

provided in the top and bottom support members 32 and 34, these recesses serving to hold the end member 26 in position and thus holding the screen 24 substantially flat in the optimum configuration for viewing.

[0057] As illustrated in FIG. 2, when the screen 24 is not needed for displaying data (for example during voice calls), it can be retracted to the retracted position shown in this Figure. The end member 26 is removed from the recesses 38 and inserted into recesses 40 in the top and bottom support members 32 and 34, these recesses 40 lying close to the phone housing. The screen 24 is held between the end member 26 and the housing as a series of serpentine folds; if, as is typically the case, the screen 24 includes a plastic substrate, this substrate may be given a "set" to facilitate the screen 24 adopting the correct serpentine configuration. The end support member 36 is temporarily detached from the top and bottom support members 32 and 34, moved to a position adjacent the end member 26 and again attached to the support members 32 and 34. Each of the support members 32 and 34 is, as shown in FIG. 2, in two sections connected hinged adjacent the recesses 40, and the outer sections, designated 32A and 34A, of the support members 32 and 34 respectively are folded at right angles to the adjacent sections so that they lie parallel to the length of the end member 26 and immediately "outside" (to the right in FIG. 2) the end support member 36. It will be seen that retracting the screen 24 in this manner greatly reduces the bulk of the cell phone 10 when the screen 24 is not required.

[0058] FIG. 3 shows an end elevation of a second external screen cell phone (generally designated 50) of the present invention which resembles that shown in FIGS. 1 and 2 but which has a different arrangement for storing the retracted external screen 24', the end elevation being taken in a direction corresponding to looking upwardly from the lower end of FIG. 2, the external screen 24' being shown in its retracted position. The cell phone 50 has a housing 52, and the external screen is provided with an end member 28 and top, bottom and end support members, all of which are essentially identical to those shown in FIG. 2. (The portion of the bottom support member adjacent the housing 52 is omitted from FIG. 3 to show details of the retracted screen 24'.) However, instead of being stored in a folded serpentine configuration as shown in FIG. 2, the screen 24' is stored in a scroll-like fashion. To this end, a spindle 54 is rotatably mounted on the top and bottom support members adjacent the housing 52. As the screen 24' is retracted, it is wound around the spindle 54, the portion of the screen 24' wound in a helical configuration around the spindle being denoted 24" in FIG. 3. Although not shown in FIG. 3, the spindle 54 is provided with biasing means in the form of helical springs (other types of biasing means may of course be substituted) which bias the spindle 54 to rotate clockwise in FIG. 3, so that once the screen 24' is released from recesses corresponding to the recesses 38 shown in FIGS. 1 and 2, the screen 24' will automatically wind around the spindle 54 under the bias provided by the biasing means.

[0059] The visual indicator cell phone (generally designated 70) shown in FIGS. 4 and 5 is similar to that shown in FIG. 1 except it lacks both the internal screen 17 and the external screen, although either or both of these screens could be provided if desired. As best seen in FIG. 5, the housing 52 of cell phone 70 is essentially cuboidal, having a front surface 14, an opposed rear surface, and opposed

pairs of end surfaces and side surfaces extending between the front and rear surfaces. As indicated by the shading in FIGS. 4 and 5, the cell phone 70 is provided with a visual indicator 72 which covers a small area at the upper end (in FIG. 4) of the front surface 14, the whole of the adjacent end face and large portions of the rear and both side surfaces (only one side surface is visible in FIG. 5, but a corresponding portion of the other side surface is also covered by the visual indicator 72). The visual indicator 72 is arranged to flash black and white when a call is received. The cell phone 70 is also provided with a conventional audible ring indicator, and a toggle button 74 (FIG. 4) is provided adjacent the microphone 22 to enable the user to toggle between the audible and visual indicators.

[0060] FIG. 6 illustrates an external display (generally designated 90) of the present invention in use with a cell phone essentially identical to that shown in FIGS. 1 and 2. The external display comprises a housing 92, having essentially the form of a flat cuboid, and an electro-optic screen 94 located within the housing 92. The housing 92 is provided adjacent one edge with buttons 28 and a trackball 30 similar to the corresponding device shown in FIGS. 1 and 2. However, the external display is not mounted upon the cell phone but is detachably connected thereto by means of a flexible cable 96, this cable being plugged by means of a connector 98 into a data output socket (not shown) provided on the cell phone. The cable 96 enables data to be transmitted from the cell phone to the external display, and may also provide for data transmission in the opposed direction, so that, for example, data input by means of the buttons 28 or trackball 30 may be conveyed to the cell phone. Many cell phones are already equipped with serial ports to enable them to be used with external modems, and these serial ports may be employed as the data output socket for communication with the external screen.

[0061] From the foregoing description, it will be seen that the external screen display of the present invention greatly reduces the problems associated with displaying data on portable, hand-held electronic devices. It will also be seen that the visual indicator cell phone of the present invention solves most of the problems associated with the use of audible ring indicators on cell phones.

[0062] While the invention has been particularly shown and described with reference to specific preferred embodiments, it should be understood by those skilled in the art that various changes in form and detail may be made without departing from the spirit and scope of the invention. For example, although the external display shown in FIG. 6 is illustrated with only a series of buttons and a trackball, it will readily be apparent that such an external display could incorporate a keyboard, thus greatly facilitating the use of the attached cell phone for sending E-mail. Accordingly, the whole of the foregoing description should be construed in an illustrative and not in a limitative sense, the invention being defined solely by the appended claims.

1. A portable electronic device having an internal screen for the display of information, the electronic device also having a flexible external screen arranged to receive information from the electronic device and being capable of displaying said information on a bistable electro-optic medium, the device further comprising a housing, the external screen being movable between a retracted position, in