Claims

1. An apparatus, comprising:

a carrier comprising a carrier body and a plurality of hollow pins extending from the carrier body, the plurality of hollow pins aligned and oriented to correspond to a plurality of wells in a well plate and each of the plurality of hollow pins having an aperture that extends through the hollow pin and carrier body and a flexible membrane extending across an end of each hollow pin; and

a plunger comprising a plunger body and a plurality of pins extending from the plunger body, the plurality of pins aligned and oriented such that each of the plurality of pins is received within the aperture of a corresponding hollow pin of the plurality of hollow pins and each of the plurality of pins having an end surface, opposite the plunger body; and

a dried reagent retained on the flexible membrane of at least a portion of the plurality of hollow pins.

2. The apparatus of claim 1, wherein the pins are generally cylindrical; and/ or
wherein the end surfaces of the pins have a protruding surface.

3. The apparatus of claim 1 or claim 2-3, including a cap, the cap comprising:

a cap body;

a plurality of covers extending from the cap body, each of the plurality of covers comprising an aperture that extends through the cover and the cap body and is configured to receive a corresponding hollow pin of the carrier; and

at least one pierceable membrane secured to the cap body and sealing at least a portion of the apertures.

4. The apparatus of claim 3,

wherein the cap comprises a plurality of key features extending from the cap body, opposite the covers, each of the plurality of key features being configured to be engaged by a cap removal system,

wherein optionally each of the plurality of key features comprises a shaft and a head at an end of the shaft, the head having a larger diameter than the shaft.

5. A method, comprising:

disposing a liquid reagent on a flexible membrane of at least one of a plurality of hollow pins, where a carrier comprises the plurality of hollow pins, the plurality of hollow pins aligned and oriented to correspond to a plurality of wells in a well plate, where each of the plurality of hollow pins have an aperture that extends through the hollow pin and the carrier, where a flexible membrane extends across an end of each of the plurality of hollow pins; and

drying the liquid reagent such that the dried reagent is retained on the flexible membrane of the plurality of hollow pins.

6. The method of claim 5, wherein about 5 µL of liquid reagent is disposed on the flexible membrane of at least a portion of the plurality of hollow pins.

7. The method of any one of claims 5-6, wherein drying the liquid reagent comprises lyophilizing the liquid reagent on the flexible membrane of the plurality of hollow pins; and/or oven drying the liquid reagent on the flexible membrane of the plurality of hollow pins.

8. The method of any one of claims 5-7, further comprising:

inserting a plurality of pins into corresponding hollow pins of the hollow pins of the carrier, where a plunger comprises the plurality of pins, the plurality of pins aligned and oriented such that each of the plurality of pins is received within the aperture of a corresponding hollow pin of the plurality of hollow pins.

9. The method of claim 8, further comprising:

removably securing a cap onto the carrier such that the dried reagent on the flexible membrane of each of the plurality of hollow pins is disposed within a corresponding cavity of a plurality of cavities formed in the cap.

10. The method of claim 10, wherein the cap is snap fit to the carrier.

11. The method of any one of claims 9-10, comprising removing the cap and rehydrating the dried reagent on the flexible membranes of each of the plurality of hollow pins.

12. The method of any one of claims 5 to 11, further comprising:

extending the plurality of hollow pins through a pierceable membrane of a cap and into a plurality of wells in a well plate, and wherein the dried reagent is retained on the flexible membrane secured to an end of at least one of the plurality of hollow pins,

extending a plurality of pins through the plurality of hollow pins of the carrier to deform the flexible membrane and push the dried reagents out of the plurality of hollow pins, where a plunger comprises the plurality of pins, the plurality of pins of the plunger aligned and oriented to correspond to the plurality of hollow pins of the carrier; and

rehydrating the dried reagent.

13. The method of claim 12, wherein rehydrating the dried reagent comprises inserting the plurality of pins into the corresponding plurality of wells of the well plate, the plurality of wells having a liquid therein or dispensing a liquid into the plurality of wells, and waiting a period of time.

14. The method of claim 13, further comprising agitating the plurality of pins within the plurality of wells for a period of time.

15. The method of claim 9, wherein the cap is snap fit to the carrier and/or the method further comprising:

removing the cap and rehydrating the dried reagent on the flexible membranes of each of the plurality of hollow pins.