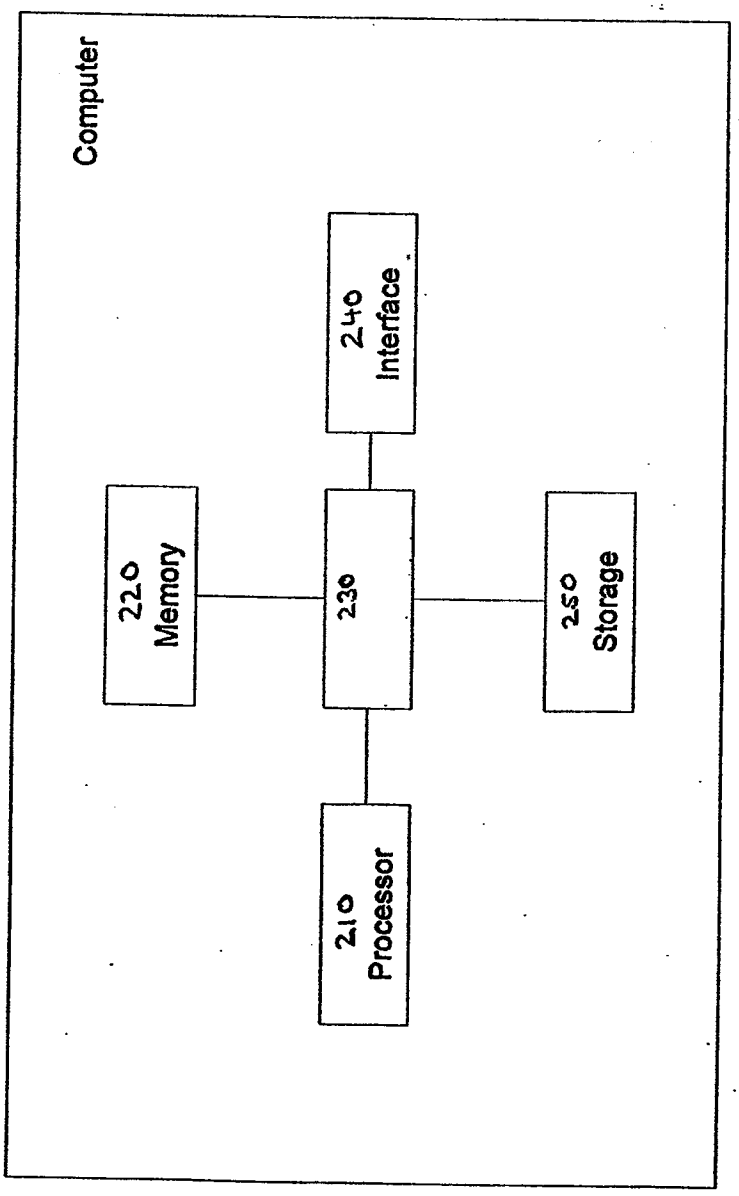

Computer
240
Interface
220
Memory
230
250
Storage
210
Processor

FIG. 2

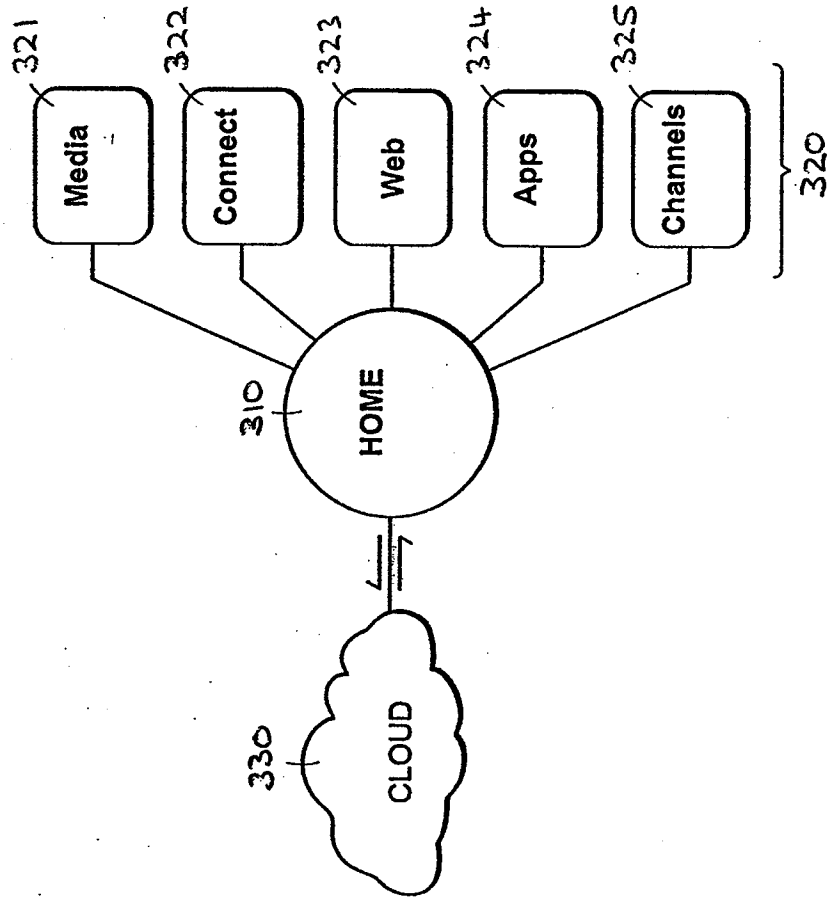

321
Media
322
Connect
323
Web
324
Apps
325
Channels
320
310
HOME
330
CLOUD

FIG. 3

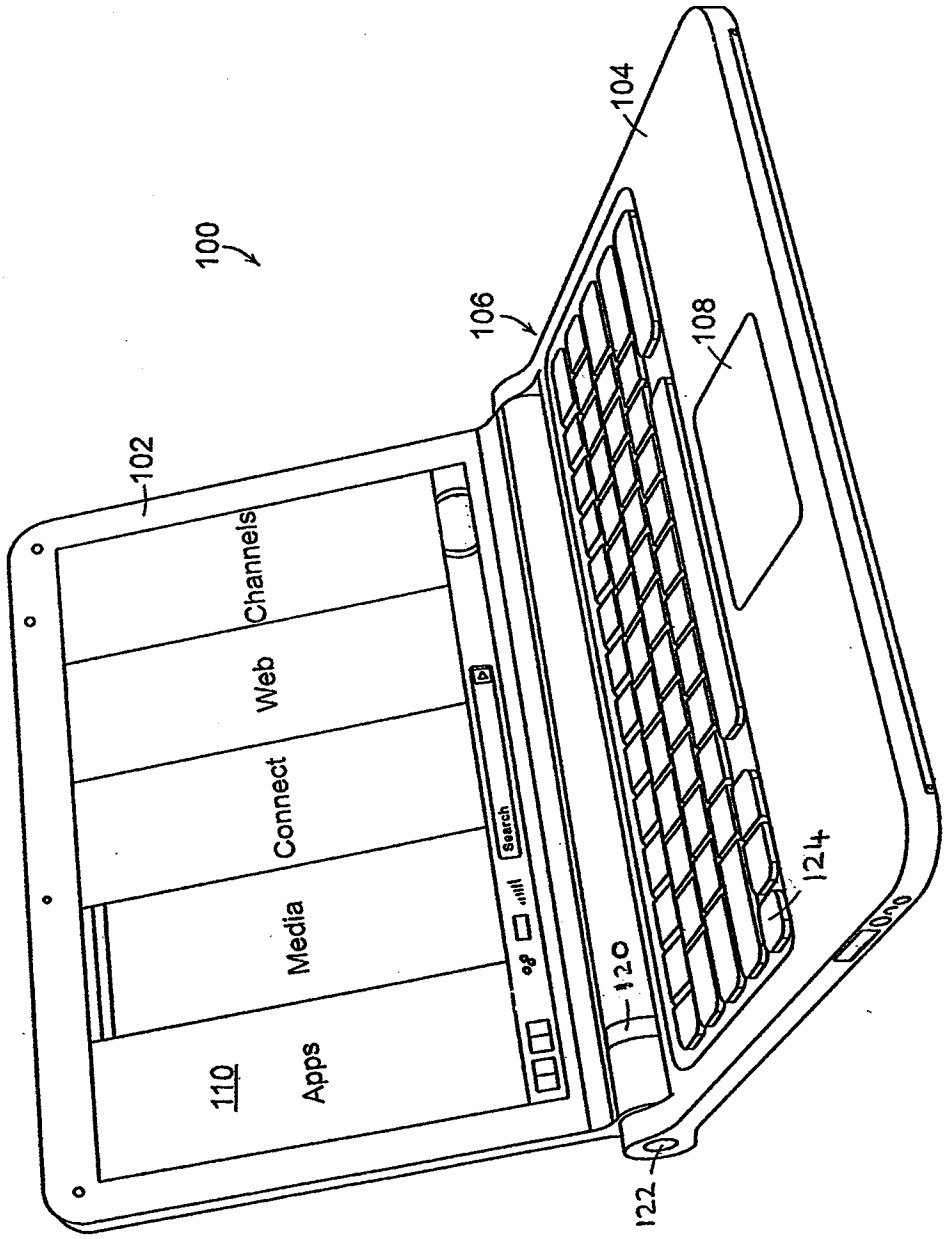

100
102
104
106
108
110
Apps
Media
Connect
Web
Channels
Search
120
122
124

FIG. 4

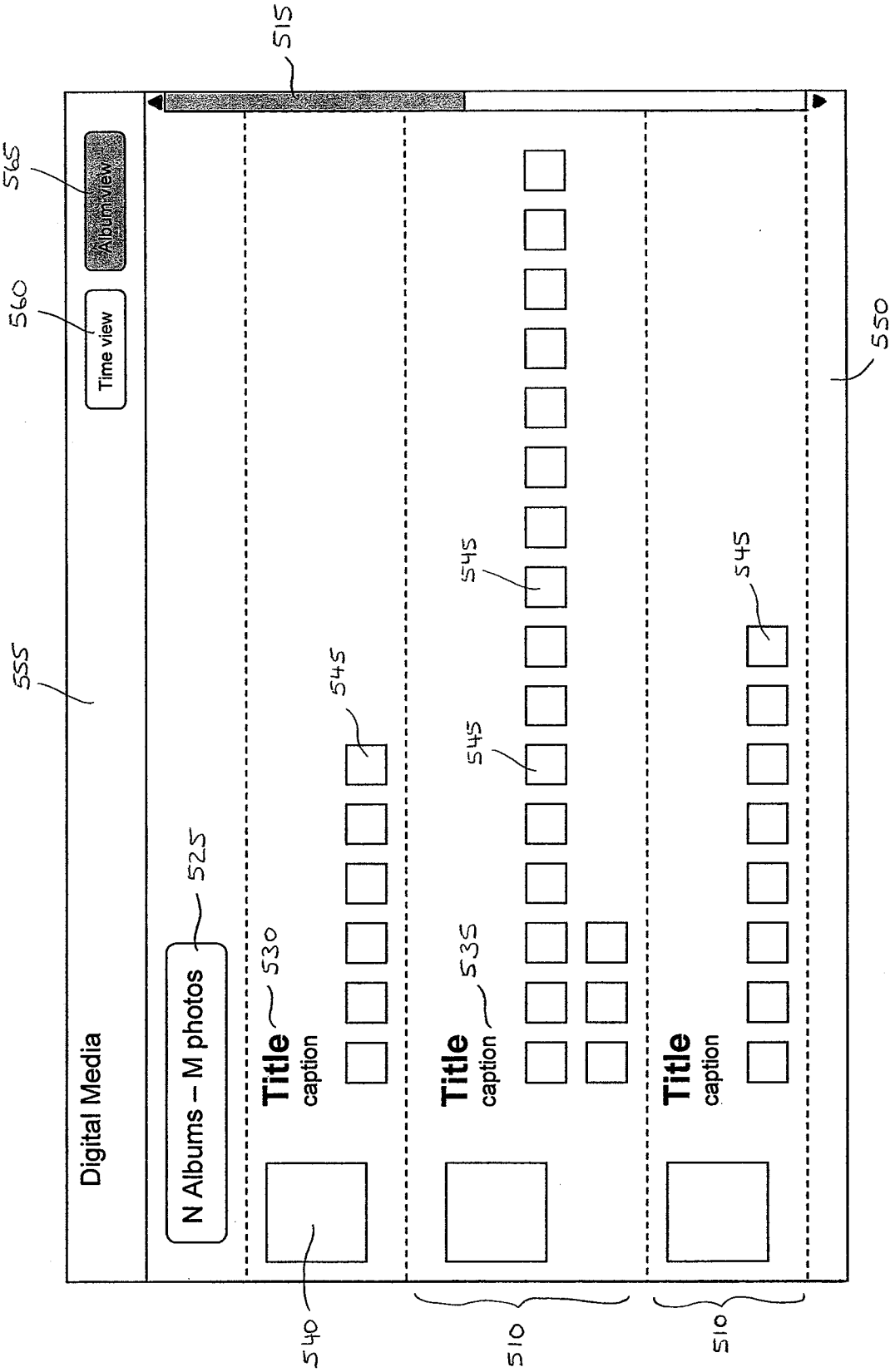

515
565
Album view
560
Time view
550
555
Digital Media
525
N Albums – M photos
530
Title
caption
545
535
540
510

FIG. 5

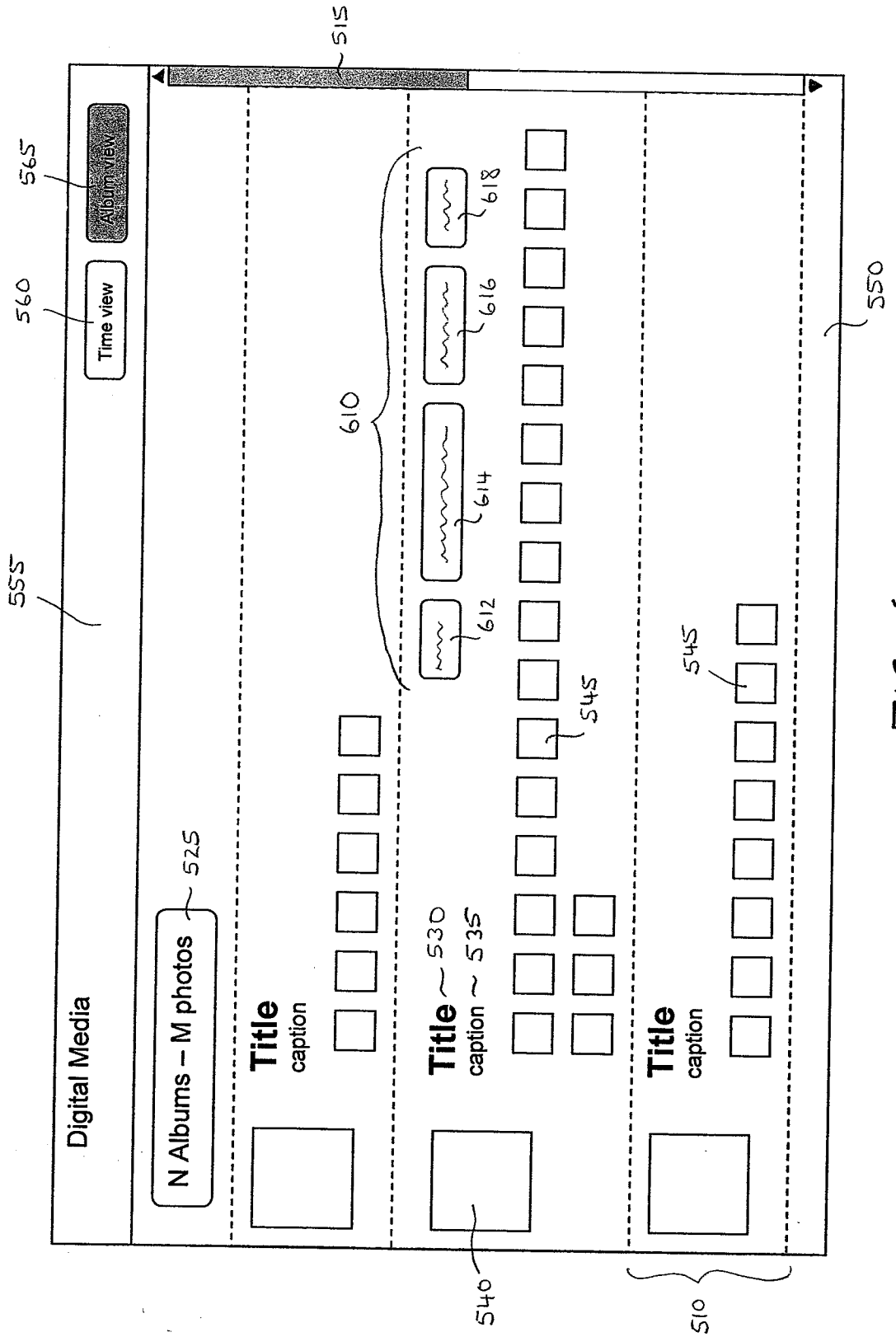

Digital Media
N Albums – M photos
525
Time view
560
Album view
565
555
515
550
610
612
614
616
618
545
Title
caption
530
535
540
510

FIG. 6

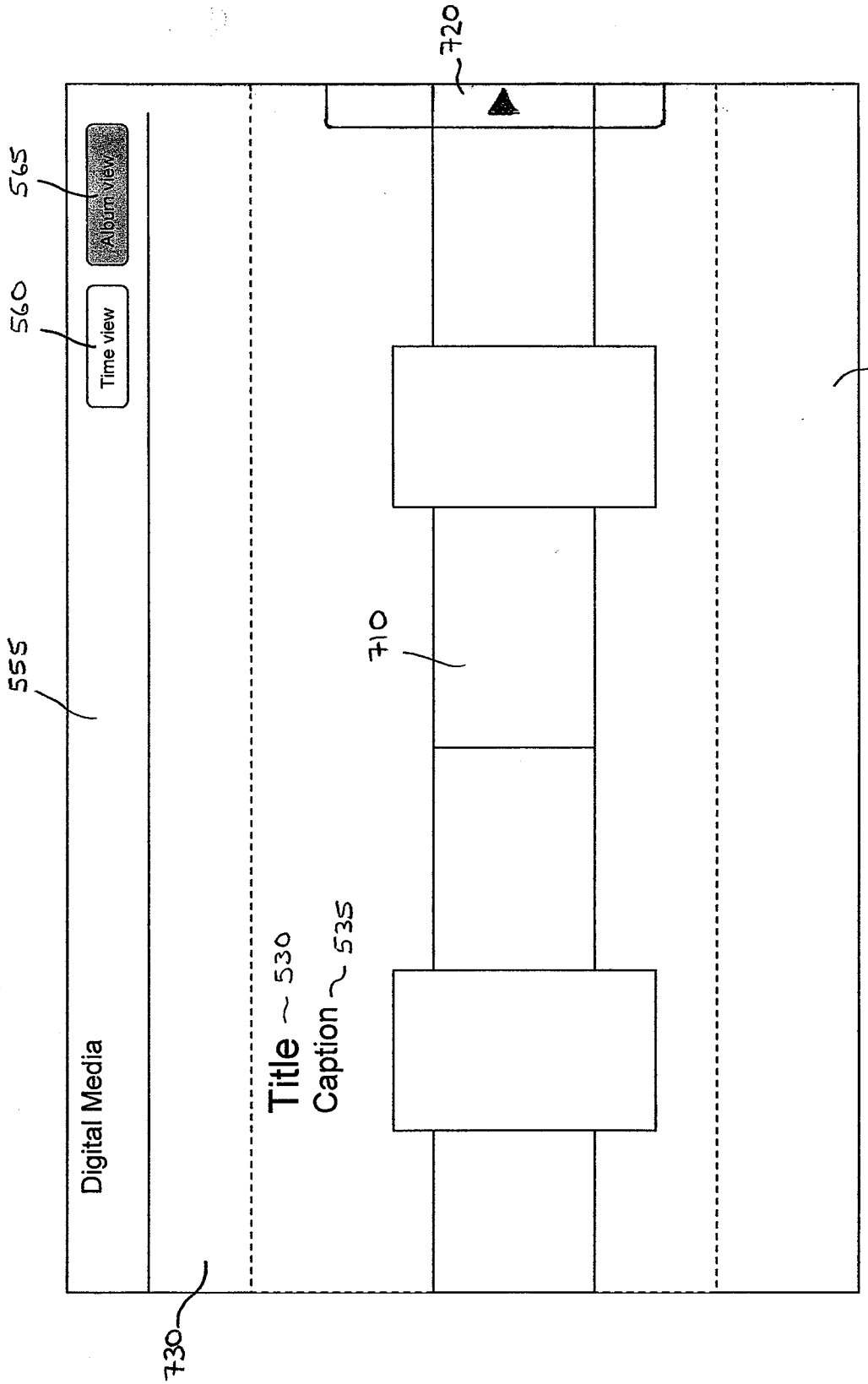

720
565
Album view
560
Time view
730
555
710
Digital Media
Title ~ 530
Caption ~ 535
730

FIG. 7A

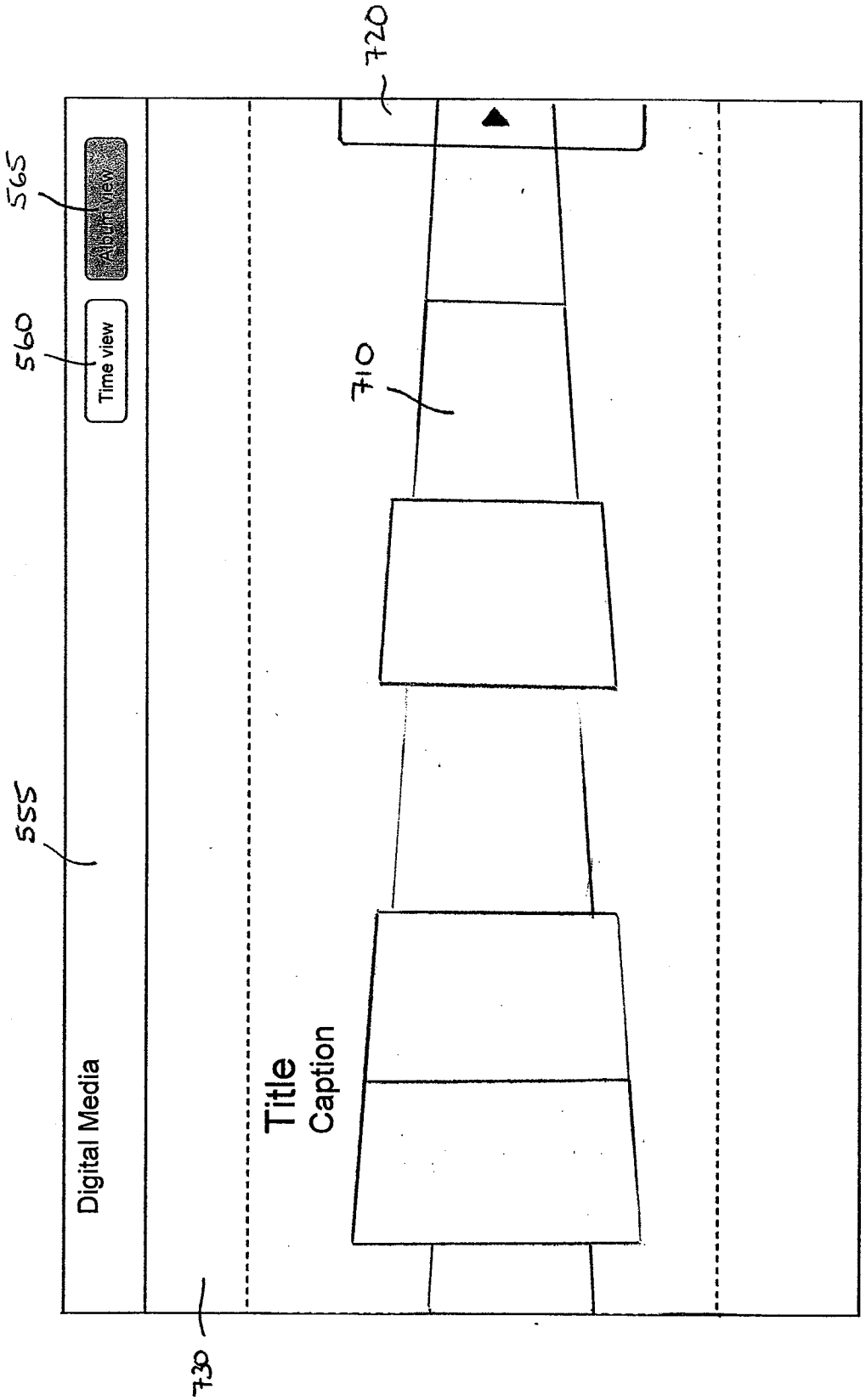

720
565
Album view
560
Time view
710
555
Digital Media
Title
Caption
730

FIG. 7B

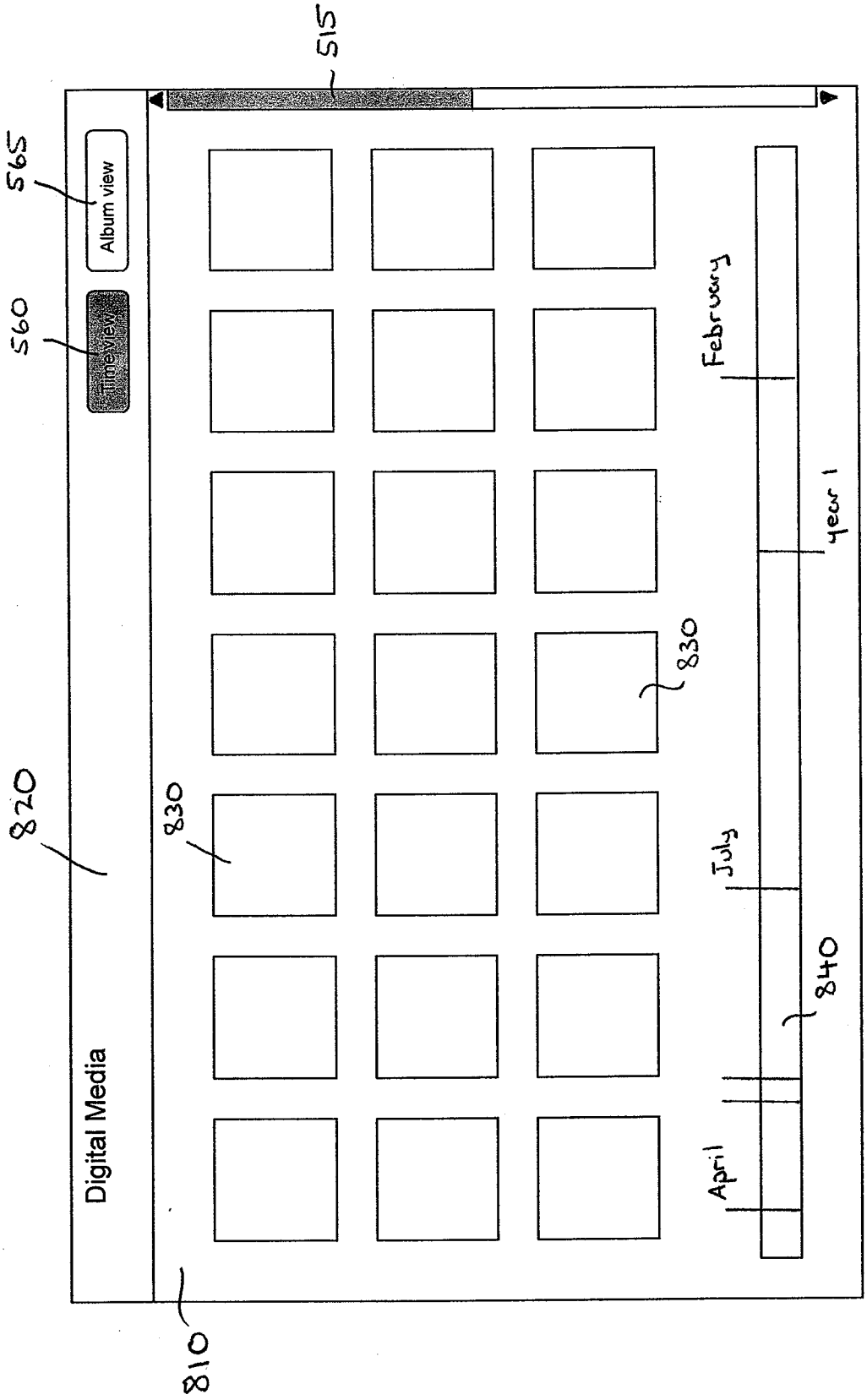

515
565
Album view
560
Time view
Digital Media
820
830
830
810
February
year 1
July
840
April

FIG. 8

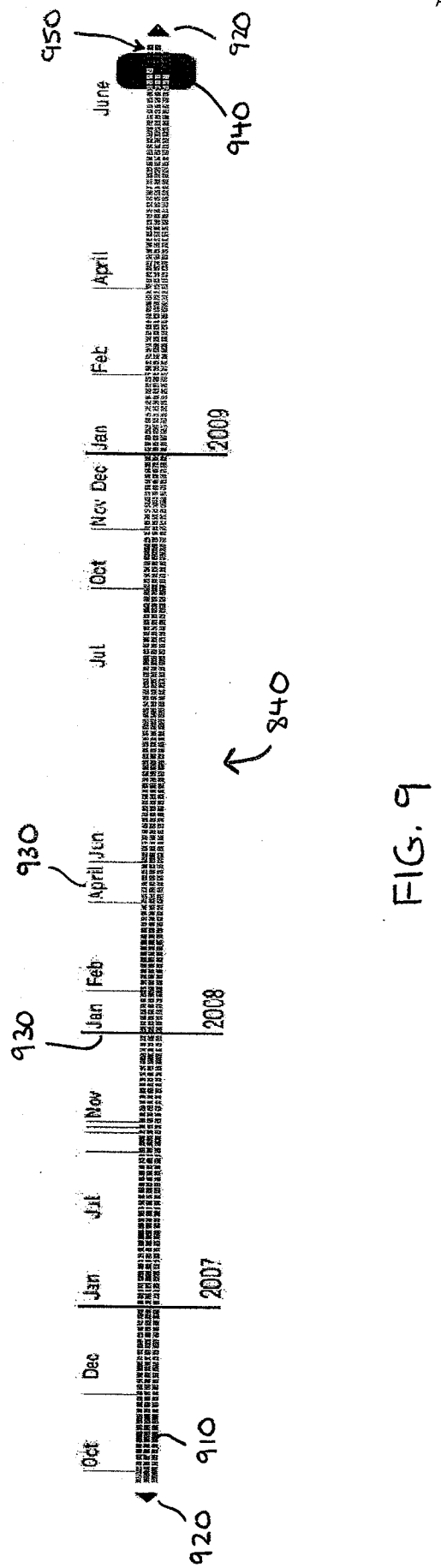

950
920
940
June
April
Feb
Jan
2009
Dec
Nov
Oct
Jul
840
930
April
Jan
Feb
Jan
2008
930
Nov
Jul
Jan
2007
Dec
Oct
910
920

FIG. 9

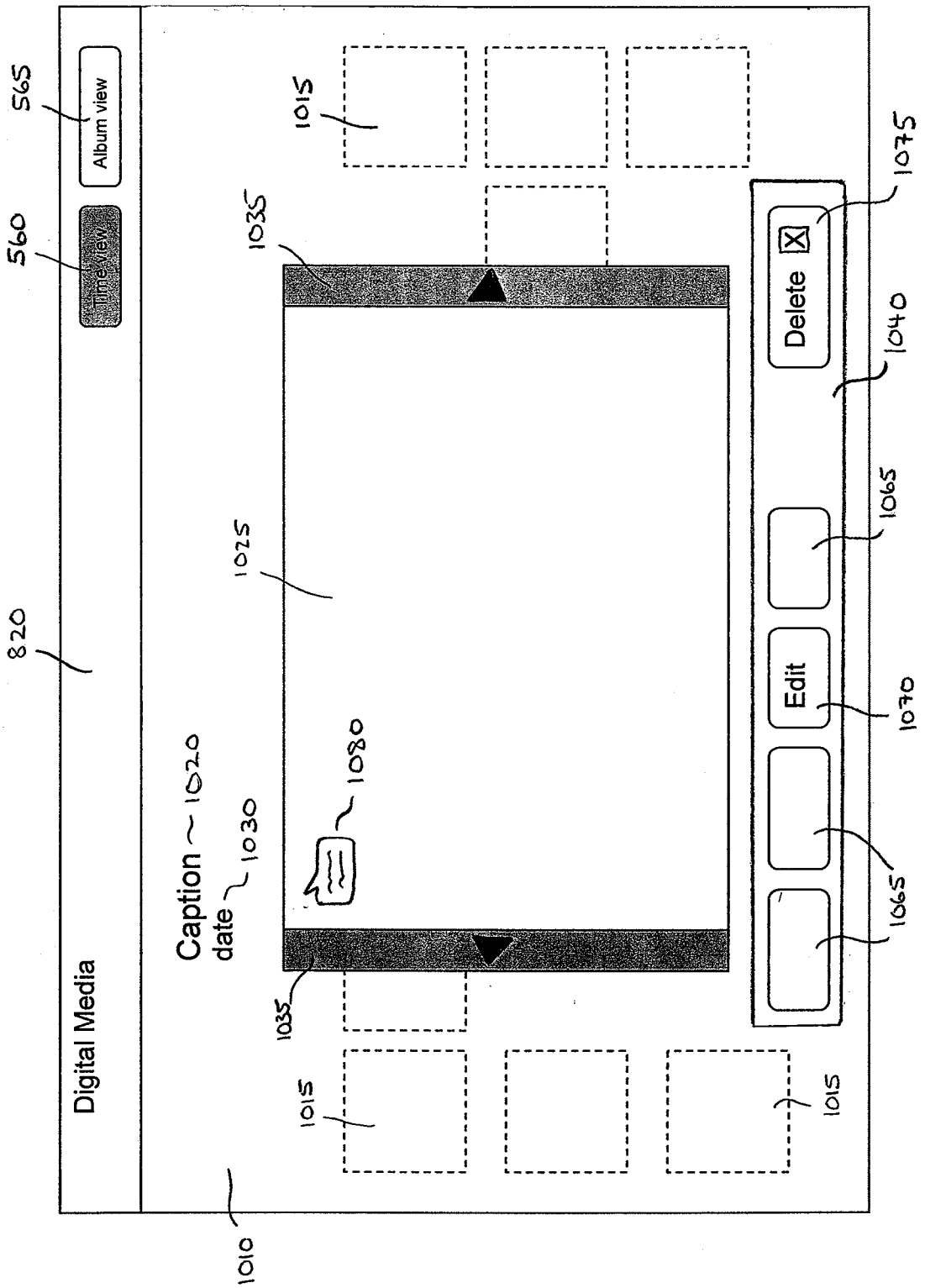

565
Album view
560
Time view
820
Digital Media
1010
1015
1035
1025
Caption ~ 1020
date
1030
1080
1035
1015
1015
1075
Delete
1040
1065
Edit
1070
1065

FIG. 10

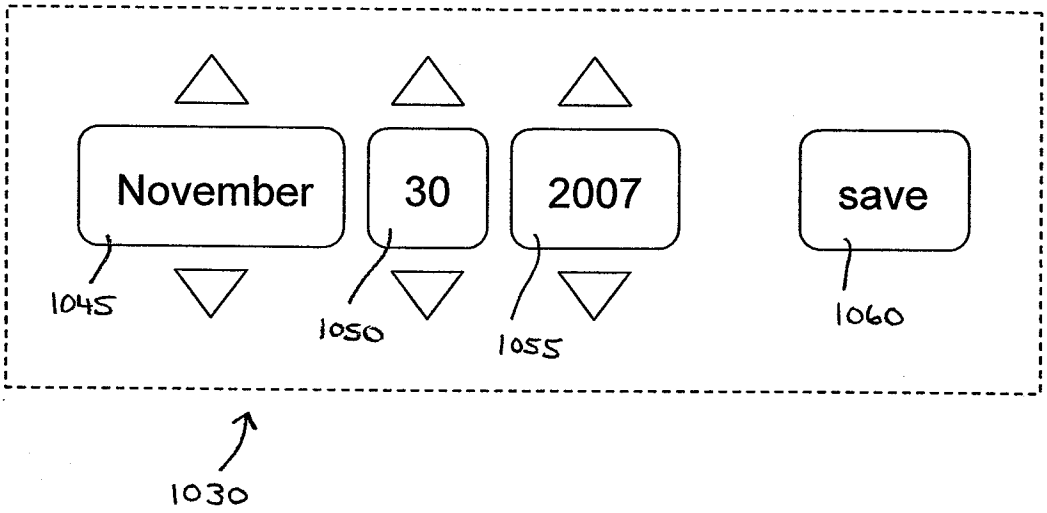


FIG. 11

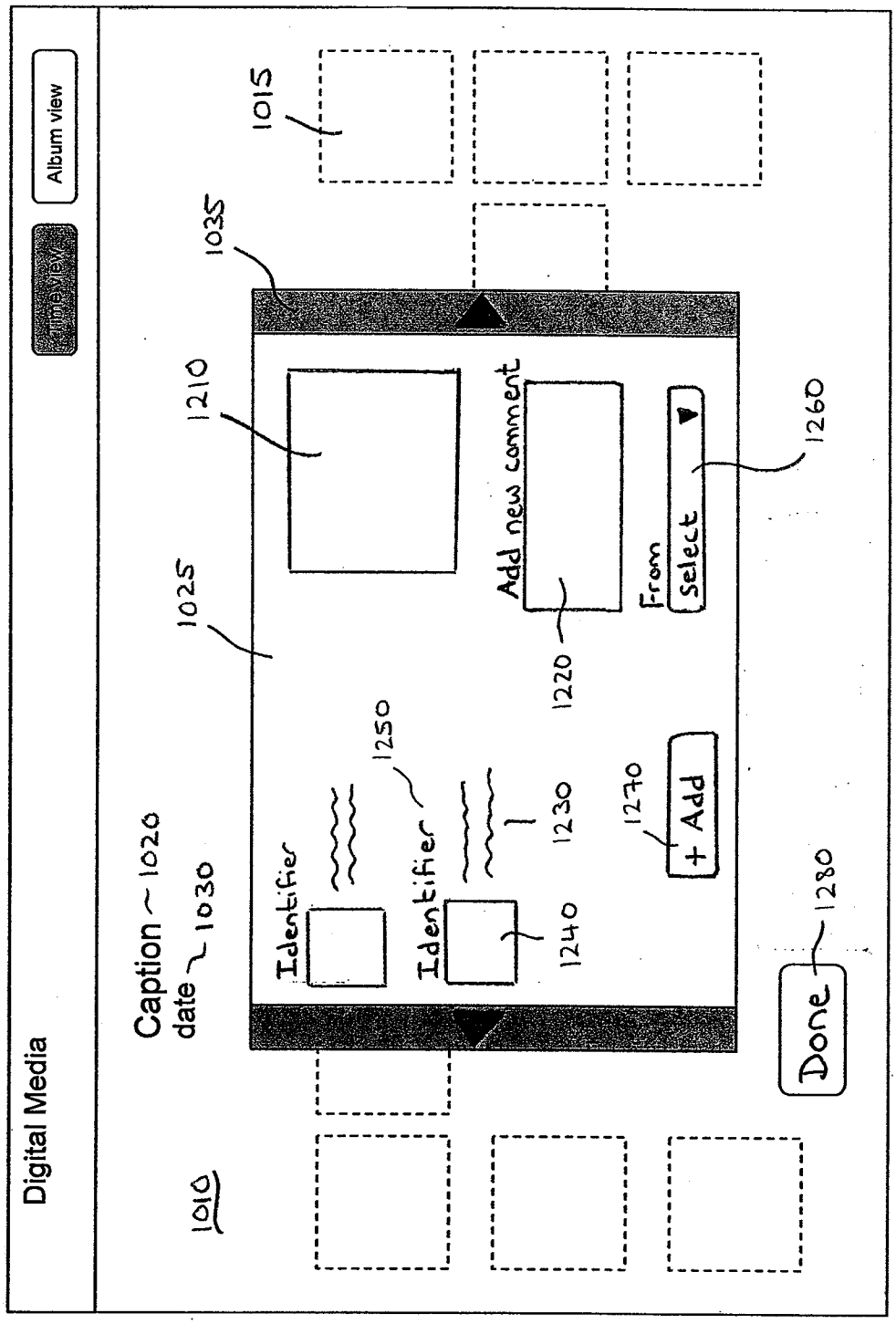

Digital Media
Timeline
Album view
1010
1015
1035
1025
1210
Caption
1020
date
1030
Identifier
1250
Identifier
1240
1230
1220
Add new comment
From
Select
1260
1270
+ Add
Done
1280

FIG. 12

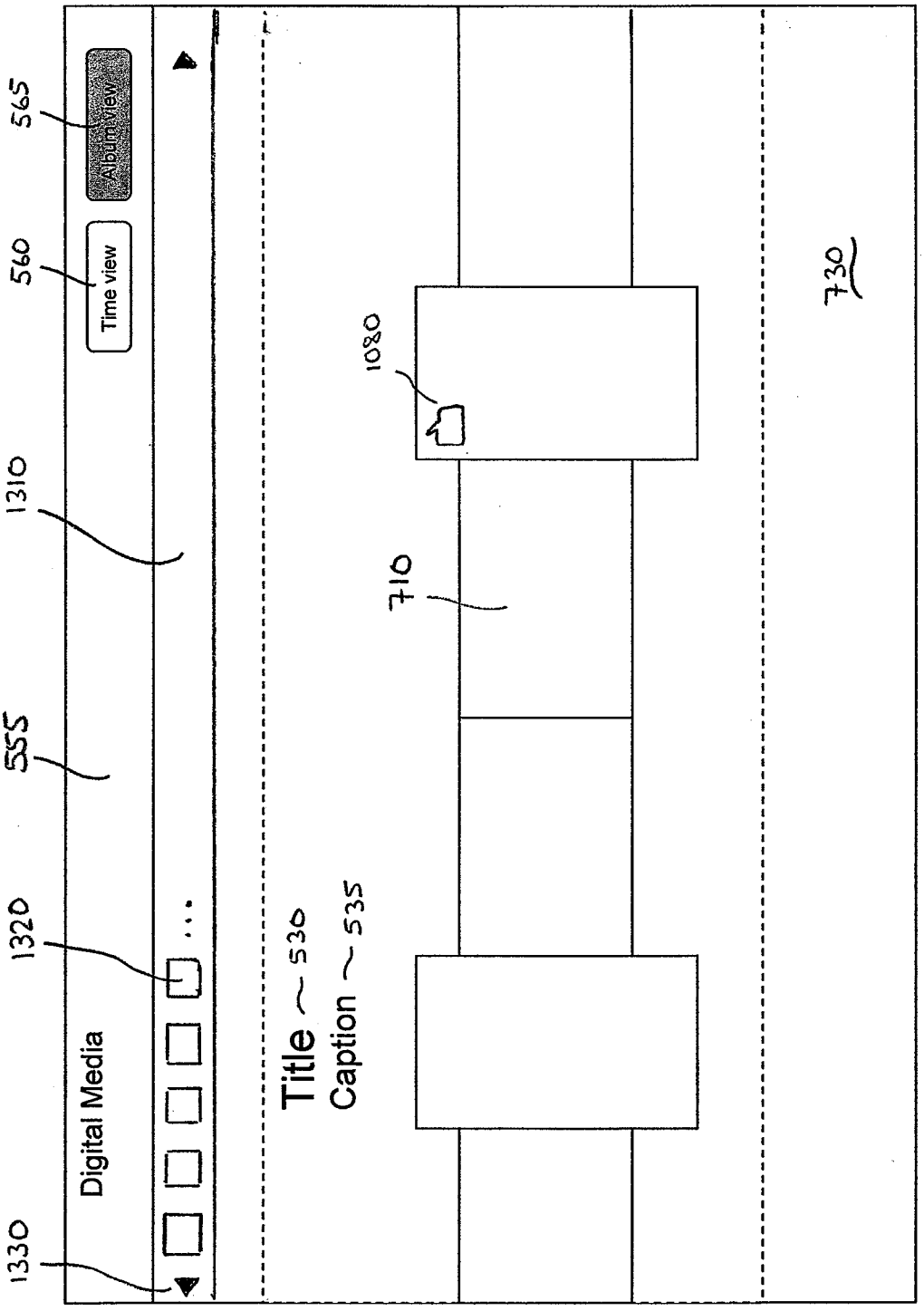

565
Album view
560
Time view
1310
555
1320
1330
Digital Media
Title ~ 530
Caption ~ 535
1080
710
730

FIG. 13A

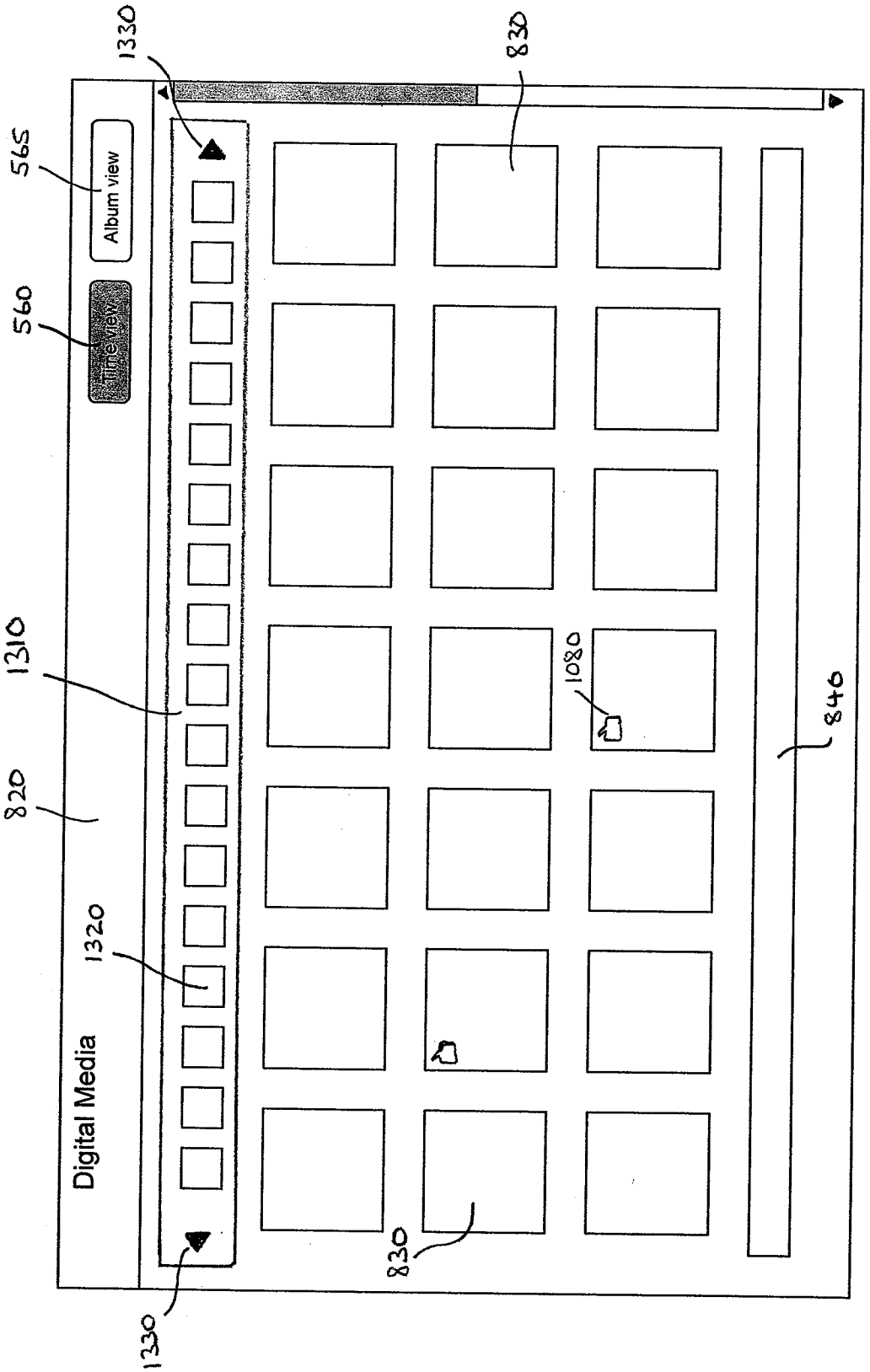

1330
830
565
Album view
560
Time view
1310
820
1320
Digital Media
1080
840
830
1330

FIG. 13B

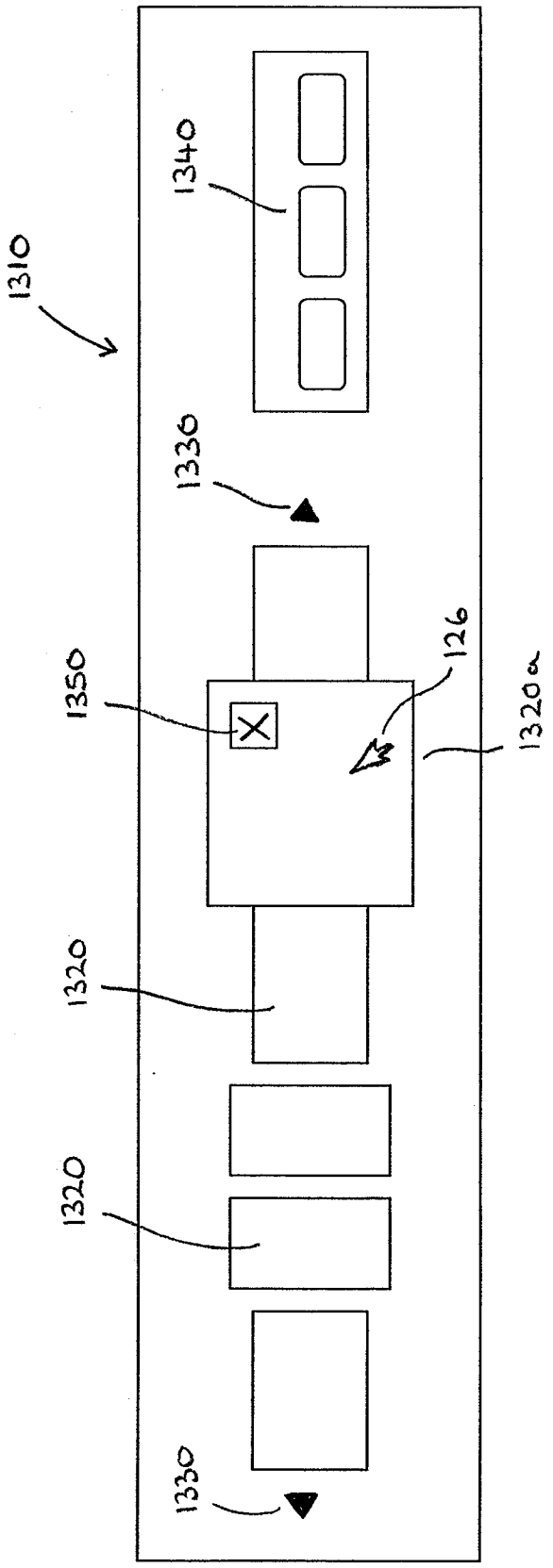


FIG. 13C

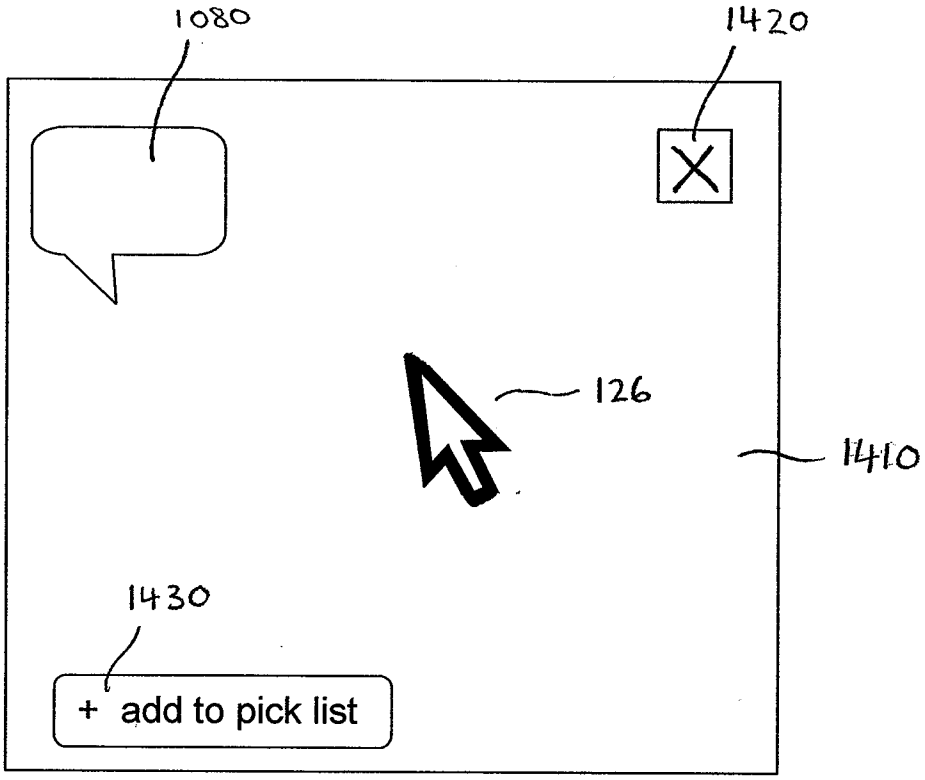


FIG. 14

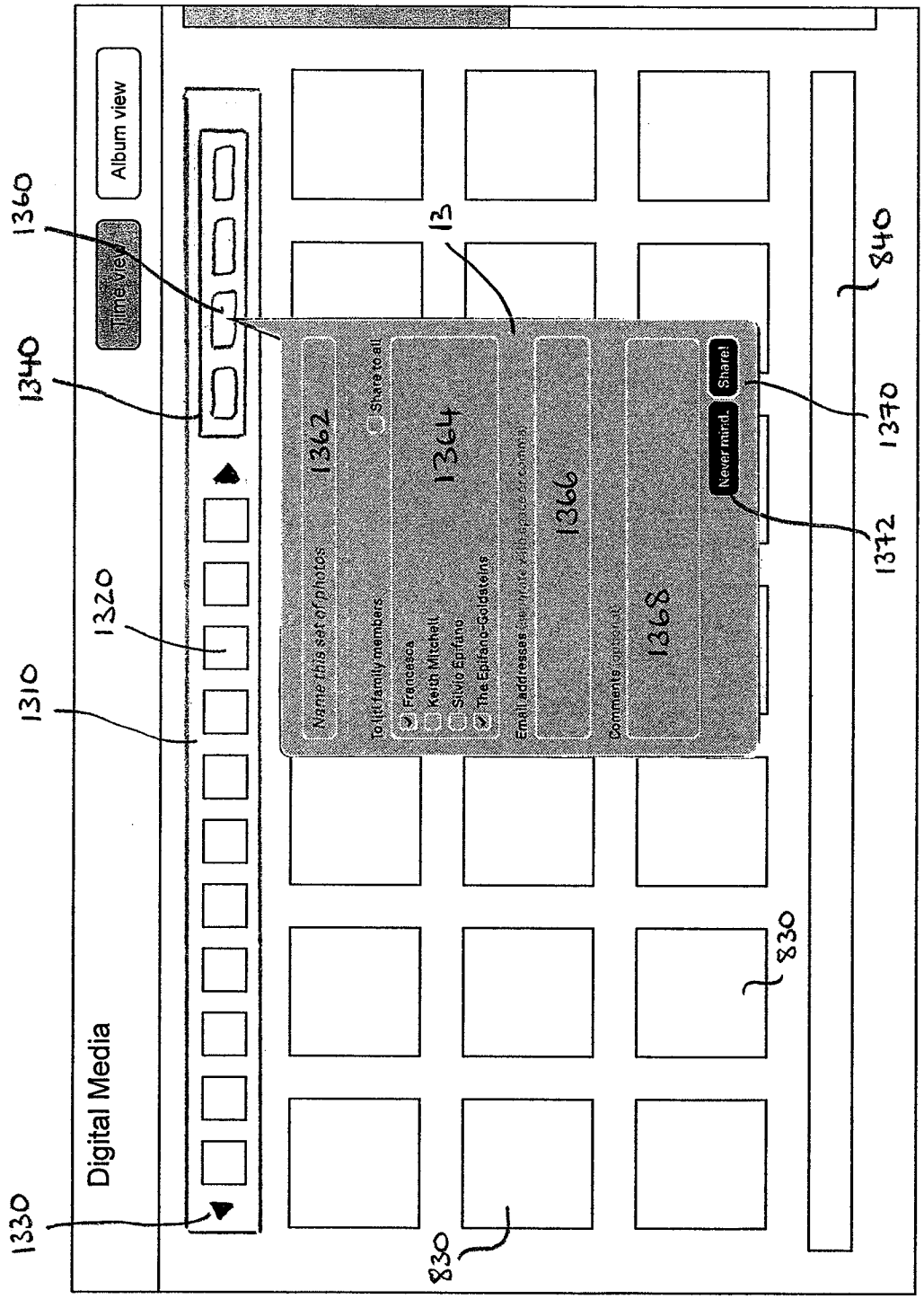

Digital Media
Album view
Time view
1330
1340
1360
1320
1310
830
830
840
13
1362
1364
1366
1368
1370
1372
Share!
Never mind.
Share to all
To: Family members
Francesca
Keith Mitchell
Silvio Epifano
The Epifano-Goldsteins
Name this set of photos
Email addresses
Comments

FIG. 15

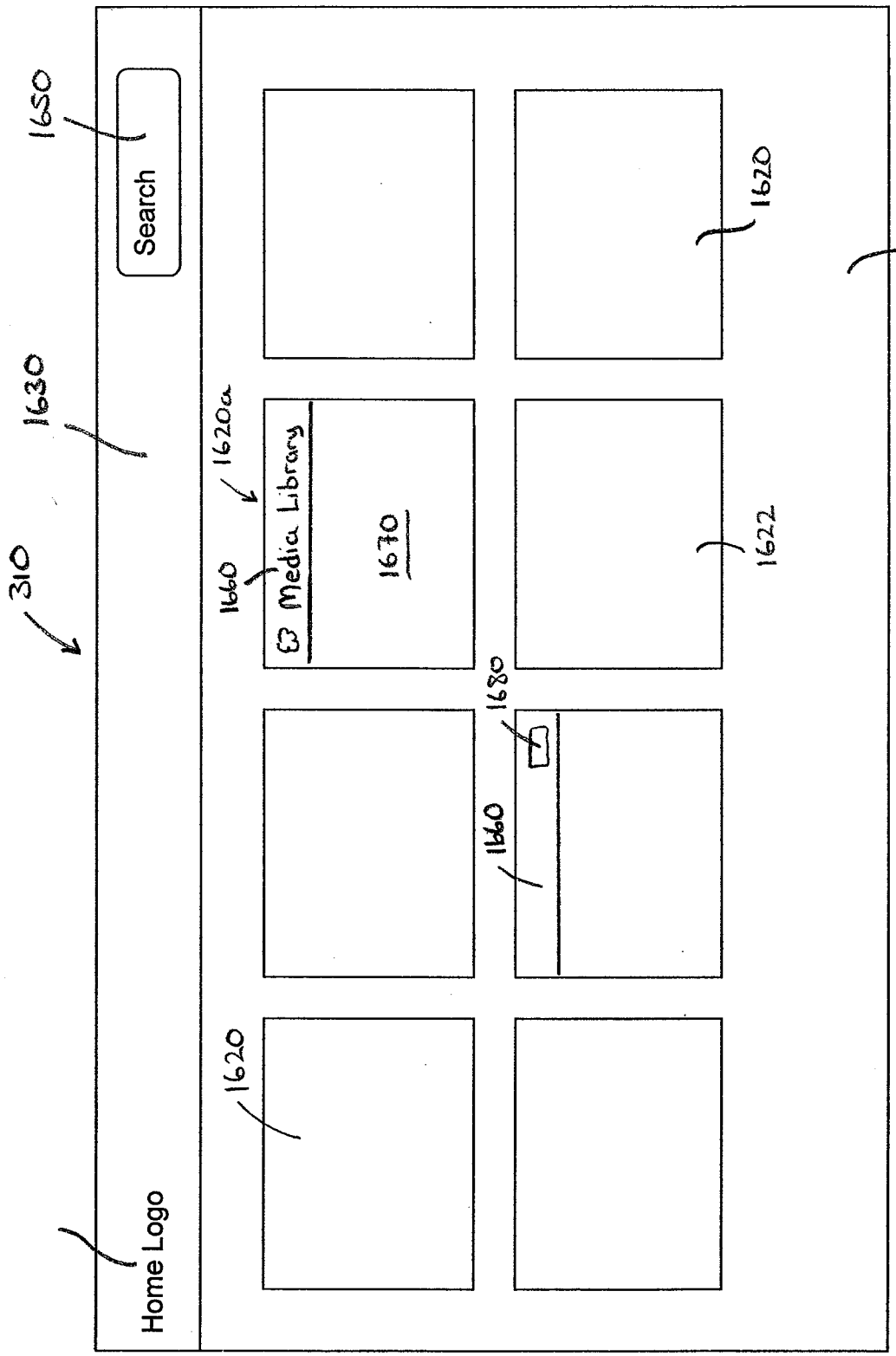

1650
Search
1630
310
1620a
1660
Media Library
1670
1620
1610
1622
1680
1660
1620
Home Logo

FIG. 16

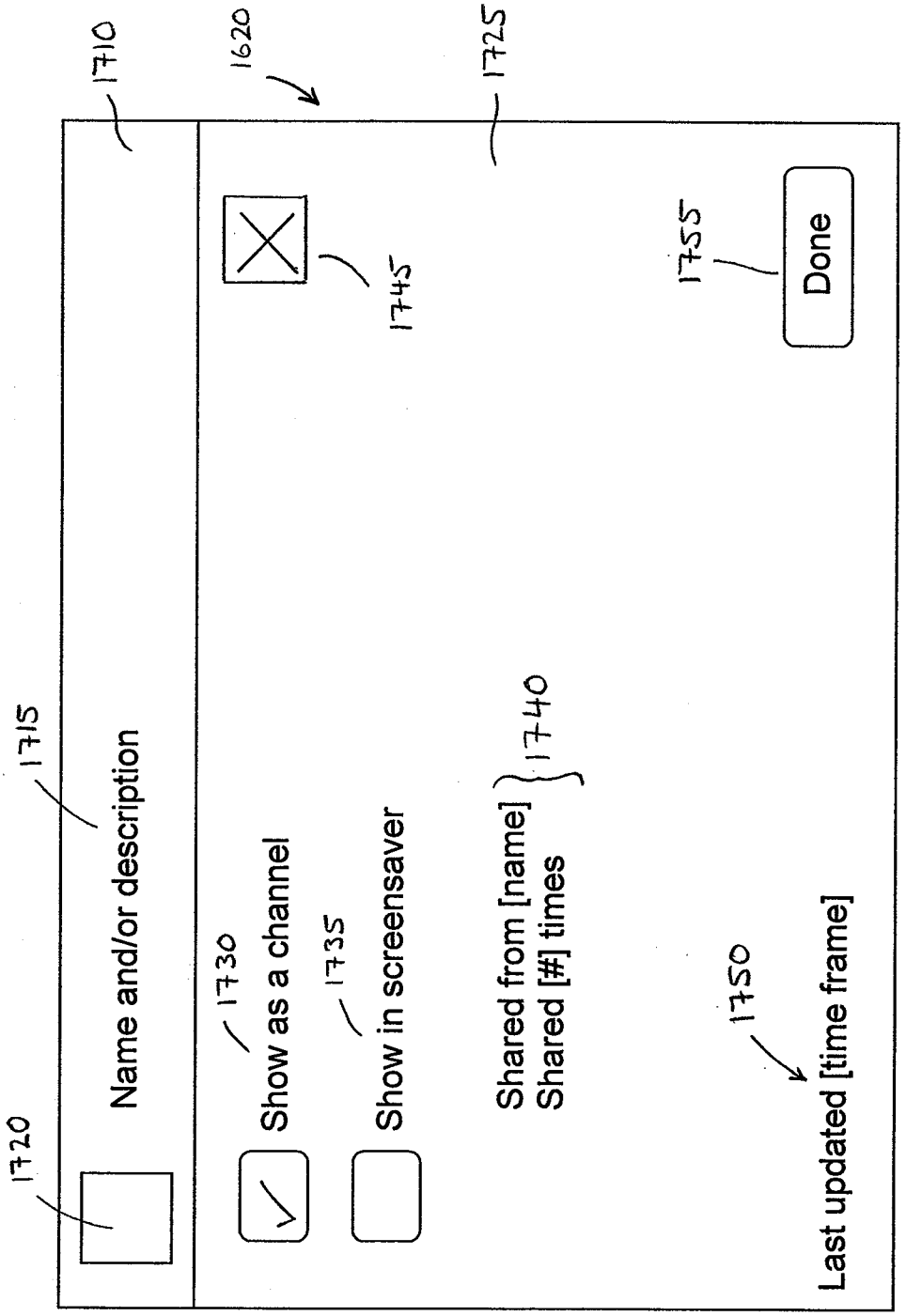

1710
1620
1725
1715
1720
Name and/or description
1730
Show as a channel
1735
Show in screensaver
1745
Shared from [name]
Shared [#] times
1740
1750
Last updated [time frame]
1755
Done

FIG. 17A

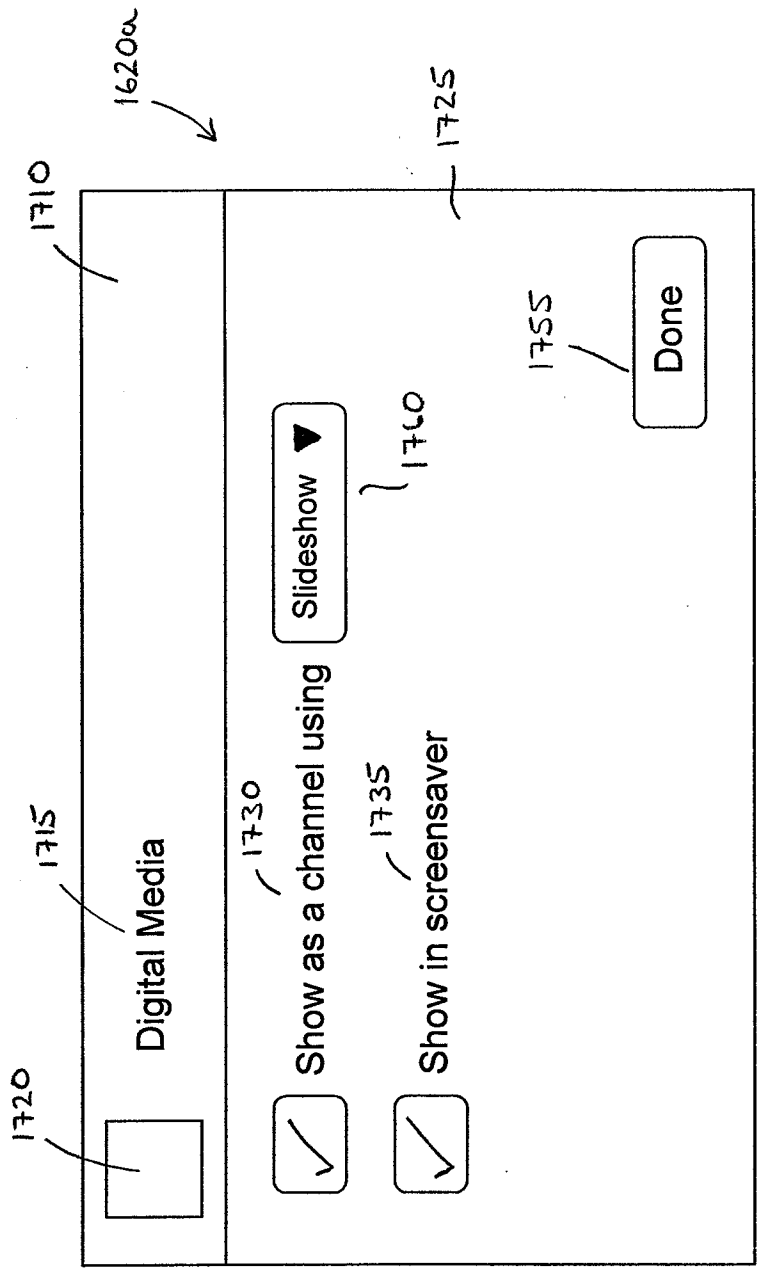

1620a
1710
1725
1715
Digital Media
1730
Show as a channel using
Slideshow
1760
1735
Show in screensaver
1755
Done
1720

FIG. 17B

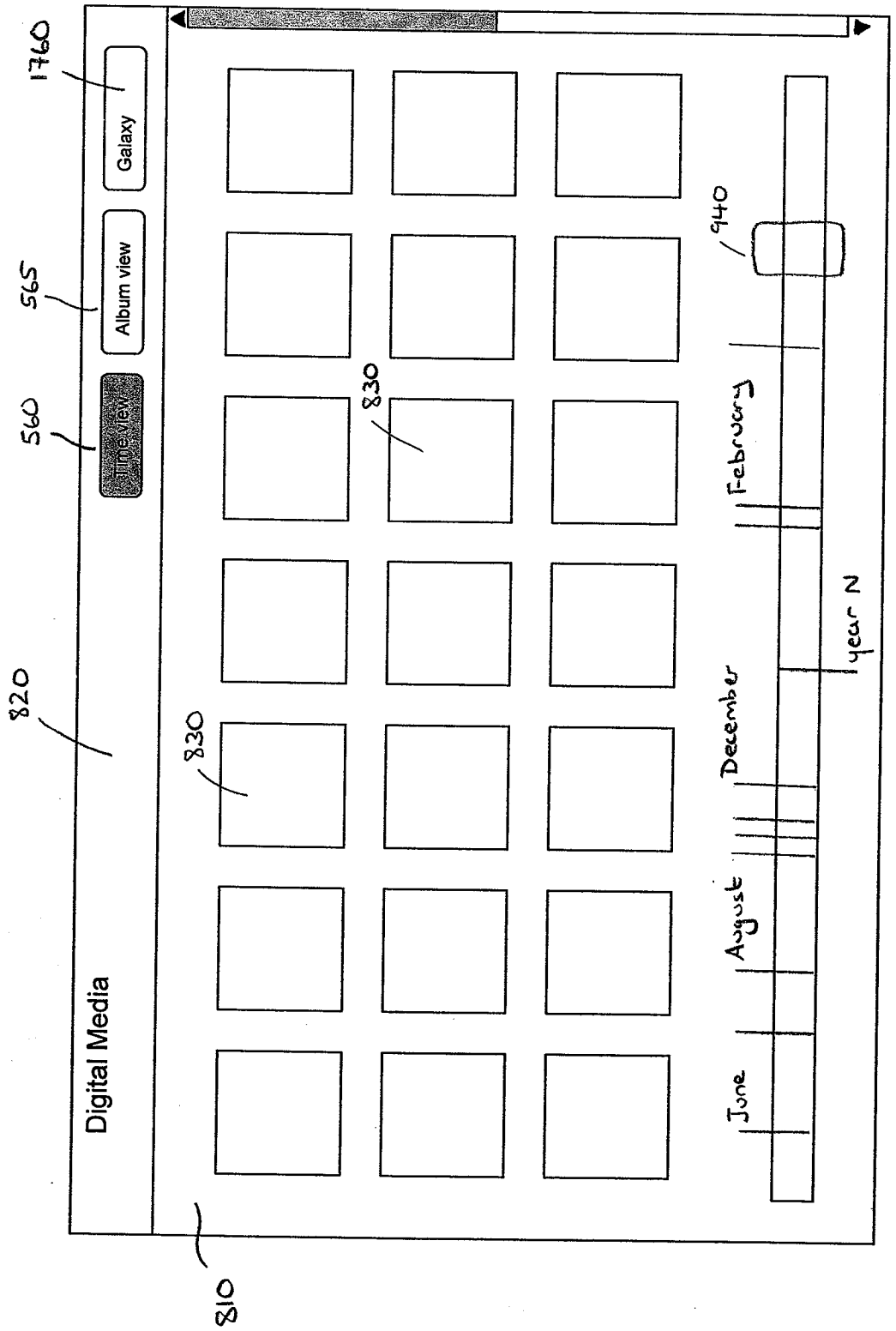

1760
Galaxy
565
Album view
560
Time view
820
Digital Media
830
830
940
February
December
year N
August
June
810

FIG. 18A

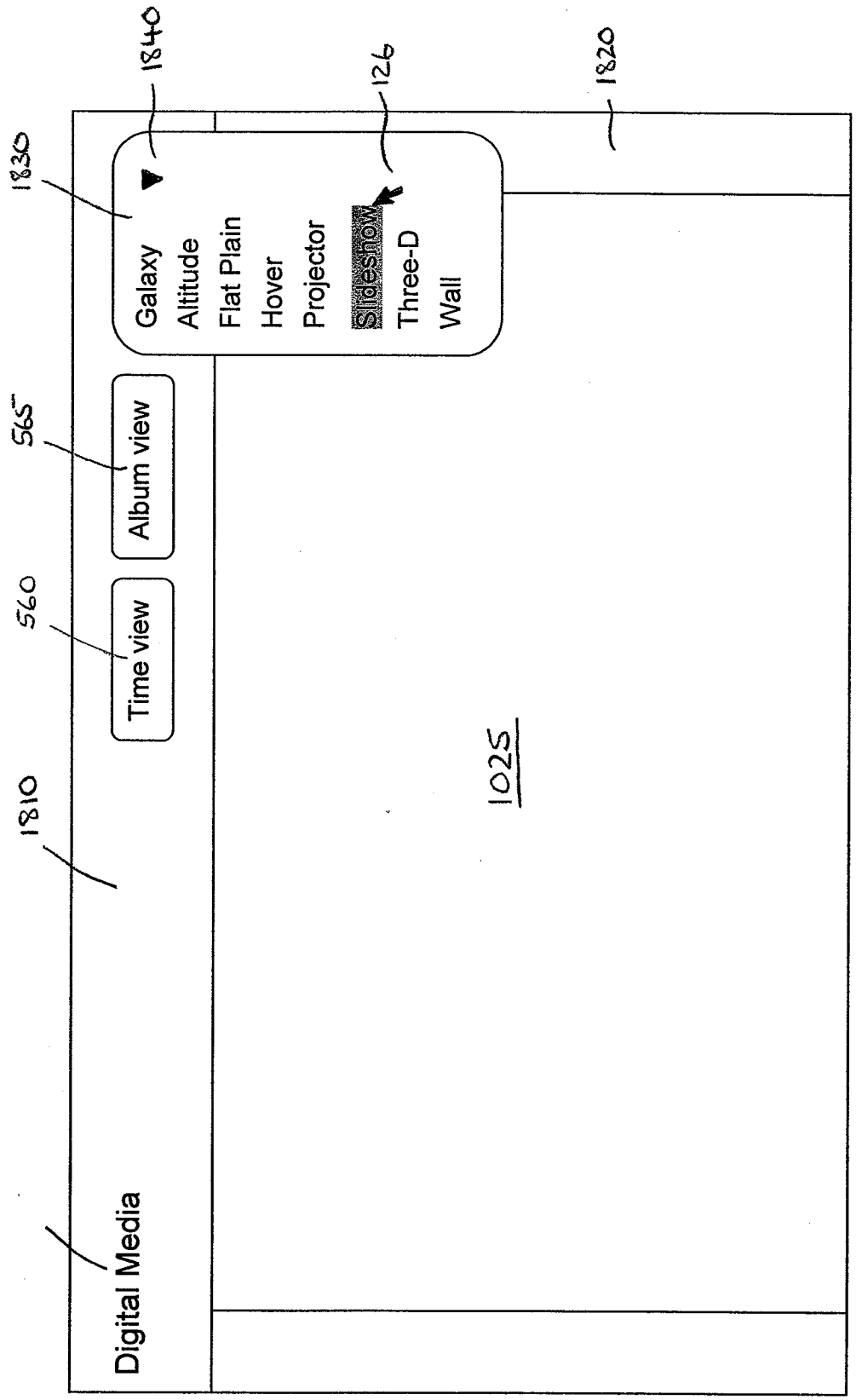

1840
126
1820
1830
Galaxy
Altitude
Flat Plain
Hover
Projector
Slideshow
Three-D
Wall
565
Album view
560
Time view
1810
Digital Media
1025

FIG. 18B

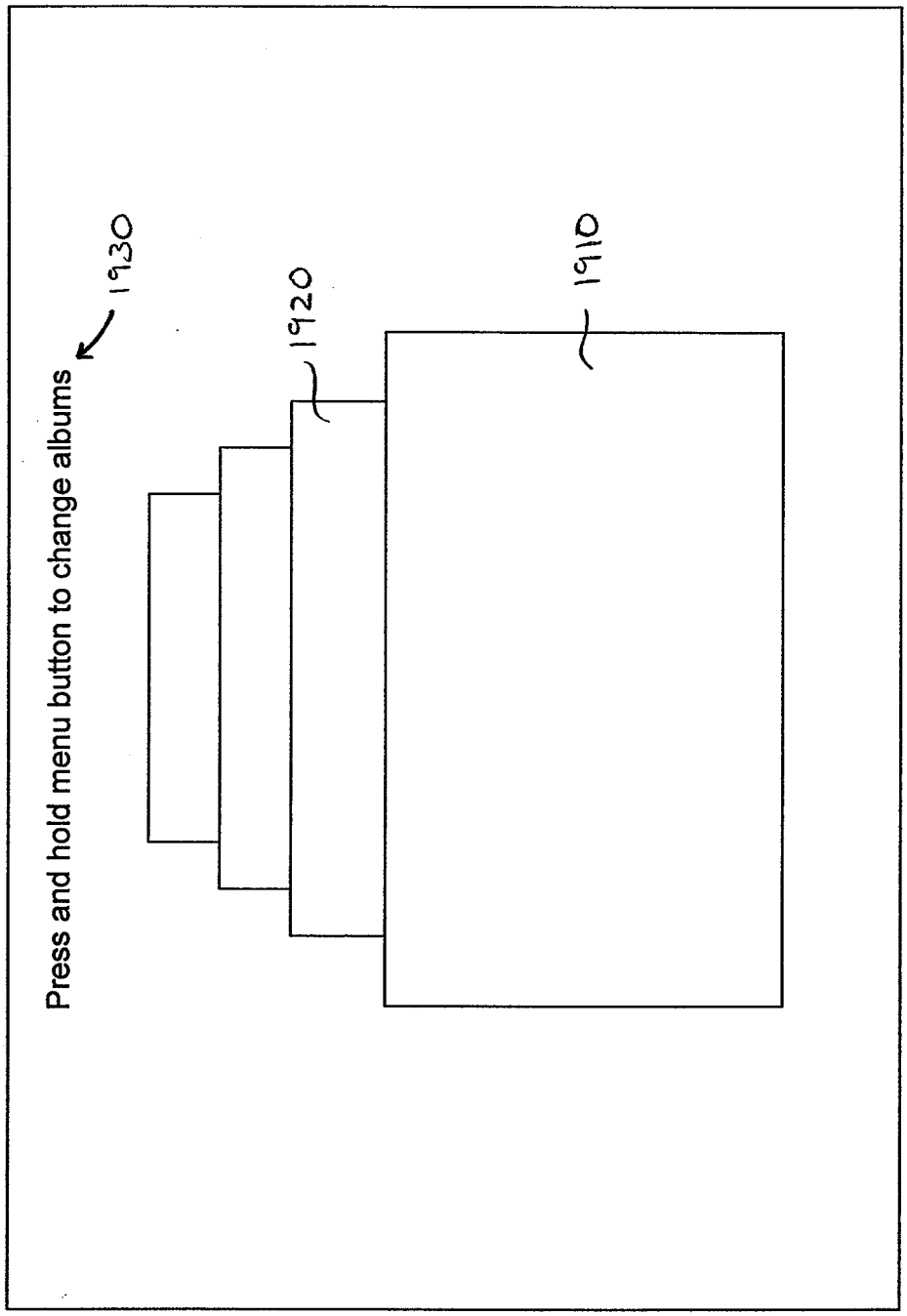


FIG. 19

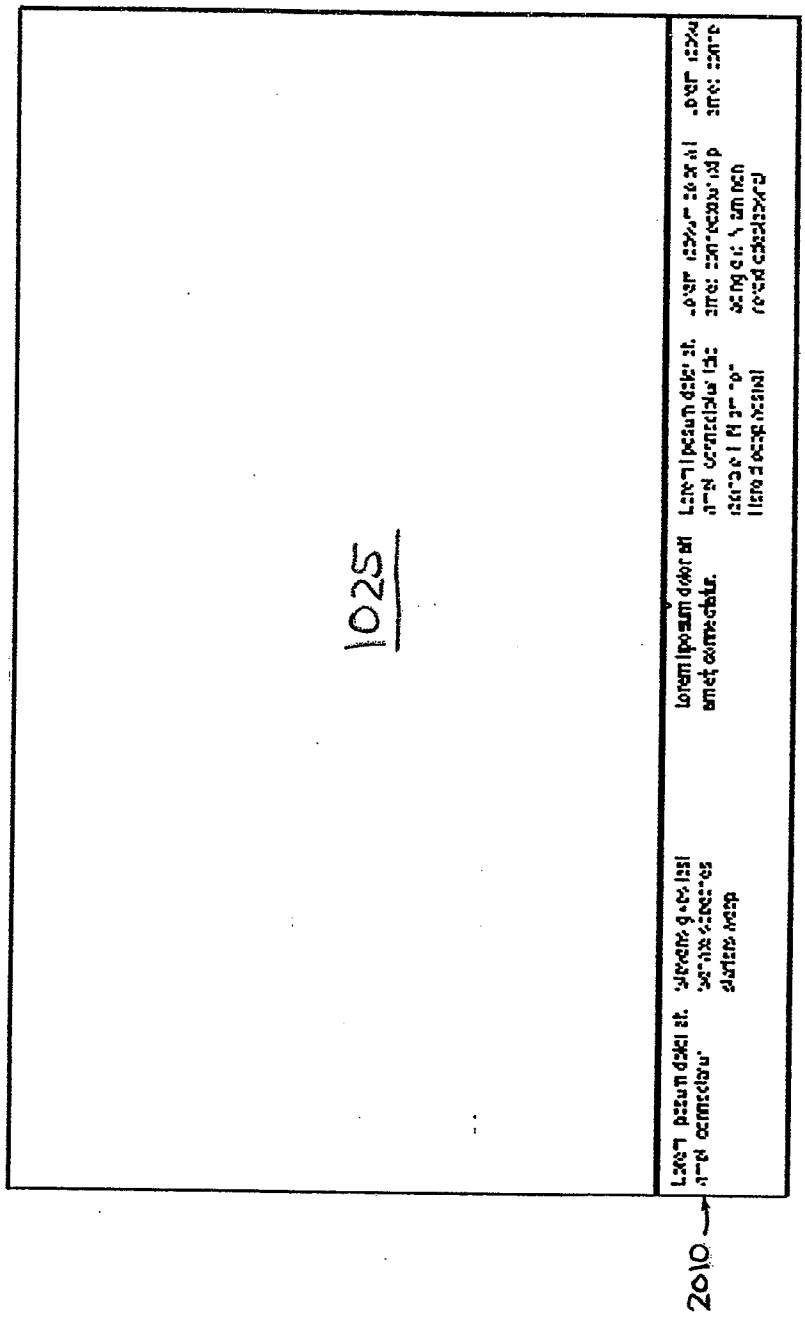


FIG. 20A

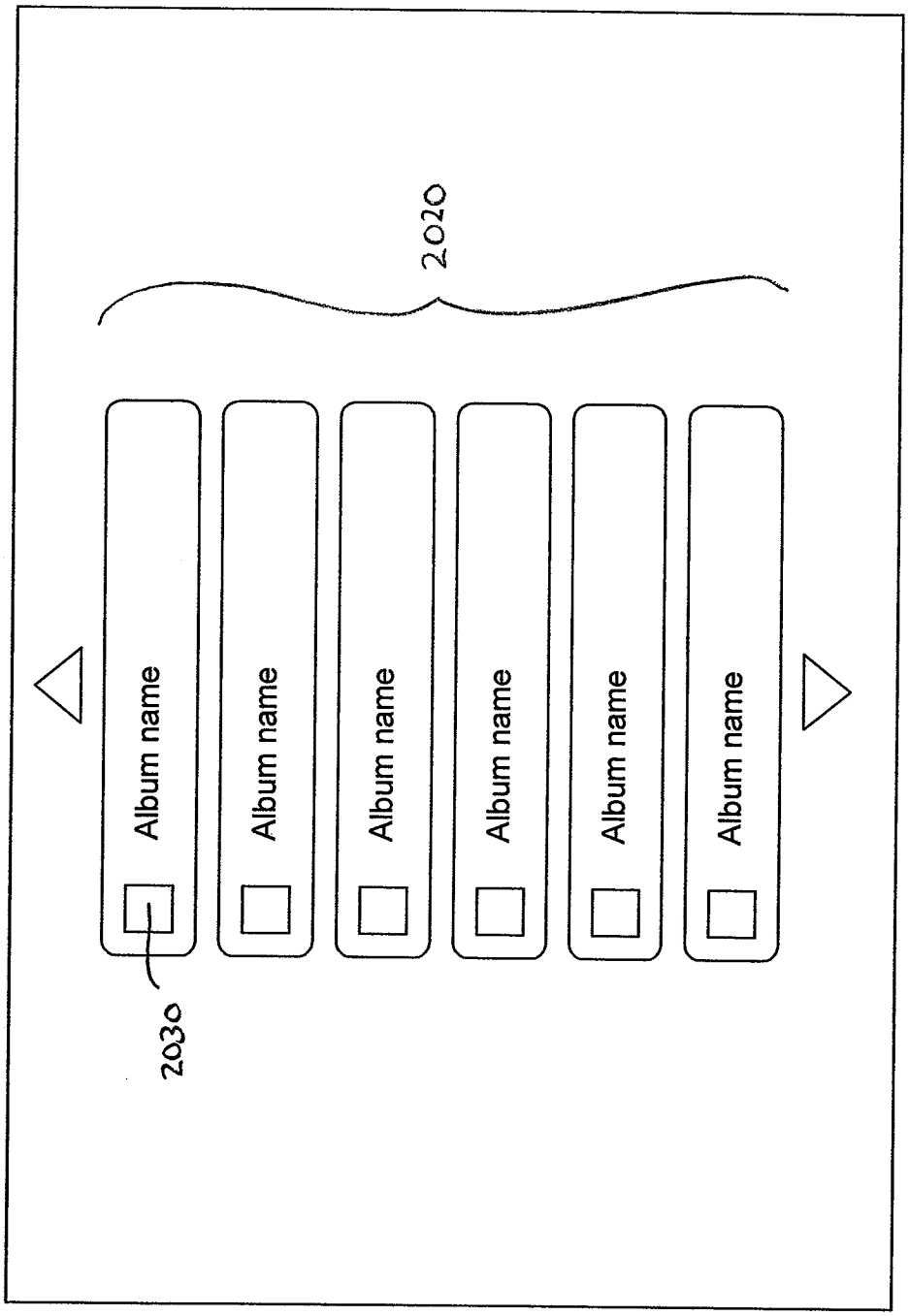

2020
Album name
Album name
Album name
Album name
Album name
Album name
2030

FIG. 20B

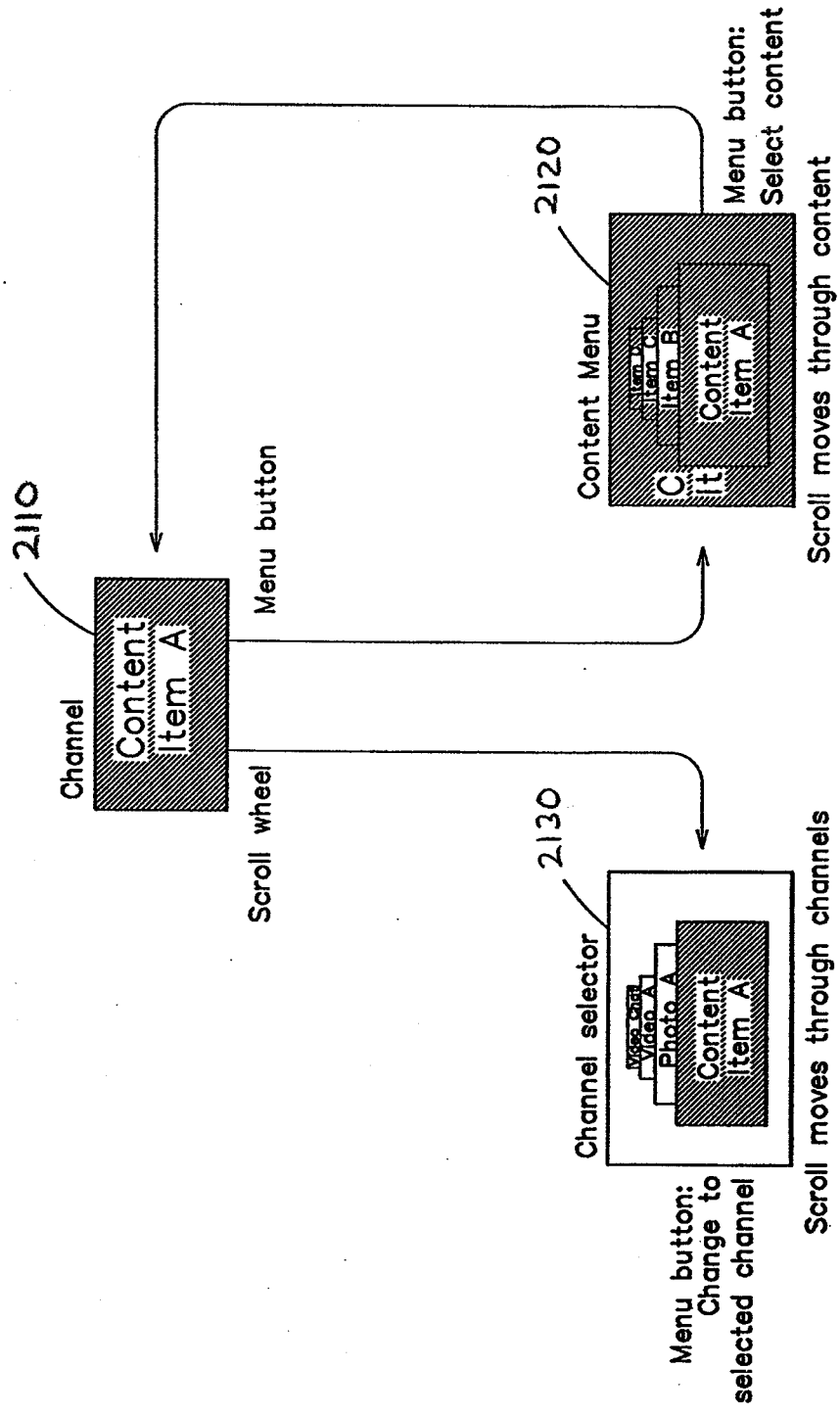

2110
Channel
Content Item A
Menu button
Scroll wheel
2120
Content Menu
Item D
Item C
Item B
Content Item A
Menu button: Select content
Scroll moves through content
2130
Channel selector
Video Cast
Video A
Photo A
Content Item A
Menu button: Change to selected channel
Scroll moves through channels

FIG. 21A

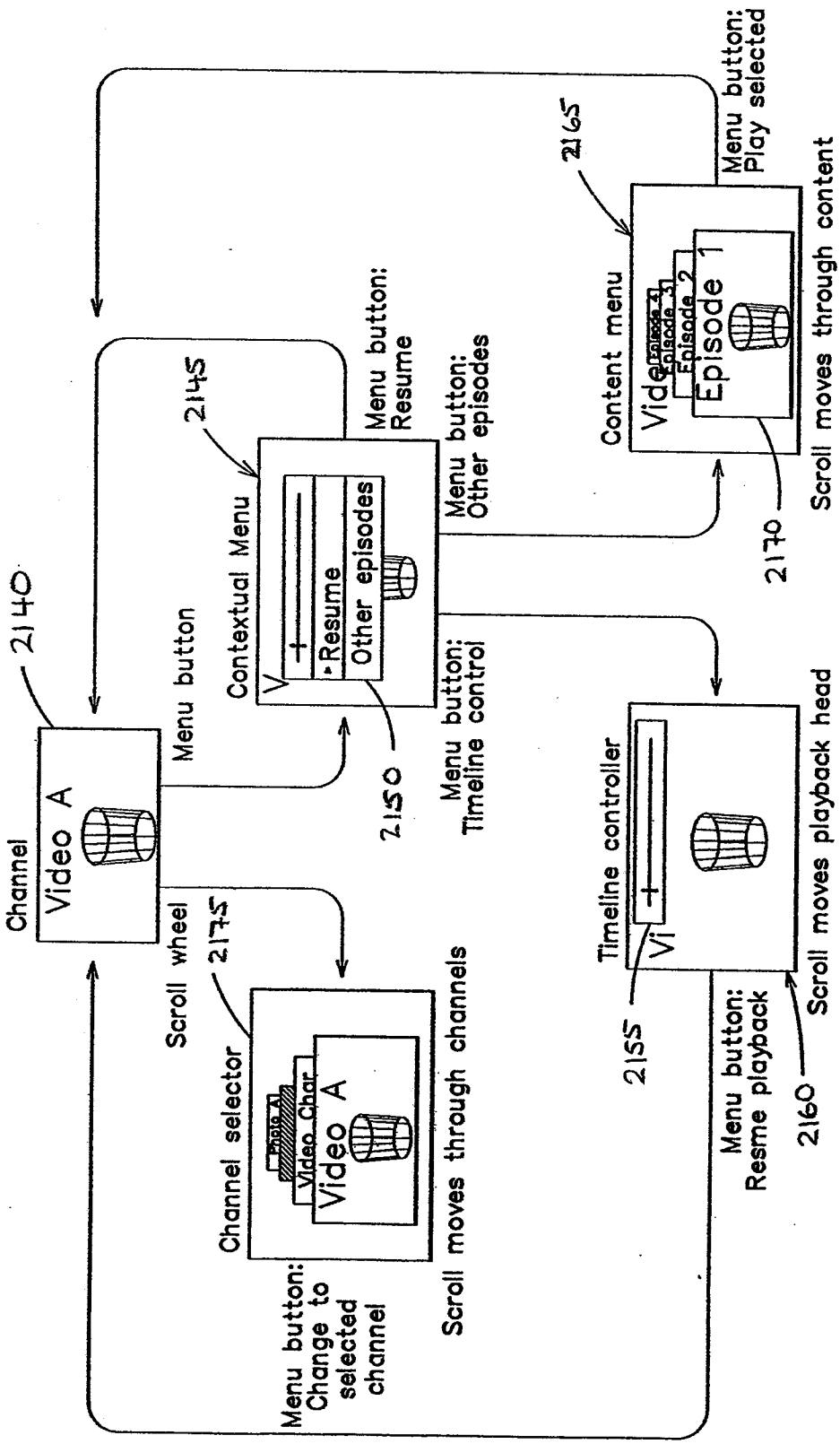

2140
Channel
Video A
Menu button
2145
Contextual Menu
Resume
Other episodes
Menu button: Resume
Menu button: Other episodes
2150
Menu button: Timeline control
2165
Content menu
Episode 1
Episode 2
Episode 3
Menu button: Play selected
2170
Scroll moves through content
Scroll wheel
2175
Channel selector
Video A
Video Char
Menu button: Change to selected channel
Scroll moves through channels
Timeline controller
2155
Menu button: Resme playback
2160
Scroll moves playback head

FIG. 21B

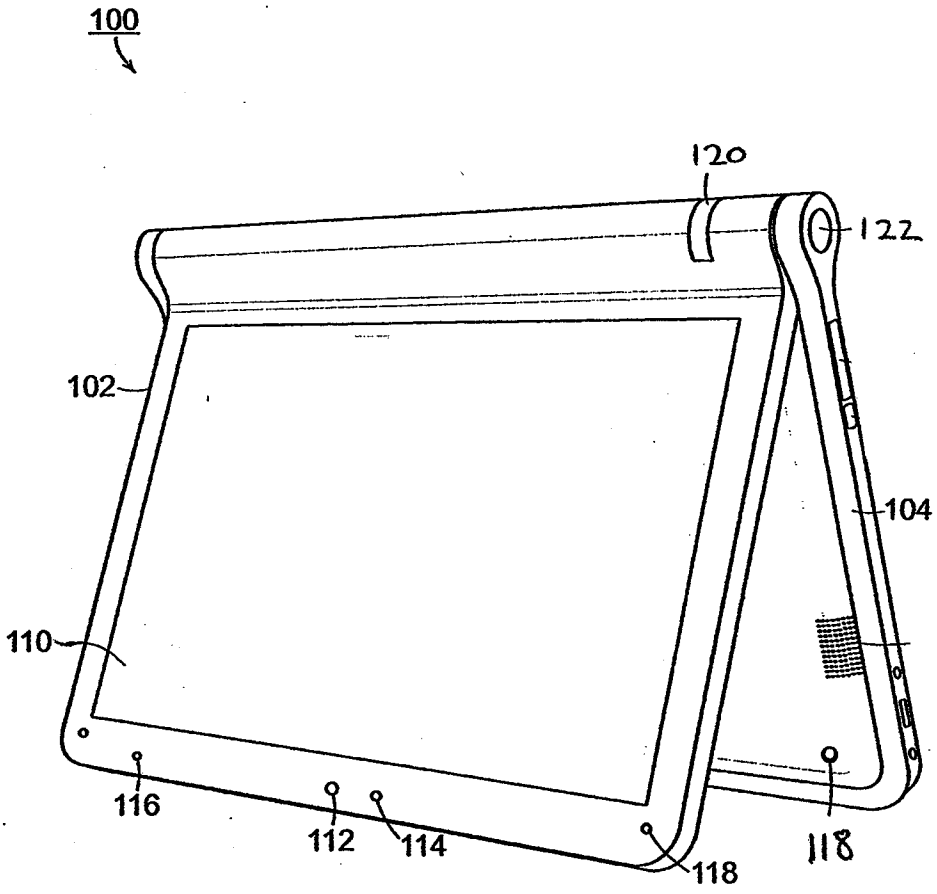


FIG. 22

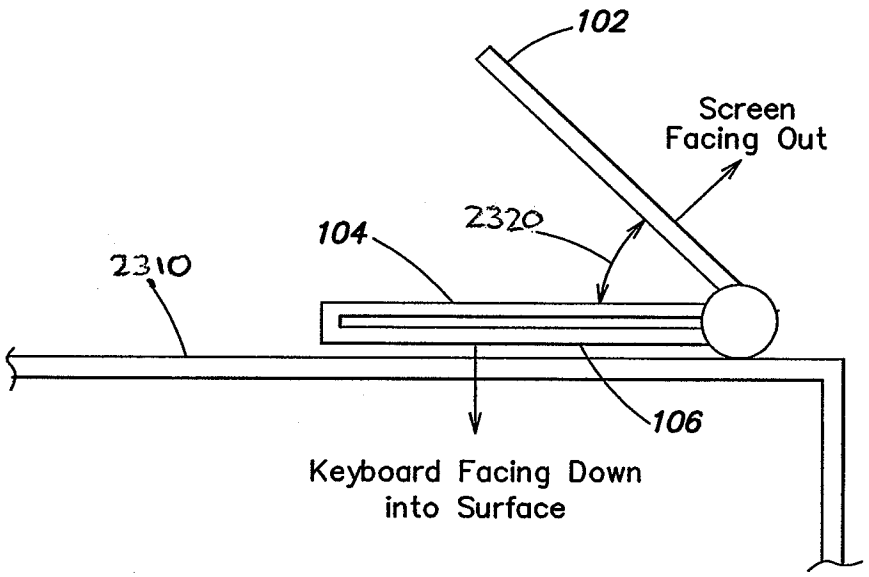

102
Screen
Facing Out
2320
104
2310
106
Keyboard Facing Down
into Surface

FIG. 23

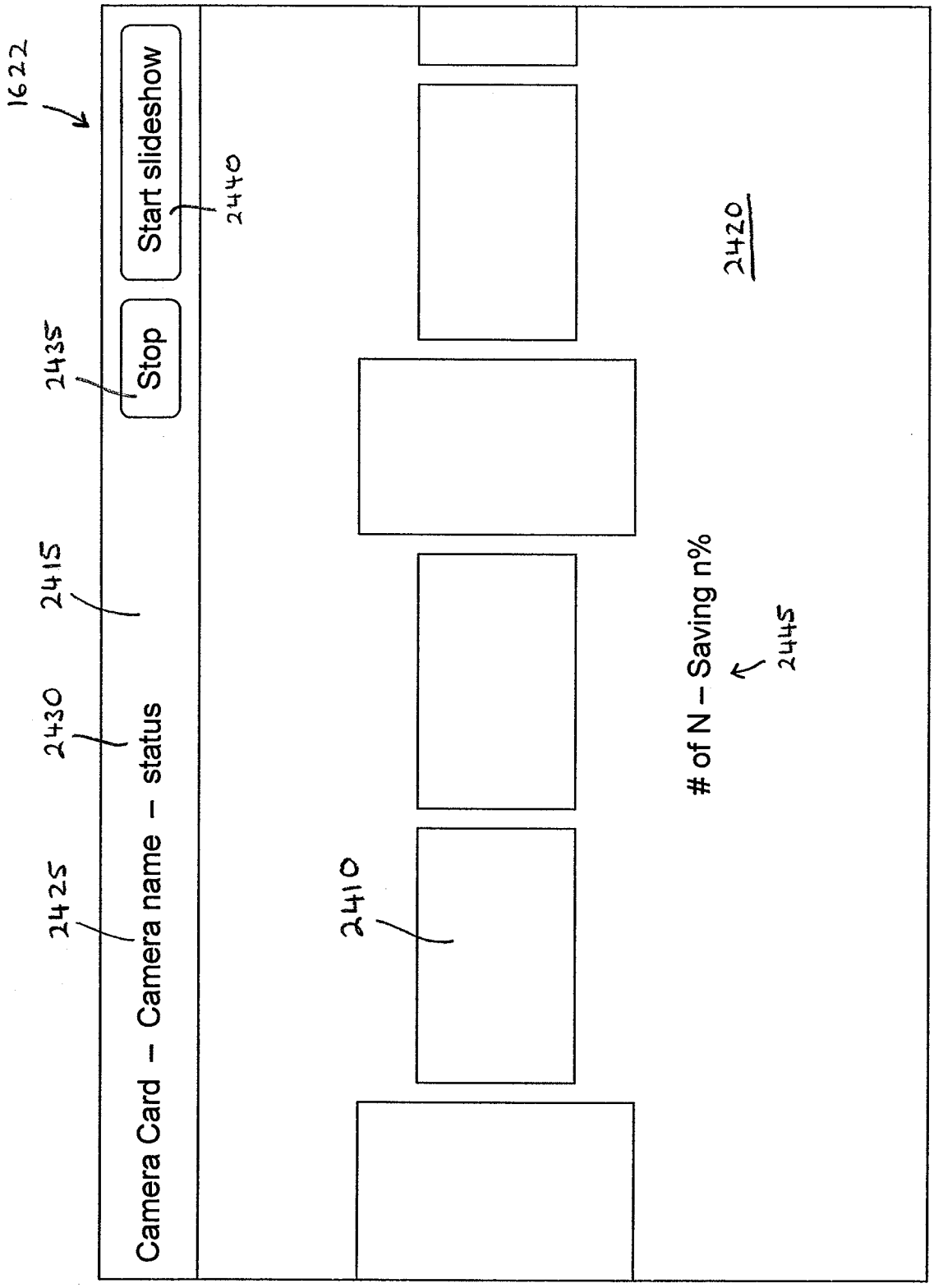

1622
Start slideshow
2440
Stop
2435
2415
2430
Camera Card – Camera name – status
2425
2410
2420
of N – Saving n%
2445

FIG. 24

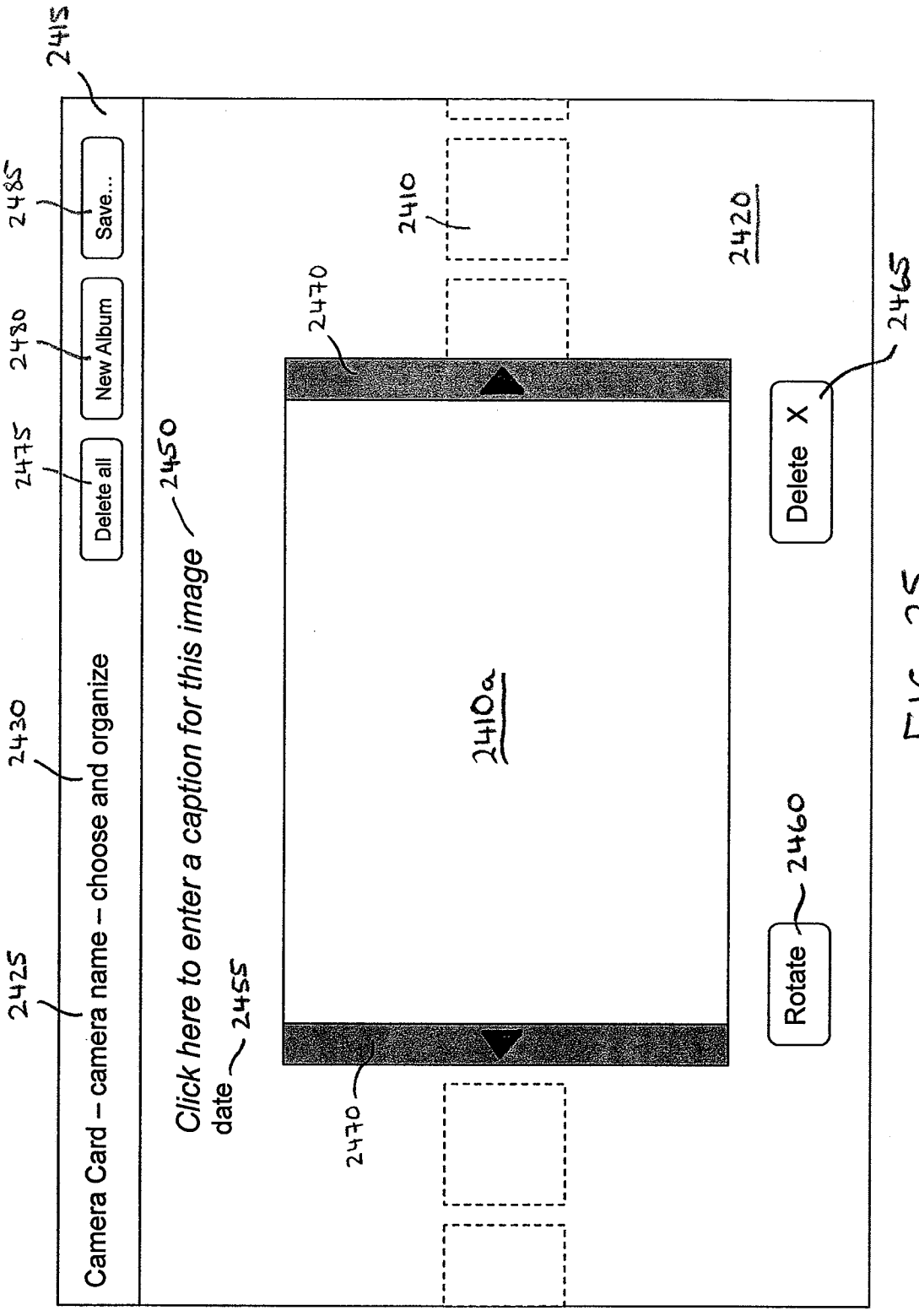

2415
2485
Save...
2480
New Album
2475
Delete all
2450
2430
Camera Card – camera name – choose and organize
2425
Click here to enter a caption for this image
date
2455
2470
2410
2420
2470
2465
Delete X
2410a
2460
Rotate

FIG. 25

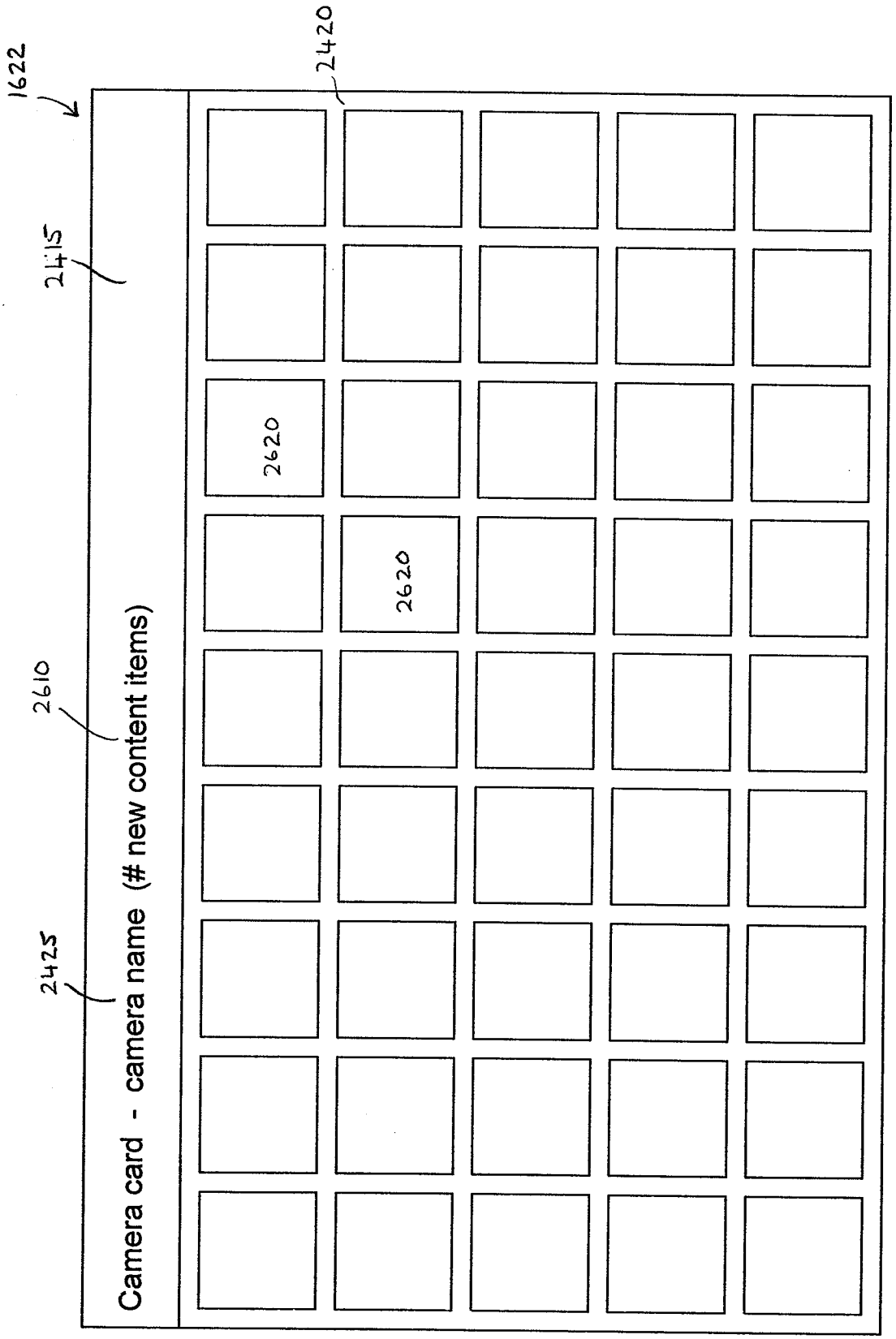

1622
2420
2415
2620
2620
2610
Camera card - camera name (# new content items)
2425

FIG. 26

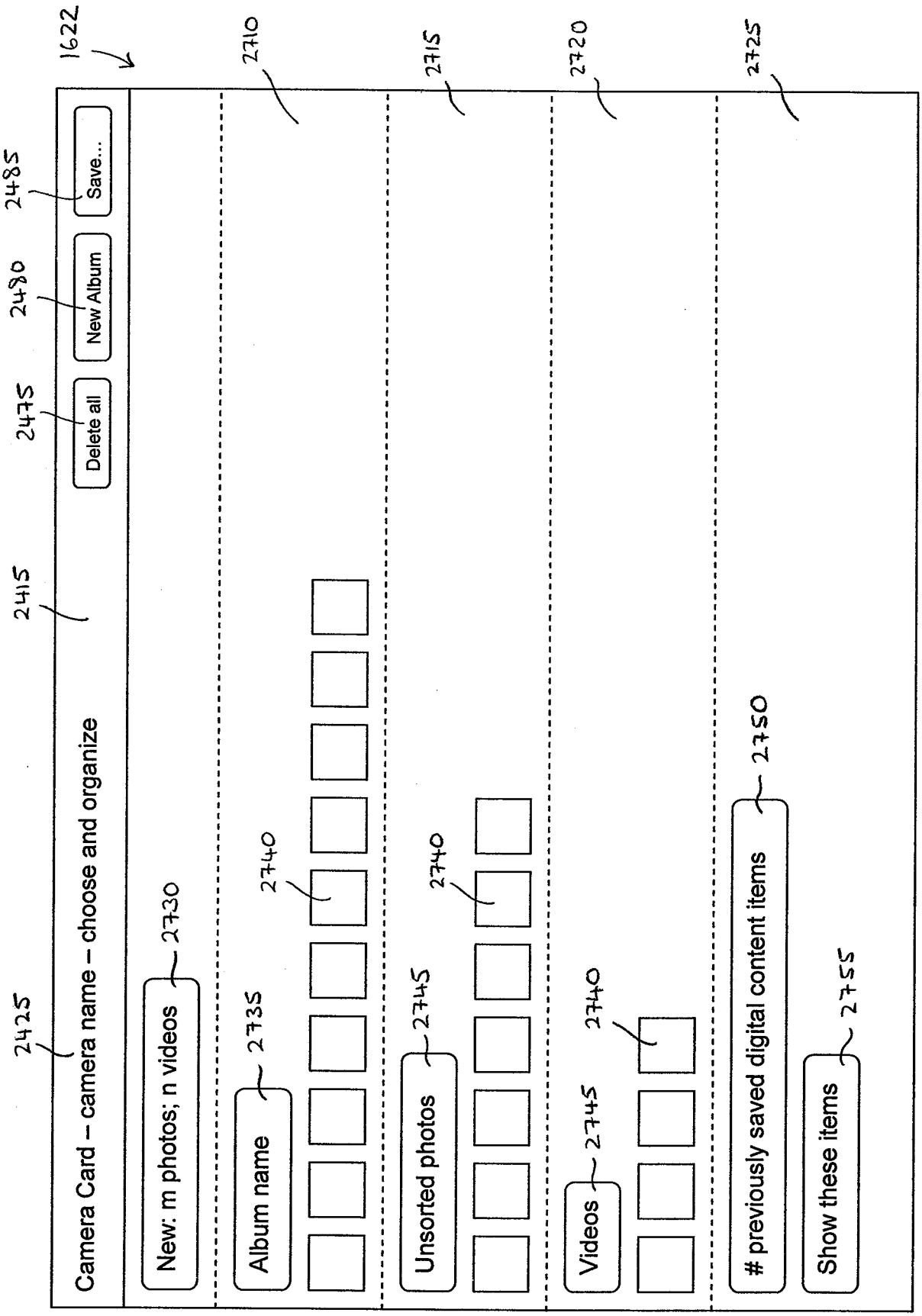

1622
2710
2715
2720
2725
2485
2480
2475
2415
2425
Save...
New Album
Delete all
Camera Card – camera name – choose and organize
New: m photos; n videos
2730
Album name
2735
2740
Unsorted photos
2745
Videos
previously saved digital content items
2750
Show these items
2755

FIG. 27

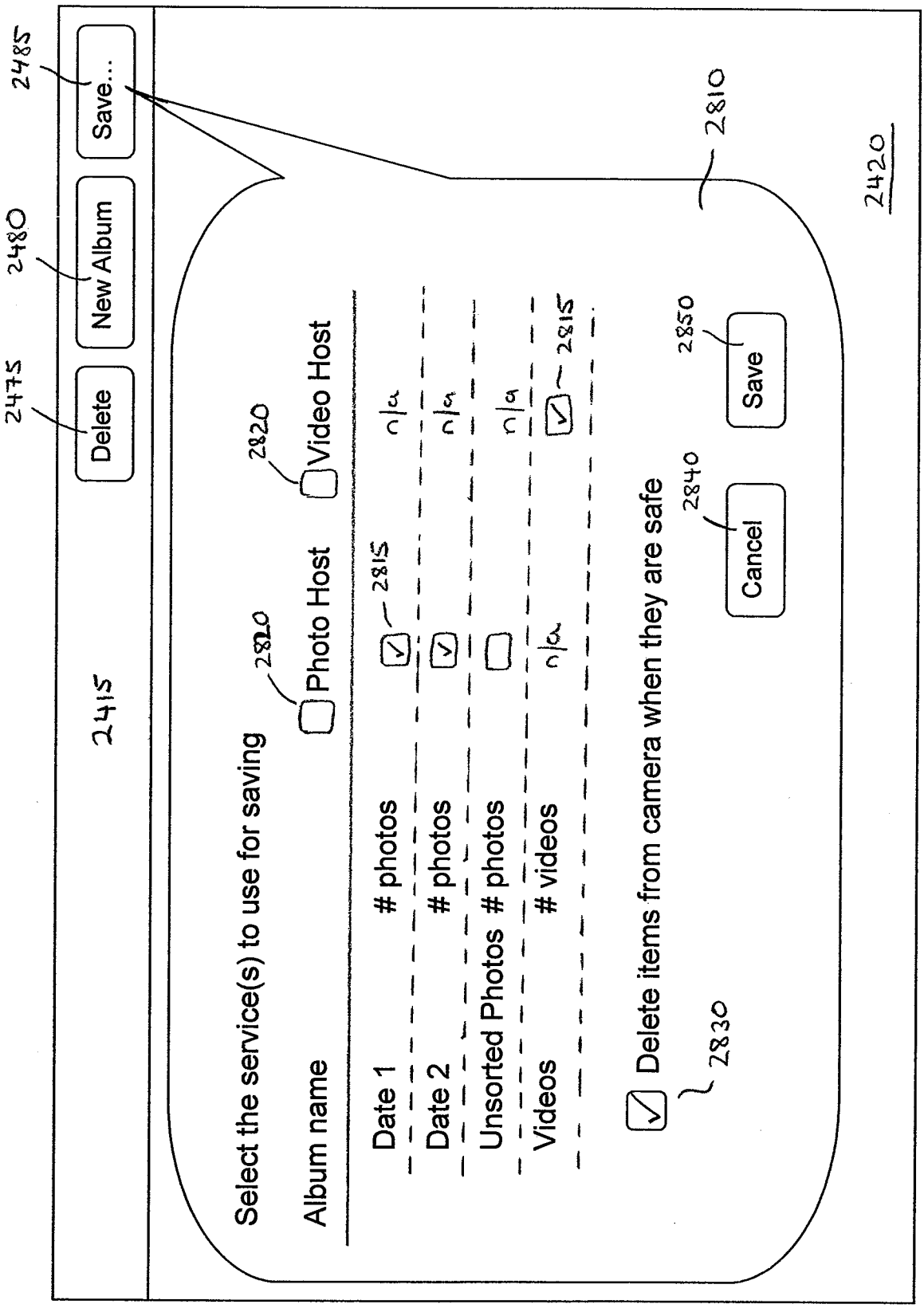

2485
2480
2475
Save...
New Album
Delete
2415
2420
2810
Select the service(s) to use for saving
2820
Photo Host
2820
Video Host
Album name
Date 1 # photos
2815
n/a
Date 2 # photos
n/a
Unsorted Photos # photos
n/a
Videos # videos
n/a
2815
Delete items from camera when they are safe
2830
2840
Cancel
2850
Save

FIG. 28

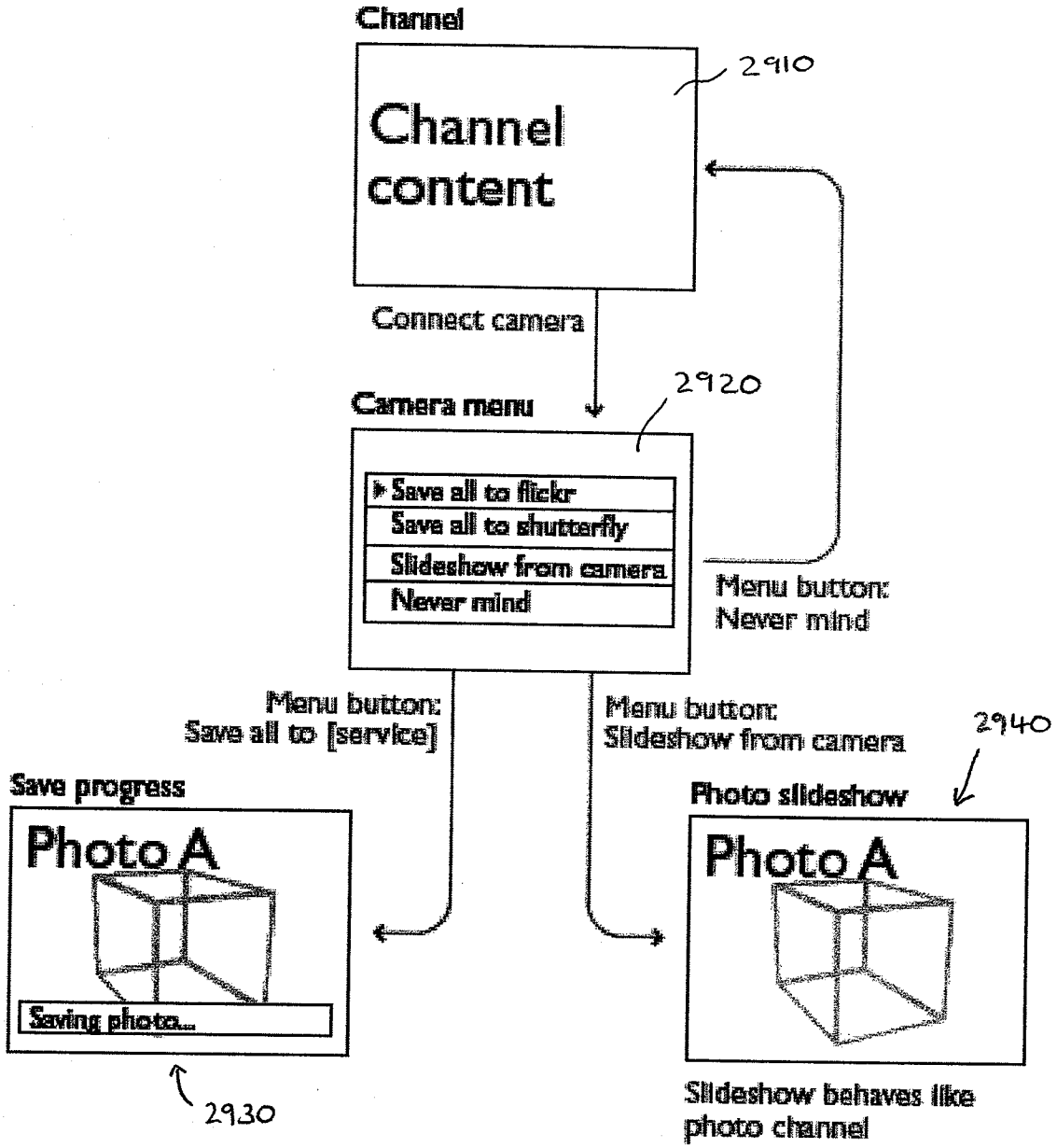

Channel
Channel content
2910
Connect camera
Camera menu
2920
Save all to flickr
Save all to shutterfly
Slideshow from camera
Never mind
Menu button:
Never mind
Menu button:
Save all to [service]
Menu button:
Slideshow from camera
2940
Save progress
Photo A
Saving photo...
2930
Photo slideshow
Photo A
Slideshow behaves like photo channel

FIG. 29

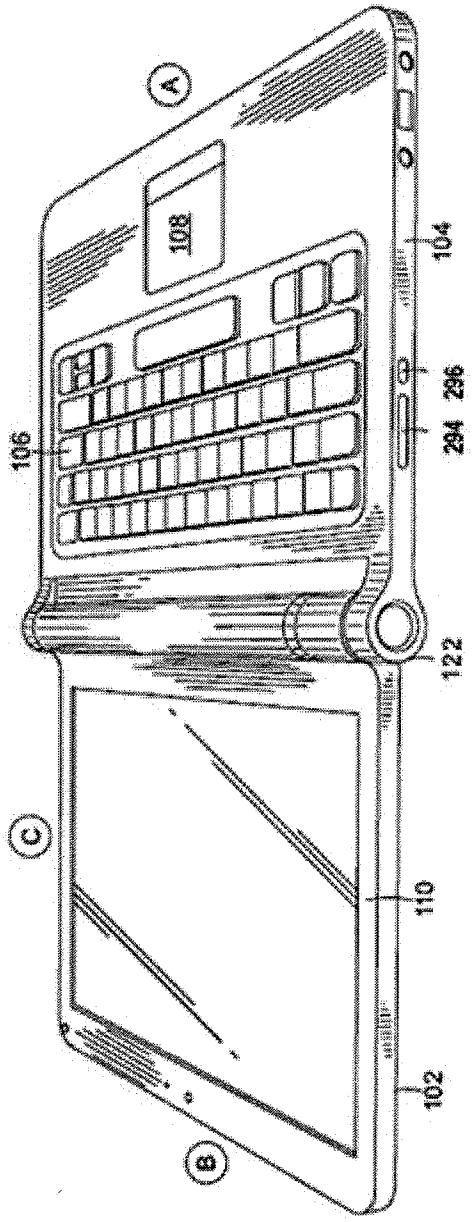


FIG. 30

Electronic Acknowledgement Receipt

EFS ID:	6665849
Application Number:	12170951
International Application Number:	
Confirmation Number:	2004
Title of Invention:	PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS
First Named Inventor/Applicant Name:	Yves Behar
Customer Number:	37462
Filer:	Matthew H. Grady
Filer Authorized By:	
Attorney Docket Number:	A2029-700111
Receipt Date:	18-DEC-2009
Filing Date:	10-JUL-2008
Time Stamp:	12:12:05
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	A2029-700111_IDS_letter.pdf	34966 0a569451671881916 80beb86860c735590d93670	no	3

Warnings:	
Information:	

2	Information Disclosure Statement (IDS) Filed (SB/08)	A2029-700111_SB08.pdf	640104 5e796783bbd080ab21acff9de07963f79e9273f3	no	7
Warnings:					
Information:					
3	Foreign Reference	EP_0588210.pdf	16182669 b6b83027b347162ab6f7d1ebbe4f4db65071790a	no	16
Warnings:					
Information:					
4	Foreign Reference	KR_10_2000_0036647.pdf	3021280 83b5d33e74d76c5dc053e38060bcdcb8a9a68c4a	no	4
Warnings:					
Information:					
5	NPL Documents	One_Laptop_Per_Child.pdf	2186514 71a90e3be6c4236c41bea3ce7cd7c4f01fa8211a	no	4
Warnings:					
Information:					
6	NPL Documents	12416479IDS.pdf	11307668 aa3ed82cb8ac3ecb49325b9b4aef7540252a98a2	no	182
Warnings:					
Information:					
7	NPL Documents	12611282IDS.pdf	5148600 25168e367fe502c0ff304b649eb6107c86f6bada	no	107
Warnings:					
Information:					
			Total Files Size (in bytes):	38521801	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

DOCKET NO: A2029-700111

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Yves Behar
Serial No:	12/170,951
Confirmation No:	2004
Filed:	July 10, 2008
For:	PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS
Examiner:	Not Yet Assigned
Art Unit:	2115

CERTIFICATE OF TRANSMISSION UNDER 37 C.F.R. §1.8(a)

The undersigned hereby certifies that this document is being electronically filed in accordance with §1.6(a)(4) on the 18th day of December, 2009.

/Matthew H. Grady/
Matthew H. Grady, Reg. No. 52,957

Commissioner for Patents

INFORMATION DISCLOSURE STATEMENT FILED PURSUANT TO THE DUTY OF DISCLOSURE UNDER 37 CFR §§1.56, 1.97 AND 1.98

Sir:

Pursuant to the duty of disclosure under 37 C.F.R. §§1.56, 1.97 and 1.98, the Applicant requests consideration of this Information Disclosure Statement.

PART I: Information Cited

The Applicant hereby makes of record in the above-identified application the information listed on the concurrently filed form PTO/SB/08a.

The order of presentation of the references should not be construed as an indication of the importance of the references.

The Applicant hereby makes the following additional information of record in the above-identified application.

The applicant would like to bring to the Examiner's attention the following co-pending applications that may contain subject matter related to this application, the published applications are cited on the form PTO/SB/08a, and a copy of the unpublished applications are enclosed:

Serial No.	Filing Date	Inventor(s)	Publication No.
12/416,496	**April 1, 2009**	**Yves Behar**	**US 2009/0303676 A1**
12/416,503	**April 1, 2009**	**Yves Behar**	**US 2009/0300511 A1**

12/416,479	**April 1, 2009**	**Yves Behar**	**N/A**
12/611,282	**November 3, 2009**	**Robert Pennington**	**N/A**

The applicant would like to bring to the Examiner's attention the following other information, whose relevance is discussed in Part II below:

PART II: Explanation of Non-English Language References and Remarks Concerning Other Information Cited

The following is a concise explanation of the relevance of each non-English language reference listed on the concurrently filed form PTO/SB/08a:

For the relevance of the listed non-English language reference KR 10-2000-0036647 A published July 05, 2000, the reference was cited in the International Search Report from a commonly owned PCT application PCT/US09/39117, wherein this document was placed in category "A," meaning that, in the opinion of the International Searching Authority, it relates to the general state of the art disclosed in PCT/US09/39117 and is not considered to be of particular relevance. An English language version of the Abstract has been provided with KR 10-2000-0036647 A.

The following are remarks concerning the other information cited:

PART III: Remarks

Documents cited anywhere in the Information Disclosure Statement, other than U.S. Patents and U.S. Patent Application Publications listed on a Form PTO/SB/08a, are enclosed unless otherwise indicated. It is respectfully requested that:

1. The Examiner consider completely the cited information, along with any other information, in reaching a determination concerning the patentability of the present claims;

2. Any concurrently filed form PTO/SB/08a be signed by the Examiner to evidence that the cited information has been fully considered by the Patent and Trademark Office during the examination of this application;

3. The citations for the information be printed on any patent which issues from this application.

By submitting this Information Disclosure Statement, the Applicant makes no representation that a search has been performed, of the extent of any search performed, or that more relevant information does not exist.

By submitting this Information Disclosure Statement, the Applicant makes no representation that the information cited in the Statement is, or is considered to be, material to patentability as defined in 37 C.F.R. §1.56(b).

By submitting this Information Disclosure Statement, the Applicant makes no representation that the information cited in the Statement is, or is considered to be, in fact, prior art as defined by 35 U.S.C. §102.

Notwithstanding any statements by the Applicant, the Examiner is urged to form his own conclusion regarding the relevance of the cited information.

An early and favorable action is hereby requested.

Respectfully submitted,

Yves Behar, Applicant

By: /Matthew H. Grady/

Matthew H. Grady, Reg. No. 52,957
LANDO & ANASTASI, LLP
Riverfront Office Park
One Main Street
Cambridge, Massachusetts 02142
Tel. (617) 395-7000

To: docketing@ll-a.com,gengelson@ll-a.com,
From: PAIR_eOfficeAction@uspto.gov
Cc: PAIR_eOfficeAction@uspto.gov
Subject: Private PAIR Correspondence Notification for Customer Number 37462

Oct 02, 2009 05:44:22 AM

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Application	Document	Mailroom Date	Attorney Docket No.
12170951	NTC.PUB	10/01/2009	A2029-700111

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/170,951	07/10/2008	Yves Behar	A2029-700111

CONFIRMATION NO. 2004

37462
LANDO & ANASTASI, LLP
ONE MAIN STREET, SUITE 1100
CAMBRIDGE, MA 02142

PUBLICATION NOTICE



Title:PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS

Publication No.US-2009-0244012-A1
Publication Date:10/01/2009

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

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Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
12/170,951	07/10/2008	2115	1220	A2029-700111	17	3

CONFIRMATION NO. 2004

UPDATED FILING RECEIPT

37462
LOWRIE, LANDO & ANASTASI, LLP
ONE MAIN STREET, SUITE 1100
CAMBRIDGE, MA 02142

OC00000033140207

Date Mailed: 11/19/2008

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Yves Behar, Oakland, CA;
Joshua Morenstein, San Francisco, CA;
Christopher Hibmacronan, Oakland, CA;
Naoya Edahiro, San Francisco, CA;
Matthew David Day, San Francisco, CA;

Power of Attorney: The patent practitioners associated with Customer Number 37462

Domestic Priority data as claimed by applicant

This appln claims benefit of 61/041,365 04/01/2008

Foreign Applications

If Required, Foreign Filing License Granted: 07/23/2008

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/170,951**

Projected Publication Date: 10/01/2009

Non-Publication Request: No

Early Publication Request: No

Title

PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS

Preliminary Class

713

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Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

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For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

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Application	Document	Mailroom Date	Attorney Docket No.
12170951	APP.FILE.REC	11/19/2008	A2029-700111

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PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

Docket No.: A2029-700111

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Yves Behar et al.
Serial No:	12/170,951
Confirmation No:	2004
Filed:	July 10, 2008
For:	PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS
Examiner:	Not Yet Assigned
Art Unit:	2115

CERTIFICATE OF TRANSMISSION UNDER 37 C.F.R. §1.8(a)

The undersigned hereby certifies that this document is being electronically filed in accordance with § 1.6(a)(4), on the 10th day of November, 2008

/Sarah M. Gates/
Sarah M. Gates

Commissioner for Patents
Alexandria, VA 22313-1450

PRELIMINARY AMENDMENT

Sir:

Responsive to the Notice to File Missing Parts mailed July 29, 2008, please amend the above-identified application as follows, please amend the above-identified application as follows. Changes to the Specification are shown by ~~strike through~~ (for deleted matter) and underlining (for added matter).

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Drawings begin on page 3 of this paper and include attached replacement sheets.

Remarks begin on page 4 of this paper.

An **Appendix** including replacement drawing figures is attached.

Amendments to the Specification

Please replace the paragraph beginning at page 6, line 29 with the following:

FIG. 9 is a cross-sectional diagram of a portion of the hinge assembly of FIG. 8, taken along line ~~A-A~~ 9-9 in FIG. 8;

Amendments to the Drawings

Please replace Figures 1-27 contained in drawing sheets 1-25 with the attached replacement figures contained in drawing sheets 1-25. Figure 8 has been amended as shown on the attached annotated sheet. The replacement Figures contain no new matter.

REMARKS

Prior to examination on the merits, please enter and consider the amendments to the specification and drawings. The replacement drawings are in compliance with 37 C.F.R. 1.84 and 37 C.F.R. 1.121(d). The specification is amended as shown on page 2 of this paper to for consistency with the replacement drawings. No new matter has been added.

This application should now be in condition for allowance; a notice to this effect is respectfully requested. If the Examiner believes, after this amendment, that the application is not in condition for allowance, the Examiner is requested to call the Applicant's attorney at the telephone number listed below.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, please charge any such fee to Deposit Account No. 50/2762; ref. no. A2029-700111.

Respectfully submitted,
Yves Behar et al., *Applicant*

By: /Sarah M. Gates/

Sarah M. Gates, Reg. No. 60,661
LOWRIE, LANDO & ANASTASI, LLP
One Main Street
Cambridge, Massachusetts 02142
United States of America
Telephone: 617-395-7000
Facsimile: 617-395-7070

Docket No.: A2029-700111

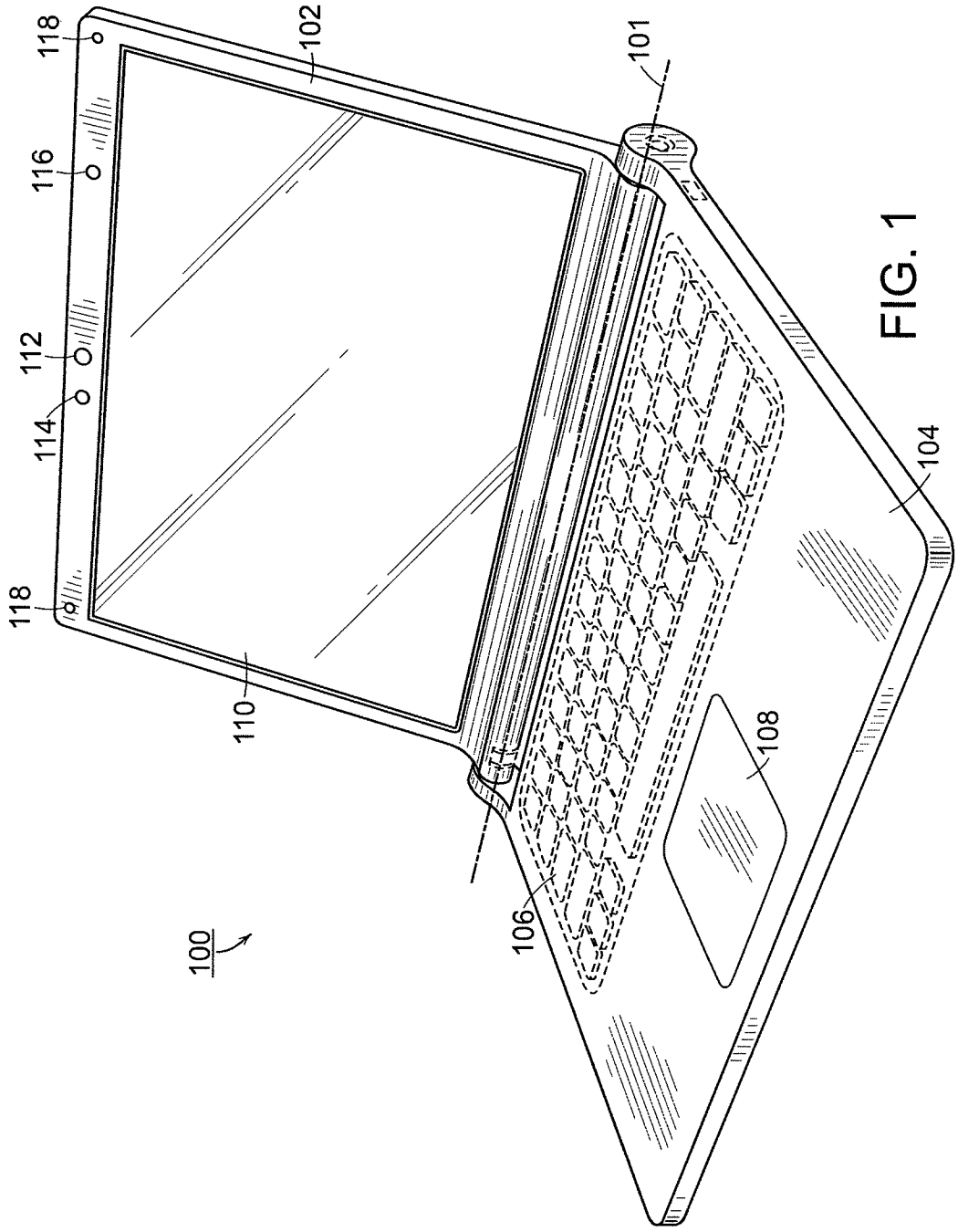


FIG. 1

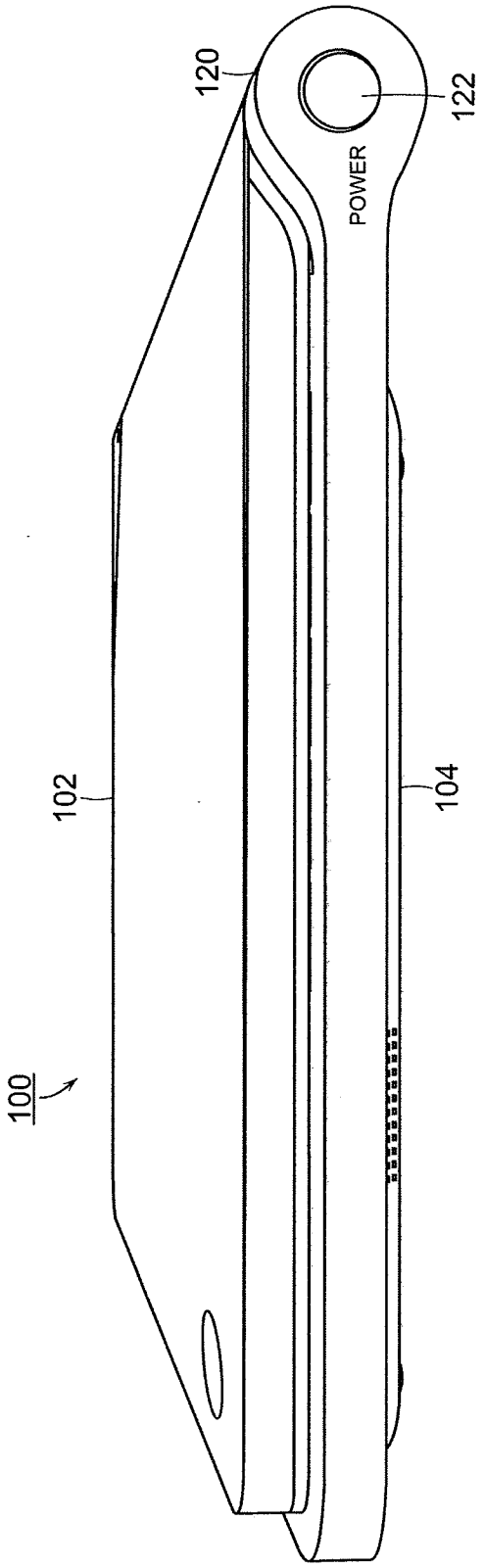


FIG. 2

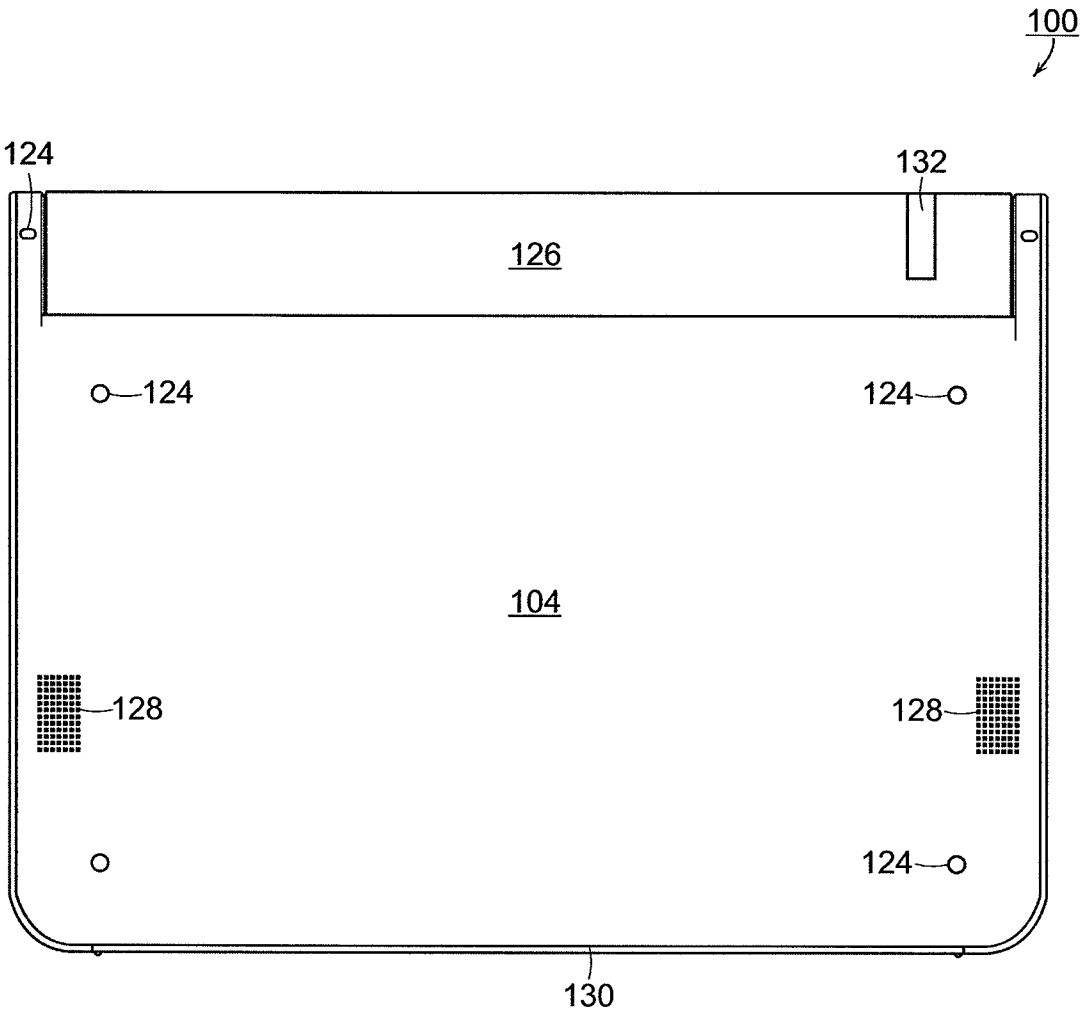


FIG. 3

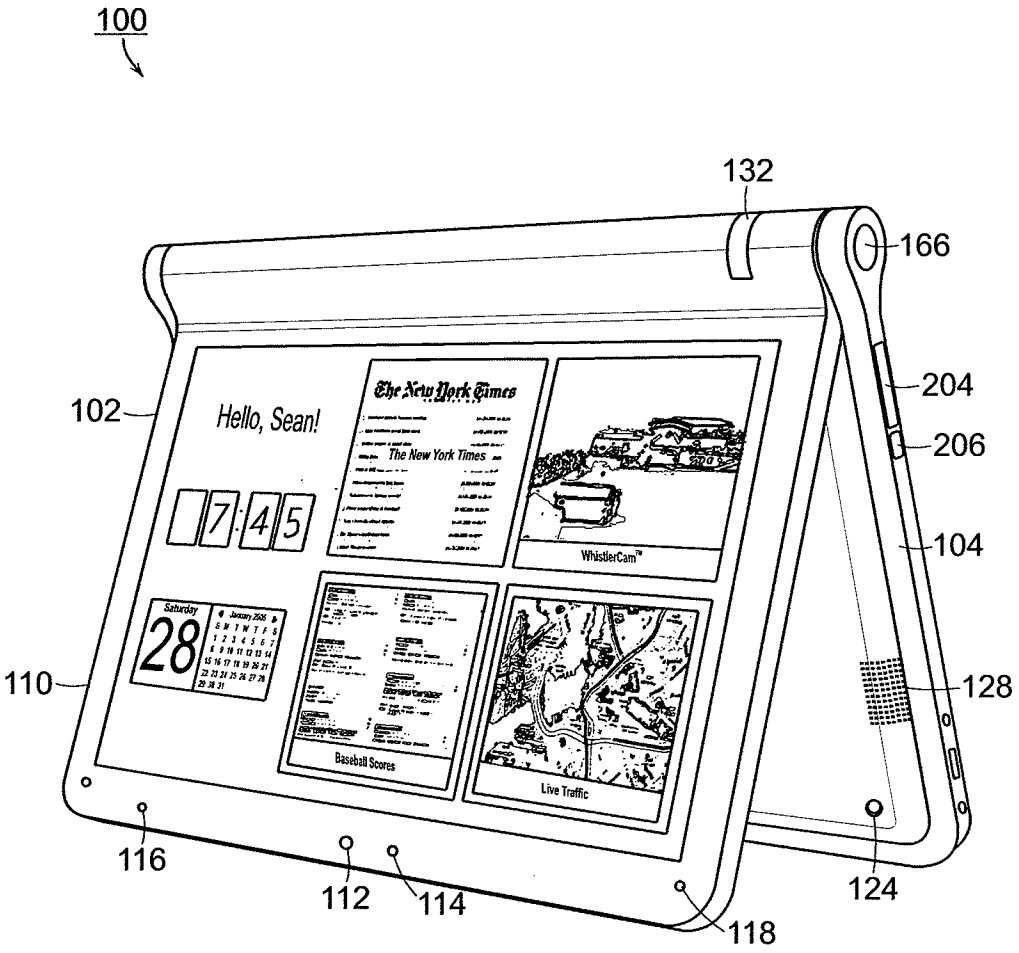

100
132
166
102
204
206
104
110
128
116
112
114
118
124
Hello, Sean!
7:45
The New York Times
WhistlerCam™
Saturday
28
Baseball Scores
Live Traffic

FIG. 4

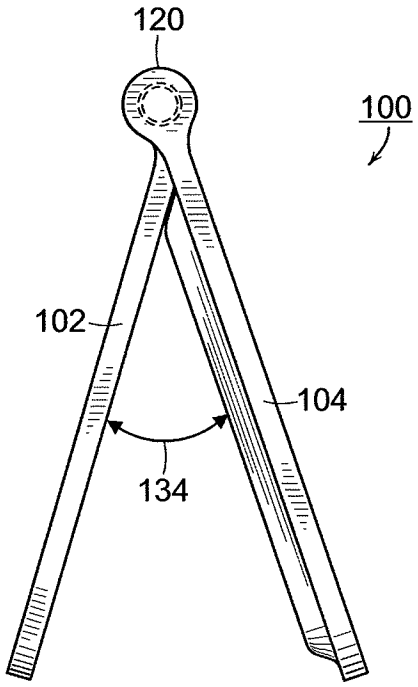


FIG. 5

6/25

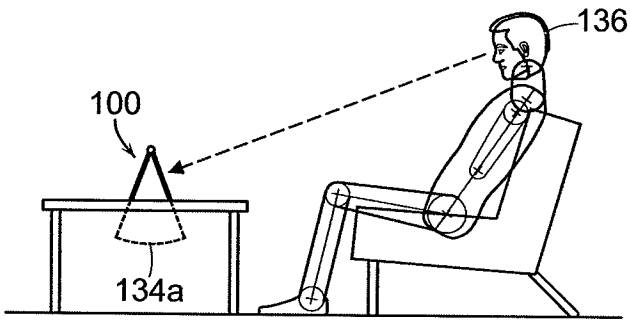


FIG. 6A

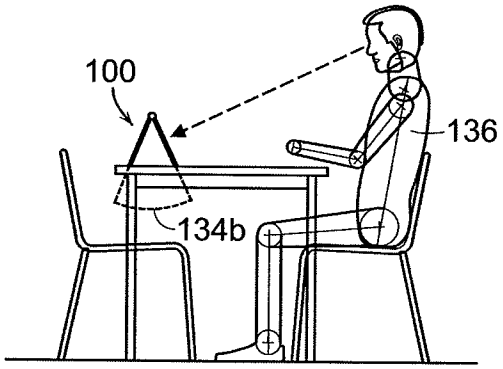


FIG. 6B

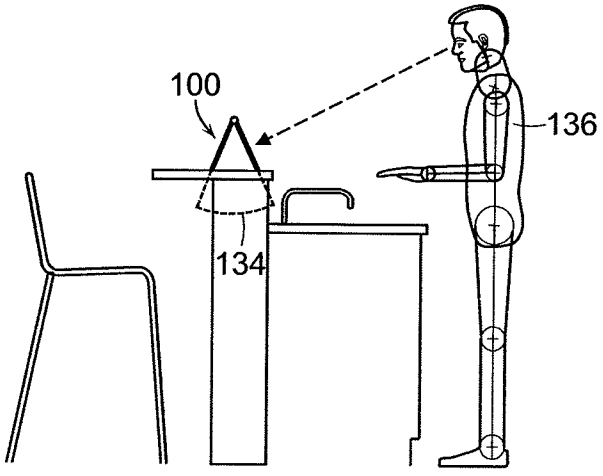


FIG. 6C

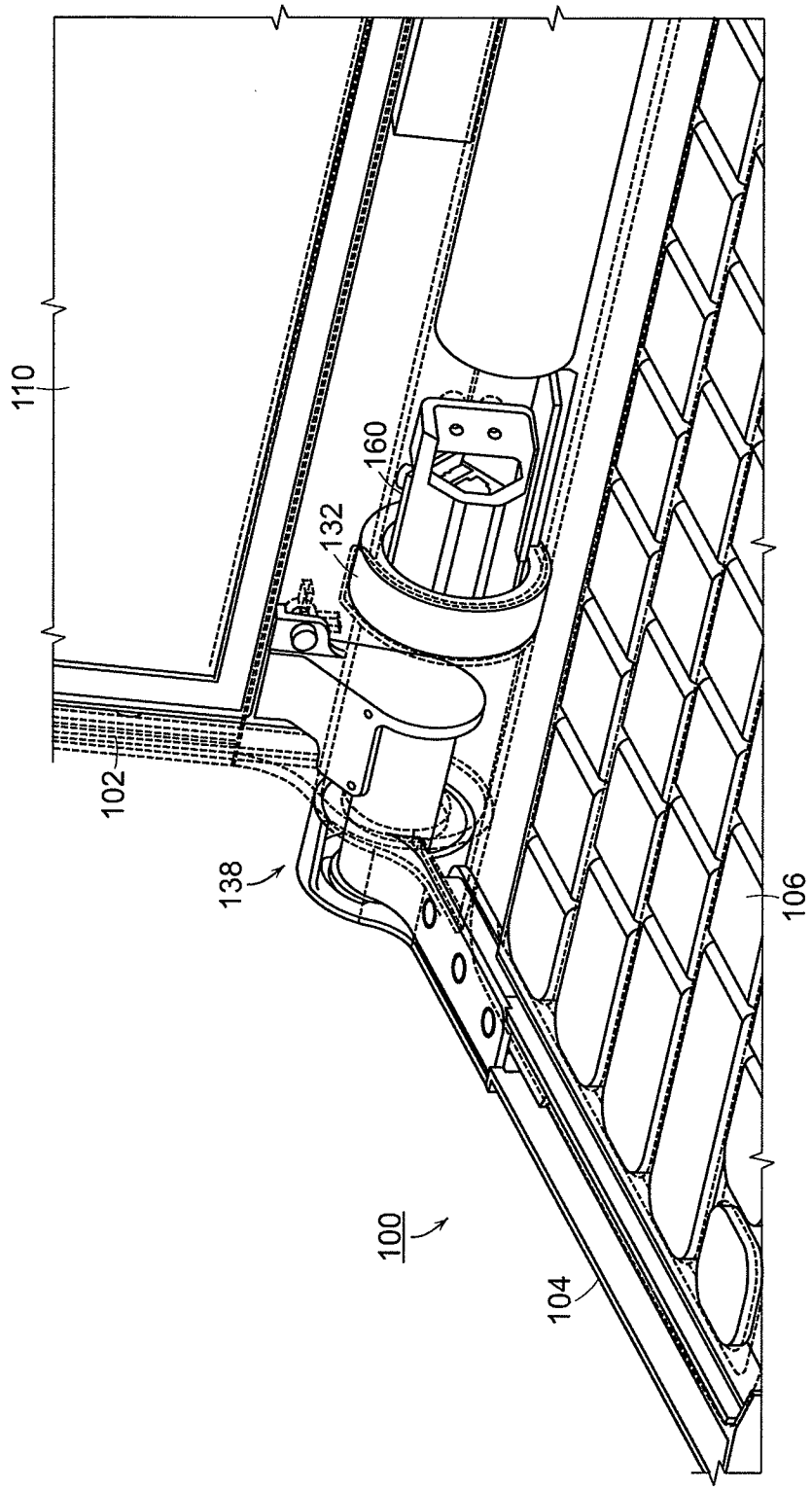


FIG. 7A

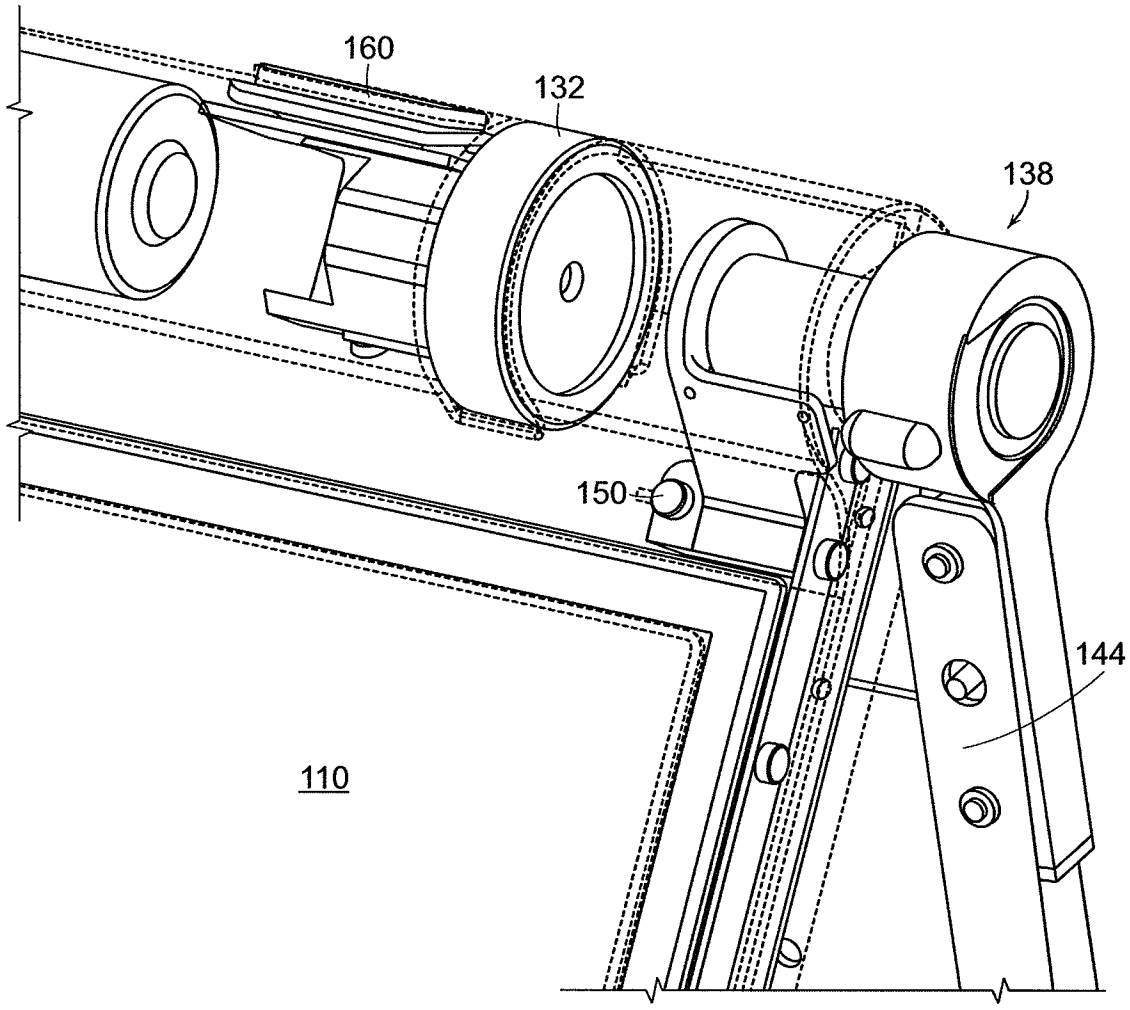


FIG. 7B

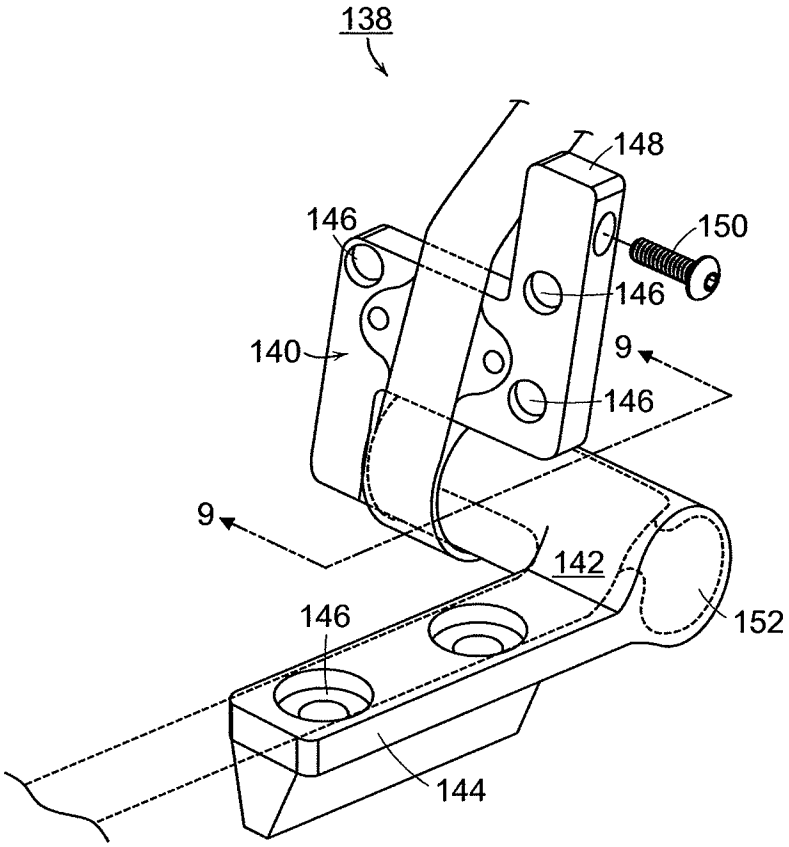


FIG. 8

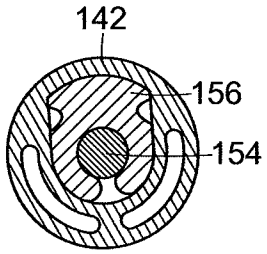


FIG. 9

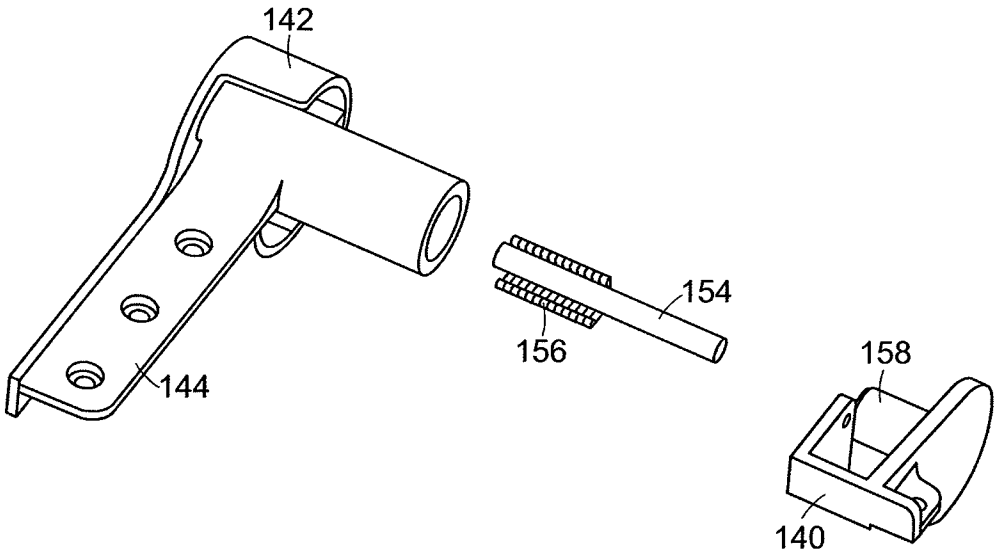


FIG. 10

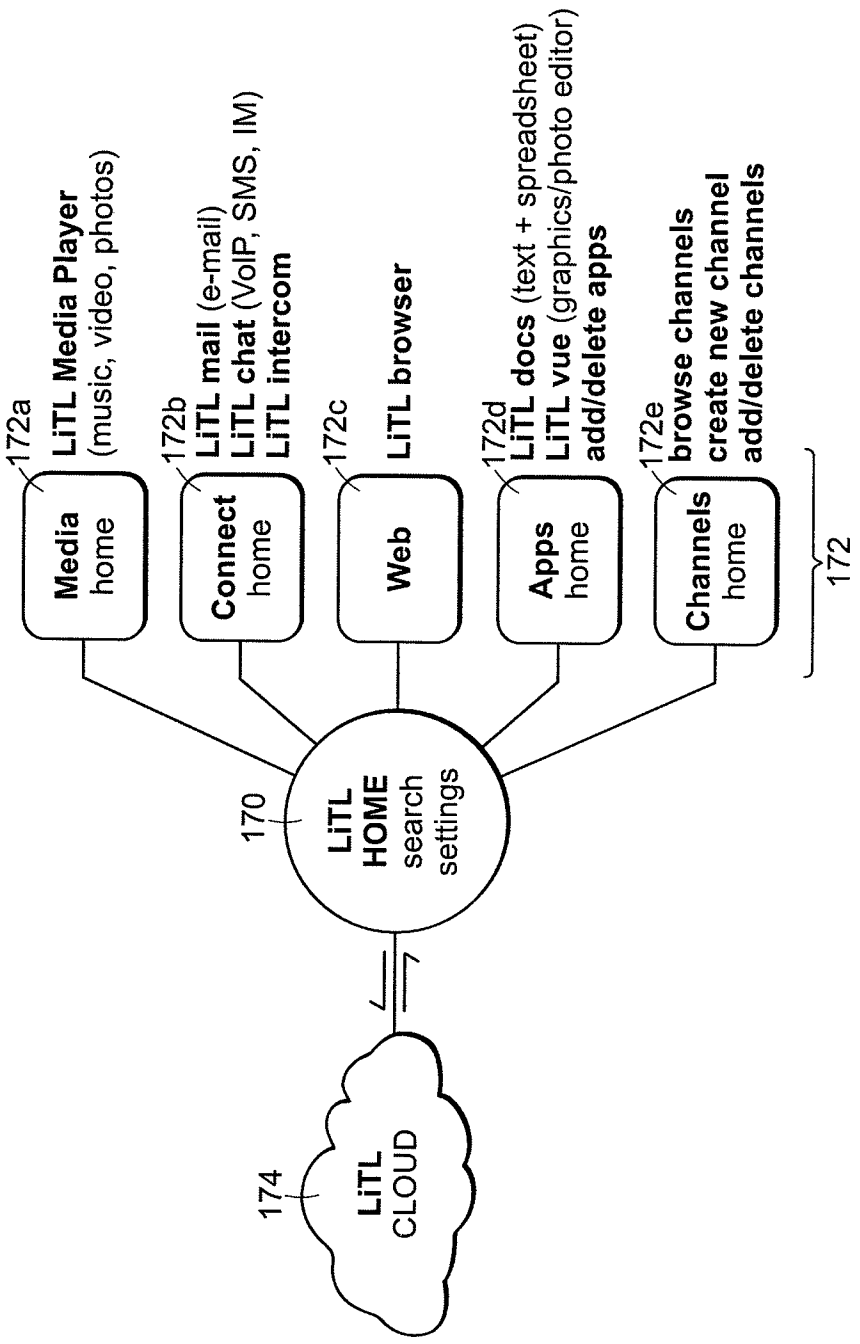

172a
LiTL Media Player
(music, video, photos)
Media
home
172b
LiTL mail (e-mail)
LiTL chat (VoIP, SMS, IM)
LiTL intercom
Connect
home
172c
LiTL browser
Web
172d
LiTL docs (text + spreadsheet)
LiTL vue (graphics/photo editor)
add/delete apps
Apps
home
172e
browse channels
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add/delete channels
Channels
home
172
170
LiTL
HOME
search
settings
174
LiTL
CLOUD

FIG. 11

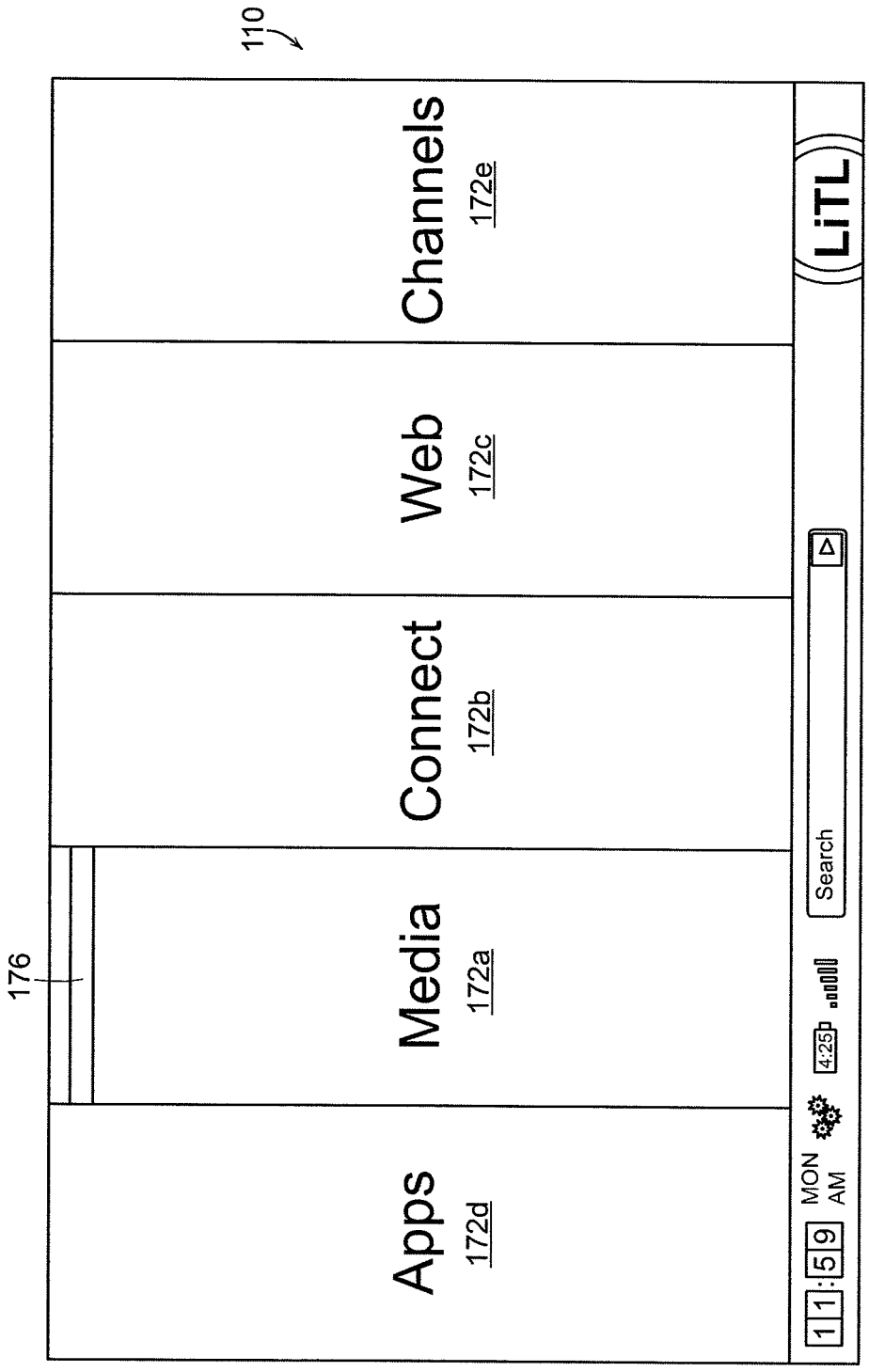

110
176
Apps
172d
Media
172a
Connect
172b
Web
172c
Channels
172e
LiTL
Search
11:59 MON AM
4:25

FIG. 12

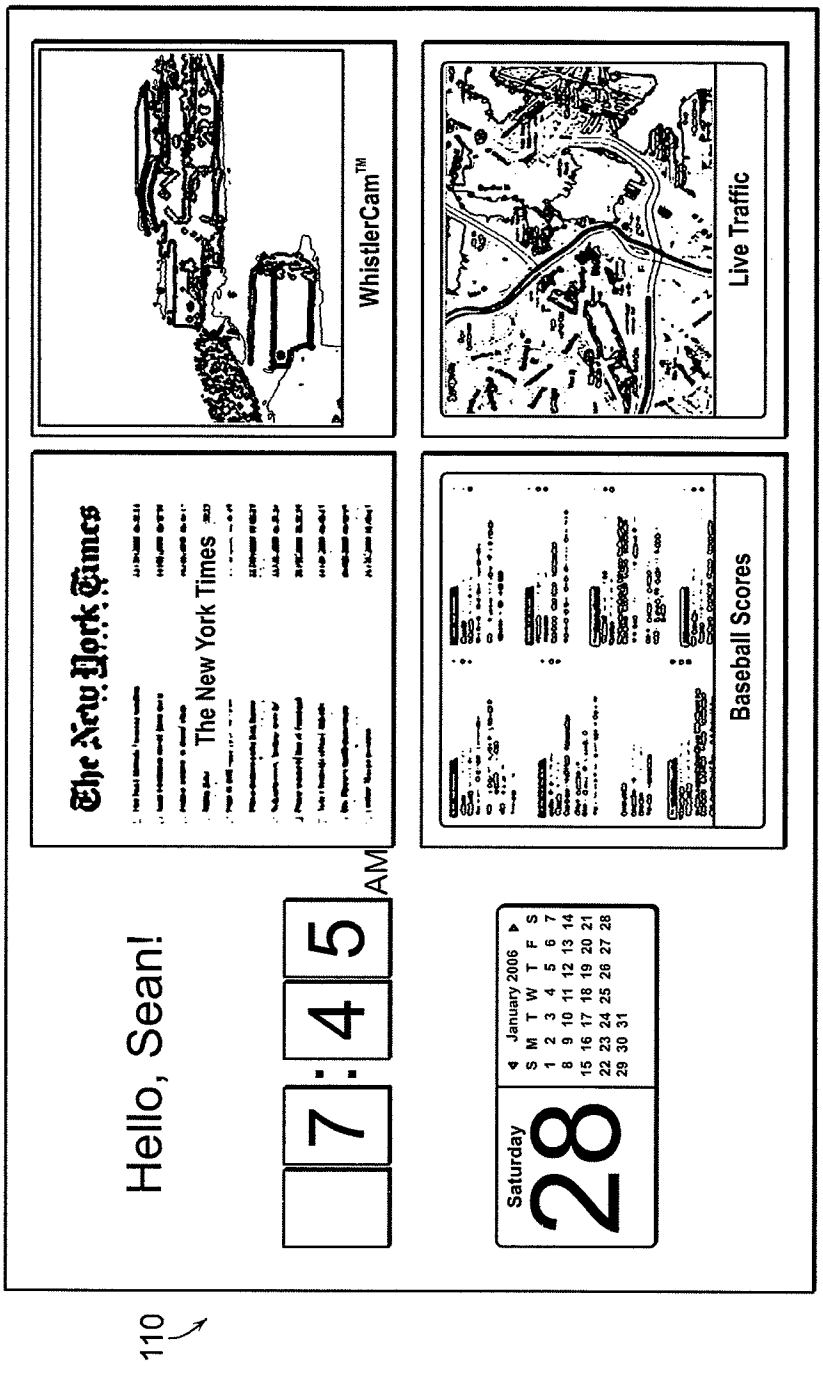

110
Hello, Sean!
7:45 AM
Saturday
28
January 2006
The New York Times
WhistlerCam™
Baseball Scores
Live Traffic

FIG. 13

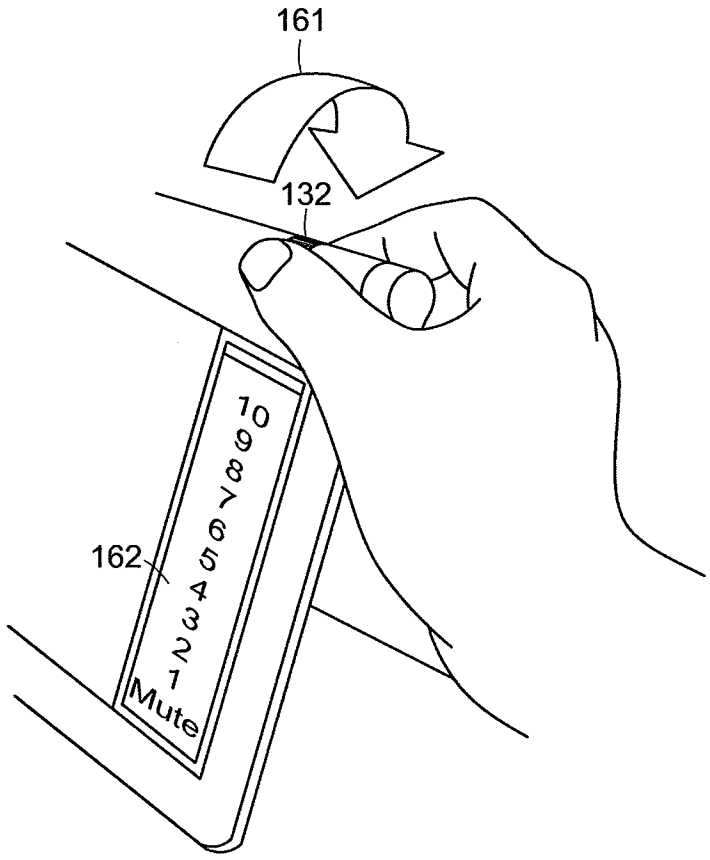


FIG. 14



FIG. 15

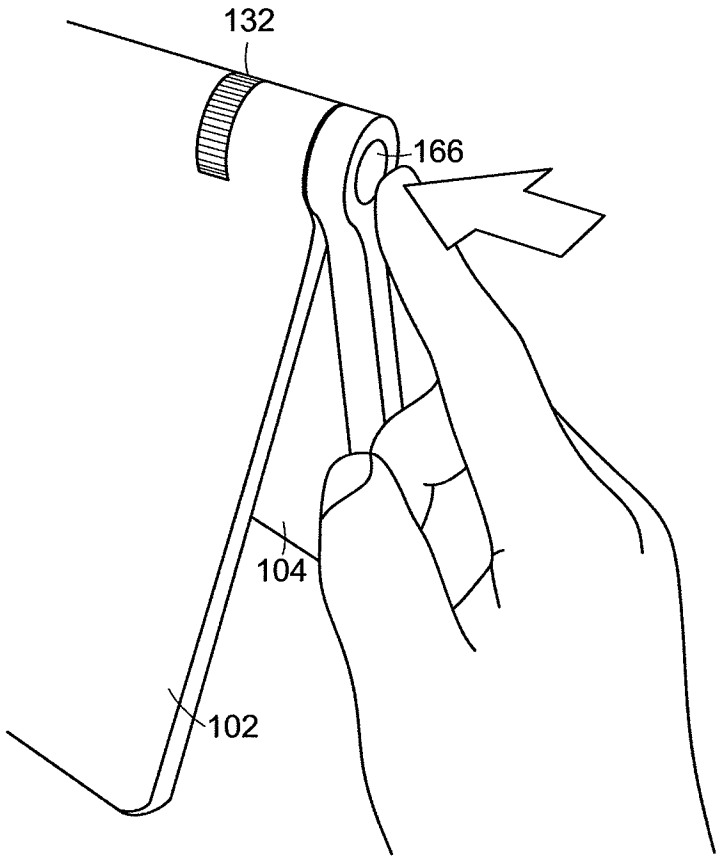


FIG. 16

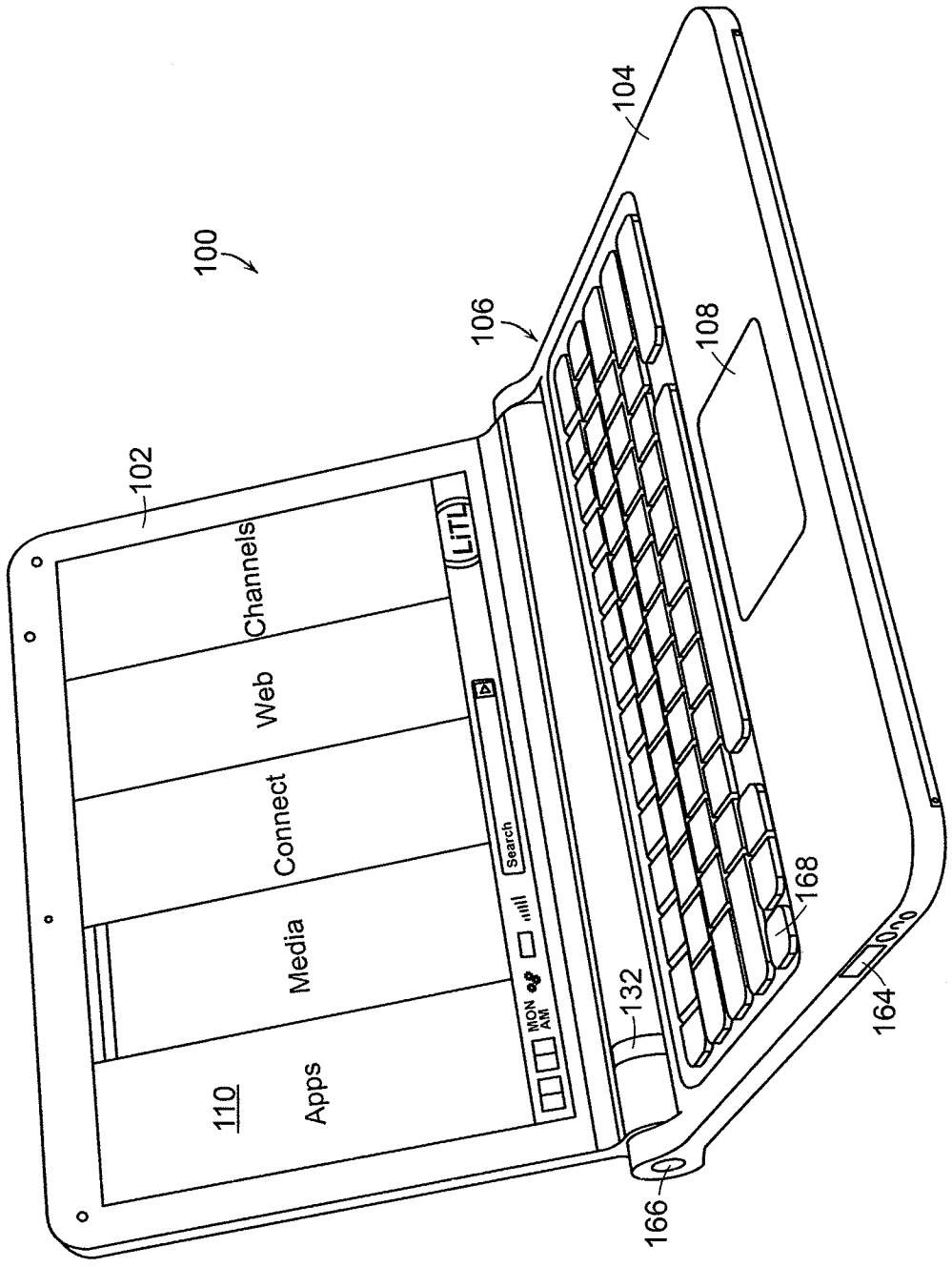

100
102
104
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108
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Channels
Web
Connect
Media
Apps
Search
MON
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164
166
168

FIG. 17

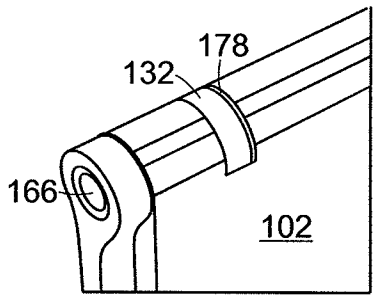


FIG. 18

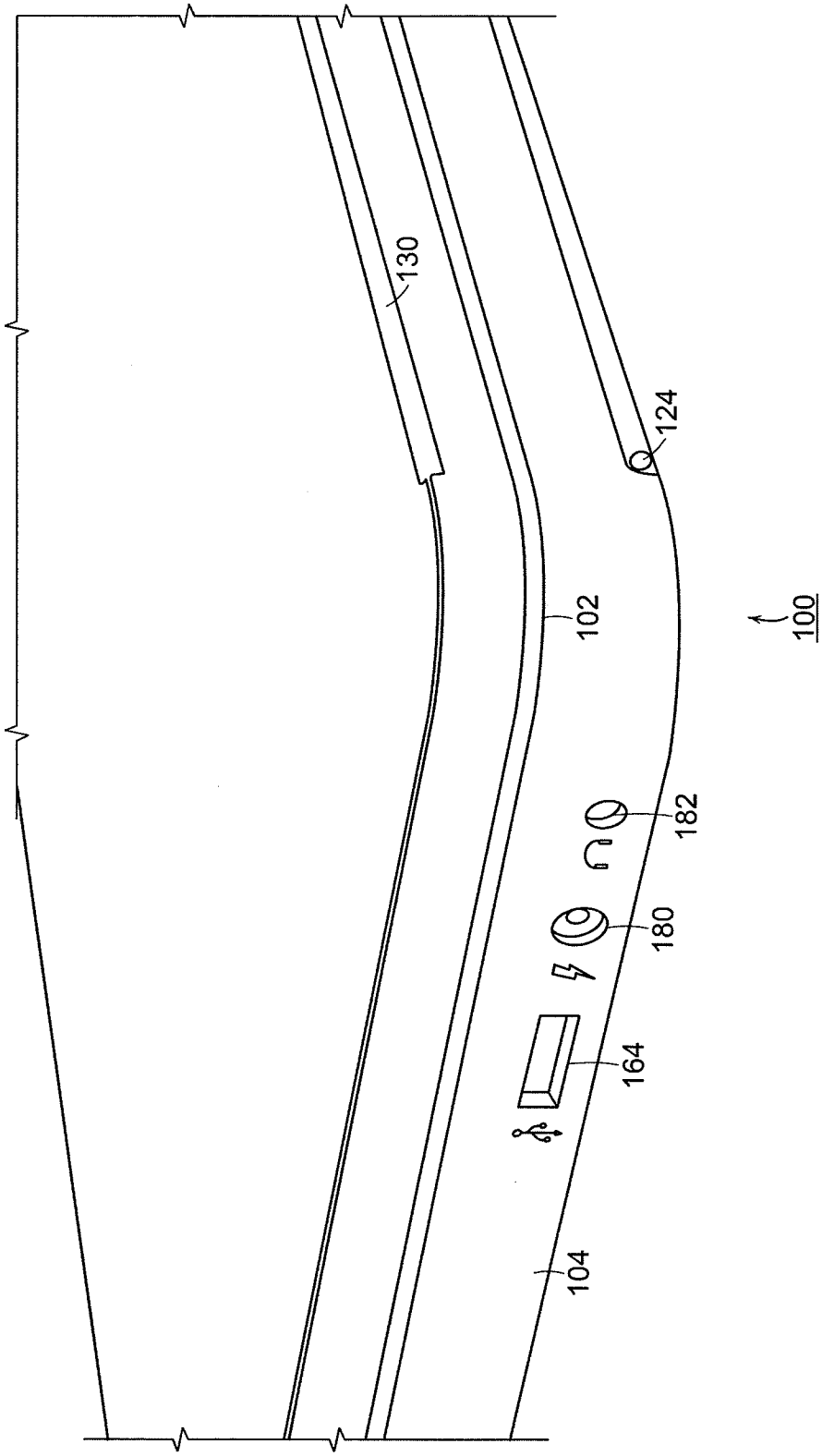


FIG. 19

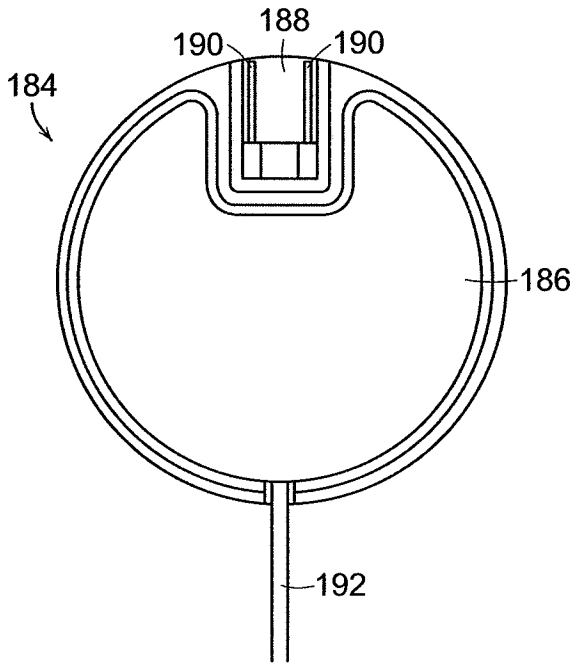


FIG. 20

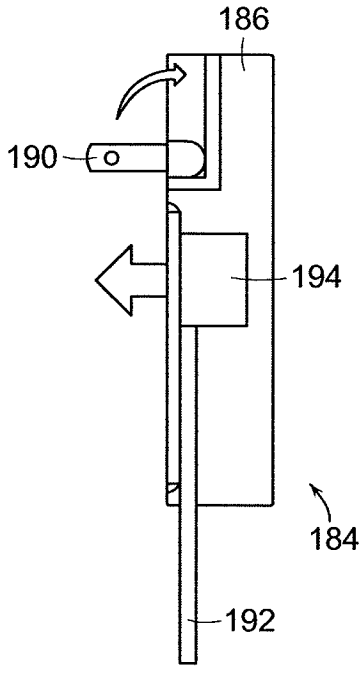


FIG. 21

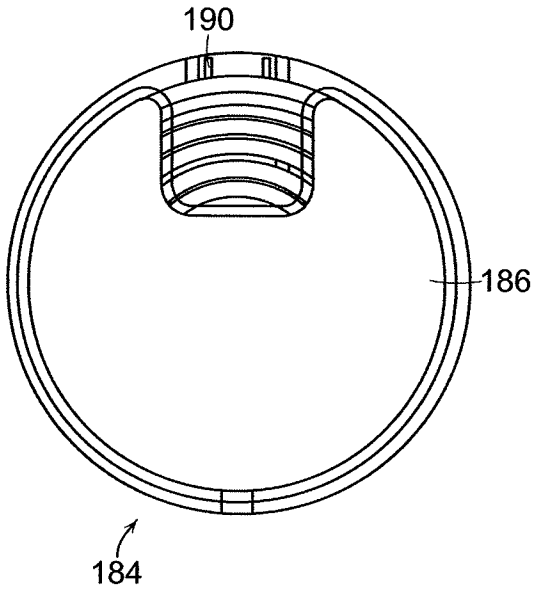


FIG. 22A

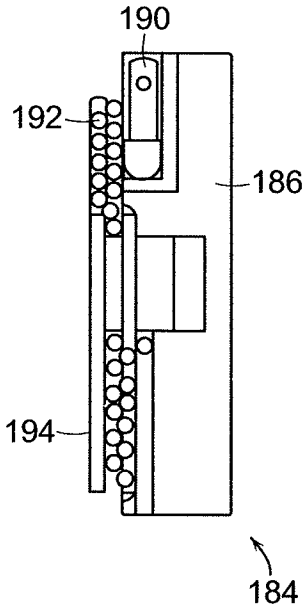


FIG. 22B

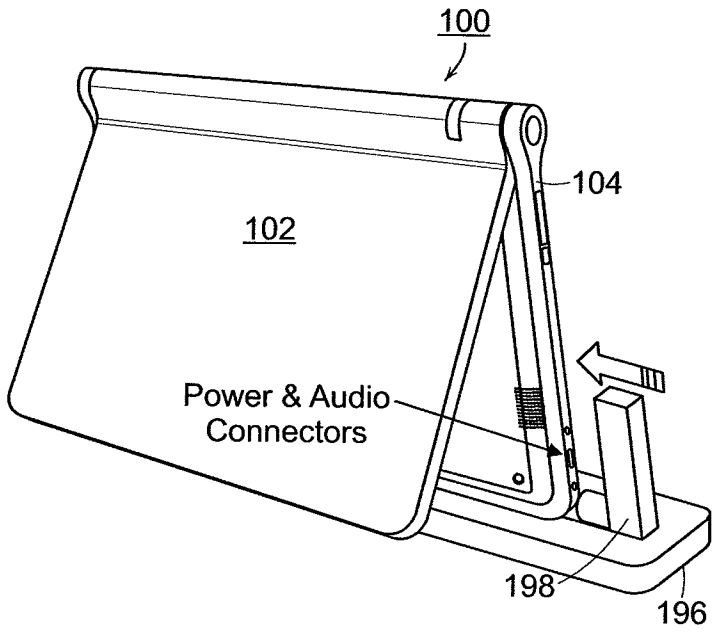


FIG. 23

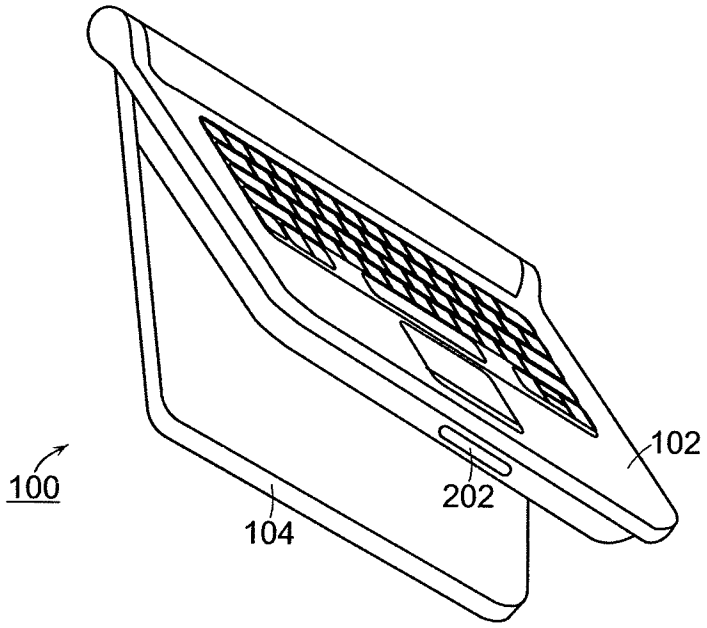


FIG. 24

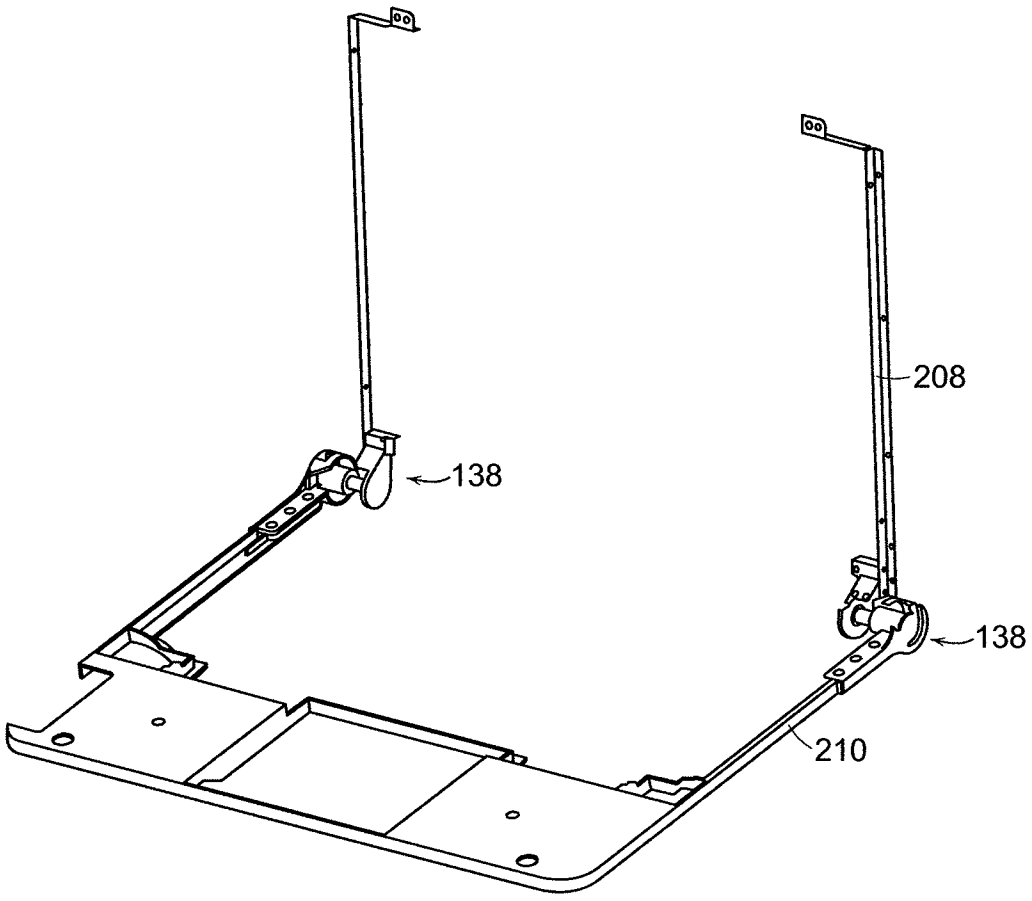


FIG. 25

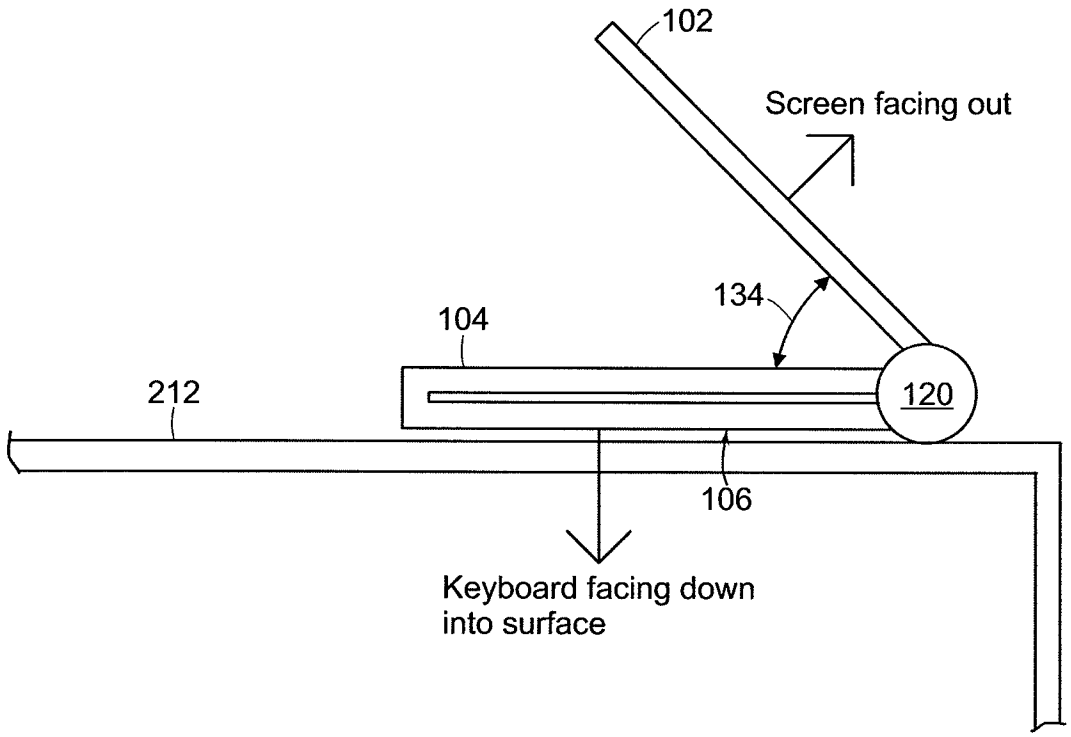

102
Screen facing out
134
104
212
120
106
Keyboard facing down
into surface

FIG. 26

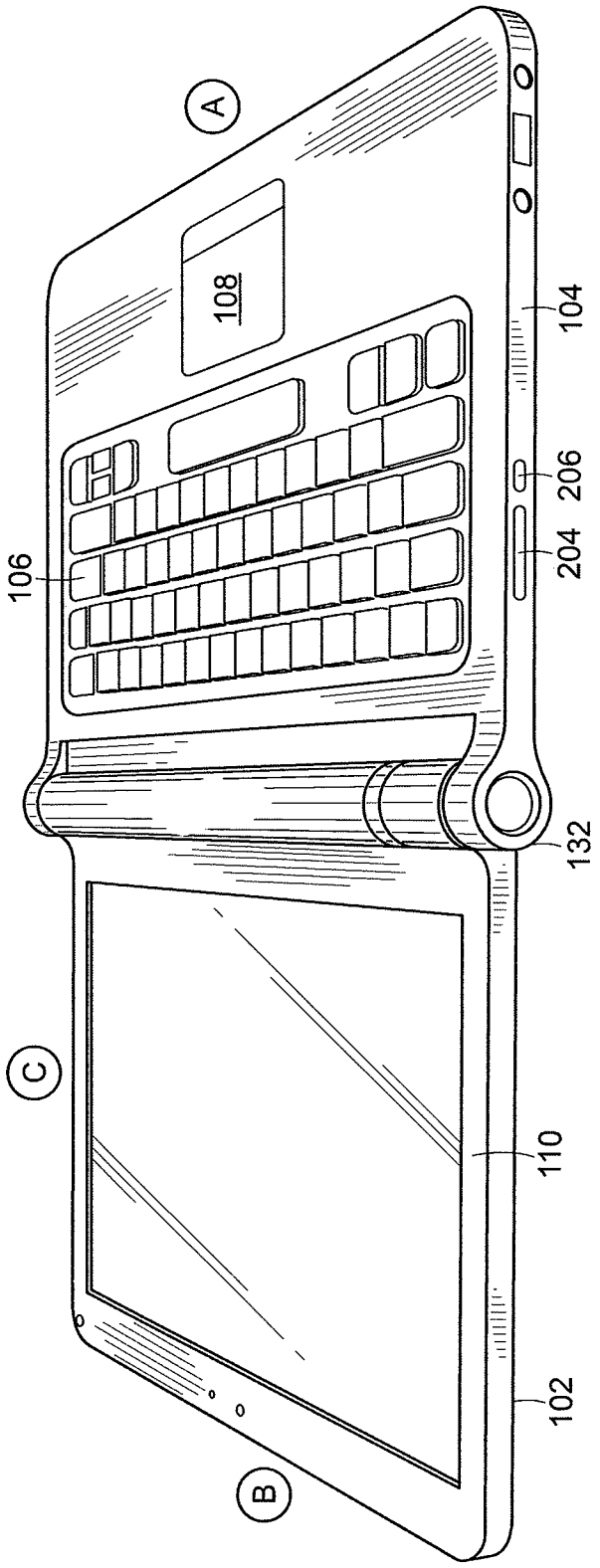


FIG. 27

DECLARATION FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am an original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the application entitled

PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS
the specification of which was filed on July 10, 2008, as Application No. 12/170,951, bearing attorney docket No. A2029-700111.

I hereby state that I have reviewed and understand the contents of the above identified application, including the claims.

I acknowledge the duty to disclose information which is known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I hereby claim the benefit under Title 35, United States Code, §119(e) of any United States provisional application(s) listed below:

61/041,365	April 1, 2008
(Application Number)	**(filing date)**

I hereby appoint the following Registered Practitioners to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

All Registered Practitioners of Lowrie, Lando & Anastasi, LLP associated with Customer Number 37462.

Address all telephone calls to John L. Welch at telephone no. (617) 395-7000.

Address all correspondence to: the Correspondence Address associated with Customer Number 37462.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

10-28-2008

Inventor's signature **Date**

Full name of first or joint inventor: Yves Behar
Citizenship: Switzerland
Residence: 5741 Scarborough Drive
Oakland, CA 94611
Post Office Address: 5741 Scarborough Drive
Oakland, CA 94611

10/22/08

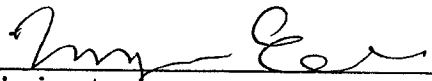
Inventor's signature **Date**

Full name of first or joint inventor: Joshua Morenstein
Citizenship: US
Residence: 124 Downey Street
San Francisco, CA 94117
Post Office Address: 124 Downey Street
San Francisco, CA 94117

10/22/08

Inventor's signature **Date**

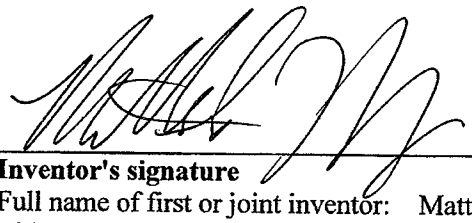
Full name of first or joint inventor: Christopher Hibmacronan
Citizenship: US
Residence: 2429 Damuth Street
Oakland, CA 94602
Post Office Address: 2429 Damuth Street
Oakland, CA 94602



10.22.08

Inventor's signature **Date**

Full name of first or joint inventor: Naoya Edahiro
Citizenship: Japan
Residence: 375 Bartlett Street
San Francisco, CA 94110
Post Office Address: 375 Bartlett Street
San Francisco, CA 94110



10.22.08

Inventor's signature **Date**

Full name of first or joint inventor: Matthew David Day
Citizenship: US
Residence: 425 2nd Street #301
San Francisco, CA 94107
Post Office Address: 425 2nd Street #301
San Francisco, CA 94107

899829.1

Docket No.: A2029-700111

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Yves Behar et al.
Serial No:	12/170,951
Confirmation No:	2004
Filed:	July 10, 2008
For:	PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS
Examiner:	Not Yet Assigned
Art Unit:	2115

CERTIFICATE OF TRANSMISSION UNDER 37 C.F.R. §1.8(a)

The undersigned hereby certifies that this document is being electronically filed in accordance with § 1.6(a)(4), on the 10th day of November, 2008

/Sarah M. Gates/
Sarah M. Gates

Commissioner for Patents
Alexandria, VA 22313-1450

PETITION FOR TWO MONTH EXTENSION OF TIME

Sir:

A two (2) month extension of time, to and including November 29, 2008, is requested for response to the Patent Office Communication of July 29, 2008.

The extension fee as set forth in 37 C.F.R. §1.17(a) is enclosed herewith.

Respectfully submitted,
Yves Behar et al., Applicant

/Sarah M. Gates/
Sarah M. Gates, Reg. No. 60,661
LOWRIE, LANDO & ANASTASI, LLP
Riverfront Office Park
One Main Street
Cambridge, Massachusetts 02142
Tel. (617) 395-7000

Electronic Patent Application Fee Transmittal

Application Number:	12170951
Filing Date:	10-Jul-2008
Title of Invention:	PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS
First Named Inventor/Applicant Name:	Yves Behar
Filer:	Sarah May Gates/Jessica Correia
Attorney Docket Number:	A2029-700111

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility application filing	1011	1	330	330
Utility Search Fee	1111	1	540	540
Utility Examination Fee	1311	1	220	220
Pages:				
Claims:				
Miscellaneous-Filing:				
Late filing fee for oath or declaration	1051	1	130	130
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 2 months with $0 paid	1252	1	490	490
Miscellaneous:				
		Total in USD ($)		**1710**

Electronic Acknowledgement Receipt

EFS ID:	4260681
Application Number:	12170951
International Application Number:	
Confirmation Number:	2004
Title of Invention:	PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS
First Named Inventor/Applicant Name:	Yves Behar
Customer Number:	37462
Filer:	Sarah May Gates
Filer Authorized By:	
Attorney Docket Number:	A2029-700111
Receipt Date:	10-NOV-2008
Filing Date:	10-JUL-2008
Time Stamp:	15:31:37
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$1710
RAM confirmation Number	1009
Deposit Account	502762
Authorized User	

The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:

Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		A2029_PA.pdf	31090 ae3570e866627984ddb64535ab4a5d8cd8a99c92	yes	4

Multipart Description/PDF files in .zip description

Document Description	Start	End
Preliminary Amendment	1	1
Specification	2	2
Drawings-other than black and white line drawings	3	3
Applicant Arguments/Remarks Made in an Amendment	4	4

Warnings:

Information:

2	Drawings-only black and white line drawings	A2029_Replacementfigs.pdf	532782 ac8db1139b4659228c175418691027a285104f7e	no	25

Warnings:

Information:

3	Drawings-other than black and white line drawings	A2029_700111_Annotated_Sheet.pdf	325959 bfcb5436782c0a74097250b3022ec9dc566e94d8	no	1

Warnings:

Information:

4	Oath or Declaration filed	A2029_Dec.pdf	111953 2cfc6781b1fdf9b5bd78d7940fd87909bd783eac	no	3

Warnings:

Information:

5	Extension of Time	A2029_2EOT.pdf	22127 e64017d99a40acc0f35eed5d59b71ee929708564	no	1

Warnings:

Information:

6	Fee Worksheet (PTO-06)	fee-info.pdf	38716 2d587bb1850e99dd88fe63e702daa1b512853428	no	2

Warnings:

Information:

Total Files Size (in bytes):	1062627

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

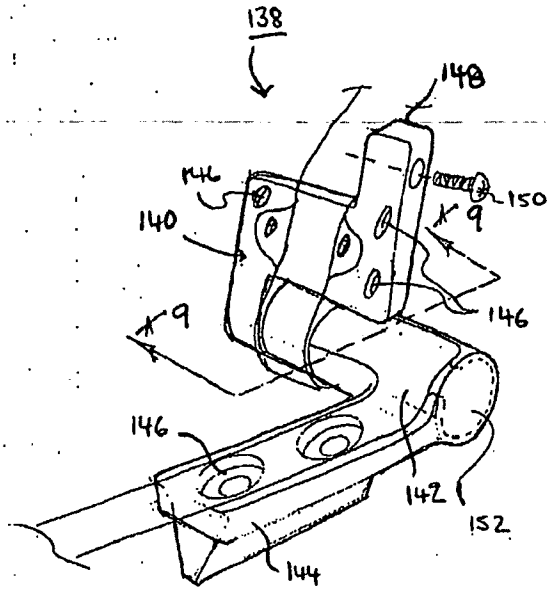
National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

9/25



8

FIG. 8

SCORE Placeholder Sheet for IFW Content

Application Number: 12170951 Document Date: 11/10/2008 3:31:37 PM

The presence of this form in the IFW record indicates that the following document type was received in electronic format on the date identified above. This content is stored in the SCORE database.

- Drawings – Other than Black and White Line Drawings

Since this was an electronic submission, there is no physical artifact folder, no artifact folder is recorded in PALM, and no paper documents or physical media exist. The TIFF images in the IFW record were created from the original documents that are stored in SCORE.

To access the documents in the SCORE database, refer to instructions developed by SIRA.

At the time of document entry (noted above):

- Examiners may access SCORE content via the eDAN interface.
- Other USPTO employees can bookmark the current SCORE URL (http://es/ScoreAccessWeb/).
- External customers may access SCORE content via the Public and Private PAIR interfaces.

Form Revision Date: February 8, 2006

PTO/SB/06 (07-06)
Approved for use through 1/31/2007. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
12/170,951	07/10/2008	

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY ☐ RATE ($)	SMALL ENTITY ☐ FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT 11/10/2008	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	* 17	Minus	** 20	= 0	X $ =		OR	X $52=	0
Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $ =		OR	X $220=	0
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	0

AMENDMENT	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
☐ Application Size Fee (37 CFR 1.16(s))									
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/ROSA HOLLAND/

This collection of information is required by 37 CFR 1.16. 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 12 minutes 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.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

DOCKET NO: A2029-700111

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Yves Behar et al.
Serial No:	12/170,951
Confirmation No:	2004
Filed:	July 10, 2008
For:	PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS
Examiner:	Not Yet Assigned
Art Unit:	2115

CERTIFICATE OF TRANSMISSION UNDER 37 C.F.R. §1.8(a)

The undersigned hereby certifies that this document is being electronically filed in accordance with §1.6(a)(4) on the 9th day of October 2008.

/Sarah M. Gates/
Sarah M. Gates

Commissioner for Patents

INFORMATION DISCLOSURE STATEMENT FILED PURSUANT TO THE DUTY OF DISCLOSURE UNDER 37 CFR §§1.56, 1.97 AND 1.98

Sir:

Pursuant to the duty of disclosure under 37 C.F.R. §§1.56, 1.97 and 1.98, the Applicant requests consideration of this Information Disclosure Statement.

PART I: Information Cited

The Applicant hereby makes of record in the above-identified application the information listed on the concurrently filed form PTO/SB/08a.

The order of presentation of the references should not be construed as an indication of the importance of the references.

The Applicant hereby makes the following additional information of record in the above-identified application.

The applicant would like to bring to the Examiner's attention the following co-pending applications that may contain subject matter related to this application:

Serial No.	Filing Date	Inventor(s)
12/170,939	**July 10, 2008**	**Yves Behar et al.**

PART II: Remarks

Documents cited anywhere in the Information Disclosure Statement, other than U.S. Patents and U.S. Patent Application Publications listed on a Form PTO/SB/08a, are enclosed unless otherwise indicated. It is respectfully requested that:

1. The Examiner consider completely the cited information, along with any other information, in reaching a determination concerning the patentability of the present claims;

2. Any concurrently filed form PTO/SB/08a be signed by the Examiner to evidence that the cited information has been fully considered by the Patent and Trademark Office during the examination of this application;

3. The citations for the information be printed on any patent which issues from this application.

By submitting this Information Disclosure Statement, the Applicant makes no representation that a search has been performed, of the extent of any search performed, or that more relevant information does not exist.

By submitting this Information Disclosure Statement, the Applicant makes no representation that the information cited in the Statement is, or is considered to be, material to patentability as defined in 37 C.F.R. §1.56(b).

By submitting this Information Disclosure Statement, the Applicant makes no representation that the information cited in the Statement is, or is considered to be, in fact, prior art as defined by 35 U.S.C. §102.

Notwithstanding any statements by the Applicant, the Examiner is urged to form his own conclusion regarding the relevance of the cited information.

An early and favorable action is hereby requested.

Respectfully submitted,

Yves Behar et al., *Applicant*

By: /Sarah M. Gates/

Sarah M. Gates, Reg. No. 60,661
LOWRIE, LANDO & ANASTASI, LLP
Riverfront Office Park
One Main Street
Cambridge, Massachusetts 02142
Tel. (617) 395-7000

Electronic Acknowledgement Receipt

EFS ID:	4087240
Application Number:	12170951
International Application Number:	
Confirmation Number:	2004
Title of Invention:	PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS
First Named Inventor/Applicant Name:	Yves Behar
Customer Number:	37462
Filer:	Sarah May Gates
Filer Authorized By:	
Attorney Docket Number:	A2029-700111
Receipt Date:	09-OCT-2008
Filing Date:	10-JUL-2008
Time Stamp:	17:18:11
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Filed (SB/08)	A2029_700111_IDS.pdf	608269 236a5e7353fe6274f3c85bb75b5cd68f072c6354	no	4

Warnings:	
Information:	

2	NPL Documents	A2029_Copending_Ap.pdf	112945 b19c781cc4bfbbb117e766ac6d3d190f0f3ce26f	no	31
Warnings:					
Information:					
3	Information Disclosure Statement Letter	908882_A2029_EFSIDS.pdf	28247 d35d5dc420942b3a9917aa27a36b20e83033fe33	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	749461	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/08a (09-08)
Approved for use through 10/31/2008. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Not for submission under 37 CFR 1.99)

Application Number	12170951
Filing Date	2008-07-10
First Named Inventor	Yves Behar
Art Unit	2115
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	Application Number	12170951
	Filing Date	2008-07-10
	First Named Inventor	Yves Behar
	Art Unit	2115
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	1	20070138806	A1	2007-06-21	Chris Ligtenberg et al.	
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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

☒ None

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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.

Signature	/Sarah M. Gates/	Date (YYYY-MM-DD)	2008-10-09
Name/Print	Sarah M. Gates	Registration Number	60661

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PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS

RELATED APPLICATIONS

This application claims priority under 35 U.S.C. §119(e) to U.S. Provisional Patent Application No. 61/041,365 filed April 1, 2008, entitled "PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS," which is incorporated herein by reference in its entirety.

BACKGROUND

Field of Invention

The present invention relates generally to portable computers and, more particularly, to a portable computer that is configurable into different functional and positional modes.

Discussion of Related Art

Portable computers, such as laptop computers or notebook computers, have become increasingly popular and ubiquitous in the home and workplace. Conventional portable computers most commonly have a "clam-shell" configuration, with a base including the keyboard, various ports, connectors and/or inputs (e.g., for power and connecting peripheral devices), and the majority of the electrical components (e.g., the central processing unit and memory), and a display component pivotably coupled to the base by a hinge. The display component is movable about the hinge between a closed position, with the display screen positioned adjacent the keyboard, and an open position, with the display screen inclined at a desired viewing angle.

Some portable computers are able to accept user inputs via a touch screen in addition to via conventional tools, such as a keyboard or mouse. The use of a touch screen to input data is sometimes referred to as operating in "tablet mode" because the computer is being used in a manner similar to a tablet of paper. U.S. Patent No. 6,771,494 discloses a hybrid tablet-type portable computer that is capable of operating either as a normal laptop computer receiving user input via a keyboard ("laptop mode"), or as a tablet computer receiving user input via a touch screen. The '494 patent further discloses that the display component of the

computer is attached to the base of the computer by hinges that allow the display to be tilted relative to the base (for laptop mode), and to be rotated and folded against the base to configure the computer into tablet mode.

Another variation of a portable computer with a moveable display is disclosed in U.S. Patent No. 6,266,236. The '236 patent discloses a computer including a base, a display member and an arm assembly coupling the display member to the base. According to the '236 patent, the arm assembly allows pivotable movement of the display member between a plurality of positions, including a notebook mode configuration, a tablet mode configuration, a presentation mode configuration, and a closed mode.

SUMMARY OF INVENTION

Aspects and embodiments of the present invention are directed to a portable computer that is configurable between a laptop mode (in which the portable computer has a conventional laptop appearance) and an easel mode in which the base of the computer and its display component stand upright forming an inverted "V," as discussed further below. The display component is pivotably coupled to the base of the portable computer by a hinge that allows the display component to be rotated or tilted about a longitudinal axis running along an interface between the base and the display component. Unlike the computers discussed in U.S. Patent No. 6,266,236 and U.S. Patent No. 6,771,494 above, the portable computer according to embodiments of the invention does not require an arm assembly, nor multiple, different hinge assemblies to be configured into the different modes. Furthermore, the portable computer according to embodiments of the invention is capable of different display modes and different functionality in the different configurations, as discussed below.

Further aspects and embodiments are directed to a portable computer having an embedded scroll wheel that can be configured to allow a user to control various features and functionality of the portable computer. For example, as discussed further below the scroll wheel can be used to navigate among information displayed on the portable computer's display and/or to alter operating modes of the portable computer, and/or to control features such as volume, display brightness, etc.

According to one embodiment, a portable computer is configurable between various modes, including a closed mode, a laptop mode, an easel mode, a flat mode and a frame mode. The portable computer may comprise a display component including a display screen, a base, and a hinge assembly at least partially housed within the base and configured to pivotably couple the display component to the base. The display component may be rotatable about a longitudinal axis running along an interface between the display component and the base. In the closed mode, the display screen may be disposed substantially against the base, and rotating the display component about the longitudinal axis up to approximately 180 degrees from the closed mode may configure the portable computer into the laptop mode. Rotating the display component about the longitudinal axis beyond approximately 180 degrees axis from the closed mode may configure the portable computer into the easel mode.

In one example of the portable computer, the display component is rotatable about the longitudinal axis up to approximately 320 degrees from the closed mode. In another example, the portable computer comprises a display orientation module that displays content on the display screen in one of a plurality of orientations relative to the longitudinal axis. The orientation of the displayed content may be dependent on the current display mode of the portable computer, or may be configurable responsive to a user input. The portable computer may further comprise a mode sensor which detects a current display mode of the portable computer, and the display orientation module may display content on the display screen in an orientation dependent on the current display mode detected by the mode sensor. Depending on the hinge assembly used, the longitudinal axis may comprises multiple parallel axes, and the hinge assembly may be configured to permit rotation of the display component about any of the multiple parallel axes to configure the portable computer between the plurality of display modes.

Another embodiment is directed to a portable computer comprising a base, a display component rotatably coupled to the base, and means for rotating the display component in a single direction relative to the base to configure the portable computer between a laptop mode and an easel mode.

In another embodiment of a portable computer configurable between multiple modes including a laptop mode and an easel mode, the portable computer comprises a display

component, a base, and a hinge assembly configured to rotatably couple the display component to the base. The hinge assembly may be configured to permit rotation of the display component about a single axis to configure the portable computer between the laptop mode and the easel mode. In one example, the single axis is a longitudinal axis running along an interface between the display component and the base. The portable computer may further comprise a scroll wheel disposed at least partially about the longitudinal axis. In one example, the display component comprises a display screen, and the scroll wheel is configured to permit a user to manipulate content displayed on the display screen.

Another embodiment is directed to a method of automatically orienting content displayed on a portable computer. The method comprises rotating a display component of the portable computer about a longitudinal axis running along an interface between the display component and a base of the portable computer, detecting a degree of rotation of the display component relative to the base, providing a signal representative of the degree of rotation of the display component, and automatically configuring an orientation, relative to the longitudinal axis, of the content displayed on the portable computer responsive to the signal.

According to another embodiment, a portable computer comprises a base unit, a display unit including a display screen configured to display content, an orientation sensor which detects an orientation of the display unit relative to the base unit, and a display orientation module which orients the content displayed on the display screen responsive to the orientation detected by the orientation sensor.

Another embodiment of a portable computer comprises a base, a display component rotatably coupled to the base such that the display component and the base are rotatable with respect to one another about a longitudinal axis running along an interface between the display component and the base, the display component including a display screen, and a scroll wheel disposed at least partially within the base and rotatable about the longitudinal axis, the scroll wheel configured to permit a user to control at least one of operating parameters of the portable computer and content displayed on the display screen. In one example, the scroll wheel is configured to permit the user to adjust a volume of sound produced by the portable computer. In another example, the screen is configured to display at least one of a plurality of modes of content, and the scroll wheel is configured to permit the

user to select a mode of content for display by the portable computer. The portable computer may further comprise one or more navigation buttons that may be used in conjunction with the scroll wheel to control aspects of the portable computer and displayed content.

According to another embodiment, a portable computer is configurable between a plurality of display modes including a laptop mode and an easel mode, the portable computer comprising a base, a display component rotatably coupled to the base and including a screen which displays content, and a scroll wheel accessible in each of the plurality of display modes and configured to permit a user to manipulate at least one of operating parameters of the portable computer and the content displayed on the screen. In one example, the scroll wheel is disposed at leas partially about an axis of rotation of the display component relative to the base.

In another embodiment, a portable computer comprises a base, a display component including a screen configured to display content, a hinge assembly configured to rotatably couple the display component to the base and to permit rotation of the display component about a longitudinal axis running along an interface between the display component and the base, and a scroll wheel disposed at least partially about the longitudinal axis.

Still other aspects, embodiments, and advantages of these exemplary aspects and embodiments, are discussed in detail below. Moreover, it is to be understood that both the foregoing information and the following detailed description are merely illustrative examples of various aspects and embodiments, and are intended to provide an overview or framework for understanding the nature and character of the claimed aspects and embodiments. Any embodiment disclosed herein may be combined with any other embodiment in any manner consistent with the objects, aims, and needs disclosed herein, and references to "an embodiment," "some embodiments," "an alternate embodiment," "various embodiments," "one embodiment" or the like are not necessarily mutually exclusive and are intended to indicate that a particular feature, structure, or characteristic described in connection with the embodiment may be included in at least one embodiment. The appearances of such terms herein are not necessarily all referring to the same embodiment. The accompanying drawings are included to provide illustration and a further understanding of the various aspects and embodiments, and are incorporated in and constitute a part of this specification. The

drawings, together with the remainder of the specification, serve to explain principles and operations of the described and claimed aspects and embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

Various aspects of at least one embodiment are discussed below with reference to the accompanying figures, which are not intended to be drawn to scale. Where technical features in the figures, detailed description or any claim are followed by references signs, the reference signs have been included for the sole purpose of increasing the intelligibility of the figures, detailed description, and claims. Accordingly, neither the reference signs nor their absence are intended to have any limiting effect on the scope of any claim elements. In the figures, each identical or nearly identical component that is illustrated in various figures is represented by a like numeral. For purposes of clarity, not every component may be labeled in every figure. The figures are provided for the purposes of illustration and explanation and are not intended as a definition of the limits of the invention. In the figures:

FIG. 1 is an illustration of one example of a portable computer, according to aspects of the invention, in a "laptop" configuration;

FIG. 2 is a view of the portable computer of FIG. 1 in the closed position;

FIG. 3 is a plan view of the exterior of the bottom of the portable computer of FIG. 1;

FIG. 4 is a perspective view of the portable computer of FIG. 1 in the easel mode;

FIG. 5 is a side view of the portable computer of FIG. 4, illustrating the adjustable angle of the easel mode;

FIGS. 6A-C are diagrams illustrating different positions of the portable computer of FIG. 4 in easel mode;

FIG. 7A is an illustration of a portion of the portable computer of FIG. 1 in the laptop mode, illustrating a hinge assembly according to aspects of the invention;

FIG. 7B is an in illustration of a portion of the portable computer of FIG. 1 in the easel mode, illustrating the hinge assembly according to aspects of the invention;

FIG. 8 is a diagram of one example of the hinge assembly of FIGS. 7A and 7B;

FIG. 9 is a cross-sectional diagram of a portion of the hinge assembly of FIG. 8, taken along line A-A in FIG. 8;

FIG. 10 is an exploded view of the hinge assembly of FIG. 8;

FIG. 11 is a block diagram of one example of a portable computer user interface architecture, according to aspects of the invention;

FIG. 12 is a screen shot illustrating one example of a graphical user interface, according to aspects of the invention;

FIG. 13 is a screen shot illustrating another example of a graphical user interface according to aspects of the invention;

FIG. 14 is an illustration of a user adjusting the scroll wheel on a portable computer in the easel mode, according to aspects of the invention;

FIG. 15 is an illustration of a user pressing the scroll wheel on a portable computer, according to aspects of the invention;

FIG. 16 is an illustration of a user pressing a navigation button on the portable computer, according to aspects of the invention;

FIG. 17 is an illustration of an example of the portable computer in the laptop mode, according to aspects of the invention;

FIG. 18 is a view of a portion of the portable computer illustrating a wireless signal indicator feature, according to aspects of the invention;

FIG. 19 is a view of a portion of the portable computer in the closed position, according to aspects of the invention;

FIG. 20 is a plan view of one example of a power adaptor, according to aspects of the invention;

FIG. 21 is a side view of the power adaptor of FIG. 20;

FIG. 22A is another side view of the power adaptor of FIG. 20, illustrating the power cord would around a cord spool, according to aspects of the invention;

FIG. 22B is a plan view of the power adaptor of FIG. 22A

FIG. 23 is an illustration of the portable computer coupled to a docking station, according to aspects of the invention;

FIG. 24 is an illustration of the portable computer showing one example of a docking connector, according to aspects of the invention;

FIG. 24 is an illustration of a hinge assembly coupled to a computer frame, according to aspects of the invention;

FIG. 26 is an illustration of the portable computer configured into a "frame" mode, according to aspects of the invention; and

FIG. 27 is an illustration of the portable computer configured into a "flat" mode, according to aspects of the invention.

DETAILED DESCRIPTION

Aspects and embodiments are directed to a portable computer that is configurable between different operating modes, including a laptop mode (in which the portable computer has a conventional laptop appearance), a flat mode, a frame mode, and an easel mode in which the base of the computer and its display component stand vertically forming an inverted "V," as discussed further below. The portable computer is capable of different display formats and functionality in the different modes, and includes a graphical user interface that may work seamlessly with the computer hardware to provide a unified, comfortable, holistic user experience. In particular, the portable computer may provide access to a wide array of functions, both those traditionally provided by computing devices and those traditionally provided by other passive information devices. For example, the hardware and software, including the graphical user interface, of the portable computer may be focused toward providing access to entertainment media, such as audio and video (e.g., playing music, streaming video, viewing photographs, etc.), email, and internet, while also providing state-of-the-art computer processing capability.

It is to be appreciated that embodiments of the methods and apparatuses discussed herein are not limited in application to the details of construction and the arrangement of components set forth in the following description or illustrated in the accompanying drawings. The methods and apparatuses are capable of implementation in other embodiments and of being practiced or of being carried out in various ways. Examples of specific implementations are provided herein for illustrative purposes only and are not intended to be limiting. In particular, acts, elements and features discussed in connection with any one or more embodiments are not intended to be excluded from a similar role in any other

embodiments. Also, the phraseology and terminology used herein is for the purpose of description and should not be regarded as limiting. Any references to embodiments or elements or acts of the systems and methods herein referred to in the singular may also embrace embodiments including a plurality of these elements, and any references in plural to any embodiment or element or act herein may also embrace embodiments including only a single element. References in the singular or plural form are not intended to limit the presently disclosed systems or methods, their components, acts, or elements. The use herein of "including," "comprising," "having," "containing," "involving," and variations thereof is meant to encompass the items listed thereafter and equivalents thereof as well as additional items. References to "or" may be construed as inclusive so that any terms described using "or" may indicate any of a single, more than one, and all of the described terms.

Referring to FIG. 1, there is illustrated one example of a portable computer according to aspects of the invention. In FIG. 1, the portable computer 100 is illustrated in the "laptop" mode, with the display component 102 inclined at a viewing angle from the base 104. The display component 102 is pivotably coupled to the base 104 by a hinge assembly (not shown) that allows the display component to be rotated with respect to the base. The hinge assembly may include a single or multiple hinges, which may be any of a variety of hinge types, including, but not limited, to single-axis hinges, multiple-axis hinges, geared hinges, etc. In one example, the hinge assembly allows the display component 102 to be rotated (or tilted) about a longitudinal axis 101 running along an interface between the display component and the base 104, as illustrated in FIG. 1 and discussed further below. The base 104 includes a keyboard 106 and internal electronic components (not shown), such as a central processing unit, memory, and other components necessary to operate the portable computer, as known to those skilled in the art. In some embodiments, the base 104 may also include a touch pad 108 or trackball (not shown) for receiving user commands, as known to those skilled in the art.

Still referring to FIG. 1, the display component 102 includes a display screen 110, and may also include a camera 112, microphone 114, and infrared receiver 116, as discussed further below. It is to be appreciated that the locations of the camera 112, microphone 114 and infrared receiver 114 are not limited to the example illustrated in FIG. 1, and may be placed in other locations on the display component 102 and/or base 104, as would be

recognized by those skilled in the art. The display component 102 may also include cushions 118 that provide soft contact points between the base 104 and the display component 102 when the portable computer is closed. In one example, the cushions 118 are made of rubber. However, it is to be appreciated that the invention is not so limited, and the cushions 118 may comprise materials other than rubber, including, for example, a polymer, felt, or other suitable materials as would be recognized by those skilled in the art.

Referring to FIG. 2, there is illustrated a side view of the portable computer 100 of FIG. 1 in the closed configuration. As is the case for conventional clam-shell type portable computers, when the portable computer 100 is closed, the display screen is disposed "face down" against the keyboard of the base 104. In the illustrated embodiment, the base 104 includes a rounded portion 120 that houses the hinge (not shown) that pivotably couples the display component 102 to the base, as discussed further below. It is to be appreciated that the rounded portion 120 is not limited to having a round shape, but may instead have another shape, which may be dependent on the type of hinge used. In one embodiment, a power button 122, configured to turn the portable computer ON and OFF, may also be provided on the rounded portion 120, as illustrated in FIG. 2. However, it is to be appreciated that the invention is not so limited, and the power button 122 may be located elsewhere on the base 104. In one example, the power button 122 may be slightly recessed relative to the surface of the base 104, so as decrease the potential for the power button to be accidentally pressed.

An exterior view of the bottom of the base 104 (the underside of the portable computer 100) is illustrated in FIG. 3. As can be seen in FIG. 3, in one embodiment, the base 104 includes a plurality of feet 124. In one example, the feet 124 are made of rubber; however, it is to be appreciated that the invention is not so limited and the feet may be made of another material, such as, for example, a polymer or felt. A ventilation slit 126 may be provided near an interface between the base 104 and the display component 102, as illustrated, or elsewhere as may be desired, to allow heat to dissipate from the internal electronic components in the base. The base 104 may also include one or more speakers 128. In one example, the base 104 includes two stereo speakers 128, positioned at either side of the base, as illustrated in FIG. 3; however, it is to be appreciated that the portable computer 100 may comprise more or fewer speakers which may be placed at any location on the base 104. A scroll wheel 132 may

be provided to allow a user to control certain functionality of the portable computer 100, such as navigating web pages, controlling speaker volume, selecting programs, etc., as discussed further below.

According to one embodiment, the base 104 may comprise a cushioning strip 130 disposed along an edge of the base 104 opposite to the interface between the display component 102 and the base, as illustrated in FIG. 3. The cushioning strip 130, which may comprise rubber, a polymer, or another suitable material, may serve as a "foot" when the portable computer is configured into the easel mode, as discussed further below. In one embodiment, the display component 102 may be provided with a similar cushioning strip that may serve as a second supporting foot when the portable computer is configured into the easel mode.

Referring to FIG. 4, there is illustrated an example of the portable computer 100 configured into the easel mode. To convert the portable computer 100 from the laptop mode (or closed position) into the easel mode, the display component 102 may be folded away from the base 104, in the same direction as to open the computer (i.e., to configure the computer from the closed position into the laptop mode) such that the base 104 and the display component 102 form an inverted "V" shape with the bottom of the base and the back of the display component face another, as illustrated in FIG. 4. In the easel mode, the display screen 110 is visible and accessible on one side of the portable computer 100 and the keyboard 106 (not shown in FIG. 4) is visible and accessible on the other side.

As illustrated in FIG. 4, in one embodiment, the portable computer may comprise integrated hardware volume controls, including a volume control button 204 and a mute button 206. In one example, the volume control button 204 may be a rocker switch that allows a user to easily increase or decrease the volume of audio played through the speakers 128. When the user presses the volume control button 204, a volume indicator may temporarily appear on the display screen 110, to provide a visual indication of the amount by which the volume is being increased or decreased. Similarly, pressing the mute button 206 may cause a visual indication that the volume is muted to appear on the display screen 110.

According to one embodiment, when the portable computer 100 is configured into the easel mode, the visual display on the display screen 110 is automatically rotated 180 degrees

such that the information appears "right-way-up," even through the display screen is upside-down compared to when the portable computer is in the laptop mode. Thus, a user may simply "flip" the portable computer 100 into the easel mode and immediately be able to comfortably view information on the display screen 110, without having to access display screen controls to adjust the orientation of the visual display. In one embodiment, the portable computer 100 includes an orientation (or mode) sensor that is configured to detect whether the portable computer is in the laptop mode or the easel mode, and to adjust the display accordingly. The orientation sensor may be incorporated into the base component 104, for example, underneath the keyboard 106, or into the display component. In one example, locating the orientation sensor in the display component 102, rather than the base 104, may provide more robust detection and therefore, may be presently preferred in some embodiments. The orientation sensor may be used to determine a precise relative orientation of the base component 104 with respect to the display component 102, or vice versa, for example, to determine whether the device is in the laptop mode, easel mode, or some point in between the two modes. In one example, the orientation sensor includes an accelerometer whose output is fed to the computer operating system (or to dedicated logic circuitry) which then triggers a display inversion as appropriate.

Accelerometers have been used in portable devices such as cellular phones, media players or computers, as sudden motion sensors, or "drop detectors," to protect against hard drive crashes in the event that the device is dropped. By contrast, however, the accelerometer in the portable computer according to an embodiment of the invention is not used to detect motion of the overall computer, but rather to detect a configuration of the portable computer 100 (e.g., laptop mode or easel mode), particularly, to detect an orientation of the display component 102 relative to the base component 104. In one example, information from the accelerometer is provided to a display controller in the portable computer and used to switch the display between portrait or landscape mode, as is done in some conventional devices.

Referring to FIG. 5, when the portable computer 100 is in the easel mode, the base 104 is disposed at an angle 134 to the display component 102. This angle 134 is adjustable, for example, to allow a comfortable viewing angle to the display screen 110 to be maintained for different positions of a user 136 and of the portable computer 100, as illustrated in FIGS. 6A,

6B and 6C. For example, when the user 136 is further from the portable computer, the angle 134a (FIG. 6A) may be made smaller than the angle 134b when the user is closer to the portable computer (FIG. 6B). As discussed above, in one example, the orientation sensor (not shown) may be used to detect, either approximately or precisely, the angle 134 and to provide the information to the computer operating system.

According to one embodiment, the display component 102 is pivotably coupled to the base 104 by a hinge that allows the display component to be moved relative to the base so as to allow the portable computer 100 to be configured into the closed position, the laptop mode or the easel mode. As discussed above, in conventional "clamshell" type portable computers, the hinges that couple the display component to the base generally do not permit more than about 180 degrees of rotation of the display component. Thus, these conventional portable computers can be in a closed position or open, laptop configuration, but cannot be configured into an easel mode because the conventional hinges do not permit sufficient movement of the display component. Similarly, the tablet-type portable computers discussed above have displays that can be opened, rotated and folded such that they lie flat against the keyboard on the base, but cannot be configured into an easel mode. Although, as discussed above, U.S. Patent No. 6,266,236 discloses a computer that is configurable into a presentation mode, this requires a complex arm assembly. By contrast, the portable computer according to embodiments of the present invention may be configured into the easel mode by simply continuing to tilt or rotate the display component past the "laptop positions" until a desired easel angle 134 is reached.

Referring to FIGS. 7A and 7B, there is illustrated a portion of the portable computer 100 illustrating a hinge assembly 138 that allows the portable computer to be configured into either the laptop mode (FIG. 7A) or the easel mode (FIG. 7B), according to aspects of the invention. According to one embodiment, the hinge assembly 138 accommodates 0-320 degrees of rotation, allowing a minimum angle 134 (see FIG. 5) of 40 degrees. However, it is to be appreciated that the hinge assembly 138 may allow greater or fewer degrees of rotation, provided only that sufficient rotation is allowed so as to configure the portable computer 100 into either the laptop mode or the easel mode. As discussed above, in one embodiment the portable computer 100 includes an orientation sensor (not shown) that is configured to detect

a relative orientation of the display component 102 and the base component 104. In one example, the orientation sensor may be an accelerometer incorporated into the base component 104, as discussed above. Alternatively, the orientation sensor may be incorporated into the hinge assembly 138 and may be used to detect movement of the hinge assembly, and to translate that movement into an information about the relative orientation of the display component 102 and the base component 104 (for example, a size of the angle 134). It is also to be appreciated that the orientation sensor may include electronic or mechanical components, or a combination thereof. For example, the hinge assembly may be provide with detents that provide an indication of the mode of the portable computer.

As discussed above, and also illustrated in FIGS. 7A and 7B, the portable computer may also comprise a scroll wheel 132 that allows a user to adjust, control and/or select various aspects of the portable computer (e.g., wireless capability or speaker volume) or items displayed on the display screen 110. A housing 160 may contain or support various mechanical and/or electronic components (not shown) that are coupled to the scroll wheel 132 and are configured to convert physical movement of the scroll wheel into electrical signals. These electrical signals may be provided to the central processing unit of the portable computer 100 which processes the electrical signals so as to translate movement of the scroll wheel into control of a selected feature, for example, adjusting the volume of the speaker(s) or selecting a particular item displayed on the display screen, as discussed further below.

One embodiment of the hinge assembly 138 is illustrated in FIG. 8. The hinge assembly includes a bracket 140 rotatably coupled to a housing 142. The housing 142 may include a first flange 144 that may be fastened to an internal frame in the base 104, as illustrated in FIG. 7A. The first flange 144 may include holes 146 to allow the first flange to be fastened to the base 104 using fasteners, such as, for example, screws, rivets or bolts. The bracket 140 may include a second flange 148 that may be similarly coupled to the display component 102 using fasteners 150. In one embodiment, the display screen 110 (see FIG. 1) may be an LCD screen. As known to those skilled in the art, an LCD screen generally comprises a frame and plastic housing. In one example, the second flange 148 may be fastened to either or both of the display screen frame and the screen's plastic housing. Referring to FIG. 25, there is illustrated an example of two hinge assemblies 138 coupled to

the display frame 208 of the display component, and to the base frame 210 of the base component 104. According to one embodiment, the bracket 140 and/or housing 142 may be formed of cast zinc. However, it is to be appreciated that other materials, including other metals, may be used, and the bracket 140 and/or housing 142 may be formed using a procedure other than casting, such as, for example, machining or molding.

Referring again to FIG. 8, in one embodiment, the hinge assembly 138 may also incorporate an area 152 for locating the power button (FIG. 2, 122) or a navigation control button (FIG. 4, 166), as discussed further below.

Referring to FIG. 9, there is illustrated a cross-sectional view of a portion of the hinge assembly 138 taken along line A-A in FIG. 8. As shown in FIG. 9, in one embodiment the hinge assembly 138 comprises a shaft 154 located within the hinge housing 142. The shaft 154 may be held in position within the hinge housing 142, and rotatably coupled to the housing, by torsion elements, such as springs 156. In one example, the springs 156 may be formed by stamping; however, it is to be appreciated that other methods of manufacture may be used. In one example, the hinge assembly may accommodate about 320 degrees of rotation, as discussed above, and may provide about 6.5 in-lbs in symmetric torque.

FIG. 10 is an exploded view of the hinge assembly of FIGS. 8 and 9. As shown in FIG. 10, the shaft 154 is coupled to a member 158. This member 158 may be integral with or coupled to the bracket 140 which is, in turn, fastened to the display component, as discussed above. Thus, the shaft 154 and springs 156 provide a rotatable coupling between the fixed elements of the hinge assembly, namely, the hinge housing 142 and bracket 140 which are fastened to the base 104 and display component 102 of the portable computer. In this manner, the hinge assembly allows the display component 102 to be moved relative to the base 104, thereby allowing the portable computer to be easily and quickly configured into any of the closed position, laptop mode or easel mode. For example, simply rotating or tilting the display component about the longitudinal axis 101 (see FIG. 1) up to approximately 180 degrees from the closed mode configures the portable computer into the laptop mode, and rotating the display component about the longitudinal axis 101 beyond approximately 180 degrees axis from the closed mode configures the portable computer into the easel mode.

According to one embodiment, the portable computer may include integrated "navigation" hardware that allows a user to easily and comfortable control various features and functions of the portable computer, and to manipulate content displayed on the portable computer. For example, as discussed above, the portable computer 100 may comprise a scroll wheel 132 that allows a user to control, adjust and/or select various functionality of the portable computer. According to another embodiment, the scroll wheel 132 may be used to provide "hardware navigation" through information, such as menus, icons, etc., displayed on the display screen 110, as discussed further below with reference to FIG. 17. A common display configuration used in conventional computers is a "desktop" view in which multiple icons representing links to various programs or applications are displayed over a background image. Navigation is conventionally performed using a mouse, touch pad or trackball, as known to those skilled in the art. In one embodiment, the portable computer 100 may display information on the display screen 110 in the conventional desktop configuration, and navigation may be performed using either conventional tools, such as a touchpad 108, trackball (not shown) or peripheral, for example, a mouse, that is connected to the portable computer 100 via a port 164, or the scroll wheel 132, or a combination thereof. According to another embodiment, the portable computer 100 includes a streamlined graphical user interface that supports "map" navigation. The map user interface provides a clear overview of the entire computing environment and searching capability within the environment that may be accessed using the scroll wheel 132 and, optionally, one or navigation buttons 166, 168 that may be provided on the base 104 of the portable computer 100 (button 166) and/or in the keyboard 106 (button 168), illustrated in FIG. 17. In one embodiment, the map mode of navigation is a hierarchical mode that reduces the number of items to select amongst at any stage of navigation, thereby facilitating user access with the scroll wheel 132 and, optionally, the navigation button(s) 166, 168. Of course, it is to be appreciated that the map user interface may also be navigated using conventional tools, such as a trackball, touchpad, mouse or arrow keys.

Referring to FIG. 11, there is illustrated a block diagram of one example of an architecture of the portable computer including a map user interface. The user interface "home" screen 170 that displays a plurality of modes of content 172. In the illustrated

example, the home screen 170 contains five modes of content 172; however, it is to be appreciated that the home screen may include more or fewer than five modes of content and that the modes of content may differ from the examples discussed below. According to one example, the modes of content 172 accessible via the home screen 170 may include "media" 172a, "connect" 172b, "web" 172c, "applications" 172d, and "channels" 172e. Using the map user interface, information, programs, features and applications may be grouped into the various modes of content 172. By selecting any mode of content 172, for example, by using the scroll wheel 132 and/or navigation buttons 166, 168, as discussed further below, the user may access the content organized within that mode. For example, the media mode 172a may provide access to a medial player to play, view, search and organize media such as music, video, photos, etc. The connect mode 172b may provide access to features such as, for example, email, voice-over-IP, instant messaging, etc., and the web mode 172c may provide access to internet browsing and searching. The application mode 172d may provide access to, for example, computer applications or programs, such as word processor, spreadsheet, calculator, etc. In one example, these applications or programs may be provided as web-based services rather than programs or applications residing on the portable computer 100. The channels mode 172e may provide access to different functionality of the portable computer, with the different functions or features defined as different channels. For example, a channel may include an alarm clock channel in which the portable computer is configured to display a clock and can be programmed to activate an alarm, e.g., a sound, piece of music, etc., at a predetermined time. Another example of a channel may include a "photo frame" channel in which the portable computer may be configured to display a pre-selected image or set of images, etc. Another example of a channel is a "television" channel, in which the portable computer is configured to stream Internet television. In one example, a user may configure particular Internet television channels (e.g., a news channel, a movie channel, a home and garden channel, etc.) into sub-channels within the channels mode of content 172(e). Some or all of the modes of content 172 may access, retrieve and/or store information on the Internet 174.

According to one embodiment, the different modes of content 172 may be displayed as a series of bars across the display screen 110, as illustrated in FIG. 12. The following

discussion of various features, including hardware navigation through the map user interface may refer primarily to the display configuration illustrated in FIG. 12. However, it is to be appreciated that the invention is not so limited, and the modes of content may be displayed in other configurations, including, for example, a "desktop" and icon configuration, a "dashboard" type display, as illustrated in FIG. 13, or another configuration, as would be recognized by those skilled in the art. Similarly, navigation is discussed below primarily with reference to the scroll wheel 132 and navigation buttons 166, 168; however, it is to be appreciation that navigation may also be accomplished using any of the conventional tools discussed above or known to those skilled in the art.

As discussed above, according to one embodiment, the scroll wheel 132 and, optionally, the navigation buttons 166, 168 may be used to navigate the user interface. Referring again to FIG. 12, scrolling the scroll wheel may sequentially highlight different ones of the modes of content 172. In one example, the highlighting may be achieved by changing the color of the selected mode, and/or by providing a visual indicator, such as a colored bar 176. A highlighted mode 172 may be selected by pressing the scroll wheel, thereby bringing up a new "page" or screen on the user interface corresponding to the selected mode. Once within a selected mode of content 172, the scroll wheel may similarly be used to select particular functions, features or applications within that mode. In one embodiment, the default action for the scroll wheel 132 may vary depending on whether the portable computer 100 is in the laptop mode or the easel mode. For example, in easel mode, the default action for the scroll wheel may be channel selection within the channels mode 172(e).

As discussed above, in one embodiment volume control for the speakers 128 may be provided by the volume control button 204 and mute button 206. Alternatively, according to another embodiment, volume control may be provided using the scroll wheel 132. Thus, as a user scrolls the scroll wheel 132, as illustrated in FIG. 14 by arrow 161, a volume indicator may appear on the display screen 110. In one example, the volume indicator may comprise a transparent, or partially transparent, box 162 containing volume level indicators that may appear directly below the scroll wheel 132 on the display screen 110. In this example, as the user scrolls the scroll wheel 132, different volume levels in the volume box 162 may be successively highlighted, to indicate to the user that the volume is increasing or decreasing.

In one embodiment, the scroll wheel 132 may be depressible as well as scrollable. Thus, pressing the scroll wheel 132, as illustrated in FIG. 15, may allow further control, such as, for example, selecting a channel onto which the user has scrolled, or "play" and "pause" of audio or video being played through the portable computer 100.

As discussed above, according to one embodiment, one or more navigation buttons may be used in conjunction with the scroll wheel. In particular, in one embodiment, the navigation button(s) may be used to change the action of the scroll wheel. As discussed above, in one example, the default action of the scroll wheel is volume control. This action may be changed by pressing the navigation button 166, as illustrated in FIG. 16, for example, from volume control to menu navigation in the user interface, and vice versa. According to one embodiment, the effect of pressing the navigation button 166 may vary depending on active the mode of content of the portable computer 100. For example, if a user is in the media mode using a photo viewing application, pressing the navigation button 166 may change the action of the scroll wheel 132 from mode navigation to slideshow controls for the photos. When the navigation button 166 is pressed, an control indicator box (similar to the volume indicator box 162 discussed above with reference to FIG. 14) may appear containing different actions for the photo slideshow, such as "play," "next," "back," "skip," "full screen view," etc., and scrolling the scroll wheel 132 may allow a user to select one of these actions. Pressing the navigation button 166 again may return the scroll wheel action to menu navigation, to allow the user to, for example, move to a different feature or application within the active mode, or to select a different mode.

As can be seen in FIG. 16, the navigation button 166 may be easily accessed when the portable computer 100 is in the easel mode, providing a convenient navigation tool for this configuration. A similar navigation button 168 may be provided on the keyboard 106, as illustrated in FIG. 17. In one example, the functionality of the two navigation buttons 166, 168 may be the same, with the different locations providing easy, comfortable access in the different configuration modes (i.e., laptop or easel) of the portable computer 100. Thus, a user may use either navigation button 166 or navigation button 168, depending on personal preference. In another example, the two navigation buttons may have different functionality. For example, the navigation button 166 may be used to alter the action of the scroll wheel

132, as discussed above, while the navigation button 168 is used to navigate "up" or "down" a level within the map user interface. For example, pressing the navigation button 168 while within a given mode of content may allow the user to "back up" to the home screen; or pressing the navigation button 168 while within a selected channel (in the channel mode of the content 172e) may allow the user to "back-up" to the channel mode main page.

It is to be appreciated that numerous variations on the functionality of the navigation buttons 166, 168 is possible, as would be recognized by those skilled in the art, and the above examples are given for illustration only and are not intended to be limiting. In addition, any functions described with reference to one navigation button (166 or 168) may be instead (or additionally) implemented with the other navigation button. In one example, the function of the navigation buttons 166, 168 may vary depending on whether the portable computer 100 is configured into the laptop mode or the easel mode. For example, only the navigation button 166 may be active in the easel mode, and only the navigation button 168 may be active in the laptop mode. Alternatively, both navigation buttons 166, 168 may be usable in either the laptop mode or the easel mode, but their functionality may vary. For example, when the portable computer 100 is in the easel mode, the default action for the navigation button 166 may be channel selection whereas the default action for the navigation button 168 is to access the "home" screen. Furthermore, the portable computer 100 is not limited to the use of two navigation buttons and may instead comprise only a single navigation button or more than two navigation buttons, any of which may be disposed in the locations described above (e.g., on the rounded portion 120 of the base 104 or on the keyboard 106), or in other locations on the portable computer.

As discussed above, according to one embodiment, the function or display content and/or display orientation of the portable computer may vary when the portable computer is configured from the laptop mode into the easel mode, or vice versa. For example, as discussed above, when the portable computer 100 is configured into the easel mode, the visual display on the display screen 110 is automatically rotated 180 degrees such that the information appears "right-way-up," even through the display screen is upside-down compared to when the portable computer is in the laptop mode. In another example, for at least some activities within at least some modes of content (e.g., viewing a photograph or

video), when the portable computer 100 is configured into the easel mode, the display may automatically adjust to "full screen view" (i.e., the displayed image or video is displayed on the full screen size, rather than in a window) to allow for comfortable viewing.

In addition, as discussed above, the ability to configure the portable computer 100 into either the laptop mode or the easel mode provides enhanced functionality. For example, when the portable computer 100 is not being actively used, the user may configure the portable computer into the easel mode, and program the portable computer to act as a digital photo frame, displaying one or more photos of the user's choice. In the easel mode, the portable computer 100 may occupy a smaller footprint on a surface than in the laptop or closed modes because the base 104 and display component 102 are upright, as illustrated in FIGS. 4 and 5. In addition, because the portable computer can act as a passive information and/or entertainment device, such as a photo frame or clock, as discussed above, the portable computer may provide a useful function even when not being actively used by the user, and may do so (in the easel mode) without taking up much surface area.

According to another embodiment, the portable computer 100 may further comprise a wireless signal indicator 178, as illustrated in FIG. 18. The wireless signal indicator 178 may indicate the availability and/or strength of a wireless signal to which the portable computer 100 is connected, or is attempting to connect to. In one example, the color of the wireless signal indicator 178 may provide information regarding the strength of a detected wireless signal. For example, green may indicate a "good" signal; yellow may indicate a "poor" or "low" signal; and red may indicate that there is no signal available. In one example, the wireless signal indicator 178 may be ON or active whenever the portable computer 100 is powered up. Alternatively, the wireless signal indicator 178 may be activated by a user action, for example, by pressing the navigation button 166 or another button or key provided on the portable computer 100, and may remain active for a predetermined time period (e.g., for 2 seconds, 10 seconds, one minute, etc.). As discussed above, the functionality of the navigation button 166 may vary depending on the configuration mode of the portable computer 100. In one example, when the portable computer 100 is in the closed position, but still powered up, the default action for the navigation button 166 may be to activate the wireless signal indicator 178.

According to one embodiment, the portable computer 100 may be provided with power cord and adapter to allow the portable computer to be plugged into a wall supply. Referring to FIG. 19, there is illustrated a view of a portion of the portable computer 100, showing a power jack 180 to which the power adaptor can be connected. As discussed above, the portable computer 100 may also include a port 164 to which peripheral devices, such as mouse, external keyboard, portable flash drive, memory stick, etc. may be connected. In one example, the port 164 is a USB port; however, it is to be appreciated that the port may accommodate protocols other than USB. In addition, although only one port 164 is illustrated in FIG 19, the portable computer 100 may comprise multiple ports that may accommodate multiple protocols. In one example, the portable computer 100 may also comprise a headphone jack 182. It is to be appreciated that the location of any or all of the power jack 180, port(s) 164, and headphone jack 182 are not limited to the example shown in FIG. 19, but may be anywhere convenient or desirable on the portable computer 100.

Referring to FIG. 20, there is illustrated a top down view one example of a power adaptor 184 that may be used with the portable computer 100 and connected via the power jack 180. As known to those skilled in the art, the power adaptor 184 comprises a transformer (not shown) that converts the wall power to a level acceptable for use by the portable computer 100. In one embodiment, the power adaptor 184 comprises a substantially round body 186 that houses the transformer and other necessary components. A connector 188 may allow the power adaptor 184 to be connected to a wall outlet or extension cord. In one example, the connector 188 may include foldable prongs 190 that can be folded against the connector 188 for storage, and folded out for connection, as illustrated in FIG. 21. A cord 192 may be slidably accommodated within the body 186, such that the cord may be stored within the body and flexibly extended (up to its maximum length) by a user.

According to one embodiment, the cord 192 may be wound around a cord spool 194 located within, or partially within, the body 186 of the power adaptor 184. As illustrated in FIG. 21, the cord spool 194 may be configured to slide out from the body 186 of the power adaptor 184, such that the cord 192 can be wound around the cord spool 194, as illustrated in FIGS. 22A and 22B.

According to another embodiment, the portable computer 100 may be configured to connect to a docking station 196, as illustrated in FIG. 23. In one embodiment, a connector 198 on the docking station 196 may be configured to slidably connect to connectors 200 on the portable computer 100, as illustrated in FIG. 23. In one example, the connectors 200 may include power and audio connectors, such that the portable computer 100 may receive power from the docking station and receive and/or provide audio signals from/to the docking station, respectively. For example, the docking station may be coupled to external speakers, and the portable computer may provide audio signals to the docking station to be played through the external speakers. In another example, the docking station 196 may also be coupled to an audio device (not shown), such as an MP3 player, which may provide audio signals and data to the portable computer 100, for example, to update an audio library on the portable computer. It is to be appreciated that many other variations of communication between the portable computer 100 and devices coupled to the docking station 196 are possible, as would be recognized by those skilled in the art, and such variations are intended to be within the scope of this disclosure. Furthermore, numerous variations on the connector(s) 198, 200 that couple the docking station 196 to the portable computer 100 are also possible, as would be recognized by those skilled in the art. For example, the portable computer 100 may include a multi-pin connector 202 located on the base 104, as illustrated in FIG. 24. Such and other variations are intended to be within the scope of this disclosure and the above-mentioned examples are provided for illustration only and are not intended to be limiting.

In addition, it is to be appreciated that although the above discussion refers primarily to the portable computer 100 being in either the laptop mode or easel mode, other modes or configurations are also possible. For example, as discussed above, because the portable computer 100 can be configured from the closed position, through the laptop mode into the easel mode by rotating the display component 102, a number of configurations are possible in between "true" laptop mode and "true" easel mode. In another example, the portable computer 100 may be configured into a "frame" mode, as illustrated in FIG. 26, in which the portable computer is placed on a surface 212 with the keyboard 106 "face down" on the surface 212 and the display 110 facing upward. In the frame mode, the display component 102 may be at a similar orientation, and angle 134, with respect to the base component 104 as

in the easel mode. However, rather than the base component 104 and display component 102 being oriented vertically with respect to the surface 212, as in the easel mode (in which the portable computer forms an inverted "V" as discussed above), in the frame mode, the base component 104 may lie flat on the surface 212, as shown in FIG. 26. In one example, software and/or hardware protection may be provided for the keyboard to prevent keys from being pressed (or to prevent the portable computer from responding to pressed keys) when the portable computer is in the frame mode.

Similarly, referring to FIG. 27, there is illustrated another configuration of the portable computer 100, referring to as the "flat" mode. In the flat mode, the display component 102 may be rotated (or opened) to approximately 180 degrees with respect to the base component 104, such that the base component and display component lay flat on a surface, with the keyboard 106 and display screen 110 exposed, as shown in FIG. 27. Unlike the easel and frame modes, in which the keyboard may be concealed and not easily accessible, in the flat mode, the keyboard is accessible and usable. In addition, as discussed above, the visual display on the display screen 110 may be automatically rotated to accommodate comfortable viewing of information by persons located in different positions relative to the base component 104 or display component 102. The visual display on the display screen 110 may also be manually adjusted by a user using, for example, the keyboard 106, touch pad 108 or mouse (not shown), scroll wheel 132 or navigation buttons (not shown). For example, if a user (located at position A) wishes to display information for a person located opposite the user (at position B), the visual display may be rotated (automatically or manually)180 degrees such that the information appears "right-way-up," to the person at location B, even through the display screen 110 is upside-down for that person. Similarly, in another example, the visual display may be rotated (automatically or manually) 90 degrees such that the information appears "right-way-up," for a person at location C. In one example, a user can "toggle" the visual display among various orientations. For example, a user at location A may have the visual display facing themselves while using the keyboard 106 or other controls to change or access information on the display, then toggle the display orientation 180 or 90 degrees to display the information for persons at locations B or C.

In summary, various aspects and embodiments provide a portable computer that is configurable between different operating modes, including a laptop mode and an easel mode, and that is capable of different display formats and functionality in the different modes. The ability to view and operate the portable computer in the different laptop and easel modes, and to incorporate features and functions such as an alarm clock, digital photograph frame, voice-over-IP, etc, may provide enhanced flexibility and usefulness. In addition, the portable computer may include a graphical user interface that may work seamlessly with the computer hardware to provide an enjoyable, holistic user experience.

Having thus described several aspects of at least one embodiment, it is to be appreciated various alterations, modifications, and improvements will readily occur to those skilled in the art. For example functionality or features that have been described herein in connection with hardware may instead be implemented in software, or vice versa. For example, the wireless signal indicator discussed above may instead (or in addition) be provided as a software application. Such alterations, modifications, and improvements are intended to be part of this disclosure and are intended to be within the scope of the invention. Accordingly, the foregoing description and drawings are by way of example only.

What is claimed is:

CLAIMS

1. A portable computer configurable between a plurality of display modes including a closed mode, a laptop mode and an easel mode, the portable computer comprising:

a display component including a display screen;

a base;

a hinge assembly at least partially housed within the base and configured to pivotably couple the display component to the base;

wherein the display component is rotatable about a longitudinal axis running along an interface between the display component and the base;

wherein, in the closed mode, the display screen is disposed substantially against the base;

wherein rotating the display component about the longitudinal axis up to approximately 180 degrees from the closed mode configures the portable computer into the laptop mode; and

wherein rotating the display component about the longitudinal axis beyond approximately 180 degrees from the closed mode configures the portable computer into the easel mode.

2. The portable computer of claim 1, wherein the display component is rotatable about the longitudinal axis up to approximately 320 degrees from the closed mode.

3. The portable computer of claim 1, further comprising a display orientation module that displays content on the display screen in one of a plurality of orientations relative to the longitudinal axis.

4. The portable computer of claim 3, further comprising a mode sensor which detects a current display mode of the portable computer; and

wherein the display orientation module displays content on the display screen in an orientation dependent on the current display mode detected by the mode sensor.

5. The portable computer of claim 3, wherein the display orientation module is configured to display the content in a first orientation relative to the longitudinal axis when the portable computer is configured into the laptop mode and in a second orientation relative to the longitudinal axis when the portable computer is configured into the easel mode.

6. The portable computer of claim 5, wherein the second orientation is 180 degrees relative to the first orientation.

7. The portable computer of claim 3, wherein the plurality of display modes further comprises a flat mode in which the display component is disposed at an angle of approximately 180 degrees, measured about the longitudinal axis, relative to the base.

8. The portable computer of claim 7, wherein the plurality of orientations comprises a first orientation relative to the longitudinal axis, a second orientation relative to the longitudinal axis, and a third orientation relative to the longitudinal axis; and

wherein, in the flat mode, the orientation of the content displayed on the display screen is configurable among the first, second and third orientations responsive to a user input.

9. The portable computer of claim 8, wherein the second orientation is 90 degrees relative to the first orientation; and

wherein the third orientation is 180 degrees relative to the first orientation.

10. The portable computer of claim 1, wherein the longitudinal axis comprises multiple parallel axes; and wherein the hinge assembly is configured to permit rotation of the display component about any of the multiple parallel axes to configure the portable computer between the plurality of display modes.

11. The portable computer of claim 1, further comprising:

a foot disposed along at least a portion of the base and configured to support the portable computer when in the easel mode.

12. A portable computer comprising:

a base;

a display component rotatably coupled to the base; and

means for rotating the display component in a single direction relative to the base to configure the portable computer between a laptop mode and an easel mode.

13. A portable computer configurable between a laptop mode and an easel mode, the portable computer comprising:

a display component;

a base; and

a hinge assembly configured to rotatably couple the display component to the base;

wherein the hinge assembly is configured to permit rotation of the display component about a single axis to configure the portable computer between the laptop mode and the easel mode.

14. The portable computer of claim 13, wherein the single axis is a longitudinal axis running along an interface between the display component and the base.

15. The portable computer of claim 14, wherein the display component comprises a display screen configured to display content and a display orientation module configured to control an orientation of the content displayed on the display screen;

wherein the orientation of the content displayed on the display screen is configurable among a plurality of orientations relative to the longitudinal axis.

16. The portable computer of claim 15, wherein the plurality of orientations comprises a first orientation relative to the longitudinal axis and a second orientation relative to the longitudinal axis; and

wherein when display orientation module is configured to automatically display the content in the first orientation when the portable computer is configured into the laptop mode and in the second orientation when the portable computer is configured into the easel mode.

17. The portable computer of claim 16, wherein the second orientation is 90 degrees relative to the first orientation; and

wherein the third orientation is 180 degrees relative to the first orientation.

18. The portable computer of claim 15, further comprising a mode sensor configured to provide information representative of a degree of rotation of the display component relative to the base; and

wherein the display orientation module is configured to automatically adjust the orientation of the content displayed on the display screen responsive to the information from the mode sensor.

19. A method of automatically orienting content displayed on a portable computer, the method comprising:

rotating a display component of the portable computer about a longitudinal axis running along an interface between the display component and a base of the portable computer;

detecting a degree of rotation of the display component relative to the base;

providing a signal representative of the degree of rotation of the display component; and

automatically configuring an orientation, relative to the longitudinal axis, of the content displayed on the portable computer responsive to the signal.

20. The method of claim 19, wherein automatically configuring the orientation of the content includes:

displaying the content in a first orientation relative to the longitudinal axis responsive to the signal indicating that the degree of rotation of the display component is less than approximately 180 degrees relative to the base; and

displaying the content in a second orientation relative to the longitudinal axis responsive to the signal indicating that the degree of rotation of the display component is greater than approximately 180 degrees relative to the base, the second orientation being at 180 degrees relative to the first orientation.

21. A portable computer comprising:

a base unit;

a display unit including a display screen configured to display content;

an orientation sensor which detects an orientation of the display unit relative to the base unit; and

a display orientation module which orients the content displayed on the display screen responsive to the orientation detected by the orientation sensor.

ABSTRACT

A portable computer that is configurable between a plurality of display modes including a laptop mode (in which the portable computer has a conventional laptop appearance) and an easel mode in which the base of the computer and its display component stand vertically forming an inverted "V." The portable computer includes a hinge assembly that couples the display component to the base of the computer, and allows the display component to be rotated about an axis along an interface between the display component and the base to configure the portable computer between a closed position, the laptop mode and the easel mode. The portable computer further comprises a scroll wheel and optional navigation buttons that permit a user to control or manipulate various aspects of operation of the portable computer (such as volume or display brightness) and/or content displayed the computer.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
12/170,951	07/10/2008	Yves Behar	A2029-700111

CONFIRMATION NO. 2004

37462
LOWRIE, LANDO & ANASTASI, LLP
ONE MAIN STREET, SUITE 1100
CAMBRIDGE, MA 02142

FORMALITIES LETTER

OC000000031174574

Date Mailed: 07/29/2008

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
  *Applicant must submit $**310** to complete the basic filing fee for a non-small entity. If appropriate, applicant may make a written assertion of entitlement to small entity status and pay the small entity filing fee (37 CFR 1.27).*
- The oath or declaration is missing.
  A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
  Note: If a petition under 37 CFR 1.47 is being filed, an oath or declaration in compliance with 37 CFR 1.63 signed by all available joint inventors, or if no inventor is available by a party with sufficient proprietary interest, is required.

The application is informal since it does not comply with the regulations for the reason(s) indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- Replacement drawings in compliance with 37 CFR 1.84 and 37 CFR 1.121(d) are required. The drawings submitted are not acceptable because:
  - The drawings must be reasonably free from erasures and must be free from alterations, overwriting, interlineations, folds, and copy marks. See Figure(s) 2-4, 8, 16,19 - 22A.
  - The drawings submitted to the Office are not electronically reproducible because portions of figures 2,4, 7A, 7B, 12,13, 17-19, 27 are missing and/or blurry.
  - The drawings are not in compliance with 37 CFR 1.84 because figures 2, 4, 7A, 7B, 11-13, 17, 19 , 25 contain figure or view numbers that have incorrect orientation. Reference characters, sheet numbers, and view numbers must be oriented in the same direction as the view. See 37 CFR 1.84(p)(1).

Applicant is cautioned that correction of the above items may cause the specification and drawings page count to exceed 100 pages. If the specification and drawings exceed 100 pages, applicant will need to submit the required application size fee.

The applicant needs to satisfy supplemental fees problems indicated below.

The required item(s) identified below must be timely submitted to avoid abandonment:

- To avoid abandonment, a surcharge (for late submission of filing fee, search fee, examination fee or oath or declaration) as set forth in 37 CFR 1.16(f) of $**130** for a non-small entity, must be submitted with the missing items identified in this notice.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is $**1160** for a non-small entity

- $**310** Statutory basic filing fee.
- $**130** Surcharge.
- The application search fee has not been paid. Applicant must submit $**510** to complete the search fee.
- The application examination fee has not been paid. Applicant must submit $**210** to complete the examination fee for a non-small entity.

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
12/170,951	07/10/2008	2115	0.00	A2029-700111	17	3

CONFIRMATION NO. 2004

37462
LOWRIE, LANDO & ANASTASI, LLP
ONE MAIN STREET, SUITE 1100
CAMBRIDGE, MA 02142

FILING RECEIPT

OC000000031174572

Date Mailed: 07/29/2008

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

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Power of Attorney: None

Domestic Priority data as claimed by applicant

This appln claims benefit of 61/041,365 04/01/2008

Foreign Applications

If Required, Foreign Filing License Granted: 07/23/2008

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 12/170,951**

Projected Publication Date: To Be Determined - pending completion of Missing Parts

Non-Publication Request: No

Early Publication Request: No

Title

PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS

Preliminary Class

713

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Application	Document	Mailroom Date	Attorney Docket No.
12170951	NTC.MISS.PRT	07/29/2008	A2029-700111
	APP.FILE.REC	07/29/2008	A2029-700111

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PATENT APPLICATION INFORMATION RETRIEVAL SYSTEM

PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS

RELATED APPLICATIONS

This application claims priority under 35 U.S.C. §119(e) to U.S. Provisional Patent Application No. 61/041,365 filed April 1, 2008, entitled "PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS," which is incorporated herein by reference in its entirety.

BACKGROUND

Field of Invention

The present invention relates generally to portable computers and, more particularly, to a portable computer that is configurable into different functional and positional modes.

Discussion of Related Art

Portable computers, such as laptop computers or notebook computers, have become increasingly popular and ubiquitous in the home and workplace. Conventional portable computers most commonly have a "clam-shell" configuration, with a base including the keyboard, various ports, connectors and/or inputs (e.g., for power and connecting peripheral devices), and the majority of the electrical components (e.g., the central processing unit and memory), and a display component pivotably coupled to the base by a hinge. The display component is movable about the hinge between a closed position, with the display screen positioned adjacent the keyboard, and an open position, with the display screen inclined at a desired viewing angle.

Some portable computers are able to accept user inputs via a touch screen in addition to via conventional tools, such as a keyboard or mouse. The use of a touch screen to input data is sometimes referred to as operating in "tablet mode" because the computer is being used in a manner similar to a tablet of paper. U.S. Patent No. 6,771,494 discloses a hybrid tablet-type portable computer that is capable of operating either as a normal laptop computer receiving user input via a keyboard ("laptop mode"), or as a tablet computer receiving user input via a touch screen. The '494 patent further discloses that the display component of the

computer is attached to the base of the computer by hinges that allow the display to be tilted relative to the base (for laptop mode), and to be rotated and folded against the base to configure the computer into tablet mode.

Another variation of a portable computer with a moveable display is disclosed in U.S. Patent No. 6,266,236. The '236 patent discloses a computer including a base, a display member and an arm assembly coupling the display member to the base. According to the '236 patent, the arm assembly allows pivotable movement of the display member between a plurality of positions, including a notebook mode configuration, a tablet mode configuration, a presentation mode configuration, and a closed mode.

SUMMARY OF INVENTION

Aspects and embodiments of the present invention are directed to a portable computer that is configurable between a laptop mode (in which the portable computer has a conventional laptop appearance) and an easel mode in which the base of the computer and its display component stand upright forming an inverted "V," as discussed further below. The display component is pivotably coupled to the base of the portable computer by a hinge that allows the display component to be rotated or tilted about a longitudinal axis running along an interface between the base and the display component. Unlike the computers discussed in U.S. Patent No. 6,266,236 and U.S. Patent No. 6,771,494 above, the portable computer according to embodiments of the invention does not require an arm assembly, nor multiple, different hinge assemblies to be configured into the different modes. Furthermore, the portable computer according to embodiments of the invention is capable of different display modes and different functionality in the different configurations, as discussed below.

Further aspects and embodiments are directed to a portable computer having an embedded scroll wheel that can be configured to allow a user to control various features and functionality of the portable computer. For example, as discussed further below the scroll wheel can be used to navigate among information displayed on the portable computer's display and/or to alter operating modes of the portable computer, and/or to control features such as volume, display brightness, etc.

According to one embodiment, a portable computer is configurable between various modes, including a closed mode, a laptop mode, an easel mode, a flat mode and a frame mode. The portable computer may comprise a display component including a display screen, a base, and a hinge assembly at least partially housed within the base and configured to pivotably couple the display component to the base. The display component may be rotatable about a longitudinal axis running along an interface between the display component and the base. In the closed mode, the display screen may be disposed substantially against the base, and rotating the display component about the longitudinal axis up to approximately 180 degrees from the closed mode may configure the portable computer into the laptop mode. Rotating the display component about the longitudinal axis beyond approximately 180 degrees axis from the closed mode may configure the portable computer into the easel mode.

In one example of the portable computer, the display component is rotatable about the longitudinal axis up to approximately 320 degrees from the closed mode. In another example, the portable computer comprises a display orientation module that displays content on the display screen in one of a plurality of orientations relative to the longitudinal axis. The orientation of the displayed content may be dependent on the current display mode of the portable computer, or may be configurable responsive to a user input. The portable computer may further comprise a mode sensor which detects a current display mode of the portable computer, and the display orientation module may display content on the display screen in an orientation dependent on the current display mode detected by the mode sensor. Depending on the hinge assembly used, the longitudinal axis may comprises multiple parallel axes, and the hinge assembly may be configured to permit rotation of the display component about any of the multiple parallel axes to configure the portable computer between the plurality of display modes.

Another embodiment is directed to a portable computer comprising a base, a display component rotatably coupled to the base, and means for rotating the display component in a single direction relative to the base to configure the portable computer between a laptop mode and an easel mode.

In another embodiment of a portable computer configurable between multiple modes including a laptop mode and an easel mode, the portable computer comprises a display

component, a base, and a hinge assembly configured to rotatably couple the display component to the base. The hinge assembly may be configured to permit rotation of the display component about a single axis to configure the portable computer between the laptop mode and the easel mode. In one example, the single axis is a longitudinal axis running along an interface between the display component and the base. The portable computer may further comprise a scroll wheel disposed at least partially about the longitudinal axis. In one example, the display component comprises a display screen, and the scroll wheel is configured to permit a user to manipulate content displayed on the display screen.

Another embodiment is directed to a method of automatically orienting content displayed on a portable computer. The method comprises rotating a display component of the portable computer about a longitudinal axis running along an interface between the display component and a base of the portable computer, detecting a degree of rotation of the display component relative to the base, providing a signal representative of the degree of rotation of the display component, and automatically configuring an orientation, relative to the longitudinal axis, of the content displayed on the portable computer responsive to the signal.

According to another embodiment, a portable computer comprises a base unit, a display unit including a display screen configured to display content, an orientation sensor which detects an orientation of the display unit relative to the base unit, and a display orientation module which orients the content displayed on the display screen responsive to the orientation detected by the orientation sensor.

Another embodiment of a portable computer comprises a base, a display component rotatably coupled to the base such that the display component and the base are rotatable with respect to one another about a longitudinal axis running along an interface between the display component and the base, the display component including a display screen, and a scroll wheel disposed at least partially within the base and rotatable about the longitudinal axis, the scroll wheel configured to permit a user to control at least one of operating parameters of the portable computer and content displayed on the display screen. In one example, the scroll wheel is configured to permit the user to adjust a volume of sound produced by the portable computer. In another example, the screen is configured to display at least one of a plurality of modes of content, and the scroll wheel is configured to permit the

user to select a mode of content for display by the portable computer. The portable computer may further comprise one or more navigation buttons that may be used in conjunction with the scroll wheel to control aspects of the portable computer and displayed content.

According to another embodiment, a portable computer is configurable between a plurality of display modes including a laptop mode and an easel mode, the portable computer comprising a base, a display component rotatably coupled to the base and including a screen which displays content, and a scroll wheel accessible in each of the plurality of display modes and configured to permit a user to manipulate at least one of operating parameters of the portable computer and the content displayed on the screen. In one example, the scroll wheel is disposed at leas partially about an axis of rotation of the display component relative to the base.

In another embodiment, a portable computer comprises a base, a display component including a screen configured to display content, a hinge assembly configured to rotatably couple the display component to the base and to permit rotation of the display component about a longitudinal axis running along an interface between the display component and the base, and a scroll wheel disposed at least partially about the longitudinal axis.

Still other aspects, embodiments, and advantages of these exemplary aspects and embodiments, are discussed in detail below. Moreover, it is to be understood that both the foregoing information and the following detailed description are merely illustrative examples of various aspects and embodiments, and are intended to provide an overview or framework for understanding the nature and character of the claimed aspects and embodiments. Any embodiment disclosed herein may be combined with any other embodiment in any manner consistent with the objects, aims, and needs disclosed herein, and references to "an embodiment," "some embodiments," "an alternate embodiment," "various embodiments," "one embodiment" or the like are not necessarily mutually exclusive and are intended to indicate that a particular feature, structure, or characteristic described in connection with the embodiment may be included in at least one embodiment. The appearances of such terms herein are not necessarily all referring to the same embodiment. The accompanying drawings are included to provide illustration and a further understanding of the various aspects and embodiments, and are incorporated in and constitute a part of this specification. The

drawings, together with the remainder of the specification, serve to explain principles and operations of the described and claimed aspects and embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

Various aspects of at least one embodiment are discussed below with reference to the accompanying figures, which are not intended to be drawn to scale. Where technical features in the figures, detailed description or any claim are followed by references signs, the reference signs have been included for the sole purpose of increasing the intelligibility of the figures, detailed description, and claims. Accordingly, neither the reference signs nor their absence are intended to have any limiting effect on the scope of any claim elements. In the figures, each identical or nearly identical component that is illustrated in various figures is represented by a like numeral. For purposes of clarity, not every component may be labeled in every figure. The figures are provided for the purposes of illustration and explanation and are not intended as a definition of the limits of the invention. In the figures:

FIG. 1 is an illustration of one example of a portable computer, according to aspects of the invention, in a "laptop" configuration;

FIG. 2 is a view of the portable computer of FIG. 1 in the closed position;

FIG. 3 is a plan view of the exterior of the bottom of the portable computer of FIG. 1;

FIG. 4 is a perspective view of the portable computer of FIG. 1 in the easel mode;

FIG. 5 is a side view of the portable computer of FIG. 4, illustrating the adjustable angle of the easel mode;

FIGS. 6A-C are diagrams illustrating different positions of the portable computer of FIG. 4 in easel mode;

FIG. 7A is an illustration of a portion of the portable computer of FIG. 1 in the laptop mode, illustrating a hinge assembly according to aspects of the invention;

FIG. 7B is an in illustration of a portion of the portable computer of FIG. 1 in the easel mode, illustrating the hinge assembly according to aspects of the invention;

FIG. 8 is a diagram of one example of the hinge assembly of FIGS. 7A and 7B;

FIG. 9 is a cross-sectional diagram of a portion of the hinge assembly of FIG. 8, taken along line A-A in FIG. 8;

FIG. 10 is an exploded view of the hinge assembly of FIG. 8;

FIG. 11 is a block diagram of one example of a portable computer user interface architecture, according to aspects of the invention;

FIG. 12 is a screen shot illustrating one example of a graphical user interface, according to aspects of the invention;

FIG. 13 is a screen shot illustrating another example of a graphical user interface according to aspects of the invention;

FIG. 14 is an illustration of a user adjusting the scroll wheel on a portable computer in the easel mode, according to aspects of the invention;

FIG. 15 is an illustration of a user pressing the scroll wheel on a portable computer, according to aspects of the invention;

FIG. 16 is an illustration of a user pressing a navigation button on the portable computer, according to aspects of the invention;

FIG. 17 is an illustration of an example of the portable computer in the laptop mode, according to aspects of the invention;

FIG. 18 is a view of a portion of the portable computer illustrating a wireless signal indicator feature, according to aspects of the invention;

FIG. 19 is a view of a portion of the portable computer in the closed position, according to aspects of the invention;

FIG. 20 is a plan view of one example of a power adaptor, according to aspects of the invention;

FIG. 21 is a side view of the power adaptor of FIG. 20;

FIG. 22A is another side view of the power adaptor of FIG. 20, illustrating the power cord would around a cord spool, according to aspects of the invention;

FIG. 22B is a plan view of the power adaptor of FIG. 22A

FIG. 23 is an illustration of the portable computer coupled to a docking station, according to aspects of the invention;

FIG. 24 is an illustration of the portable computer showing one example of a docking connector, according to aspects of the invention;

FIG. 24 is an illustration of a hinge assembly coupled to a computer frame, according to aspects of the invention;

FIG. 26 is an illustration of the portable computer configured into a "frame" mode, according to aspects of the invention; and

FIG. 27 is an illustration of the portable computer configured into a "flat" mode, according to aspects of the invention.

DETAILED DESCRIPTION

Aspects and embodiments are directed to a portable computer that is configurable between different operating modes, including a laptop mode (in which the portable computer has a conventional laptop appearance), a flat mode, a frame mode, and an easel mode in which the base of the computer and its display component stand vertically forming an inverted "V," as discussed further below. The portable computer is capable of different display formats and functionality in the different modes, and includes a graphical user interface that may work seamlessly with the computer hardware to provide a unified, comfortable, holistic user experience. In particular, the portable computer may provide access to a wide array of functions, both those traditionally provided by computing devices and those traditionally provided by other passive information devices. For example, the hardware and software, including the graphical user interface, of the portable computer may be focused toward providing access to entertainment media, such as audio and video (e.g., playing music, streaming video, viewing photographs, etc.), email, and internet, while also providing state-of-the-art computer processing capability.

It is to be appreciated that embodiments of the methods and apparatuses discussed herein are not limited in application to the details of construction and the arrangement of components set forth in the following description or illustrated in the accompanying drawings. The methods and apparatuses are capable of implementation in other embodiments and of being practiced or of being carried out in various ways. Examples of specific implementations are provided herein for illustrative purposes only and are not intended to be limiting. In particular, acts, elements and features discussed in connection with any one or more embodiments are not intended to be excluded from a similar role in any other

embodiments. Also, the phraseology and terminology used herein is for the purpose of description and should not be regarded as limiting. Any references to embodiments or elements or acts of the systems and methods herein referred to in the singular may also embrace embodiments including a plurality of these elements, and any references in plural to any embodiment or element or act herein may also embrace embodiments including only a single element. References in the singular or plural form are not intended to limit the presently disclosed systems or methods, their components, acts, or elements. The use herein of "including," "comprising," "having," "containing," "involving," and variations thereof is meant to encompass the items listed thereafter and equivalents thereof as well as additional items. References to "or" may be construed as inclusive so that any terms described using "or" may indicate any of a single, more than one, and all of the described terms.

Referring to FIG. 1, there is illustrated one example of a portable computer according to aspects of the invention. In FIG. 1, the portable computer 100 is illustrated in the "laptop" mode, with the display component 102 inclined at a viewing angle from the base 104. The display component 102 is pivotably coupled to the base 104 by a hinge assembly (not shown) that allows the display component to be rotated with respect to the base. The hinge assembly may include a single or multiple hinges, which may be any of a variety of hinge types, including, but not limited, to single-axis hinges, multiple-axis hinges, geared hinges, etc. In one example, the hinge assembly allows the display component 102 to be rotated (or tilted) about a longitudinal axis 101 running along an interface between the display component and the base 104, as illustrated in FIG. 1 and discussed further below. The base 104 includes a keyboard 106 and internal electronic components (not shown), such as a central processing unit, memory, and other components necessary to operate the portable computer, as known to those skilled in the art. In some embodiments, the base 104 may also include a touch pad 108 or trackball (not shown) for receiving user commands, as known to those skilled in the art.

Still referring to FIG. 1, the display component 102 includes a display screen 110, and may also include a camera 112, microphone 114, and infrared receiver 116, as discussed further below. It is to be appreciated that the locations of the camera 112, microphone 114 and infrared receiver 114 are not limited to the example illustrated in FIG. 1, and may be placed in other locations on the display component 102 and/or base 104, as would be

recognized by those skilled in the art. The display component 102 may also include cushions 118 that provide soft contact points between the base 104 and the display component 102 when the portable computer is closed. In one example, the cushions 118 are made of rubber. However, it is to be appreciated that the invention is not so limited, and the cushions 118 may comprise materials other than rubber, including, for example, a polymer, felt, or other suitable materials as would be recognized by those skilled in the art.

Referring to FIG. 2, there is illustrated a side view of the portable computer 100 of FIG. 1 in the closed configuration. As is the case for conventional clam-shell type portable computers, when the portable computer 100 is closed, the display screen is disposed "face down" against the keyboard of the base 104. In the illustrated embodiment, the base 104 includes a rounded portion 120 that houses the hinge (not shown) that pivotably couples the display component 102 to the base, as discussed further below. It is to be appreciated that the rounded portion 120 is not limited to having a round shape, but may instead have another shape, which may be dependent on the type of hinge used. In one embodiment, a power button 122, configured to turn the portable computer ON and OFF, may also be provided on the rounded portion 120, as illustrated in FIG. 2. However, it is to be appreciated that the invention is not so limited, and the power button 122 may be located elsewhere on the base 104. In one example, the power button 122 may be slightly recessed relative to the surface of the base 104, so as decrease the potential for the power button to be accidentally pressed.

An exterior view of the bottom of the base 104 (the underside of the portable computer 100) is illustrated in FIG. 3. As can be seen in FIG. 3, in one embodiment, the base 104 includes a plurality of feet 124. In one example, the feet 124 are made of rubber; however, it is to be appreciated that the invention is not so limited and the feet may be made of another material, such as, for example, a polymer or felt. A ventilation slit 126 may be provided near an interface between the base 104 and the display component 102, as illustrated, or elsewhere as may be desired, to allow heat to dissipate from the internal electronic components in the base. The base 104 may also include one or more speakers 128. In one example, the base 104 includes two stereo speakers 128, positioned at either side of the base, as illustrated in FIG. 3; however, it is to be appreciated that the portable computer 100 may comprise more or fewer speakers which may be placed at any location on the base 104. A scroll wheel 132 may

be provided to allow a user to control certain functionality of the portable computer 100, such as navigating web pages, controlling speaker volume, selecting programs, etc., as discussed further below.

According to one embodiment, the base 104 may comprise a cushioning strip 130 disposed along an edge of the base 104 opposite to the interface between the display component 102 and the base, as illustrated in FIG. 3. The cushioning strip 130, which may comprise rubber, a polymer, or another suitable material, may serve as a "foot" when the portable computer is configured into the easel mode, as discussed further below. In one embodiment, the display component 102 may be provided with a similar cushioning strip that may serve as a second supporting foot when the portable computer is configured into the easel mode.

Referring to FIG. 4, there is illustrated an example of the portable computer 100 configured into the easel mode. To convert the portable computer 100 from the laptop mode (or closed position) into the easel mode, the display component 102 may be folded away from the base 104, in the same direction as to open the computer (i.e., to configure the computer from the closed position into the laptop mode) such that the base 104 and the display component 102 form an inverted "V" shape with the bottom of the base and the back of the display component face another, as illustrated in FIG. 4. In the easel mode, the display screen 110 is visible and accessible on one side of the portable computer 100 and the keyboard 106 (not shown in FIG. 4) is visible and accessible on the other side.

As illustrated in FIG. 4, in one embodiment, the portable computer may comprise integrated hardware volume controls, including a volume control button 204 and a mute button 206. In one example, the volume control button 204 may be a rocker switch that allows a user to easily increase or decrease the volume of audio played through the speakers 128. When the user presses the volume control button 204, a volume indicator may temporarily appear on the display screen 110, to provide a visual indication of the amount by which the volume is being increased or decreased. Similarly, pressing the mute button 206 may cause a visual indication that the volume is muted to appear on the display screen 110.

According to one embodiment, when the portable computer 100 is configured into the easel mode, the visual display on the display screen 110 is automatically rotated 180 degrees

such that the information appears "right-way-up," even through the display screen is upside-down compared to when the portable computer is in the laptop mode. Thus, a user may simply "flip" the portable computer 100 into the easel mode and immediately be able to comfortably view information on the display screen 110, without having to access display screen controls to adjust the orientation of the visual display. In one embodiment, the portable computer 100 includes an orientation (or mode) sensor that is configured to detect whether the portable computer is in the laptop mode or the easel mode, and to adjust the display accordingly. The orientation sensor may be incorporated into the base component 104, for example, underneath the keyboard 106, or into the display component. In one example, locating the orientation sensor in the display component 102, rather than the base 104, may provide more robust detection and therefore, may be presently preferred in some embodiments. The orientation sensor may be used to determine a precise relative orientation of the base component 104 with respect to the display component 102, or vice versa, for example, to determine whether the device is in the laptop mode, easel mode, or some point in between the two modes. In one example, the orientation sensor includes an accelerometer whose output is fed to the computer operating system (or to dedicated logic circuitry) which then triggers a display inversion as appropriate.

Accelerometers have been used in portable devices such as cellular phones, media players or computers, as sudden motion sensors, or "drop detectors," to protect against hard drive crashes in the event that the device is dropped. By contrast, however, the accelerometer in the portable computer according to an embodiment of the invention is not used to detect motion of the overall computer, but rather to detect a configuration of the portable computer 100 (e.g., laptop mode or easel mode), particularly, to detect an orientation of the display component 102 relative to the base component 104. In one example, information from the accelerometer is provided to a display controller in the portable computer and used to switch the display between portrait or landscape mode, as is done in some conventional devices.

Referring to FIG. 5, when the portable computer 100 is in the easel mode, the base 104 is disposed at an angle 134 to the display component 102. This angle 134 is adjustable, for example, to allow a comfortable viewing angle to the display screen 110 to be maintained for different positions of a user 136 and of the portable computer 100, as illustrated in FIGS. 6A,

6B and 6C. For example, when the user 136 is further from the portable computer, the angle 134a (FIG. 6A) may be made smaller than the angle 134b when the user is closer to the portable computer (FIG. 6B). As discussed above, in one example, the orientation sensor (not shown) may be used to detect, either approximately or precisely, the angle 134 and to provide the information to the computer operating system.

According to one embodiment, the display component 102 is pivotably coupled to the base 104 by a hinge that allows the display component to be moved relative to the base so as to allow the portable computer 100 to be configured into the closed position, the laptop mode or the easel mode. As discussed above, in conventional "clamshell" type portable computers, the hinges that couple the display component to the base generally do not permit more than about 180 degrees of rotation of the display component. Thus, these conventional portable computers can be in a closed position or open, laptop configuration, but cannot be configured into an easel mode because the conventional hinges do not permit sufficient movement of the display component. Similarly, the tablet-type portable computers discussed above have displays that can be opened, rotated and folded such that they lie flat against the keyboard on the base, but cannot be configured into an easel mode. Although, as discussed above, U.S. Patent No. 6,266,236 discloses a computer that is configurable into a presentation mode, this requires a complex arm assembly. By contrast, the portable computer according to embodiments of the present invention may be configured into the easel mode by simply continuing to tilt or rotate the display component past the "laptop positions" until a desired easel angle 134 is reached.

Referring to FIGS. 7A and 7B, there is illustrated a portion of the portable computer 100 illustrating a hinge assembly 138 that allows the portable computer to be configured into either the laptop mode (FIG. 7A) or the easel mode (FIG. 7B), according to aspects of the invention. According to one embodiment, the hinge assembly 138 accommodates 0-320 degrees of rotation, allowing a minimum angle 134 (see FIG. 5) of 40 degrees. However, it is to be appreciated that the hinge assembly 138 may allow greater or fewer degrees of rotation, provided only that sufficient rotation is allowed so as to configure the portable computer 100 into either the laptop mode or the easel mode. As discussed above, in one embodiment the portable computer 100 includes an orientation sensor (not shown) that is configured to detect

a relative orientation of the display component 102 and the base component 104. In one example, the orientation sensor may be an accelerometer incorporated into the base component 104, as discussed above. Alternatively, the orientation sensor may be incorporated into the hinge assembly 138 and may be used to detect movement of the hinge assembly, and to translate that movement into an information about the relative orientation of the display component 102 and the base component 104 (for example, a size of the angle 134). It is also to be appreciated that the orientation sensor may include electronic or mechanical components, or a combination thereof. For example, the hinge assembly may be provide with detents that provide an indication of the mode of the portable computer.

As discussed above, and also illustrated in FIGS. 7A and 7B, the portable computer may also comprise a scroll wheel 132 that allows a user to adjust, control and/or select various aspects of the portable computer (e.g., wireless capability or speaker volume) or items displayed on the display screen 110. A housing 160 may contain or support various mechanical and/or electronic components (not shown) that are coupled to the scroll wheel 132 and are configured to convert physical movement of the scroll wheel into electrical signals. These electrical signals may be provided to the central processing unit of the portable computer 100 which processes the electrical signals so as to translate movement of the scroll wheel into control of a selected feature, for example, adjusting the volume of the speaker(s) or selecting a particular item displayed on the display screen, as discussed further below.

One embodiment of the hinge assembly 138 is illustrated in FIG. 8. The hinge assembly includes a bracket 140 rotatably coupled to a housing 142. The housing 142 may include a first flange 144 that may be fastened to an internal frame in the base 104, as illustrated in FIG. 7A. The first flange 144 may include holes 146 to allow the first flange to be fastened to the base 104 using fasteners, such as, for example, screws, rivets or bolts. The bracket 140 may include a second flange 148 that may be similarly coupled to the display component 102 using fasteners 150. In one embodiment, the display screen 110 (see FIG. 1) may be an LCD screen. As known to those skilled in the art, an LCD screen generally comprises a frame and plastic housing. In one example, the second flange 148 may be fastened to either or both of the display screen frame and the screen's plastic housing. Referring to FIG. 25, there is illustrated an example of two hinge assemblies 138 coupled to

the display frame 208 of the display component, and to the base frame 210 of the base component 104. According to one embodiment, the bracket 140 and/or housing 142 may be formed of cast zinc. However, it is to be appreciated that other materials, including other metals, may be used, and the bracket 140 and/or housing 142 may be formed using a procedure other than casting, such as, for example, machining or molding.

Referring again to FIG. 8, in one embodiment, the hinge assembly 138 may also incorporate an area 152 for locating the power button (FIG. 2, 122) or a navigation control button (FIG. 4, 166), as discussed further below.

Referring to FIG. 9, there is illustrated a cross-sectional view of a portion of the hinge assembly 138 taken along line A-A in FIG. 8. As shown in FIG. 9, in one embodiment the hinge assembly 138 comprises a shaft 154 located within the hinge housing 142. The shaft 154 may be held in position within the hinge housing 142, and rotatably coupled to the housing, by torsion elements, such as springs 156. In one example, the springs 156 may be formed by stamping; however, it is to be appreciated that other methods of manufacture may be used. In one example, the hinge assembly may accommodate about 320 degrees of rotation, as discussed above, and may provide about 6.5 in-lbs in symmetric torque.

FIG. 10 is an exploded view of the hinge assembly of FIGS. 8 and 9. As shown in FIG. 10, the shaft 154 is coupled to a member 158. This member 158 may be integral with or coupled to the bracket 140 which is, in turn, fastened to the display component, as discussed above. Thus, the shaft 154 and springs 156 provide a rotatable coupling between the fixed elements of the hinge assembly, namely, the hinge housing 142 and bracket 140 which are fastened to the base 104 and display component 102 of the portable computer. In this manner, the hinge assembly allows the display component 102 to be moved relative to the base 104, thereby allowing the portable computer to be easily and quickly configured into any of the closed position, laptop mode or easel mode. For example, simply rotating or tilting the display component about the longitudinal axis 101 (see FIG. 1) up to approximately 180 degrees from the closed mode configures the portable computer into the laptop mode, and rotating the display component about the longitudinal axis 101 beyond approximately 180 degrees axis from the closed mode configures the portable computer into the easel mode.

According to one embodiment, the portable computer may include integrated "navigation" hardware that allows a user to easily and comfortable control various features and functions of the portable computer, and to manipulate content displayed on the portable computer. For example, as discussed above, the portable computer 100 may comprise a scroll wheel 132 that allows a user to control, adjust and/or select various functionality of the portable computer. According to another embodiment, the scroll wheel 132 may be used to provide "hardware navigation" through information, such as menus, icons, etc., displayed on the display screen 110, as discussed further below with reference to FIG. 17. A common display configuration used in conventional computers is a "desktop" view in which multiple icons representing links to various programs or applications are displayed over a background image. Navigation is conventionally performed using a mouse, touch pad or trackball, as known to those skilled in the art. In one embodiment, the portable computer 100 may display information on the display screen 110 in the conventional desktop configuration, and navigation may be performed using either conventional tools, such as a touchpad 108, trackball (not shown) or peripheral, for example, a mouse, that is connected to the portable computer 100 via a port 164, or the scroll wheel 132, or a combination thereof. According to another embodiment, the portable computer 100 includes a streamlined graphical user interface that supports "map" navigation. The map user interface provides a clear overview of the entire computing environment and searching capability within the environment that may be accessed using the scroll wheel 132 and, optionally, one or navigation buttons 166, 168 that may be provided on the base 104 of the portable computer 100 (button 166) and/or in the keyboard 106 (button 168), illustrated in FIG. 17. In one embodiment, the map mode of navigation is a hierarchical mode that reduces the number of items to select amongst at any stage of navigation, thereby facilitating user access with the scroll wheel 132 and, optionally, the navigation button(s) 166, 168. Of course, it is to be appreciated that the map user interface may also be navigated using conventional tools, such as a trackball, touchpad, mouse or arrow keys.

Referring to FIG. 11, there is illustrated a block diagram of one example of an architecture of the portable computer including a map user interface. The user interface "home" screen 170 that displays a plurality of modes of content 172. In the illustrated

example, the home screen 170 contains five modes of content 172; however, it is to be appreciated that the home screen may include more or fewer than five modes of content and that the modes of content may differ from the examples discussed below. According to one example, the modes of content 172 accessible via the home screen 170 may include "media" 172a, "connect" 172b, "web" 172c, "applications" 172d, and "channels" 172e. Using the map user interface, information, programs, features and applications may be grouped into the various modes of content 172. By selecting any mode of content 172, for example, by using the scroll wheel 132 and/or navigation buttons 166, 168, as discussed further below, the user may access the content organized within that mode. For example, the media mode 172a may provide access to a medial player to play, view, search and organize media such as music, video, photos, etc. The connect mode 172b may provide access to features such as, for example, email, voice-over-IP, instant messaging, etc., and the web mode 172c may provide access to internet browsing and searching. The application mode 172d may provide access to, for example, computer applications or programs, such as word processor, spreadsheet, calculator, etc. In one example, these applications or programs may be provided as web-based services rather than programs or applications residing on the portable computer 100. The channels mode 172e may provide access to different functionality of the portable computer, with the different functions or features defined as different channels. For example, a channel may include an alarm clock channel in which the portable computer is configured to display a clock and can be programmed to activate an alarm, e.g., a sound, piece of music, etc., at a predetermined time. Another example of a channel may include a "photo frame" channel in which the portable computer may be configured to display a pre-selected image or set of images, etc. Another example of a channel is a "television" channel, in which the portable computer is configured to stream Internet television. In one example, a user may configure particular Internet television channels (e.g., a news channel, a movie channel, a home and garden channel, etc.) into sub-channels within the channels mode of content 172(e). Some or all of the modes of content 172 may access, retrieve and/or store information on the Internet 174.

According to one embodiment, the different modes of content 172 may be displayed as a series of bars across the display screen 110, as illustrated in FIG. 12. The following

discussion of various features, including hardware navigation through the map user interface may refer primarily to the display configuration illustrated in FIG. 12. However, it is to be appreciated that the invention is not so limited, and the modes of content may be displayed in other configurations, including, for example, a "desktop" and icon configuration, a "dashboard" type display, as illustrated in FIG. 13, or another configuration, as would be recognized by those skilled in the art. Similarly, navigation is discussed below primarily with reference to the scroll wheel 132 and navigation buttons 166, 168; however, it is to be appreciation that navigation may also be accomplished using any of the conventional tools discussed above or known to those skilled in the art.

As discussed above, according to one embodiment, the scroll wheel 132 and, optionally, the navigation buttons 166, 168 may be used to navigate the user interface. Referring again to FIG. 12, scrolling the scroll wheel may sequentially highlight different ones of the modes of content 172. In one example, the highlighting may be achieved by changing the color of the selected mode, and/or by providing a visual indicator, such as a colored bar 176. A highlighted mode 172 may be selected by pressing the scroll wheel, thereby bringing up a new "page" or screen on the user interface corresponding to the selected mode. Once within a selected mode of content 172, the scroll wheel may similarly be used to select particular functions, features or applications within that mode. In one embodiment, the default action for the scroll wheel 132 may vary depending on whether the portable computer 100 is in the laptop mode or the easel mode. For example, in easel mode, the default action for the scroll wheel may be channel selection within the channels mode 172(e).

As discussed above, in one embodiment volume control for the speakers 128 may be provided by the volume control button 204 and mute button 206. Alternatively, according to another embodiment, volume control may be provided using the scroll wheel 132. Thus, as a user scrolls the scroll wheel 132, as illustrated in FIG. 14 by arrow 161, a volume indicator may appear on the display screen 110. In one example, the volume indicator may comprise a transparent, or partially transparent, box 162 containing volume level indicators that may appear directly below the scroll wheel 132 on the display screen 110. In this example, as the user scrolls the scroll wheel 132, different volume levels in the volume box 162 may be successively highlighted, to indicate to the user that the volume is increasing or decreasing.

In one embodiment, the scroll wheel 132 may be depressible as well as scrollable. Thus, pressing the scroll wheel 132, as illustrated in FIG. 15, may allow further control, such as, for example, selecting a channel onto which the user has scrolled, or "play" and "pause" of audio or video being played through the portable computer 100.

As discussed above, according to one embodiment, one or more navigation buttons may be used in conjunction with the scroll wheel. In particular, in one embodiment, the navigation button(s) may be used to change the action of the scroll wheel. As discussed above, in one example, the default action of the scroll wheel is volume control. This action may be changed by pressing the navigation button 166, as illustrated in FIG. 16, for example, from volume control to menu navigation in the user interface, and vice versa. According to one embodiment, the effect of pressing the navigation button 166 may vary depending on active the mode of content of the portable computer 100. For example, if a user is in the media mode using a photo viewing application, pressing the navigation button 166 may change the action of the scroll wheel 132 from mode navigation to slideshow controls for the photos. When the navigation button 166 is pressed, an control indicator box (similar to the volume indicator box 162 discussed above with reference to FIG. 14) may appear containing different actions for the photo slideshow, such as "play," "next," "back," "skip," "full screen view," etc., and scrolling the scroll wheel 132 may allow a user to select one of these actions. Pressing the navigation button 166 again may return the scroll wheel action to menu navigation, to allow the user to, for example, move to a different feature or application within the active mode, or to select a different mode.

As can be seen in FIG. 16, the navigation button 166 may be easily accessed when the portable computer 100 is in the easel mode, providing a convenient navigation tool for this configuration. A similar navigation button 168 may be provided on the keyboard 106, as illustrated in FIG. 17. In one example, the functionality of the two navigation buttons 166, 168 may be the same, with the different locations providing easy, comfortable access in the different configuration modes (i.e., laptop or easel) of the portable computer 100. Thus, a user may use either navigation button 166 or navigation button 168, depending on personal preference. In another example, the two navigation buttons may have different functionality. For example, the navigation button 166 may be used to alter the action of the scroll wheel

132, as discussed above, while the navigation button 168 is used to navigate "up" or "down" a level within the map user interface. For example, pressing the navigation button 168 while within a given mode of content may allow the user to "back up" to the home screen; or pressing the navigation button 168 while within a selected channel (in the channel mode of the content 172e) may allow the user to "back-up" to the channel mode main page.

It is to be appreciated that numerous variations on the functionality of the navigation buttons 166, 168 is possible, as would be recognized by those skilled in the art, and the above examples are given for illustration only and are not intended to be limiting. In addition, any functions described with reference to one navigation button (166 or 168) may be instead (or additionally) implemented with the other navigation button. In one example, the function of the navigation buttons 166, 168 may vary depending on whether the portable computer 100 is configured into the laptop mode or the easel mode. For example, only the navigation button 166 may be active in the easel mode, and only the navigation button 168 may be active in the laptop mode. Alternatively, both navigation buttons 166, 168 may be usable in either the laptop mode or the easel mode, but their functionality may vary. For example, when the portable computer 100 is in the easel mode, the default action for the navigation button 166 may be channel selection whereas the default action for the navigation button 168 is to access the "home" screen. Furthermore, the portable computer 100 is not limited to the use of two navigation buttons and may instead comprise only a single navigation button or more than two navigation buttons, any of which may be disposed in the locations described above (e.g., on the rounded portion 120 of the base 104 or on the keyboard 106), or in other locations on the portable computer.

As discussed above, according to one embodiment, the function or display content and/or display orientation of the portable computer may vary when the portable computer is configured from the laptop mode into the easel mode, or vice versa. For example, as discussed above, when the portable computer 100 is configured into the easel mode, the visual display on the display screen 110 is automatically rotated 180 degrees such that the information appears "right-way-up," even through the display screen is upside-down compared to when the portable computer is in the laptop mode. In another example, for at least some activities within at least some modes of content (e.g., viewing a photograph or

video), when the portable computer 100 is configured into the easel mode, the display may automatically adjust to "full screen view" (i.e., the displayed image or video is displayed on the full screen size, rather than in a window) to allow for comfortable viewing.

In addition, as discussed above, the ability to configure the portable computer 100 into either the laptop mode or the easel mode provides enhanced functionality. For example, when the portable computer 100 is not being actively used, the user may configure the portable computer into the easel mode, and program the portable computer to act as a digital photo frame, displaying one or more photos of the user's choice. In the easel mode, the portable computer 100 may occupy a smaller footprint on a surface than in the laptop or closed modes because the base 104 and display component 102 are upright, as illustrated in FIGS. 4 and 5. In addition, because the portable computer can act as a passive information and/or entertainment device, such as a photo frame or clock, as discussed above, the portable computer may provide a useful function even when not being actively used by the user, and may do so (in the easel mode) without taking up much surface area.

According to another embodiment, the portable computer 100 may further comprise a wireless signal indicator 178, as illustrated in FIG. 18. The wireless signal indicator 178 may indicate the availability and/or strength of a wireless signal to which the portable computer 100 is connected, or is attempting to connect to. In one example, the color of the wireless signal indicator 178 may provide information regarding the strength of a detected wireless signal. For example, green may indicate a "good" signal; yellow may indicate a "poor" or "low" signal; and red may indicate that there is no signal available. In one example, the wireless signal indicator 178 may be ON or active whenever the portable computer 100 is powered up. Alternatively, the wireless signal indicator 178 may be activated by a user action, for example, by pressing the navigation button 166 or another button or key provided on the portable computer 100, and may remain active for a predetermined time period (e.g., for 2 seconds, 10 seconds, one minute, etc.). As discussed above, the functionality of the navigation button 166 may vary depending on the configuration mode of the portable computer 100. In one example, when the portable computer 100 is in the closed position, but still powered up, the default action for the navigation button 166 may be to activate the wireless signal indicator 178.

According to one embodiment, the portable computer 100 may be provided with power cord and adapter to allow the portable computer to be plugged into a wall supply. Referring to FIG. 19, there is illustrated a view of a portion of the portable computer 100, showing a power jack 180 to which the power adaptor can be connected. As discussed above, the portable computer 100 may also include a port 164 to which peripheral devices, such as mouse, external keyboard, portable flash drive, memory stick, etc. may be connected. In one example, the port 164 is a USB port; however, it is to be appreciated that the port may accommodate protocols other than USB. In addition, although only one port 164 is illustrated in FIG 19, the portable computer 100 may comprise multiple ports that may accommodate multiple protocols. In one example, the portable computer 100 may also comprise a headphone jack 182. It is to be appreciated that the location of any or all of the power jack 180, port(s) 164, and headphone jack 182 are not limited to the example shown in FIG. 19, but may be anywhere convenient or desirable on the portable computer 100.

Referring to FIG. 20, there is illustrated a top down view one example of a power adaptor 184 that may be used with the portable computer 100 and connected via the power jack 180. As known to those skilled in the art, the power adaptor 184 comprises a transformer (not shown) that converts the wall power to a level acceptable for use by the portable computer 100. In one embodiment, the power adaptor 184 comprises a substantially round body 186 that houses the transformer and other necessary components. A connector 188 may allow the power adaptor 184 to be connected to a wall outlet or extension cord. In one example, the connector 188 may include foldable prongs 190 that can be folded against the connector 188 for storage, and folded out for connection, as illustrated in FIG. 21. A cord 192 may be slidably accommodated within the body 186, such that the cord may be stored within the body and flexibly extended (up to its maximum length) by a user.

According to one embodiment, the cord 192 may be wound around a cord spool 194 located within, or partially within, the body 186 of the power adaptor 184. As illustrated in FIG. 21, the cord spool 194 may be configured to slide out from the body 186 of the power adaptor 184, such that the cord 192 can be wound around the cord spool 194, as illustrated in FIGS. 22A and 22B.

According to another embodiment, the portable computer 100 may be configured to connect to a docking station 196, as illustrated in FIG. 23. In one embodiment, a connector 198 on the docking station 196 may be configured to slidably connect to connectors 200 on the portable computer 100, as illustrated in FIG. 23. In one example, the connectors 200 may include power and audio connectors, such that the portable computer 100 may receive power from the docking station and receive and/or provide audio signals from/to the docking station, respectively. For example, the docking station may be coupled to external speakers, and the portable computer may provide audio signals to the docking station to be played through the external speakers. In another example, the docking station 196 may also be coupled to an audio device (not shown), such as an MP3 player, which may provide audio signals and data to the portable computer 100, for example, to update an audio library on the portable computer. It is to be appreciated that many other variations of communication between the portable computer 100 and devices coupled to the docking station 196 are possible, as would be recognized by those skilled in the art, and such variations are intended to be within the scope of this disclosure. Furthermore, numerous variations on the connector(s) 198, 200 that couple the docking station 196 to the portable computer 100 are also possible, as would be recognized by those skilled in the art. For example, the portable computer 100 may include a multi-pin connector 202 located on the base 104, as illustrated in FIG. 24. Such and other variations are intended to be within the scope of this disclosure and the above-mentioned examples are provided for illustration only and are not intended to be limiting.

In addition, it is to be appreciated that although the above discussion refers primarily to the portable computer 100 being in either the laptop mode or easel mode, other modes or configurations are also possible. For example, as discussed above, because the portable computer 100 can be configured from the closed position, through the laptop mode into the easel mode by rotating the display component 102, a number of configurations are possible in between "true" laptop mode and "true" easel mode. In another example, the portable computer 100 may be configured into a "frame" mode, as illustrated in FIG. 26, in which the portable computer is placed on a surface 212 with the keyboard 106 "face down" on the surface 212 and the display 110 facing upward. In the frame mode, the display component 102 may be at a similar orientation, and angle 134, with respect to the base component 104 as

in the easel mode. However, rather than the base component 104 and display component 102 being oriented vertically with respect to the surface 212, as in the easel mode (in which the portable computer forms an inverted "V" as discussed above), in the frame mode, the base component 104 may lie flat on the surface 212, as shown in FIG. 26. In one example, software and/or hardware protection may be provided for the keyboard to prevent keys from being pressed (or to prevent the portable computer from responding to pressed keys) when the portable computer is in the frame mode.

Similarly, referring to FIG. 27, there is illustrated another configuration of the portable computer 100, referring to as the "flat" mode. In the flat mode, the display component 102 may be rotated (or opened) to approximately 180 degrees with respect to the base component 104, such that the base component and display component lay flat on a surface, with the keyboard 106 and display screen 110 exposed, as shown in FIG. 27. Unlike the easel and frame modes, in which the keyboard may be concealed and not easily accessible, in the flat mode, the keyboard is accessible and usable. In addition, as discussed above, the visual display on the display screen 110 may be automatically rotated to accommodate comfortable viewing of information by persons located in different positions relative to the base component 104 or display component 102. The visual display on the display screen 110 may also be manually adjusted by a user using, for example, the keyboard 106, touch pad 108 or mouse (not shown), scroll wheel 132 or navigation buttons (not shown). For example, if a user (located at position A) wishes to display information for a person located opposite the user (at position B), the visual display may be rotated (automatically or manually)180 degrees such that the information appears "right-way-up," to the person at location B, even through the display screen 110 is upside-down for that person. Similarly, in another example, the visual display may be rotated (automatically or manually) 90 degrees such that the information appears "right-way-up," for a person at location C. In one example, a user can "toggle" the visual display among various orientations. For example, a user at location A may have the visual display facing themselves while using the keyboard 106 or other controls to change or access information on the display, then toggle the display orientation 180 or 90 degrees to display the information for persons at locations B or C.

In summary, various aspects and embodiments provide a portable computer that is configurable between different operating modes, including a laptop mode and an easel mode, and that is capable of different display formats and functionality in the different modes. The ability to view and operate the portable computer in the different laptop and easel modes, and to incorporate features and functions such as an alarm clock, digital photograph frame, voice-over-IP, etc, may provide enhanced flexibility and usefulness. In addition, the portable computer may include a graphical user interface that may work seamlessly with the computer hardware to provide an enjoyable, holistic user experience.

Having thus described several aspects of at least one embodiment, it is to be appreciated various alterations, modifications, and improvements will readily occur to those skilled in the art. For example functionality or features that have been described herein in connection with hardware may instead be implemented in software, or vice versa. For example, the wireless signal indicator discussed above may instead (or in addition) be provided as a software application. Such alterations, modifications, and improvements are intended to be part of this disclosure and are intended to be within the scope of the invention. Accordingly, the foregoing description and drawings are by way of example only.

What is claimed is:

CLAIMS

1. A portable computer comprising:

a base;

a display component rotatably coupled to the base such that the display component and the base are rotatable with respect to one another about a longitudinal axis running along an interface between the display component and the base, the display component including a display screen; and

a scroll wheel disposed at least partially within the base and rotatable about the longitudinal axis, the scroll wheel configured to permit a user to control at least one of operating parameters of the portable computer and content displayed on the display screen.

2. The portable computer of claim 1, where the scroll wheel is configured to permit the user to adjust a volume of sound produced by the portable computer.

3. The portable computer of claim 1, further comprising a first navigation button disposed on one of the base and the display component and configured to permit the user to manipulate selected content displayed on the screen.

4. The portable computer of claim 3, wherein the screen is configured to display at least one of a plurality of modes of content; and

wherein the navigation button is configured to permit the user to select for display one of the plurality of modes of content.

5. The portable computer of claim 3, further comprising a second navigation button;

wherein the first navigation button is disposed on a major surface of the base; and

wherein the second navigation button is disposed on a minor surface of the base.

6. The portable computer of claim 1, wherein the scroll wheel is configured to permit the user to select a mode of content for display by the portable computer.

7. A portable computer configurable between a plurality of display modes including a laptop mode and an easel mode, the portable computer comprising:

a base;

a display component rotatably coupled to the base and including a screen which displays content; and

a scroll wheel accessible in each of the plurality of display modes and configured to permit a user to manipulate at least one of operating parameters of the portable computer and the content displayed on the screen.

8. The portable computer of claim 7; wherein the scroll wheel is disposed at leas partially about an axis of rotation of the display component relative to the base.

9. The portable computer of claim 8, wherein the axis of rotation runs along an interface between the display component and the base.

10. The portable computer of claim 7, further comprising a first navigation button user-accessible in each of the laptop mode and the easel mode, and configured to permit the user to manipulate selected content displayed on the screen.

11. The portable computer of claim 10, wherein the screen is configured to display at least one of a plurality of modes of content; and

wherein the first navigation button is configured to permit the user to select for display one of the plurality of modes of content.

12. The portable computer of claim 10, further comprising a second navigation button that is not user-accesssible when the portable computer is in the laptop mode.

13. A portable computer comprising:

a base;

a display component including a screen configured to display content;

a hinge assembly configured to rotatably couple the display component to the base and to permit rotation of the display component about a longitudinal axis running along an interface between the display component and the base; and

a scroll wheel disposed at least partially about the longitudinal axis.

14. The portable computer of claim 13, wherein the scroll wheel is configured to permit a user to manipulate the content displayed on the screen.

15. The portable computer of claim 13, wherein the scroll wheel is configured to permit a user to control a volume of sound played by the portable computer.

16. The portable computer of claim 13, wherein the scroll wheel is disposed at least partially within the hinge assembly.

17. The portable computer of claim 13, further comprising at least one navigation button disposed on one of the base and the display component.

ABSTRACT

A portable computer that is configurable between a laptop mode (in which the portable computer has a conventional laptop appearance) and an easel mode in which the base of the computer and its display component stand vertically forming an inverted "V." The portable computer includes a hinge assembly that couples the display component to the base of the computer, and allows the display component to be rotated about an axis along an interface between the display component and the base to configure the portable computer between a closed position, the laptop mode and the easel mode. The portable computer further comprises a scroll wheel and optional navigation buttons that

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	A2029-700111
	Application Number	
Title of Invention	PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
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Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Applicant Information:

Applicant 1 Remove

Applicant Authority	◉ Inventor	○ Legal Representative under 35 U.S.C. 117	○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Yves		Behar	

Residence Information (Select One) ◉ US Residency ○ Non US Residency ○ Active US Military Service

City	Oakland	State/Province	CA	Country of Residence i	US

Citizenship under 37 CFR 1.41(b) i	CH

Mailing Address of Applicant:

Address 1	5741 Scarborough Drive		
Address 2			
City	Oakland	State/Province	CA
Postal Code	94611	Country i	US

Applicant 2 Remove

Applicant Authority	◉ Inventor	○ Legal Representative under 35 U.S.C. 117	○ Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Joshua		Morenstein	

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City	San Francisco	State/Province	CA	Country of Residence i	US

Citizenship under 37 CFR 1.41(b) i	US

Mailing Address of Applicant:

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Address 2			
City	San Francisco	State/Province	CA
Postal Code	94117	Country i	US

Applicant 3 Remove

Applicant Authority	◉ Inventor	○ Legal Representative under 35 U.S.C. 117	○ Party of Interest under 35 U.S.C. 118

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	Christopher		Hibmacronan	

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	A2029-700111
	Application Number	
Title of Invention	PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS	

Citizenship under 37 CFR 1.41(b) i	US			
Mailing Address of Applicant:				
Address 1	2429 Damuth Street			
Address 2				
City	Oakland	**State/Province**	CA	
Postal Code	94602	**Country**i	US	

Applicant 4 Remove

Applicant Authority (•) Inventor ( ) Legal Representative under 35 U.S.C. 117 ( ) Party of Interest under 35 U.S.C. 118

Prefix	Given Name	Middle Name	Family Name	Suffix
	Naoya		Edahiro	

Residence Information (Select One) (•) US Residency ( ) Non US Residency ( ) Active US Military Service

City	San Francisco	**State/Province**	CA	**Country of Residence** i	US

Citizenship under 37 CFR 1.41(b) i	JP
Mailing Address of Applicant:	
Address 1	375 Bartlett Street
Address 2	

City	San Francisco	**State/Province**	CA
Postal Code	94110	**Country**i	US

Applicant 5 Remove

Applicant Authority (•) Inventor ( ) Legal Representative under 35 U.S.C. 117 ( ) Party of Interest under 35 U.S.C. 118

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	Matthew	David	Day	

Residence Information (Select One) (•) US Residency ( ) Non US Residency ( ) Active US Military Service

City	San Francisco	**State/Province**	CA	**Country of Residence** i	US

Citizenship under 37 CFR 1.41(b) i	US
Mailing Address of Applicant:	
Address 1	425 2nd Street #301
Address 2	

City	San Francisco	**State/Province**	CA
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All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

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For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	37462

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	A2029-700111
	Application Number	
Title of Invention	PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS	

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Application Information:

Title of the Invention	PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS		
Attorney Docket Number	A2029-700111	**Small Entity Status Claimed**	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		**Sub Class (if any)**	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	24	**Suggested Figure for Publication (if any)**	4

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S. C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

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Please Select One:	◉ Customer Number	○ US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	37462		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78(a)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	non provisional of	61041365	2008-04-01

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	A2029-700111
	Application Number	
Title of Invention	PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS	

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

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Application Number	Country [i]	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
			○ Yes ◉ No

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Assignee Information:

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Assignee 1 Remove

If the Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information:

Address 1			
Address 2			
City		**State/Province**	
Country [i]		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee Data may be generated within this form by selecting the **Add** button. Add

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.

Signature	/Sarah M. Gates/			Date (YYYY-MM-DD)	2008-07-10
First Name	Sarah	Last Name	Gates	Registration Number	60661

This collection of information is required by 37 CFR 1.76. 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 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet 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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3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspections or an issued patent.

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Electronic Acknowledgement Receipt

EFS ID:	3596910
Application Number:	12170951
International Application Number:	
Confirmation Number:	2004
Title of Invention:	PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS
First Named Inventor/Applicant Name:	Yves Behar
Customer Number:	37462
Filer:	Sarah May Gates
Filer Authorized By:	
Attorney Docket Number:	A2029-700111
Receipt Date:	10-JUL-2008
Filing Date:	
Time Stamp:	16:31:49
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1		898552_A2029_700111_AP.pdf	108262 4c041da9631a339441338f6ef09e0e146b56e06f	yes	29

	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	25	
	Claims		26	28	
	Abstract		29	29	
Warnings:					
Information:					
2	Drawings-other than black and white line drawings	A2029_700111_Figs.pdf	1020649 f61b93aca4a393fc9678ff639e066421442ab369	no	25
Warnings:					
Information:					
3	Application Data Sheet	A2029_700111_ADS.pdf	965632 b24ca6f137507fae7a53ea4ea35cbcf8e822783b	no	5
Warnings:					
Information:					
		Total Files Size (in bytes):	2094543		

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
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Application Number: 12170951 Document Date: 7/10/2008

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Form Revision Date: February 8, 2006

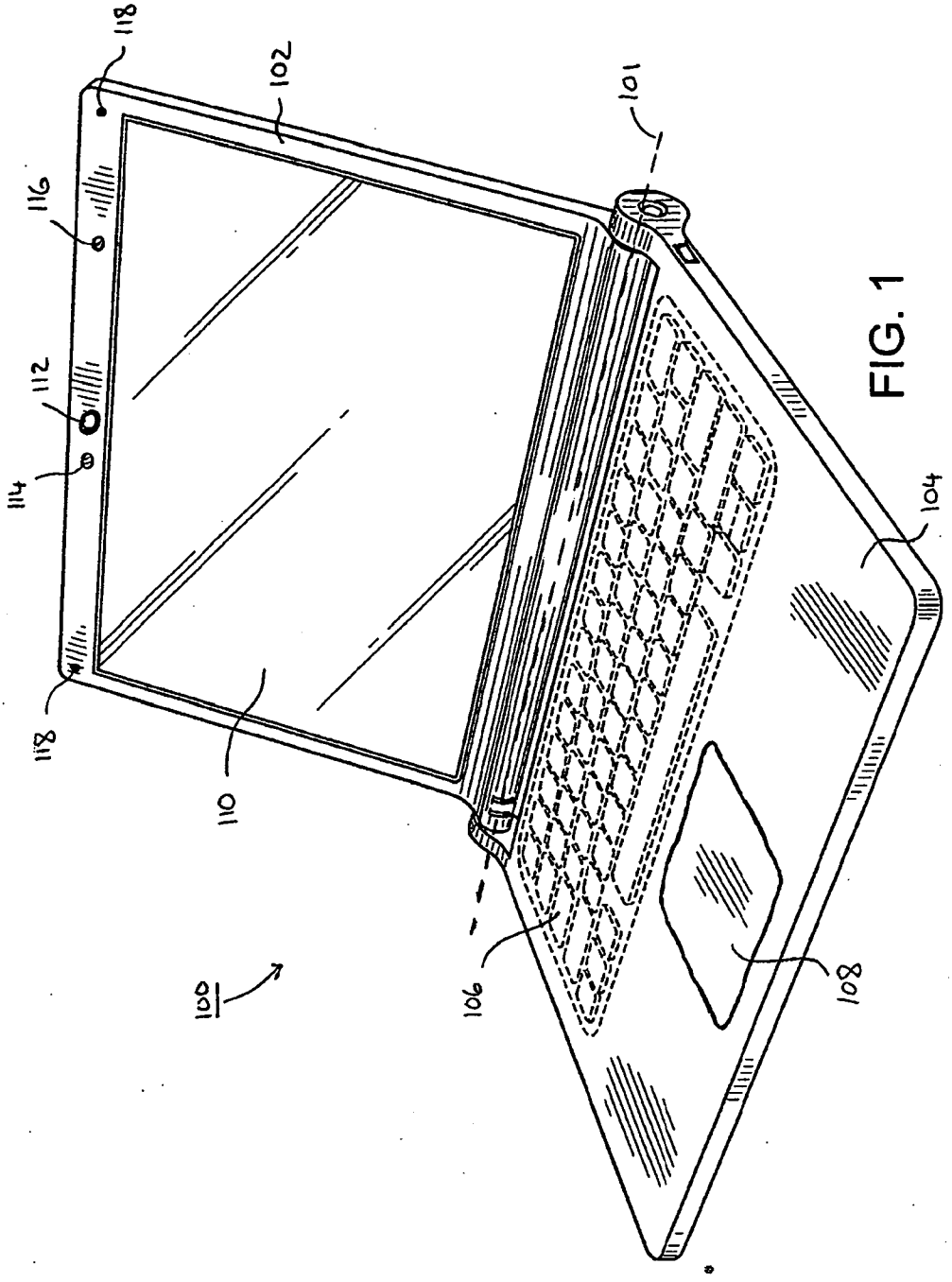


FIG. 1

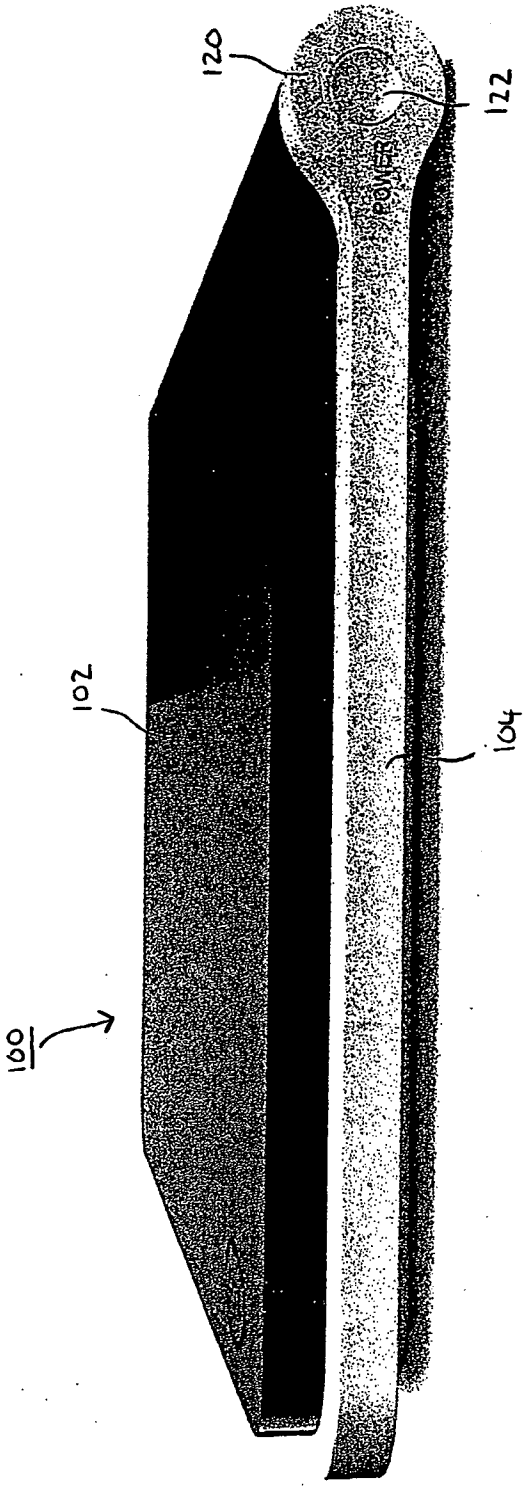


FIG. 2

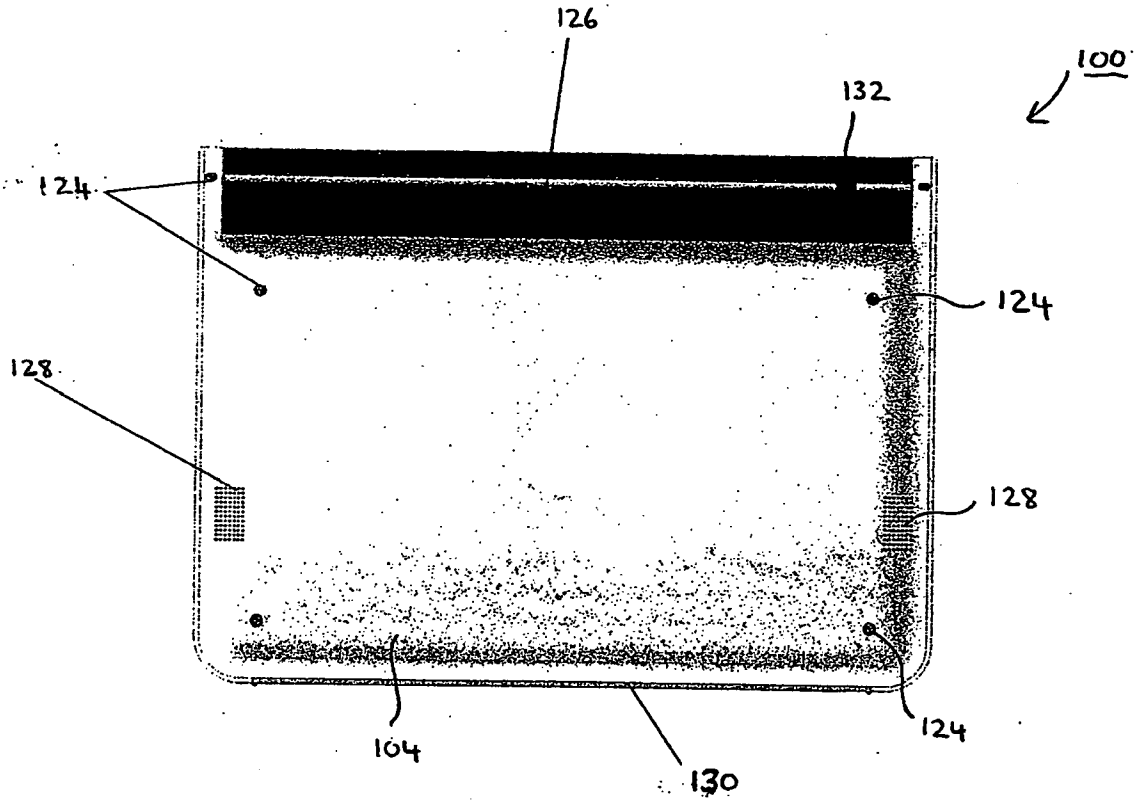


FIG. 3

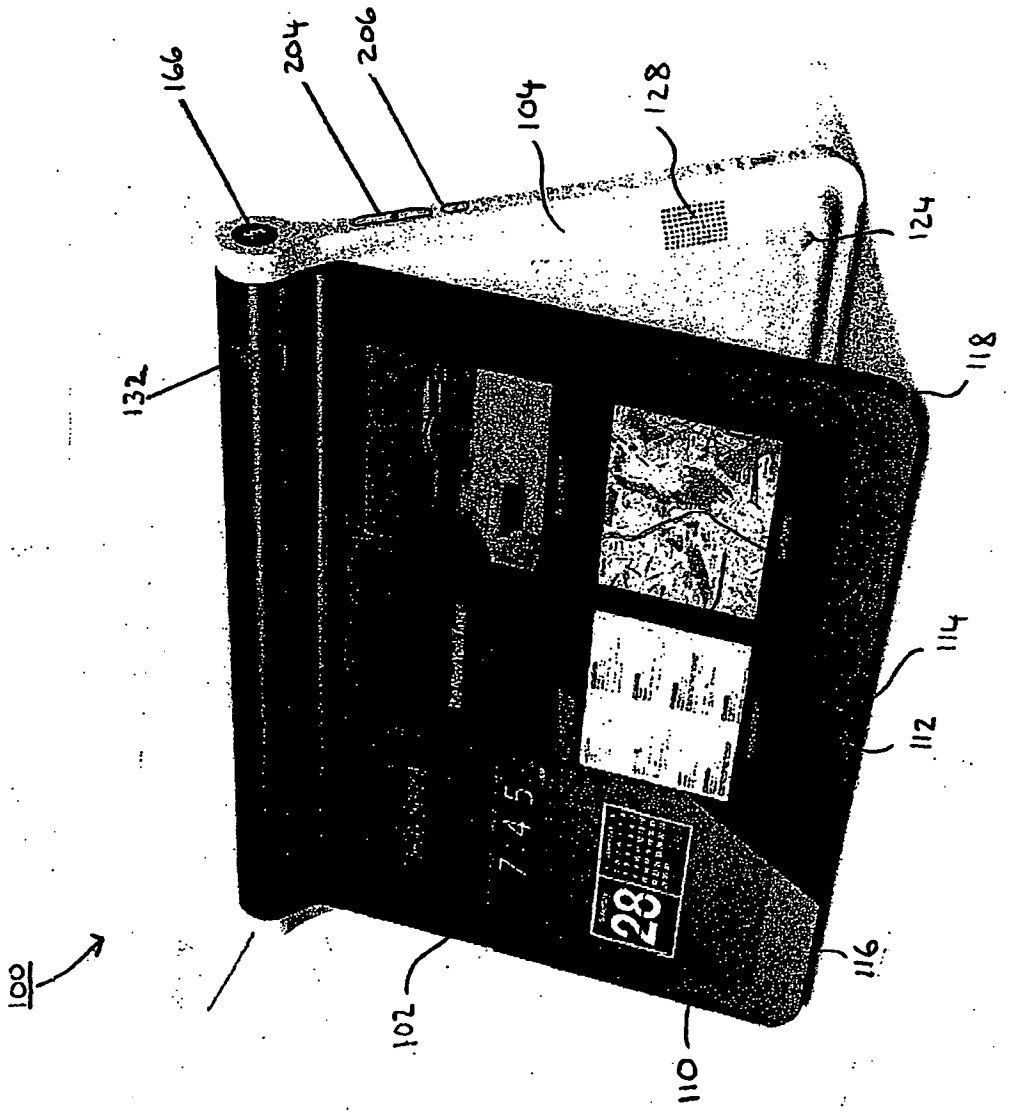


FIG. 4

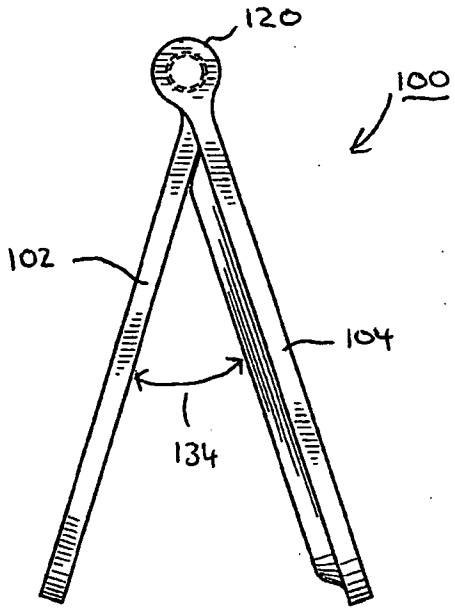


FIG. 5

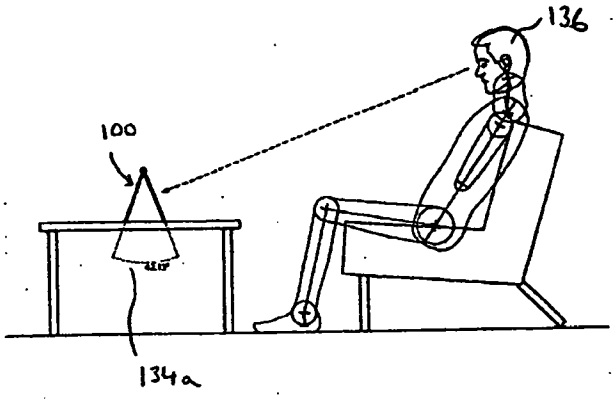


FIG. 6A

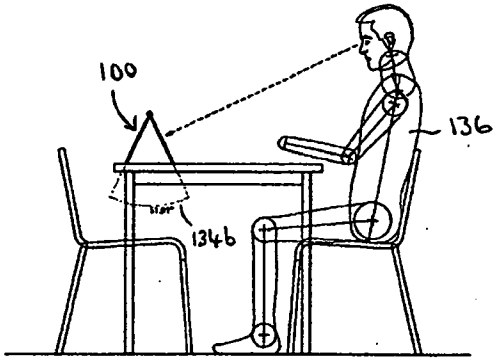


FIG. 6B

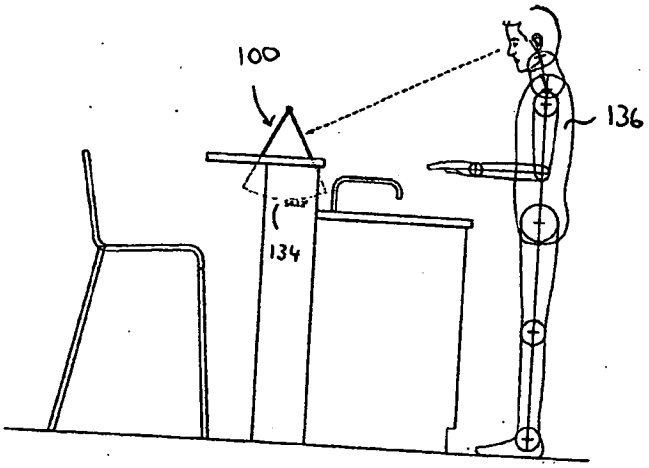


FIG. 6C

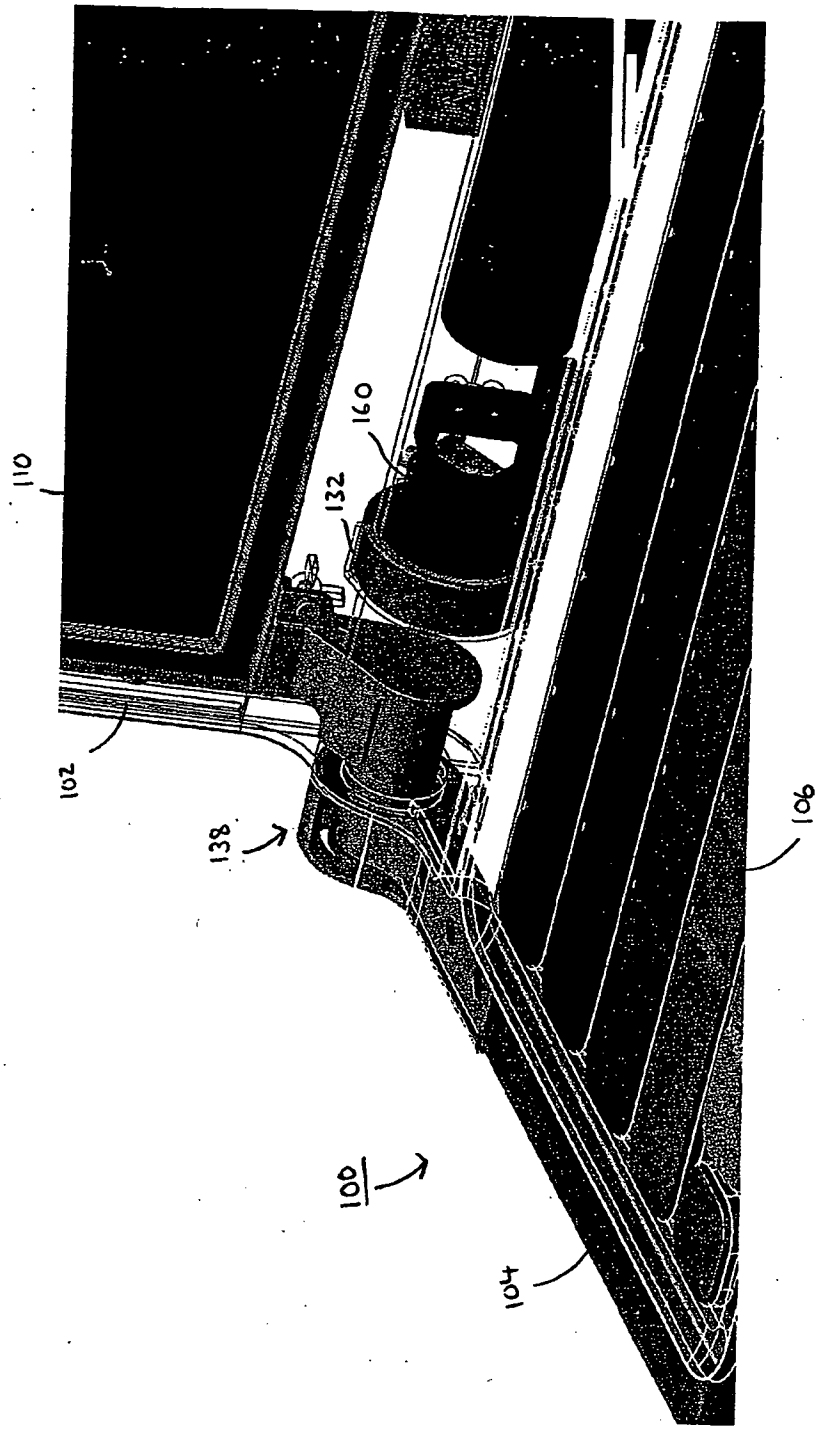


FIG. 7A

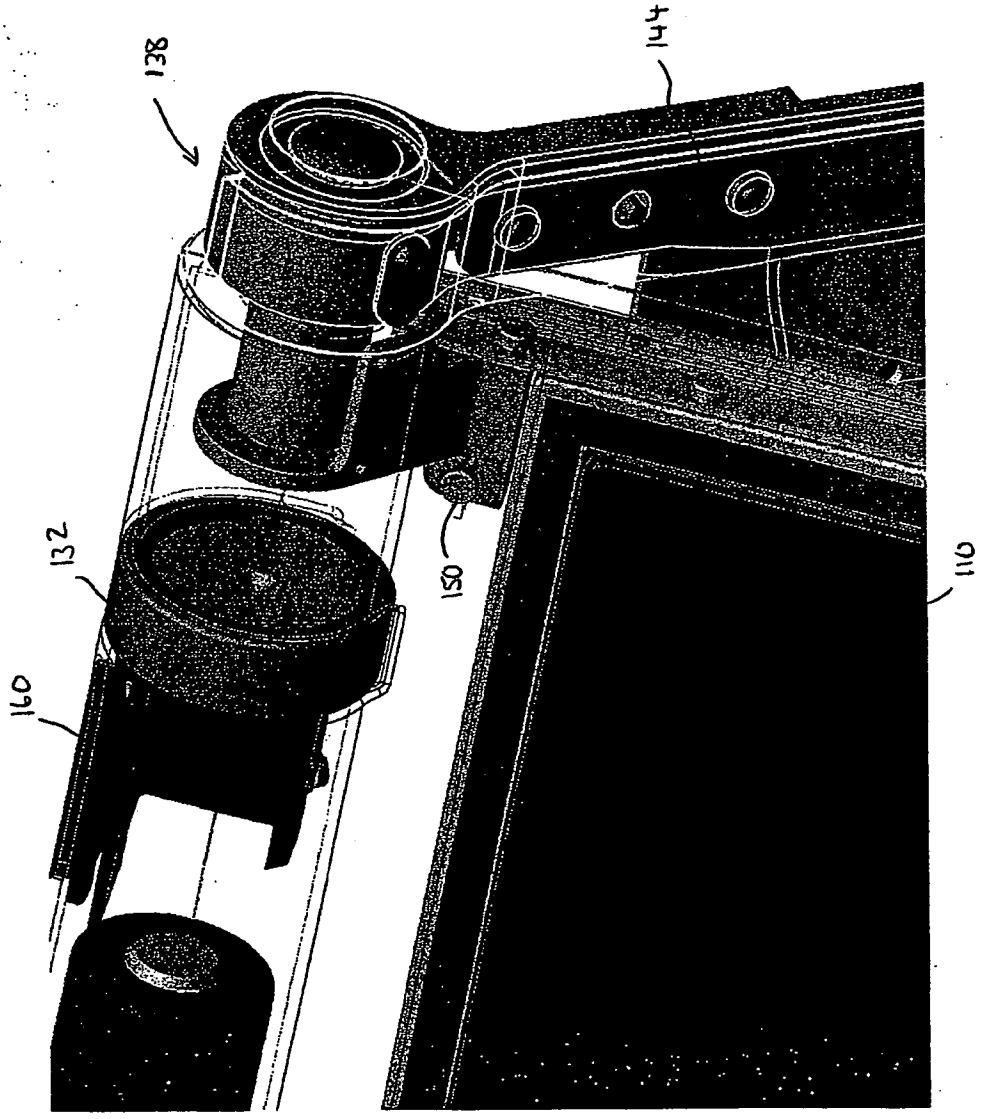
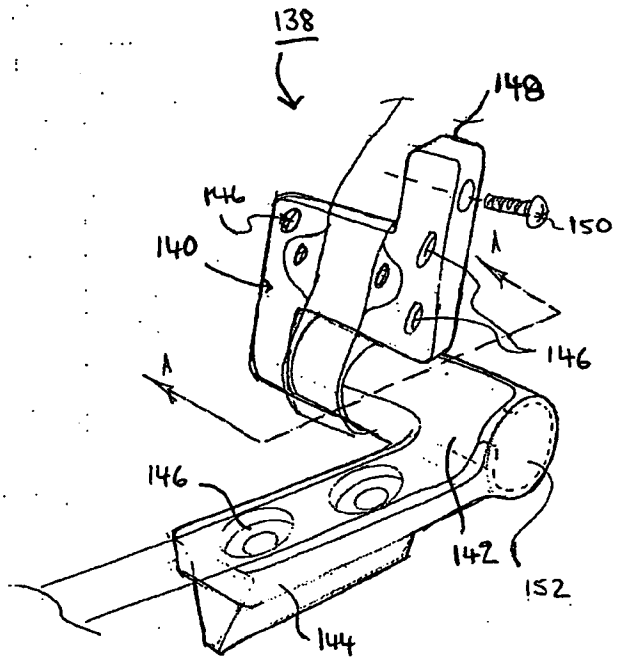


FIG. 7B



8

FIG. 8

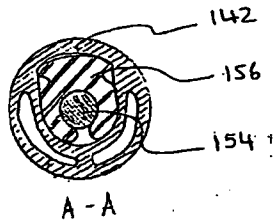


FIG 9

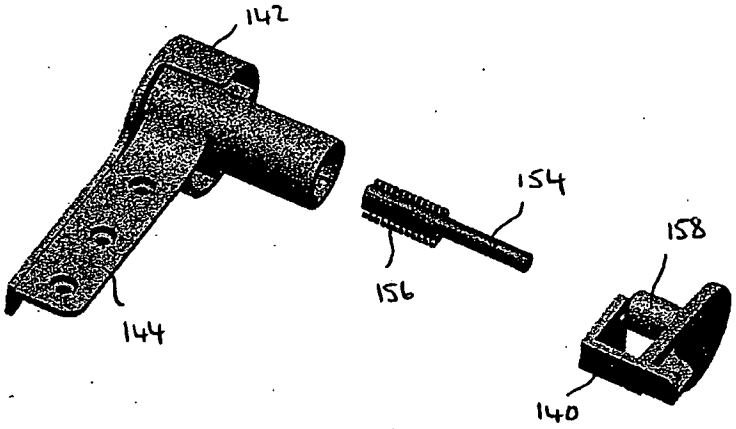


FIG. 10

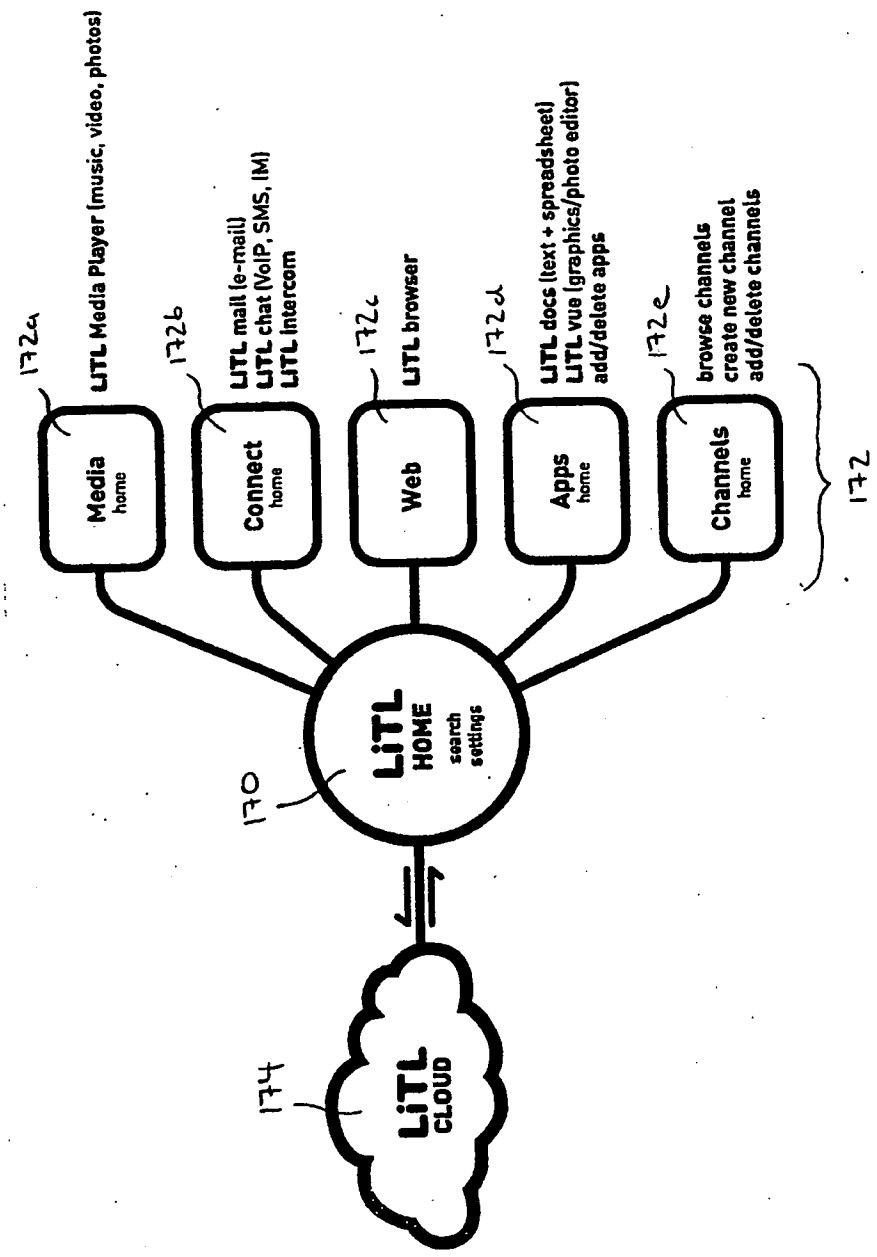

LiTL Media Player (music, video, photos)
LiTL mail (e-mail)
LiTL chat (VoIP, SMS, IM)
LiTL intercom
LiTL browser
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add/delete apps
browse channels
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Connect home
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LiTL CLOUD
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FIG. 11

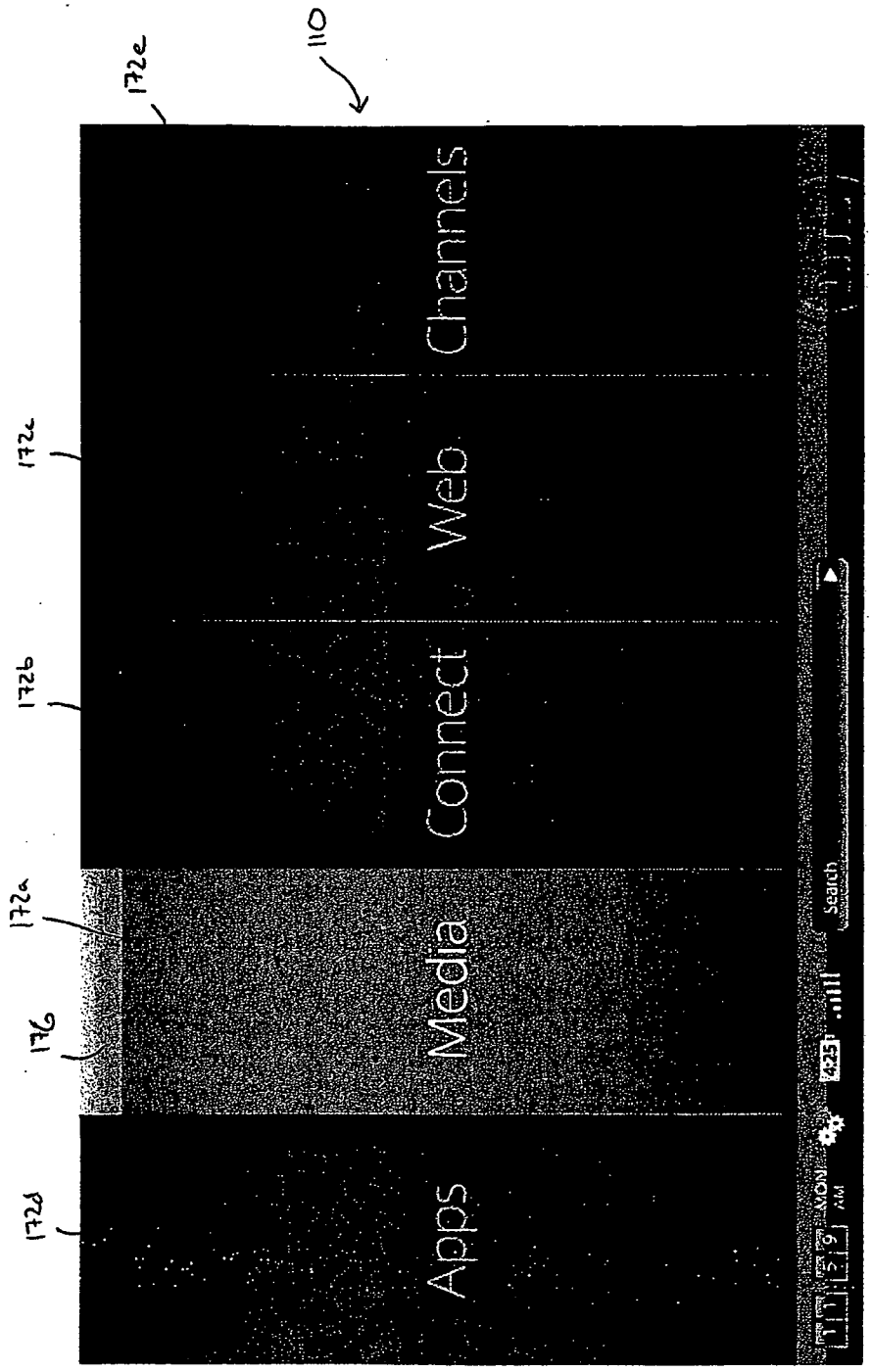
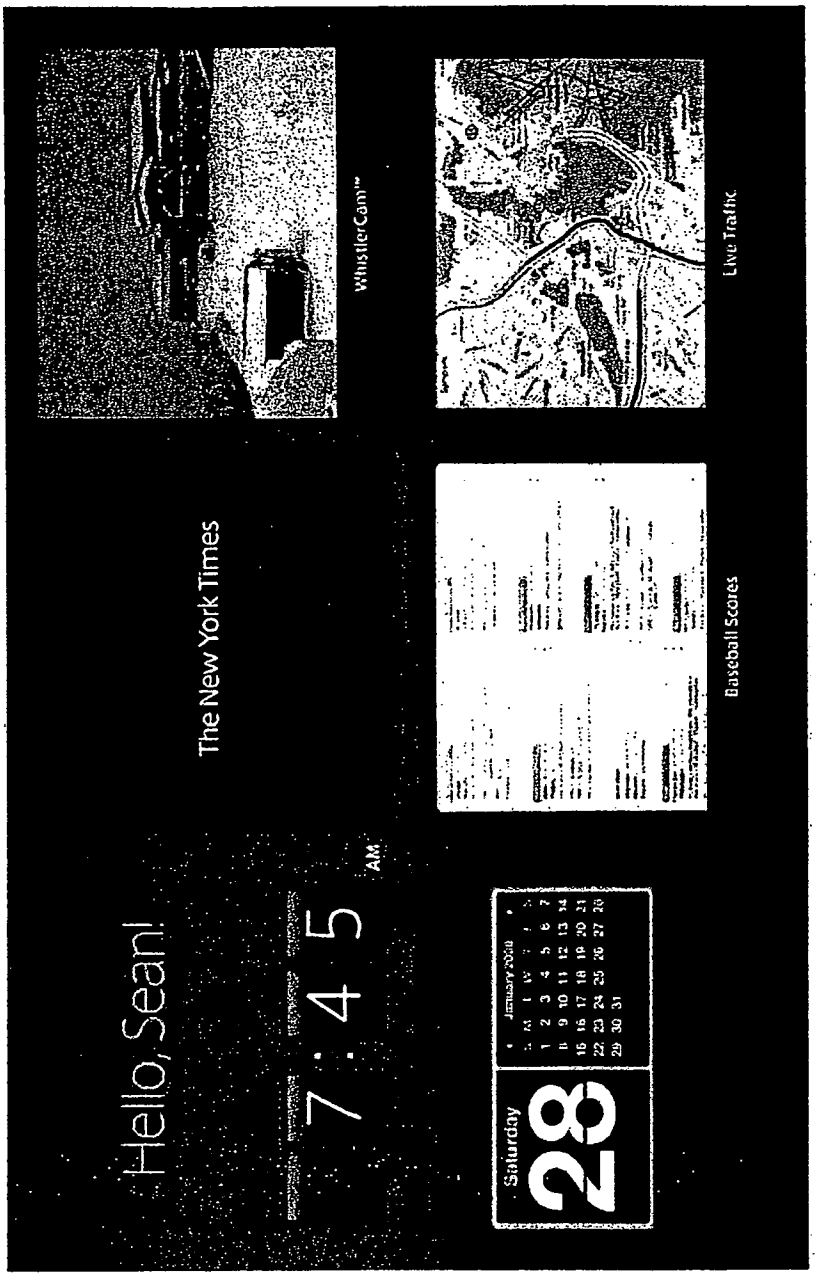

172e
110
172c
172b
172a
176
172d
Channels
Web
Connect
Media
Apps
Search
425

FIG 12


Hello, Sean!
7:45
AM
The New York Times
WhistlerCam™
Live Traffic
Baseball Scores
Saturday
28

110

FIG. 13

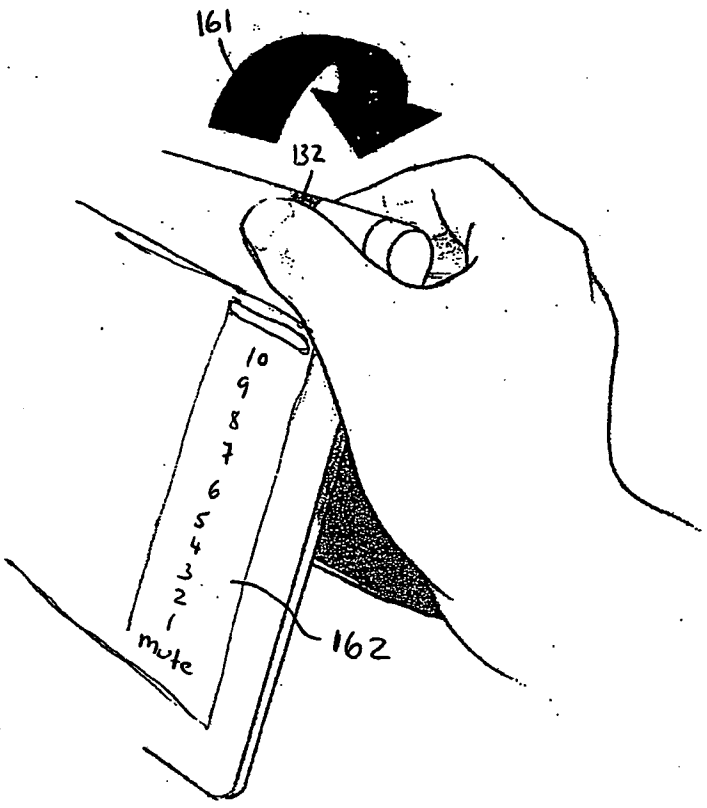


FIG. 14

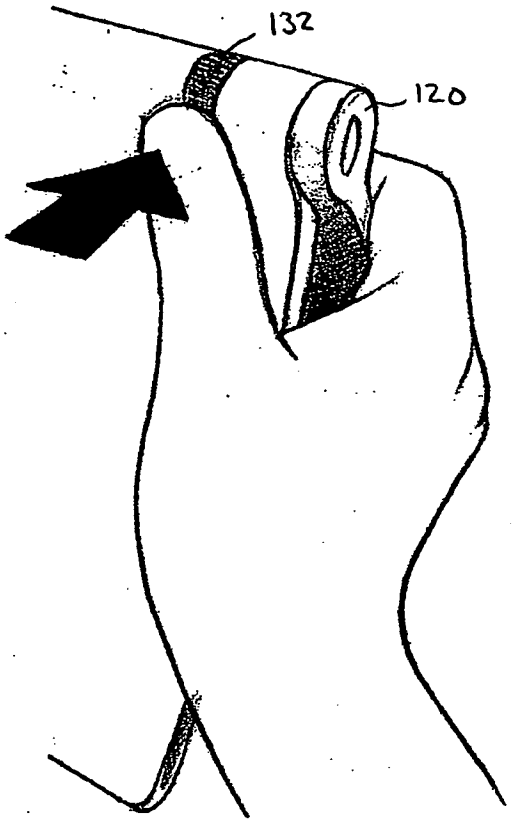


FIG. 15

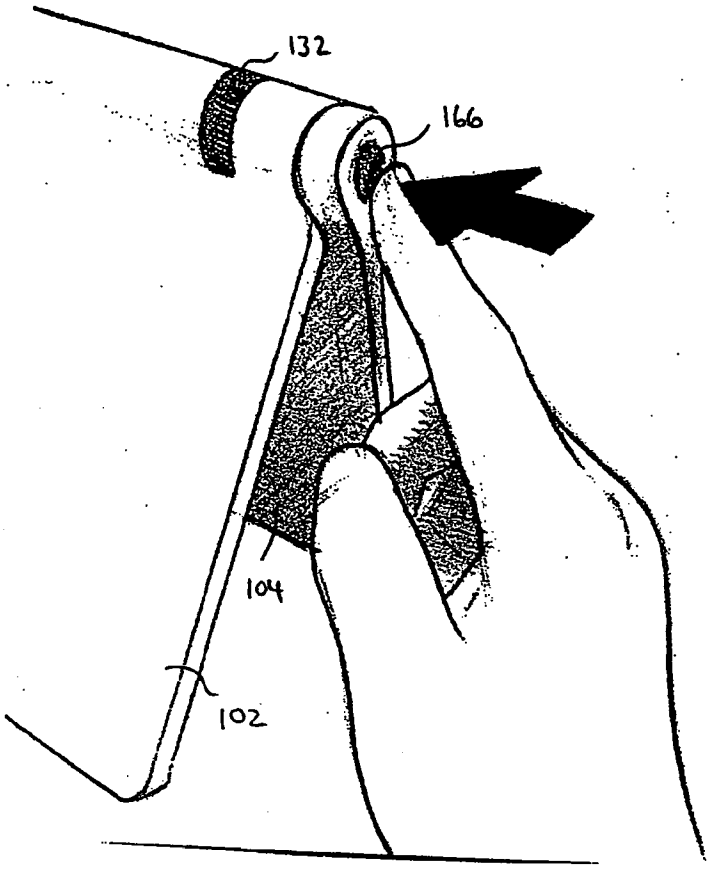


FIG. 16

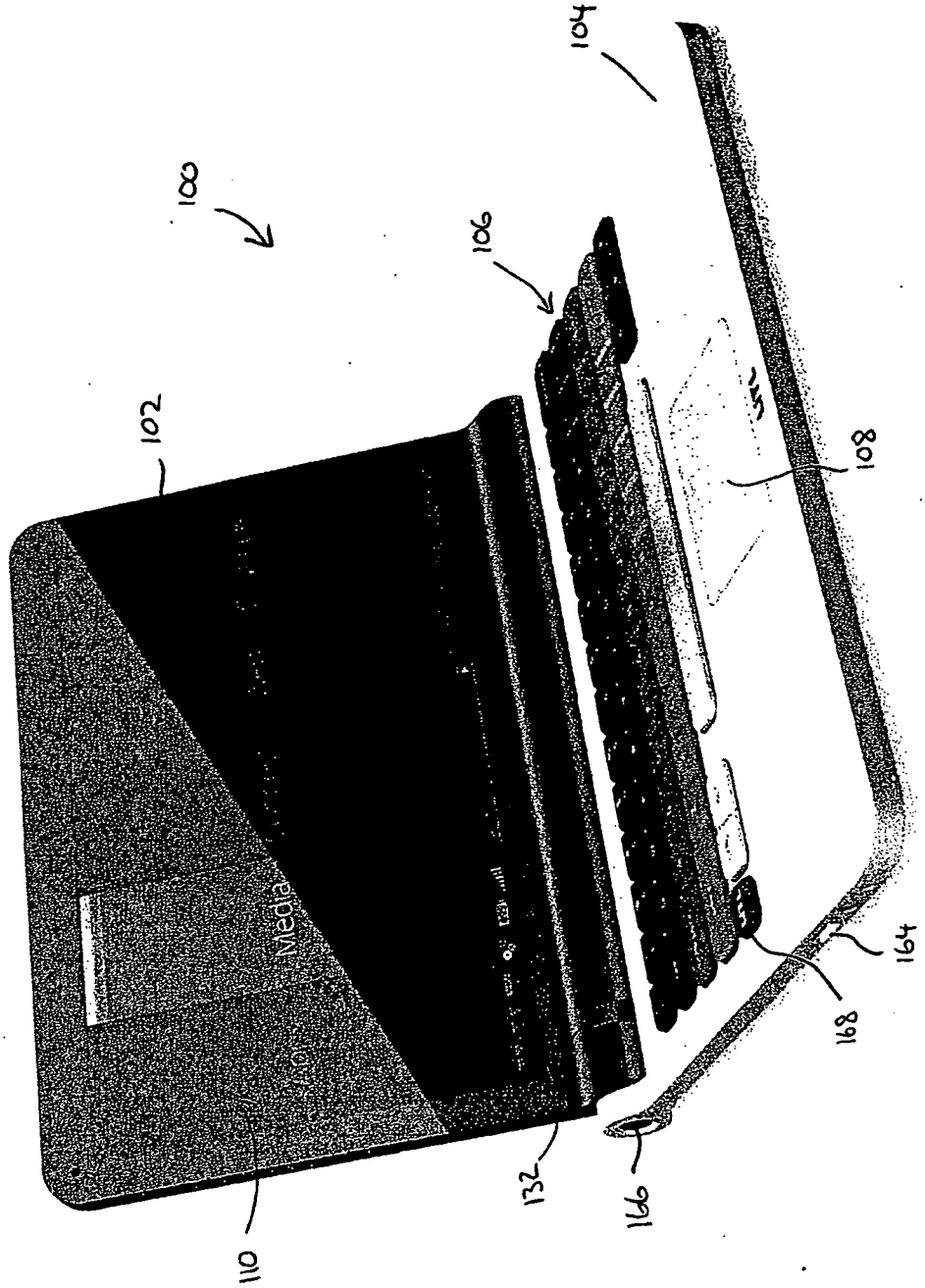


FIG. 17

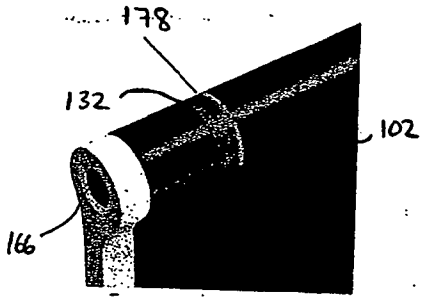


FIG 18

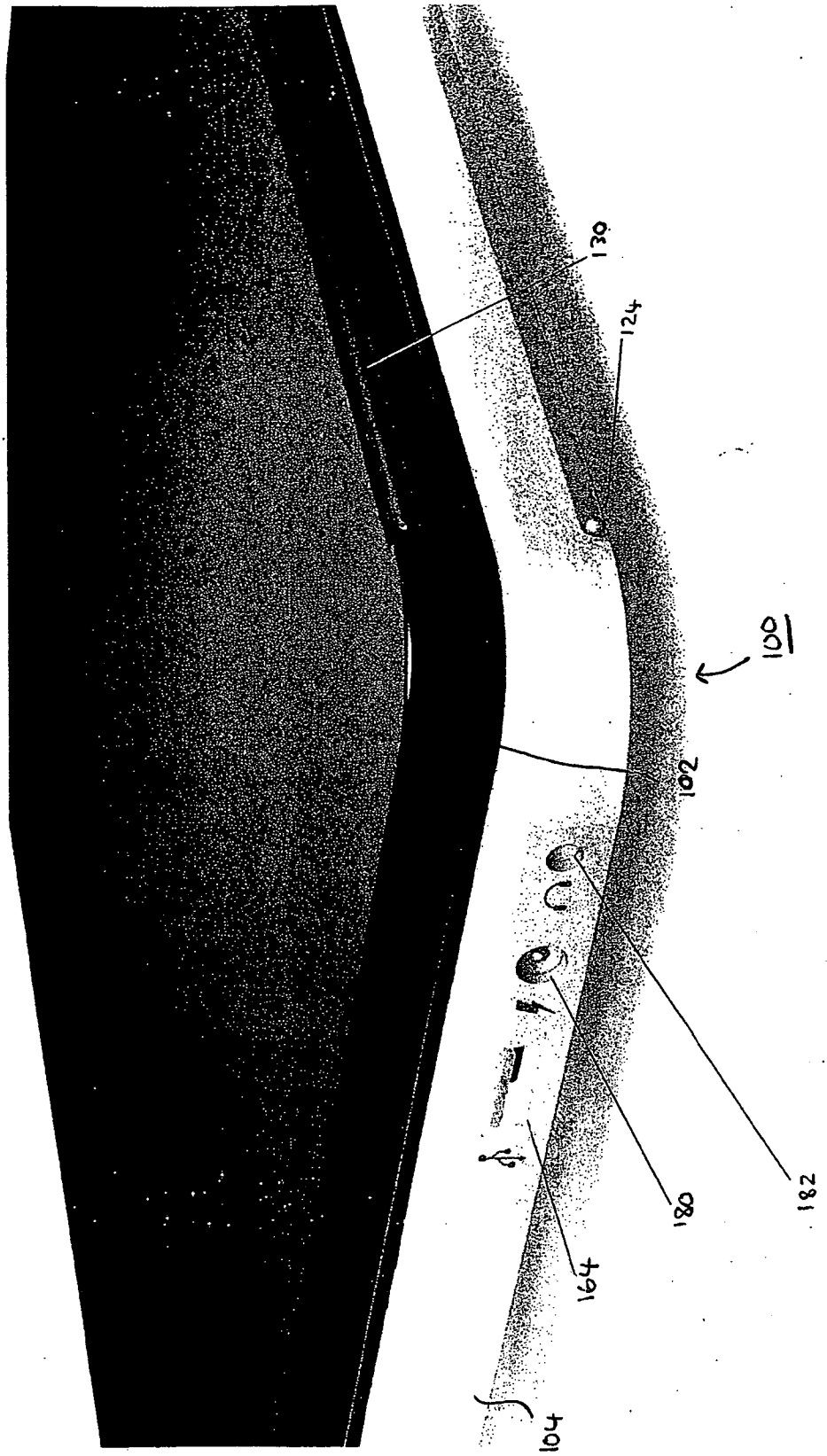


FIG 19

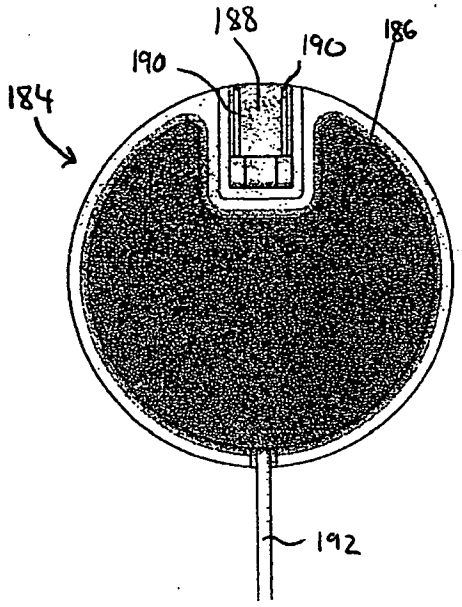


FIG 20

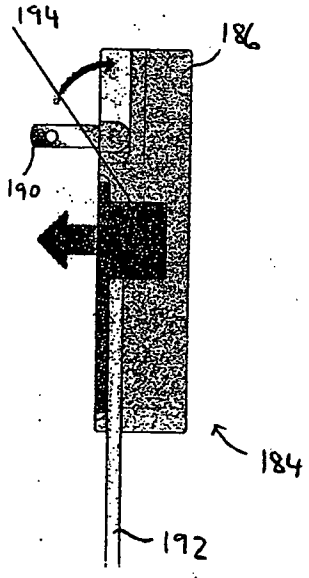


FIG 21

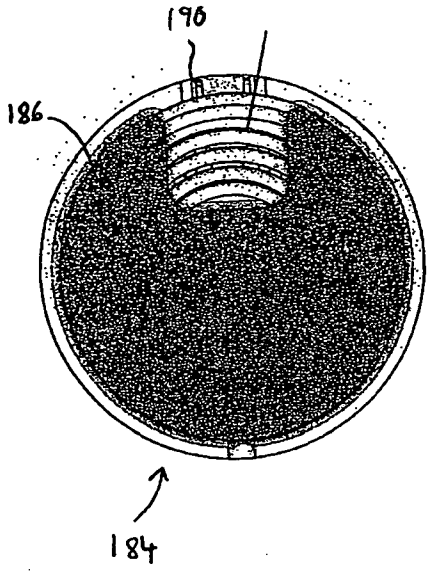


FIG. 22A

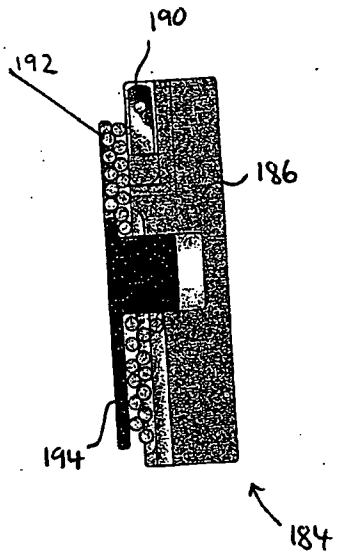


FIG. 22B

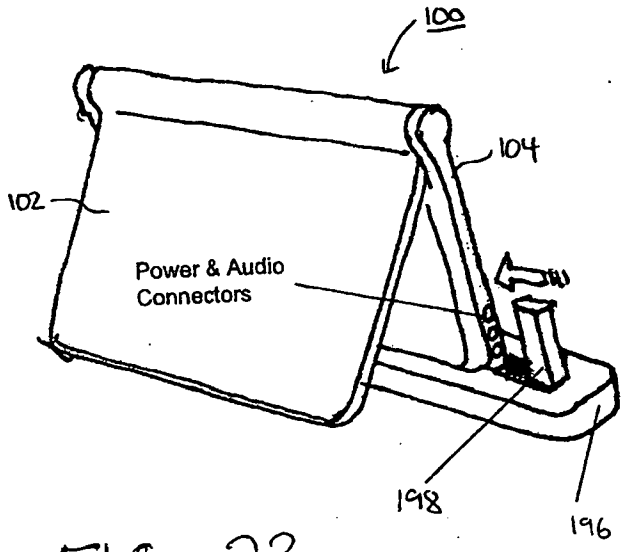


FIG 23

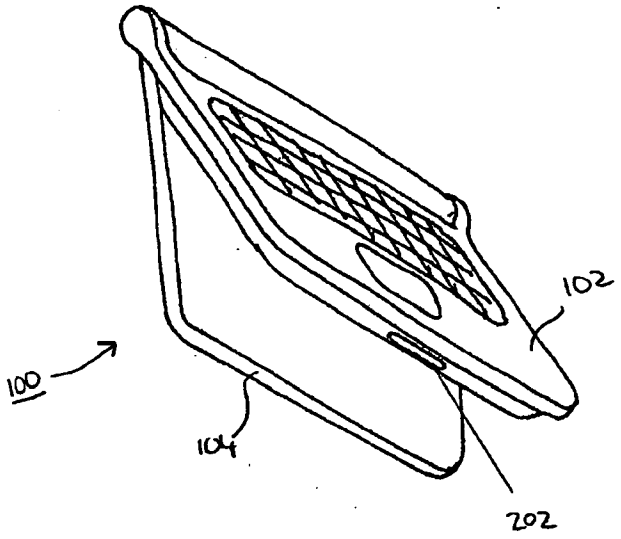


FIG. 24

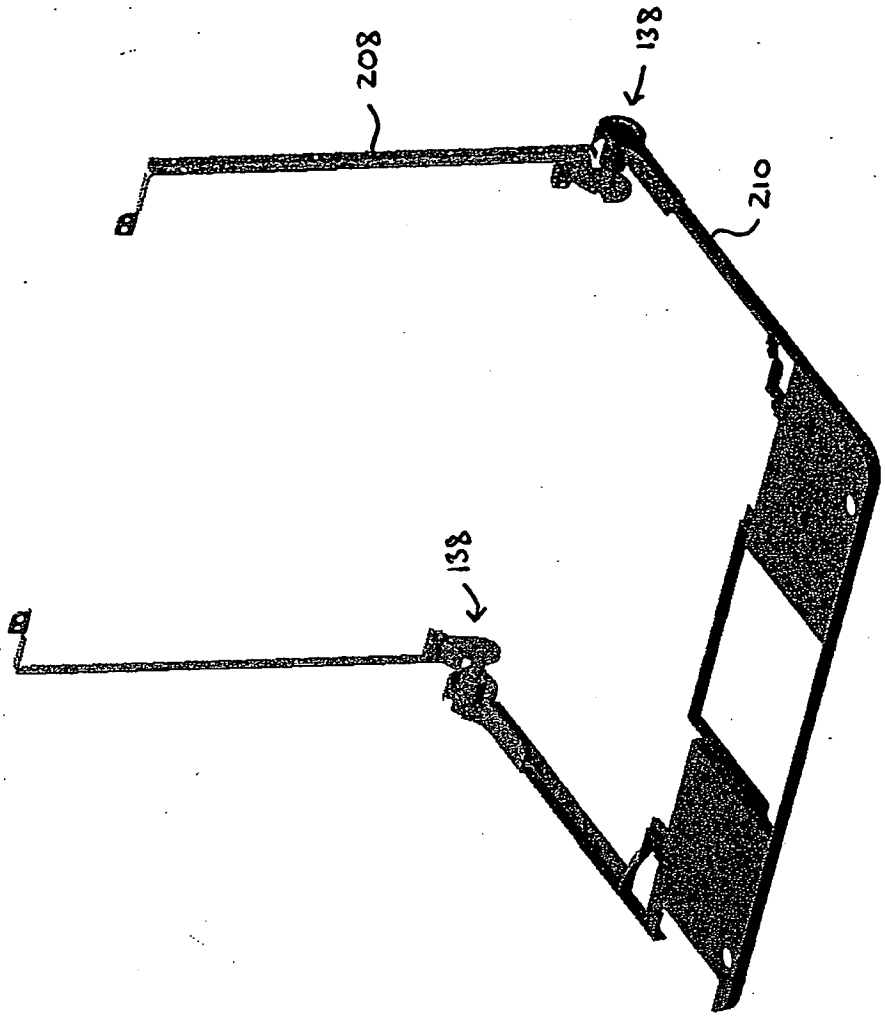


FIG. 25

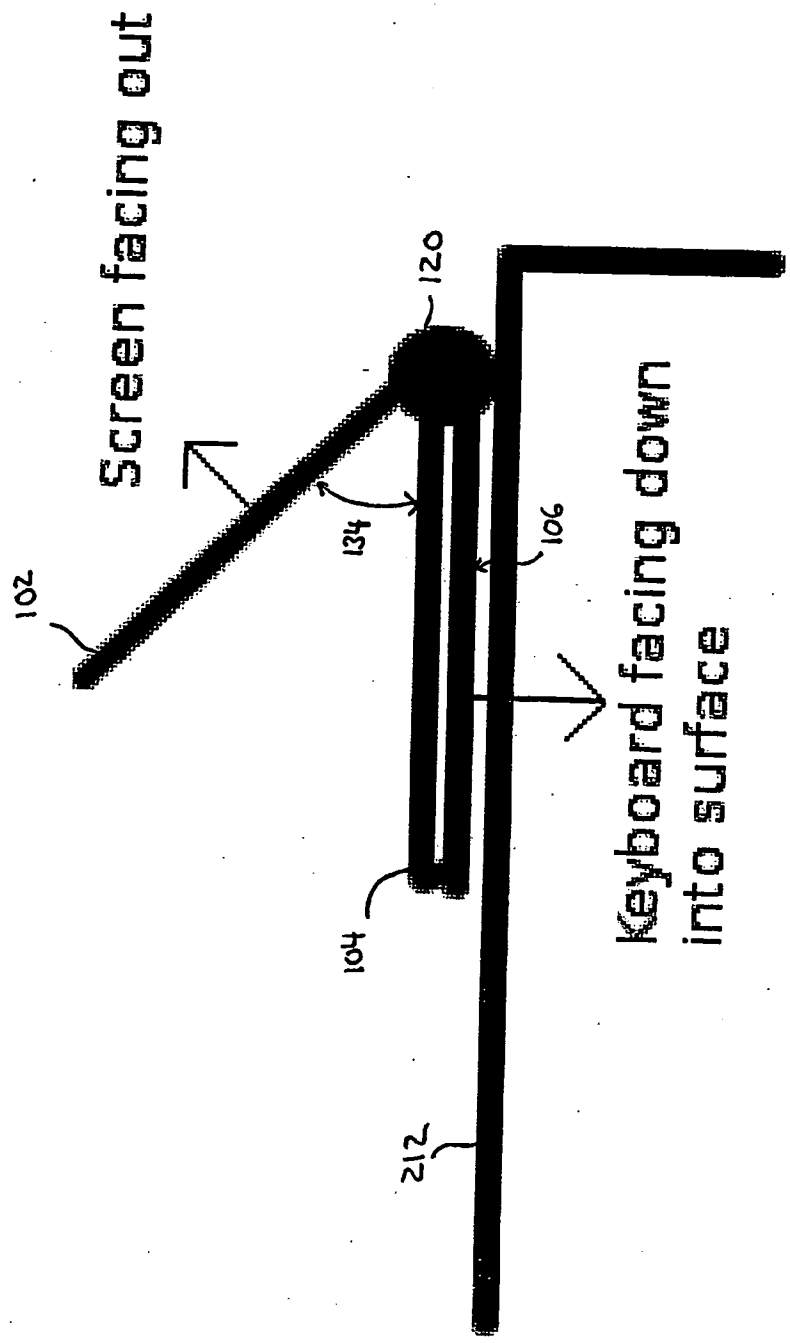

Screen facing out
120
102
134
106
104
Keyboard facing down into surface
212

FIG. 26

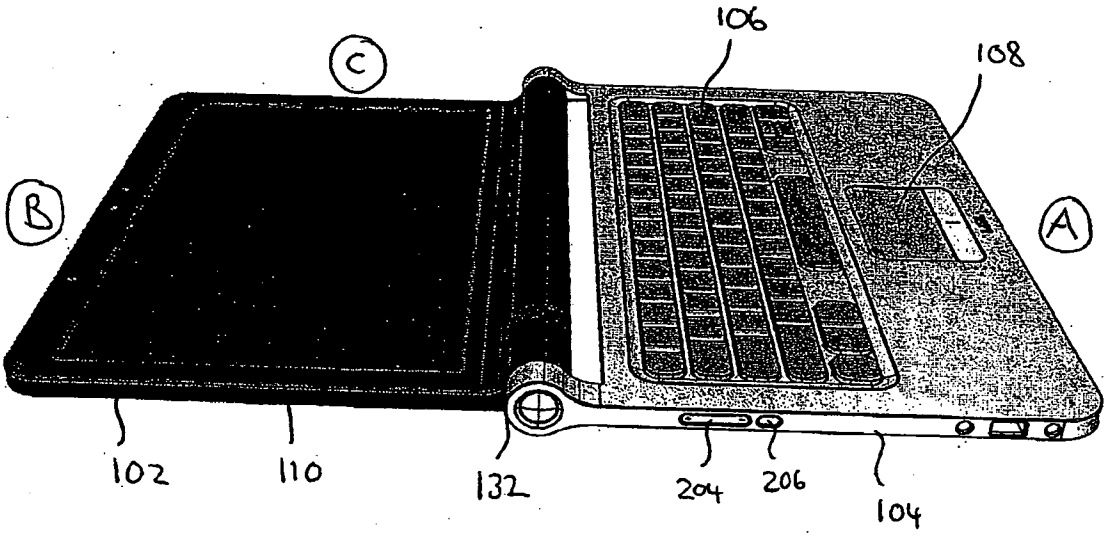


FIG. 27

Filing Date: 07/10/08

Approved for use through 7/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 12/170,951

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	310
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	510
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	210
TOTAL CLAIMS (37 CFR 1.16(i))	17 minus 20 =	0	X$ 25		OR	X$50	0
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 =	* 0	X$105			X$210	0
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $260 ($130 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR						
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))			185			370	
			TOTAL	0		TOTAL	1030

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					N/A		OR	N/A	
					TOTAL ADD'T FEE		OR	TOTAL ADD'T FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					N/A		OR	N/A	
					TOTAL ADD'T FEE		OR	TOTAL ADD'T FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. 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 12 minutes 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.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Electronic Acknowledgement Receipt

EFS ID:	47180702
Application Number:	90014965
International Application Number:	
Confirmation Number:	3442
Title of Invention:	Portable Computer with Multiple Display Configurations
First Named Inventor/Applicant Name:	8624844
Customer Number:	23628
Filer:	Edward J. Russavage/Jennifer Weaver
Filer Authorized By:	Edward J. Russavage
Attorney Docket Number:	
Receipt Date:	09-DEC-2022
Filing Date:	25-FEB-2022
Time Stamp:	17:27:14
Application Type:	Reexam (Third Party)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Non Patent Literature	Schwartz_Org_Edit_Photos_Picasa_2005_pt1_pdf_Part9.pdf	24019287 88ae07c5cc9ba4d1c6ad3bda568683549089939f	no	13

Warnings:

Information:					
2	Non Patent Literature	Schwartz_Org_Edit_Photos_Picasa_2005_pt1_pdf_Part10.pdf	23925160 67a888ceed2592d911200263ec85ab4925acef0d	no	12
Warnings:					
Information:					
3	Non Patent Literature	Schwartz_Org_Edit_Photos_Picasa_2005_pt1_pdf_Part11.pdf	24767423 685927a84193b1a20b3798686417dea11490a0c9	no	12
Warnings:					
Information:					
4	Non Patent Literature	Schwartz_Org_Edit_Photos_Picasa_2005_pt1_pdf_Part12.pdf	25130451 ac080b80471790aae67bcca2184db5406c13956c	no	12
Warnings:					
Information:					
5	Non Patent Literature	Schwartz_Org_Edit_Photos_Picasa_2005_pt1_pdf_Part13.pdf	16508753 3a59815a0822cff9f0f4519c9b0deb4cba7837ee	no	8
Warnings:					
Information:					
6	Other reference-Patent/Application/ Search Documents	FILE_HISTORY_EP09727165_49 pages.pdf	1980112 bbe6488f89dac81d0f70193fddd9caab5d534552	no	49
Warnings:					
Information:					
7	Foreign Reference	JP2005242436A_w_Eng_Translation.pdf	2714750 b1d99bef4c10a2ba8e23c421ab990f64738f5e46	no	28
Warnings:					
Information:					
8	Other reference-Patent/Application/ Search Documents	L203970001EP00_Comm_dated_11-23-2015.pdf	155280 b4a3876aeda38fa602d6c313e827d76734a5fb60	no	5
Warnings:					
Information:					

9	Other reference-Patent/Application/ Search Documents	L203970001EP00_ER_dated_11-22-2016.pdf	275378 1a03a118ef3072b41500d8683afa39c741779435	no	8
Warnings:					
Information:					
10	Other reference-Patent/Application/ Search Documents	L203970001WO00_ISRWO_mailed_06-03-2009.pdf	845912 bc7a4f7df73cce3f1f8bcf5c8728bc7509f4324b	no	12
Warnings:					
Information:					
11	Other reference-Patent/Application/ Search Documents	L203970004EP00_EESR_mailed_04-05-2011.pdf	229033 5120e937826ce621e4be96bfc191699dcb4a9cbb	no	7
Warnings:					
Information:					
12	Other reference-Patent/Application/ Search Documents	L203970004EP00_ER_dated_01-17-2017.pdf	287260 faf1a12be4f9df0bc4b8e5702740bf64cc3a11ea	no	8
Warnings:					
Information:					
13	Other reference-Patent/Application/ Search Documents	L203970004EP01_Communication_Dated_09-13-2021.pdf	253485 0aa73cf778f74306fc3997cb9a9408dec15ecf26	no	7
Warnings:					
Information:					
14	Other reference-Patent/Application/ Search Documents	L203970004EP01_EESR_dtd_02-03-2020.pdf	240667 81b9c0f4b4f3764da7c8387a3a856101751417c7	no	8
Warnings:					
Information:					
15	Other reference-Patent/Application/ Search Documents	L203970004WO00_IPRP_mailed_10-14-2010.pdf	1189961 ee8a0fdcc4bd12dde42f949b409e616bc646ff4a	no	8
Warnings:					
Information:					

16	Other reference-Patent/Application/ Search Documents	PCTUS200939117_ISRWO_dtd_ 09-28-2009.pdf	168350 8967b7c54a0353ae407b94c0cc6f9d3ead8025e2	no	4
Warnings:					
Information:					
17	Other reference-Patent/Application/ Search Documents	FILE_HISTORY_8624844_1439pages_Part1.pdf	20964227 8eefa8f6bab53d37de147a2745e6345fd196ca92	no	480
Warnings:					
Information:					
18	Other reference-Patent/Application/ Search Documents	FILE_HISTORY_8624844_1439pages_Part2.pdf	20941762 3147c73c82d15ba8553e26e6daf00fdadb16aa24	no	455
Warnings:					
Information:					
19	Other reference-Patent/Application/ Search Documents	FILE_HISTORY_8624844_1439pages_Part3.pdf	20929897 f3c1fc4a81a22f0d5249dc8e5b3c83fc62d9aa32	no	409
Warnings:					
Information:					
20	Other reference-Patent/Application/ Search Documents	FILE_HISTORY_8624844_1439pages_Part4.pdf	4018910 25061ea944e0200df1c9fee7129a7b2f15fa173a	no	95
Warnings:					
Information:					
		Total Files Size (in bytes):	189546058		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

FORM PTO-1449/A and B (modified PTO/SB/08)	APPLICATION NO.: 90/014,965	ATTY. DOCKET NO.: L2039.70001US10
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	FILING DATE: February 25, 2022	CONFIRMATION NO.: 3442
	FIRST NAMED INVENTOR: Yves Behar	
Sheet 1 of 16	GROUP ART UNIT: 3992	EXAMINER: C. Y. Leung

U.S. PATENT DOCUMENTS

Examiner's Initials #	Cite No.	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication or Issue of Cited Document MM-DD-YYYY
		Number	Kind Code		
		D333,636		Issa	03-02-1993
		D391,927		Faranda et al.	03-10-1998
		D392,944		Issa	03-31-1998
		D395,868		Iino	07-07-1998
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		D462,069		Gatto	08-27-2002
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		D491,177		Andre et al.	06-08-2004

EXAMINER:	DATE CONSIDERED:

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

FORM PTO-1449/A and B (modified PTO/SB/08)	APPLICATION NO.: 90/014,965	ATTY. DOCKET NO.: L2039.70001US10
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	FILING DATE: February 25, 2022	CONFIRMATION NO.: 3442
	FIRST NAMED INVENTOR: Yves Behar	
Sheet 2 of 16	GROUP ART UNIT: 3992	EXAMINER: C. Y. Leung

		D491,936		Jao	06-22-2004
		D494,162		Kondo	08-10-2004
		D495,674		Yoo et al.	09-07-2004
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		5,825,352		Bisset et al.	10-20-1998

EXAMINER:	DATE CONSIDERED:

[#] EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.

FORM PTO-1449/A and B (modified PTO/SB/08)	APPLICATION NO.: 90/014,965	ATTY. DOCKET NO.: L2039.70001US10
INFORMATION DISCLOSURE STATEMENT BY APPLICANT	FILING DATE: February 25, 2022	CONFIRMATION NO.: 3442
	FIRST NAMED INVENTOR: Yves Behar	
Sheet 3 of 16	GROUP ART UNIT: 3992	EXAMINER: C. Y. Leung

		5,841,631		Shin et al.	11-24-1998
		5,847,698		Reavey et al.	12-08-1998
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		5,926,364		Karidis	07-20-1999
		5,949,643		Batio	09-07-1999
		5,986,634		Alioshin et al.	11-16-1999
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		8,284,714		Ray	10-09-2012
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		JP	11-296259		Canon Inc.	10-29-1999	Y; Abstract Only
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EXAMINER:	DATE CONSIDERED:

[#] EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to Applicant.

FORM PTO-1449/A and B (modified PTO/SB/08) **INFORMATION DISCLOSURE STATEMENT BY APPLICANT**				APPLICATION NO.: 90/014,965	ATTY. DOCKET NO.: L2039.70001US10
				FILING DATE: February 25, 2022	CONFIRMATION NO.: 3442
				FIRST NAMED INVENTOR: Yves Behar	
Sheet	14	of	16	GROUP ART UNIT: 3992	EXAMINER: C. Y. Leung

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FORM PTO-1449/A and B (modified PTO/SB/08)				APPLICATION NO.: 90/014,965	ATTY. DOCKET NO.: L2039.70001US10
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				FILING DATE: February 25, 2022	CONFIRMATION NO.: 3442
				FIRST NAMED INVENTOR: Yves Behar	
Sheet	15	of	16	GROUP ART UNIT: 3992	EXAMINER: C. Y. Leung

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FORM PTO-1449/A and B (modified PTO/SB/08)				APPLICATION NO.: 90/014,965	ATTY. DOCKET NO.: L2039.70001US10
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				FILING DATE: February 25, 2022	CONFIRMATION NO.: 3442
				FIRST NAMED INVENTOR: Yves Behar	
Sheet	16	of	16	GROUP ART UNIT: 3992	EXAMINER: C. Y. Leung

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[NOTE – No copies of U.S. patents, published U.S. patent applications, or pending, unpublished patent applications stored in the USPTO's Image File Wrapper (IFW) system, are included. See 37 CFR § 1.98 and 1287OG163. Copies of all other patent(s), publication(s), unpublished, pending U.S. patent applications, or other information listed are provided as required by 37 CFR § 1.98 unless 1) such copies were provided in an IDS in an earlier application that complies with 37 CFR § 1.98, and 2) the earlier application is relied upon for an earlier filing date under 35 U.S.C. § 120.]

EXAMINER:	DATE CONSIDERED:

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

DOCKET NO.: L2039.70001US10

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor:	Yves Behar
Application No.:	90/014,965
Confirmation No.:	3442
Filed:	February 25, 2022
For:	PORTABLE COMPUTER WITH MULTIPLE DISPLAY CONFIGURATIONS
Examiner:	Christina Y. Leung
Art Unit:	3991

Certificate of Electronic Filing under 37 C.F.R. § 1.8
I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being transmitted via the Office's electronic filing system in accordance with 37 C.F.R. § 1.6(a)(4).

Dated: December 9, 2022 Electronic Signature for Jennifer A. Weaver: /Jennifer A. Weaver/

MAIL STOP AMENDMENT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

STATEMENT FILED PURSUANT TO THE DUTY OF DISCLOSURE UNDER 37 C.F.R. §§ 1.56, 1.97 AND 1.98

Sir:

Pursuant to the duty of disclosure under 37 C.F.R. §§ 1.56, 1.97 and 1.98, the undersigned requests consideration of this Information Disclosure Statement.

PART I: Compliance with 37 C.F.R. § 1.97

This Information Disclosure Statement has been filed more than three months after the filing date of this application and after the mailing date of a first Office Action, but before the mailing date of any of a Final Action under 37 C.F.R. § 1.113, a Notice of Allowance under 37 C.F.R. § 1.311, or an action that otherwise closes prosecution in this application.

Please charge our Credit Card in the amount of $260.00 covering the fee set forth in 37 C.F.R. § 1.17(p).

PART II: Information Cited

The undersigned hereby makes of record in the above-identified application the information listed on the attached form PTO-1449 (modified PTO/SB/08). The order of presentation of the references should not be construed as an indication of the importance of the references.

PART III: Remarks

Documents cited anywhere in the Information Disclosure Statement are enclosed unless otherwise indicated. It is respectfully requested that:

1. The Examiner consider completely the cited information, along with any other information, in reaching a determination concerning the patentability of the present claims;

2. The enclosed form PTO-1449 (modified PTO/SB/08) be signed by the Examiner to evidence that the cited information has been fully considered by the United States Patent and Trademark Office during the examination of this application;

3. The citations for the information be printed on any patent which issues from this application.

By submitting this Information Disclosure Statement, the undersigned makes no representation that a search has been performed, of the extent of any search performed, or that more relevant information does not exist.

By submitting this Information Disclosure Statement, the undersigned makes no representation that the information cited in the Statement is, or is considered to be, material to patentability as defined in 37 C.F.R. § 1.56(b).

By submitting this Information Disclosure Statement, the undersigned makes no representation that the information cited in the Statement is, or is considered to be, in fact, prior art as defined by 35 U.S.C. § 102, or an admission by Applicant as prior art.

Notwithstanding any statements by the undersigned, the Examiner is urged to form his or her own conclusion regarding the relevance of the cited information.

An early and favorable action is hereby requested.

The Director is hereby authorized to charge any deficiency or credit any overpayment in the fees occasioned by the filing of this Information Disclosure Statement to our Deposit Account No. 23/2825 under Docket No. L2039.70001US10 from which the undersigned is authorized to draw.

Respectfully submitted,

Electronic signature: /Edward J. Russavage/
Edward J. Russavage
Registration No.: 43,069
Richard F. Giunta
Registration No.: 36,149
WOLF, GREENFIELD & SACKS, P.C.
600 Atlantic Avenue
Boston, Massachusetts 02210-2206
617.646.8000

Docket No.: L2039.70001US10
Date: December 5, 2022

CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §1.248 and §1.550(f), the undersigned hereby certifies that a copy of this **Statement Filed Pursuant to the Duty of Disclosure Under 37 C.F.R. §§ 1.56, 1.97 AND 1.98**, in Reexamination No.: 90/014,965, including all attachments, exhibits, and documents filed therewith, will be served by first-class mail upon:

KLARQUIST SPARKMAN, LLP
121 SW SALMON STREET
SUITE 1600
PORTLAND, OR 97204

Dated: December 5, 2022

/MacAulay Rush/
MacAulay Rush
Patent Paralegal
WOLF, GREENFIELD & SACKS, P.C.

Electronic Acknowledgement Receipt

EFS ID:	47180079
Application Number:	90014965
International Application Number:	
Confirmation Number:	3442
Title of Invention:	Portable Computer with Multiple Display Configurations
First Named Inventor/Applicant Name:	8624844
Customer Number:	23628
Filer:	Edward J. Russavage/Jennifer Weaver
Filer Authorized By:	Edward J. Russavage
Attorney Docket Number:	
Receipt Date:	09-DEC-2022
Filing Date:	25-FEB-2022
Time Stamp:	17:09:01
Application Type:	Reexam (Third Party)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	L203970001US10-TRN-EJR.pdf	25776 abb8b7daa7ccb8efdd56c94a4cf0afbd4f697d0f	no	1

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45	Other reference-Patent/Application/ Search Documents	IPR202100821_Lenovo_v_Litl_US_8612888_04-27-2021_Part1.pdf	14708279 5187cd6ca029ea0509e88671978ac6a2d798aaf6	no	70
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46	Other reference-Patent/Application/ Search Documents	IPR202100821_Lenovo_v_Litl_US_8612888_04-27-2021_Part2.pdf	15930750 087a394126ace3e9c754bbccf0d9e7c3b5125339	no	58
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47	Other reference-Patent/Application/ Search Documents	IPR202100822_Decision_Denying_10-21-2021_15pgs.pdf	538475 203351bac3e5d3cb3b418cb7dce0dcc6ea4fd395	no	15
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48	Other reference-Patent/Application/ Search Documents	IPR202100822_Lenovo_v_Litl_US_8624844_05-04-2021.pdf	12327528 a7e7c28183eba2c69be0ad85963e0b73c596a073	no	121
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49	Other reference-Patent/Application/ Search Documents	IPR202101011_Microsoft_v_Litl_US_8577957_05-25-2021.pdf	6124287 377576d6d0f3e2f7928a7dbaefaec0e08061cddf	no	89
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50	Non Patent Literature	1_No_Author_Listed_Dell_Latitude_XT_Tablet_2007_17pgs.PDF	2802908 51789c54f5c05958d708ee6d08039348c635b2a9	no	17
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51	Non Patent Literature	2_No_Author_Listed_Wikipedia_Environment_Variable_6pgs.PDF	212507 a7280edecdf96ce756efe62af9ae3b63707c606d	no	6
Warnings:					
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52	Non Patent Literature	3_No_Author_Listed_HP_Compaq_PC_TC1100_QuickSpecs_2005_24pgs.PDF	1195752 2ba3369a3c381f636f6de2e7ede768895e478309	no	24
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53	Non Patent Literature	5_No_Author_Listed_Lenovo_ThinkPad_X61_Tablet_Trblsht_Guide_2007_80pgs.PDF	750948 5a3559d6f25bbfe9fd74e04417ad35f121d9d149	no	80
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54	Non Patent Literature	6_No_Author_Listed_Microsoft_Digital_Image_Suite_Users_Manual_2005.PDF	4874768 5d16acc6536252fe8744d24dd344c1597af6c7df	no	294
Warnings:					
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55	Non Patent Literature	7_No_Author_Listed_MotionComp_M1400_Addendum_2004.PDF	211673 da6bac7c26d283ede51a9b9aa3777e53529e59bf	no	5
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56	Non Patent Literature	8_No_Author_Listed_Motion_Comp_M1400_Tablet_User_Guide_2004.PDF	1870062 f3f6e41b801315748b46bb1ffc5498190125247f	no	89
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Information:					
57	Non Patent Literature	4_No_Author_Listed_Show_Desktop_icon_missing_Wayback_2007.pdf	135408 e71ab481668f8b8c23a5d09f4aca8ff049476e90	no	1
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58	Information Disclosure Statement (IDS) Form (SB08)	L203970001US10-IDS1449-EJR.pdf	162179 01ac2fb49649031bc69a4e7bcab08e6e76263188	no	16
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59		L203970001US10-IDSBODY-EJR.pdf	32809 2121037bca1c47ad33966b2a06c2b7b31f2732ae	yes	4

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TRANSMITTAL FORM

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Total Number of Pages in This Submission	

Application Number	90/014,965-Conf. #3442
Filing Date	February 25, 2022
First Named Inventor	Yves Behar
Art Unit	3991
Examiner Name	C. Y. Leung
Attorney Docket Number	L2039.70001US10

ENCLOSURES (*Check all that apply*)

- [X] Fee Transmittal Form
  - [ ] Fee Attached
- [ ] Amendment/Reply
  - [ ] After Final
  - [ ] Affidavits/declaration(s)
- [ ] Extension of Time Request
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- [x] Information Disclosure Statement
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- [ ] Reply to Missing Parts/ Incomplete Application
  - [ ] Reply to Missing Parts under 37 CFR 1.52 or 1.53
- [ ] Drawing(s)
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- [ ] After Allowance Communication to TC
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- [ ] Proprietary Information
- [ ] Status Letter
- [x] Other Enclosure(s) (please Identify below):

Form PTO-1449
Copies of cited references

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	WOLF, GREENFIELD & SACKS, P.C.		
Signature	/Edward J. Russavage/		
Printed name	Edward J. Russavage		
Date	December 5, 2022	Reg. No.	43,069

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FEE TRANSMITTAL

Complete if known	
Application Number	90/014,965-Conf. #3442
Filing Date	February 25, 2022
First Named Inventor	Yves Behar
Examiner Name	C. Y. Leung
Art Unit	3991
Practitioner Docket No.	L2039.70001US10

☐ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entity status. See 37 CFR 1.29. Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

TOTAL AMOUNT OF PAYMENT ($)260.00

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FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES (U = undiscounted fee; S = small entity fee; M = micro entity fee)

	FILING FEES			SEARCH FEES			EXAMINATION FEES			
Application Type	**U ($)**	**S ($)**	**M ($)**	**U ($)**	**S ($)**	**M ($)**	**U ($)**	**S ($)**	**M ($)**	**Fees Paid ($)**
Utility	320	160*	80	700	350	175	800	400	200	
Design	220	110	55	160	80	40	640	320	160	
Plant	220	110	55	440	220	110	660	330	165	
Reissue	320	160	80	700	350	175	2,320	1,160	580	
Provisional	300	150	75	0	0	0	0	0	0	

* The $160 small entity status filing fee for a utility application is further reduced to $80 for a small entity status applicant who files the application via EFS-Web.

2. EXCESS CLAIM FEES

Fee Description	**Undiscounted Fee ($)**	**Small Entity Fee ($)**	**Micro Entity Fee ($)**
Each claim over 20 (including Reissues)	100	50	25
Each independent claim over 3 (including Reissues)	480	240	120
Multiple dependent claims	860	430	215

Total Claims	**Extra Claims**	**Fee ($)**	**Fee Paid ($)**
_____ - 20 or HP =	_____ x	_____ =	_____

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims	**Extra Claims**	**Fee ($)**	**Fee Paid ($)**
_____ - 3 or HP =	_____ x	_____ =	_____

HP = highest number of independent claims paid for, if greater than 3.

Multiple Dependent Claims	**Fee ($)**	**Fee Paid ($)**
	_____	_____

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $420 ($210 for small entity) ($105 for micro entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	**Extra Sheets**	**Number of each additional 50 or fraction thereof**	**Fee ($)**	**Fee Paid ($)**
_____ - 100 =	_____ /50 =	_____ (round **up** to a whole number) x	_____ =	_____

4. OTHER FEE(S)

	Fees Paid ($)
Non-English specification, $130 fee (no small or micro entity discount)	
Non-electronic filing fee under 37 CFR 1.16(t) for a utility application, $400 fee ($200 small or micro entity)	
Other (e.g., late filing surcharge): 1806 Submission of an Information Disclosure Statement	260.00

SUBMITTED BY

Signature	/Edward J. Russavage/	Registration No. (Attorney/Agent)	43,069	Telephone	617.646.8000
Name (Print/Type)	Edward J. Russavage			Date	December 5, 2022

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DESCRIPTION CN1292112

Technical Field

The present invention relates to a display device, specifically, the present invention relates can be like a book by using can

Open the display data and allows the user to display device users really flip the page feeling.

Background Art

A conventional portable display apparatus press the Prev button or rearwardly page display electronic books, etc.

Button to turn the pages.

Japanese Patent No. 258076 (Japanese Patent Publication No. 2-230313) discloses a browser installed

Set it to issue commands to page through the user rotates the rotation detector.

This Japanese patent also discloses the use of

On an instruction by the pressure detector flip.

According to Japanese Patent browse the direction and speed by

To browse the pressure between the pressure detector to the browser of the pressure detector and negative Poor OK.

Above this patent

Also disclosed for the page by using the a curvature detector and a switch instruction.

According to this patent, the browser

Speed calculated based on the curvature of the curvature detector detected size, while browsing the direction based on the switching

Status determination.

Japanese Patent Publication No. 2-148257 discloses a portable document processor having a phase

When in a display screen.

This processor through the display to the previous page key to making it equivalent to a

The data read out from the memory 3 and reads out the display data stored in the display buffer memory 3.

Because

Here, equivalent to the one of the display data is stored in the display buffer memory 3, in order to display a number of pages

According to the display.

In this way, users like the user through flip to reading as to read the file.

Japanese Patent Publication No. 63-116287 discloses a display device, which has two open display

The display screen.

The user can input by operating a key to flip.

Above mentioned device is turned by pressing a button or turn a wheel (roller)

Page, which is different from a book or magazine page.

In this case, e-books are not giving a true

Positive to turn the pages of the printed book or magazine by the paper, plastics, etc. feeling as to read.

If you do not have a finger touch button or scroll wheel to be able to flip, it would be very convenient.

The above browsing means and the portable document processor only one display screen, which is not convenient means

Use.

Although the above-described display device has two display screens, but as a whole of the screen are not

Can be folded back to back up and use.

As a result, the display device is accounted for a larger place, making it difficult to grip

In the hand, resulting in the problem of portability.

Even if the display apparatus can be folded back to back from

, But the data is always also cause information leakage users to watch on the screen, as well as electric

Source of waste.

In addition, since the above display apparatus can not be folded back to back up, if the means for

Playing game sex games, for example, the kind of a player is best not shown his cards game, the players

It can not be a secret to conceal its brand of home.

Disclosure of the Invention

Accordingly, an object of the present invention is to provide a way to turn the page of the electronic book display apparatus in order to

Printed, such as paper, plastic sheet or magazine page real by giving a flip feeling.

It is another object of the present invention to provide a flip display device, which through the same

An operation will not only be able to give people the feeling really ruffled a book page, but a page flip

And the ability to continuously flip.

Still another object of the present invention is to provide a display device, even if the user does not move as hand and hand

Refers to such a pointer to the button, it is possible to flip.

Another object of the present invention is to provide a can be folded back to back, form, and can

Display device in hand, it has a small size, easy to carry, low energy consumption and suited to play the game

Sex games.

Is another object of the present invention further provides a display device, it is to prevent information leakage

Advantages, and low energy consumption.

According to an aspect of the invention, the display device comprising: a memory for storing information; display,

For displaying information; the flip instruction unit, for detecting an instruction unit own inclined to output

A detection signal; indicates that the direction of inclination, and a display control unit for the instruction unit from the flip

Receiving instructions, in order to read from the memory according to the direction of said inclined Next or Previous Letter

Interest rates, and the read information is displayed on the display.

In response to the sliding of the user's finger or hand on top of the flip instruction unit, the display control unit to turn a

Page.

In this way, the user can be if the user is a real hand turn pages to flip.

In accordance with another aspect of the invention, the display apparatus comprising: a memory for storing information; monitors

For displaying information; next page instruction unit, for detecting a pointer moving direction, and to output an indication to the

The moving direction of the detection signal;, and a display control unit for the instruction unit receives an instruction from the next page,

In order according to the direction of movement to the next or previous page read from the memory information, and in significant

The indicator displayed on the information read.

In response to such a movement of the pointer such as a user's finger or hand on top of the next page instruction unit, the display

The control unit turned one.

In this way, the user is able to if the user is in really hand turned one page

The land next page.

The display control unit preferably includes a unit for the instruction from the the flip instruction unit receives, from the root

A storage determined by the length of time of the instruction unit according to the direction of pointer movement in contact and pointer flip

The device information, the reading of the information of the next or previous page, and the read information is displayed on the display.

Display control unit according to the pointer contact with the flip instruction unit changes in the length of time of the page to be turned

Number.

Thus, pages can be one in the same operation as a flip, also can continuously Goto.

According to another aspect of the invention, further, the display device including: a memory for storing information; display

For displaying information; flip instruction unit, for detecting the position of the pointer in contact, to output a

Two directions of the touch position detection signal; as well as a display control unit for the unit receives from the flip instruction

Instructions so that, based on a change of position of the pointer contact, read from the memory Next or Previous of

Information, and the read information is displayed on the display.

User contact page by using a pointer the instruction unit twice to turn a.

Page according to the direction of

Determined by the change of the touch position.

In this way, the user is able to if the user is really hand turned one page

Like to flip.

According to another aspect of the invention, the display device comprising: a memory for storing information; from to

At least two openable and closable screen configuration of a display for displaying information; flip instruction single

Element for detecting ON / OFF operation of the monitor, to output a detection signal; and a display control unit

Element for flip instruction unit receives an instruction, so that according to the ON / OFF operation is detected, the switching

Is displayed on the display of the information.

The user can display the ON / OFF operation flip.

Thus, the display device at the same time in the hand,

Can not move like hands and fingers like a pointer to the button on the next page.

According to the further of the present invention, on the other hand, the display device comprising: a memory for storing information; significant

Shown, for displaying information; speaker, for outputting sound; flip instruction unit for transmitting a

Instructions, in order to switch the display of the information on the display; display control unit for single flip instruction

Receives an instruction to switch the display of the information on the display; well connected to the display control unit

The sound output control unit, for turning paper based on the switching information is displayed on the display output from the speakers

Sound.

The sound output control unit in the next page while the voice output reversing sheet.

In this way, the user can be good

Feeling like the user to turn pages flip.

The speaker is preferably constituted by at least two speakers.

A sound output unit and a display control unit phase

A circuit connected to the output from the speaker based on the switching information is displayed on the display turned paper sound,

And according to the direction of the switching information, the output changing sound volume at the same time, from at least two speakerphones

Sound output device.

According to the direction of the next page by the user, the voice of the inverted paper generated in the manner of moving the center of the sound.

This

Like the user if the user really turn a sheet of paper the same feeling flip.

According to the further of the present invention, on the other hand, the display apparatus comprising: a memory for storing information; by

At least two openable and closable screen configuration of a display for displaying information; rotational angle of the subject

Measurement means for the rotational angle of the detection display; well connected to the display of the rotation angle detection unit

A control unit to control whether the display is used according to the rotational angle of the display provides a display.

The display control unit when the user back to back folding the monitor, it is possible to generate a control to induce

The screen is not viewed by the user does not provide a display.

Therefore, in the prevention of information leakage can be provided a

Have the advantage of the display device.

Can also reduce the energy consumption of the display device.

Can also provide a more

Plus portable, capable by the user freely rotatable, so that even if the display apparatus accounts for fewer places

Households are also able to watch the display apparatus of the advantages of the display monitor.

The display device preferably includes a fixing unit for the monitor is fixed in a predetermined range of a

A rotation angle.

The user can mount the monitor in a predetermined range of a rotational angle.

Thus, the user can

Play the license does not allow the user to leak to the game home game.

According to the further of the present invention, on the other hand, the display apparatus comprising: a memory for storing information; by

At least two openable and closable screen configuration of a display for displaying information; has at least two

Graphical input panel unit constituted by the configuration of the component parts corresponding to the respective display screen, means for detecting

A needle contact area of the display; as well as the display control unit connected to the tablet for

Control whether the display the tablet unit area pointer contact display.

Display the graphic input of the control unit according to the pointer such as a finger in contact the surface of the plate element

Plot, to determine that one of the monitor screen being viewed by the user, in order to not be viewed on the screen does not

Providing display.

Therefore, it is possible to provide a display device has an advantage in the prevention of information leakage.

Also

Can reduce the energy consumption of the display device.

BRIEF DESCRIPTION

Figure 1 shows a block diagram showing a configuration of a display device of the first embodiment of the present invention.

Figure 2 is a diagram showing the appearance of a display device of the first embodiment of the present invention.

Figure 3 is a sectional view of the flip instruction unit.

Figure 4 is an equivalent circuit diagram of the flip instruction unit.

Shown in Figure 5 is a block diagram showing a configuration of a display device of the second embodiment of the present invention.

Figure 6 illustrates the appearance of a display device of the second embodiment of the present invention.

Figures 7 and 8, shown is a flowchart of the page turning processing.

Figure 9 illustrates the appearance of the display apparatus having a touch position of the detector.

Figure 10 diagrammatically represents the flip effective region of the touchpad.

Figure 11 shows a block diagram showing a configuration of the display device of the third embodiment of the present invention.

Figure 12 illustrates the appearance of the display apparatus of the third embodiment of the present invention.

Figure 13 illustrates the structure of the tilt detector.

Figure 14 is a diagram showing a page turning processing flowchart.

Shown in Figure 15 is a block diagram showing a configuration of the display device of the fourth embodiment of the present invention.

Figure 16 illustrates the appearance of the display apparatus of the fourth embodiment of the present invention.

Figure 17 illustrates a flowchart of processing of the sound output.

Shown in Figure 18 is a block diagram showing a configuration of the display device of the fifth embodiment of the present invention.

Figure 19 is a diagram showing the appearance of the display device of the fifth embodiment of the present invention.

Figure 20 shown from the side of the display device.

Figure 21 illustrates the structure of the switch and the switch extrusion.

Figure 22 shows a state that is applied to the pressure on the switch shown in Figure 21 and the switch.

Figure 23 illustrates that the next page of the instruction unit.

Figure 24 illustrates the structure of the switch and the switch extrusion.

Figure 25 shows a state applied to the pressure on the switch shown in Figure 24, and the switch.

Figure 26 shows the state of the switch that generated by the switching state is formed in Figure 25.

Figures 27 and 28 are a graphical representation of the flip instruction unit.

Figure 29 shows a block diagram showing a configuration of a sixth embodiment of the display device of the present invention.

Figure 30 shows the structure of the first switch and the first switch extruder.

Figure 31A shows a state of the first switch.

Figure 31B shows a state of the second switch.

Figure 32 diagrammatically shows the relationship between the first and second state of the switch, as well as in flat panel displays

4A and 4B, the display on the state.

Figure 33 is a block diagram showing a configuration of the seventh embodiment of the present invention the display device.

Figure 34 is a diagram showing the structure of a switch with a first and second switch extrusion device.

Figure 35 is a block diagram showing a configuration of the display apparatus of the eighth embodiment of the present invention.

Figure 36 shows the appearance of the display apparatus of the eighth embodiment of the present invention.

Figure 37A shows the appearance of the display device of the open.

Figure 37B diagrammatic representation of the area of finger contact with the flat panel display is folded back to back.

Figure 38 from the side shows a closed when the display device.

Figure 39 a graphical representation of the shape of the contact in the switch status, pointers, and the flat panel display 4A and 4B

State as well as the relationship between the display state on the flat panel display 4A and 4B.

Figure 40 is a block diagram showing a configuration of the display device of the tenth embodiment of the present invention.

Figure 41 shows the state of the third switch.

Figure 42 is a diagrammatic representation in the first to third switching state in the flat panel display 4A and 4B

The relationship between the state is displayed.

Figure 43 shows the appearance of the flat panel display is folded back to back, 4A and 4B.

Figure 44 shows the structure of the third switch and the third switch extruder.

Figure 45 shows a flat panel display with a nail and a flat panel display with a hook

The appearance of the display apparatus.

Figure 46 shows the appearance of a display device, the display device is applied to a layer of non-slip outer

Shell.

Figure 47 is a diagram showing an appearance of a display device, the display device installed in a non-slip

Base.

Figure 48 is a block diagram showing a structure of a display device of the eleventh embodiment of the present invention.

Figure 49 is a diagram showing the structure of a switch and the first to third switching extruder.

Preferred embodiment of the present invention is implemented

First Example

Referring to Figure 1, the first embodiment of the display device 1 includes: a memory 3, which consists of as the semiconductor memory

Memory, hard disk, MO (Magneto-Optical, magneto-optical disc) as a magnetic storage device is configured

Into, for storing image information, character information, etc.; flat panel display 4 by the liquid crystal panel, a PDP (the Plasma

Display Panel, the plasma display panel) and the like constructed from, for displaying image information, character

Information, etc.; display control unit 2, for controlling the image information stored in the memory 3, character information

Information, etc. read, and the read information is displayed on the flat panel display 4; flip instruction unit 5,

Flip instructions for receiving from the user, the display control unit 2 so as to indicate the next page.

After this the user includes in addition to the the software dynamic of animals such as humans outside (software

agent), such as robots like artificial limbs.

Referring to Figure 2, the display device 1 of the display 4 of the two plates and two flip instruction unit 5.

The number of the flat panel display 4 and flip instruction do not limit the number of unit 5 into two, may be one,

Can also be at least three.

If the number of flat panel displays and flip instruction unit 5 are two or

More, then they can be configured when they are not being used, and open into a use state of the display

And instruction unit is folded up.

Although Figure 2 illustrates a flat display put into a back-to-back 4, but

This arrangement is not limiting this form.

The flip instruction unit 5 is arranged in an edge of the display device 1.

The display control unit 2 and the memory

3 is mounted on the display device 1.

Figure 3 is a a cross-sectional view of the flip instruction unit 5 in Figure 2 along the line III-III.

Page instruction unit

5 constructed from the following parts: a support shaft 5d, around the switch 5d rotating columnar-shaped object being

5c, the contacts 5a 'and 5b'.

The switch 5c on two opposite sides of the contacts 5a and 5b.

In Figure 3 in the open

OFF 5c, 5d around the supporting shaft is rotated counterclockwise to allow the contacts 5a and 5a 'to achieve mutual contact.

In

In Figure 3, the switch 5c around the supporting shaft 5d rotated clockwise to allow contact 5b and 5b ', in a mutually connected

Touch state.

The switch 5c is supported by a spring (not shown), and when the contacts are not in contact with each other, are stable

's.

The surface of the switch 5c is covered film on the layer of pieces of rubber, silicon, plastics, etc. 5E.

Therefore, flip

The instruction unit 5 is reinforcement, any electrical damage could have been avoided, and external substances like dust like

Can not enter the display device 1.

Figure 4 is a next page equivalent circuit diagram of the instruction unit 5.

The instruction unit is configured so as to satisfy: when the touch

Point 5b and 5b 'contact with each other, the contacts 5a and 5a' mutual contact.

When all the contacts are not relative

Contact with each other, often is a stable state.

When the mutual contact of contacts 5a and 5a 'Be, 5a "point

A voltage change.

When the mutual contact, contact 5b and 5b ', 5b "point of the voltage change.

Noticeable

The display control unit 2 is detected by a voltage change at the point 5a "and point 5b" flip

instruction.

Referring again to Figure 3, the user flip instruction unit 5, the upper left and lower right corner of the sliding finger or

Hand.

Therefore 5c is rotated.

Here term also refers to "slide" in close 5a and 5b any position,

With your fingers or hands on.

In other words, the term refers to a similar hand turned the paper printed book

Operation.

The rotation of the switch 5c procure a voltage change in the point 5a "5b", and thus the display control unit

2 is able to detect the user in the desired direction.

For example, when the user on the left page instruction unit 5 upper right slide within the fingers or hands, the display control

System unit to move forward flip.

Slide your finger or hand 5 top left of the page on the right when the user command unit

, The display control unit 2 back flip.

Therefore, users like real paper in hand turned

Perform next page.

When the user on the left page instruction unit 5 lower left slide within the fingers or hands, the display control unit

2 back flip.

When the user is on the right page instruction unit 5 bottom right of the slide your finger or hand,

the display

Control unit forward flip.

By the display control unit 2, such a control allows the user through the

Only one instruction unit 5 will be able to flip forward and back.

Therefore, the user can with one hand and flip.

Second Example

Referring to Figure 5, a second embodiment of a display device 11 includes: similar to the first embodiment of the deposit

Reservoir 3; similar to the first embodiment of the flat panel display 4; the display control unit 12 for controlling the

The picture information, character information and the like stored in the memory 3 to read, and to read the information in the Tablet

Display on the monitor 4; completely cover the flat panel display touchpad 15, placed into a 4, to receive from the

User to flip instruction, and send an instruction to the display control unit 12 in order to flip.

With reference to Figure 6, a second embodiment of the display device 11 in the embodiment includes a display 4, and two of the two plates

Touchpad 15.

15 back-to-back arrangement of the two sets of flat panel displays 4 and touchpad.

Flat display 4 and

The number of the touch panel 15 is not limited to two, and may be one, can also be at least three.

Display control

Unit 12 and the memory 3 is mounted on the display device 11.

The touchpad 15 is a detector detecting the position of contact by the pointer as a finger and a pen like.

The display control unit 12 is changed according to the length of time of the pointer is contacting the touch panel, the number of pages of the next page.

Referring to Figure 7, described by the display control unit 12 performs the flip control process.

Referred to here

The book was supposed to display on the right of the flat panel display 4, page numbers, the smaller one is written vertically.

If the display in the right flat panel displays 4, page numbers, the smaller one is the level of writing, before and after

The direction of mutual exchange.

Display control unit 12 determines whether the touch panel 15 detects a pointer like a finger and a pen or the like

Contact (S11).

If the touch pad 15 does not detect contact with the pointer ("NO" in S11),

Then the display control unit 12 repeats S11, the processing, until the touch pad 15 into contact with the pointer is detected.

When the touchpad 15 detects the contact with the pointer ("Yes" in S11), the display control unit

12 determines the pointer in the touch panel 15, the moving direction (S12).

If the pointer moves from left to right (in

S12 is "left to right"), and then turned in the forward direction, the display control unit 12 a (S13).

After this,

Display control unit 12 determines that the contact between the pointer with the touchpad 15 is a continuation of a predetermined time

The length or longer (S14), if the contact time between the pointer and the touch pad 15 is less than a predetermined

The length of time ("NO" in S14), the display processing in the control unit 12 repeats S14.

As

The contact time between the fruit pointer with a touch pad 15 is at least a predetermined length of time (in S14

"Yes"), then the display control unit 12 is then turned in the forward direction, a (S13).

When the pointer away from the touch

The plate 15 (in S14 touchpad 15 "), by the display control unit 12 executes the process ends.

If the pointer is right-to-left movement (in S12 "right to left"), the display control unit 12 in the

Turned a backwards direction (S15).

After this, the display control unit 12 determines that the pointer and the touch pad 15

The contact between the continuation of a predetermined length of time or longer (S16), if the pointer with the touch

The contact time between the plate 15 is less than a predetermined length of time ("NO" in S16), the display

The control processing unit 12 repeats S16.

If the pointer with the touch panel 15 between the contact time of at least

Is a predetermined length of time ("YES" in S16), the display control unit 12 and the rearward facing direction Total

A (S13).

When the pointer touchpad 15:00 (in S16 touchpad 15 ") by

The display control unit 12 executes the process ends.

Referring to Figure 8, the display control unit 12 may control the following description of the flip.

According to Figure 7 illustrates

Processing example, the user through the pointer is contacting the touch panel 15 and the moving contact with the touch panel 15 pointer,

Specifies the forward or backward direction.

According to the the processing practical cases illustrated in Figure 8.

Forward or rearward side

By moving the pointer, without the pointer contact with the touch pad 15 to specify.

The display control unit 12 determines whether the touch panel 15 detects contact (S40) with the pointer.

If

Touchpad 15 does not detect contact with the pointer (in S40, "NO"), the display control unit 12 by weight

Complex S40, processing until the touch panel 15 detects the contact with the pointer up.

If the touch pad 15 detects the contact with the pointer ("Yes" in S40), the display control unit

12 records the contact position, and determines whether there is between the touch panel 15 and the pointer to the second pick

Touch (S41).

If no second contact (in a predetermined time period or longer period of time within

S41 "No"), the end of the processing of the control unit 12 is displayed within a predetermined time.

When the touch pad 15 is detected with the pointer of the second contact ("Yes" in S41), the display control

Process unit 12 according to the direction of movement of a difference between the calculated first

and second touch position pointer to ensure

Set the moving direction (S42).

If the pointer moves from left to right (in S42, "left to right"), an explicit

The display control unit 12 is turned in the forward direction, a (S43).

After this, the display control unit 12 determines

The contact between the pointer and the touch pad 15 whether to extend a predetermined length of time or longer (S44),

If the contact time between the pointer and the touch pad 15 is less than a predetermined length of time (in S44

"No"), the display processing in the control unit 12 repeats S44.

If the pointer with the touchpad 15

The contact time is at least a predetermined length of time ("YES" in S44), the display control unit 12

Turn a page in the forward direction (S43).

When the pointer touchpad 15:00 ("left touch in S44

Moban 15 "), by the display control unit 12 executes the processing ends.

If the pointer is right-to-left movement (in S42, the "right to left"), the display control unit 12 in the

Turned a backwards direction (S45).

After this, the display control unit 12 determines that the pointer and the touch pad 15

Whether the contact between the continuation of a predetermined length of time or longer (S46), if the pointer with the touch

The contact time between the plate 15 is less than a predetermined length of time ("NO" in S46), the display

The control processing unit 12 repeats S46.

If the pointer with the touch panel 15 between the contact time of at least

Is a predetermined length of time ("YES" in S46), the display control unit 12 and the rearward facing direction Total

A (S43).

When the pointer touchpad 15:00 (in S46 touchpad 15 ") by

The display control unit 12 executes the process ends.

When the display device 11 shown in Figure 6, having a two-screen structure, the pointer and touchpad

15 between the first and second contact may be the same of the touchpad 15 impact.

Alternatively, means

The needle in the first contact with the left touch pad 15 contacts, while in the second contact with the right touchpad

15 contacts.

Through this operation, the user is able to if the user turned the same feeling of paper printed book

Next page.

If the first contact position is very close to the second contact position, in particular, for example, two

Times the distance between the touch position is 10 mm or smaller, and at the same time allows the pointer contact with the touch panel 15,

Then the display control unit 12 may determine that the user moves the pointer position, and according to the flow shown in Figure 7

Perform flip chart processing.

Reference to Figure 9, with the current being a notebook-type personal computer is used as a

touch position detection of the pointer device

16 alternative touchpad 15.

In this case, the touch position detector 16 and the flat panel display 14 is separated

Arrangements.

Referring to Figure 10, the touchpad 15 can have as part of a page active area 15a, the user can only

Only effective area by page 15a the issue next page directive.

Since this way, it is possible to prevent accidental finger

An erroneous operation caused by the contact.

Although the shape of the flip effective region 15a in Figure 10 is a triangle,

But the shape is not limited to this, and may be another polygon, arc, circle, etc..

Flip the effective area 15a

The position is not limited to the lower left and right, one-third of the strip can be equivalent to the bottom of the touchpad

Within the region.

Such as described above, the user can by using the pointer to the touch or move the pointer changes a.

Because

Here, the user is able to if the user turned the same feeling of paper printed book pages.

Will flip the pages according to the change in length of the contact time between the pointer and the touch pad 15.

Therefore,

The same kind of operation can achieve a one page can achieve the purpose of the continuous

page.

In addition, the flip-effective area 15a arrangements to prevent erroneous operation caused by casual contact fingers

For.

Third Example

Referring to Figure 11, the display control unit 21 according to the third embodiment including: similar to the first embodiment

The example of the memory 3; similar to the first embodiment of a flat panel display; the display control unit 22, with

The reading of the information for controlling the picture information, character information, etc. is stored in the memory 3 in operation, and a reading

The information is displayed on the flat panel display 4 operation, and the inclination of the detector 25 for transmitting page refers

Order to the display control unit 22.

Referring to Figure 12, according to a third embodiment of the display control unit 21 includes: two flat display 4

And two tilt detector 25, and the flat panel display 4 and the inclination of the detector 25 the two groups face

Surface arrangements.

The display controller 22 and the memory 3 is mounted in the display device.

The bits of the inclination of the detector 25

Set is not limited to, as shown in Figure 12.

From the characteristics of the inclination of the detector 25 is considered, the detector as possible

4 shaft away from the flat panel display.

Referring to Figure 13, the tilt detector 25 comprising: a hollow cylinder 25d; one package

Cylinder 25d of the conductive balls 25c; and electrodes 25a and 25b are mounted on the upper portion of the cylinder 25d.

Shown in Figure 13, when the inclination of the detector 25 is in the normal state ("off" state), the ball 25c

In the lower portion of the cylinder 25d, the ball 25c and the electrodes 25a and 25b are not in contact.

Rotation of the entire detector and

Due to tilting of the ball 25c is moved in the cylinder 25d and come into contact with an electrode mounted on the upper portion of the cylinder 25d

25a and 25b.

Result, the current flowing between the electrodes 25a and 25b, thereby detecting the inclination seized

The inclination of the measuring device 25 ("open" state).

Assumed here that, when the display control unit 121 is the open state shown in Figure 12, left and right

Inclination detector 25 are in the "off" state.

If the flat panel display 4 is a solid

Given, while the other flat panel display 4 is closed, turn opened, then one of the slope detector 25 to enter

"On" state.

Then the display control unit 22 is able to detect that the right and left flat-panel display 4

An open and close.

Referring to Figure 14, describes the processing of the flip control by the display control unit.

Shown in Figure 14

Processing referred to herein, it is assumed that book are displayed on the right side of the tablet on the display 4, page numbers, smaller

A vertical writing.

The display control unit 22 has been waiting to skew detector 25 into the "on" state (S21)

Ended.

When the state of the slope detector 25 becomes "ON" ("ON" in S21), the display control unit

Determine the right and left inclination of the detector 25 that is in the "open" (S22), if the left gradient

The detector 25 is in the "open" left "(S22), the display control unit 22 waits until the inclination seized

Measurement device 25 into the "off" state (S23).

When the state of the slope detector 25 becomes "OFF" (in

S25, is in the "Off"), the display control unit 22 controls a turning in the forward direction.

If the right side of the slope of the detector 25 becomes "ON" (S23 "right"), the display control unit

22 waits until the right side of the slope of the detector 25 becomes "OFF" state (S25).

When the inclination to the right

When the status of the detector 25 becomes "OFF" ("off") in S25, the display control unit 22 controls the

System moving in the direction of turn one.

Therefore, the user can open and close the display device to flip.

So in a user holding the display device

Set to 21 at the same time, do not move the hand or fingers to the button will be able to turn the

pages.

A fourth embodiment

Referring to Figure 15, according to the fourth embodiment of the display device 31 includes: image hard disk, MO such

Magnetic storage device constructed from a memory 33 for storing image information, character information, audio

Information, etc.; similar to the first embodiment of a flat panel display; display controller 32 for controlling the deposit

The picture information, character information and the like stored in the memory 3 to read, and to read the information in the flat panel display

Diagram 4 on the display; similar to the second embodiment of the touchpad 15; audio controller 36,

For reading data stored in the memory 3 of the sound information for the display controller 32 is turning in flat

When the page of information is displayed on the panel display 4 turn a sheet of paper, by the speaker 37 outputs sound.

Audio control

Made 36 different sounds flip speed output.

With reference to Figure 16, according to the fourth embodiment of the display device 31 includes: two flat display 4 and

Two touchpad 15, and the two groups of the flat-panel display 4 and the touch panel 15 is face to face arranged.

In addition,

Two loudspeakers 37 are placed in the left and right sides of the display device 31, respectively.

A display controller 32, the audio control

36 and the memory 33 is mounted on the inner 31.

Can use the generic switch instead of the touchpad 15.

Display controller 32 in a manner similar according to the described in conjunction with Figure 7 and 8, a second embodiment of explicit

The display device 1 of the display control unit 12 used in the control page.

The control description is not

Repeat here.

From the touch panel 15 to display controller 32, the pointer with the touchpad of 15

The contact between the information provided to the sound control unit 36.

With reference to Figure 17, describes the sound output control process carried out by the voice control unit 36.

Audio frequency

The controller 36 determines that the instruction refers to the flip by the touchpad 15 is normal flip or high-speed flip

(S31).

Normal page means just turned one, while the high-speed flip means continuous page, or both

Turned a few pages as a unit.

If the flip instruction refers to the normal flip (S31 is "normal"),

The audio controller 36 is read from the memory 33 the voice samples A (S32).

If the page directive refers to the

Is a high-speed page (S31 in the "high-speed"), the audio controller 36 to read from the memory 33 sound

Sample B (S33).

Sound sample A voice slowly turned a page, while the sound sample B flash

Over and skip the voice of a multi-page.

After the processing in S32 and S33, the audio controller 36 determines a direction to be chaona

Next page.

If the orientation of the page is being turned from left to right (in S34 "left to right"), then in S32

The sound data is read and the process of S33 of the sound center left to right (S35) moves lose

A.

If the orientation of the page is being turned from right to left (in S34, the "right to left"), then in S32, and

The processing of S33 of the read audio data to the sound center is from right to left (S35) mobile means output.

Here, the moving sound from left to right center refers to the operation of the output sound, it first left speaker 37

Send a large volume of the sound, the sound volume of the left speaker 37 is then gradually reduced, but the speaker

37 volume increases.

Right-to-left mobile voice center is the opposite way of operating.

As discussed above, the display device 31 is output while the flip operation reversing sheet acoustic

Different voices sound output, and based on the number of pages to turn.

Thus, the user is able to if the user turned

The same feeling of paper printed book page.

In addition, the display device 31 is changed in accordance with the next page in the direction the

balance of the output sound.

Whereby the user can

Enough like real hair books page.

The fifth embodiment

With reference to Figure 18, according to the fifth embodiment of the display device comprising: a memory 3; flat panel display 4;

Switch 46, for detecting a flat panel display 4, the opening degree (rotation angle); switch extruder 47

For extrusion switch 46; display control unit 42 for controlling the image information, character information, etc. is stored

In the read information in the memory 3, and the read information is displayed on the flat panel display 4, and the root

According to the state control of the switch 46 of the flat-panel display 4 display / not display; flip instruction unit 45, with

Flip command is received from the user and sends the next page instruction to the display control unit 42.

The display device

Further comprising a display buffer memory (not shown), is used to hold in the flat panel display 4, the number displayed in

It is.

Referring to Figure 19, the display device has two flat panel displays. 4A and 4B.

These two flat panel displays

4A and 4B by a hinge 51 is connected, so that the monitor 4A and 4B can be about the equivalent of one of the binding of the book

The side portion of the rotary shaft 53 is rotated, if not particularly described here, to the flat panel

display 4A

And 4B display the page data, which is to be energized.

Referring to Figure 20, the flat panel display 4A includes a bottom plate 56A and is formed on the bottom plate 56A of the display table

Surface 54A.

The flat panel display 4B includes a bottom plate 56B and the display surface 54B is formed on the base plate 56B.

The switch 46 is disposed on the base plate 56B.

The bottom plate 56A is connected to the hinge 51, and around the shaft 53 in order to be able to

Rotation.

The top of the switch 46 is squeezed, so that the switch 46 is in the "on" state, if no pressure

The force is applied to the switch 46, then it is in the "off" state.

In Figure 20 is shown a flat panel display 4

A rotation angle is 0 °.

Referring to Figure 21, the switch extrusion 47 is formed around the hinge 51.

When the hinge 51 in Fig 21

Arrow the direction of rotation (clockwise), prompting switch extruder 47 and the switch 46 is in the angle range

Contact with each other for 200 ° to 300 °, so that the switch extrusion 47 is extruded switch 46.

Note: 200 °

The angle allows the flat panel display 4A to be recognized into a turn to the back surface of the flat panel display 4B.

360 ° angle means flat

4B back-to-back of the the board monitor 4A and flat panel displays placed.

While flat panel displays 4A and 4B to each other for relative rotation, but for convenience, the flat panel display

Up 4B here are placed horizontally to be described herein, while the flat panel display 4A is rotated.

Referring to Figure 22, the rotational angle of the hinge 51, and applied to the relationship between the pressure on the switch 46

Shown by solid lines.

The pressure can be digitized according to a predetermined threshold value, to obtain a relationship indicated by dashed lines

Department.

Then be able to determine the switch 46 state ("ON" or "OFF" state).

When the switch 46 is in the "on" state, the display control unit 42 so that the flat panel display. 4A and 4B

One does not provide the display.

Referring to Figure 23, flip instruction unit 45 are respectively embedded in the flat panel display. 4A and 4B flip instruction

Units 45A and 45B.

Flip instruction units 45A and 45B are constituted by a graphic input device (touch panel).

Each flip instruction unit 45A and 45B are each equivalent is formed at such a position at a

The triangular region, the position is turned to hold the location of the finger of the hands of the booklet pages of the book.

When the user moves his finger from left to right in this region, and allows the finger contact area

Domain when the the flip command unit 45 outputs a signal for page forward.

The display control unit 42 is connected

The signal received and the page data for the next page is read from the memory 3, so as to obtain about Backward which

The page and updates the display of the flat panel display 4A and 4B.

When the user moves his finger in the opposite direction

The when, flip instruction unit 45 outputs a signal Pagedown.

The display control unit 42 receives

Page data of the previous page of the signal and read from the memory 3, so that one is being turned back

And profile in a display of the flat panel display 4A and 4B.

The direction of movement of the finger can be considered by tracking the time of contact position detection.

Page refers to

So that the unit 45 may be configured in a flat panel display 4A and 4B over the entire surface.

However, in order to avoid

To a malfunction caused by the contact of a finger or the like, the flip instruction unit 45 shown in Figure 23 can be constructed in the

Flat panel displays, 4A and 4B and the special area.

When the flat panel display 4A and 4B are both in the display state, the display control unit 42 is once

Can be turned to two, while the flat panel display 4A and 4B is only one in a display state, the display control

System unit 42 once turned a In this case, if the above-mentioned display buffer capable of storing phase

In two of the data, then the display control unit 42 time go two data read from the memory 3

And these data written into the display buffer memory.

If the above-mentioned display buffer be able to deposit

The reservoir is equivalent to the one of the data, then the display control unit 42 the time is read from the memory 3 to a Pages

Data, and the data written in the display buffer memory.

If you have given display flat panel display 4A and 4B either stop the display,

The display control unit 42 may be equivalent to the currently displayed page of data compression into a data, and

Rewrite of display buffer memory contents, so that in the display state of the flat panel display 4A or 4B

Is displayed on the compressed data.

Page compression is a well known technique.

For example, if the display information is merely

The text information, page compression can be obtained by reducing the character size.

If the display information is the number of images

According to page compression can be achieved by thinning the data.

Page data compression to be displayed only in a flat panel display has been given of the display 4A and 4B two

By one stop providing display.

After this, the display control unit, when the flip instruction issuing

42 non-compressed data and a page to page.

As Figure 23, since the next page instruction unit 45A and 45B symmetrically arranged, so no matter

Display device is in your right hand or to get in the left hand, or by right-handed or left-handed holding a can

Convenient to flip.

The deformation of the switch extruder 47

Referring to Figure 24, switches the extruder 47 may be only in the rotational angle corresponding to the hinge 51 to close to 200 °

At the position of configuration.

Referring to Figure 25, the rotational angle of the hinge 51, and the relationship between the pressure to the switch 46 is applied by

The solid line shows.

The pressure can be digitized according to a predetermined threshold value, to obtain a relationship indicated by dashed lines

System and therefore be able to determine the status (of the switch 46 "on" state or "OFF" state).

Referring to Figure 26,

The switch 46 also includes a circuit for forming the signal represented by the dashed line in Figure 25, and in the switch

46 is in the angle range of 200 ° to 360 ° when the output becomes "on" state of the signal.

When the transfer of the hinge

Activity angle changes by less than 200 ° to more than 200 °, that is equivalent to the letter indicated by the dotted line in Figure 5

When the number of the rising section, the circuit provides the output of the "open", and when the rotation angle of the hinge formed from greater than 200 °

Changes to less than 200 °, which is equivalent to the falling section of the signal represented by

the dotted line in Figure 5, the

The circuit provides the output of the "OFF".

Such a circuit can be easily constructed from a flip-flop circuit through the famous.

Flip a first modification of the instruction unit 45

Referring to Figure 27, the flip instruction unit 45 may be configured corresponding to the flat panel display. 4A and 4B

About a quarter of the bottom region.

Flip a second deformation of the instruction unit 45

Referring to Figure 28, the flip instruction unit 45 may be disposed at both sides of the flat panel display 4A and 4B and

Similar to FIG triangular region 23.

The display device as described above, having can be freely opened by the user within the range of 0 ° to 360 °

A flat panel display, 4A and 4B.

Therefore, even if display means the place occupied by reduced, the user can see

To the flat panel display 4A and 4B.

This display device can provide a very convenient.

Furthermore, this display device has a flat panel display that can be folded back to back up 4A and 4B.

The advantage of above points is: even if the flat panel display has a large display area 4A and 4B, the user can

Enough for a hand to support the display device.

In addition, such a flat panel display can be folded back to back up the display device 4A and 4B

The set allows the flat panel display one of 4A and 4B shows the display, while the other in the flat panel display 4A and 4B

Not a given show.

Therefore, even in a crowded place, such as the streetcar, the page data will not be

The others stole see.

Therefore possible to provide an excellent display means to prevent information leakage performance.

In reducing energy

The Consume aspects are also effective.

Furthermore, when the display device and hold it in one hand, flip instruction units 45A and 45B are placed in the appropriate

Finger placement.

So the user can use one hand to flip the display device.

Page instruction units 45A and 45B are arranged symmetrically, so regardless of the display device in my right hand.

Take in the left hand, the user can easily flip.

In addition, regardless of whether the user is right-handed or left-handed,

The user can be convenient and similar to flip.

A sixth embodiment

Referring to Figure 29, according to the sixth embodiment of the display device comprising: a memory 3; flat panel display 4;

First and second switches 76A and 76B, for detecting the degree of opening (the rotational angle) of the flat panel display 4;

First and second switches extruder 77A and 77B, for pressing the first and second switches 76A

and

76B; the display control unit 72 for controlling the image information, character information, etc. is stored in the memory 3.

Reading of the information, as well as control whether the display is given in the flat panel display 4; flip instruction unit

45.

Referring to Figure 30, the first switch extruder 77A is disposed in the vicinity of 0 ° of the hinge 51 of Figure 19 rotated

Corner.

Referring to FIG 31A, the first switch 76A when the rotation angle of the hinge 51 is more than 0 °, into the "open"

Status.

The second switch extruder 77B and the second switch 76B is configured so as to be described and with reference to Fig 24 of the

Switching extruder 47 and is similar to the switch 46.

Therefore, this part of the descriptions are not repeated.

Referring to Figure 31B,

The hinge 51 is near 0 ° to turn the corner.

Referring to Figure 31A, when the rotational angle of the hinge 51 in the 200 °

Into the range of 360 ° when the second switch 76B is turned into the "ON" state.

Referring to Figure 32, the display control unit 72 receives the first and second switches 76A and 76B output,

In order to control the flat panel display 4A and 4B show / display.

When the first and second switches 76A and 76B

Are in the "on" state, i.e., the rotational angle of the hinge 51 is in the range of 200 ° to 360 °,

The display control unit 72 causes the flat panel display 4A does not display, instead of the flat panel display 4B shows.

And when

The first switch 76A is in the "on" state, the second switch 76B is in the "off" state, i.e., the hinge 51

When the rotational angle is 0 ° to 200 ° range, the display control unit 72 allows the flat panel display. 4A peace

The board monitor 4B display.

When the first switch 76A is in the "off" state, i.e. the plate display 4

Is turned off, the display control unit 72, 4A, the flat panel displays, and flat panel display 4B do not provide display.

The above-described display device can have a fifth embodiment has a similar effect in the Examples.

Seventh embodiment

Referring to Figure 33, according to the seventh embodiment of the display device comprising: a memory 3; flat panel display 4;

Switch 46; the first and second switches extruder 77A and 77B; flip instruction unit 45.

Referring to Figure 34, the first and second switches extruder 77A and 77B are respectively arranged at the hinge 51

Rotational angle close to 0 ° and approximately 200 °.

The switch 46 shown in Figures 31A and 31B

Output.

Thus, the display control unit 82 is similar to the binding Figure 32 described in the sixth

embodiment of the display

The display control unit 72, control the flat panel display, 4A and 4B display / no display.

The above-described display device can have a fifth embodiment has a similar effect in the Examples.

Eighth embodiment

Referring to Figure 35, according to the eighth embodiment of the display device comprising: a memory 3; flat panel display;

The display control unit 83 for controlling the image information, character information, etc. stored in the memory 3 information

Read, and control the display of flat-panel display 4 / no display; flip instruction unit 45.

Electrostatic coupling

Aggregate type, pressure-sensitive type or an integrated display (display-integrated) type pattern input means (not

Shown) are embedded in the four kinds of flat panel displays.

When contact like finger as a pointer to the table of flat panel displays

Surface, the directions of the touch position signal is applied to the display control unit 83.

Referring to Figure 36, a flat panel display. 4A and 4B via a hinge 52 is rotatably coupled together.

Figure 37A illustrates a display device to be opened, the left thumb is come into contact with the flat panel display. 4A

Right thumb was exposed to flat panel displays 4B.

The display device is supported by the palm of your hand or other fingers.

In this

State, the contact of the finger area of the flat panel display 4A and 4B is almost equal.

Figure 37B illustrates when the flat panel display. 4A and 4B is rotated to the back to back with one another and substantially

The display device by the one hand holding the finger contact, 4A and 4B, a region on the flat panel display 88A

And 88B.

Typically, the user to take the display device, so that is supporting the flat panel display 4A the right hand finger contacts

To the region 88A of the area is larger than the area to the contact by the finger in the currently seen on the flat panel display 4B

Area domains 88B.

This is because the user attempt is supported in such a manner that the flat panel display 4B, eligible

Obtained can do a large display area, but also tried are supporting a flat panel display by protecting 4A, by hand

Refers to the area of contact 88A of the larger area to stably support the display device.

If the flat panel display 4A and 4B one has a contact area of at least greater than the other flat panel display

Illustrates a contact area of 20%, and the contact time is continued for a predetermined time (e.g. 3 seconds) or more

Long, then the display control unit 83 shows a flat panel display having a greater contact area without mentioning

For display, while the other has a smaller contact area to provide display.

In addition, if the flat panel display 4A

Have almost equal to the area of the region of the pointer contact with a flat panel display 4B, contact by the pointer

The size of the area, and the contact state continues for a predetermined length of time, then the

display controller 83

Flat panel display 4A and 4B show the display are allowed.

A graphical input device for detecting a touch position may be located at the top of a flat panel display. 4A and 4B the internal

Or any region other than the region above the surface.

Like finger as a pointer contact of the above-described display device is based on a flat panel display. 4A and

4B in the area of the region to determine which one of the flat panel display 4A and 4B viewed by the user.

Then

Provides a display of the tablet can only be allowed to be viewed by the user display device 4A or 4B, not to be viewed by the user level

The plate display device 4A or 4B does not provide display.

Therefore able to obtain to prevent information leaks and reduce energy consumption.

Advantages.

Other advantages similar to the fifth embodiment.

Ninth embodiment

Similar according to the ninth embodiment of the display device according to the fifth embodiment, in conjunction with FIG 18 described

Function block configuration of the display apparatus.

Therefore, his descriptions are not repeated here.

Similar to the combination of

Described in the eighth embodiment of the graphical input device is embedded in a flat-panel display 4.

Referring to Figure 38, the flat panel display. 4A and 4B by the hinge 51 as shown in Figure 19, as coupler in an

Onwards.

The switch extrusion 47 is constructed in the hinge 51 to form an angle of 200 °, when the flat panel display 4A and 4B,

Prompting the extrusion 47 is extruded at a position of the switch 46.

The switch 46 is in the "off" when the angle formed by the flat panel display 4A and 4B is smaller than 200 °

State, while when the angle is equal to or greater than 200 ° is in the "on" state.

The display control unit 42 according to Figure 39 controls the display of the flat panel display 4A and 4B / no display.

When the switch 46 is in the "on" state of at least 200 ° (the angle formed by the flat panel display 4A and 4B).

And by the pointer in contact with the flat panel display 4A and 4B, the difference between the area of the respective regions is equal to or

Less than a predetermined value, the display control unit 42 determines that a user viewing a flat panel display 4A and 4B

Two display surfaces 54A and 54B, thus allowing the flat panel display. 4A and 4B are provided display.

If open

The switch 46 is in the "ON" state, and a flat panel display of the pointer contact respective regions 4A and 4B

A difference between the area is greater than a predetermined value, display control unit 42 determines that the user merely viewing flat

The display surface of the panel display 4B, 54B, and such that the flat panel display 4A does not provide the display, whereas only Tablet

Monitor 4B offers.

If the switch 46 is in the "off" state, then the display control unit 42 contracting

Given user to see the flat panel display 4A and 4B, each of the display surface 54A and 54B of both, and makes the tablet

Monitor 4A and 4B are provided in the display, regardless of the magnitude of the difference of the area of contact.

Therefore, the above-described display device are similar to the efficiency of the display device according to a fifth embodiment of the

Fruit.

Tenth embodiment

With reference to Figure 40, according to the tenth embodiment of the display device comprising: a memory 3; flat panel display 4;

The first, second and third switch 76A, 76B, and 76C, for the degree of opening of the detector flat panel display 4

(Rotation angle); first, second and third switching extruder 77A, 77B and 77C, are used to first,

Second and third switches 76A, 76B, and 76C extrusion; the display control unit 102 for controlling the image-

Interest, character information, etc. stored in the flat panel display 4 of the reading of the information of the memory 3, and a control display

/ No display; the flip instruction unit 45; as well as by the keyboard, the function keys, a joystick, graphic input means

Etc. constituting the information input unit 102, to the display device the input information.

First and second switches 76A and 76B having a similar combination of a sixth embodiment described kind Results

Structure, and when the rotational angle of the flat panel display 4 is greater than 0 ° and equal to

or less than 360 °, the first switch

76A becomes "on" state.

When the rotational angle of the flat panel display 4 in the range between 200 ° to 360 °,

The second switch 76B into the "on" state.

Referring to Figure 41, the third switch extrusion 77C similar binding

Switches described in Figure 21 the extruder 47, is configured around the hinge 51, so that when the flat panel display 4

The rotational angle range between 300 ° to 350 °, the third switch 76c is turned into the "ON" state.

The display control unit 102 control the flat panel display according to Figure 42, 4A and 4B, whether to provide a display.

In particular, if the angle formed by the flat panel display 4A and 4B is greater than 0 ° and equal to or less than 200 °,

Then the first switch 76A is turned into the "ON" state, while the second and the third switch 76B and 76C becomes "OFF"

Status.

Then the display control unit 102 determines that the user views the two flat panel displays. 4A and 4B, and

Allow two flat monitor 4A and 4B provides a display.

If the angle formed by the flat panel display 4A and 4B is greater than 200 ° and equal or less than 300 °,

Mody first and second switches 76A and 76B into the "on" state, and the third switch 76c becomes "off"

Status.

And display control unit 102 determines that the user merely viewing flat panel display 4B, and

makes flat

Panel display 4A provides the display, but only the flat panel display 4B provides a display.

Referring to Figure 43, if the angle formed by the flat panel display. 4A and 4B over 300 ° and equal to or smaller

At 350 °, then the first, second and third switches 76A to 76C are all "on" state.

Then

The display control unit 102 determines that the user is playing a game resistance, etc., and folding the display apparatus, so that not displayed

User card to the family, thus allowing flat panel displays 4A and 4B provide a display.

If the angle formed by the flat panel display 4A and 4B is 0 °, then the first, second and third opening

Off 76A to 76C all become the "off" state.

And display control unit 102 determines that the user is significantly off

Display device, and 4A and 4B are not to provide the display and prompted to make flat panel displays.

Referring to Figure 44, the third switch is formed shapes allow to third switching extruder 77C loaded.

Because

Here, when the third switch 76c is in the "on" state, i.e. the angle formed by the flat panel display 4A and 4B

In a special range from 300 ° to 350 °, a flat panel display. 4A and 4B are fixed.

Thus, the user can

Enough to easily enjoy the game sex games.

Users can use To cancel this fixed state than usual

The bigger the force of rotation of the flat panel display device 4A and 4B.

With reference to Figure 45, a flat panel display. 4A may have a pin 116, while the flat panel display 4B

There is a hook 118.

When hanging by appropriately determining the position of the length of the hook 118 and pins 116,

When the hook 118 is linked to the pin 116, can be set by the angle formed by the flat panel display 4A and 4B

Disposed in a special range from 300 ° to 350 °.

Referring to Figure 46, when the flat panel display 4A and 4B are established in the use of the plane, the flat panel display 4A

And 4B each one connected to one side of the plane, sets of layer material having a large coefficient of friction, such as

For preventing the slide display apparatus of the rubber member 120.

Referring to Figure 47, in order to prevent sliding of the display device, flat panel display, 4A and 4B may be mounted on

Using the base 122.

Cradle is wrapped in a layer having a large friction coefficient materials, such as for preventing the bottom

Block 122 of the sliding of the rubber member 124.

If the angle formed by the flat panel display 4A and 4B is greater than 350 ° and equal or less than 360 °,

Mody first and second switches 76A and 76B into the "on" state, and the third switch 76c becomes "off"

Status.

Then the display control unit 102 determines that the user allows the flat panel display 4A and 4B are back to back, so

Just look of the flat panel display 4B, and therefore to urge the flat panel display 4A does not provide the display, but only

4B provides display of flat panel displays.

The user of the display apparatus shown in the above described games, without the user will be able to enjoy the game sexual licensing

Leaked to the home.

Flat panel display 4A and 4B after processing for a non-slip, therefore, the user can comfortably perform

The operation of the games.

The other effects similar to the effect of the fifth embodiment of the display apparatus.

Eleventh embodiment

Referring to Figure 48, according to the eleventh embodiment of the display device comprising: a memory 3; flat panel display

4; switch 46, for detecting a flat panel display 4 opening degree (rotation angle); first, second, and

Third switching extruders 77A, 77B, and 77C, have been used to switch 46 extrusion; display control unit 112,

Stored in the reading of the information of the memory 3, and a control level for controlling the image information, character information, etc.

Board display 4 display / non-display; flip instruction unit 45; well as by the keyboard, function keys, joystick,

A graphical input device and the like of the information input unit 1, memory 3, for the input signal to the display device

Interest rates.

Referring to Figure 49, the first and second switches extruder 77A and 77B configured in the periphery of the hinge 51,

Such that when the rotational angle of the hinge 51 are 0 ° and 200 °, the pressing switch 46.

Third switch squeeze

Pressure device 77C configured around the hinge 51, so that when the rotational angle of the hinge 51 to 300 ° to 350 °

, The pressing switch 46.

The switch 46 shown in Figure 31A, 31B and 41, the output shown.

Therefore show

The control unit 112 is similar to that according to Figure 42 depicts a tenth embodiment of a display device in a display control

Unit 102, control the flat panel display 4A and 4B and the display / no display.

Such a display device can be obtained effects similar to the fifth embodiment of the display device.

Industrial Applicability

As described above, the display device of the present invention allows the like actually turning a sheet of paper to next page, in the anti-

Stop information leaks advantage, and has the advantages of small energy consumption.

Therefore, such a display device is suitable

For manufacture of information access to a given and in the normal reading when the feeling.

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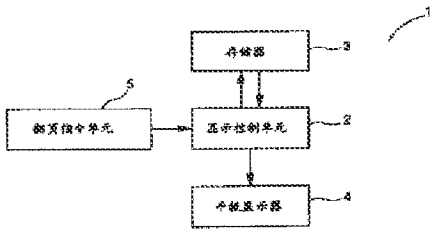
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[54]发明名称 显示装置

[57]摘要

一种能够达到给人好像真正翻页的感觉来翻页的显示装置，包括用于存储信息 的存储器；用于显示信息的显示器；用于检测指令单元本身倾斜的情况，输出 指示该倾斜方向的检测信号的翻页指令单元；以及用于从翻页指令单元接收指 令，以便根据所述倾斜的方向从存储器中读取下页或上页的信息，并且在显示 器上显示读取的信息的显示控制单元。



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权 利 要 求 书

1. 一种显示装置，包括:

信息存储装置，用于存储信息;

信息显示装置，用于显示信息;

翻页指令装置，用于检测翻页指令装置自己的倾斜，以输出指示倾斜方向的检测信号; 以及

显示控制装置，用于从所述翻页指令装置接收指令，以便根据倾斜方向从所述信息存储装置读取下页或前页信息，并在所述信息显示装置上显示读取的信息。

2. 如权利要求 1 所述的显示装置，其中

所述翻页指令装置具有覆盖了一层薄膜的表面。

3. 一种显示装置，包括:

信息存储装置，用于存储信息;

信息显示装置，用于显示信息;

翻页指令装置，用于检测指针移动的方向，以便输出指示移动方向的检测信号; 以及

显示控制装置，用于从所述翻页指令装置接收指令，以便根据指针移动的方向从所述信息存储装置读取下页或前页的信息，并在所述信息显示装置上显示读取的信息。

4. 如权利要求 3 所述的显示装置，其中

所述翻动指令装置包含用于覆盖所述信息显示装置的透明触摸板。

5. 如权利要求 3 所述的显示装置，其中

所述显示控制装置包括用于从所述翻页指令装置接收指令，以便根据指针移动的方向以及该指针与所述翻页指令单元接触的时间段从所述的信息存储装置中读取确定页的信息，并在所述信息显示装置上显示读取的信息的装置。

6. 一种显示装置，包括:

信息存储装置，用于存储信息;

信息显示装置，用于显示信息;

翻页指令装置，用于检测被指针接触的位置，以便输出指示触摸位置的

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检测信号；以及

显示控制装置，用于从所述翻页指令装置接收指令，以便根据被指针接触的位置变化，从所述信息存储装置中读取下页或前页的信息，并在所述显示装置上显示读取的信息。

7. 一种显示装置，包括：

信息存储装置，用于存储信息；

由至少两个可打开和可关闭的屏幕构成的信息显示装置，用于显示信息；

翻页指令装置，用于检测所述显示装置的开/关操作，以输出检测信号；以及

显示控制装置，用于从翻页指令装置接收指令，以便根据被检测到的开/关操作，切换被显示在所述显示装置上的信息。

8. 如权利要求 7 所述的显示装置，其中

由至少两个屏幕形成的所述信息显示装置安装成面对面。

9. 如权利要求 7 所述的显示装置，其中

所述翻页指令装置包含至少两个被分别装在由至少两个屏幕的所述信息显示装置上的翻页指令装置，以及

所述显示控制装置包含用于从所述至少两个翻页指令装置中接收指令，以便依据每个翻页指令装置输出的检测信号在不同方向上切换信息的装置。

10. 一种显示装置包括：

信息存储装置，用于存储信息；

信息显示装置，用于显示信息；

声音输出装置，用于输出声音；

翻页指令装置，用于发送指令，以便切换在所述显示装置上显示的信息；

显示控制装置，用于从所述翻页指令装置接收指令，以便切换在所述显示装置上显示的信息；以及

连接到所述显示控制装置的声音输出控制装置，用于根据显示在所述显示装置上的信息切换从所述声音输出装置中输出翻纸的声音。

11. 如权利要求 10 所述的显示装置，其中

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所述声音输出控制装置包含连接到所述显示控制装置的装置，用于根据显示在所述显示装置上的信息切换从所述声音输出装置中输出翻纸的声音，并依据显示在所述信息显示装置上的信息的切换速度输出不同的声音。

12. 如权利要求 10 所述的显示装置，其中

所述声音输出装置由至少两个声音输出装置形成，以及

所述声音输出控制装置包含连接到所述显示控制装置的装置，用于根据显示在所述显示装置上的信息切换从所述声音输出装置中输出翻纸的声音，并依据切换信息的方向，改变从所述多个声音输出装置中输出的音量大小。

13. 一种显示装置，包括:

信息存储装置，用于存储信息;

由至少两个可打开和可关闭的屏幕构成的信息显示装置，用于显示信息;

转动角度检测装置，用于检测所述显示装置的转动角度; 以及

连接到所述转动角度检测装置的显示控制装置，用于根据所述信息显示装置的转动角度控制是否所述显示装置提供显示;

14. 如权利要求 13 所述的显示装置，其中

所述转角检测装置包括:

配置在所述信息显示装置的屏幕之一上的一个开关; 以及

配置在所述信息显示装置的另一个屏幕之上的开关挤压器，它的定位要使得当所述信息显示装置的转角等于预定角度时，能够挤压所述开关，以及

所述显示控制装置包括连接到所述开关上的装置，用于根据所述开关的输出控制所述显示装置是否提供显示。

15. 如权利要求 13 所述的显示装置，其中

所述转角检测装置包括:

配置在所述信息显示装置的屏幕之一上的多个开关; 以及

配置在所述信息显示装置的另一个屏幕之上的多个开关挤压器，它的定位要使得当所述信息显示装置的转角等于预定角度时，能够分别挤压所述多个开关，以及

所述显示控制装置包括连接到所述多个开关上的装置，用于根据所述多个开关的输出控制所述显示装置是否提供显示。

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16. 如权利要求 13 所述的显示装置，其中

所述转角检测装置包括:

配置在所述信息显示装置的屏幕之一上的一个开关；以及

配置在所述信息显示装置的另一个屏幕之上的多个开关挤压器，它的定位要使得当所述信息显示装置的转角等于预定角度时，能够挤压所述开关，以及

所述显示控制装置包括连接到所述开关上的装置，用于根据所述开关的输出控制所述显示装置是否提供显示。

17. 如权利要求 13 所述的显示装置，还包括翻页指令装置，用于发送指令，以便切换显示在所述信息显示装置上的信息，其中

所述显示控制装置包含:

连接到所述转动角度检测装置的装置，用于根据所述信息显示装置的转动角度控制是否所述显示装置提供显示；以及

连接到所述翻页指令装置的装置，用于根据所述翻页指令装置的输出，对应于所述信息显示装置提供显示的屏幕数按单元切换信息。

18. 如权利要求 17 所述的显示装置，其中

所述显示控制装置还包含用于压缩的装置，若所述信息显示装置提供显示的屏幕数量减少，那么在提供显示的屏幕数量减少之前，压缩显示在所述信息显示装置上的信息，并在所述信息显示装置提供显示的屏幕上显示压缩过的信息。

19. 如权利要求 13 所述的显示装置，还包括固定装置，用于把所述信息显示装置固定在预定范围的一个旋转角上。

20. 如权利要求 19 所述的显示装置，还包括防滑装置，所述的装置配置在接触板底部的部分，用于防止固定在预定范围的一个旋转角度上的信息显示装置的滑动。

21. 一种显示装置，包括:

信息存储装置，用于存储信息;

由至少两个可打开和可关闭的屏幕构成的信息显示装置，用于显示信息;

由至少两个分别配置在所述信息显示装置屏幕上的组件形成的接触面积检测装置，用于检测被指针接触的所述信息显示装置上的面积；以及

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连接到所述接触面积检测装置的显示控制装置，用于根据由指针接触的所述接触面积检测装置的面积，控制是否所述显示装置提供显示。

22. 如权利要求 21 所述的显示装置，其中

所述显示控制装置包括使所述信息显示装置的屏幕不提供显示的装置，该屏幕对应于被指针接触的面积是最大的的所述接触面积检测装置的一部分。

23. 如权利要求 21 所述的显示装置，其中

所述显示控制装置包括:

用于根据由指针接触的所述接触面积检测装置的面积，控制是否所述显示装置提供显示的装置；以及

用于从所述信息存储装置中，根据接触所述检测装置的指针的移动方向读取下页或前页的信息，并在所述信息显示装置上显示读取的信息的第一装置。

24. 如权利要求 23 所述的显示装置，其中

所述第一装置包括用于根据由指针接触的所述接触面积检测装置的面积，控制是否所述显示装置提供显示，根据接触所述检测装置的指针的移动方向，把对应于所述信息显示装置提供显示的屏幕数作为一个单元，从所述信息存储装置中读取下页或前页的信息并在所述信息显示装置上显示读取的信息的装置。

25. 如权利要求 23 所述的显示装置，其中

所述显示控制装置还包含用于压缩的装置，若所述信息显示装置提供显示的屏幕数量减少，那么在提供显示的屏幕数量减少之前，压缩显示在所述信息显示装置上的信息，并在所述信息显示装置提供显示的屏幕上显示压缩过的信息。

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说　明　书

显示装置

技术领域

本发明涉及显示装置，具体地讲，本发明涉及能够通过使用象书一样可打开显示数据，并能允许用户以用户真正翻页的感觉翻页的显示装置。

背景技术

显示电子书籍等的传统的便携式显示装置通过按向前页按钮或向后页按钮来翻页。

日本专利第 258076 号（日本专利公开号 2-230313）公开了一种浏览装置，它通过用户转动转动检测器发出指令来翻页。这份日本专利也公开了用于通过压力检测器翻页的指令。根据这份日本专利，浏览的方向和速度由正向浏览压力检测器和负向浏览压力检测器之间的压力差确定。以上这份专利还公开了用于通过使用曲率检测器和开关翻页的指令。根据这份专利，浏览的速度基于被曲率检测器检测到的曲率大小计算，而浏览的方向基于开关的状态确定。

日本专利公开号 2-148257 公开了一种便携式文件处理器，具有一个相当于一页的显示屏幕。这种处理器通过按向前页键以使得相当于一页的显示数据从存储器 3 中读出，并且读出的显示数据存储在显示缓冲存储器 3。因此，相当于一页的显示数据被存储在显示缓冲存储器 3 中，以便显示一页数据到显示屏上。这样，用户可以象用户通过翻页来读书一样地来读文件。

日本专利公开号 63-116287 公开了一种显示装置，它有两个可打开的显示屏幕。用户可以通过操作一个输入键来翻页。

以上提到的浏览装置通过按一个按钮或转动一个滚轮（roller）来翻页，它不同于一般的书或杂志翻页。既然这样，电子书籍不能以给人一种真正地翻由纸张、塑料等印制的书或杂志的书页的感觉那样来读。

如果不用手指等触摸按钮或滚轮就能够翻页，那将是很方便的。

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以上的浏览装置和便携式文件处理器只有一个显示屏幕，这不便于装置的使用。

虽然以上所述的显示装置具有两个显示屏幕，但作为一个整体该屏幕不能被背靠背地折叠起来使用。结果，该显示装置占较大的地方，使它难于握在手上，从而产生关于便携性的问题。即使显示装置能够背靠背地折叠起来，但数据总是还显示在不被用户观看的那个屏幕上，引起信息泄漏以及电源浪费。

此外，既然以上的显示装置不能够背靠背地折叠起来，如果本装置用于玩比赛性游戏，例如，那种一个玩家最好不示出自己的牌的游戏，则该玩家就不能对对家隐瞒其牌的秘密。

发明的公开

因此本发明的一个目的是提供一种能够翻电子书籍的页的显示装置，以给人一种由纸张、塑料等印制的书或杂志的页真正翻动感觉。

本发明的另一个目的是提供一种能够翻页的显示装置，这种装置通过同一种操作不但能够给人一种书页真正翻动的感觉，而且还有一页一页地翻页和连续地翻页的能力。

本发明的再另一个目的是提供一种显示装置，即使用户不移动象手和手指这样的指针到按钮，也能够翻页。

本发明的另外一个目的是提供一个能够被折叠成背对背形式，并且能够握在手中的显示装置，它具有尺寸小、携带方便、耗能低并且适合于玩比赛性游戏。

本发明的再另外一个目的是提供一种显示装置，它在防止信息泄漏方面具有优势，并且能耗低。

根据发明的一方面，显示装置包括：存储器，用于存储信息；显示器，用于显示信息；翻页指令单元，用于检测指令单元自己倾斜的情况，以输出一个指示该倾斜方向的检测信号；以及显示控制单元，用于从翻页指令单元接收指令，以便根据所述倾斜的方向从存储器中读取下一页或上一页的信息，并且在显示器上显示读取的信息。

响应于用户的手指或手在翻页指令单元之上的滑动，显示控制单元翻一

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页。这样，用户能够以好像用户是在真正地用手翻一页纸一样地翻页。

根据发明的另一方面，显示装置包括：存储器，用于存储信息；显示器，用于显示信息；翻页指令单元，用于检测指针移动方向，以输出一个指示该移动方向的检测信号；以及显示控制单元，用于从翻页指令单元接收指令，以便根据所述移动的方向从存储器中读取下一页或上一页的信息，并且在显示器上显示读取的信息。

响应于如用户的手指或手这样的指针在翻页指令单元之上的移动，显示控制单元翻一页。这样，用户能够以好像用户是在真正地用手翻一页纸一样地翻页。

显示控制单元最好包括用于从翻页指令单元接收指令的单元，以便从根据指针移动的方向和指针接触翻页指令单元的时间长度确定的一页的存储器信息中，读取下一页或上一页的信息，并且在显示器上显示读取的信息。

显示控制单元根据指针接触翻页指令单元的时间长度变化将要翻的页数。这样，书页能以同样的操作一页一页地翻页，也能连续地翻页。

根据发明的再另一方面，显示装置包括：存储器，用于存储信息；显示器，用于显示信息；翻页指令单元，用于检测被指针接触的位置，以输出一个指示触摸位置的检测信号；以及显示控制单元，用于从翻页指令单元接收指令，以便根据被指针接触的位置变化，从存储器中读取下一页或上一页的信息，并且在显示器上显示读取的信息。

用户能够通过用指针接触翻页指令单元两次来翻一页。翻页的方向根据触摸位置的变化确定。这样，用户能够以好像用户是在真正地用手翻一页纸一样地翻页。

根据发明的另外一方面，显示装置包括：存储器，用于存储信息；由至少两个可打开和可关闭的屏幕构成的显示器，用于显示信息；翻页指令单元，用于检测显示器的开/关操作，以输出一个检测信号；以及显示控制单元，用于从翻页指令单元接收指令，以便根据被检测到的开/关操作，切换被显示在显示器上的信息。

用户能够通过显示器的开/关操作翻页。这样，在手握显示装置的同时，还能够不移动象手和手指之类的指针到按钮就翻页。

根据发明的再另外一方面，显示装置包括：存储器，用于存储信息；显示器，用于显示信息；音箱，用于输出声音；翻页指令单元，用于发送一个

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指令，以便切换在显示器上显示的信息；显示控制单元，用于从翻页指令单元接收指令，以便切换在显示器上显示的信息；以及连接到显示控制单元的声音输出控制单元，用于根据显示在显示器上的切换信息从音箱中输出翻纸的声音。

声音输出控制单元在翻页的同时输出翻纸的声音。这样，用户能够以好像用户在翻一页纸一样的感觉翻页。

音箱最好由至少两个扬声器构成。声音输出单元包括和显示控制单元相连的电路，以根据显示在显示器上的切换信息从扬声器中输出翻纸的声音，并且根据切换信息的方向，在变化声音输出的音量的同时，从至少两个扬声器中输出声音。

根据用户翻页的方向，翻纸的声音以移动声音的中心的方式产生。这样，用户能够以好像用户在真正地翻一页纸一样的感觉翻页。

根据发明的再另外一方面，显示装置包括：存储器，用于存储信息；由至少两个可打开和可关闭的屏幕构成的显示器，用于显示信息；转动角度检测单元，用于检测显示器的转动角度；以及连接到转动角度检测单元的显示控制单元，用于根据显示器的转动角度控制是否该显示器提供显示。

显示控制单元在用户背靠背地折叠显示器时，能够产生一个控制来促使不被用户观看的屏幕不提供显示。因此，可以提供一种在防止信息泄漏方面有优势的显示装置。也可以降低显示装置的能耗。此外，还可以提供一种更加便携，具有能够由用户自由转动，以使得即使显示装置所占的地方减少用户也能够观看显示的显示器之优势的显示装置。

该显示装置最好包括一个固定单元，用于把显示器固定在预定范围的一个转动角度上。

用户能够把显示器固定在预定范围的一个转动角度上。这样，用户能够玩不允许用户的牌泄漏给对家的比赛性游戏。

根据发明的再另外一方面，显示装置包括：存储器，用于存储信息；由至少两个可打开和可关闭的屏幕构成的显示器，用于显示信息；有至少两个对应于各自的显示屏幕配置的组成部件构成的图形输入板单元，用于检测指针接触的显示器的面积；以及连接到图形输入板的显示控制单元，用于根据指针接触的图形输入板单元的面积控制是否显示器提供显示。

显示控制单元根据诸如手指之类的指针接触的图形输入板单元的面

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积，确定显示器屏幕中的那一个被用户观看，以便于在不被观看的屏幕上不提供显示。因此，可以提供一种在防止信息泄漏方面有优势的显示装置。也可以降低显示装置的能耗。

附图的简要描述

图 1 示出的是本发明的第一实施例的显示装置的结构方框图。

图 2 示出本发明的第一实施例的显示装置的外观。

图 3 是翻页指令单元的截面图。

图 4 是翻页指令单元的等效电路图。

图 5 示出的是本发明的第二实施例的显示装置的结构方框图。

图 6 示出本发明的第二实施例的显示装置的外观。

图 7 和 8 示出的是翻页处理的流程图。

图 9 示出具有触摸位置的检测器的显示装置的外观。

图 10 图解表示触摸板的翻页有效区。

图 11 示出的是本发明的第三实施例的显示装置的结构方框图。

图 12 示出本发明的第三实施例的显示装置的外观。

图 13 示出倾斜检测器的结构。

图 14 示出的是翻页处理的流程图。

图 15 示出的是本发明的第四实施例的显示装置的结构方框图。

图 16 示出本发明的第四实施例的显示装置的外观。

图 17 示出的是声音输出处理的流程图。

图 18 示出的是本发明的第五实施例的显示装置的结构方框图。

图 19 示出本发明的第五实施例的显示装置的外观。

图 20 从侧面示出了显示装置。

图 21 示出了开关和开关挤压器的结构。

图 22 示出了施加到图 21 所示的开关上的压力和该开关的状态。

图 23 图解表示翻页指令单元。

图 24 示出了开关和开关挤压器的结构。

图 25 示出了施加到图 24 所示的开关上的压力和该开关的状态。

图 26 示出了通过图 25 中形成的开关状态产生的开关的状态。

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图 27 和 28 图解表示翻页指令单元。

图 29 示出的是本发明的第六实施例的显示装置的结构方框图。

图 30 示出了第一开关和第一开关挤压器的结构。

图 31A 示出了第一开关的一种状态。

图 31B 示出了第二开关的一种状态。

图 32 图解表示第一和第二开关的状态之间的关系，以及在平板显示器 4A 和 4B 上的显示状态。

图 33 是本发明的第七实施例的显示装置的结构方框图。

图 34 示出了一个开关与第一和第二开关挤压器的结构。

图 35 是本发明的第八实施例的显示装置的结构方框图。

图 36 示出本发明的第八实施例的显示装置的外观。

图 37A 示出了开着的显示装置的外观。

图 37B 图解表示手指接触被背靠背地折叠起来的平板显示器的区域。

图 38 从侧面示出了关着时显示装置。

图 39 图解表示在开关状态、指针和平板显示器 4A 和 4B 之间的接触状态以及在平板显示器 4A 和 4B 上的显示状态之间的关系。

图 40 是本发明的第十实施例的显示装置的结构方框图。

图 41 示出了第三开关的状态。

图 42 图解表示在第一到第三开关的状态与在平板显示器 4A 和 4B 上的显示状态之间的关系。

图 43 示出了被背靠背地折叠起来的平板显示器 4A 和 4B 的外观。

图 44 示出了第三开关和第三开关挤压器的结构。

图 45 示出了具有一个带钉的平板显示器和一个带挂钩的平板显示器的显示装置的外观。

图 46 示出了一种显示装置的外观，该显示装置被施加了一层防滑外壳。

图 47 示出了一种显示装置的外观，该显示装置安装在一个用于防滑的底座上。

图 48 是本发明的第十一实施例的显示装置的结构方框图。

图 49 示出了一个开关和第一到第三开关挤压器的结构。

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实现本发明的最佳实施例

第一实施例

参考图 1，第一实施例的显示装置 1 包括：存储器 3，它由象半导体存储器、硬盘、MO（Magneto-Optical，磁光盘）那样的磁性存储装置构造而成，用于存储图像信息、字符信息等；平板显示器 4，它由液晶板、PDP（Plasma Display Panel，等离子体显示板）等构造而成，用于显示图像信息、字符信息等；显示控制单元 2，用于控制存储在存储器 3 中的图像信息、字符信息等的读取，以及读取的信息在平板显示器 4 上的显示；翻页指令单元 5，用于从用户那里接收翻页指令，以便指示显示控制单元 2 翻页。

这以后所述的用户包括除了动物如人类之外的软件动作者（software agent），诸如机器人之类的人造肢体。

参考图 2，显示装置 1 采用两个平板显示器 4 和两个翻页指令单元 5。平板显示器 4 的数量和翻页指令单元 5 的数量都不限制成二，可以是一个，也可以至少三个。如果平板显示器 4 和翻页指令单元 5 的数量都是两个或者更多，那么它们可以被构造成在它们不被使用和打开成使用状态时，该显示器和指令单元被折叠起来。虽然图 2 示出了放成背靠背的平板显示器 4，但这安排不因此限制成这种形式。

翻页指令单元 5 安排在显示装置 1 的一条边上。显示控制单元 2 和存储器 3 装在显示装置 1 中。

图 3 是图 2 中的翻页指令单元 5 沿线 III-III 的截面图。翻页指令单元 5 由以下部分构造而成：支撑轴 5d，围绕 5d 转动的柱状形物体之中的开关 5c，触点 5a’和 5b’。开关 5c 在两个边上有触点 5a 和 5b。在图 3 中的开关 5c 绕着支撑轴 5d 反时针转动，以允许触点 5a 和 5a’实现相互接触。在图 3 中，开关 5c 绕着支撑轴 5d 顺时针转动允许触点 5b 和 5b’处于相互接触状态。开关 5c 由弹簧支撑（未显示），并且当触点不相互接触时，是稳定的。开关 5c 的表面被覆盖上一层橡胶件、硅、塑料等薄膜 5e。因此，翻页指令单元 5 被加固，任何电器损害都可以避免，并且象灰尘之类的外部物质不能进入显示装置 1。

图 4 是翻页指令单元 5 的等效电路图。该指令单元被构造成满足：当触点 5b 和 5b’相互接触时，触点 5a 和 5a’互相不接触。当所有触点都不相

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互接触时，时常是稳定状态。当触点 5a 和 5a' 成为相互接触时，在 5a" 点的电压变化。当触点 5b 和 5b' 成为相互接触时，在 5b" 点的电压变化。显示控制单元 2 通过在点 5a" 和点 5b" 的电压变化来检测翻页的指令。

再参考图 3，用户在翻页指令单元 5 的左上角和右下角之内滑动手指或手。因此 5c 被转动。这里的"滑动"词也指在接近 5a 和 5b 的任何位置，用手指或手按。换句话说，这个词指的是一个类似于用手翻用纸印刷的书的操作。开关 5c 的转动促使在 5a" 或 5b" 点的电压变化，因此显示控制单元 2 能够检测到用户想要的方向。

例如，当用户在左边翻页指令单元 5 右上方内滑动手指或手时，显示控制单元 2 朝前翻页。当用户在右边翻页指令单元 5 左上方内滑动手指或手时，显示控制单元 2 往回翻页。因此，用户能够像用户真正在用手翻纸一样执行翻页。

当用户在左边翻页指令单元 5 左下方内滑动手指或手时，显示控制单元 2 往回翻页。当用户在右边翻页指令单元 5 右下方内滑动手指或手时，显示控制单元 2 朝前翻页。通过显示控制单元 2 的这样一个控制，使得用户通过仅仅一个指令单元 5 就能够朝前和往回翻页。因此，用户能够用一只手翻页。

第二实施例

参考图 5，第二实施例的显示装置 11 包括：类似于第一实施例中的存储器 3；类似于第一实施例中的平板显示器 4；显示控制单元 12，用于控制存储在存储器 3 中的图像信息、字符信息等的读取，以及读取的信息在平板显示器 4 上的显示；以及触摸板 15，摆成完全覆盖平板显示器 4，以接收从用户那里来的翻页指令，并送一个指令给显示控制单元 12 以便翻页。

参考图 6，第二实施例中的显示装置 11 包括两个平板显示器 4 和两个触摸板 15。两组平板显示器 4 和触摸板 15 背靠背地安排。平板显示器 4 和触摸板 15 的数量不限制为两个，可以是一个，也可以至少三个。显示控制单元 12 和存储器 3 被装在显示装置 11 中。

触摸板 15 是一个检测由象手指和笔一样的指针接触的位置的检测器。显示控制单元 12 根据指针接触触摸板的时间长度，改变翻页的页数。

参考图 7，描述了由显示控制单元 12 执行的翻页控制处理。这里所指的书被假定显示在右边的平板显示器 4 上的、页码较小的一页是垂直书写的。如果显示在右边的平板显示器 4 上、页码较小的一页是水平书写的，则前后

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方向互相交换。

显示控制单元 12 确定是否触摸板 15 检测到用象手指和笔之类的指针的接触（S11）。如果触摸板 15 没有检测到与指针的接触（在 S11 中“否”），则显示控制单元 12 重复 S11 中的处理，直到触摸板 15 检测到与指针的接触。

当触摸板 15 检测到与指针的接触（在 S11 中“是”），则显示控制单元 12 确定指针在触摸板 15 上移动的方向（S12）。如果指针从左到右移动（在 S12 中“左到右”），则显示控制单元 12 在朝前方向翻一页（S13）。在这以后，显示控制单元 12 确定指针与触摸板 15 之间的接触是延续了一个预定的时间长度还是更长（S14），如果指针与触摸板 15 之间的接触时间小于一个预定的时间长度（在 S14 中“否”），则显示控制单元 12 重复 S14 中的处理。如果指针与触摸板 15 之间的接触时间至少是预定的时间长度（在 S14 中“是”），则显示控制单元 12 再在朝前方向翻一页（S13）。当指针离开触摸板 15 时（在 S14 中“离开触摸板 15”），由显示控制单元 12 执行的处理结束。

如果指针从右到左移动（在 S12 中“右到左”），则显示控制单元 12 在朝后方向翻一页（S15）。在这以后，显示控制单元 12 确定指针与触摸板 15 之间的接触是延续了一个预定的时间长度还是更长（S16），如果指针与触摸板 15 之间的接触时间小于一个预定的时间长度（在 S16 中“否”），则显示控制单元 12 重复 S16 中的处理。如果指针与触摸板 15 之间的接触时间至少是预定的时间长度（在 S16 中“是”），则显示控制单元 12 再在朝后方向翻一页（S13）。当指针离开触摸板 15 时（在 S16 中“离开触摸板 15”），由显示控制单元 12 执行的处理结束。

参考图 8，显示控制单元 12 可以控制以下描述的翻页。根据图 7 图解的处理实例，用户通过用指针接触触摸板 15 和移动与触摸板 15 接触的指针，指定朝前或朝后的方向。根据在图 8 中图解的处理实事例。朝前或朝后的方向通过移动指针，而又不使指针接触触摸板 15 来指定。

显示控制单元 12 确定是否触摸板 15 检测到与指针的接触（S40）。如果触摸板 15 没有检测到与指针的接触（在 S40 中“否”），显示控制单元 12 重复 S40 中的处理，直到触摸板 15 检测到与指针的接触为止。

如果触摸板 15 检测到与指针的接触（在 S40 中“是”），显示控制单元 12 记录下接触的位置，并且确定在触摸板 15 和指针之间是否存在第二次接触（S41）。如果在一个预定的时间段或更长的时间段之内没有第二次接触（在

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S41 中“在预定时间之内没有任何”），显示控制单元 12 的处理结束。

当触摸板 15 检测到与指针的第二次接触（在 S41 中“是”）时，显示控制单元 12 根据第一和第二次触摸位置之间的差计算指针移动的方向，以确定移动的方向（S42）。如果指针从左到右移动（在 S42 中“左到右”），则显示控制单元 12 在朝前方向翻一页（S43）。在这以后，显示控制单元 12 确定指针与触摸板 15 之间的接触是否延续了一个预定的时间长度或更长（S44），如果指针与触摸板 15 之间的接触时间小于一个预定的时间长度（在 S44 中“否”），则显示控制单元 12 重复 S44 中的处理。如果指针与触摸板 15 之间的接触时间至少是预定的时间长度（在 S44 中“是”），则显示控制单元 12 再在朝前方向翻一页（S43）。当指针离开触摸板 15 时（在 S44 中“离开触摸板 15”），由显示控制单元 12 执行的处理结束。

如果指针从右到左移动（在 S42 中“右到左”），则显示控制单元 12 在朝后方向翻一页（S45）。在这以后，显示控制单元 12 确定指针与触摸板 15 之间的接触是否延续了一个预定的时间长度或更长（S46），如果指针与触摸板 15 之间的接触时间小于一个预定的时间长度（在 S46 中“否”），则显示控制单元 12 重复 S46 中的处理。如果指针与触摸板 15 之间的接触时间至少是预定的时间长度（在 S46 中“是”），则显示控制单元 12 再在朝后方向翻一页（S43）。当指针离开触摸板 15 时（在 S46 中“离开触摸板 15”），由显示控制单元 12 执行的处理结束。

当采用图 6 所示的、具有两屏幕结构的显示装置 11 时，指针与触摸板 15 之间的第一和第二次接触可以对同一触摸板 15 产生影响。作为选择，指针在第一次接触时可以与左触摸板 15 接触，而在第二次接触时与右触摸板 15 接触。通过这样的操作，用户能够以好像用户翻用纸印刷的书一样的感觉翻页。

如果第一次接触的位置十分接近第二次接触的位置，特别地，例如，两次触摸位置之间的距离是 10mm 或更小，且同时允许指针与触摸板 15 接触，那么显示控制单元 12 可以确定用户移动指针位置，并且根据图 7 所示的流程图执行翻页处理。

参考图 9，用现在正被笔记本式个人电脑用作指针装置的触摸位置检测器 16 替代触摸板 15。既然这样，触摸位置检测器 16 与平板显示器 14 分开安排。

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参考图 10，触摸板 15 可以有一部分作为翻页有效区 15a，用户可以仅仅通过翻页有效区 15a 发出翻页指令。既然这样，能够防止由于手指的偶然接触引起的错误操作。虽然图 10 中的翻页有效区 15a 形状是一个三角形，但形状并不限于此，可以是另一个多边形、弧形、圆形等。翻页有效区 15a 的位置不限于左下角和右下角，可以在相当于触摸板的底部三分之一的带状区域之内。

如以上描述的那样，用户可以通过用指针接触或移动指针变化一页。因此，用户能够以好像用户翻用纸印刷的书一样的感觉翻页。

将要翻动的页数根据指针与触摸板 15 之间的接触时间长度变化。因此，同一种操作既能达到一页一页地翻页，也能达到连续地翻页的目的。

此外，翻页有效区 15a 的安排能够防止由手指偶然接触引起的错误操作。

第三实施例

参考图 11，根据第三实施例的显示控制单元 21 包括：类似于第一实施例的存储器 3；类似于第一实施例中的平板显示器 4；显示控制单元 22，用于控制图像信息、字符信息等存储在存储器 3 中信息的读取操作，以及读取的信息在平板显示器 4 上显示操作，以及倾斜度检测器 25，用于发送翻页指令给显示控制单元 22。

参考图 12，根据第三实施例的显示控制单元 21 包括：两个平板显示器 4 和两个倾斜度检测器 25，并且平板显示器 4 和倾斜度检测器 25 的两组面对面安排。显示控制器 22 和存储器 3 装在显示装置内。倾斜度检测器 25 的位置不限于图 12 所示的那样。但从倾斜度检测器 25 的特性考虑，检测器尽可以远离平板显示器 4 的转轴。

参考图 13，倾斜度检测器 25 包括：一个中空的柱体 25d；一个被包在柱体 25d 之中的导电球 25c；以及安装在柱体 25d 的上部的电极 25a 和 25b。如图 13 所示，当倾斜度检测器 25 处于正常状态时（“关”状态），球 25c 位于柱体 25d 的下部，球 25c 与电极 25a 和 25b 不接触。整个检测器的转动和倾斜引起球 25c 在柱体 25d 中移动，并接触到安装在柱体 25d 的上部的电极 25a 和 25b。结果，电流在电极 25a 和 25b 之间流动，从而检测到倾斜度检测器 25 的倾斜度（“开”状态）。

这里假设，当显示控制单元 121 是如图 12 所示的开状态时，左和右边

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的倾斜度检测器 25 都是处于“关”状态。如果平板显示器 4 中的一个是固定的，而别的平板显示器 4 被关闭接着又打开，则斜度检测器 25 之一进入“开”状态。然后显示控制单元 22 能够检测右和左边平板显示器 4 中的那一个被打开和关闭。

参考图 14，描述了由显示控制单元进行的翻页控制处理。在图 14 所示的处理中，假设这里所指的书显示在右边的平板显示器 4 上的、页码较小的一页是垂直书写的。

显示控制单元 22 一直等待到斜度检测器 25 进入“开”状态（S21）为止。当斜度检测器 25 的状态变成“开”（在 S21 中“开”）时，显示控制单元确定右和左斜度检测器 25 中的那一个处于“开”（S22），如果左边的斜度检测器 25 处于“开”（S22 中“左”），则显示控制单元 22 一直等待到斜度检测器 25 进入“关”状态（S23）为止。当斜度检测器 25 的状态变成“关”（在 S25 中处于“关”）时，显示控制单元 22 控制在朝前方向翻一页。

如果右边的斜度检测器 25 变成“开”（S23 中“右”），则显示控制单元 22 一直等待到右边的斜度检测器 25 变成“关”状态（S25）。当右边的斜度检测器 25 的状态变成“关”（在 S25 中处于“关”）时，显示控制单元 22 控制在朝后方向翻一页。

因此，用户能够通过打开和关闭显示装置来翻页。故在用户手握显示装置 21 的同时，不用移动手或手指到按钮就能翻页。

第四实施例

参考图 15，根据第四实施例的显示装置 31 包括：由象硬盘、MO 这样的磁性存储装置构造而成的存储器 33，用于存储图像信息、字符信息、音频信息等；类似于第一实施例中的平板显示器 4；显示控制器 32，用于控制存储在存储器 3 中的图像信息、字符信息等的读取，以及读取的信息在平板显示器 4 上的显示；类似于第二实施例中的触摸板 15；以及音频控制器 36，用于读取存储在存储器 3 中的声音信息，以便在显示控制器 32 翻动有在平板显示器 4 上显示的信息的页时，经音箱 37 输出翻一页纸的声音。音频控制器 36 根据翻页的速度输出不同的声音。

参考图 16，根据第四实施例的显示装置 31 包括：两个平板显示器 4 和两个触摸板 15，并且平板显示器 4 和触摸板 15 的两组面对面安排。此外，两个扬声器 37 分别摆在显示装置 31 的左右两边。显示控制器 32、音频控制

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器 36 和存储器 33 装在 31 内。可以使用通用的开关等代替触摸板 15。

显示控制器 32 以类似于根据以结合图 7 和 8 描述过的第二实施例的显示装置 1 中的显示控制单元 12 中使用的方式控制翻页。故该控制的描述不再在这里重复。显示控制器 32 从触摸板 15 来的、关于指针与触摸板 15 之间的接触信息，提供给声音控制单元 36。

参考图 17，描述了由声音控制单元 36 进行的声音输出控制处理。音频控制器 36 确定由触摸板 15 翻页的指令指的是正常翻页还是高速翻页（S31）。正常翻页意味着仅仅翻一页，而高速翻页意味着连续翻页或者同时翻作为一个单位的几页。如果翻页指令指的是正常翻页（S31 处于“正常”），则音频控制器 36 从存储器 33 中读取声音样本 A（S32）。如果翻页指令指的是高速翻页（S31 处于“高速”），则音频控制器 36 从存储器 33 中读取声音样本 B（S33）。声音样本 A 产生慢慢翻一页纸的声音，而声音样本 B 产生闪过和跳越多页的声音。

在 S32 和 S33 中的处理之后，音频控制器 36 确定将要朝那一个方向上翻页。如果正在翻的页的方向是从左到右（在 S34 中“左到右”），则在 S32 和 S33 的处理中读取的声音数据以声音中心被从左到右（S35）移动方式输出。如果正在翻的页的方向是从右到左（在 S34 中“右到左”），则在 S32 和 S33 的处理中读取的声音数据以声音中心被从右到左（S35）移动方式输出。这里，从左到右移动声音中心指的是输出声音的操作，它首先从左扬声器 37 发出较大的声音音量，然后左扬声器 37 的声音音量逐渐减小，而又扬声器 37 的音量增大。从右到左移动声音中心指的是相反方式的操作。

正如以上所讨论的那样，显示装置 31 在翻页操作的同时输出翻纸的声音，并且根据将要翻的页数输出不同的声音。这样，用户能够以好像用户翻用纸印刷的书一样的感觉翻页。

另外，显示装置 31 按照翻页的方向改变输出声音的平衡。从而用户能够好像真正发书籍一样地翻页。

第五实施例

参考图 18，根据第五实施例的显示装置包括：存储器 3；平板显示器 4；开关 46，用于检测平板显示器 4 的打开程度（转动角度）；开关挤压器 47，用于挤压开关 46；显示控制单元 42，用于控制图像信息、字符信息等存储在存储器 3 中信息的读取，以及读取的信息在平板显示器 4 上显示，并且根

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据开关 46 的状态控制平板显示器 4 显示/不显示；以及翻页指令单元 45，用于从用户那里接收翻页指令并发送翻页指令给显示控制单元 42。该显示装置还包括显示缓冲存储器（未显示），用于保存将要在平板显示器 4 显示的数据。

参考图 19，该显示装置有两个平板显示器 4A 和 4B。这两个平板显示器 4A 和 4B 通过铰链 51 连接，使得显示器 4A 和 4B 能够绕相当于一本书的装订边部分的转轴 53 转动，在这里如果没有特别的说明，为了在平板显示器 4A 和 4B 上显示页数据，它们要被通电。

参考图 20，平板显示器 4A 包括底板 56A 和在底板 56A 上形成的显示表面 54A。平板显示器 4B 包括底板 56B 和在底板 56B 上形成的显示表面 54B。开关 46 配置在底板 56B 上。底板 56A 连接到铰链 51 上，以便能够绕转轴 53 转动。开关 46 的顶部被挤压，以使得开关 46 处于“开”状态，如果没有压力加到开关 46，则它处于“关”状态。在图 20 中，被示出的平板显示器 4 的转动角度为 0°。

参考图 21，开关挤压器 47 形成在铰链 51 周围。当铰链 51 以图 21 中的箭头所指方向转动（顺时针）时，促使开关挤压器 47 和开关 46 在角度范围为 200°到 300°时相互接触，以使得开关挤压器 47 挤压开关 46。注意：200°角允许平板显示器 4A 被确认成翻到平板显示器 4B 的背面。360°角意味着平板显示器 4A 和平板显示器 4B 背靠背放置。

虽然平板显示器 4A 和 4B 能够互相作相对转动，但为了方便，平板显示器 4B 在这里是作为水平放置来描述的，而平板显示器 4A 是转动的。

参考图 22，铰链 51 的转动角度和施加到开关 46 上的压力之间的关系使用实线示出。压力能够根据一个预定的阈值数字化，以得到由虚线表示的关系。然后能够确定开关 46 的状态（“开”或者“关”状态）。

当开关 46 处于“开”状态时，显示控制单元 42 使平板显示器 4A 和 4B 中的一个不提供显示。

参考图 23，翻页指令单元 45 分别嵌入平板显示器 4A 和 4B 的翻页指令单元 45A 和 45B。翻页指令单元 45A 和 45B 由图形输入装置（触摸板）构成。每个翻页指令单元 45A 和 45B 的每一个都相当于在这样的位置处形成的一个三角形区域，该位置就是翻拿在手中的小册子的书页的手指所在的位置。

当用户在这个区域内从左到右移动他的手指，而且允许该手指接触该区

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域时，翻页指令单元 45 输出一个用于向前翻页的信号。显示控制单元 42 接收该信号并从存储器 3 中读取下一页的页数据，以便得到正要向前翻的那一页并更新在平板显示器 4A 和 4B 的显示。当用户以相反的方向移动他的手指时，翻页指令单元 45 输出一个用于向后翻页的信号。显示控制单元 42 接收该信号并从存储器 3 中读取前一页的页数据，以便得到正在向回翻的那一页并更新在平板显示器 4A 和 4B 的显示。

手指移动的方向能够通过跟踪考虑了时间的接触的位置来检测。翻页指令单元 45 可以构造在平板显示器 4A 和 4B 的整个表面之上。但为了避免由于手指等的接触引起的误操作，翻页指令单元 45 能够构造在如图 23 所示的平板显示器 4A 和 4B 的特殊区域中。

当平板显示器 4A 和 4B 两者都处于显示状态时，显示控制单元 42 一次可以翻两页，而当平板显示器 4A 和 4B 中只有一个处于显示状态时，显示控制单元 42 一次翻一页，既然这样，如果以上提到的显示缓冲区能够存储相当于两页的数据，那么显示控制单元 42 一次从存储器 3 中读去两页数据，并且把这些数据写入显示缓冲存储器中。如果以上提到的显示缓冲区能够存储相当于一页的数据，那么显示控制单元 42 一次从存储器 3 中读去一页数据，并且把这些数据写入显示缓冲存储器中。

如果已经给出显示的平板显示器 4A 和 4B 两者之一停止提供显示，那么显示控制单元 42 可以把相当于当前显示的两页的数据压缩成一页数据，并重写显示缓冲存储器的内容，以便在处于显示状态的平板显示器 4A 或者 4B 上显示该压缩数据。页压缩是众所周知的技术。例如，如果显示信息仅仅是文本信息，页压缩能够通过减小字符尺寸来获得。如果显示信息是图像数据，页压缩能够通过稀疏该数据来实现。

将要显示的页数据压缩可以只在已经给出显示的平板显示器 4A 和 4B 两者之一停止提供显示时进行。在这以后，当翻页指令发出时，显示控制单元 42 不压缩数据并且一页一页地翻页。

正如图 23 所时，既然翻页指令单元 45A 和 45B 对称地安排，所以无论显示装置是拿在右手还是拿在左手中，或者由右撇子还是左撇子拿着，都能方便地翻页。

开关挤压器 47 的变形

参考图 24，开关挤压器 47 可以只在相应于铰链 51 的转动角度接近 200°

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的位置处配置。

参考图 25，铰链 51 的转动角度和施加到开关 46 上的压力之间的关系由实线示出。压力能够根据一个预定的阈值数字化，以得到由虚线表示的关系，因此能够确定开关 46 的状态（“开”状态或者“关”状态）。参考图 26，开关 46 还包括一个电路，用于形成由图 25 中的虚线表示的信号，并在开关 46 处于角度范围 200°到 360°中时输出变成“开”状态的信号。当铰链的转动角度由小于 200°变化到大于 200°时，也就是相当于图 5 中由虚线表示的信号的上升段时，该电路提供“开”输出，而当铰链的转动角度由大于 200°变化到小于 200°时，也就是相当于图 5 中由虚线表示的信号的下降段时，该电路提供“关”输出。这样的电路能够容易地通过著名的触发电路构造而成。

翻页指令单元 45 的第一种变形

参考图 27，翻页指令单元 45 可以配置在相当于在平板显示器 4A 和 4B 的底部约四分之一的区域中。

翻页指令单元 45 的第二种变形

参考图 28，翻页指令单元 45 可以配置在平板显示器 4A 和 4B 的两边和类似于图 23 中的三角区域上。

如上所述的显示装置具有能够自由地由用户在 0°到 360°范围内打开的平板显示器 4A 和 4B。因此即使被显示装置占用的地方减小，用户也能够看到平板显示器 4A 和 4B。这样能够提供一种十分便捷的显示装置。

此外，这种显示装置具有能够背靠背地折叠起来的平板显示器 4A 和 4B。以上各点产生的优势是：即使平板显示器 4A 和 4B 有大显示面积，用户也能够用一只手支撑该显示装置。

此外，这种具有能够背靠背地折叠起来的平板显示器 4A 和 4B 的显示装置允许平板显示器 4A 和 4B 之一给出显示，而平板显示器 4A 和 4B 中的另一个不给出显示。因此即使在拥挤的地方，例如有轨电车里，页数据也不会被别人偷看到。故能够提供一种防止信息泄漏性能极好的显示装置。在降低能耗方面也有效果。

此外，当显示装置拿在一只手中时，翻页指令单元 45A 和 45B 放在相应于手指的放置位置的地方。故用户能够用一只手翻页显示装置。

翻页指令单元 45A 和 45B 对称地安排，所以无论显示装置被拿在右手还是拿在左手中，用户都能方便地翻页。此外，无论用户是右撇子还是左撇子，

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用户都能方便而且类似地翻页。

第六实施例

参考图 29，根据第六实施例的显示装置包括：存储器 3；平板显示器 4；第一和第二开关 76A 和 76B，用于检测平板显示器 4 的打开程度（转动角度）；第一和第二开关挤压器 77A 和 77B，用于分别按压第一和第二开关 76A 和 76B；显示控制单元 72，用于控制图像信息、字符信息等存储在存储器 3 中信息的读取，以及控制是否在平板显示器 4 上给出显示；以及翻页指令单元 45。

参考图 30，该第一开关挤压器 77A 配置在图 19 的铰链 51 的 0°附近转动角处。参考图 31A，第一开关 76A 当铰链 51 的旋转角度超过 0°时，变成“开”状态。

该第二开关挤压器 77B 和第二开关 76B 被构造成和结合图 24 所描述的开关挤压器 47 和开关 46 类似。因此，这部分的描述不再重复。参考图 31B，的铰链 51 的 0°附近转动角处。参考图 31A，当铰链 51 的转动角度处于 200°到 360°范围中时，第二开关 76B 变成“开”状态。

参考图 32，显示控制单元 72 接收第一和第二开关 76A 和 76B 的输出，以便控制平板显示器 4A 和 4B 显示/不显示。当第一和第二开关 76A 和 76B 都处于“开”状态时，即铰链 51 的转动角度处于 200°到 360°范围中时，显示控制单元 72 使平板显示器 4A 不显示，而不使平板显示器 4B 显示。而当第一开关 76A 处于“开”状态，第二开关 76B 处于“关”状态时，即铰链 51 的转动角度处于 0°到 200°范围时，显示控制单元 72 允许平板显示器 4A 和平板显示器 4B 都提供显示。当第一开关 76A 处于“关”状态，即平板显示器 4 关闭时，显示控制单元 72 使平板显示器 4A 和平板显示器 4B 都不提供显示。

以上所述的显示装置能够有第五实施例中所拥有的类似效果。

第七实施例

参考图 33，根据第七实施例的显示装置 包括：存储器 3；平板显示器 4；开关 46；第一和第二开关挤压器 77A 和 77B；以及翻页指令单元 45。

参考图 34，第一和第二开关挤压器 77A 和 77B 被分别地配置在铰链 51 的转动角接近于 0°和接近于 200°的地方。开关 46 提供如图 31A 和 31B 所示的输出。因此，显示控制单元 82 以类似于结合图 32 描述的第六实施例的显示控制单元 72 方式，控制平板显示器 4A 和 4B 显示/不显示。

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以上所述的显示装置能够有第五实施例中所拥有的类似效果。

第八实施例

参考图 35，根据第八实施例的显示装置 包括：存储器 3；平板显示器 4；显示控制单元 83，用于控制图像信息、字符信息等存储在存储器 3 中信息的读取，以及控制平板显示器 4 显示/不显示；以及翻页指令单元 45。静电耦合型、压敏型或集成显示器（display-integrated）型图形输入装置（未显示）嵌入在平板显示器 4 种。当象手指那样的指针接触到平板显示器 4 的表面时，指示触摸位置的信号被施加给显示控制单元 83。

参考图 36，平板显示器 4A 和 4B 通过铰链 52 可转动地耦合在一起。

图 37A 示出了被打开的显示装置，左手拇指正接触到平板显示器 4A，而右手拇指正接触到平板显示器 4B。显示装置由手掌或别的手指支撑。在这种状态下，接触平板显示器 4A 和 4B 的手指面积几乎相等。

图 37B 示出当平板显示器 4A 和 4B 之一被转动到与另一个背靠背并且显示装置由一只手拿着时，被手指接触的、平板显示器 4A 和 4B 上的区域 88A 和 88B。通常，用户拿显示装置，使得正支持着的平板显示器 4A 右手指接触到的区域 88A 的面积大于由手指在当前看到的平板显示器 4B 上接触到的区域 88B 的面积。这是由于用户试图以这样一种方式支撑平板显示器 4B，以获得尽可以大的显示面积，也试图通过保护正支撑的平板显示器 4A 中，由手指接触的区域 88A 的更大面积来稳定地支撑显示装置。

如果平板显示器 4A 和 4B 之一有一个接触区域面积至少大于别的平板显示器的接触面积 20%，并且接触时间延续一个预定的时间（例如 3 秒）或更长，那么显示控制单元 83 示的平板显示器的一个具有更大的接触面积不提供显示，而另一个拥有更小的接触面积提供显示。此外，如果平板显示器 4A 拥有几乎等于由指针接触的平板显示器 4B 中的区域的面积的、由指针接触的区域面积，并且接触状态延续一个预定的时间长度，那么显示控制器 83 允许平板显示器 4A 和 4B 给出显示。

用于检测触摸位置的图形输入装置可以位于除平板显示器 4A 和 4B 内部或者表面之上的区域以外的任何区域。

以上描述的显示装置基于由象手指那样的指针接触的平板显示器 4A 和 4B 中的区域的面积，确定平板显示器 4A 和 4B 中的哪一个由用户观看。然后可以只允许被用户观看的平板显示器 4A 或 4B 提供显示，不被用户观看的平

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板显示器 4A 或 4B 不提供显示。因此能够获得关于防止信息泄漏和降低能耗的优点。其他优点类似第五实施例中的。

第九实施例

根据第九实施例的显示装置有类似于根据第五实施例、结合图 18 所描述的显示装置的功能块结构。因此，他的描述不再在这里重复。类似于结合第八实施例描述过的图形输入装置被嵌入平板显示器 4 中。

参考图 38，平板显示器 4A 和 4B 由铰链 51 象图 19 所示的那样耦合在一起。开关挤压器 47 构造在铰链 51 上、当平板显示器 4A 和 4B 形成 200°角时，促使挤压器 47 挤压开关 46 的位置处。

开关 46 在当由平板显示器 4A 和 4B 形成的角小于 200°时处于“关”状态，而当该角度等于或者大于 200°时处于“开”状态。

显示控制单元 42 根据图 39 控制平板显示器 4A 和 4B 的显示/不显示。当开关 46 处于“开”状态（由平板显示器 4A 和 4B 形成的角至少为 200°），并且被指针接触的平板显示器 4A 和 4B 上各自区域的面积之间的差等于或者小于一个预定值时，显示控制单元 42 判定用户观看平板显示器 4A 和 4B 的两个显示面 54A 和 54B，因此允许平板显示器 4A 和 4B 都提供显示。如果开关 46 处于“开”状态，并且被指针接触的平板显示器 4A 和 4B 上各自区域的面积之间的差大于一个预定值，则显示控制单元 42 判定用户仅仅观看平板显示器 4B 的显示面 54B，并使得平板显示器 4A 不提供显示，而只有平板显示器 4B 提供显示。如果开关 46 处于“关”状态，则显示控制单元 42 判定用户观看平板显示器 4A 和 4B 各自的显示面 54A 和 54B 两者，并使得平板显示器 4A 和 4B 都提供显示，而不管接触面积的差的大小。

因此，以上所述的显示装置有类似于根据第五实施例的显示装置的效果。

第十实施例

参考图 40，根据第十实施例的显示装置包括：存储器 3；平板显示器 4；第一、第二和第三开关 76A、76B 和 76C，用于检测平板显示器 4 的打开程度（转动角度）；第一、第二和第三开关挤压器 77A、77B 和 77C，用于给第一、第二和第三开关 76A、76B 和 76C 挤压；显示控制单元 102，用于控制图像信息、字符信息等存储在存储器 3 中信息的读取，以及控制平板显示器 4 显示/不显示；翻页指令单元 45；以及由键盘、功能键、操纵杆、图形输入装置

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等构成的信息输入单元102，用于给显示装置输入信息。

第一和第二开关 76A 和 76B 具有类似于结合第六实施例描述的那种结构，并且当平板显示器 4 的转动角度大于 0°和等于或小于 360°时，第一开关 76A 变成“开”状态。当平板显示器 4 的转动角度范围在 200°至 360°之间时，第二开关 76B 变成“开”状态。参考图 41，第三开关挤压器 77C 类似于结合图 21 描述的开关挤压器 47、被构造在铰链 51 周围，以使得当平板显示器 4 的转动角度范围在 300°至 350°之间时，第三开关 76C 变成“开”状态。

显示控制单元 102 根据图 42 控制平板显示器 4A 和 4B 是否提供显示。特别地，如果由平板显示器 4A 和 4B 形成的角度大于 0°和等于或小于 200°，那么第一开关 76A 变成“开”状态，而第二和第三开关 76B 和 76C 变成“关”状态。然后显示控制单元 102 判定用户观看两个平板显示器 4A 和 4B，并且允许两个平板显示器 4A 和 4B 提供显示。

如果由平板显示器 4A 和 4B 形成的角度大于 200°和等于或小于 300°，那么第一和第二开关 76A 和 76B 变成“开”状态，而第三开关 76C 变成“关”状态。然后显示控制单元 102 判定用户仅仅观看平板显示器 4B，并且使得平板显示器 4A 不提供显示，而仅仅平板显示器 4B 提供显示。

参考图 43，如果由平板显示器 4A 和 4B 形成的角度超过 300°和等于或小于 350°，那么第一、第二和第三开关 76A 至 76C 全部变成“开”状态。然后显示控制单元 102 判定用户玩比赛性等，并折叠显示器装置，以使得不显示用户的牌给对家，因此允许平板显示器 4A 和 4B 均提供显示。

如果由平板显示器 4A 和 4B 形成的角度为 0°，那么第一、第二和第三开关 76A 至 76C 全部变成“关”状态。然后显示控制单元 102 判定用户关闭显示装置，并促使使平板显示器 4A 和 4B 均不提供显示。

参考图 44，第三开关形成一个允许第三开关挤压器 77C 装入的形状。因此，当第三开关 76C 处于“开”状态，即由平板显示器 4A 和 4B 形成的角度处于特殊范围 300°至 350°时，平板显示器 4A 和 4B 均被固定。这样，用户能够方便地享受比赛性游戏等。为了取消这种固定状态，用户可以使用比平常大些的力转动平板显示器 4A 和 4B。

参考图 45，平板显示器 4A 可以有一个销钉 116，而平板显示器 4B 可以有一个挂钩 118。通过适当地确定挂钩 118 的长度和销钉 116 的位置，当挂钩 118 挂到销钉 116 上时，通过由平板显示器 4A 和 4B 形成的角度能够被设

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置在一个特殊范围 300°至 350°中。

参考图 46，当平板显示器 4A 和 4B 立在使用的平面上时，平板显示器 4A 和 4B 的每一个中与该平面相连的一边，套一层具有大摩擦系数的材料，如用于防止显示装置滑动的橡胶件 120。

参考图 47，为了防止显示装置的滑动，平板显示器 4A 和 4B 可以安装在使用的底座 122 中。底座被包上一层具有大摩擦系数的材料，如用于防止底座 122 的滑动的橡胶件 124。

如果由平板显示器 4A 和 4B 形成的角度大于 350°和等于或小于 360°，那么第一和第二开关 76A 和 76B 变成“开”状态，而第三开关 76C 变成“关”状态。然后显示控制单元 102 判定用户让平板显示器 4A 和 4B 背靠背，以便仅仅看平板显示器 4B，并且因此来促使平板显示器 4A 不提供显示，而仅仅平板显示器 4B 提供显示。

以上描述的显示装置示的用户能够享受比赛性游戏，而不会把用户的牌泄漏给对家。

平板显示器 4A 和 4B 经过用于防滑的处理，因此，用户能够舒适地执行游戏等的操作。

别的效果类似于第五实施例中的显示装置的效果。

第十一实施例

参考图 48，根据第十一实施例的显示装置包括：存储器 3；平板显示器 4；开关 46，用于检测平板显示器 4 的打开程度（转动角度）；第一、第二和第三开关挤压器 77A、77B 和 77C，用于给开关 46 挤压；显示控制单元 112，用于控制图像信息、字符信息等存储在存储器 3 中信息的读取，以及控制平板显示器 4 显示/不显示；翻页指令单元 45；以及由键盘、功能键、操纵杆、图形输入装置等构成的信息输入单元 1 存储器 3，用于给显示装置输入信息。

参考图 49，第一和第二开关挤压器 77A 和 77B 构造在铰链 51 的周围，以使得当铰链 51 的转动角度分别为 0°和 200°时，挤压开关 46。第三开关挤压器 77C 构造在铰链 51 的周围，以使得当铰链 51 的转动角度为 300°至 350°时，挤压开关 46。开关 46 提供如图 31A、31B 和 41 所示的输出。因此显示控制单元 112 类似于根据图 42 描述的第十实施例的显示装置中的显示控制单元 102 地，控制平板显示器 4A 和 4B 的显示/不显示。

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这种显示装置能够获得类似于第五实施例中的显示装置的效果。

工业实用性

如上所述，本发明的显示装置允许象真正地翻一页纸一样来翻页，在防止信息泄漏方面有优势，并且具有小能耗的优势。因此，这种显示装置适合用于制造一种给出和在正常读书时一样的感觉的信息访问。

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说 明 书 附 图

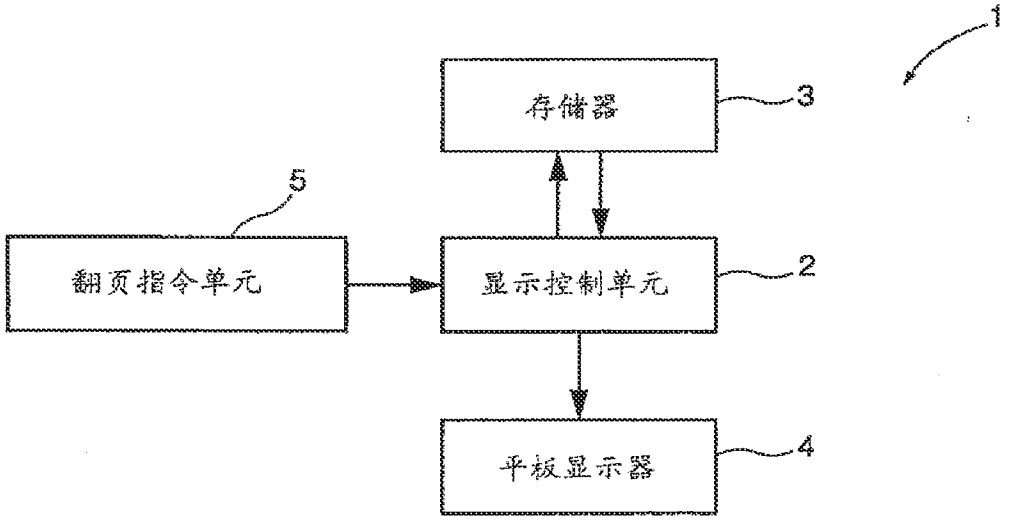


图 1

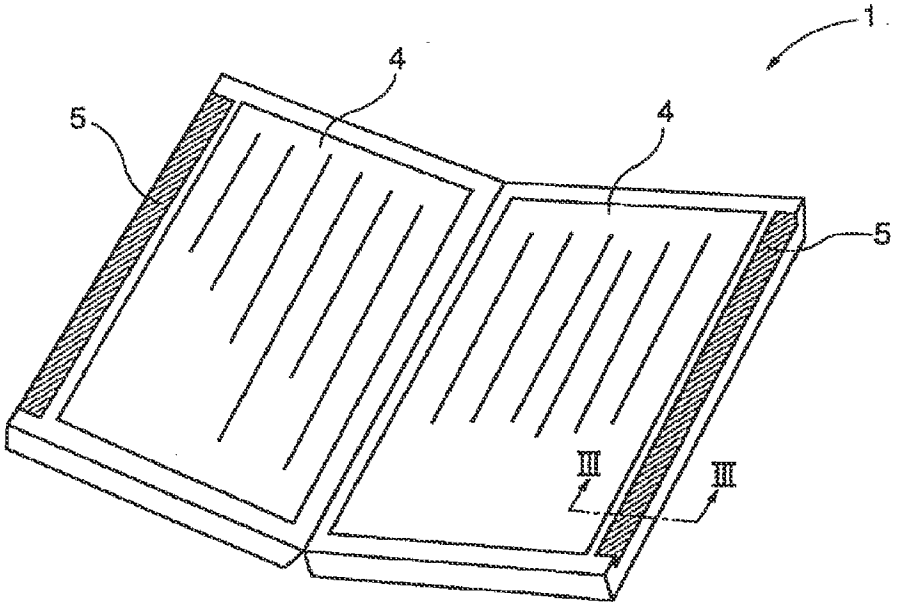


图 2

00-08-23

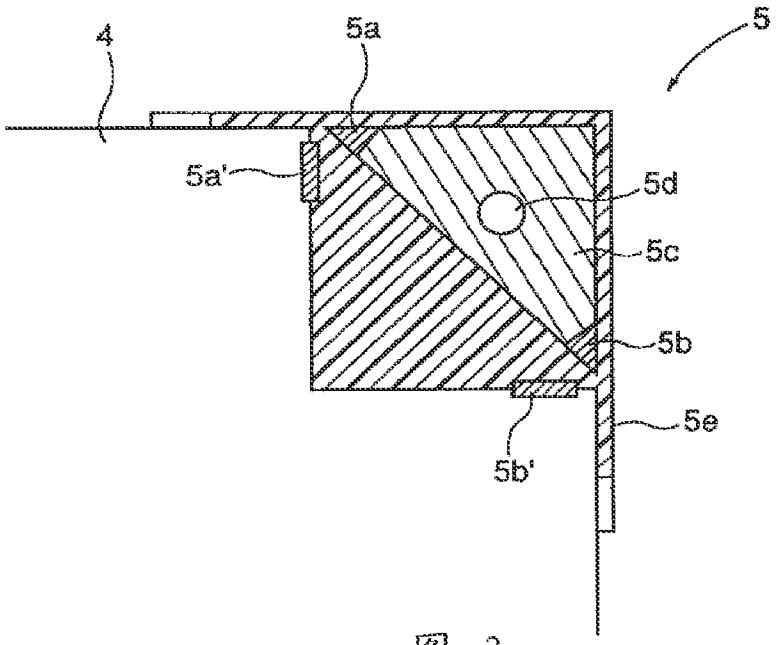


图 3

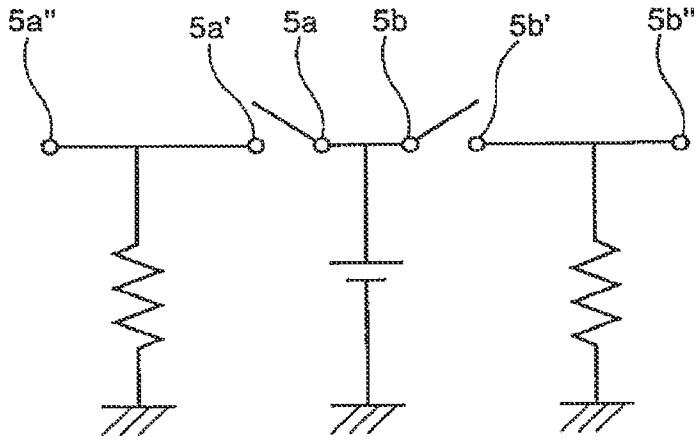


图 4

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00-08-23

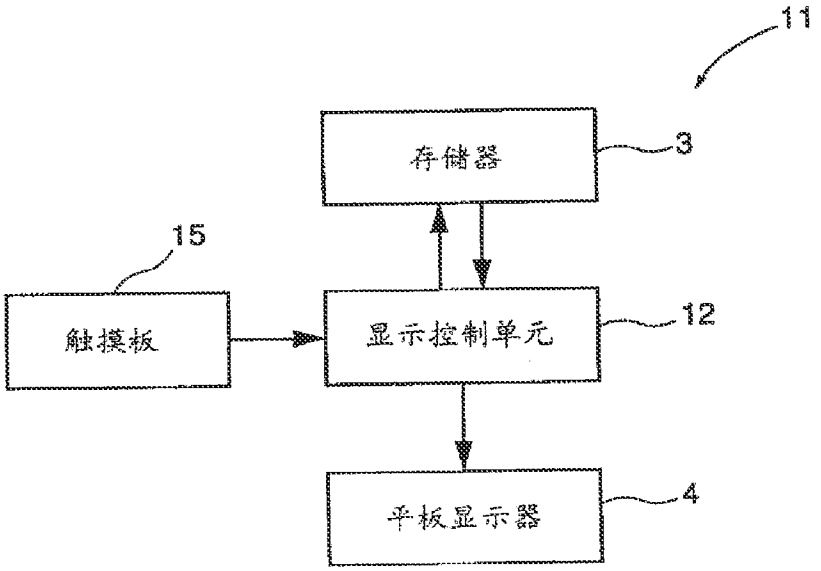


图 5

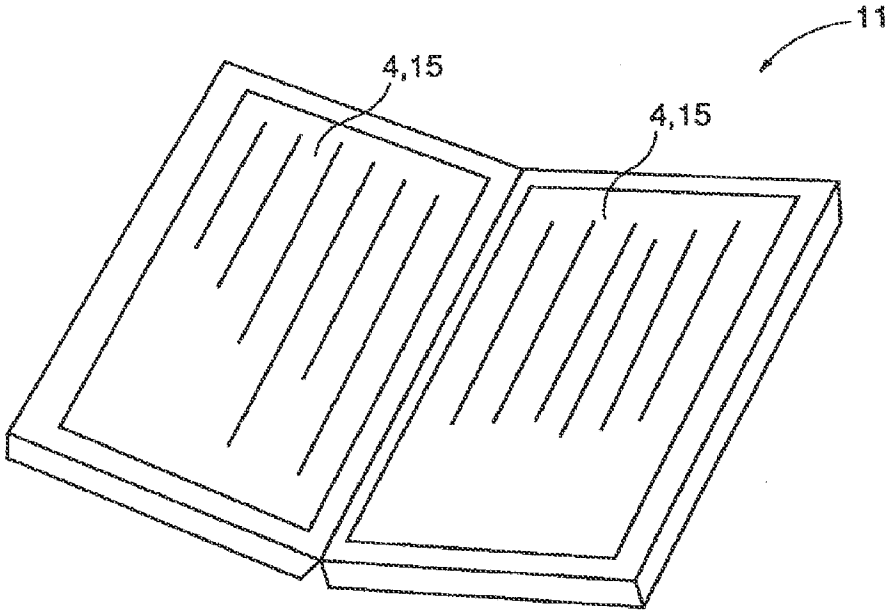


图 6

HP Inc. - Exhibit 1005 - Page 1891

00-03-23

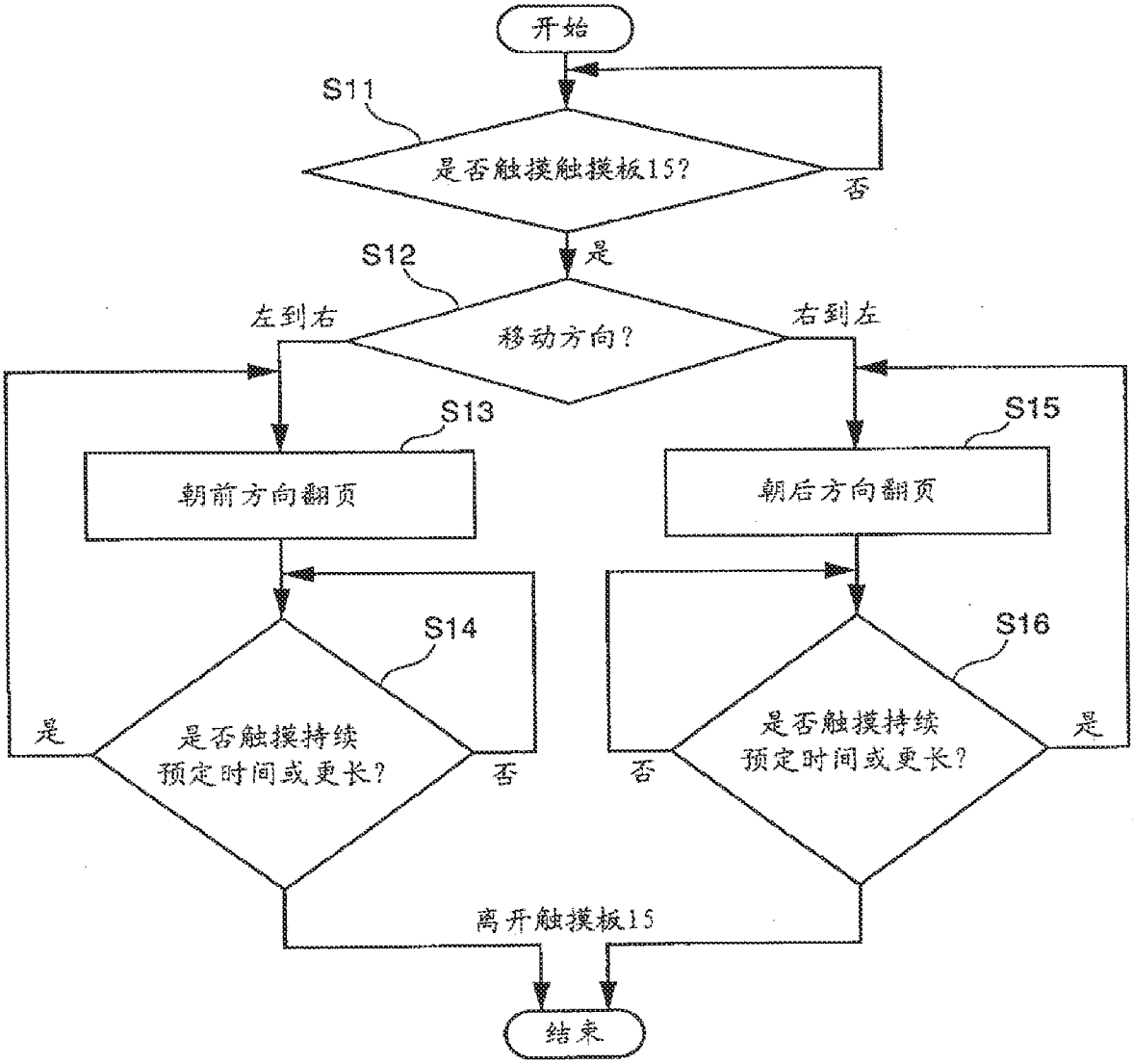


图 7

HP Inc. - Exhibit 1005 - Page 1892

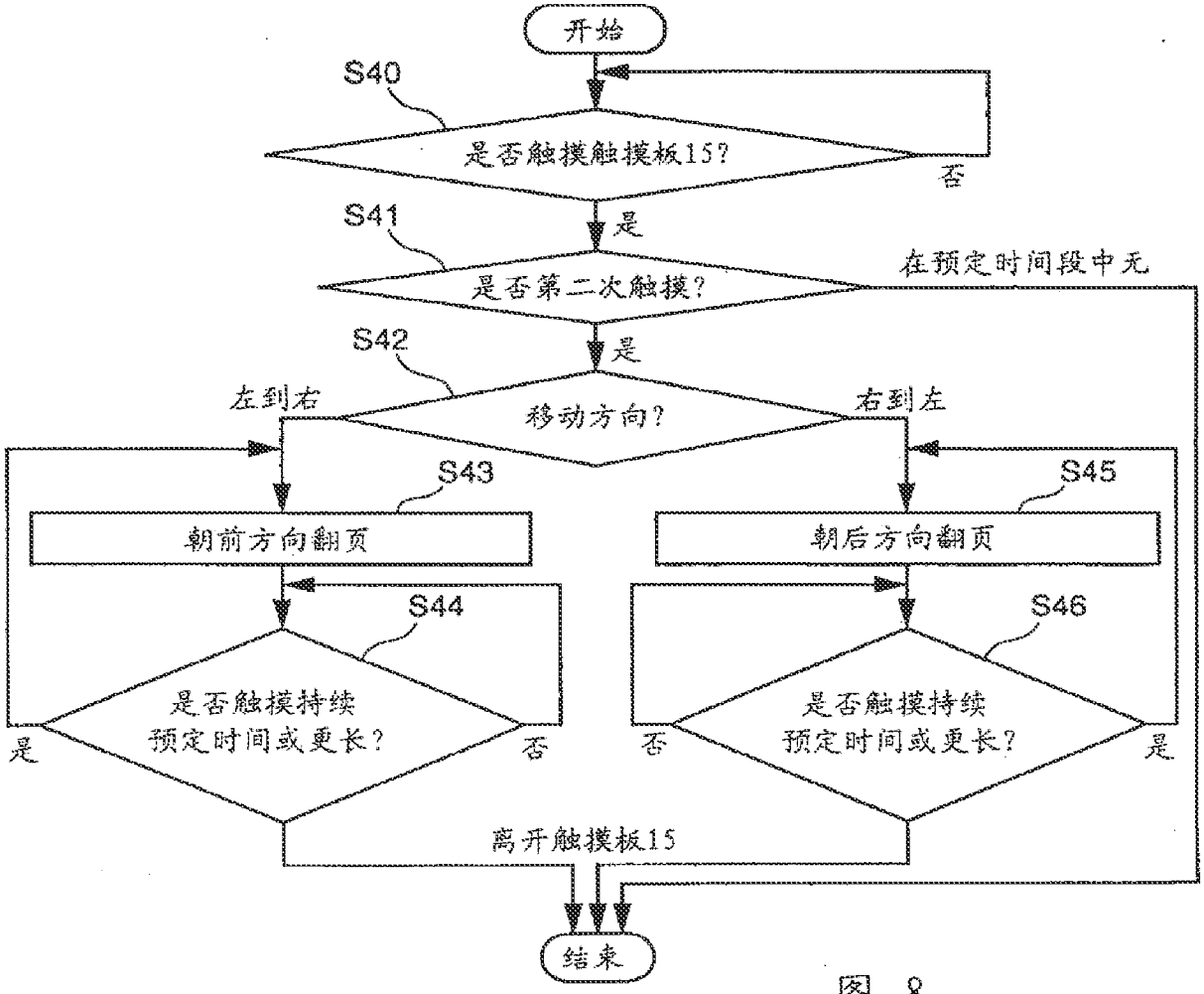
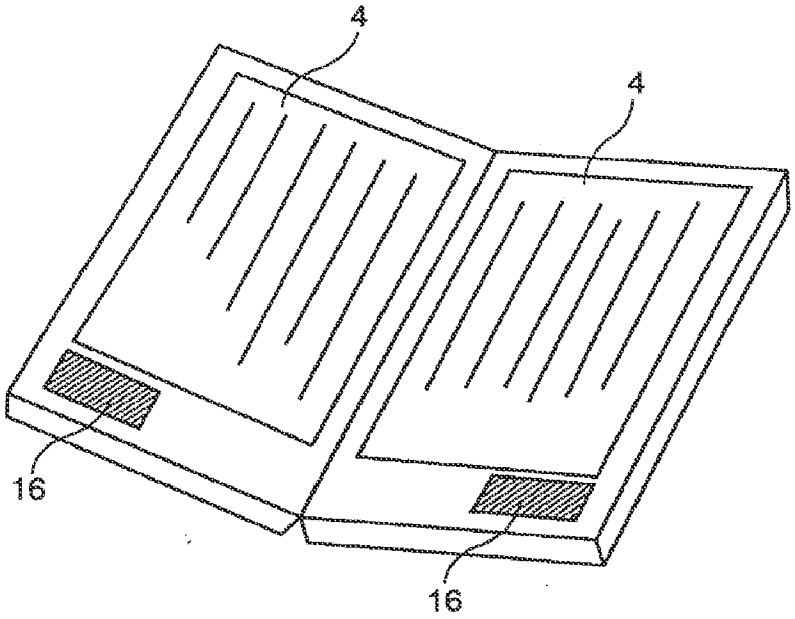


图 8

图 9



HP Inc. - Exhibit 1005 - Page 1893

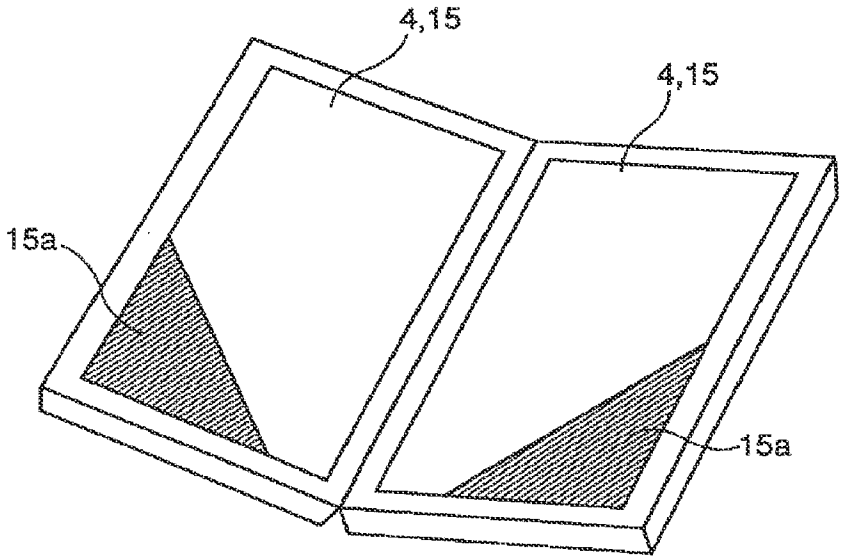


图 10

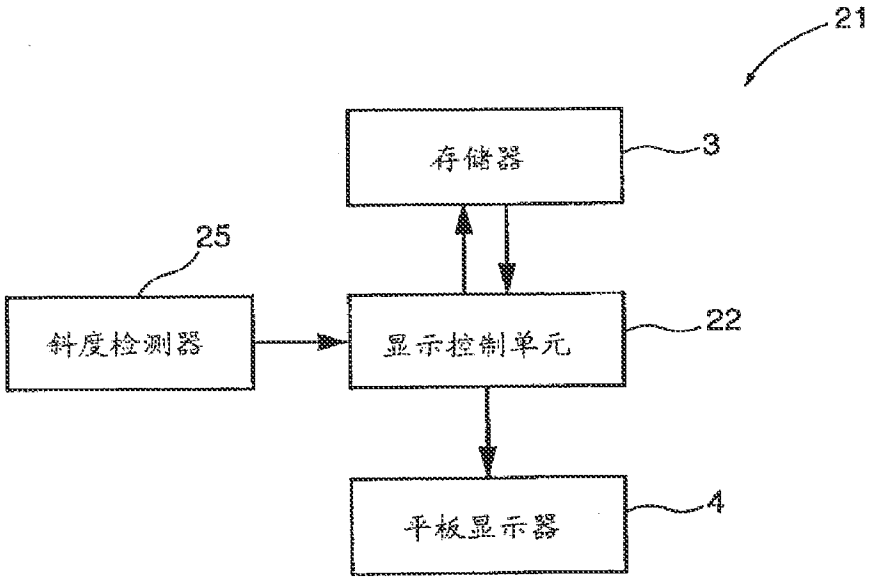


图 11

HP Inc. - Exhibit 1005 - Page 1894

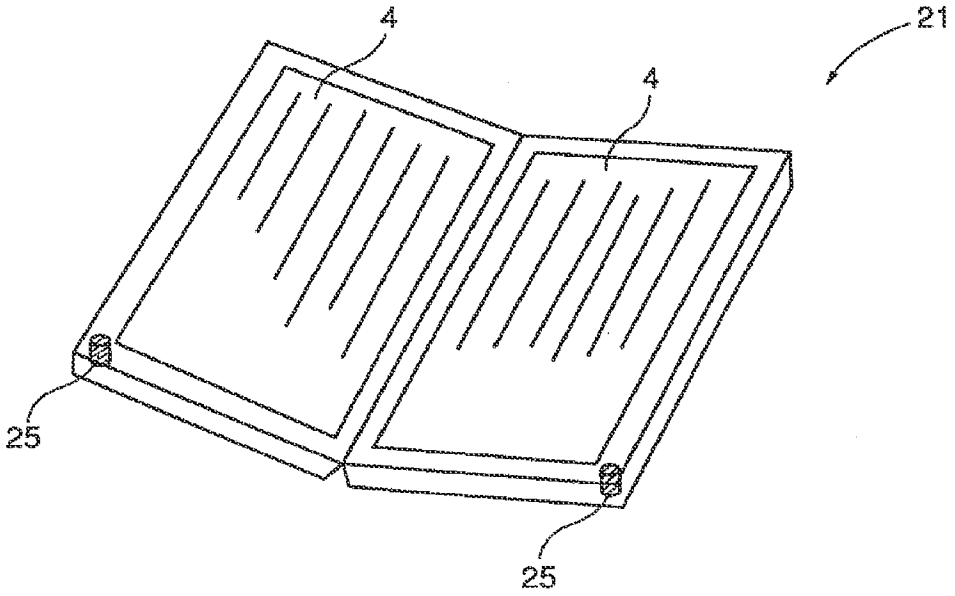


图 12

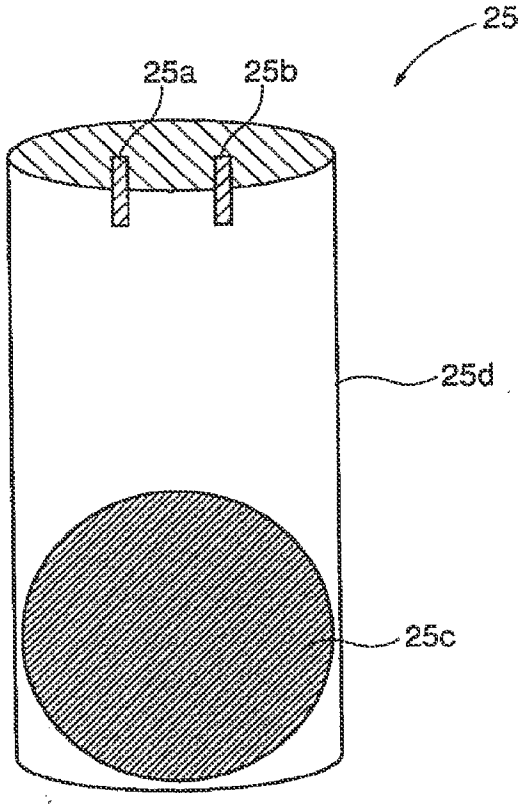


图 13

HP Inc. - Exhibit 1005 - Page 1895

00·08·23

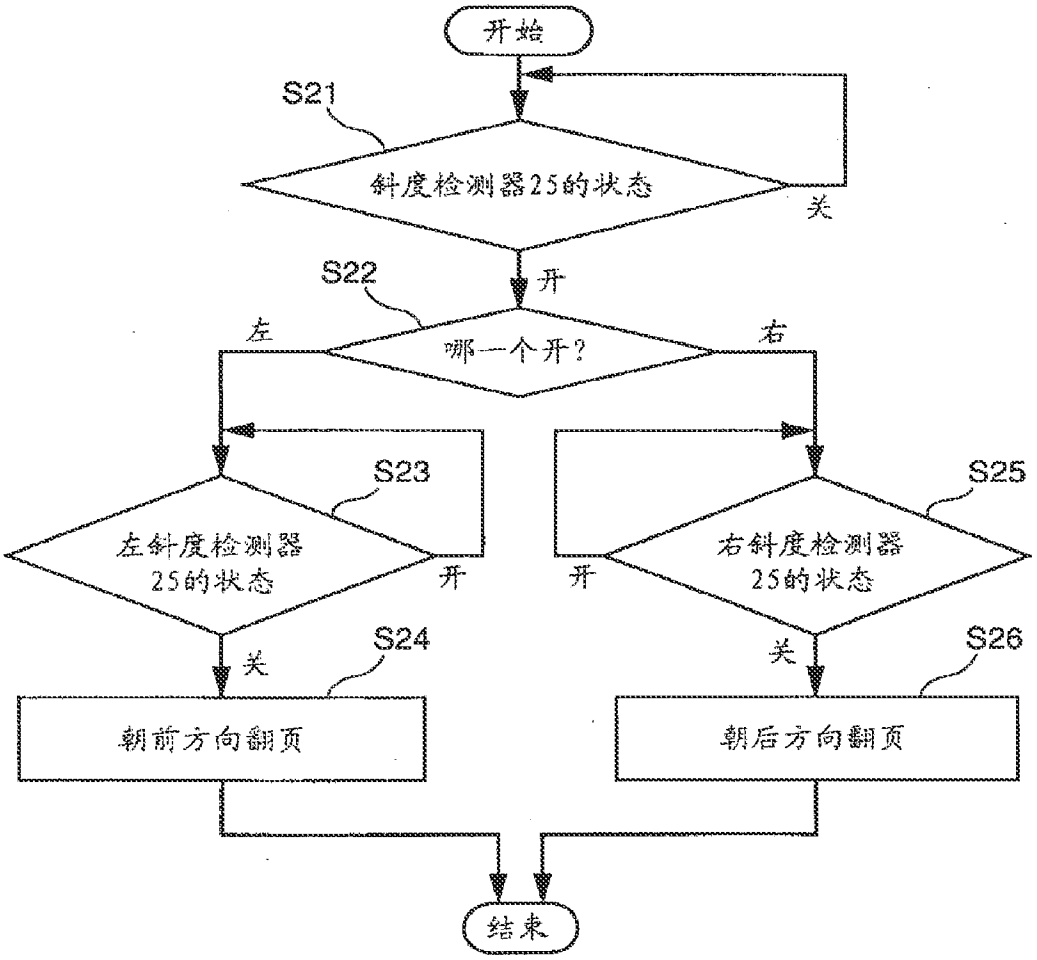


图 14

HP Inc. - Exhibit 1005 - Page 1896

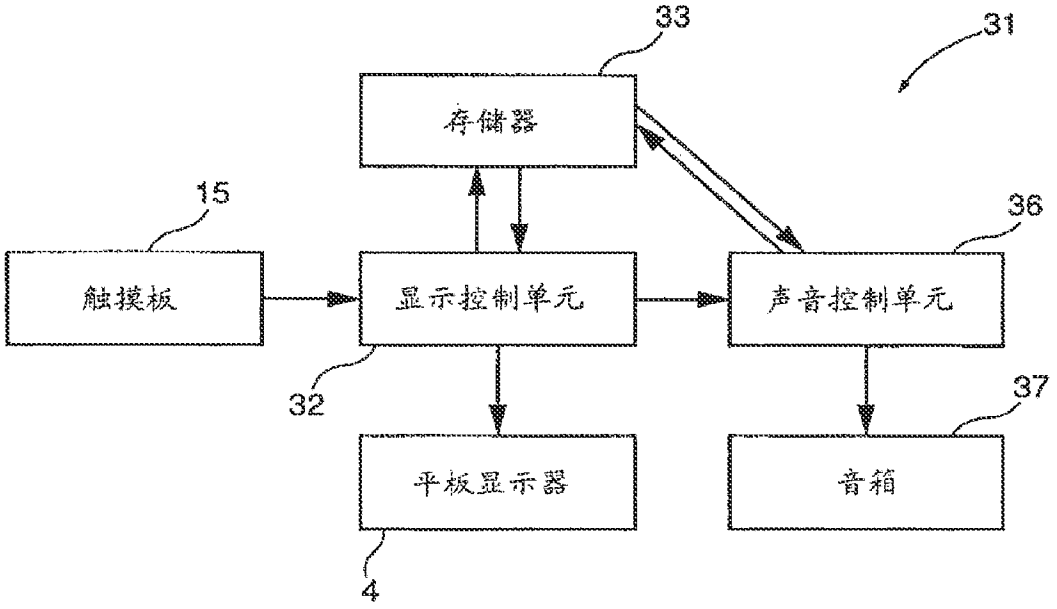


图 15

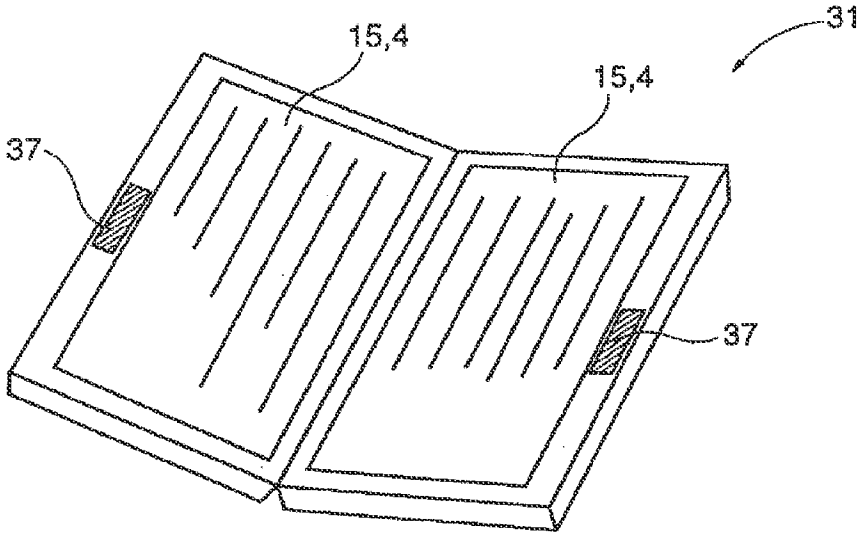


图 16

HP Inc. - Exhibit 1005 - Page 1897

00·05·23

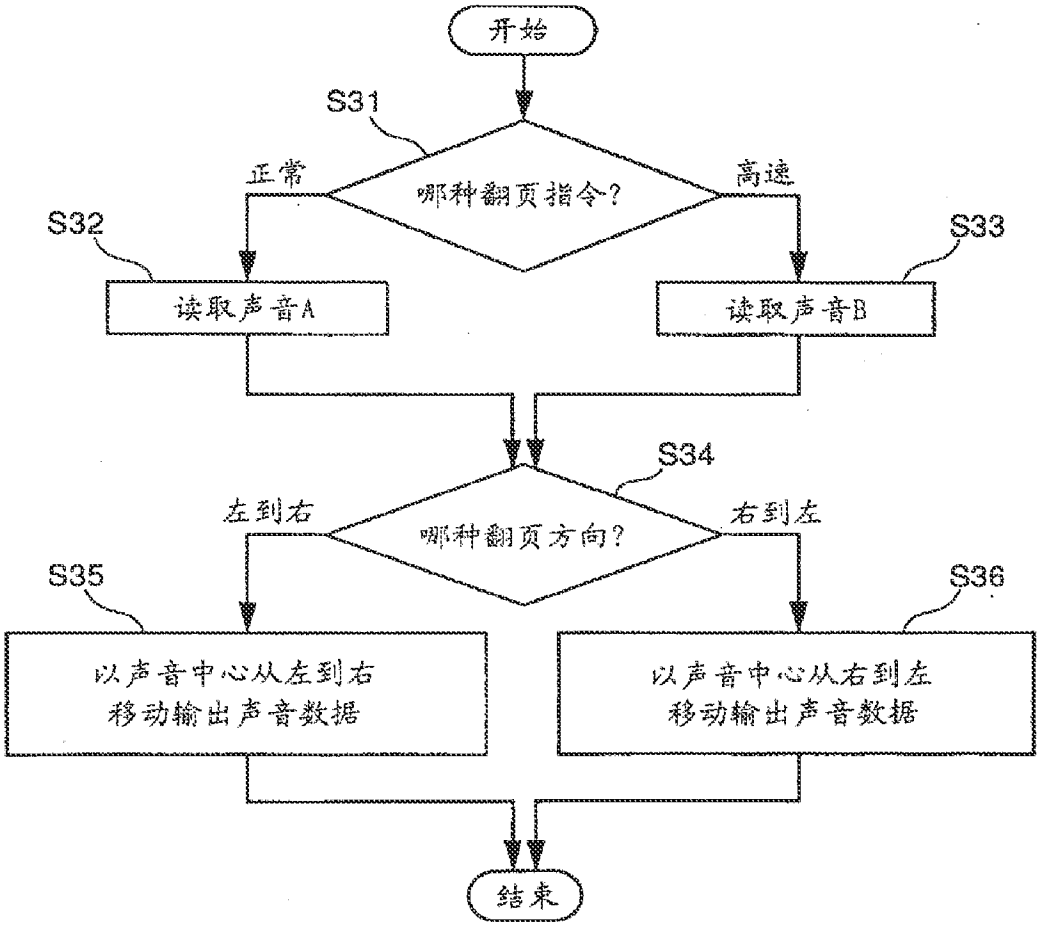


图 17

HP Inc. - Exhibit 1005 - Page 1898

01·08·23

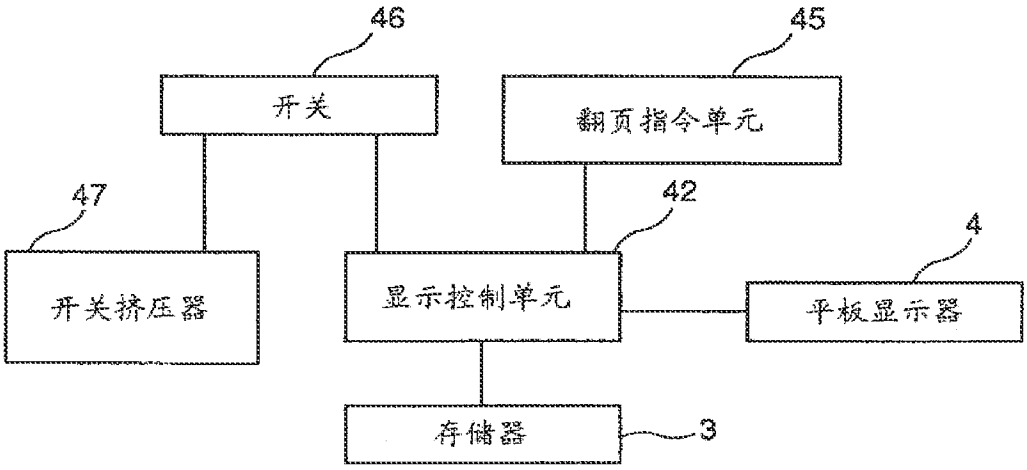


图 18

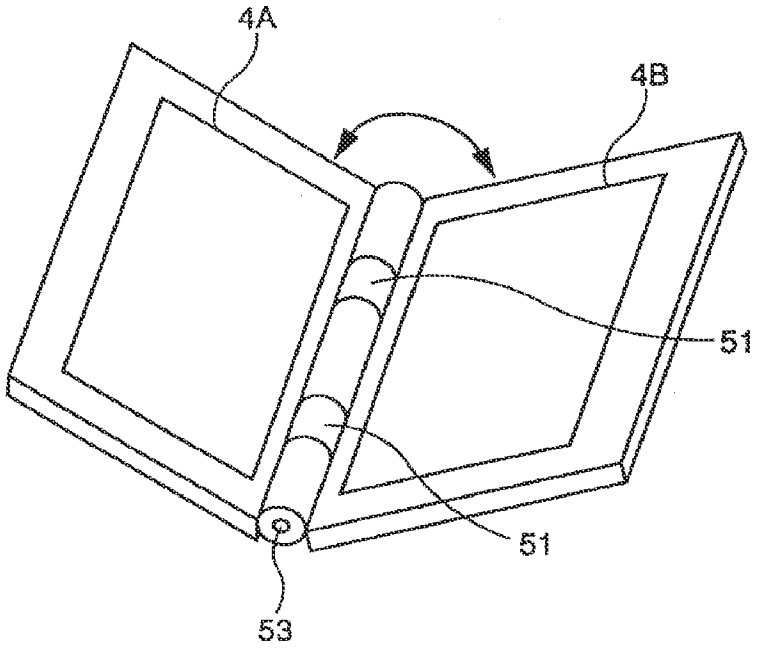


图 19

HP Inc. - Exhibit 1005 - Page 1899

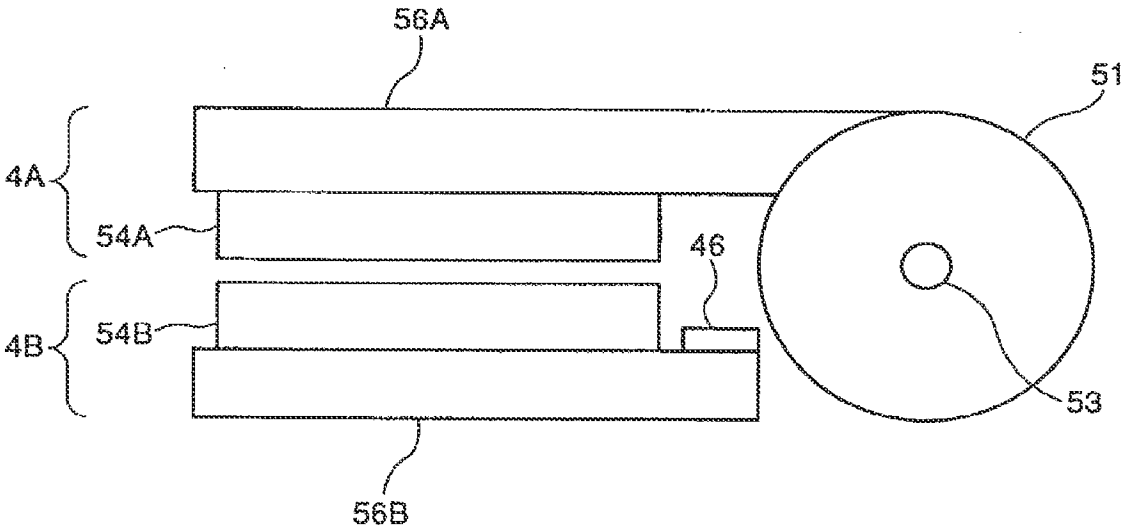


图 20

HP Inc. - Exhibit 1005 - Page 1900

00·03·23

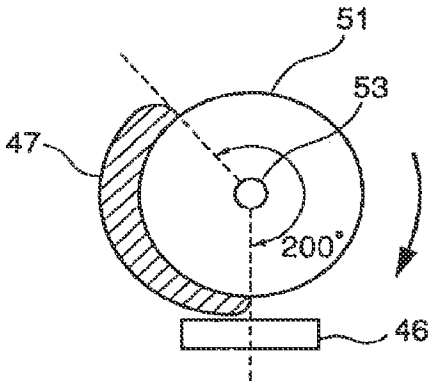


图 21

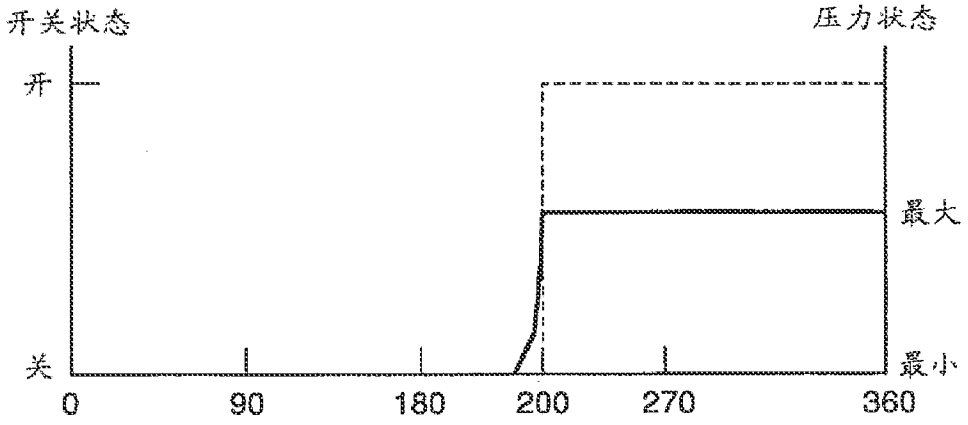


图 22

HP Inc. - Exhibit 1005 - Page 1901

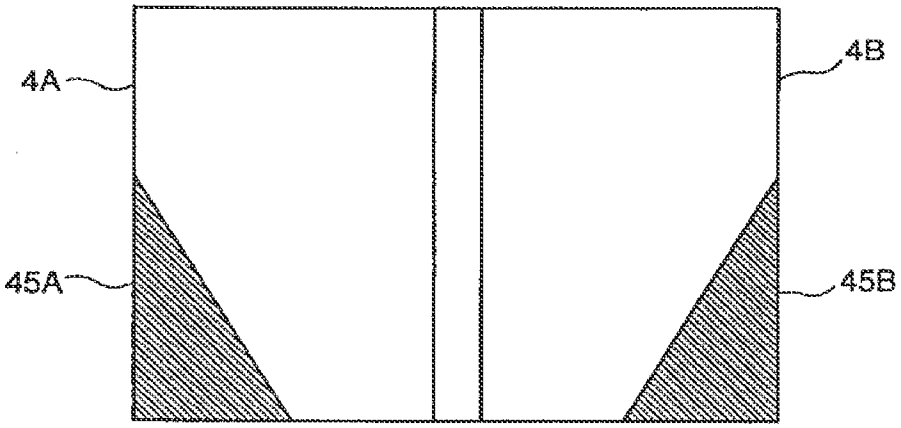


图 23

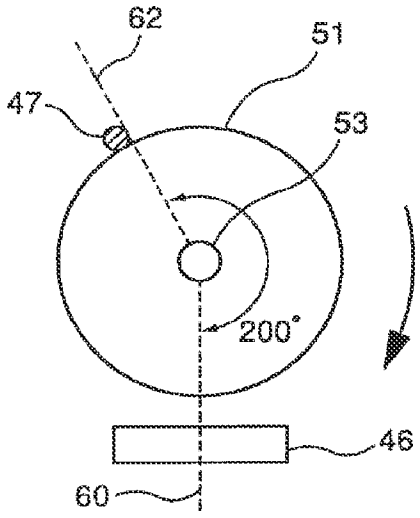


图 24

HP Inc. - Exhibit 1005 - Page 1902

00·08·23

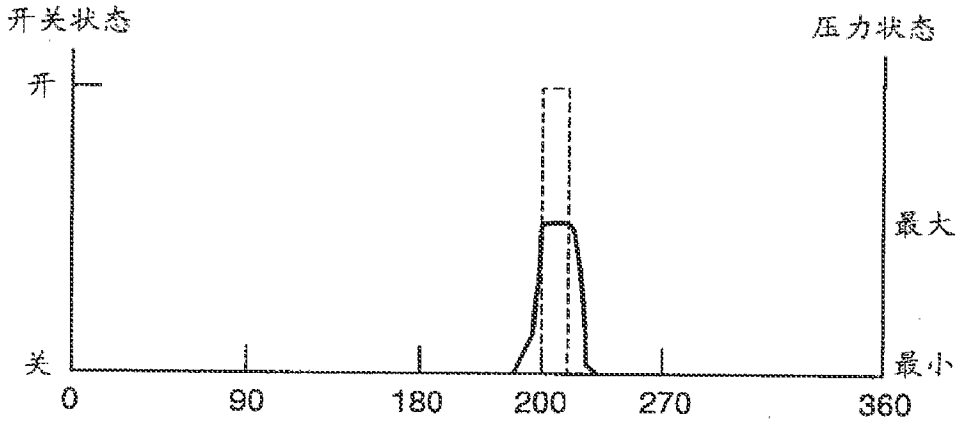


图 25

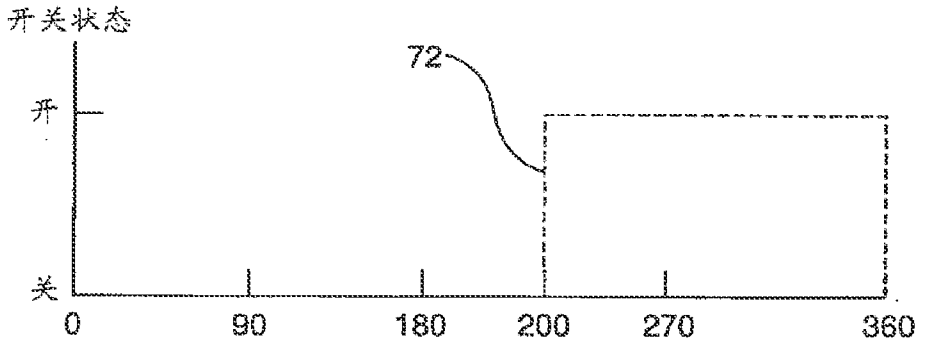


图 26

HP Inc. - Exhibit 1005 - Page 1903

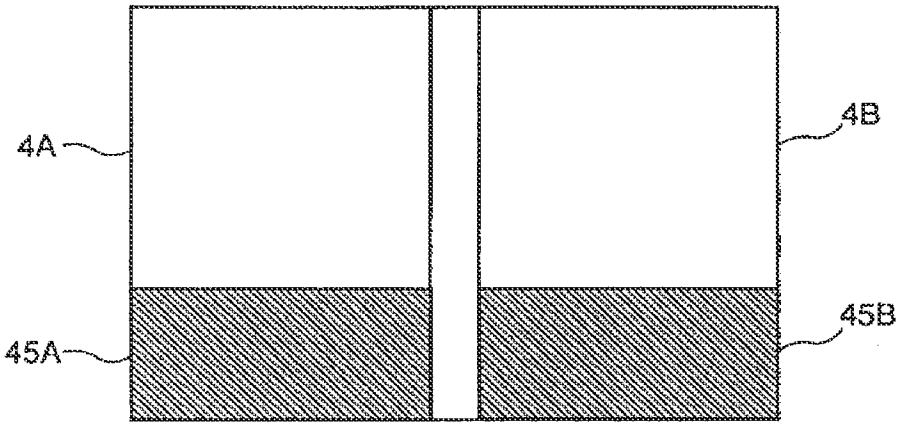


图 27

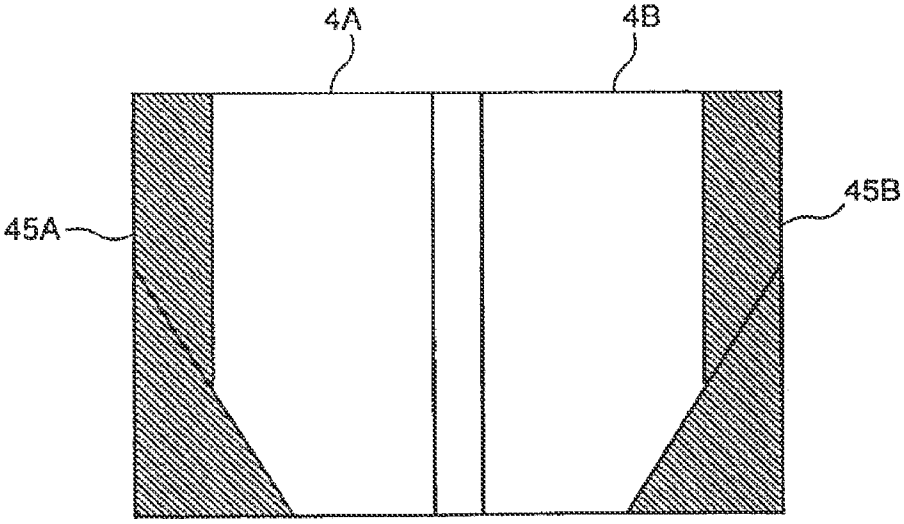


图 28

HP Inc. - Exhibit 1005 - Page 1904

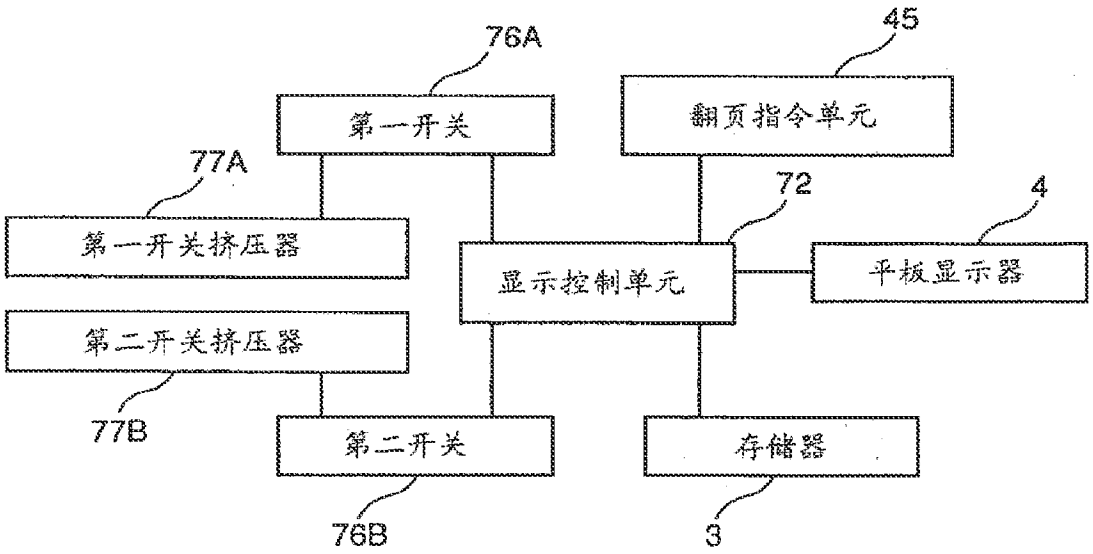


图 29

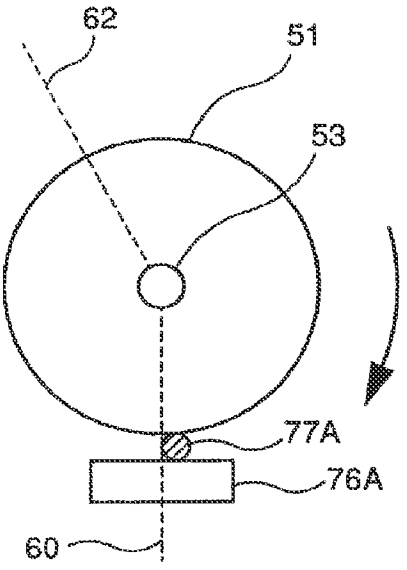


图 30

HP Inc. - Exhibit 1005 - Page 1905

00-08-23

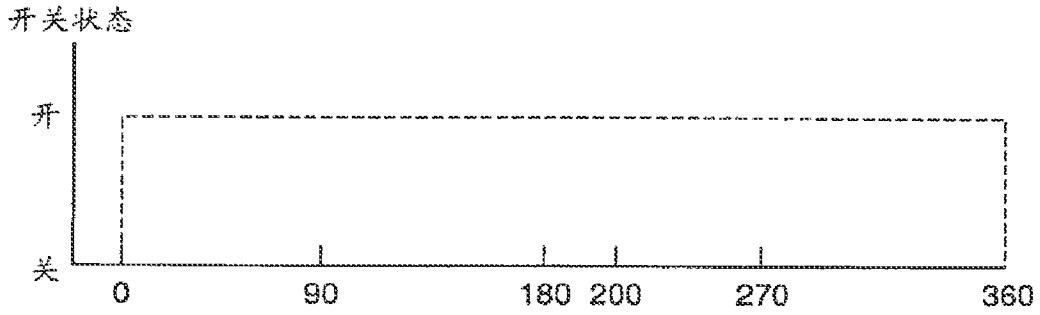


图 31A

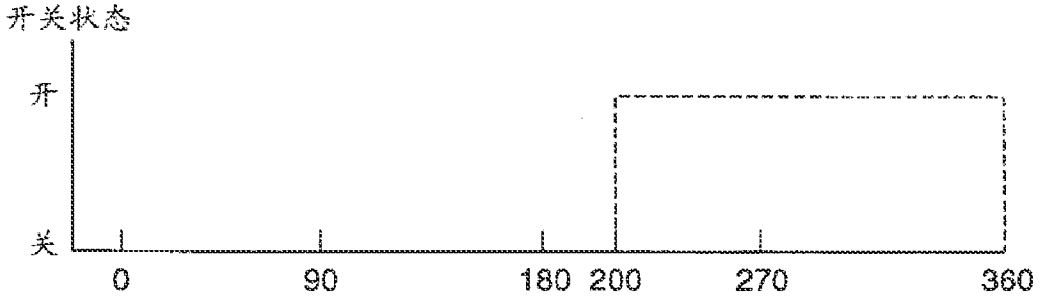


图 31B

第一开关的状态	第二开关的状态	平板显示器4A的状态	平板显示器4B的状态
开	开	不显示	显示
开	关	显示	显示
关	开	不显示	不显示
关	关	不显示	不显示

图 32

HP Inc. - Exhibit 1005 - Page 1906

00·08·23

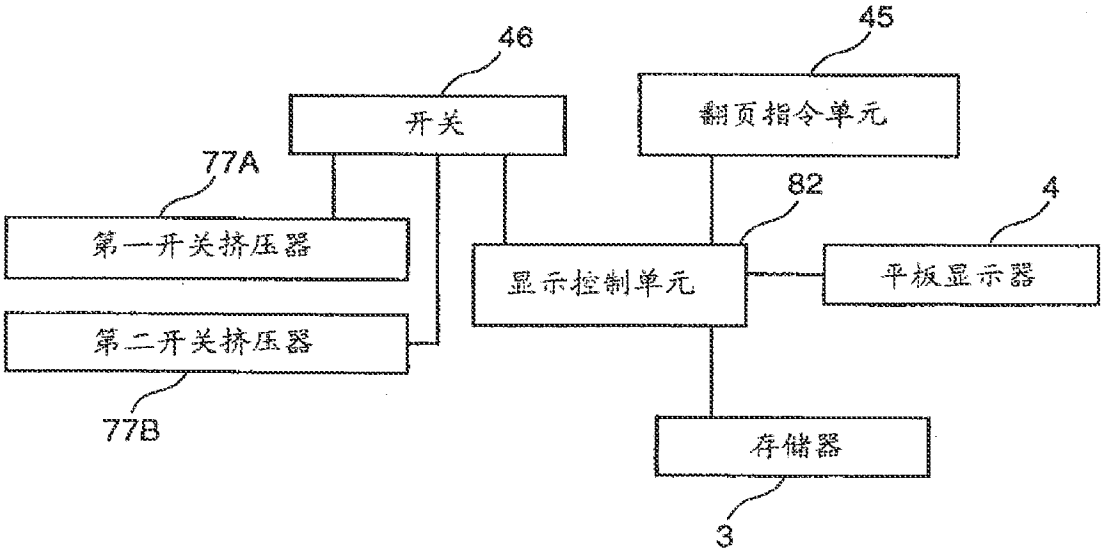


图 33

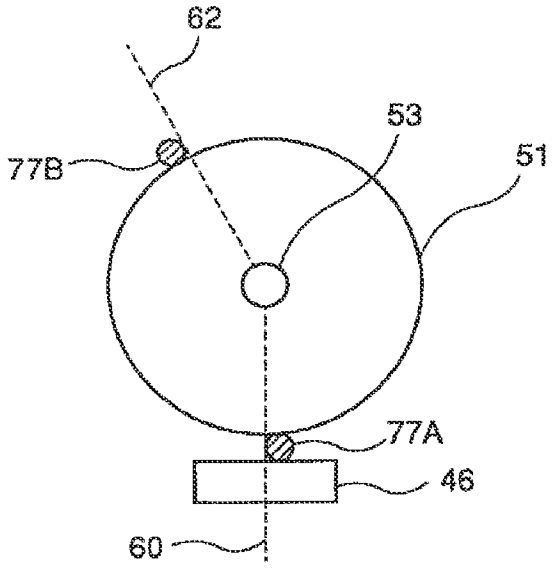


图 34

HP Inc. - Exhibit 1005 - Page 1907

00.08.23

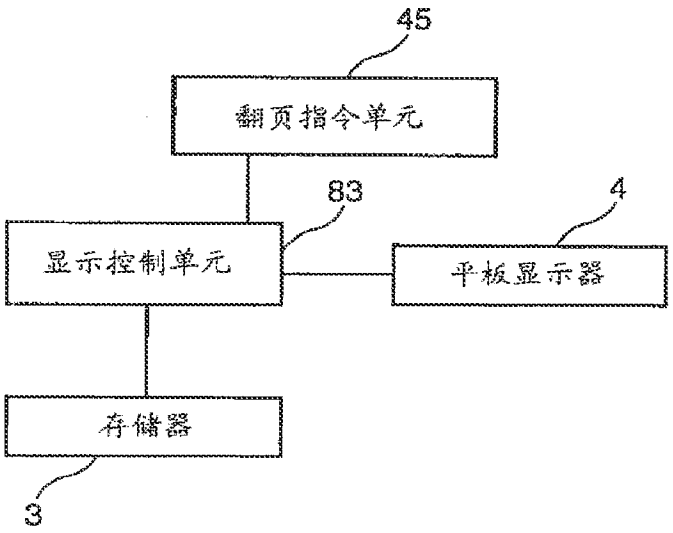


图 35

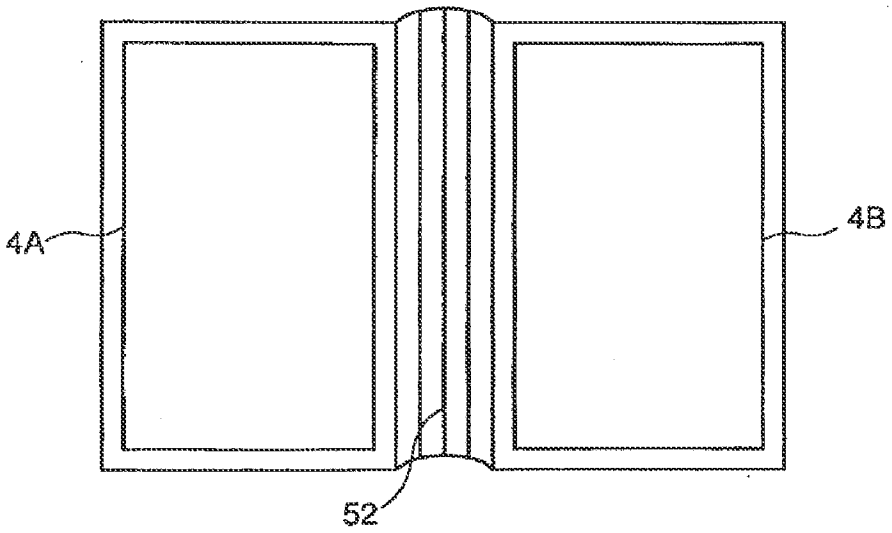


图 36

HP Inc. - Exhibit 1005 - Page 1908

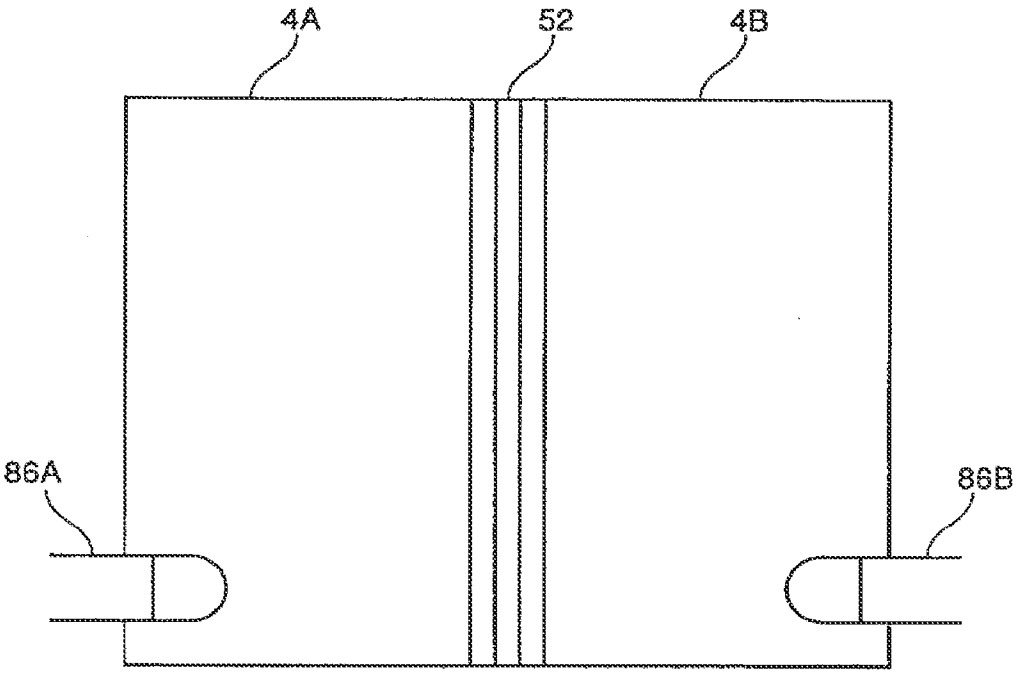


图 37A

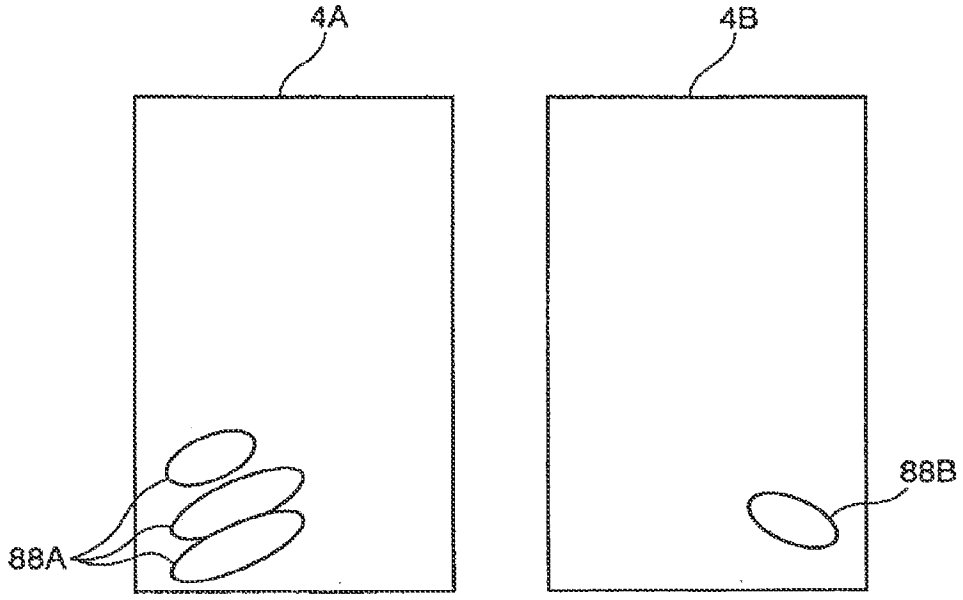


图 37B

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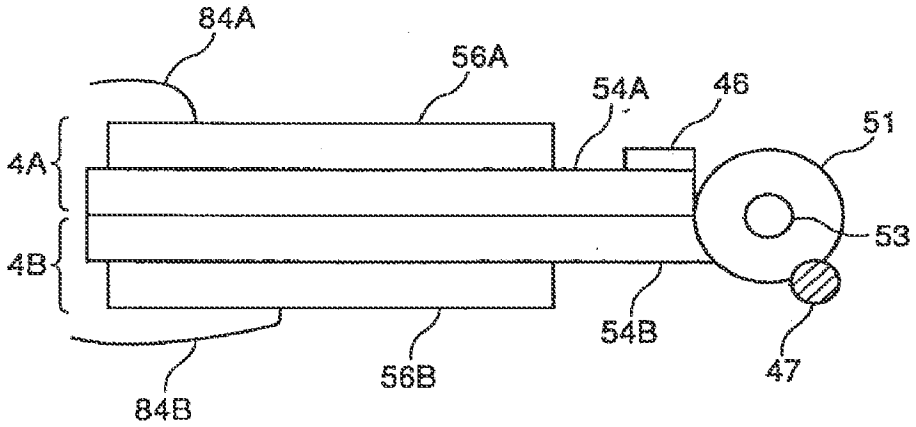


图 38

开关状态	触摸状态	平板显示器 4A的状态	平板显示器 4B的状态
开	一致	显示	显示
开	不一致	不显示	显示
关	一致	显示	显示
关	不一致	显示	显示

图 39

HP Inc. - Exhibit 1005 - Page 1910

00·08·23

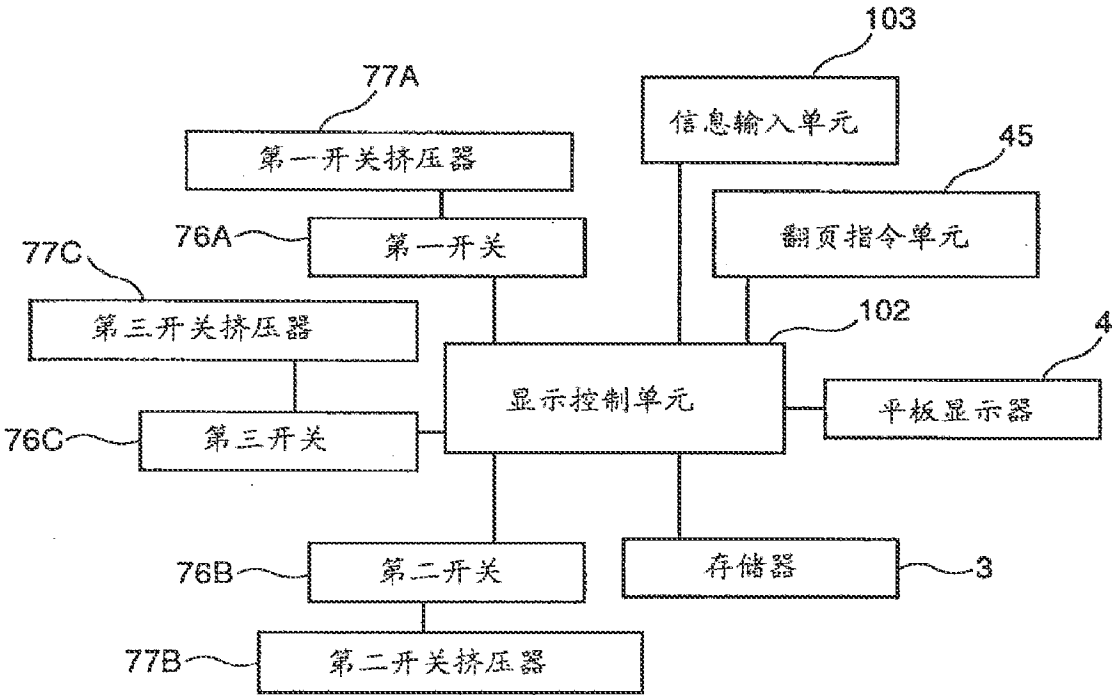


图 40

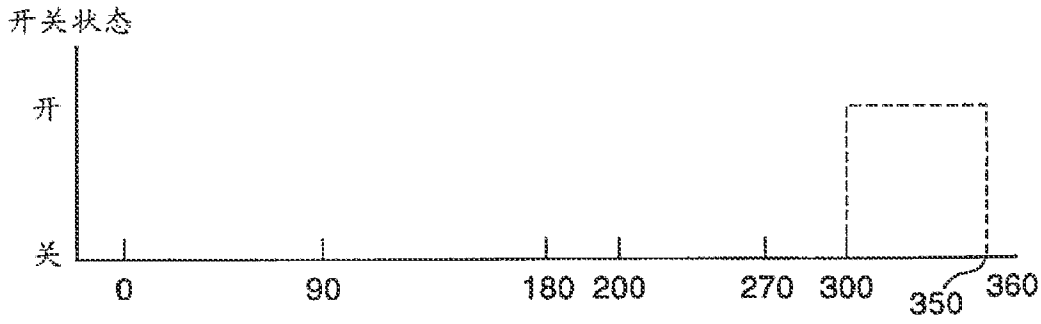


图 41

HP Inc. - Exhibit 1005 - Page 1911

第一开关状态	第二开关状态	第三开关状态	平板显示器4A的状态	平板显示器4B的状态
关	开	关	不显示	不显示
关	开	开	不显示	不显示
关	关	开	不显示	不显示
关	关	关	不显示	不显示
开	开	开	显示	显示
开	开	关	不显示	显示
开	关	关	显示	显示
开	关	开	显示	显示

图 42

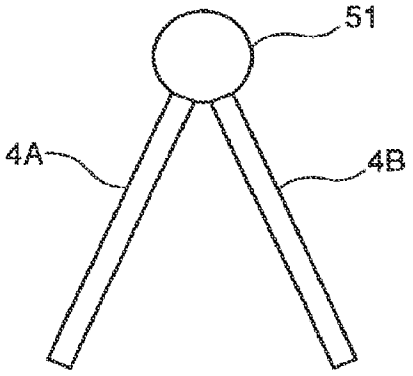


图 43

HP Inc. - Exhibit 1005 - Page 1912

00-05-23

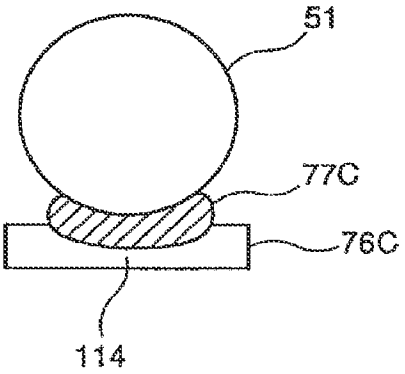


图 44

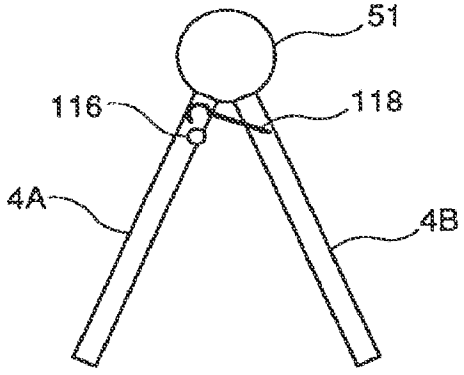


图 45

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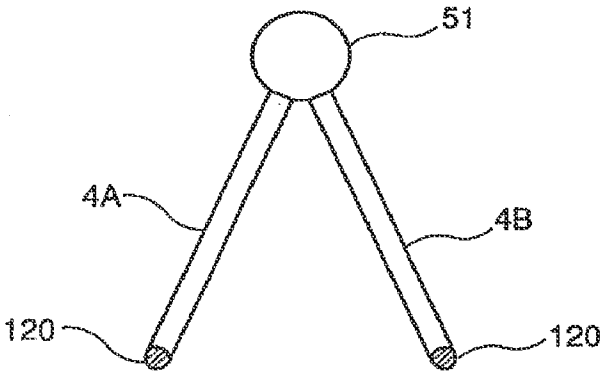


图 46

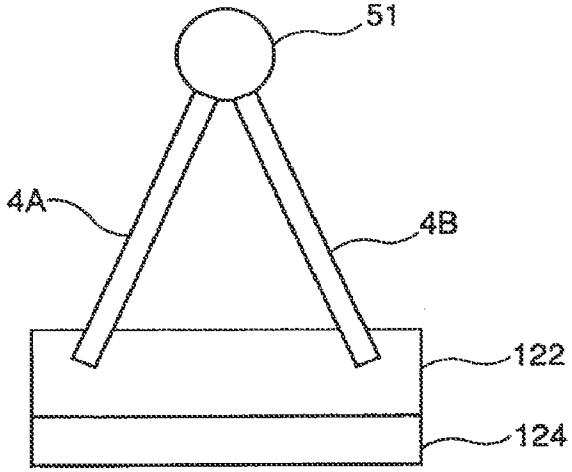


图 47

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06.08.23

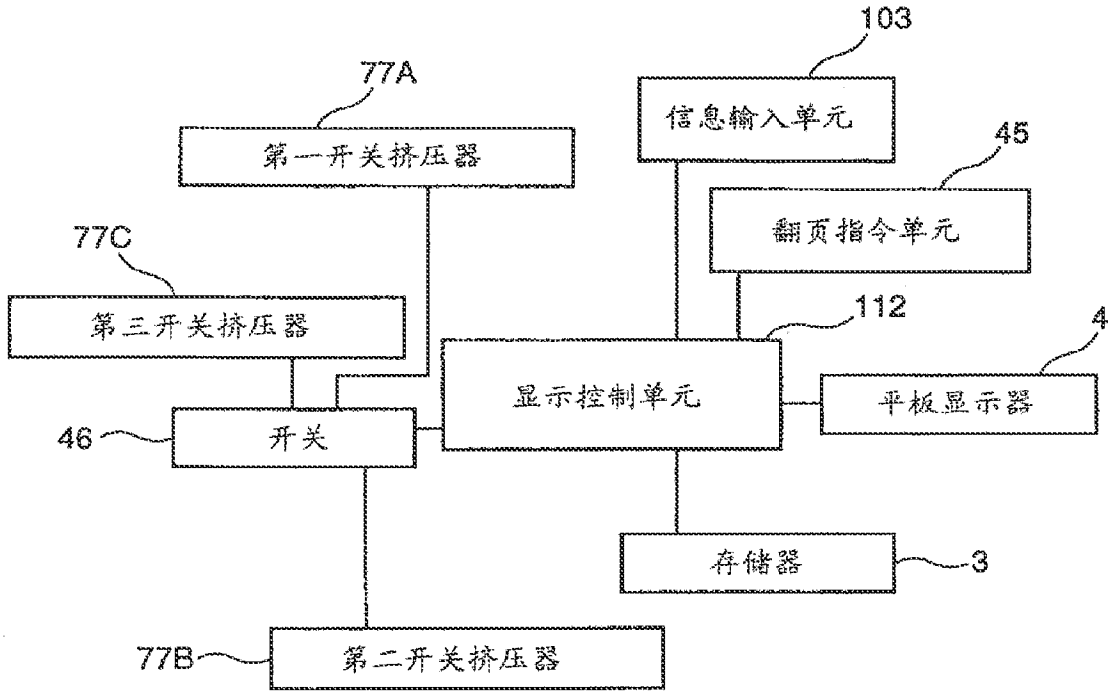


图 48

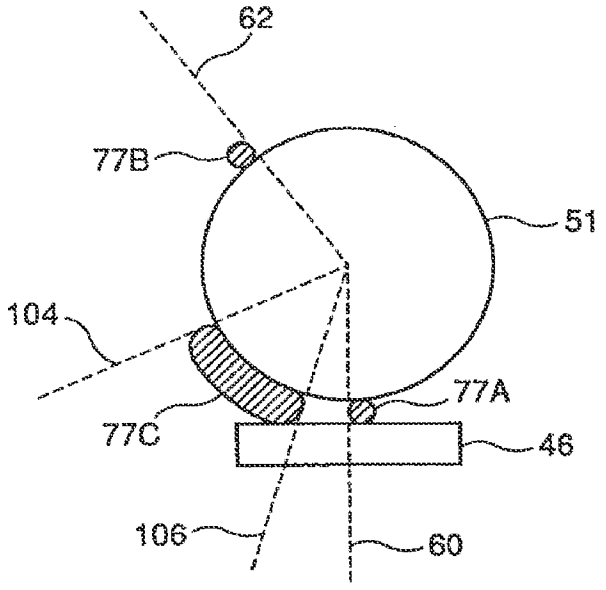


图 49

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Espacenet

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Methods and apparatuses for operating a portable device based on an accelerometer

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Classification: - international: *G06F1/16; G08B13/14*
- cooperative: G08B13/1409; G08B13/1436; G08B25/008

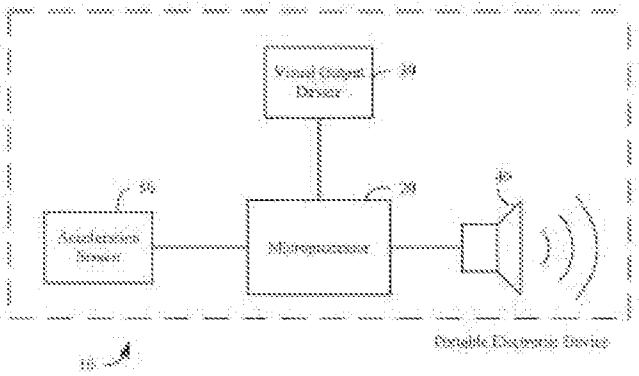
Application number: CN2005806827 20050127

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Also published as: CN1926496 (B) US2005190059 (A1) US2007146133 (A1) US2009224914 (A1) US2011227736 (A1) more

Abstract of CN1926496 (B)

Methods and apparatuses for operating a portable device based on an accelerometer are described. According to one embodiment of the invention, an accelerometer attached to a portable device detects a movement of the portable device. In response, a machine executable code is executed within the portable device to perform one or more predetermined user configurable operations. Other methods and apparatuses are also described.



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权利要求书 18 页 说明书 32 页 附图 31 页

[54] 发明名称

基于加速度计操作便携式设备的方法及装置

[57] 摘要

本发明描述了基于加速度计操作便携式设备的方法及装置。根据本发明的一个实施例，安装到便携式设备的加速度计检测便携式设备的运动。作为响应，机器可执行代码在便携式设备中被执行，以进行一个或多个预定的用户可配置操作。其他方法和装置也被描述。

1. 一种方法，包括：

利用安装到便携式设备的加速度计检测所述便携式设备的运动；以及

响应于所述便携式设备的运动的检测，执行机器可执行代码，以进行一个或多个预定的用户可配置动作。

2. 根据权利要求1所述的方法，进一步包括：

基于所述加速度计所提供的运动数据，确定所述运动的方向；以及

将所确定的运动的方向与预定方向相比较，以确定所确定的方向是否与所述预定方向相对匹配，以便执行所述机器可执行代码。

3. 根据权利要求2所述的方法，其中所述便携式设备的运动包括平行于所述便携式设备的表面朝某方向移动所述便携式设备。

4. 根据权利要求2所述的方法，其中所述便携式设备的运动包括相对于所述便携式设备的边和角中至少一个旋转所述便携式设备。

5. 根据权利要求2所述的方法，其中所述便携式设备的运动包括平行于所述便携式设备的表面朝某方向移动所述便携式设备、相对于所述便携式设备的边旋转所述便携式设备、以及相对于所述便携式设备的角旋转所述便携式设备中至少两个的组合。

6. 根据权利要求2所述的方法，进一步包括基于由所述加速度计所收集的运动数据确定所述便携式设备在所述运动后的定向，其中基于所确定的定向执行所述一个或多个预定的用户可配置动作。

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7. 根据权利要求6所述的方法，其中所述一个或多个预定的用户可配置动作包括根据与所述图像在所述运动之前的定向相对一致的定向在所述便携式设备的显示屏上显示图像。

8. 根据权利要求7所述的方法，其中所述图像包括文档页面、网页以及幻灯片演示页面中之一。

9. 根据权利要求2所述的方法，进一步包括：

在所述运动之前，在所述便携式设备的显示屏上显示文档的第一页；以及

如果所确定的运动的方向相对匹配所述预定方向，则在所述便携式设备的显示屏上显示所述文档的不同于所述第一页的第二页。

10. 根据权利要求9所述的方法，进一步包括在所述文档的第一页和第二页之间显示一个或多个中间页面，所述一个或多个中间页面表示从所述第一页到所述第二页的转换。

11. 根据权利要求9所述的方法，其中当所述便携式设备的运动被检测时，所述便携式设备被放置在支撑平面上，并且当突发力拍打所述支撑平面时，所述便携式设备的运动被检测。

12. 根据权利要求11所述的方法，进一步包括：

通过所述支撑表面检测由拍打所述支撑平面所导致的所述便携式设备的振动；以及

基于所检测的所述便携式设备的振动产生所述运动数据。

13. 根据权利要求11所述的方法，其中所述文档的第二页被显示为从所述文档的第一页前进的下一页面。

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14. 根据权利要求11所述的方法，其中所述文档的第二页被显示为从所述文档的第一页返回的前一页面。

15. 根据权利要求2所述的方法，进一步包括：

在所述运动之前，在所述便携式设备的显示屏上显示文档页面的第一部分；以及

如果所确定的运动的方向与所述预定方向相对匹配，则在所述便携式设备的显示屏上显示所述文档页面的不同于所属第一部分的第二部分。

16. 根据权利要求15所述的方法，进一步包括在所述文档页面的第一和第二部分之间显示一个或多个所述文档页面的过渡部分，所述一个或多个过渡部分表示从所述第一部分到所述第二部分的转换。

17. 根据权利要求16所述的方法，其中从第一部分转换地显示所述第二部分，就像所述便携式设备在移动、而所述文档页面是静止的一样。

18. 根据权利要求16所述的方法，其中根据从用户视点所确定的运动的方向执行从所述第一部分到所述第二部分的转换。

19. 根据权利要求15所述的方法，其中所述文档页面不能被完整地显示在所述便携式设备的显示屏中的一个页面上。

20. 根据权利要求15所述的方法，其中所述文档页面是地图、报纸以及视频游戏场景之一。

21. 根据权利要求2所述的方法，进一步包括：

显示从用户视点看来朝从第一场景到第二场景的方向转换的一

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系列图像；

检测所述便携式设备的运动是否和与从用户视点看所述转换的方向相关联的方向一致；以及

如果根据与所述转换的方向相关联的方向没有检测到所述运动，则执行预定操作。

22. 根据权利要求21所述的方法，其中所述预定操作包括下述操作之一：引起所述便携式设备的振动，产生声音报警，以及振动和声音报警的组合。

23. 根据权利要求21所述的方法，进一步包括：

基于由所述加速度计所提供的运动数据，确定所述便携式设备的运动的加速度；以及

用与所述运动的加速度相对关联的加速度调整所述图像序列的显示。

24. 根据权利要求21，其中所述图像序列表示视频游戏的活动场景，并且所述便携式设备表示从拿着所述便携式设备的用户的视点看面向所述运动场景的运动对象。

25. 根据权利要求6所述的方法，进一步包括：

启动所述便携式设备的最适合于给定的确定定向的至少一个接口；以及

可选地，去激励所述便携式设备的较不适合于给定的确定定向的至少一个接口。

26. 根据权利要求25所述的方法，进一步包括：

基于由所述加速度计所提供的运动数据，确定在所述运动之后所述便携式设备是否被用户拿着；以及

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预测所述用户用于握持所述便携式设备的手的位置，其中基于所述手的预测位置启动或去激励所述至少一个的接口。

27. 根据权利要求26所述的方法，进一步包括：

启动不在所述预测位置内的至少一个接口；以及

去激励在所述预测位置内的至少一个接口。

28. 根据权利要求25所述的方法，其中所述至少一个接口包括一个或多个无线收发器。

29. 根据权利要求28所述的方法，进一步包括：

启动以相对较强信号通信的至少一个无线收发器；以及

去激励以相对较弱信号通信的至少一个无线收发器。

30. 根据权利要求25所述的方法，其中所述至少一个接口包括一个或多个扬声器。

31. 根据权利要求30所述的方法，进一步包括驱动至少一个扬声器，以在所述运动之后在便携式设备的给定的确定的定向上具有最佳声音效果。

32. 根据权利要求25所述的方法，其中所述至少一个接口包括一个或多个照相机。

33. 根据权利要求25所述的方法，其中所述至少一个接口包括一个或多个麦克风。

34. 根据权利要求25所述的方法，其中所述至少一个接口包括一个或多个视频输出接口。

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35. 根据权利要求2所述的方法，进一步包括：

基于由所述加速度计所提供的运动数据，确定所述运动是否是重复运动；以及

确定所述运动的重复率，其中基于所确定的运动的重复率执行所述机器可执行代码。

36. 根据权利要求35所述的方法，其中所述便携式设备是多媒体播放器，并且执行所述机器可执行代码包括通过所述便携式设备播放多媒体内容。

37. 根据权利要求36所述的方法，进一步包括调整当前正被播放的多媒体内容的节奏，以相对匹配所确定的运动的重复率。

38. 根据权利要求36所述的方法，进一步包括选择和播放节拍与所确定的运动的重复率相对匹配的多媒体内容。

39. 根据权利要求36所述的方法，其中所述便携式设备是数字音频播放器。

40. 根据权利要求1所述的方法，进一步包括确定所述便携式设备的包括活动运行状态和非活动运行状态之一的运行状态，其中基于所确定的运行状态执行所述机器可执行代码。

41. 根据权力要求40所述的方法，进一步包括：如果基于所述加速度计所提供的运动数据确定所述便携式设备处于非活动状态并且正在移动，则将所述便携式设备转换到相对较低功率模式。

42. 根据权利要求40所述的方法，进一步包括：如果基于由所

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述加速度计所提供的运动数据确定所述便携式设备处于非活动状态并且不是正在移动，则将所述便携式设备转换为睡眠模式。

43. 根据权利要求42所述的方法，其中将所述便携式设备转换为睡眠模式包括：

将所述便携式设备的系统存储器中的至少一部分内容交换到所述便携式设备的永久存储器中；以及

基本关闭所述便携式设备消耗的所有电源。

44. 根据权利要求40所述的方法，其中当所述便携式设备处于非活动状态时，所述便携式设备的盖子是合着的。

45. 根据权利要求40所述的方法，其中当所述便携式设备处于非活动状态时，所述便携式设备的用户接口被锁定。

46. 根据权利要求40所述的方法，其中当所述便携式设备处于非活动状态时，所述便携式设备的接口设备被禁用。

47. 根据权利要求2所述的方法，进一步包括：

在检测所述便携式设备的运动之前，要求用户移动所述便携式设备，作为密码输入的一部分；以及

基于所述便携式设备的运动方向是否相对匹配所述预定方向，指示所述密码是否被正确输入。

48. 根据权利要求47所述的方法，进一步包括在请求所述用户移动所述便携式设备之前，提示所述用户输入所述密码的第一部分，其中基于所述便携式设备的所述运动以及所输入的所述密码的第一部分确定所述密码是否被成功输入的指示。

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49. 根据权利要求48所述的方法，进一步包括：在请求所述用户移动所述便携式设备之后，提示所述用户输入所述密码的第二部分，其中基于所述便携式设备的运动以及所输入的所述密码的第一和第二部分确定所述密码是否被成功输入的指示。

50. 根据权利要求2所述的方法，进一步包括：

利用所述加速度计记录一段时间内所述便携式设备的一系列运动；以及

随后利用所记录的运动序列绘制表示所述运动序列的轨迹。

51. 根据权利要求50所述的方法，其中记录所述运动序列包括：

基于所述加速度计所提供的运动数据确定每个运动的运动方向；以及

记录具有不同运动方向的每个运动之间的时间间隔，其中基于所确定的每个运动的方向以及每个运动之间的时间间隔执行所述绘制。

52. 根据权利要求51所述的方法，进一步包括在绘制之前，将所记录的运动序列存储到所述便携式设备的存储器中。

53. 根据权利要求52所述的方法，其中通过从所述便携式设备的存储器中检索所记录的运动序列离线地执行所述绘制。

54. 根据权利要求2所述的方法，进一步包括：

基于所述加速度计所提供的运动数据，确定所述便携式设备的预定表面是否朝向预定方向；以及

如果所述便携式设备的预定表面朝向所述预定方向，则使所述便携式设备进入相对较低功率模式。

55. 根据权利要求54所述的方法，其中如果所述便携式设备的

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显示器表面朝下，则使所述便携式设备进入所述相对较低功率模式。

56. 根据权利要求2所述的方法，进一步包括：

确定所述便携式设备是否处于锁定状态；以及

如果所述便携式设备处于锁定状态，则产生警报以指示所述便携式设备的运动。

57. 根据权利要求56所述的方法，其中产生所述警报包括产生可听到的音频警报。

58. 根据权利要求56所述的方法，其中产生所述警报包括通过网络将信号发送到远程设备。

59. 根据权利要求2所述的方法，进一步包括：

基于所述加速度计所提供的运动数据，确定所述便携式设备的位置简表；以及

根据所确定的位置简表配置所述便携式设备。

60. 根据权利要求59所述的方法，其中配置所述便携式设备包括：如果所述便携式设备与移动简表相关联，则禁用所述便携式设备的无线网络接口以及使能所述便携式设备的蜂窝接口。

61. 根据权利要求1所述的方法，其中所述便携式设备是膝上型计算机、触摸屏PC、PDA(个人数字助理)、蜂窝电话、个人通信器以及多媒体播放器中之一。

62. 一种便携式设备，包括：

处理器；

连接到所述处理器的存储器，所述存储器存储有指令；以及

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连接到所述处理器和所述存储器的加速度计，用于检测所述便携式设备的运动，其中所述处理器响应于检测到所述便携式设备的运动而执行来自所述存储器的指令以执行一个或多个预定的用户可配置动作。

63. 根据权利要求62所述的便携式设备，进一步包括连接到所述加速度计以及所述处理器的控制器，所述控制器用于

基于所述加速度计所提供的运动数据，确定所述运动的方向；以及

将所确定的运动的方向与预定方向相比较，以确定所确定的方向是否相对匹配所述预定方向，以便执行所述指令。

64. 一种具有用于使机器执行方法的可执行代码的机器可读介质，所述方法包括：

利用安装到便携式设备的加速度计，检测所述便携式设备的运动；以及

响应于检测到所述便携式设备的运动，执行机器可执行代码，以进行一个或多个预定的用户可配置动作。

65. 根据权利要求64所述的机器可读介质，其中所述方法进一步包括：

基于所述加速度计所提供的运动数据，确定所述运动的方向；以及

将所确定的运动的方向与预定方向相比较，以确定所确定的方向是否相对匹配所述预定方向，以便执行所述机器可执行代码。

66. 一种装置，包括：

用于利用安装到便携式设备的加速度计检测所述便携式设备的运动的单元；以及

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用于响应于检测到所述便携式设备的运动而执行机器可执行代码，以进行一个或多个预定的用户可配置动作的单元。

67. 根据权利要求66所述的装置，进一步包括：

用于基于所述加速度计所提供的运动数据确定所述运动的方向的单元；以及

用于比较所确定的运动的方向与预定方向，以确定所确定的方向是否相对匹配所述预定方向，以便执行所述机器可执行代码的单元。

68. 一种方法，包括：

利用安装到便携式设备的加速度计检测所述便携式设备的运动；

基于所述加速度计所提供的运动数据确定所述运动之后所述便携式设备的定向；以及

根据与所述运动之前所述图像的定向相对一致的定向，在所述便携式设备的显示屏上显示图像。

69. 根据权利要求68所述的方法，其中所述图像是文档页面、网页以及幻灯片演示页面之一。

70. 一种方法，包括：

在便携式设备的显示屏上显示文档的第一页；

利用安装到所述便携式设备的加速度计，检测所述便携式设备的运动；以及

响应于运动的检测，显示所述文档的不同于所述第一页的第二页。

71. 根据权利要求70所述的方法，进一步包括基于所述加速度计所提供的运动数据，确定所述运动的方向，其中如果所确定的方向相对匹配预定方向，则显示所述第二页。

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72. 根据权利要求71所述的方法，进一步包括在所述文档的第一和第二页之间显示一个或多个中间页面，其中所述一个或多个中间页面表示从所述第一页到所述第二页的转换。

73. 根据权利要求71所述的方法，其中当检测所述便携式设备的运动时，所述便携式设备被放在支撑平面上，并且当突发力敲打所述支撑表面时检测所述便携式设备的运动。

74. 根据权利要求73所述的方法，进一步包括：

通过所述支撑平面检测由敲打所述支撑平面所引起的所述便携式设备的振动；以及

基于所检测到的便携式设备的振动，产生所述运动数据。

75. 根据权利要求73所述的方法，其中所述文档的第二页被显示作为从所述文档的第一页前进的下一页。

76. 根据权利要求73所述的方法，其中所述文档的第二页被显示作为从所述文档的第一页返回的上一页。

77. 一种方法，包括：

在所述便携式设备的显示屏上显示文档页面的第一部分；

利用安装到所述便携式设备的加速度计，检测所述便携式设备的运动；以及

响应于所述检测，在所述便携式设备的显示屏上显示所述文档页面的不同于所述第一部分的第二部分。

78. 根据权利要求77所述的方法，进一步包括基于所述加速度计所提供的运动数据，确定所述运动的方向，其中如果所确定的方向

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相对匹配预定方向，则显示所述文档页面的第二部分。

79. 根据权利要求78所述的方法，其中从所述第一部分转换地显示所述第二部分，就好像所述便携式设备在移动、而所述文档页面静止一样。

80. 根据权利要求78所述的方法，其中根据从用户视点确定的所述运动的方向而执行从所述第一部分到所述第二部分的转换。

81. 根据权利要求77所述的方法，其中所述文档页面不能被完整地显示在所述便携式设备的显示器内一个页面上。

82. 根据权利要求77所述的方法，其中所述文档页面是地图、报纸以及视频游戏场景之一。

83. 一种方法，包括：

在便携式设备的显示屏上显示从用户视点看来朝从第一场景到第二场景的方向转换的一系列图像；

利用安装到所述便携式设备的加速度计，检测所述便携式设备的运动；以及

如果所检测到的运动不和与从用户视点看的所述转换的方向相关联的方向一致，则执行预定操作。

84. 根据权利要求83所述的方法，其中所述预定操作包括导致所述便携式设备振动、产生声音报警、以及振动和声音报警的组合之一。

85. 根据权利要求83所述的方法，进一步包括：

基于所述加速度计所提供的运动数据，确定所述便携式设备的运

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动的加速度；以及

以和所述运动的加速度相对关联的加速度调整所述图像序列的显示。

86. 根据权利要求83所述的方法，其中所述图像序列表示视频游戏的运动场景，并且所述便携式设备表示从拿着所述便携式设备的用户的视点看面向所述运动场景的运动物体。

87. 一种方法，包括：

利用安装到便携式设备的加速度计，检测所述便携式设备的运动；

基于所述加速度计所提供的运动数据，确定在所述运动之后所述便携式设备的定向；以及

启动所述便携式设备的最适合于给定的确定的定向的至少一个接口。

88. 根据权利要求87所述的方法，进一步包括可选地去激励所述便携式设备的较不适于给定的确定的定向的至少一个接口。

89. 根据权利要求88所述的方法，进一步包括：

基于所述加速度计所提供的运动数据，确定在所述运动之后所述便携式设备是否被用户拿着；以及

预测所述用户用于握着所述便携式设备的手的位置，其中基于所预测的手的位置启动或去激励所述至少一个接口。

90. 根据权利要求89所述的方法，进一步包括：

启动不在所述预测位置内的至少一个接口；以及

去激励位于所述预测位置内的至少一个接口。

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91. 根据权利要求88所述的方法，其中所述至少一个接口包括一个或多个无线收发器。

92. 根据权利要求91所述的方法，进一步包括：

启动以相对较强信号通信的至少一个无线接口；以及

去激励以相对较弱信号通信的至少一个无线收发器。

93. 根据权利要求88所述的方法，其中所述至少一个接口包括一个或多个扬声器。

94. 根据权利要求93所述的方法，进一步包括驱动至少一个扬声器，从而在所述运动之后，在所确定的便携式设备的定向上具有最佳声音效果。

95. 根据权利要求88所述的方法，其中所述至少一个接口包括一个或多个照相机。

96. 根据权利要求88所述的方法，其中所述至少一个接口包括一个或多个麦克风。

97. 根据权利要求88所述的方法，其中所述至少一个接口包括一个或多个视频输出接口。

98. 一种方法，包括：

利用加速度计检测便携式设备的运动是否是重复运动；

基于所述加速度计所提供的运动数据，确定所述运动的重复率；以及

基于所确定的运动的重复率，通过所述便携式设备播放多媒体内容。

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99. 根据权利要求98所述的方法，进一步包括调整所述多媒体内容的节奏，以相对匹配所确定的运动的重复率。

100. 根据权利要求98所述的方法，进一步包括选择和播放节奏相对匹配所确定的运动的重复率的多媒体内容。

101. 根据权利要求98所述的方法，其中所述便携式设备是数字音频播放器。

102. 一种方法，包括：

利用安装到便携式设备的加速度计，检测所述便携式设备是否正在移动；

确定所述便携式设备的运行状态，所述运行状态包括非活动状态和活动状态之一；以及

如果所述便携式设备正在移动，则基于所确定的运行状态，将所述便携式设备配置到预定功耗模式。

103. 根据权利要求102所述的方法，进一步包括：如果基于所述加速度计所提供的运动数据确定所述便携式设备处于所述非活动状态并且正在移动，则将所述便携式设备转换到相对较低功耗模式。

104. 根据权利要求102所述的方法，进一步包括：如果基于所述加速度计所提供的运动数据确定所述便携式设备处于所述非活动状态并且没有移动，则将所述便携式设备转换到睡眠模式。

105. 根据权利要求104所述的方法，其中将所述便携式设备转换到睡眠模式包括：

将所述便携式设备的系统存储器中内容的至少一部分交换到所

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述便携式设备的永久存储器中；以及

基本关掉由所述便携式设备消耗的所有电源。

106. 根据权利要求102所述的方法，进一步包括：

基于由所述加速度计所提供的运动数据，确定所述便携式设备的预定表面是否朝向预定方向；以及

如果所述便携式设备的预定表面朝向所述预定方向，则将所述便携式设备配置为相对较低功耗模式。

107. 根据权利要求106所述的方法，其中如果所述便携式设备的显示器表面朝下，则所述便携式设备被配置为所述相对较低功耗模式。

108. 根据权利要求102所述的方法，其中当所述便携式设备处于所述非活动状态时，所述便携式设备的盖子是闭合的。

109. 根据权利要求102所述的方法，其中当所述便携式设备处于所述非活动状态时，所述便携式设备的用户接口被锁定。

110. 根据权利要求102所述的方法，其中当所述便携式设备处于所述非活动状态时，禁用所述便携式设备的接口设备。

111. 一种方法，包括：

利用安装到便携式设备的加速度计检测所述便携式设备的运动；

基于由所述加速度计所提供的运动数据，确定所述便携式设备的运动方向；以及

调整所显示对象在所述便携式设备的显示屏上的位置，以补偿所述便携式设备的运动，使得调整后的显示对象相对于所述便携式设备的用户保持相对不变的位置。

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112. 根据权利要求111所述的方法，其中检测所述便携式设备的运动包括根据预定位置作为时间的函数而检测所述便携式设备的运动。

113. 根据权利要求111所述的方法，进一步包括：

提取由所述加速度计所提供的运动数据的一个或多个相对高的频率分量；以及

基于所提取的一个或多个相对高的频率分量确定所述运动方向，而忽略相对低的频率分量。

114. 根据权利要求113所述的方法，其中所述一个或多个相对高的频率分量表示所述便携式设备的突发运动。

115. 根据权利要求111所述的方法，其中所显示对象包括电子文档。

116. 一种方法，包括：

响应于施加到便携式设备的力，利用安装到所述便携式设备的加速度计检测所述便携式设备的运动；

基于由所述加速度计所提供的加速度信息，计算所述力的幅值和方向；以及

在所述便携式设备的显示屏上将所显示对象从第一位置移动到第二位置，其中基于所计算的力的幅值和方向确定所述第一位置和第二位置之间的方向和距离。

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基于加速度计操作便携式设备的方法及装置

相关申请

本申请是2004年7月13日提交的共同待审美国专利申请No.10/890,856的部分连续(CIP)，共同待审美国专利申请No.10/890,856是2003年1月21日提交的共同待审美国专利申请No.10/348,465、现为美国专利No.6,768,066的继续，美国专利No.6,768,066是2000年10月2日提交的共同待审美国专利申请No.09/678,541、现为美国专利No.6,520,013的分案申请。

本申请也是2004年3月1日提交的共同待审美国专利申请No.10/791,495的部分连续(CIP)。上述美国专利申请在此被引入作为参考。

技术领域

本发明一般涉及便携式设备。本发明尤其涉及使用便携式设备的加速度计来操作便携式设备。

背景技术

加速度计是广泛使用的设备，它的应用有多种多样，例如振动监控、应用控制、游戏杆、工业过程控制、空间发射、卫星控制以及其他应用。例如，加速度计已经被用在汽车中作为检测汽车运动期间运行条件变化的传感器。

随着计算机变得越来越流行，加速度计已经被用在计算机中，以感测计算机的突发运动，诸如自由掉落。加速度计在计算机中的一个典型应用就是保护硬盘驱动器的读/写头。然而，还没有加速度计与计算机中的可执行软件结合使用的应用。

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发明内容

本说明书描述了基于加速度计操作便携式设备的方法和装置。根据本发明的一个实施例，连接到便携式设备的加速度计检测便携式设备的运动。作为响应，机器可执行代码被执行以进行预定的用户可配置的操作。

根据本发明的一个实施例，便携式设备的加速度计可以连续或周期性地监控便携式设备的运动。因此，基于由连接到便携式设备的加速度计所提供的运动数据，可以确定便携式设备在运动之前以及运动之后的定向(orientation)。

根据本发明另一实施例，加速度计可以被用于检测便携式设备的运动，从而作为触发文档或图形页面是否可以被显示的一种方式。

根据本发明的另一实施例，加速度计可以被用于导航应用中。例如，其中附加有加速度计的便携式设备可以被用作导航工具，以导航通常不能一次被完整地显示在便携式设备的显示屏上的相对较大的对象或文档。

根据本发明的另一实施例，加速度计可以被应用在游戏应用中，其中加速度计可以被用于检测在视频游戏在便携式设备中运行期间的场景变换。

根据本发明的另一实施例，加速度计可以被用于检测便携式设备的运动，并且可以基于加速度计所提供的运动数据确定便携式设备的定向。此后，可以基于所确定的运动后定向，启动或去激励便携式设备的一个或多个接口。

根据本发明的另一实施例，加速度计可以被用于检测和确定带着其中装有加速度计的便携式设备的用户的活动(例如晃动)。

根据本发明的另一实施例，加速度计可以被用于确定便携式设备是否正在移动(例如被用户携带)，以及便携式设备是否应该进入适当的运行状态(例如睡眠或休眠模式)。

根据本发明的另一实施例，加速度计可以被用于检测便携式设备是否根据特定方向移动，以确定密码是否输入正确。

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根据本发明的另一实施例，加速度计可以被用于检测和记录便携式设备的一系列运动，其中所记录的运动数据可以被用于随后重建运动历史(例如，离线)。

从附图以及下面的详细描述中可以了解本发明的其他特征。

附图说明

本发明是通过实例来阐述的，但并不限于附图中的图形，在附图中，相似的标号表示类似的元件。

附图1是阐述依据本发明一个实施例的便携式设备的示例性体系结构的框图。

附图2是阐述依据本发明一个实施例的用于响应于加速度计所产生的事件而操作便携式设备的示例性进程的流程图。

附图3A和3B是阐述依据本发明一个实施例的可以使用加速度计的示例性应用的图。

附图4是阐述依据本发明一个实施例的用于基于加速度计重新定向所显示文档的示例性处理器的流程图。

附图5A和5B是阐述依据本发明某些实施例的可以被用于触发文档页面的显示的便携式设备的示例性运动的图。

附图6是阐述依据本发明一个实施例的用于基于加速度计呈现文档的示例性进程的流程图。

附图7A和7B是阐述依据本发明一个实施例的基于加速度计的示例性导航应用的图。

附图8是阐述依据本发明一个实施例的用于基于加速度计导航图像的示例性进程的流程图。

附图9A和9B是阐述依据本发明一个实施例的基于加速度计的示例性游戏应用的图。

附图10A和10B是阐述依据本发明另一实施例的基于加速度计的示例性游戏应用的图。

附图11是阐述依据本发明一个实施例的用于基于加速度计的游

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戏应用的示例性进程的流程图。

附图12A和12B是阐述依据本发明一个实施例的用于基于加速度计启动/去激励便携式设备接口的示例性机制的图。

附图13是阐述依据本发明一个实施例的用于基于加速度计操作便携式设备接口的示例性进程的流程图。

附图14A和14B是阐述依据本发明一个实施例的用于利用加速度计启动/去激励便携式设备的多媒体接口的示例性机制的图。

附图15是阐述依据本发明一个实施例的用于基于加速度计重新配置多媒体接口的示例性进程的流程图。

附图16是阐述依据本发明一个实施例的用于基于加速度计播放多媒体内容的示例性进程的流程图。

附图17是阐述依据本发明一个实施例的用于便携式设备的电源管理的示例性进程的流程图。

附图18是阐述依据本发明一个实施例的用于处理密码的示例性进程的流程图。

附图19是阐述依据本发明一个实施例的用于利用加速度计重建运动轨迹的示例性进程的流程图。

附图20是阐述根据本发明一个实施例的具有加速度计的示例性便携式设备的方框图。

附图21是可以与本发明的一个实施例一起使用的数字处理系统的方框图。

附图22是阐述依据本发明一个实施例的用于利用加速度计进行运动补偿的示例性进程的流程图。

附图23是阐述依据本发明一个实施例的用于利用加速度计检测冲击的示例性进程的流程图。

附图24是阐述依据本发明一个实施例的用于利用加速度计操作便携式设备的部件的示例性进程的流程图。

具体实施方式

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本说明书描述了基于加速度计操作便携式设备的方法和装置。根据某些实施例，加速度计已经被应用于便携式设备中，诸如例如膝上型计算机、触摸屏PC、个人数字助理(PDA)、蜂窝电话以及数字多媒体播放器等。一旦加速度计检测到便携式设备的运动，就基于加速度计所提供的运动数据确定运动方向，也被称为运动矢量或加速度矢量。运动方向和/或运动数据可以被提供给在便携式设备中执行的软件成分(例如应用程序软件)。响应于检测到便携式设备的运动，相应的软件成分基于由加速度计所提供的运动方向和/或运动数据执行一个或多个预定的用户可配置动作，诸如例如前进一页文档等。

在接下来的描述中，阐述许多细节，以提供对本发明更为全面的解释。然而，对于本领域技术人员来说，显然可以不需要这些具体细节而实施本发明。在其他情况中，为了避免使本发明太过晦涩，用方框图的形式表示公知的结构及设备，而不是用细节描述。

下述具体描述中的某些部分是用计算机存储器中数据位上的操作的算法和符号表示的方式提供的。这些算法描述和表示是数据处理领域技术人员用于最有效地向其他本领域技术人员传递他们的工作主旨的方式。算法在这里、并且通常被认为是导致期望结果的有条理的步骤序列。这些步骤是需要物理量的物理控制的那些步骤。通常、尽管不是必要地，这些量是能够被存储、传递、组合、比较、以及控制的电信号或磁信号形式。原则上，为了通用性，已经证实了把这些信号表示为位、值、元件、符号、字符、术语、数字等是方便的。

然而，应该牢记的是，所有这些以及类似的术语要与适当的物理量相关联，并且仅仅是应用于这些物理量的合适标记。除非特别指出，否则从下述的讨论中显然可以看到，在整个说明书中，利用诸如“处理”或“计算”或“运算”或“确定”或“显示”等术语的讨论是指计算机系统或类似电子计算设备的控制计算机系统的寄存器和存储器内的表示为物理(电子)量的数据、以及将它们转换为计算机系统的存储器或寄存器或其他此类信息存储、传送或显示设备内的类似地被表示为物理量的其他数据的动作和进程。

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本发明还涉及用于执行这里的操作的装置。该装置可以被特定构造用于需要的目的，或者其可以包括由存储在计算机中的计算机程序选择性地启动或重新配置的通用计算机。这样的计算机程序可以被存储在计算机可读存储介质中，诸如、但不限于任意类型的盘，包括软盘、光盘、CD-ROM、以及磁光盘、只读存储器(ROM)、随机存取存储器(RAM)、可擦除可编程ROM(EPROM)、电可擦除可编程ROM(EEPROM)、磁卡或光卡、或适于存储电指令的任意类型的介质，并且每一个都连接到计算机系统总线。

本文中所表示的算法和显示本质上与任何特定计算机或其他装置都不关联。不同通用系统都可以与根据文中教导的程序一起使用，或者可以证实构造更专门的装置以执行所需方法步骤是很方便的。对于多种这些系统的所需结构将在下面的描述中提供。此外，本发明不参考任意特定编程语言来阐述。应该理解，多种编程语言可以被用于实现文中描述的本发明的教导。

机器可读介质包括用于以机器(例如计算机)可读格式存储或传送信息的任意机制。例如，机器可读介质包括只读存储器(“ROM”)；随机存取存储器(“RAM”)；磁盘存储介质；光学存储介质；闪速存储器设备；电、光、声或其他形式的传播信号(例如载波，红外信号，数字信号等)；等。

概述

附图1是阐述依据本发明一个实施例的便携式设备的示例性体系结构的方框图。在一个实施例中，示例性系统100包括、但不只限于处理器；连接到处理器的存储器，存储器存储有指令；以及连接到处理器和存储器的加速度计，用于检测便携式设备的运动，其中响应于检测到便携式设备的运动，处理器执行来自存储器的指令，以实现一个或多个预定的用户可配置动作。在一个可选实施例中，示例性系统100进一步包括连接到加速度计的控制器，用于基于由加速度计所提供的运动数据确定运动方向，并且将所确定的运动方向与预定方向进行比较，以确定所确定的方向是否相对匹配预定方向，以便执行指令。

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参照附图1，根据一个实施例，示例性系统100包括一个或多个加速度计101、一个或多个连接到加速度计101的控制器102、与运动相关的固件103、运动软件成分104、以及一个或多个应用程序软件105-107。加速度计101可以被安装到便携式设备上，诸如例如安装到便携式设备的主板上。可选地，加速度计101可以与便携式设备的另一组件集成。例如，加速度计101可以与便携式设备的芯片组集成。

根据一个实施例，加速度计101能够检测便携式设备的运动，包括加速和/或减速。加速度计101可以为多个维度产生运动数据，这些运动数据可以被用于确定便携式设备的运动方向。例如，当加速度计101检测到便携式设备被移动时，加速度计101可以产生X、Y和Z轴加速度信息。在一个实施例中，加速度计101可以被实现为在被转让给本申请的共同受让人的美国专利No.6,520,013中所描述的那些设备。可选地，可以利用商业上可用的各种加速度计来实现加速度计101。例如，加速度计101可以是来自Kionix的KGF01加速度计或者来自模拟器件公司(Analog Devices)的ADXL311加速度计。

此外，示例性系统100包括一个或多个连接到加速度计101的控制器102。控制器102可以被用于计算便携式设备的运动方向，运动方向也被称为运动矢量。可以基于加速度计101所提供的运动数据(例如X、Y和Z轴运动信息)，根据一个或多个预定公式确定运动矢量。计算运动矢量的某些实施例将在下文中进一步详细描述。

根据一个实施例，控制器102负责监控加速度计101的一个或多个输出，并且与便携式设备的其它组件-诸如例如芯片组(例如存储器控制器或北桥)以及/或者微处理器(例如CPU)-通信。控制器102可以利用商业上可用的多种微控制器来实现。例如，控制器102可以是来自Microchip公司的PIC 16F818微控制器。控制器102可以与加速度计101集成。可选地，控制器102可以与便携式设备的其他组件-诸如例如芯片组或微处理器-集成。

在一个实施例中，控制器102可以通过总线-诸如I2C(inter-IC)总线-以及中断线与其它组件通信。响应于运动数据，

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控制器102经由中断线向其他组件-诸如固件103-产生中断，例如硬件中断、软件中断或者二者的结合，以将这样的运动通报给其他组件。此外，控制器102可以进一步基于由加速度计101所提供的运动数据计算运动矢量。有关控制器102和便携式设备的其他组件之间的通信的详细信息将在下文中进一步描述。

返回到附图1，运动固件103包括可以被嵌入到便携式设备的一个或多个硬件组件-诸如例如控制器102或芯片组(例如BIOS的一部分，BIOS也被称为基本输入/输出系统)-内的一段或多段机器可执行代码。在一个实施例中，运动固件103可以被存储在控制器102的只读存储器(ROM)(例如闪速存储器)中。然而，可以通过将更新版本上载到存储器中、例如利用闪速应用程序(flash utility)来升级运动固件103的机器可执行代码。固件103可以负责检测响应于运动检测而产生的任何事件。根据一个实施例，固件103提供控制器102和便携式设备的其他组件-诸如例如操作系统(OS)之间的主通信机制。

运动软件104可以负责运动固件103和其他软件成分-诸如应用程序软件成分105-107-以及操作系统之间的通信。在一个实施例中，运动软件104可以被实现为操作系统的一部分，诸如例如设备驱动程序的核心组件等。操作系统可以用商业上可用的多种操作系统来实现。例如，操作系统可以是Apple Computer(苹果电脑)公司的Mac OS。可选地，操作系统可以是Microsoft(微软)公司的Windows操作系统。其他操作系统-诸如例如Unix、Linux、嵌入式操作系统(例如Palm OS)或实时操作系统-也可以被实现。

根据一个实施例，响应于可以由运动固件103通知的运动检测事件，运动软件成分104可以向一个或多个应用程序软件105-107通信该事件。响应于检测，应用程序软件105-107可以执行某些操作。应用程序105-107可以是多种不同的应用程序，诸如例如浏览器、文字处理器、幻灯片显示等。应用程序105-107所执行的操作的某些实施例将在下文中进一步详细描述。

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附图2是阐述依据本发明一个实施例的用于响应于由加速度计所产生的事件而操作便携式设备的示例性进程的流程图。示例性进程200可以由处理逻辑执行，处理逻辑可以包括硬件(电路，专用逻辑等)、软件(诸如运行在专用机器上的软件)，或者两者的组合。在一个实施例中，示例性进程200包括、但不只限于利用安装在便携式设备的加速度计检测便携式设备的运动，以及响应于检测到便携式设备的运动而运行机器可执行代码以执行一个或多个预定的用户可配置动作。

参照附图2，在方框201中，利用安装在便携式设备上的加速度计(例如附图1的加速度计)检测便携式设备-诸如例如膝上型计算机或触摸屏PC-的运动。在一个实施例中，响应于检测，加速度计可以为多个维度(例如X，Y和Z轴)产生运动数据。响应于检测，在方框202中，基于由加速度计所提供的运动数据确定运动的方向。在一个实施例中，由控制器(例如附图1中的控制器102)确定运动方向。响应于所确定的方向，在方框203中，一段或多段机器可执行代码(例如应用程序软件)可以被执行，以完成一个或多个预定的用户可配置动作，诸如例如前进网页等。其他操作也可以被执行。

基于加速度计确定定向

根据本发明的一个实施例，便携式设备的加速度计可以连续地或周期性地监控便携式设备的运动。因此，可以基于由安装在便携式设备上的加速度计所提供的运动数据确定运动之前和运动之后便携式设备的定向。

附图3A和3B是阐述依据本发明一个实施例的可以利用加速度计的示例性应用的图。在这个实施例中，并且在整个应用中，触摸屏设备被用作为便携式设备的示例。但便携式设备并不只限于此。应该认识到，也可以应用其他便携式设备，诸如膝上型计算机、个人数字助理(PDA)、个人通信器(例如Research In Motion公司的blackberry)、蜂窝电话、或多媒体播放器(例如MP3播放器)等。

参照附图3A和3B，首先根据一个实施例，便携式设备处于定向

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301，其中在便携式设备的显示屏上显示文档页面303。在定向301中，从面向给定定向301的显示屏的用户视点来看，文档页面303被正确显示，其中定向301可以被加速度计以及与之相关联的控制器周期性地或连续地检测和确定。

当便携式设备被移动时，例如按照移动方向304移动并结束在定向302，加速度计（附图1中的加速度计101）可以检测这种运动。响应于检测，控制器（例如附图1中的控制器102）可以基于加速度计所提供的运动数据确定运动方向，并且通知便携式设备的适当组件，诸如例如附图1中的固件103、运动软件104以及/或者应用程序105-107。这种通知可以通过中断或通过拉出控制器和/或加速度计的一个或多个寄存器而被实现。此外，控制器可以进一步确定运动后便携式设备的定向。

依据一个实施例，响应于通知，可以根据所确定的运动后的定向调整文档页面303的定向，如附图3B所示。在一个实施例中，所显示的文档页面的定向可以在运动之后被调整，从而与运动之前的定向相对一致。因此，尽管便携式设备的定向已经改变，但所显示的文档页面的定向仍然保持相对一致，尤其是在面向便携式设备的显示屏的用户的视点上。

在这个实施例中，文档页面303的定向的调整可以通过将所显示的数据（例如文档页面）传送给便携式设备的显示屏的显示驱动程序（例如视频驱动程序）实现。可选地，定向的调整可以通过提供文档页面303的原始应用程序软件（例如附图1的应用程序105-107）（例如提供网页的浏览器或提供文档页面的文字处理器）来实现。注意，附图3A和3B所示的运动方向304只是用于说明的目的。其它运动方向、诸如附图5A所示的那些运动方向或者它们的组合也可以被实现。此外，仅仅为了说明的目的，如附图3A和3B所示，便携式设备被向左旋转90度。便携式设备可以被旋转、平移或者二者或多个维度并且以任意运动步长的组合。

附图4是依据本发明一个实施例的用于基于加速度计重新定向所

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显示文档的示例性处理器的流程图。示例性进程400可以由处理逻辑执行，其中处理逻辑可以包括硬件(电路，专用逻辑等)、软件(诸如运行在专用机器上的软件)、或者二者的组合。在一个实施例中，示例性进程400包括、但不只限于利用安装到便携式设备的加速度计来检测便携式设备的运动，基于由加速度计所提供的运动数据确定运动后便携式设备的定向，以及根据与运动前图像的定向相对一致的定向将图像显示在便携式设备的显示屏上。

参照附图4，在方框401，利用安装到便携式设备的加速度计检测便携式设备从第一定向开始的运动。响应地，在方框402，基于由加速度计所提供运动数据、诸如X、Y及Z轴信息，运动方向被确定。在一个实施例中，可以由连接到加速度计的控制器(例如附图1中的控制器102)执行确定。可以根据一个或多个预定公式确定运动方向。在方框403，在运动之后，可以基于由加速度计所提供的运动数据确定便携式设备的第二定向。在方框404，可以基于所确定的第二定向调整所显示文档页面的定向。在一个实施例中，所显示文档页面的定向可以被调整，使得调整后的文档页面的定向与运动前的定向相对一致，尤其是从用户的视点上来看。其它操作也可以被执行。

基于加速度计显示不同文档页面

根据本发明的另一实施例，加速度计可以被用于检测便携式设备的运动，作为触发是否可以显示文档或图像页面的方式。例如，当便携式设备朝预定方向被移动(例如突然的运动)时，加速度计可以检测这个运动，并且应用程序软件可以响应于检测到运动而显示特定页面。

附图5A是阐述依据本发明一个实施例的可以被用于触发文档页面显示的便携式设备的示例性运动的图。例如，参照附图5A，文档的第一页面被显示在便携式设备500的显示屏507上。当便携式设备500在某些方向上被移动时，安装到便携式设备500的加速度计(例如附图1的加速度计101)可以检测这样的运动。响应于检测，加速度计可以经由相关的控制器、固件和/或操作系统通知其他组件、诸如应用

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程序软件，尤其是通知提供正被显示的文档的第一页面的组件。

在一个特定实施例中，加速度计可以通知控制器（例如附图1中的控制器102），包括提供运动数据（例如X、Y和Z轴）。控制器和/或固件可以基于由加速度计所提供的运动数据计算运动的运动矢量。其后，控制器可以向其他组件-诸如运动软件成分（例如运动软件104）以及/或者操作系统-发送信号。运动软件以及/或者操作系统可以将运动矢量与预定方向进行比较，以确定运动矢量是否与预定方向相对匹配，例如基于预定阈值确定。

在一个实施例中，预定方向以及与这个预定方向相关联的阈值（例如灵敏度）可以由用户通过用户接口配置。这种灵敏度可以基于在给定时间和地点与便携式设备相关联的不同轮廓来配置。例如，当便携式设备位于家里/办公室时，与它位于运动的平台（例如汽车、火车、轮船或飞机等）上相比，便携式设备的灵敏度可以不同。在另一实施例中，便携式设备可以包括智能地过滤掉某些“嘈杂的”运动背景的机制。

如果运动矢量相对匹配预定方向，则可以通知相关的应用程序软件。作为响应，相关应用程序软件可以执行某些操作，包括在显示屏上显示与第一页面不同的第二页面。

在一个实施例中，文档的第二页面可以是文档的下一页或前一页。文档可以是由文字处理器-诸如Microsoft Office的文字处理器-所创建的文字文档。可选地，文档可以是由浏览器-诸如Microsoft的互联网浏览器(Internet Explorer)或者Netscape Communications的Netscape通讯器-所呈现的网页。此外，文档可以是幻灯片显示，例如由Microsoft的PowerPoint或Apple Computer的Keynote所显示的。

参照附图5A，运动方向可以包括与便携式设备表面（例如便携式设备的显示器表面507）平行的运动方向，如方向501和502所示。可选地，运动方向可以包括便携式设备相对于平行于便携式设备边缘（例如边缘505和506）的轴线的旋转，如方向503和504所示。而

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且，便携式设备的运动方向可以是上述方向的组合。例如，运动可以是相对于便携式设备500的角的多维旋转。也可以使用其它类型的运动。

附图5B是阐述根据本发明一个可选实施例的可以被用于触发文档页面显示的便携式设备的示例性运动的图。在这个实施例中，便携式设备551可以被放置在支撑平面552上。此外，运行在便携式设备551中的应用程序软件可以被配置为“缺省”模式。当突发的力被施加到支撑表面552时，突发的力引起支撑平面552的振动。突发的力可以通过用户轻敲(tabbing)支撑平面552而被提供。

响应于支撑表面552的振动，安装到便携式设备551的加速度计可以检测这种振动。响应于检测，加速度计可以通过固件和/或控制器等通知相关的应用程序软件。作为响应，应用程序软件可以显示文档的下一页、上一页或者特定页，这可以由用户通过用户接口配置。当便携式设备被放置在桌面上或与演示投影机一起被挂起时，这尤其有用。进行演示的用户可以简单地轻敲桌子来前进到演示的下一页，而不必按便携式设备的键盘的键(例如“Enter”键或空格键)或鼠标。

附图6是阐述依据本发明一个实施例的基于加速度计显示文档的示例性进程的流程图。示例性进程600可以由处理逻辑执行，处理逻辑可以包括硬件(电路、专用逻辑等)、软件(诸如运行在专用机器上的软件)或者这二者的组合。在一个实施例中，示例性进程600包括、但不只限于将文档的第一页面显示在便携式设备的显示屏上，利用安装到便携式设备的加速度计检测便携式设备的运动，以及响应于检测到运动而显示不同于第一页面的第二文档页面。

参照附图6，在方框601，利用安装到便携式设备的加速度计来检测便携式设备的运动。响应于检测，在方框602中，基于由加速度计所提供的运动数据、例如X、Y、Z轴信息，确定运动的运动方向。在一个实施例中，可以由相关联的控制器和/或相关联的固件确定运动方向。在方框603，确定运动方向是否和预定方向相对匹配。如果匹配，则在方框604，通知在已经显示第一文档页面的便携式设备中所

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运行的相关应用程序软件。作为响应，在方框605，应用程序软件显示与第一页面不相同的第二文档页面。其它操作也可以被执行。

基于加速度计的导航应用

根据本发明另一实施例，加速度计可以被用于导航应用。例如，其中装有加速度计的便携式设备可以被用作导航工具，以导航通常不能一次被完整地显示在便携式设备的显示屏内的较大对象或文档。

附图7A和7B是阐述依据本发明一个实施例的基于加速度计的示例性导航应用的图。在这种实施例中，起初地图的一部分被显示，如附图7A所示。地图通常不能以一定详细程度作为整体被完整地显示在便携式设备700的显示屏中。例如，当用户“放大”地图时，只有一部分地图能够被显示在显示屏上。当用户导航遍及地图的第一部分时，用户可能希望从第一部分逐渐导航到地图的第二部分。

根据一个实施例，拿着便携式设备700的用户可以朝着用户所希望导航的方向、例如根据方向703（例如以东北方向为例）移动便携式设备700。响应于运动，安装到便携式设备700的加速度计可以检测这样的运动。加速度计可以为便携式设备的控制器和/或固件提供运动数据（例如X、Y和Z轴信息）。相关联的控制器和/或固件可以基于由加速度计所提供的运动数据，利用一个或多个预定公式，计算运动方向和/或运动距离。其后，控制器和/或固件可以将运动方向传递给当前正提供地图的相关应用程序软件。

作为响应，应用程序软件可以基于由控制器和/或固件所提供的运动方向、运动距离以及/或者运动加速度数据来确定地图的第二部分。相应地，应用程序软件随后显示第二部分。因此，用户不必按压和/或点击按钮以导航地图的其它部分。注意，图示的运动方向703只是为了说明的目的。任意其它方向也可以被应用。

在一个实施例中，地图的第二部分可以通过从第一部分过渡来显示。也就是说，第一部分和第二部分之间的多个中间部分可以被顺序显示，以构成从第一部分到第二部分的过渡。因此，第二部分逐渐地“进入”便携式设备的显示屏。依据一个实施例，从第一部分到第二部分的

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过渡被显示，就像用户在较大的地图上移动便携式设备而地图保持稳定一样。在这种实施例中，过渡被显示，就像用户拿着便携式设备作为放大器来导航大的地图、大的报纸或网页等一样。

根据另一实施例，某些运动可以被用于“放大”或“缩小”所显示的页面。例如，平行于便携式设备表面（例如显示器表面）的运动可以被用于导航显示页面的不同部分，而便携式设备的旋转可以被用于放大或缩小显示页面，这可以改变显示页面的分辨率。例如，用户可以将便携式设备向上倾斜以作为缩小的方式，并且可以向下倾斜便携式设备以作为放大的方式。其他运动方向、诸如附图5A所示的那些方向或那些方向的组合也可以被利用。

根据另一实施例，上述技术可以被用于虚拟现实环境中。在一个实施例中，允许用户使用便携式显示设备所装配的加速度计作为进入虚拟现实图像数据库的轻便和可控的窗口。例如，拿着触摸屏设备的用户可以转向并且看到从二维或三维图像或对象数据库中的位置向后看到的景象，就像用户在虚拟现实游戏空间里漫步一样。根据另一实施例，用户可以实现图像全景的观察，其中不同方向的景象由从单个位置指向不同方向的多个照相机提供。

附图8是阐述依据本发明一个实施例的基于加速度计导航图像的示例性进程的流程图。示例性进程800可以由处理逻辑执行，处理逻辑可以包括硬件（电路、专用逻辑等）、软件（诸如运行在专用机器上的软件）、或两者的组合。在一个实施例中，示例性进程800包括、但不只限于运动之前在便携式设备的显示屏上显示文档页面的第一部分，并且如果所确定的运动方向和预定方向相对匹配，则在便携式设备的显示屏上显示不同于第一部分的文档页面的第二部分。

参照附图8，在方框801，图像的第一部分（例如附图7A所示的地图的一部分）被显示在便携式设备的显示屏上。图像可以是全景图像、虚拟现实图像数据库、三维图像数据库或由多部照相机输入所构成的环境等的一部分。在方框802，利用安装到便携式设备的加速度计检测便携式设备的运动。响应于检测，在方框803，基于由加速度

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计所提供的运动数据（例如X、Y和Z轴信息）计算运动方向。在一个实施例中，响应于检测，加速度计将运动数据发送给相关的控制器和/或固件。控制器和/或固件可以基于运动数据计算运动方向。可选地，运动方向的计算可以由便携式设备的其他组件-诸如例如附图1的运动软件组件104和/或便携式设备的操作系统-执行。在方框804，基于所确定的运动方向显示图像的第二部分。在一个实施例中，图像的多个中间部分可以被显示，这些中间部分构成从第一部分到第二部分的过渡。第二部分被显示得好像便携式设备在运动而所显示图像保持稳定一样。其它操作也可以被执行。

基于加速度计的游戏应用

根据本发明的另一实施例，加速度计可以被用于游戏应用，其中加速度计可以被用于检测视频游戏在便携式设备上运行期间的场景转换。

附图9A和9B是阐述根据本发明一个实施例的基于加速度计的示例性游戏应用的图。在这个实施例中，作为示例，用户正手握便携式设备900作为方向盘，就好像用户正面对第一场景901驾驶汽车。当用户朝一个方向、诸如例如方向903移动（例如旋转）便携式设备时，所显示的场景可以被改变为附图9B所示的第二场景。

根据一个实施例，当拿着便携式设备900的用户按照方向903移动时，安装到便携式设备的加速度计检测这样的运动。加速度计可以将运动数据（例如X、Y和Z轴信息）提供给便携式设备的控制器和/或固件。基于由加速度计所提供的运动数据，相关的控制器和/或固件可以利用一个或多个预定公式计算运动方向。随后，控制器和/或固件可以将运动方向和/或运动距离或加速度传递给当前正提供游戏的相关游戏应用程序软件。

作为响应，游戏应用程序软件可以基于由控制器和/或固件所提供的运动方向、运动距离以及/或者运动加速度来确定游戏的第二场景。相应地，游戏应用程序软件随后显示第二场景。因此，为了改变游戏的场景，用户不必按压和/或点击按钮。注意，图示的运动方向903

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只是用于说明的目的。任何其它方向也可以被应用。

在一个实施例中，游戏的第二场景可以通过从第一场景的过渡而被显示。也就是说，第一场景和第二场景之间的多个中间场景可以被顺序显示，以构成从第一场景到第二场景的过渡。因此，第二场景逐渐地“进入”便携式设备的显示屏中。

根据另一实施例，某些运动可以被检测，作为使运行的汽车加速和/或减速的方式。例如，当便携式设备向上倾斜(例如类似于加大油门)时，所显示的场景可以变为显示汽车的加速。同样地，当便携式设备向下倾斜(例如类似于踩刹车)时，所显示的场景可以变为显示汽车的减速。

此外，加速度计可以被用于检测便携式设备的运动是否超出某些阈值。如果超出，则一个或多个预定的用户可配置动作可以被执行。例如，在驾驶游戏中，当用户将汽车驶离公路时，警告消息可以被传递给用户用于这样的指示。

附图10A和10B是阐述依据本发明另一实施例的基于加速度计的示例性游戏应用的图。在这个实施例中，用户正手握内置有加速度计的便携式设备作为汽车的方向盘。如附图10A所示，当场景包括向左弯曲的道路时，为了停留在道路上，要求用户向左旋转方向盘。安装到便携式设备的加速度计可以被用于检测便携式设备(例如方向盘)是否已经相应地被旋转以及旋转角度和距离是否合适。

如果检测到便携式设备的旋转并没有旋转或旋转得不够，则相关的游戏应用程序软件可以执行某些预定动作。例如，游戏应用程序可以对用户产生警告，诸如例如便携式设备的振动或语音警报等等。此外，离开道路的场景可以被显示。如果检测到用户长达一段时间没有对路面状况做出反应，则撞车的场景可以被相应地显示。

根据某些实施例，其他运动方向可以被用于从拿着便携式设备的用户的视点“向上看”和“向下看”。例如，在飞行游戏中，用户可能拿着便携式设备，就像用户正在开动飞行对象(例如飞机)，其中加速度计可以被用于检测便携式设备的运动，以便确定飞行对象将朝向哪

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里。例如，当便携式设备向上倾斜时，飞行对象上升，而当便携式设备向下倾斜时，飞行对象下降。其他方向、诸如例如附图5A所示的那些方向或他们的组合可以被用于使飞行对象飞往任意方向。

同样，在依据一个实施例的射击游戏中，除了上述可以被用于向上看、向下看以及/或者向周围看的运动之外，便携式设备的平行于便携式设备的显示表面的垂直运动可以被用于检测用户是在站立的射击位置还是在藏匿位置。例如，当向下移动便携式设备时，保护障碍可以被显示阻挡对手，以表示拿着便携式设备作为射击武器的用户藏匿在保护障碍之后。当向上移动便携式设备时，保护障碍可以被移除而暴露对手，以表示用户处在没有保护的射击位置。其它游戏配置也可以存在。

附图11是阐述依据本发明一个实施例的基于加速度计的游戏应用程序的示例性进程的流程图。示例性进程1100可以由处理逻辑执行，处理逻辑可以包括硬件(电路、专用逻辑等)、软件(诸如运行在专用机器上的软件)或者二者的组合。在一个实施例中，示例性进程1100包括、但不只限于显示从用户视点看到的、朝这从第一场景到第二场景方向过渡的一系列图像；检测便携式设备的运动是否和从户视点看到的变换方向相关联的方向一致；以及如果根据与变换方向相关联的方向没有检测到运动，则执行预定操作。

参照附图11，在方框1101，从第一场景变换到第二场景的一系列图像(例如驾驶游戏)被显示在便携式设备的显示屏上。在方框1102，利用安装到便携式设备的加速度计检测便携式设备的运动。在方框1103，基于由加速度计所提供的运动数据确定便携式设备的运动方向。在一个实施例中，运动方向由连接到加速度计的控制器和/或固件确定，类似于附图1所示的配置。响应于所确定的运动方向，在方框1104中，一个或多个预定操作-诸如例如导致便携式设备的振动、产生音频警报或者二者的组合-可以被执行。其它操作也可以被执行。

基于加速度计启动/去激励设备

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根据本发明另一实施例，加速度计可以被用于检测便携式设备的运动，并且可以基于加速度计所提供的运动数据而确定便携式设备的定向。其后，可以基于所确定的运动后的定向而启动或去激励便携式设备的一个或多个接口。

附图12A和12B是阐述依据本发明一个实施例的基于加速度计启动/去激励便携式设备的接口的示例性机制的图。在这个实施例中，如附图12A的配置1201所示，多个接口1204-1207被设置在便携式设备的多个位置。作为示例，接口1204-1207在文中被描述为无线接口、诸如例如天线或无线收发器。应该理解，其它接口也可以被应用。

参照附图12A，最初对于给定定向1201，文档1203被显示。根据一个实施例，当用户在定向1201举起便携式设备时，安装到便携式设备的加速度计可以检测这样的运动，并且由类似附图1所示的连接到加速度计的相关控制器和/或固件确定定向1201。由所确定的定向，可以确定在定向1201的情况下，无线接口1204和1205处于发送和/或接收无线信号的最佳位置(例如接收和/或发送最强的信号)，而无线接口1206-1207处于相对较弱的位置。因此，无线接口1204-1205可以被启动，而无线接口1206-1207可以可选地被去激励。

当便携式设备被移动时，例如按照方向1208旋转90度，便携式设备可能停在不同的定向1202，如附图12B所示。安装到便携式设备的加速度计可以检测这样的运动，并且将运动数据传输给上述便携式设备的其它组件。除了如上参照附图3A和3B所述维持文档页面的定向与运动前定向相对一致地被显示之外，无线接口1204-1207可以被重新评估，以确定现有配置对于运动后的定向是否仍然是最佳配置。

在这个实施例中，假设便携式设备顶部和底部的无线接口被认为是最佳位置。在运动之后(例如，左转90度)，最初处于最佳位置的无线接口1204-1205可能不再处于最佳位置了。相反，原来不在最佳位置的无线接口1206-1207现在可能处在最佳位置。因此，响应于检测到运动以及确定运动后的定向，无线接口1206和1207可以被启动，如粗体所示，这是因为他们处于最佳位置。同样，无线接口1204-1205

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可以被去激励，因为他们不再处于最佳位置。

此外，除了检测便携式设备是否被移动之外，还基于由加速度计所提供的运动数据确定便携式设备是否被用户捡起或手握着。在一个实施例中，这样的确定可以由类似于附图1所示的结构的连接到加速度计的控制器和/或固件执行。如果确定便携式设备被用户手握着，则可以进一步确定或预测拿着便携式设备的用户的手1208-1209的位置。

例如，在附图12A所示的定向1201中，在预测用户的手的位置之后，可能被手1208-1209遮盖的一个或多个无线接口-诸如无线接口1207和1208-可以被去激励。同样，在附图12B所示的运动后的定向1202中，无线接口1204和1205可以被去激励，因为预测它们被用户的手所遮盖。

附图13是阐述根据本发明一个实施例的用于基于加速度计操作便携式设备的接口的示例性进程的流程图。示例性进程1300可以由处理逻辑执行，其中处理逻辑可以包括硬件(电路、专用逻辑等)、软件(诸如运行在专用机器上的软件)、或二者的组合。在一个实施例中，示例性进程1300包括、但不只限于利用安装到便携式设备的加速度计检测便携式设备的运动，基于由加速度计所提供的运动数据确定运动后的便携式设备的定向，以及启动便携式设备的在所确定定向的情况下最适合的至少一个接口。

参照附图13，在方框1301，利用安装到便携式设备的加速度计检测便携式设备的运动，其中便携式设备包括设置在多个位置上的多个接口(例如无线接口)。在方框1302，基于由加速度计所提供的运动数据确定运动后便携式设备的定向。在方框1303，可选地，基于由加速度计所提供的运动数据确定便携式设备是否被用户捡起或拿着。如果是，则预测拿着便携式设备的用户的手的位置。在方框1304，基于所确定的定向，一个或多个接口可以被启动或去激励。可选地，某些被预测的用户的手所遮盖的接口可以被去激励，而那些没有被遮盖的接口被启动。其他操作也可以被执行。

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根据一个实施例，上述技术也可以被应用到便携式设备的多媒体接口。附图14A和14B是阐述根据本发明一个实施例的利用加速度计启动/去激励便携式设备的多媒体接口的示例性机制的框图。在这个实施例中，作为示例，一个或多个扬声器被用作便携式设备的多媒体接口。参照附图14A，便携式设备包括设置在便携式设备的不同位置上的多个扬声器1405-1408，并且可选地在便携式设备的显示屏上显示文档页面1403。在运动前的定向1401中，考虑左侧的扬声器1405-1406和右侧的扬声器1407-1408，可以配置音频驱动程序以产生适当的3D环绕声。当便携式设备被移动时，例如按照运动方向1404旋转90度，通过加速度计以及加速度计的相关联控制器和/或固件检测并确定第二定向1402，如附图14B所示。

响应于检测，除了如上参考附图3A和3B所述保持文档页面1403的定向与运动之前的定向相对一致地被显示之外，扬声器1405-1408的位置可以被重新评估，以确定现有配置对于运动后的定向是否仍然是最佳配置。在这个实例中，如附图14B所示，最初的左侧扬声器1405和1406位于底部，而最初的右侧扬声器1407和1408位于顶部。因而，现有声音条件已经改变，并且声音效果不再处于最佳状态。因此，音频驱动程序可能被重新配置以产生与便携式设备运动之前相对相当的声音质量。例如，扬声器1405和1407可以被用作左侧扬声器，而扬声器1406和1408可以被用作右侧扬声器，以便产生合适的声音效果。其他配置也可以存在。

附图15是阐述根据本发明一个实施例的用于基于加速度计重新配置多媒体接口的示例性进程的流程图。示例性进程1500可以由处理逻辑执行，处理逻辑可以包括硬件(电路、专用逻辑等)、软件(诸如运行在专用机器上的软件)或二者的组合。参照附图15，在方框1501，利用安装到便携式设备的加速度计检测便携式设备的运动，其中便携式设备包括多个设置在不同位置的多媒体接口或设备。在方框1502，基于由加速度计所提供的运动数据确定便携式设备运动后的定向。在方框1503，可以可选地基于所确定的定向启动或去激励一个或

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多个多媒体接口。在方框1504，驱动一个或多个多媒体设备，以在所确定的运动后定向的情况下产生最佳效果。其他操作也可以被执行。

尽管在本文中以无线接口和音频接口作为示例，但并不只限于这两种接口。其他类型的接口-诸如例如视频接口、麦克风以及照相机-也可以被应用。

根据本发明的某些实施例，某些设备只有当机器位于某个定向或位于与它通常被使用时的定向不同的定向时才能被适当地使用。例如，媒体插入可能要求设备被侧立放置或是正面朝下放置以提供接入。弹出媒体可能需要设备被侧立放置或是正面朝下放置，以防止媒体被阻碍或掉落地上。

例如，根据一个实施例，用户可以通过按压按钮或其他控制启动将媒体从媒体设备或组件的弹出(例如CD从CD ROM设备中弹出)。设备准备弹出媒体或卸下磁盘等。此时，利用安装到便携式设备的加速度计，控制这个设备的控制模块或应用程序软件可以检测到便携式设备不处于适于弹出媒体的位置。因此，设备可以通过周期性地或连续地读取来自加速度计的加速度数据，等待单元被定位在适当的位置或定向。此外，与设备关联的应用程序软件可以通知设备的用户(例如弹出消息或是声音警告等)设备需要处于某些位置以完成用户的请求。一旦设备处于适当的定向，所请求的操作可以被执行(例如弹出媒体)。

同样地，根据另一实施例，如果用户不重新定向单元，则加速度计可以被用于放弃操作。如果设备在一段时间内不被重新定位到适当的或预定的位置，则设备可以取消所请求的操作或者向用户提供进一步的指令。根据另一实施例，加速度计可以被用于检测定向，或者为了使能和/或禁用安装在设备侧边或底部的输入设备。例如，在设备的底部可以存在弹出按钮，这个按钮当设备竖立时被禁用。这样，用户将设备放置在桌上或用户的膝盖上时，该按钮不被启动。

附图24是阐述根据本发明另一实施例的启动或去激励设备的示例性进程的流程图。示例性进程可以由处理逻辑执行，处理逻辑可以

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包括硬件(电路、专用逻辑等)、软件(诸如运行在专用机器上的软件)或二者的组合。参考附图24，在方框2401，用于将便携式设备的组件从第一运行状态变换到第二运行状态的请求被接收(例如，弹出便携式存储设备)。在方框2402，利用安装到便携式设备的加速度计，确定便携式设备是否根据预定的适合于第二运行状态的定向被定位。

在方框2403，如果基于加速度计所提供的加速度信息确定便携式设备按照预定的定向或位置被定位，则便携式设备的组件随后被从第一运行状态变换到第二运行状态(例如，打开CD ROM的托盘)。然而，如果便携式设备不在预定的位置或定向，则在方框2404，所请求的变换被拒绝或挂起，从而使便携式设备的组件依然停留在第一运行状态或是其他状态(例如第三态：tri-state等)。同时，利用加速度计周期性或连续地监视便携式设备的位置或定向，其中一旦便携式设备的位置或定向被检测为位于适当的位置或定向，则所请求的操作可以被重新开始。如果便携式设备不在适当的位置或定向长达一个预定的时间周期，则所请求的操作可以被放弃。可选地，在方框2405，可以产生通知，以告知便携式设备的用户将便携式设备放到某些位置，以便完成所请求的操作。其他操作也可以被执行。

基于加速度计的其他应用

根据本发明另一实施例，加速度计可以被用于检测和确定携带其中装有加速度计的便携式设备的用户的活动。根据一个实施例，例如，被安装到可以被用户拿着的便携式设备中的加速度计可以检测用户在拿着便携式设备时抖动。在这个实施例中，便携式设备可以是数字多媒体播放器(例如MP3播放器)。安装到便携式设备的加速度计可以检测由用户活动所引起的便携式设备的运动可能是反复性的。

响应于检测，便携式设备的运动的重复率可以被确定，例如，通过连接到加速度计的控制器和/或固件，类似于附图1所示的配置。一旦运动的重复率被确定，应用程序软件(例如Microsoft的Windows媒体播放器或Real Networks的实时播放器(real player)等)可以调整当前正被便携式设备播放的多媒体内容的节奏，使其相对匹配所确

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定的运动重复率。因此，例如，可以调整当前被MP3播放器所播放的音乐的速度，以与拿着MP3播放器的用户的抖动率相对匹配。

此外，根据另一实施例，应用程序软件可以进一步选择和播放最适合于所确定的用户活动(例如抖动率)的多媒体内容。在一个实施例中，用户可以通过用户接口配置多媒体播放器，从而在某些环境下可以选择和播放某些类型的多媒体内容。因此，当加速度计和相关的控制器和/或固件检测到用户正在执行某些类型的活动时，相关类型的多媒体内容可以被相应地选择和播放。

附图16是阐述根据本发明一个实施例的用于基于加速度计播放多媒体内容的示例性进程的流程图。示例性进程1600可以由处理逻辑执行，处理逻辑可以包括硬件(电路、专用逻辑等)、软件(诸如运行在专用机器上的软件)或二者的组合。参照附图16，在方框1601，利用安装到便携式设备的加速度计检测便携式设备的运动，其中便携式设备的运动每隔一定时间周期就重复。在方框1602，基于由加速度计所提供的运动数据确定便携式设备的运动重复率。在方框1603，可选地，具有和所确定的重复率相对匹配的节奏的数字多媒体内容被选择和播放。在方框1604，当前播放的多媒体内容的节奏被调整以相对匹配所确定的运动重复率。其他操作也可以被执行。

根据本发明的另一实施例，加速度计可以被用于检测便携式设备是否正在移动(例如被用户携带着)以及便携式设备是否应该被置于适当的运行状态。根据一个实施例，当便携式设备处于非活动状态并且通过安装到便携式设备的加速度计检测到便携式设备正在移动时，便携式设备可以被置于相对较低功耗模式，诸如例如休眠模式。例如，顶盖合上的膝上型计算机可以被认为处于非活动状态。由于膝上型计算机电脑的顶盖是合上的，所以用户不能主动操作膝上型计算机。可选地，当膝上型计算机的桌面被锁定时，它被认为处于非活动状态。其他情况也可以被认为是非活动状态，这可以是用户可配置的。因此，膝上型计算机可以被置于低功耗模式。此外，如果膝上型计算机被确定为是移动的(通过加速度计)，则向永久存储设备(例如硬盘驱动

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器）写任何数据可能是不安全的。因此，永久存储设备的读/写头可以被停放到安全位置，而不向永久存储设备写数据。

根据一个实施例，如果基于由安装到便携式设备的加速度计所提供的数据确定便携式设备处于非活动状态，并且便携式设备不是正在移动，则可以使便携式设备进入休眠模式，其中系统存储器的内容可以被交换到永久存储设备（例如硬盘驱动器）中。由于便携式设备没有移动，因此向永久存储设备写数据是相对安全的。

附图17是阐述根据本发明一个实施例的用于便携式设备的电源管理的示例性进程的流程图。示例性进程1700可以由处理逻辑执行，处理逻辑可以包括硬件（电路、专用逻辑等）、软件（诸如运行在专用机器上的软件）或二者的组合。参照附图17，在方框1701，确定便携式设备是否处于非活动状态。例如，当便携式设备的顶盖合上或它的桌面被锁定时，便携式设备被认为处于非活动状态。在方框1702，利用安装到便携式设备的加速度计检测便携式设备以确定便携式设备是否正在移动（例如便携式设备是否被用户携带）。在方框1703，如果便携式设备正在移动，则使便携式设备进入相对较低功耗模式，并且不把系统存储器的内容交换到永久存储设备中。否则，在方框1704，如果便携式设备正在移动，通过将系统存储器的内容交换到永久存储设备，使便携式设备进入睡眠模式。其他操作也可以被执行。

根据本发明的另一实施例，为了确定是否正确输入密码，加速度计可以被用于检测便携式设备是否按照特定方向运动。在一个实施例中，当便携式设备的用户被提示输入密码时，作为输入密码的一部分，用户必须朝一个或几个方向移动便携式设备。安装到便携式设备的加速度计可以检测这样的运动，并且运动方向可以被确定，例如，通过相关的控制器和/或固件。如果运动方向相对匹配预定方向，则认为密码已经被正确“输入”了。

根据一个可选实施例，用户可能被要求在便携式设备上输入密码的第一部分。然后，用户被要求根据特定方向移动便携式设备。此后，用户被要求输入密码的第二部分（例如密码的其余部分）。因此，输

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入的密码以及便携式设备的特定运动的组合构造完整的密码。也可以存在其他配置。

附图18是阐述根据本发明一个实施例的用于处理密码的示例性进程的流程图。示例性进程1800可以由处理逻辑执行，处理逻辑可以包括硬件(电路、专用逻辑等)、软件(诸如运行在专用机器上的软件)或二者的组合。参照附图18，在方框1801，用户被要求在便携式设备上输入密码。在方框1802中，利用安装到便携式设备的加速度计检测便携式设备是否被移动。在方框1803，基于由加速度计所提供的运动数据确定运动方向。在方框1804，确定便携式设备是否已经按照预定方向被移动。在方框1805，基于运动方向与预定方向是否相对匹配，发布提示以指明密码是否被正确“输入”。其他操作也可以被执行。

根据本发明的另一实施例，加速度计可以被用于检测和记录便携式设备的一系列运动，其中所记录的运动数据随后(例如离线)可以被用于重现运动历史。在一个实施例中，当便携式设备在一段时间内被移动时，安装到便携式设备的加速度计检测和记录这样的运动。在运动过程中，由加速度计所记录的运动数据可以被存储在便携式设备的存储设备(例如硬盘驱动器)中。可选地，运动数据可以在运动期间通过网络(例如无线网络)被发送到远程设备。随后，在运动之后，可以利用由加速度计所提供的运动数据，重现表示这段时间上的运动的轨迹。

这在用户希望以后重新绘制过山车运行轨迹时是非常有用的。例如，用户可以携带安装有加速度计的便携式设备并坐上过山车。在乘车期间，加速度计可以检测运动数据并将它们存储在存储设备中，或是可选地，加速度计把运动数据通过网络传送到远程设备。在乘坐之后，运动数据可以被用于重现过山车运行的轨迹。过山车只是被用作一个示例，上述技术可以被应用于其他场合。例如，为了绘制其他地区的地图，携带加速度计的用户可以开车去那些地方进行测量，其中加速度计被安装到便携式设备或被安装到汽车上。然后，可以利用在开车过程中由加速度计所收集的运动数据绘制地图。

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附图19是阐述根据本发明一个实施例的用于利用加速度计重现运动轨迹的示例性进程的流程图。示例性进程1900可以由处理逻辑执行，处理逻辑可以包括硬件(电路、专用逻辑等)、软件(诸如运行在专用机器上的软件)、或二者的组合。参照附图19，在方框1901，利用安装到便携式设备的加速度计检测便携式设备的一系列运动。在上述示例中，汽车可以被认为是便携式设备。在方框1902中，这一系列运动中的每一个运动的运动方向以及每个运动之间的时间被确定。在方框1903，信息可以被存储在便携式设备的存储器中。可选地，信息也可以通过网络被动态地传输到远程设备(例如无线网络)。随后，在方框1904，可以利用所存储的运动数据重现表示运动历史的轨迹。其他操作也可以被执行。

利用加速度计的运动补偿

根据本发明的另一实施例，加速度计可以被用于检测便携式设备的运动，并且可响应于检测应用运动补偿。例如，安装到便携式设备的加速度计可以检测使用便携式设备(例如阅读显示在便携式设备的显示屏上的电子文档)的用户可能正乘坐在颠簸的汽车上。响应于检测，可以对所显示的文档执行运动补偿，使得电子文档可以相对保持在对于用户的眼睛一样的位置。

在一个实施例中，可以通过适当地对从加速度计所接收的信号求积分来计算显示器平面内作为时间的函数的显示器平台的位置。随后，图像在显示屏上被作为时间的函数垂直和水平地变换，以保持图像位置在空间中充分固定，而与显示器平面内显示器的运动无关。可以通过由加速度计所提供的运动数据的相对较高频率分量来表示这样的运动(例如，诸如颠簸之类的突发运动)。为了防止当汽车上山和下山或绕圈时图像离开屏幕，显示器运动的低频率分量-诸如由汽车的前进速度所引起的那些-可以不被补偿。同样，当乘车在颠簸的平台上时，这种技术也可以被应用到通过便携式设备玩的电子游戏中。

附图22是阐述根据本发明一个实施例的用于利用加速度计的运动补偿的示例性进程的流程图。示例性进程可以由处理逻辑执行，处

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理逻辑可以包括硬件(电路、专用逻辑等)、软件(诸如运行在专用机器上的软件)或是二者的组合。在一个实施例中，示例性进程包括、但不只限于利用安装到便携式设备的加速度计检测便携式设备的运动，基于加速度计所提供的运动数据确定便携式设备的运动方向，以及调整所显示对象在便携式设备的显示屏上的位置，以补偿便携式设备的运动，使得调整后的显示对象相对于便携式设备的用户保持相对同样的位置。

参照附图22，在方框2201，利用安装到便携式设备的加速度计检测便携式设备的运动。在一个实施例中，根据作为加速度计所提供的运动数据的一部分的位置，作为时间的函数检测运动。运动数据可以包括表示突发运动的相对高频率分量以及表示低速运动的相对低频率分量。在方框2202，在显示器平面中提取运动数据中相对高频率分量(例如降低阅读所显示文档或观察静止图像的人视觉灵敏度的运动分量)。在方框2203，所显示文档或图像的位置可以基于所提取的高频率分量而被移位，以补偿便携式设备的高频率运动(例如突发运动)。因此，对于用户来说，所显示的文档或图像可以被相对稳定地保持在空间中。其他操作也可以被执行。

利用加速度计的冲击检测及应用

根据本发明的另一实施例，加速度计可以用于检测便携式设备的用户所施加的冲击。在一个实施例中，该技术允许用户在提供受控动量传递的物理意义上施加冲击，作为应用程序的便携式或固定式设备的输入。例如，这些冲击可以出现以与冲击的幅值和方向成比例地启动或偏转显示屏上对象的运动。这将支持游戏(例如台球或其他球类游戏)以及教育/工程探测(例如结构对敲击的反应)。

例如，用户可以通过轻敲便携式设备的侧边，在便携式设备的显示屏上“晃动”指针。安装到便携式设备的加速度计可以检测这样的引起便携式设备运动的力。力的方向和幅值可以基于加速度计所提供的运动数据确定。当为应用使能这项功能时，在设备侧面的轻拍将使鼠标以类似于轻拍小物体并使其滑过平面上一段距离的方式移动。同样，

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这种技术可以被应用在多种其它应用中，诸如例如视频游戏(例如高尔夫球、保龄球、网球等)。

附图23是阐述根据本发明一个实施例的用于冲击检测的示例性进程的流程图。示例性进程可以由处理逻辑执行，处理逻辑可以包括硬件(电路、专用逻辑等)、软件(诸如运行在专用机器上的软件)或二者的组合。在一个实施例中，示例性进程包括、但不只限于响应于施加到便携式设备的力，利用安装到便携式设备的加速度计检测便携式设备的运动，基于加速度计所提供的加速度信息计算力的幅值和方向，以及将所显示对象在便携式设备的显示屏上从第一位置移动到第二位置，其中基于所计算的力的幅值和方向确定第一位置和第二位置之间的方向和距离。

参照附图23，在方框2301，响应于便携式设备上的轻拍(例如用户用手轻拍便携式设备的边缘)，安装到便携式设备的加速度计检测三轴加速度作为时间的函数。在方框2302中，通过执行三轴加速度的分量的时间积分，与传递到设备的冲击的幅值成比例地计算值。在一个实施例中，可以基于例如通过加速度的三个分量(例如X、Y和Z轴加速度信息)的矢量和所确定的所得到的加速度矢量的绝对值的积分确定该值。

在方框2303，确定由于轻拍便携式设备所导致的传递到便携式设备的冲击的方向。在一个实施例中，基于加速度计所提供的运动数据，由连接到加速度计的微控制器和/或固件计算方向。响应于所确定的冲击方向和幅值，应用程序软件使所显示的对象相对相关于所确定的冲击的方向和距离地以某个方向移动一定距离。所显示的对象可以是指针。可选地，所显示的对象可以是在台球或弹球中的球、保龄球游戏中的保龄球、网球中的球拍或球板、观测形变和/或动力学运动的结构等。上述技术也可以被应用到其它类似应用类型，这对于本领域技术人员来说是显而易见。

带加速度计的示例性便携式设备

附图20是阐述根据本发明一个实施例的具有加速度计的示例性

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便携式设备的框图。例如，示例性系统2000可以至少表示附图1所示的示例性系统100或者附图21的示例性系统2100的一部分（例如子系统）。参照附图20，示例性系统2000包括一个或多个加速度计2001、一个或多个微控制器2002、主芯片组2003以及一个或多个外围设备2006，其中主芯片组2003可以被连接到视频适配器2004和音频设备2005。

在一个实施例中，加速度计2001是可以提供X、Y和Z轴上加速度数据的三轴加速度计。加速度计是被封装在芯片组件中的机电式微型机械。它提供三路模拟输出（例如X、Y和Z轴），这些模拟输出的值与沿三维空间中的相应轴所测量的加速度直接成比例。在一个实施例中，加速度计2001可以是Kionix公司的KGF01加速度计或是模拟器件公司的ADXL311。

微控制器2002负责监视加速度计2001的模拟输出，并通过芯片组2003与主机通信。在一个实施例中，通过I2C总线2007以及中断线2008把微控制器2002连接到主芯片组2003。可选地，微控制器2002可以与主芯片组2003集成。在一个实施例中，微控制器2002可以是Microchip(微芯)公司的PCI 16F818微控制器。

根据一个实施例，当加速度计2001检测到便携式设备正在移动时，微控制器2002从加速度计2001接收三轴加速度信息，并通过中断线通知主机。作为响应，运动数据可以通过I2C总线2007被从微控制器2002中读出。在一个实施例中，微控制器2002可以基于从加速度计2001所接收的三轴加速度信息确定运动方向。可选地，主芯片组可以执行这样的操作。在一个实施例中，所有这三个轴的所得到的加速度矢量的幅值可以根据下列公式确定：

$$Mag(Acceleration_{resultant}) = Sqrt(X_{accel}^{2} + Y_{accel}^{2} + Z_{accel}^{2})$$

响应于确定的加速度矢量的幅值，在示例性系统2000中执行的一个或多个软件成分（例如应用程序软件、固件以及操作系统等）可以执行特定操作，例如本申请中上述的那些操作。例如，所显示的图像的定向可以被视频适配器调整，以及声音效果可以通过音频设备

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2005被调整等。此外，一个或多个外围设备2006-诸如例如硬盘驱动器-可以被相应地配置。其它配置也可以存在。

示例性数据处理系统

附图21是可以和本发明的一个实施例一起使用的数字处理系统的方框图。例如，附图21所示的系统2100可以被用作为附图1和20所示的示例性系统。

注意，虽然附图21表示了计算机系统的各种组件，但是并不打算表示任何特定架构或组件互联方式，因为这些细节和本发明没有密切关系。也应该理解，网络计算机、手持计算机、蜂窝电话、多媒体播放器以及可以有更少组件或可能可以具有更多组件的其他数据处理系统也可以与本发明一起使用。例如，附图21的计算机系统可以是Apple Macintosh计算机或IBM兼容计算机。

如附图21所示，作为一种数据处理系统的计算机系统2100包括总线2102、易失性RAM2105以及非易失性存储器2106，其中总线2102连接到微处理器2103和ROM 2107。可以是例如Motorola(摩托罗拉)公司或IBM公司的PowerPC G4或PowerPC G5微处理器的微处理器2103被连接到高速缓存存储器2104，如附图21的实例中所示。总线2102把这些不同部件互相连接到一起，并且也把这些部件2103、2107、2105、2106互相连接到显示控制器和显示设备2108，以及连接到输入/输出(I/O)设备2110，输入输出设备可以是鼠标、键盘、调制解调器、网络接口、打印机以及其他本领域中公知的设备。通常，输入/输出设备2110通过输入/输出控制器2109连接到系统。易失性RAM 2105通常被实现为需要连续供电以刷新或保持存储器中的数据的动态RAM(DRAM)。非易失性存储器2106通常为磁硬盘驱动器、磁光盘驱动器、光盘驱动器、或DVD RAM或者其它类型的甚至在电源被从系统中去除之后还保持数据的存储系统。通常，非易失性存储器也是随机存取存储器，尽管这并不需要。虽然附图21显示了非易失性存储器是直接连接到数据处理系统的其它部件的本地设备，但应该理解，本发明可以利用远离系统的非易失性存储器，诸如

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通过网络接口-诸如调制解调器或以太网接口-连接到数据处理系统的网络存储设备。总线2102可以包括通过各种桥、控制器以及/或者适配器彼此连接的一条或多条总线，如本领域中所公知的。在一个实施例中，I/O控制器2109包括用于控制USB(通用串行总线)外围设备的USB适配器。可选地，I/O控制器2109可以包括用于控制FireWire设备的IEEE-1394适配器，IEEE-1394适配器也被称为FireWire适配器。其他部件也可以被包括。

因此，用于利用加速度计操作便携式设备的方法和装置已经被描述。在前述说明书中，已经参照具体示例性实施例描述了本发明。但显然可以对其进行各种修改而不会背离在以下权利要求书中所确定的本发明的主旨和范围。相应地，说明书和附图将被视为图解说明的意思，而不是限制的意思。

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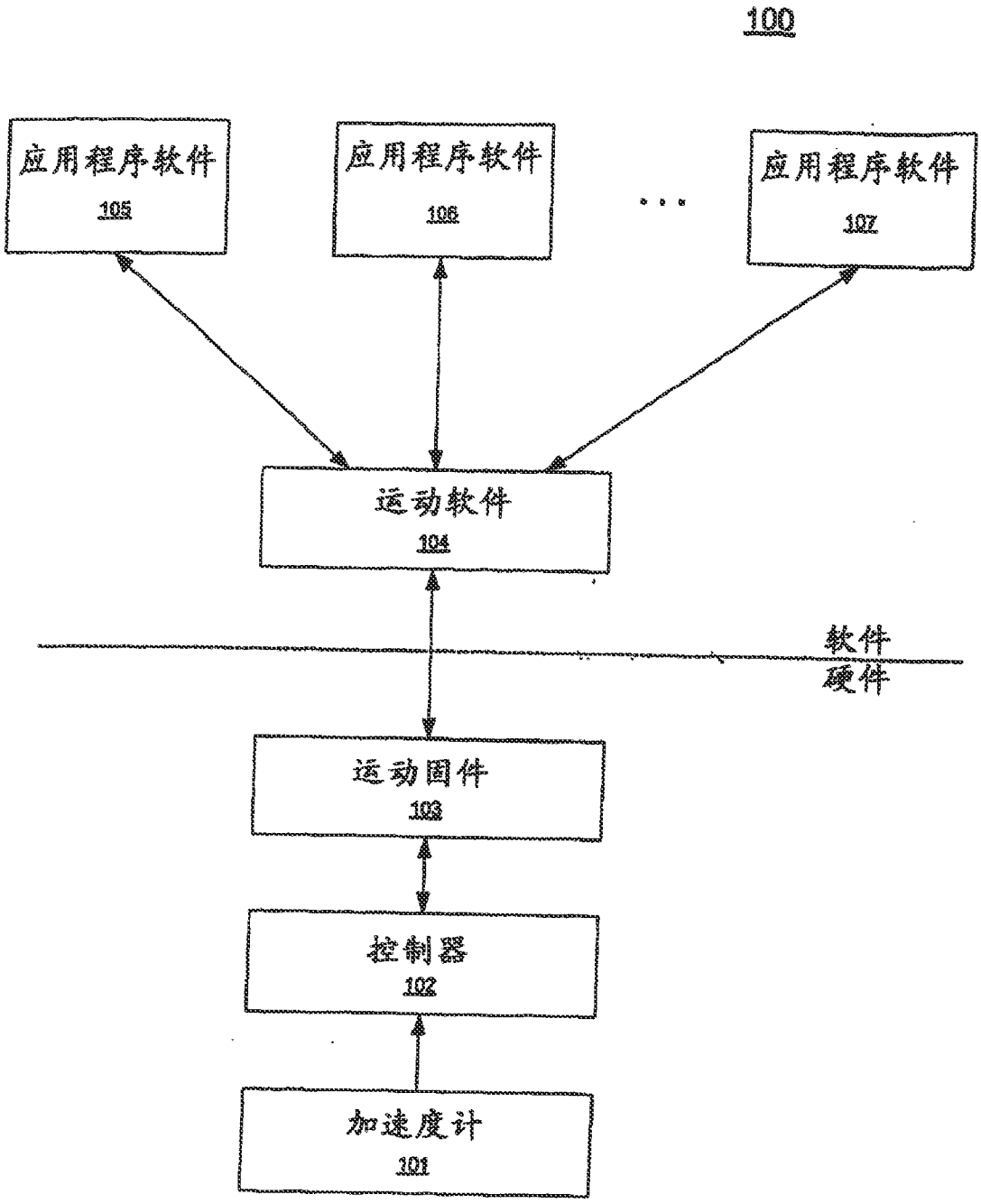


图1

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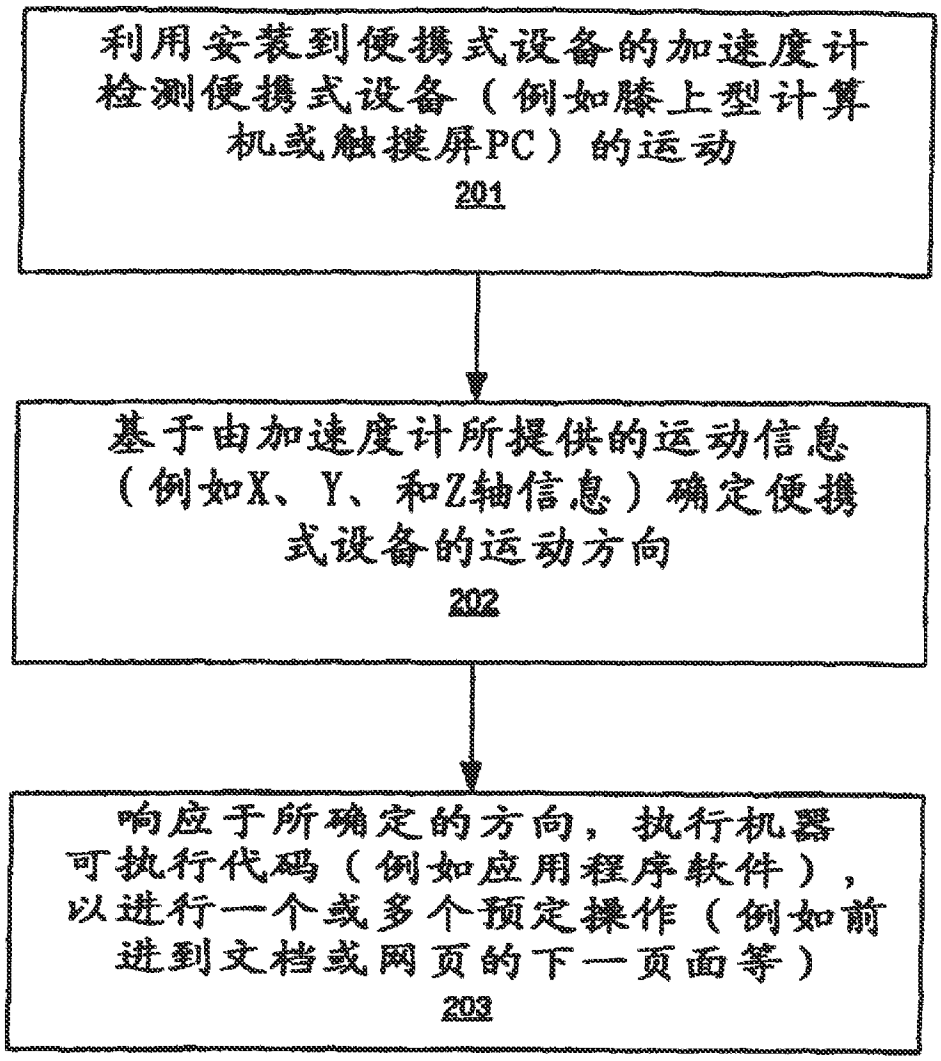


图2

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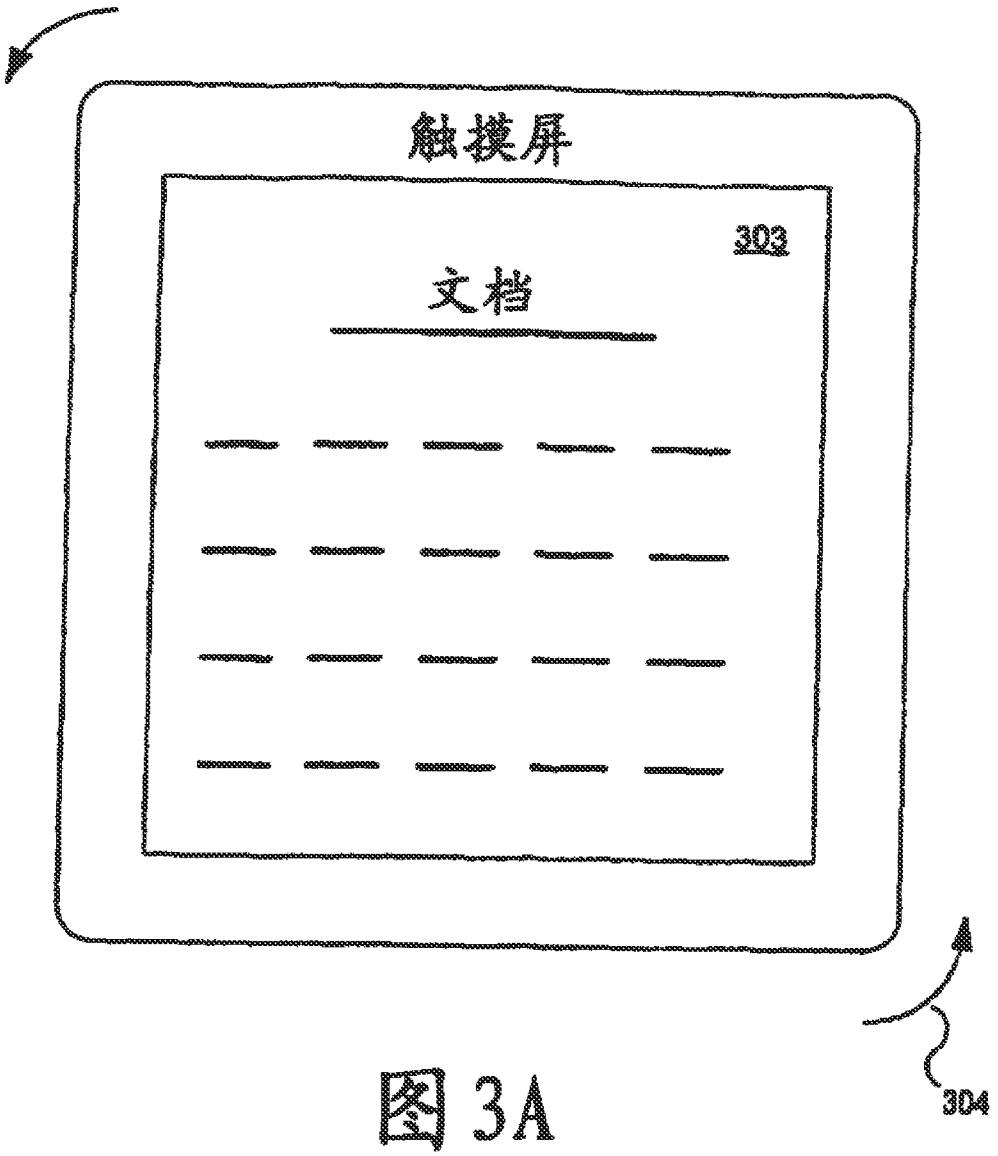


图 3A

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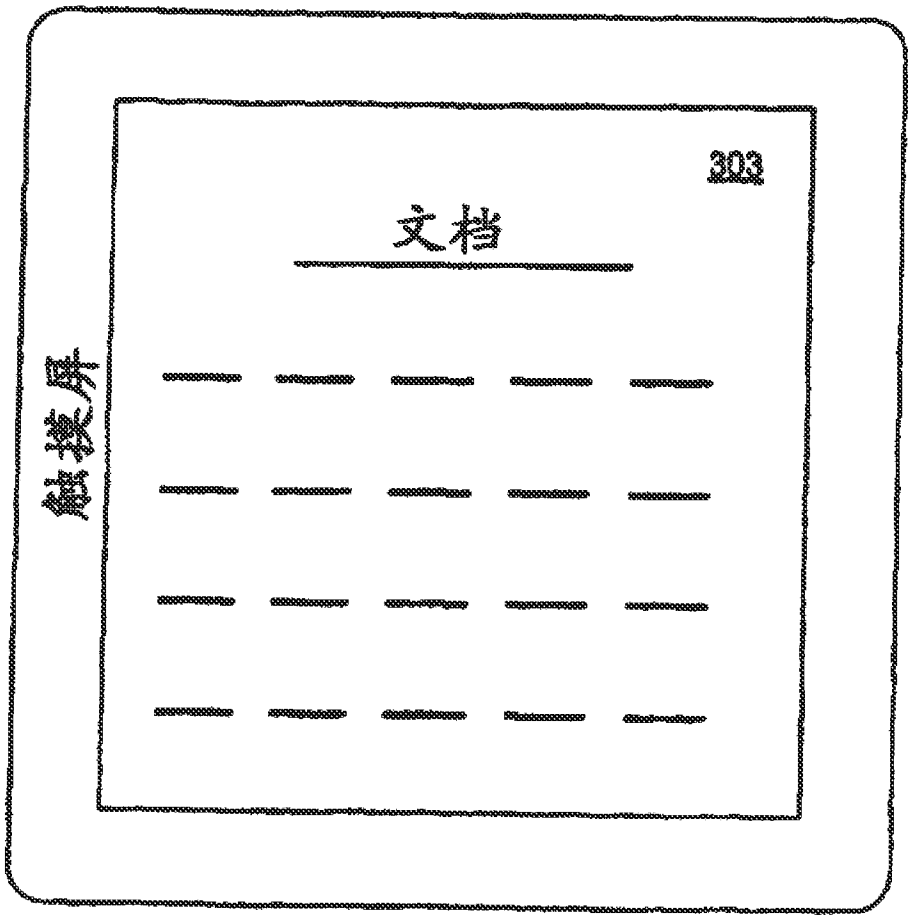


图 3B

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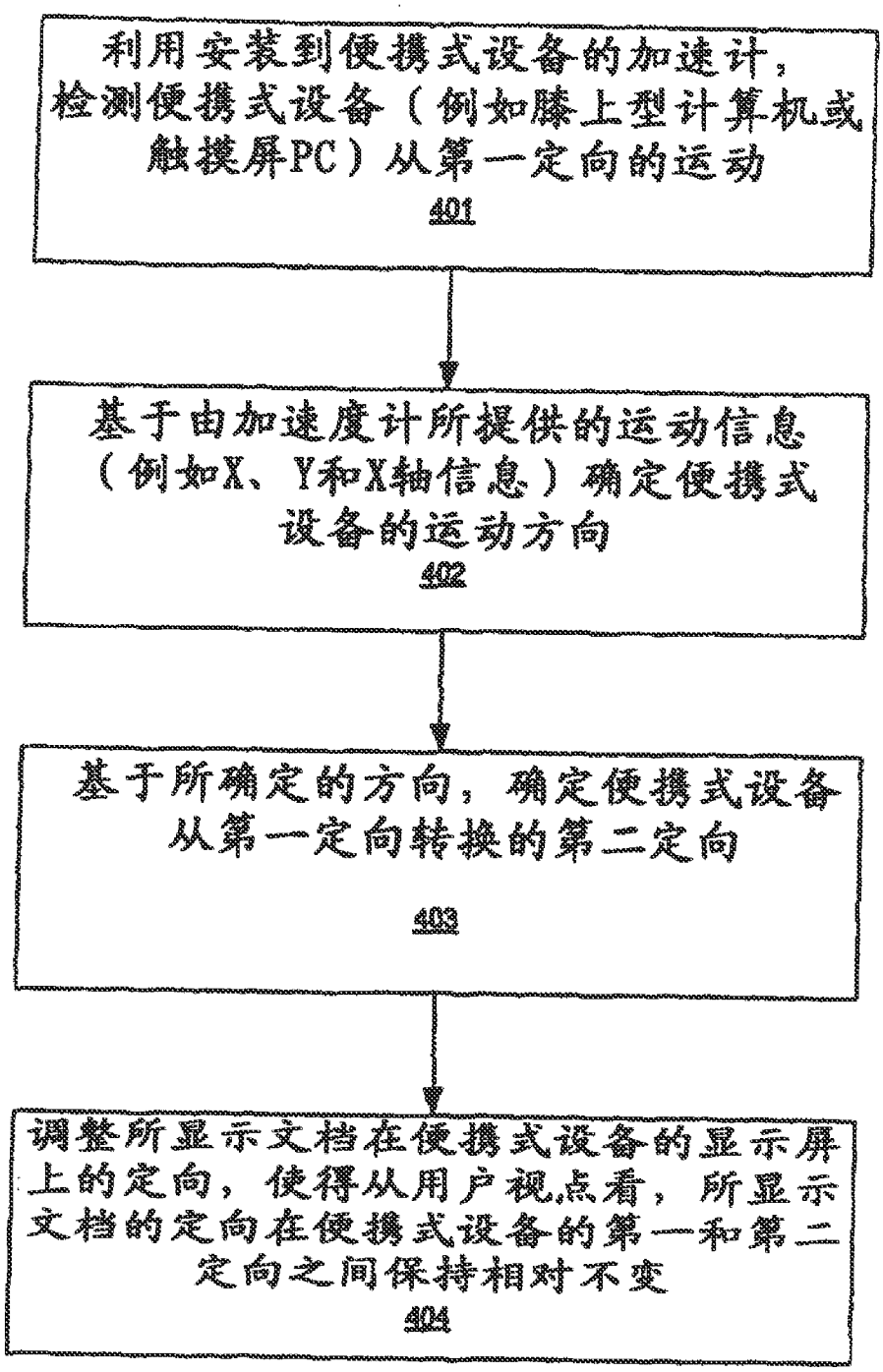


图4

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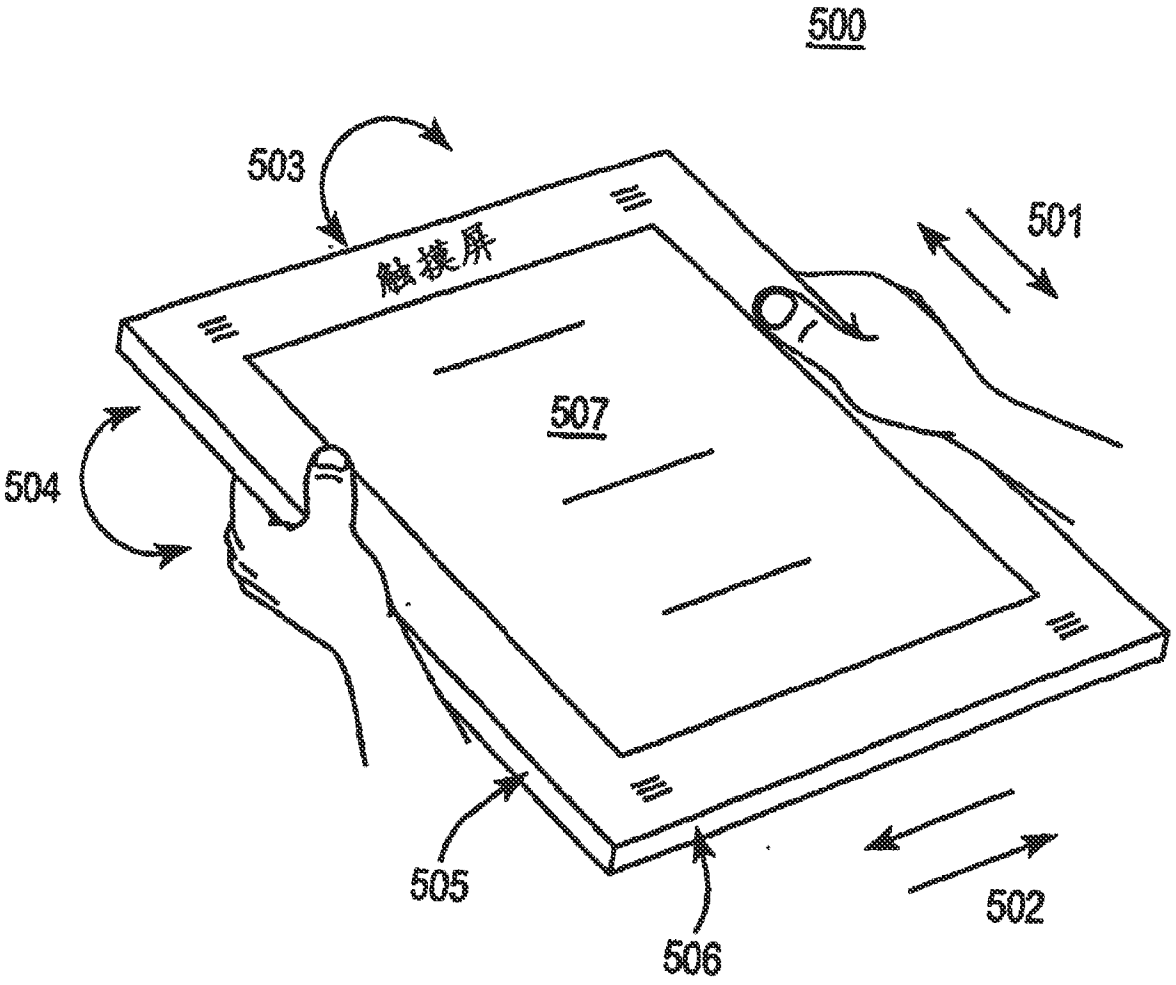


图 5A

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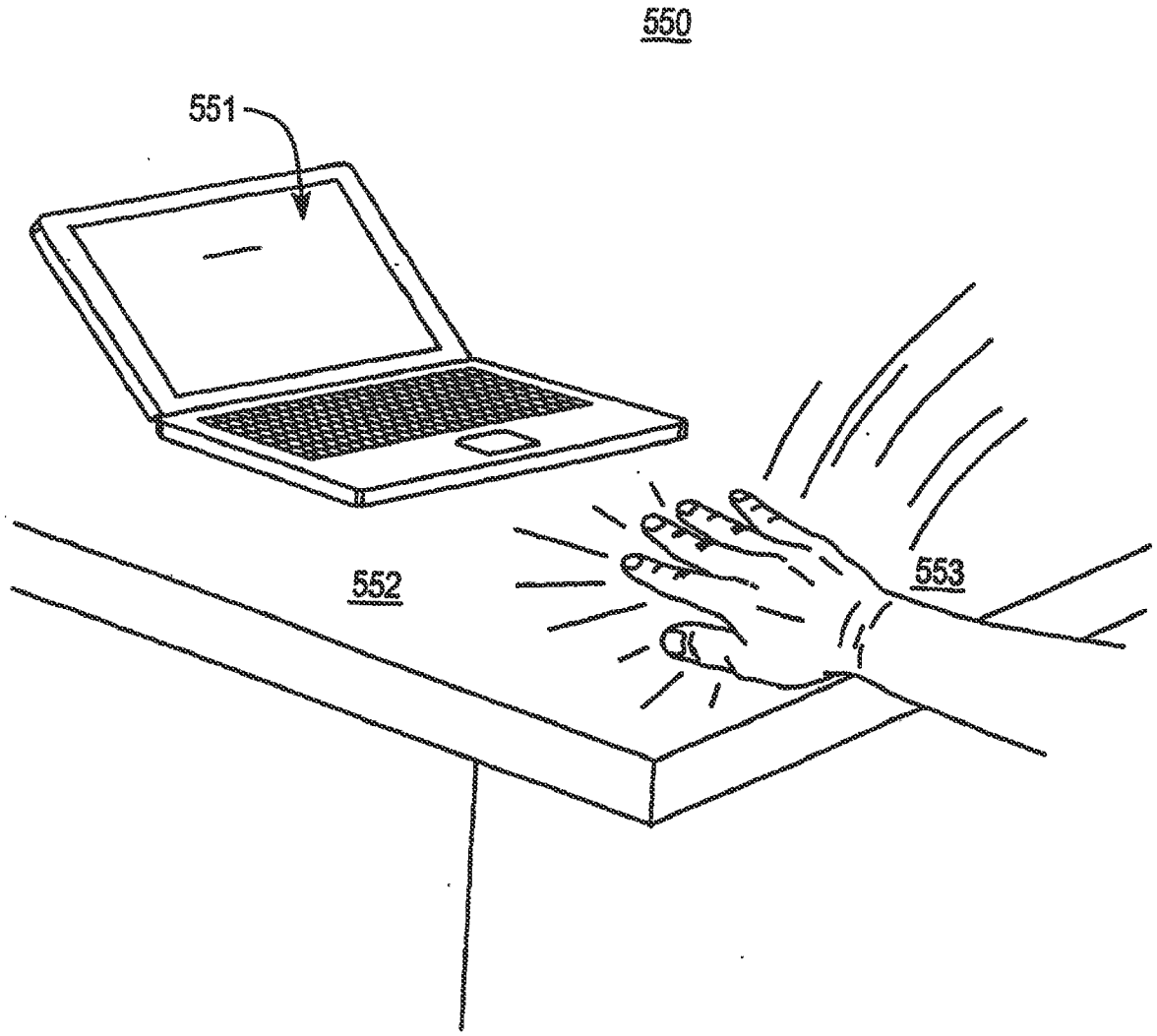


图 5B

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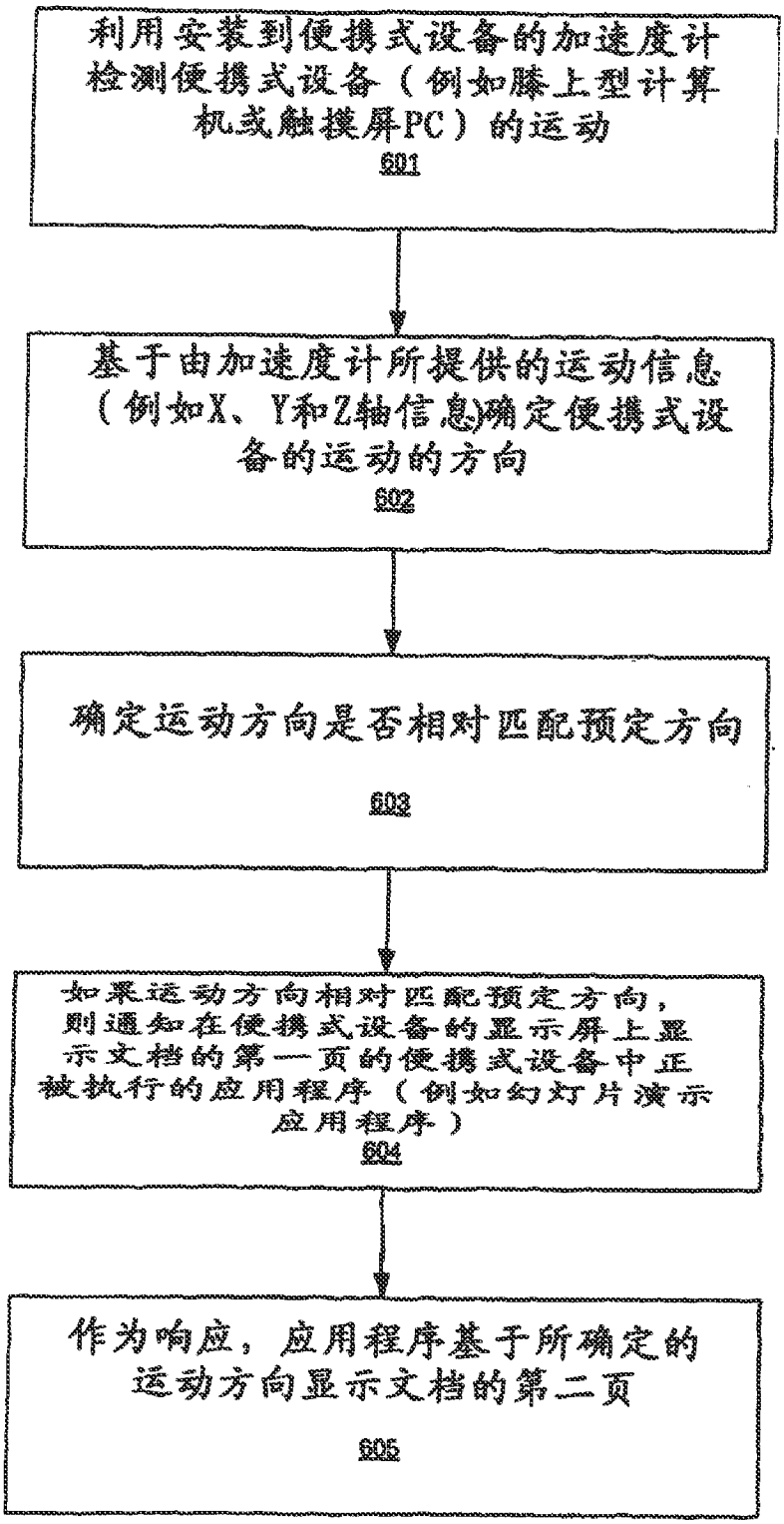


图6

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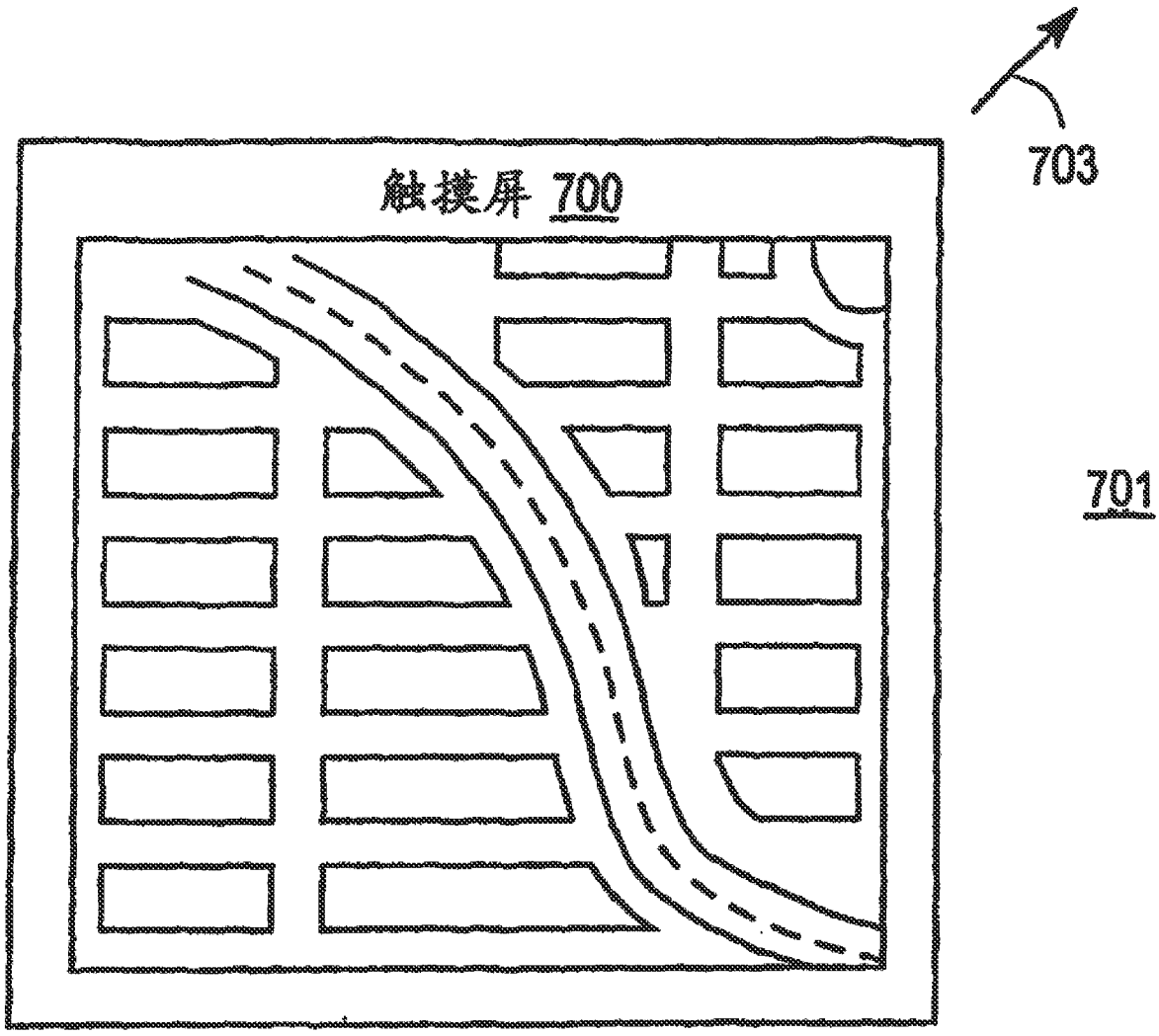


图 7A

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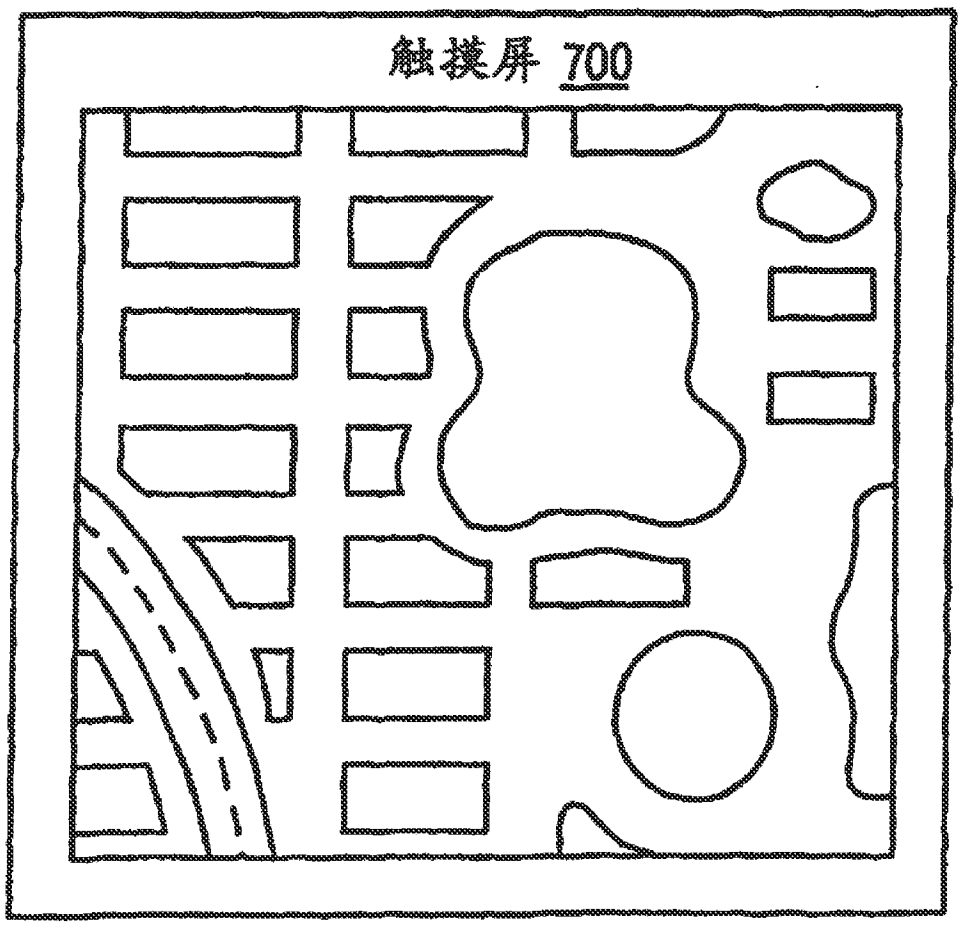


图 7B

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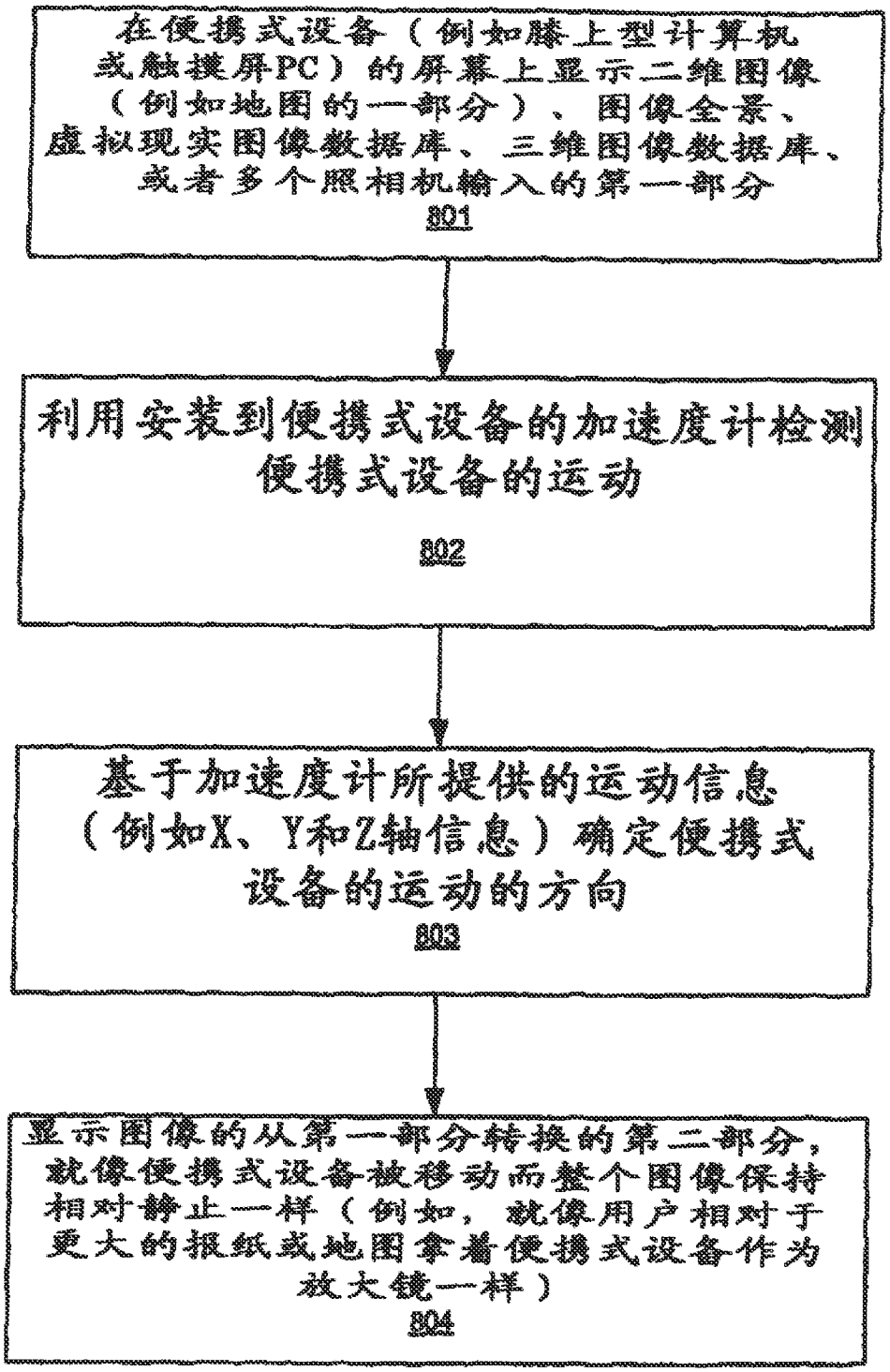


图8

HP Inc. - Exhibit 1005 - Page 1978

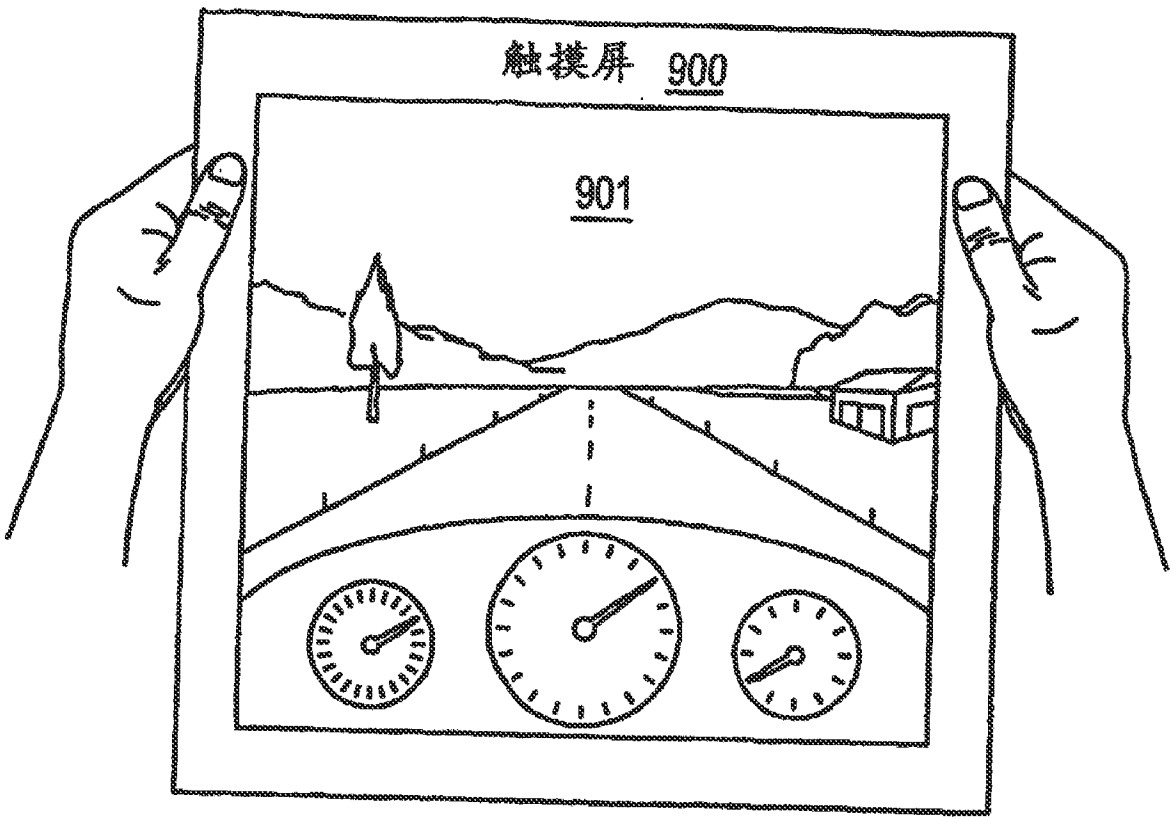


图 9A

HP Inc. - Exhibit 1005 - Page 1979

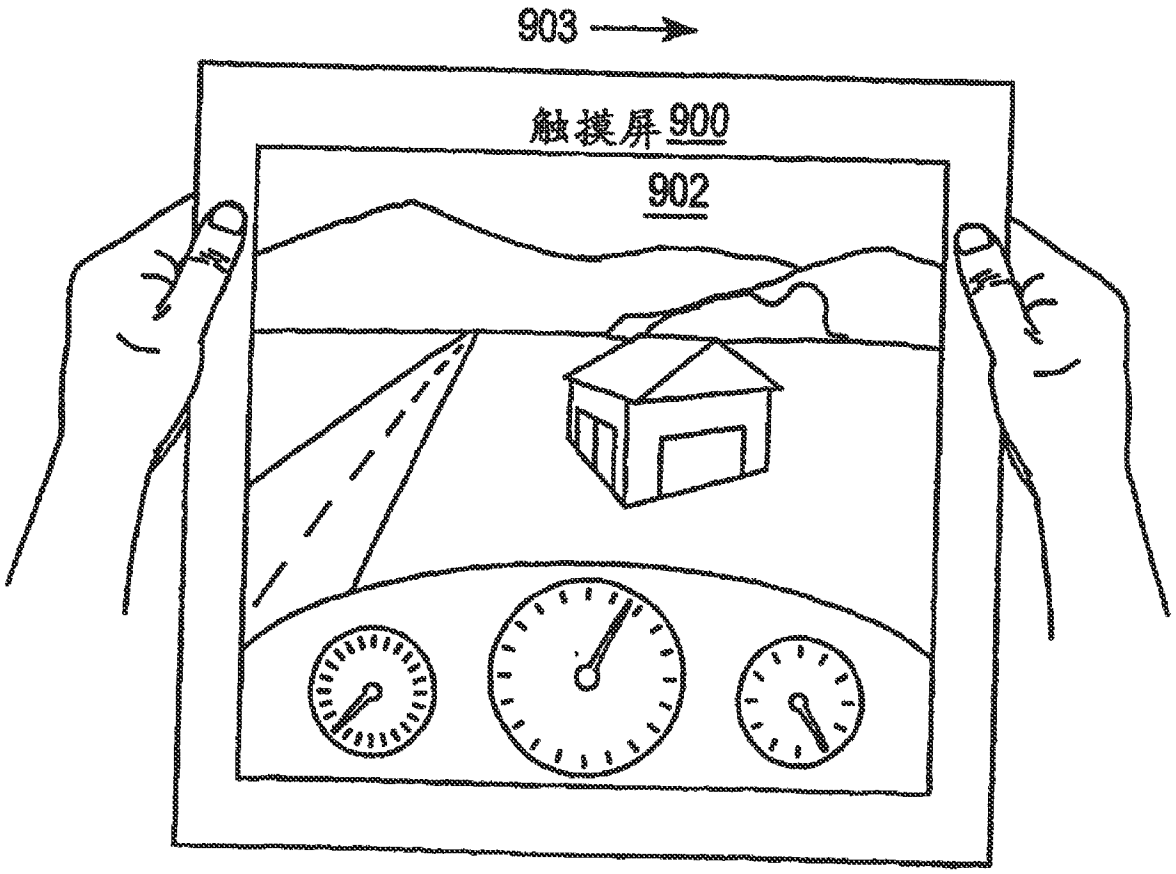


图9B

HP Inc. - Exhibit 1005 - Page 1980

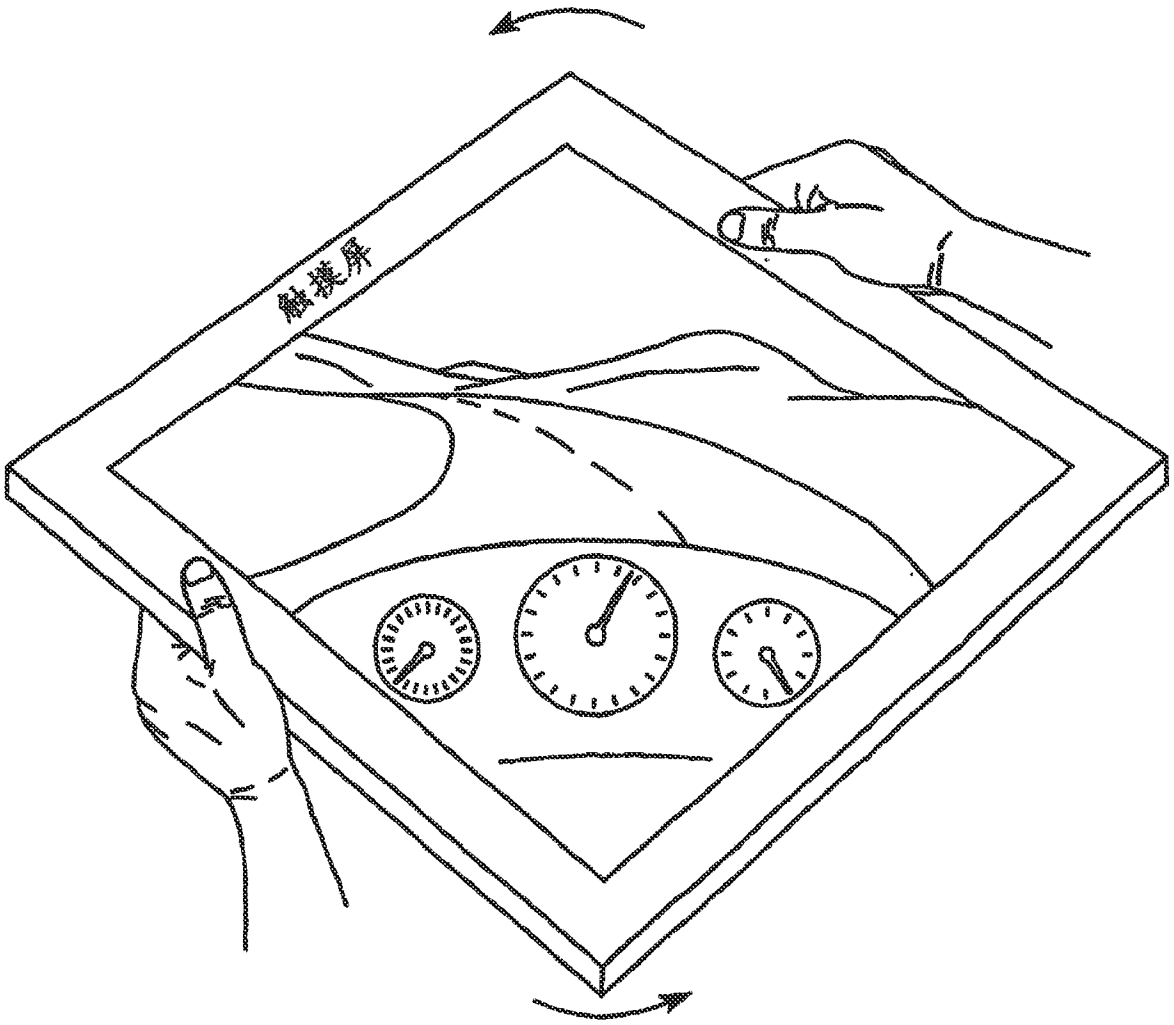


图10A

HP Inc. - Exhibit 1005 - Page 1981

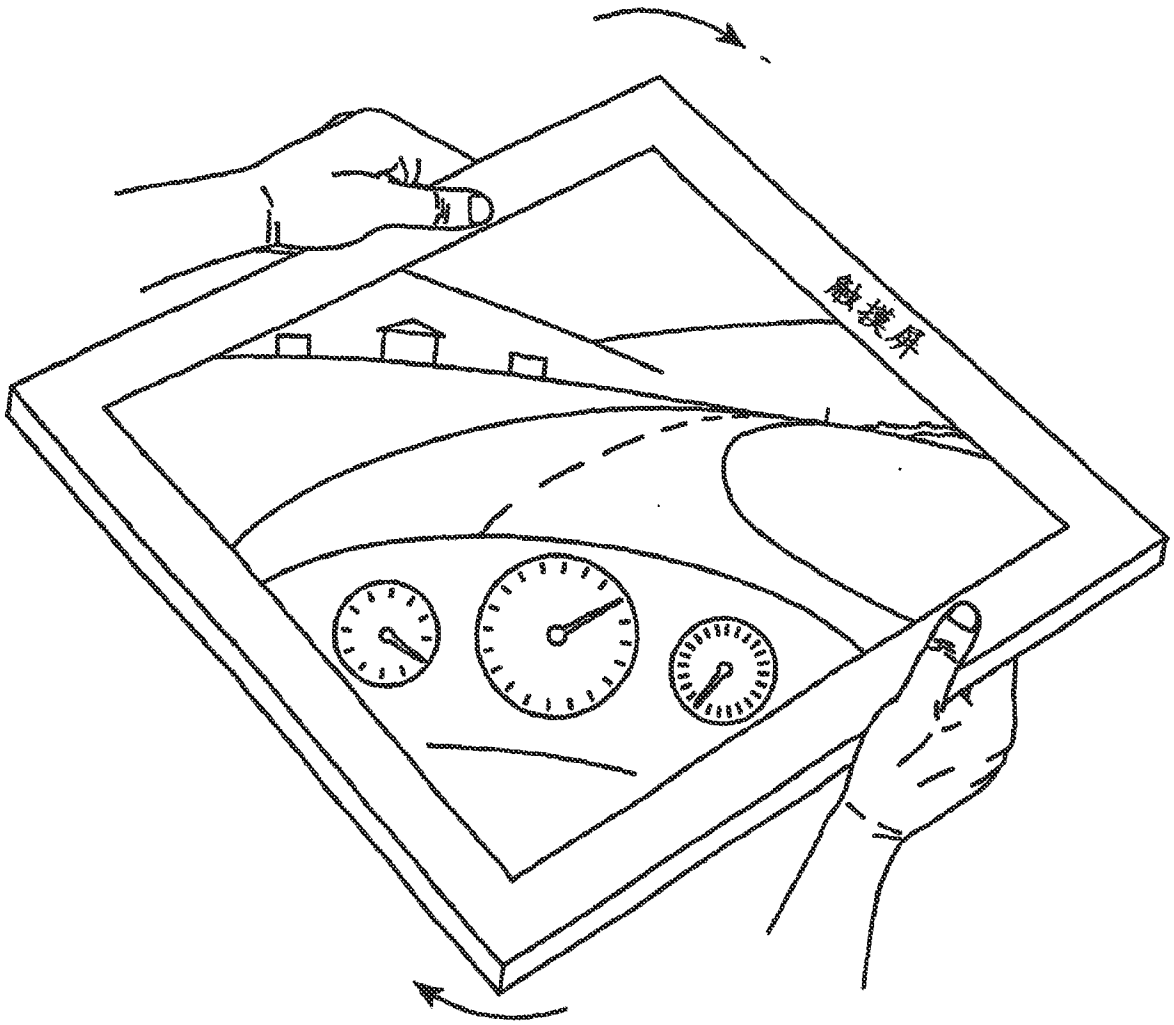


图10B

HP Inc. - Exhibit 1005 - Page 1982

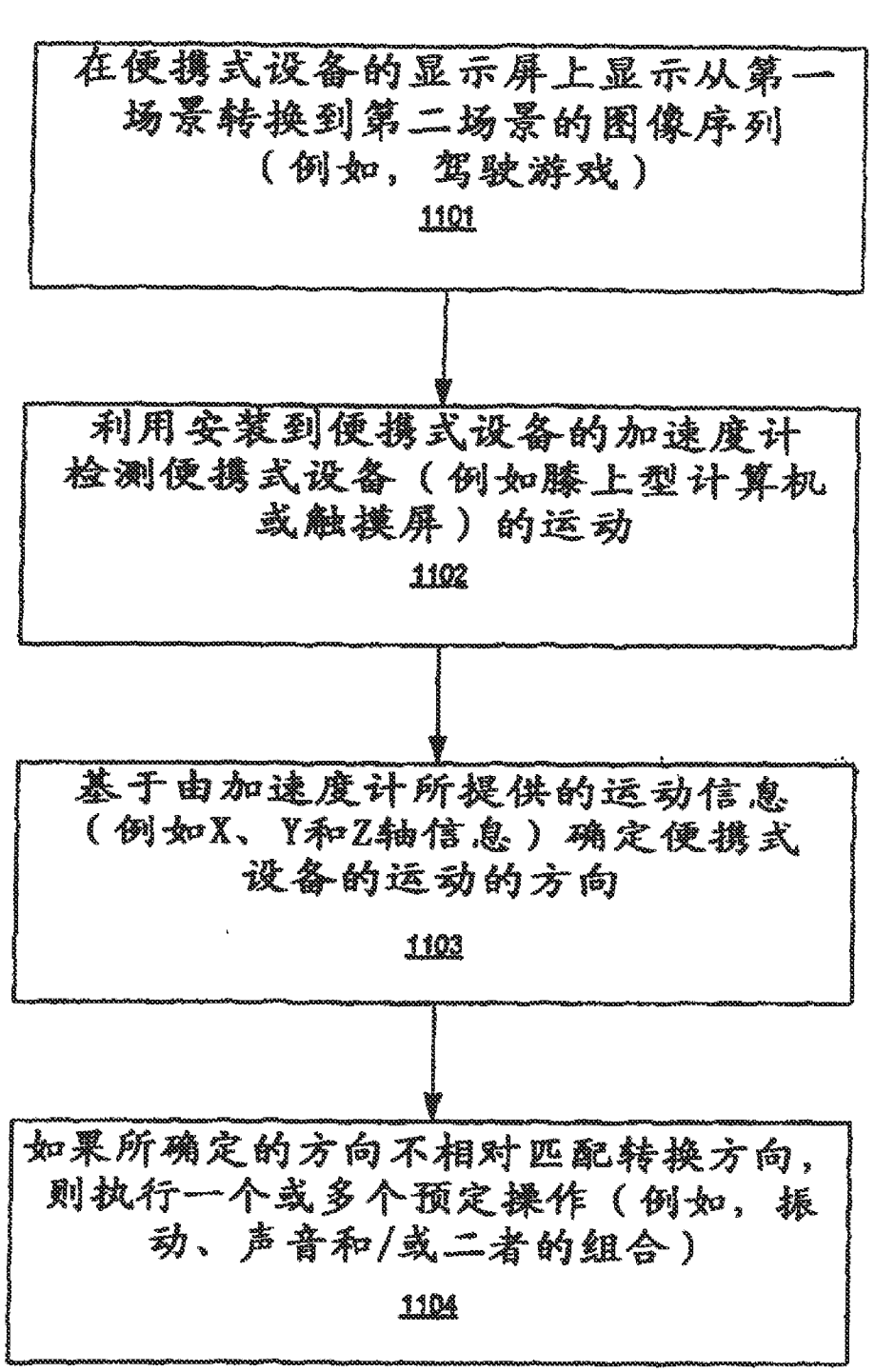


图11

HP Inc. - Exhibit 1005 - Page 1983

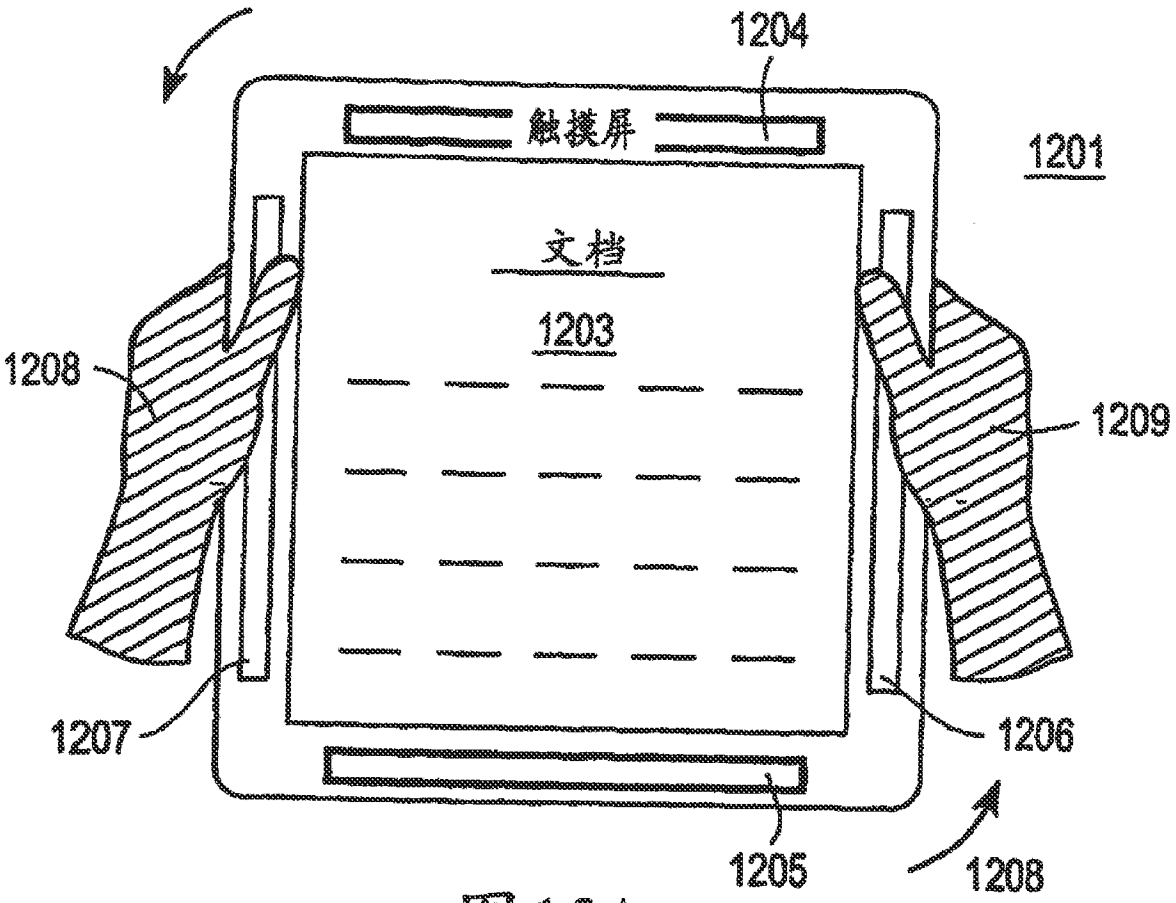


图12A

HP Inc. - Exhibit 1005 - Page 1984

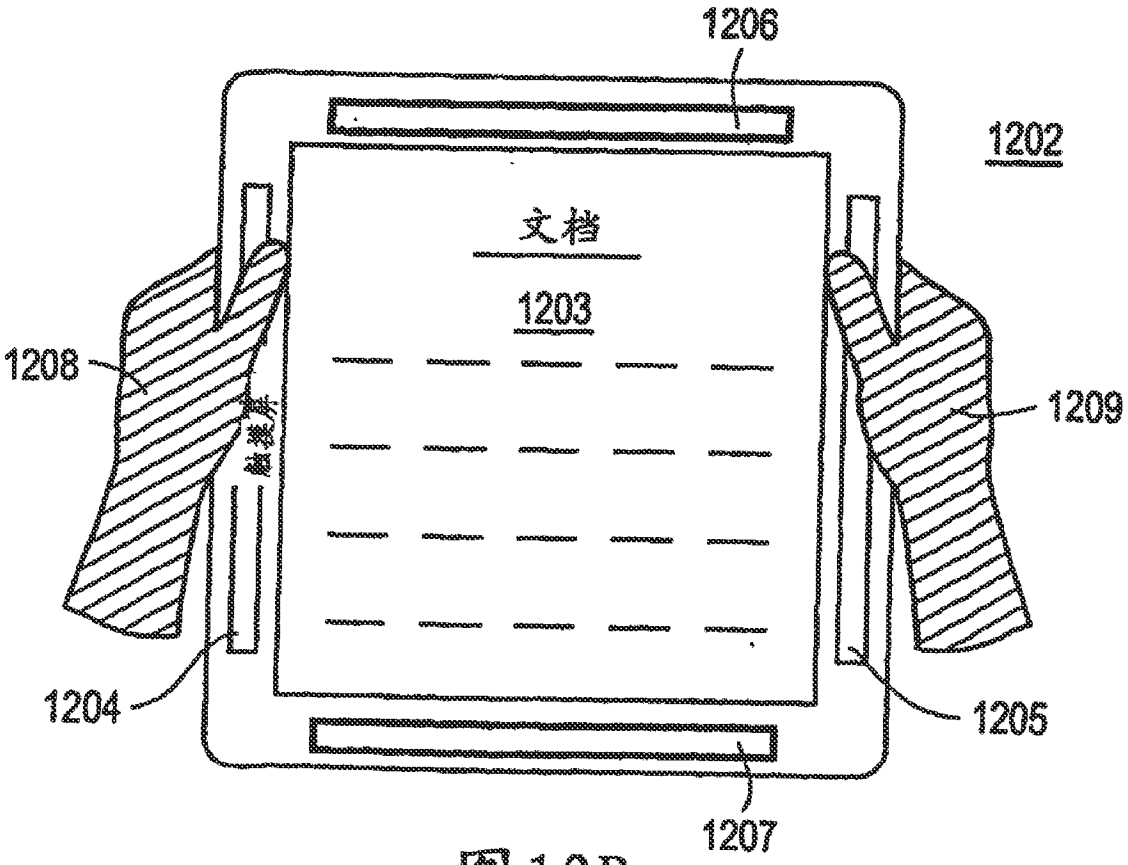


图 12B

HP Inc. - Exhibit 1005 - Page 1985

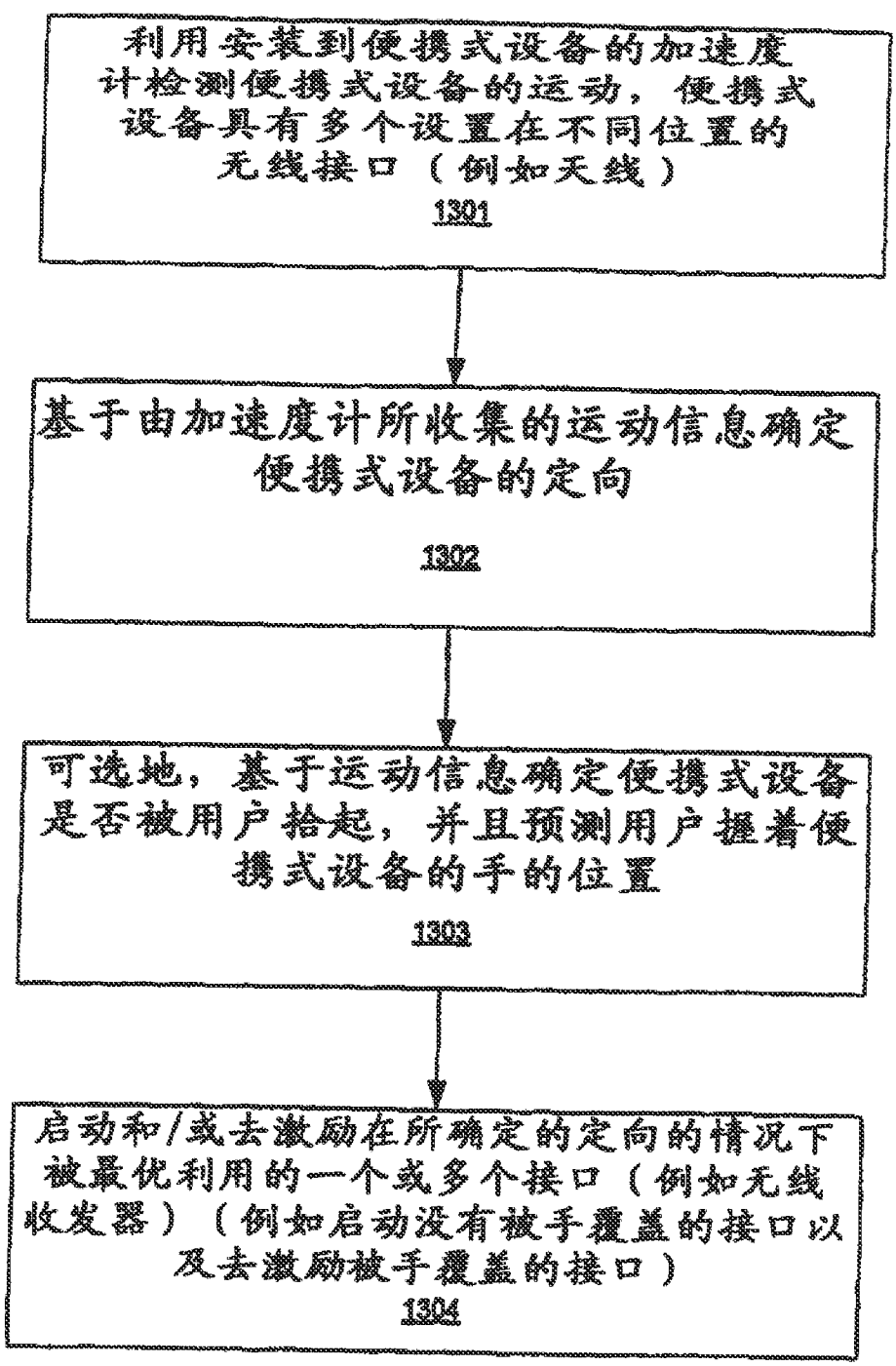


图13

HP Inc. - Exhibit 1005 - Page 1986

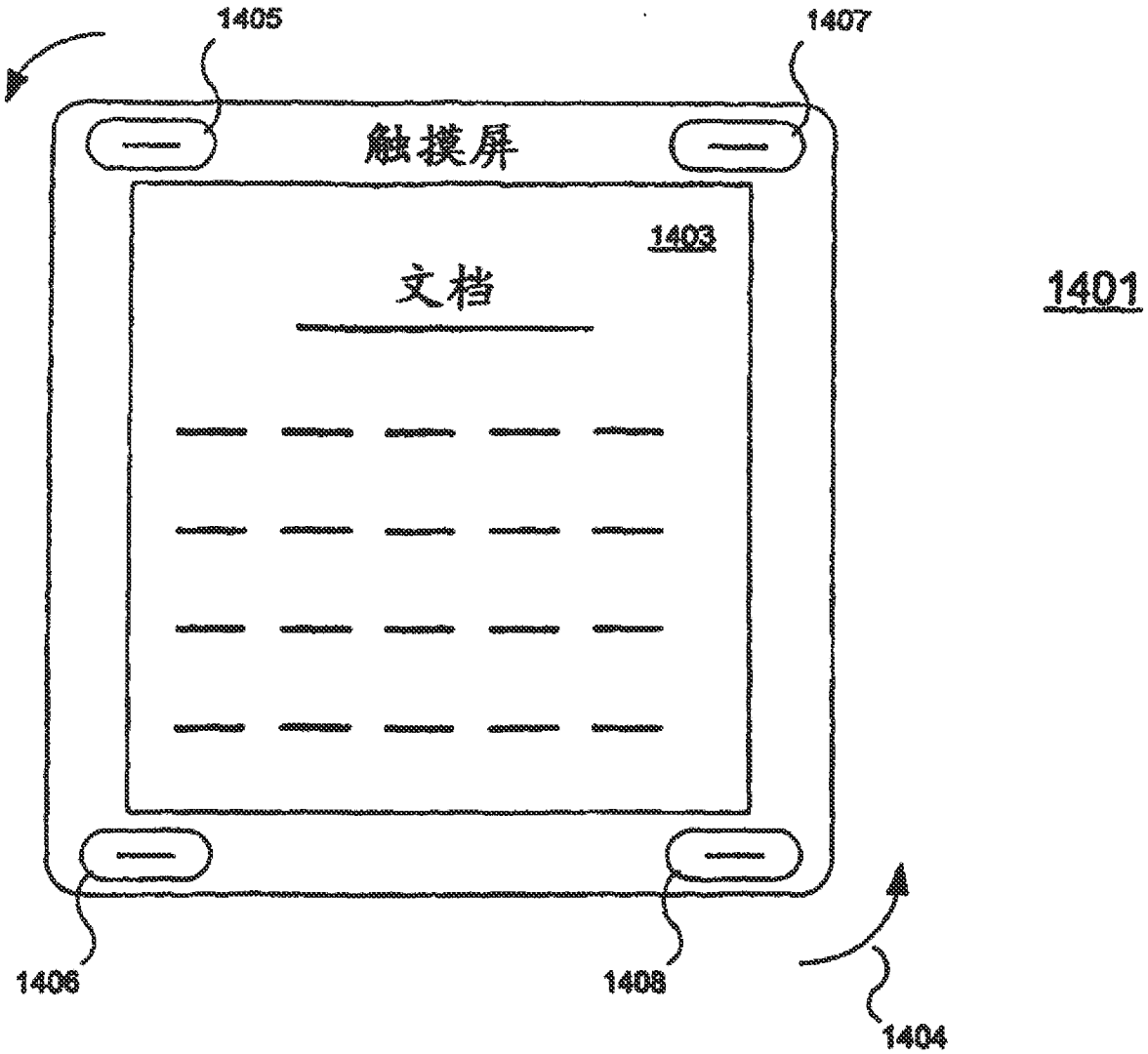


图14A

HP Inc. - Exhibit 1005 - Page 1987

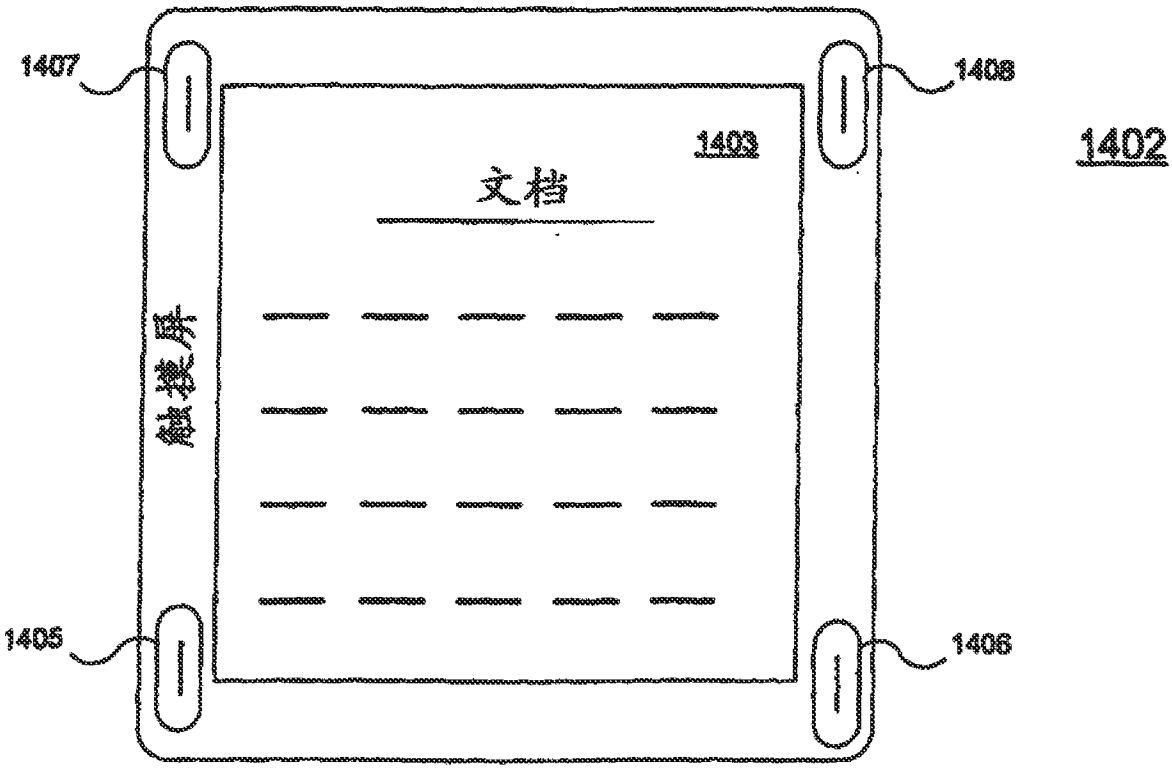


图 14B

HP Inc. - Exhibit 1005 - Page 1988

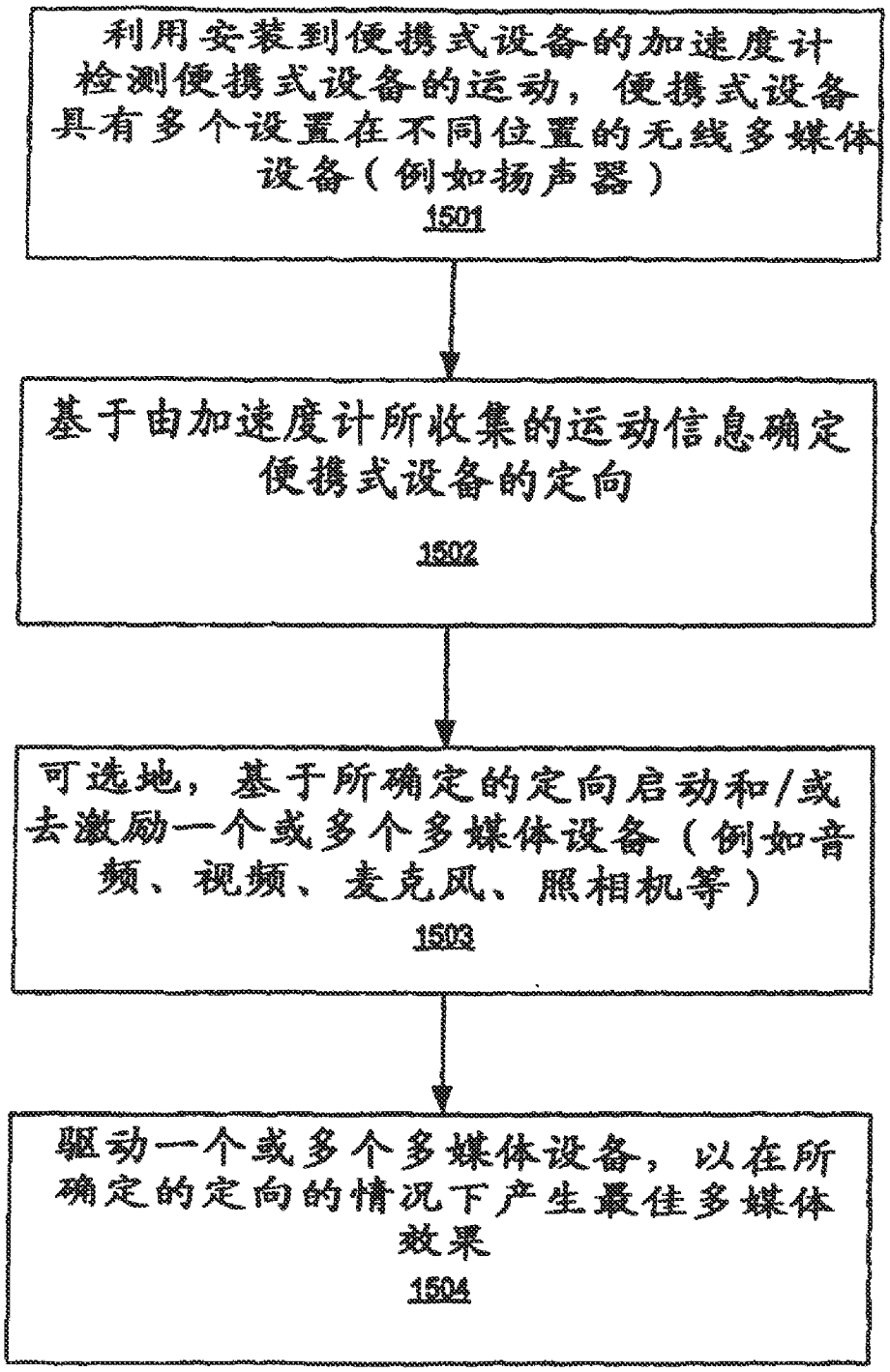


图15

HP Inc. - Exhibit 1005 - Page 1989

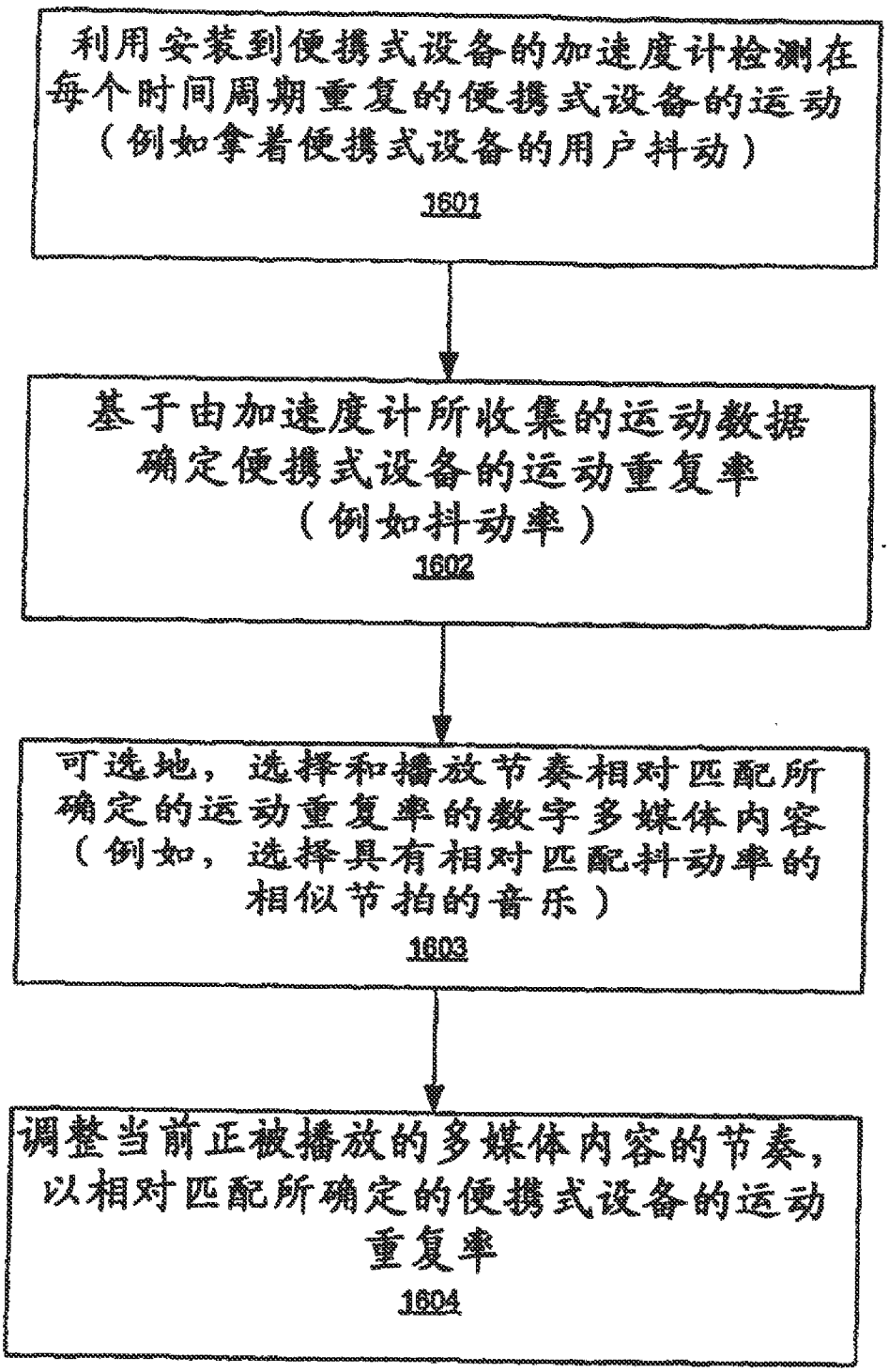


图16

HP Inc. - Exhibit 1005 - Page 1990

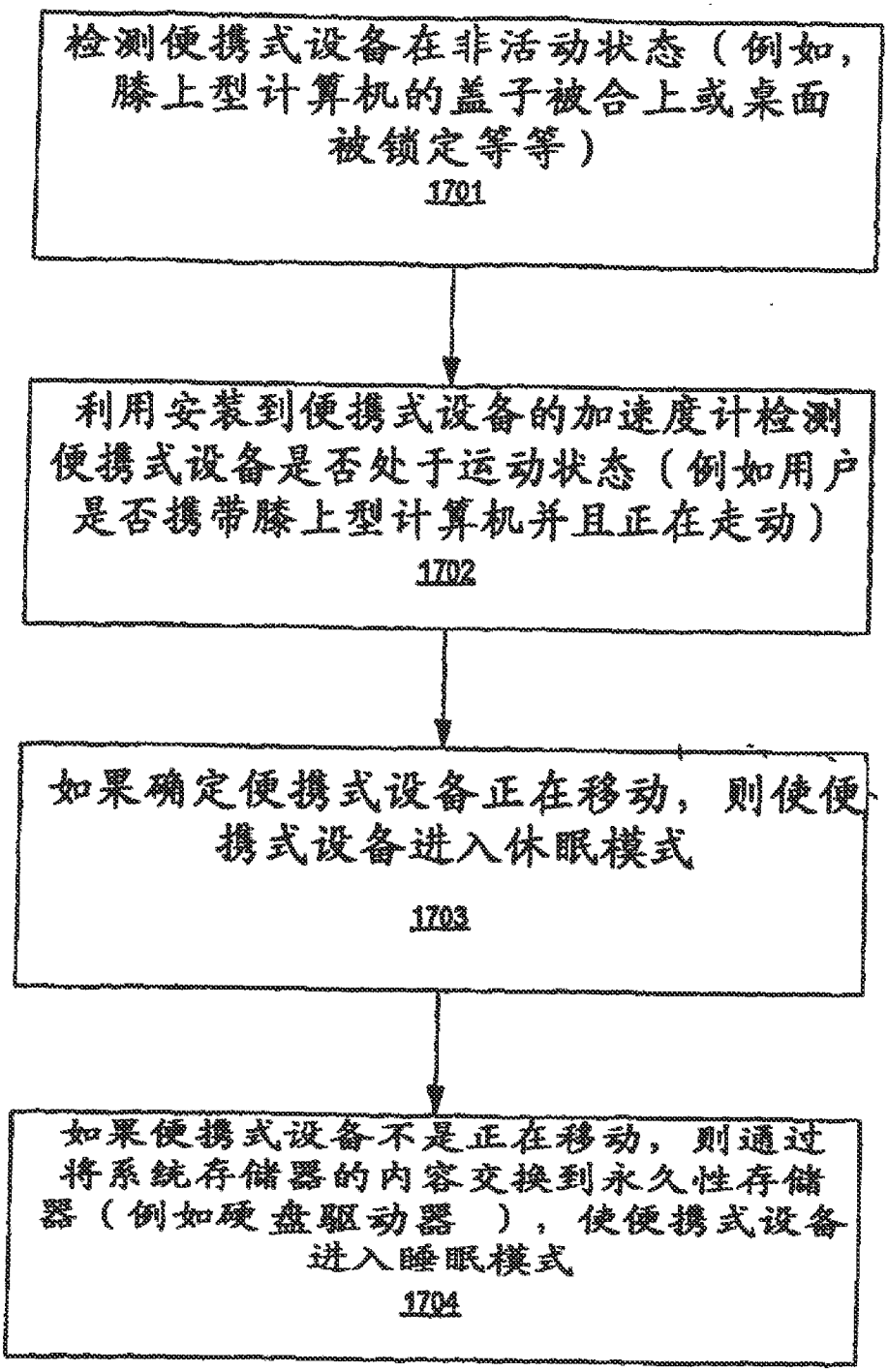


图17

HP Inc. - Exhibit 1005 - Page 1991

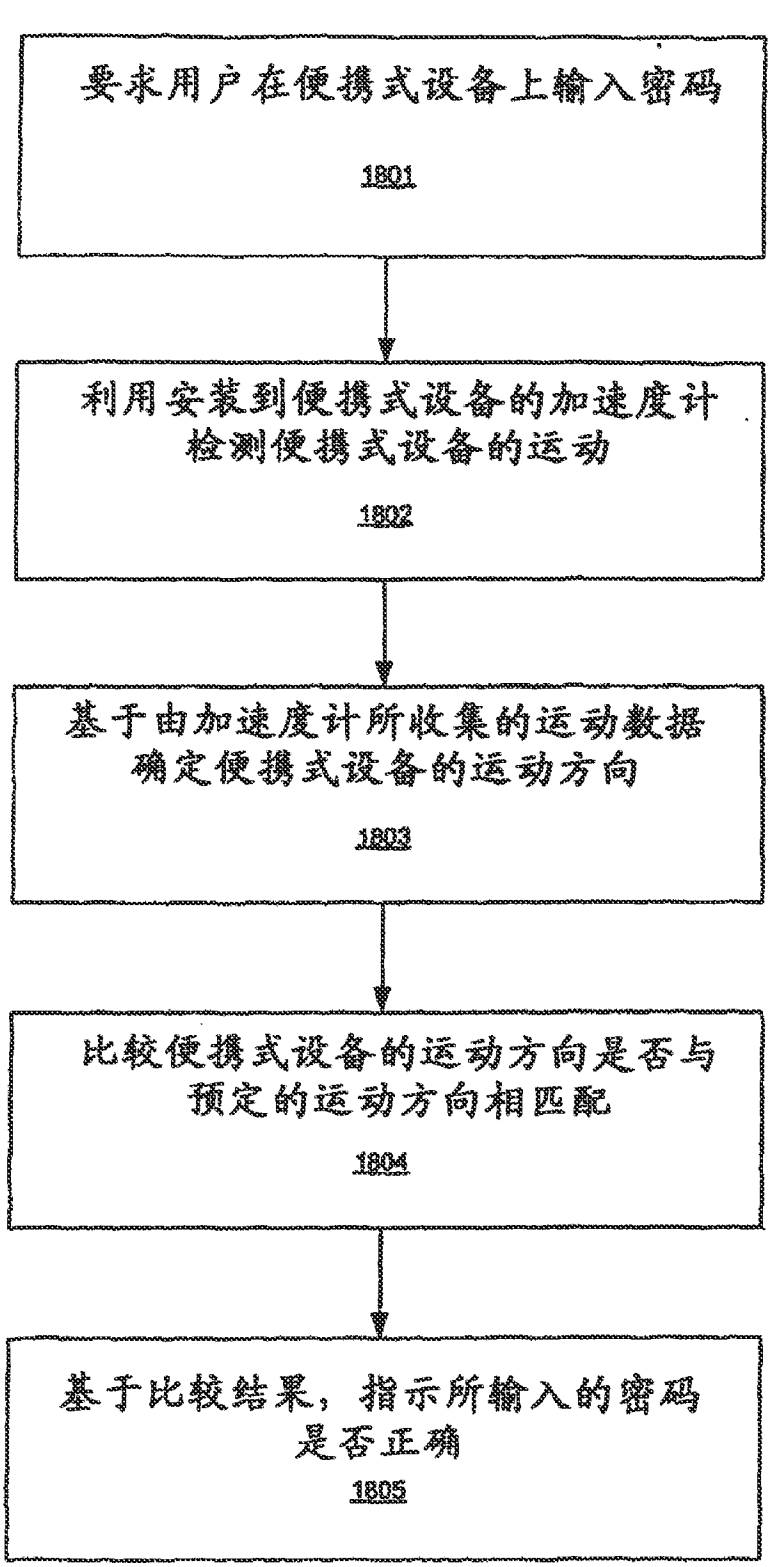


图18

HP Inc. - Exhibit 1005 - Page 1992

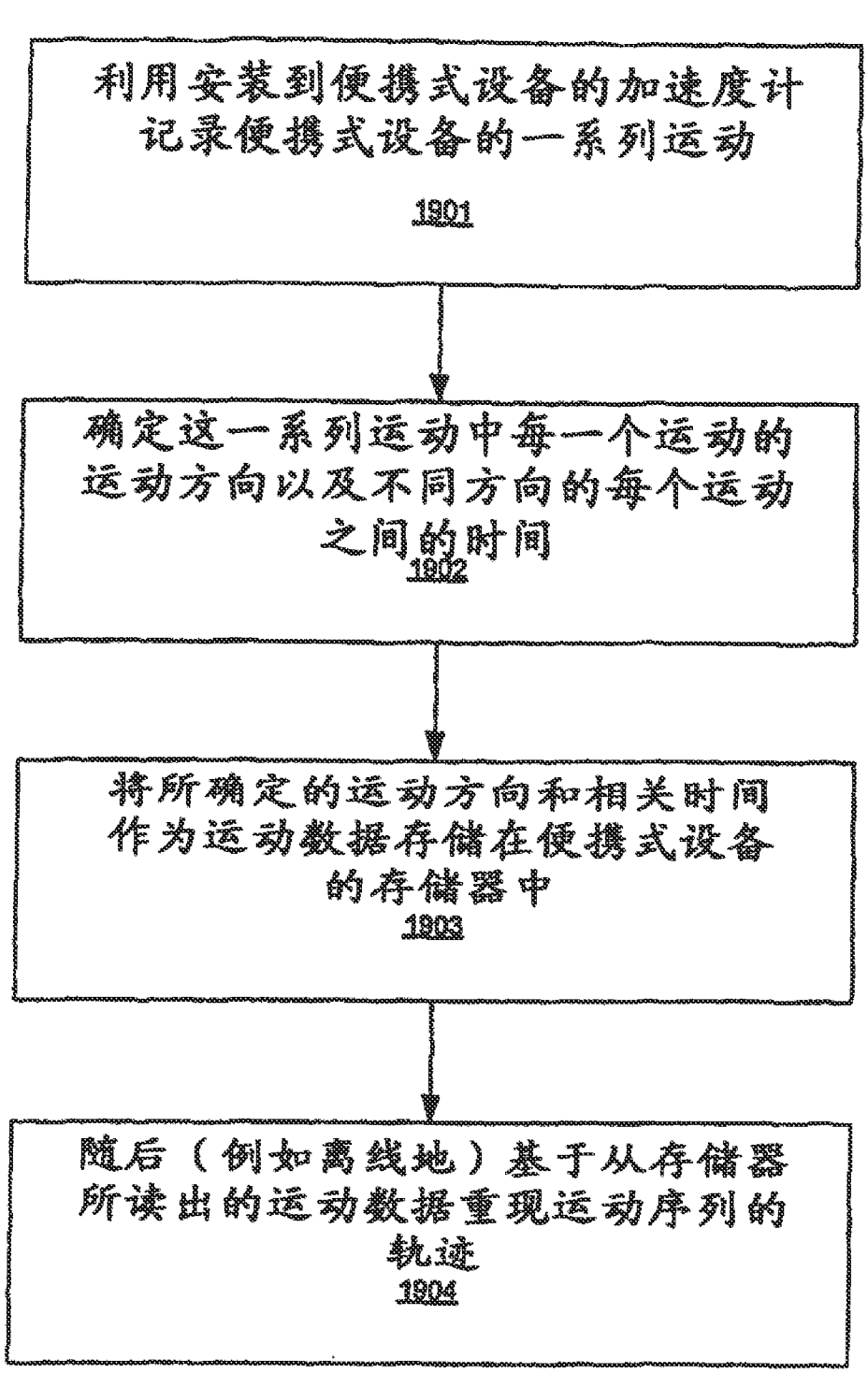


图19

HP Inc. - Exhibit 1005 - Page 1993

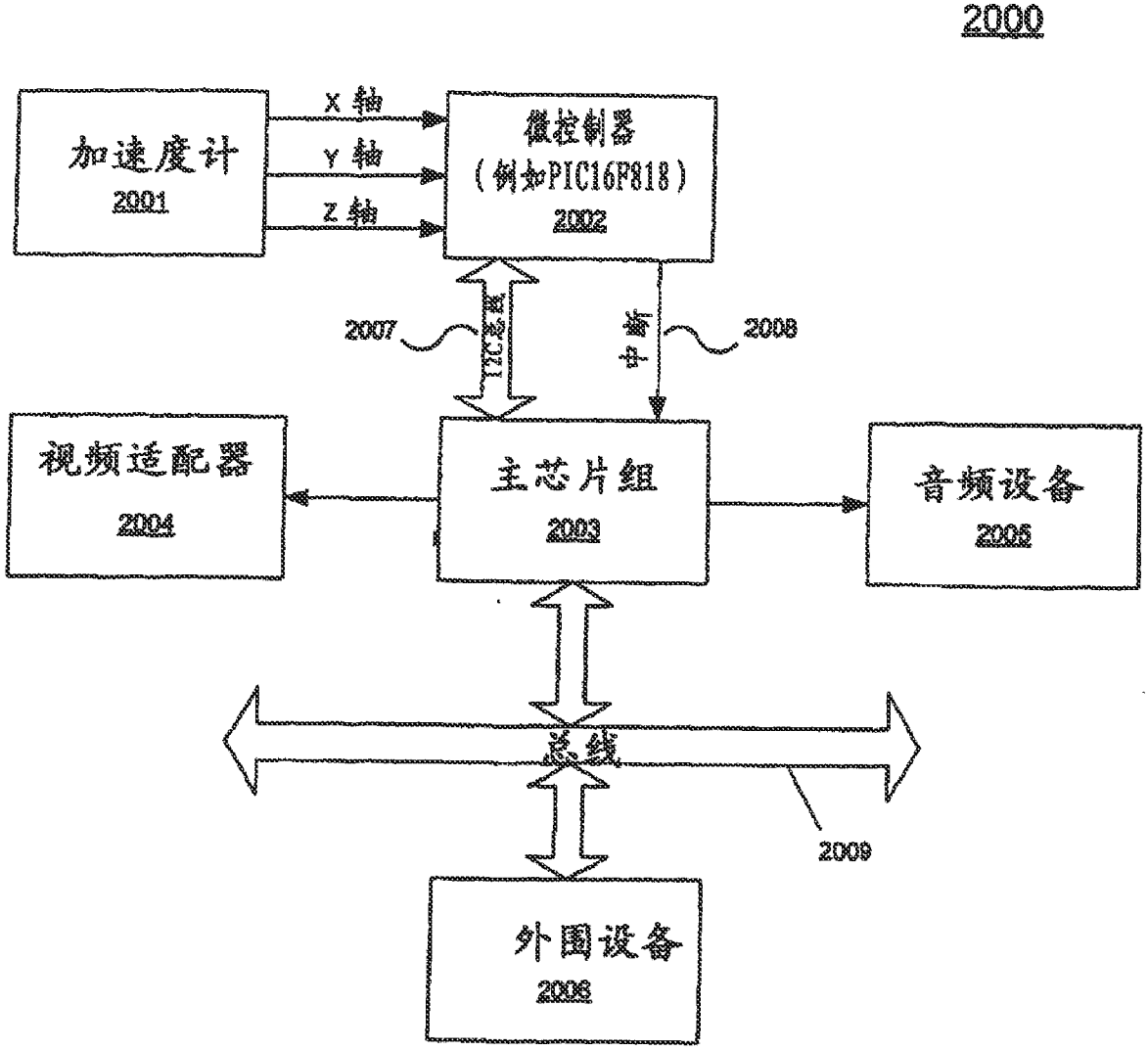


图20

HP Inc. - Exhibit 1005 - Page 1994

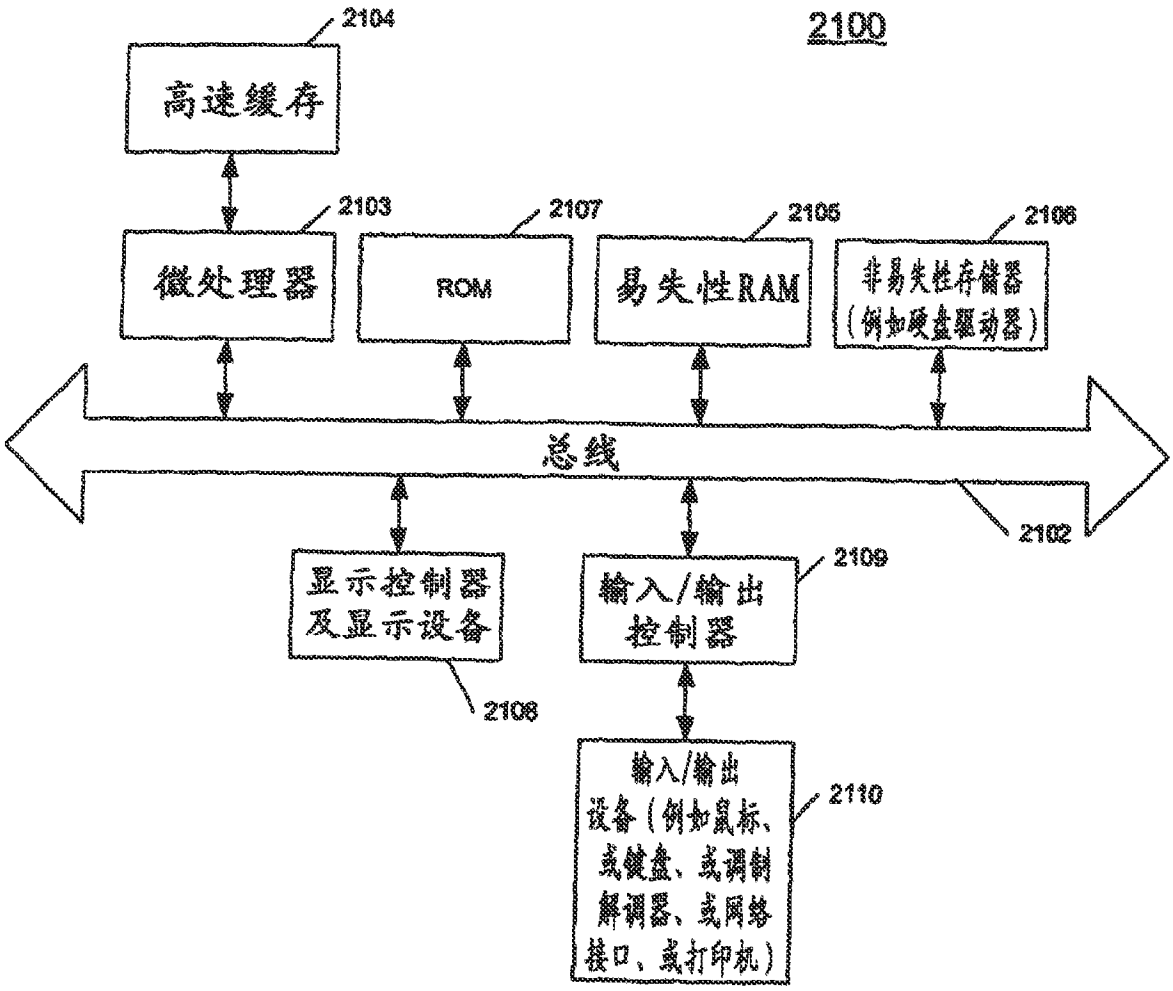


图21

HP Inc. - Exhibit 1005 - Page 1995

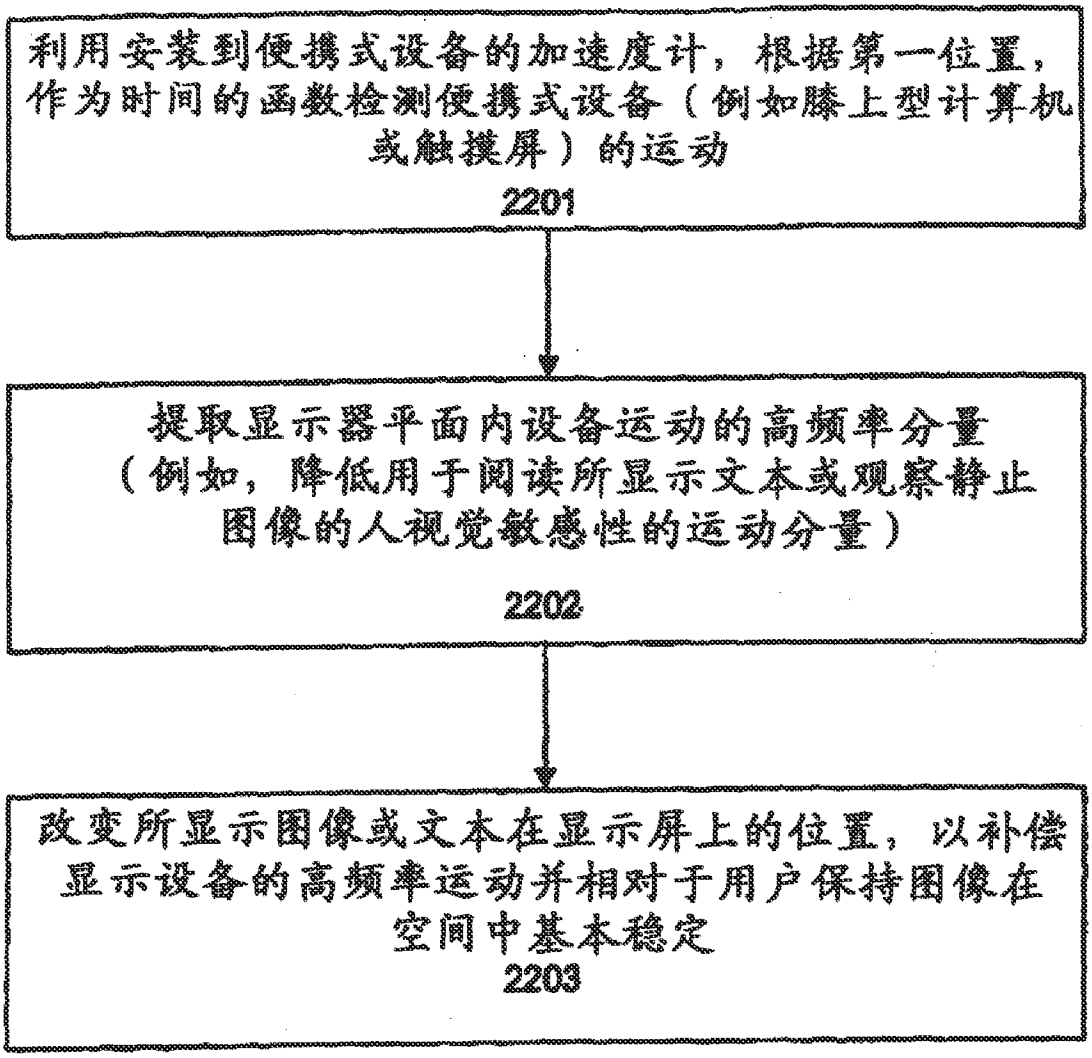


图22

HP Inc. - Exhibit 1005 - Page 1996