within the plunger receiver recess **278** of the floating actuator plate **276**. Continued downward movement by the plunger **274** presses the actuator plate **276** against the blister **262**, thereby collapsing the blister **262** and displacing fluid from the blister **262** through the dispensing channel **266** to a fluid egress. Continued pressure will cause the frangible seal at **268** to break, or an apparatus for opening the vessel as described above may be employed to open the frangible seal. The plunger point **275** nested within the plunger point recess **278** helps to keep the plunger **274** centered with respect to the actuator plate **276** and prevents the actuator plate **276** from sliding laterally relative to the plunger **274**. When the blister is fully collapsed, as shown in FIG. **19**, a convex side of the plunger receiver recess **278** of the floating actuator plate **276** nests within a plunger recess **282** formed in the substrate **264**.

[0226] Accordingly, the blister housing cover **270** protects the blister **262** from inadvertent damage or collapse, while the floating actuator plate inside the blister housing cover **270** permits and facilitates the collapsing of the blister **262** without having to remove or otherwise alter the blister housing cover **270**. In components having more than one collapsible vessel and dispensing channel, a blister housing cover may be provided for all of the vessels and dispensing channels or for some, but less than all vessels and dispensing channels.

[0227] In addition to the bottom substrate, the top plate and the LRM, the cartridges of the invention comprise an external housing that holds these three components in appropriate fluid communication with each other as applicable as well as provide interconnects to the instrument bays.

External Housing

[0228] Thus, the cartridges of the invention include an external housing, which is essentially a protective shell or casing to completely or partially enclose the PCB, top plate, and LRM assembly, yet allow access to functional components such as the electronic connections and the sample port. In general, the external housing is made of a molded material, including, but not limited to, acrylics and plastics, polystyrene and copolymers of styrene and other materials, polypropylene, polyethylene, polybutylene, polyimide, polycarbonate, polyurethanes, etc.

[0229] The external housing (and thus the corresponding bays of the devices) is optionally configured to allow only asymmetrical insertion into the apparatus, preferably both "top up" as well as "correct end in". That is, the cartridges can only be inserted in one direction and in one orientation (due to physical design, for example any or all of a housing curved only on one side (depicted in the Figures as curved on the bottom, for example, which allows the insertion only in a "top up" fashion), grooves or fittings in either or both of the cartridge and the bay such that the cartridge can only be inserted in one orientation, e.g. "front to back". See for example the Figures for cartridge and bay grooving. A variety of such techniques are well known in the art.

[0230] The external housing can completely encase the other three components or can provide physical access to parts of the LRM, as is generally shown in FIG. **20**, depicting general open areas over the blisters. As will be appreciated by those in the art, the access to the blisters, depending on the mechanism to deform the blisters, can also be a smaller access area, for example just a general hole in the housing. In some preferred embodiments, the blister area of the housing will be sealed with a protective cover comprising an easily breakable material (e.g., paper or equivalent) that contains perforated traces corresponding to the outline of each blister. Such a cover will generally protect the cartridge against accidental damage to the blisters during transportation and handling, yet it is not sufficiently resilient to impede efficient reagent dispensing by the blister actuation mechanism as described herein. The housing generally comprises a sealing, latch cover for the sample entry port. In some embodiments, this cover is irreversibly engaged such that once a biological sample has been put in the cartridge and closed no further user access to the cartridge is possible.

[0231] In one optional embodiment, the housing comprises a unique cartridge identifier tag, such as an optically readable barcode, that contains information about such things as the specific assay type of the cartridge, lot, batch or manufacturing information, date of manufacturing, storage conditions, etc.

[0232] In one optional embodiment, the housing comprises a surface suitable for the attachment of a unique sample identification tag (again, generally an optically readable barcode) to identify the patient that is affixed by the user. As will be appreciated by those in the art, while this could be specific patient information, in general this will be an identifying number or code to preserve patient confidentiality.

III. Devices

[0233] The devices of the invention have a number of functionalities, including the cartridge bays (optionally organized into instrument banks), a processor with an appropriate user interface, all of which are further described below.

[0234] As described herein, the invention includes cartridges that are inserted into a device containing a plurality of bays (formed from a top bay and a bottom bay) into which the cartridges fit. The devices of the invention include a least one instrument bank comprising a plurality of biochip cartridge bays for insertion and analysis of biochip cartridge(s). These instrument banks can be configured in a variety of ways, as will be appreciated by those in the art. Exemplary configurations are shown in the accompanying figures, with banks of 6 or 8 being preferred, arranged in a linear vertical fashion. As outlined herein, apparatus can include more than one instrument bank, with 1, 2, 3 or 4 banks all finding use in the present invention. In some cases, more instrument banks are used.

The Cartridge Bays

[0235] The individual bays are configured to allow asymmetrical access to the biochip cartridges. That is, the cartridges can only be inserted in one direction and in one orientation (due to physical design as outlined herein, for example any or all of a housing curved only on one side (depicted in the Figures as curved on the bottom, for example, which allows the insertion only in a "top up" fashion), grooves or fittings in either or both of the cartridge and the bay such that the cartridge can only be inserted in one orientation, e.g. "front to back". See, for example, FIG. **6** for cartridge and bay grooving. A variety of such techniques are well known in the art.

[0236] The bays each include a processor with memory with at least one program stored in the memory and executable by the processor comprising instructions for steps of the assay including, but not limited to, blister package actuators, heating programs, electrowetting transport steps, mixing steps, magnetic bead capture steps, washing steps, detection steps, reporting steps, exporting data steps, etc.