Displays utilizing other cell arrangements, such as 20 or 80 cells, are within the scope of the invention. It is also within the scope of the invention to use a portable 14 cell arrangement. The cells **26** extend across a monolithic surface. As a result, there are no spaces or gaps between adjacent cells **26** of display **20**. A cursor routing button **28** is associated with and located above each Braille cell **26**. For sake of clarity, not all cells **26** and buttons **28** have been labeled with reference numerals. Cursor routing buttons **28** are used to move the cursor to a particular point or to select text. These serve as function keys or panning buttons. At either end of the display are a rocker key **34** and push button **36**. Rocker key **34** is used to scroll up or down through the text being displayed. Push button **36** is a toggle control that selects whether the rocker key scrolls **34** through lines, paragraphs or pages of material. Display **20** can be programmed by the user to determine the scroll rate and the sensitivity of rocker keys **34**.

A series of keys **38** are also aligned along the back of display **20**. These include six inner keys **38**(*b*) and two outer keys **38**(*a*). In the depicted embodiment, keys **38** are Braille keys and are similar to those found on a conventional Perkins style keyboard. Keys **38** are angled inwardly towards the center line of the display to conform to the natural placement of a user's fingers. The space between the keys is not uniform. Namely, the two outer keys **38**(*a*) are spaced further apart than the inner keys **38**(*b*). The outer keys **38**(*a*) are spaced further away to accommodate the natural extension and placement of a user's pinkey. A space key **42** is also centrally located adjacent the front edge of display **20** and is accessible via the user's thumbs.

The front surface of display **20** also contains selector buttons **44** that control an auto advance feature. Also included are rocker bars **46** for controlling upward and downward movement of the lines being displayed by Braille cells **26**. Panning buttons **48** are also included that allow for panning left or right one display width. Display **20** includes an outer housing **52** formed from an upper cover **54** and a lower tray **56**. Upper cover **54** and lower tray **56** can be injected molded from an impact resistant plastic. The upper cover and lower tray (**54** and **56**) are releasably joined together, such as by screws or other mechanical fasteners (not shown). As illustrated in FIG. **3**, upper cover **54** includes openings **58** to accept tactile pins and keys associated with the display. FIG. **3** is an illustration of upper cover **54** in an inverted or upside down configuration so as to display features on the inner surface of cover **54**.

A backplane board **62** is secured within the interior of housing **52** (note FIG. **6**). As is known in the art, a series of Braille cell assemblies **64** are interconnected to backplane board **62**. For sake of clarity, FIG. **6** only shows only cell assembly **64**, but a series would be included in a complete display **20**. Backplane board **62** includes an integrated motherboard. An example of a Braille cell assemblies being secured to a backplane board is disclosed in commonly owned U.S. Pat. No. 7,410,359 to Murphy et al. The contents of the '359 patent are incorporated by reference herein for all purposes. Each Braille cell assembly **64** (note FIG. **6**) corresponds to an individual Braille cell **26** and supports a corresponding number of either six or eight tactile pins **66**. More specifically, each cell assembly **64** includes a printed circuit board (PCB) **68** to which six or eight bimorph reeds **72** are secured. In the preferred embodiment, eight reeds **72** are included, with four reeds **72** being removably fastened to each side of PCB **68**. The lower extent of each tactile pin **66** contacts the distal end of a corresponding reed **72**. As explained in more detail hereinafter, an individual tactile pin **66** can be selectively raised by applying a voltage to the corresponding reed **72**. The applied voltage creates a bending moment in the corresponding reed **72** which, in turn, flexes the distal end of reed **72** upwardly to lift an associated pin **66**.

Reeds **72** are preferably parallel polled bimorphs. As is well known in the art, bimorphs are flexure elements that consist of two expander plates bonded to a metal vane. The polarization of the plates causes one plate to expand and the other to contract upon the application of a voltage. This, in turn, causes the bimorph to bend. Bimorphs can either be series polled or parallel polled. In a series polled bimorph, the plates are polarized in the same direction with respect to the vane. In a parallel polled bimorph, the plates are polarized in opposite directions with respect to the center vane. In the series type bimorphs, electrical connections are made to the two outer plates (via electrodes) and no connection is made to the center vane. In the parallel type bimorphs, one electrical lead goes to the center vane and the other lead goes to the two outer plates (via electrodes). Examples of series and parallel polled bimorphs are disclosed in commonly owned U.S. Pat. No. 7,367,806 to Murphy et al. Contents of the '806 patent are incorporated by reference herein for all purposes. Although either parallel or series polled bimorphs can be employed in connection with the present disclosure, parallel polled bimorphs are preferred.

Modular Mounting Blocks

In accordance with the present disclosure, tactile pins **66** are held in groups via a mounting block **74**. Each mounting block includes a housing **76** with an array of apertures. Blocks **74** can support pins **66** in either four or six cell arrangements. FIG. **4** illustrates a four cell mounting block **74**; FIG. **4A** illustrates a six cell mounting block **74**. Each block **74** further includes a depending forward edge **78**. Depending forward edge **78** is received within a channel positioned within the lower tray **56** of housing **52** (note FIG. **1**A). As best illustrated in FIG. **3**, the inside surface of upper cover **54** includes a channel **82** formed from two opposing walls **84**. Walls **84** are adapted to receive a block **74** in a friction-type fit. To accomplish this, walls **84** include locking features **84**(*a*) (which may be male features) that snap fit into corresponding locking features **76**(*a*) (which may be female features) within housing **76** (note FIG. **1**A). Walls **84** span the length of upper cover **54**. Thus, a series of different blocks **74** can be snap fit into the length of channel **82**. For example, for the 40 cell display depicted in FIG. **1**, a series of ten, four cell blocks **74** can be snapped into channel **82**.

During assembly, mounting blocks **74** can be initially held within upper cover **54** and thereafter inserted into the forward edge of lower tray **56**. Once positioned, the lower extent of each pin **66** contacts the reed **72** of an associated cell assembly **64**. Different configurations of mounting blocks **74** can be utilized depending upon the size of display **20**. For instance, for a portable display utilizing 14 total Braille cells, one six cell block and two four cell blocks can be utilized. In a display using 20 Braille cells, two six cell blocks and two four cell blocks can be utilized. Still yet other arrangements can be used for different sized displays. One benefit of encasing the tactile pins **66** in modular groups via blocks **74** is that it creates a more serviceable product. In prior art units, pins **66** would become loose and scatter when removing the cover. Modular arrangements of pins also eliminates tolerance stack up across the length of the display. By providing the blocks **74** in four and six cell arrangements, a variety of sized displays **20** can be created.

As best illustrated in the exploded view of FIG. **5**, each of the tactile pins **66** includes a rounded upper extent **86** that is adapted to be extended above cover **54** and felt by the user. A collar **88** is also included about each pin along its length. A plate **92** is secured over top of each mounting block **74** via a