

second hammer element in communication with a second cam on the control axle. The first and second cams may be located in different relative rotational positions in the ampoule breaking mechanism, and the first and second cams are configured to engage the first and second hammer elements at different times during the rotation of the control axle, wherein the breaking step (v) comprises breaking the plurality of ampoules in series. Alternatively, the first and second cams are located in approximately the same relative rotational positions in the ampoule breaking mechanism, and the first and second cams are configured to engage the first and second hammer elements at approximately the same time during the rotation of the control axle, wherein the breaking step (v) comprises breaking the plurality of ampoules in parallel.

BRIEF DESCRIPTION OF THE DRAWINGS

- [0036] FIG. 1a depicts a simplified pictorial representation of a cartridge-based assay module.
- [0037] FIG. 1b depicts one embodiment of an assay cartridge having two detection chambers and two banks of individually addressable electrodes.
- [0038] FIG. 1c illustrates an exploded assembly of one embodiment of an electrode array.
- [0039] FIG. 2 is a pictorial representation of an electrode array having matched electrical lead resistances.
- [0040] FIGS. 3a-3e illustrate various configurations of an electrodes array for use with a pair-wise firing schemes.
- [0041] FIGS. 3f-3g illustrate two possible configurations of an electrode array employing a single, common counter electrode.
- [0042] FIG. 4 depicts the electrode array of FIG. 3a in one embodiment of an assay cartridge.
- [0043] FIG. 5 is an image of electrochemiluminescence emitted from an electrode array where one of the electrodes has an air bubble on the electrode surface.
- [0044] FIGS. 6a and 6b are images of electrochemiluminescence from electrode arrays that are untreated (FIG. 6a) or that have been pre-washed with a surfactant (FIG. 6b).
- [0045] FIG. 7a illustrates the use of a localized washing apparatus having concentric tubes.
- [0046] FIG. 7b is a cross-sectional view of the localized washing apparatus depicted in FIG. 7a.
- [0047] FIG. 8 plots the contact angle of drops of fluid on carbon ink and dielectric ink surfaces as a function of the dispensing velocity.
- [0048] FIG. 9 is a schematic representation of one embodiment of an assay cartridge illustrating various fluidic components.
- [0049] FIG. 10 depicts the fluidic network in accordance with the schematic representation of FIG. 9.
- [0050] FIGS. 11a-11c are top, bottom and isometric views, respectively, of the assay cartridge of FIG. 9; FIG. 11a illustrates the fluidic networks formed on one side of the cartridge, FIG. 11b illustrates the fluidic network formed on the other side of the cartridge and FIG. 11c provides an isometric view with phantom lines to illustrate the entire cartridge fluidic network as seen within the cartridge body.
- [0051] FIG. 12 is a bottom view of the assay cartridge of FIG. 9 illustrating one preferred layout for fluidic detectors to detect/monitor fluid movement.
- [0052] FIG. 13a is an exploded assembly drawing illustrating the laminar assemblage for the assay cartridge depicted in FIG. 9.
- [0053] FIG. 13b is a detail drawing of the gasket and electrode array cover layer depicted in FIG. 13a.
- [0054] FIG. 14a is a schematic representation of another embodiment of an assay cartridge illustrating various fluidic components.
- [0055] FIG. 14b is an exploded assembly drawing illustrating the laminar assemblage for the two-piece assay cartridge depicted in FIG. 14a.
- [0056] FIG. 14c is a detail drawing of the gasket and electrode array cover layer depicted in FIG. 14b.
- [0057] FIG. 15a is a top view of the upper cartridge component of the assay cartridge depicted in FIG. 14b.
- [0058] FIGS. 16a and 16b are top and bottom views, respectively, of the lower cartridge component of the assay cartridge depicted in FIG. 14b.
- [0059] FIG. 17 is a bottom view of the assay cartridge of FIG. 14b illustrating one preferred layout for fluidic detectors to detect/monitor fluid movement.
- [0060] FIGS. 18a and 18b are top and bottom isometric views, respectively, depicting the fluidic network in accordance with the schematic representation of FIG. 14a.
- [0061] FIG. 19 is a bottom view of the upper cartridge component of the assay cartridge depicted in FIG. 14b illustrating one embodiment of integral filters.
- [0062] FIG. 20 is a bottom isometric view of an alternative assay cartridge embodiment illustrating filter inserts.
- [0063] FIG. 21 is an isometric view of the assay cartridge depicted in FIG. 14b having assay reagent ampoules inserted therein, illustrating one embodiment for an assay reagent release mechanism.
- [0064] FIG. 22 illustrates one embodiment for a drop-in assay reagent blister pack assembly and integrated assay reagent release (piercing) mechanism.
- [0065] FIG. 23 illustrates one embodiment for a cartridge reader that incorporates various subsystems for performing a predetermined assay. The cartridge reader is depicted holding one embodiment of an assay cartridge.
- [0066] FIG. 24 illustrates one preferred valve configuration for the assay cartridge depicted in FIG. 14a.
- [0067] FIG. 25 is the schematic representation shown in FIG. 14a depicting the arrangement of fluidic components and locations of fluid detectors.
- [0068] FIGS. 26a through 26c illustrate one preferred manner of operating the assay cartridge depicted in FIG. 25.
- [0069] FIG. 27 is a cross-sectional view of a sample chamber having an integral vent port within the chamber itself.
- [0070] FIG. 28 is a cross-sectional view of one embodiment of a sample chamber for extracting analyte from a solid or solid-containing matrix.
- [0071] FIG. 29 is a cross-section view of an alternative embodiment of a sample chamber for extracting analyte from a solid or solid-containing matrix incorporating force focusing elements.
- [0072] FIG. 30 is a cross-section view of another embodiment of a sample chamber for extracting analyte from a solid or solid-containing matrix incorporating a two-region, or compound, sample chamber.
- [0073] FIG. 31 is a cross-sectional view depicting one embodiment of a bubble trap chamber.
- [0074] FIG. 32 is a schematic representation of another embodiment of an assay cartridge illustrating various fluidic components.