sometimes referred to as "driving" the high-resolution display at a lower resolution. In this example, the effective pixel count would be 400×300 and the effective pixel density would be 100 dpi.) It should be noted that when a display with a given pixel count and pixel density is referred to, it is intended to include displays that are driven to effectively display content at that pixel count and pixel density (even if the method for doing this involves binning groups of smaller pixels together), with each effective pixel (however it is generated) being roughly square. Hence, the terms "effective pixel count" and "effective pixel density" shall mean, respectively, the resultant pixel count and resultant pixel density that an observer sees, independent of how the display (in hardware or software) is configured to render the resultant visual effect. (Ideally each pixel's height is exactly the same as that pixel's width, but if the pixels are not perfectly square then preferably they should be fairly close to square.) For example, if it herein said that one embodiment of the invention includes a 600×400 pixel 144 ppi display, it is intended to mean the inclusion of devices with 1200×800 pixel 288 ppi displays (or other high counts and densities) driven to present content at 600×400 pixel 144 ppi. Similarly, a device could have a display with 600 horizontal pixels and 800 vertical pixels where each pixel is twice as tall as it is wide, and that device could "bin" the pixels 2×1 to drive the display at 600×400 fairly square "virtual" pixels, and it would be considered an example of a 600×400 display for the purposes of this document.

[**0075**] One aspect of the present invention is to find a balance of pixel dimension range, pixel density range, and overall device size that allows users to see a substantial enough portion of a typical Web page so that scrolling does not become tedious, while still keeping the device pocket-size and easy to use even when standing, and while still making the pixel density low enough (i.e., making the pixels large enough) so that most people can still comfortably read the text and view images on typical Web pages. Also, displays with fewer pixels are generally less expensive than displays with more pixels, everything else being equal, so using enough pixels to make Web access comfortable, but not so many pixels that Web pages have to be magnified to be legible, optimizes the cost of the display while also optimizing the user experience. (In hand-held devices, a good color display can represent a substantial portion of the overall cost of the device, so lowering the cost of the display also lowers the cost of the entire device.) The present invention sets forth several new classes of devices with displays that have a balanced range of pixel dimensions and pixel densities that are unique among known hand-held mobile devices, particularly Web-enabled hand-held wireless devices.

[**0076**] The present invention also exemplifies variations on these new classes of hand-held mobile devices with unique features that help minimize the device size—particularly the extent to which the device body, enclosure, or "frame" extends beyond the sides of the display—while making the Web access user experience more fun and intuitive. It should be noted that when a device "body" or "frame" is referred to (e.g. 6×5 inches), it is meant that a rectangle that is 6 inches on one side and 5 inches on the other could fit around the device, not necessarily counting any antenna, or display cover, or case that the device might have, thereby defining what is referred to as an effective size; e.g., an effective size of 6×5 inches exclusive of protruding or (re)movable members, including but not limited to, antennas, covers, cases, or keyboards.

[**0077**] **FIG. 1**-A illustrates a front view of a portable electronic display device according to an embodiment of the present invention. Its display pixel count, display pixel density, and overall size, are carefully balanced to optimize viewing content such as Web pages while keeping the device pocket size. It lets users see enough content at any given time to avoid feeling constrained, without squeezing so much content in the given space that content becomes too small to comfortably read. And by not squeezing more pixels than are optimal into the display, the cost of the display is kept to a minimum too. **FIG. 1**-B illustrates a left side view of the portable electronic display device whose front view is shown in **FIG. 1**-A.

[**0078**] Shown in the Figure is a device **100** with a display **101** that is 600×400 pixel, 144 ppi., and where the frame surrounding the display is relatively narrow all the way around the display—less than 0.16 inch in this example. The display is 4.167 wide by 2.778 tall (i.e. 5 inches diagonally), and yet the entire exemplary device illustrated in **FIG. 1** is less than 4.5 inches wide (i.e., less than the 4.167-inch-wide screen plus a frame that extends no more than 0.16 inch to the left and right of the display at the widest part of the device) and less than 3.1 inches tall (i.e., less than the 2.778 display height plus a frame that extends no more than 0.16 inch above and below the display at the tallest part of the device). It should be noted that the foregoing balance of pixel count and pixel density is one not found on known mobile Web-enabled devices.

[**0079**] This device example illustrated in **FIG. 1** has no moving electrical-mechanical buttons or controls on the front surface of the frame surrounding the display, which allows the frame to be narrow around the display. (Herein the terms "electrical-mechanical" and "mechanical" will be used interchangeably unless otherwise noted.) Of course, users need ways to interact with content displayed on their mobile devices. Usually device makers add electrical-mechanical controls to the frame surrounding the display (i.e., controls such as dials, jog-dials [where a jog-dial is basically a roller controller that can also be pressed to make a selection], joy sticks, buttons, and so on, that have moving parts that get translated into electrical signals that the device's electronics, firmware and software interpret as user interaction with that content). In at least one case, the "nVoy Communicator" device made by Pogo, the device maker did not include any electrical-mechanical controls, and instead has the user interact with the content by using a stylus on a touch-sensitive display as on most PDAs. By not including controls around the display, the frame around the display of the Pogo device can be relatively narrow (roughly 0.3 inch) all the way around the display, including below the display, keeping the overall device smaller than it would be if they added controls. (Unfortunately, the Pogo device's 3.5-inch diagonal display is only 320×240 pixel, so the device suffers from the inability to allow users to comfortably access real Web content, as described earlier.)

[**0080**] The present invention reduces a user's feeling the aforementioned "looking through a straw" effect. One reason for occurrence of this feeling is that, by the time a user scrolls from the left side of a typical Web page to the right side, little if any of the page that was visible when looking