so that the tactile enhancements could be implemented for other industrial improvements.

[0055] In the responsive reconfiguration mode of the invention, the material which responds to the electrical pulses creates a tactile bump or crevice on the display screen and is reconfigurable at a reasonable speed to provide computing capabilities for sight-impaired users. At one end, the panel is simply enhanced by squares. For example, in a simplistic embodiment, the industrial operator puts their finger in the proper location to operate machinery correctly. At the most complex embodiment, a combination of Braille, shapes, figures, letters and custom-designed icons may be presented tactically on the screen at the same time. While FIG. **11** is simply showing a finger running through concave and convex portions of the tactile display screen, it should be noted that parts of the screen are simply responding to the touch of other parts of the screen much in the way that a mouse, cursor, digitizer or other device would be able to do so.

[0056] An alternate embodiment of the present invention has an object of taking advantage of the electrical/mechanical properties of the above described electroheleogical materials in order to created an enhanced display screen, including a Braille version for sight-impaired individuals that would also be usable as regular screens. These embodiments are detailed in the description below for FIGS. **13**-**23**.

[0057] Referring to FIG. **13**, very much like the FIG. **1** shown above, a material layer is coated by a thin film and located above an electrically connective layer. The material layer, which is described above as a material that changes viscosity, shape, or other formation through various electrical and/or electromagnetic signals will cause a raise, a bump, line, square, shape of a type that can be felt by the finger shown running across the film. Thus we can see many different variations of how a non-display or visual display-based computing system could be implemented.

[0058] Referring now to FIGS. **14**A and **14**B, we see a single and double tap system, in which a finger can cause a raise or create a "bubble."FIG. **14**A shows a finger touching the first location and then FIG. **14**B shows the finger touching a second location. Thus both locations will have raised portions or "bubbles" in them. In this manner, a display user can configure the tactile-based screen in a way that they desire, even using multiple bubbles or strings of bubbles that create shapes, Braille letters, standard letters, characters or icons of any sort. Of course, the invention is quite different considering this pure tactile screen-based form as compared to a tactile enhanced standard display screen which may or may not have tactile-based bubbles that correspond to display features.

[0059] FIG. **15** shows a sample tactile-based operating system marked OS in which there is a control region and a writing region. The writing region is in fact the tactile-based output where the control region may include control-based tactile icons that may not need reconfiguration but act as standard buttons. Thus, a tactile-based user would go to the control region in the lower right portion of the screen to create tactile-based features in the written-based portion of the screen. This provides a single example of how a tactile-based screen or display system may be used but, as can be appreciated, other forms that include some display portions or tactile portions may also be included.

[0060] Referring now to FIG. **16**, we show that different types of tactile "patterns" or tixels as described above may be based on user preferences. For example, in FIG. **16** a single tap in the control region of the screen may produce smooth-like alphanumeric characters in the tactile form. Thus, the sample A and B would be enhanced or tactically enhanced as the user moved their fingers over them. As shown in FIG. **17**, however, two taps may make a different type of pattern. Broken lines or dots can be seen in the display region if the user taps twice in the control region during the appropriate period, thus creating a pattern that is perhaps more recognizable to the sight-impaired user. In this manner, the control region may provide a Braille user the opportunity to simultaneously and tactically write in Braille and alphanumeric characters while being able to check and see if the alphanumeric text is correct based on the Braille pattern.

[0061] The multiple-tactile screen can be seen in FIG. **18** in which a tactile screen is divided into different sections that may include an alphanumeric section, a Braille section and a control region. For example, three taps in the control region divides the screen into the writing section in which the pattern would include alphanumeric characters or perhaps include a visual display underneath. The Braille section only uses a tactically enhanced display system such that a sight-impaired user could read Braille of any sort or alphanumeric characters as well as text in Braille or different types of icons. It can be imagined that the complexity of the invention may be made increasingly difficult based on the needs of the end user. However, it is anticipated that in a preferred embodiment, no more than 10 of the display sections including one alphanumeric section, one Braille section and a control region would be necessary because dividing the display screen would be costly during the manufacturing process.

[0062] Now referring to FIG. **19**, an implementation of the split screen system as implemented in FIG. **18** is shown. For example, a user tactically writes alphanumeric characters in the writing region while in the Braille region corresponding Braille characters appear. In this way, a tactile-based display system may keep the uses of input and output in multiple forms. Consequently, a non-Braille user would be able to write on a screen creating alphanumeric characters that are translated in both raised conventional alpha-numeric characters and Braille. Similarly, the writing region can disappear when the system is being used by only sight impaired or Braille users. This invention also encompasses an embodiment in which the writing region may be both writing region be both tactically used and also used as a digitizer or other kind of touch screen in which writing may be more effective with an input path rather than through the use of a finger. It may also require little, if any, tactile enhancement; however, that does not mean that the invention does not implement the tactile enhanced screen in the Braille region in which Braille or alphanumeric text may appear based on the digitizing input in the writing region.

[0063] FIG. **20** shows the different types of patterns based on the taps in the control region, thus different tactile patterns may appear based on user preference. One of the reasons this may be important is that continuous alphanumeric or icon-based characters in a tactically enhanced system are more costly in terms of computation time as opposed to characters that are composed only of portions or