

CLAIMS

What is claimed is:

1. An apparatus comprising:
 - 5 a frame;
 - a microfluidic plate having one or more first fluidic ports in a first side; and
 - a first support bracket that is attached to the frame such that:
 - the microfluidic plate is interposed between the first support bracket
 - and the frame,
 - 10 the first support bracket floats relative to the microfluidic plate and the frame,
 - the microfluidic plate and the frame float relative to one another, and
 - a first side of the first support bracket faces towards the microfluidic plate, wherein:
 - 15 the first support bracket includes a first indexing feature that protrudes from the first side of the first support bracket and is proximate to a first edge of the microfluidic plate,
 - the first support bracket includes a second indexing feature that protrudes from the first side of the first support bracket and is proximate to a second edge of the microfluidic plate,
 - 20 the first support bracket includes a first gasket with at least one seal that is proud of the first side of the first support bracket and is positioned against the first side of the microfluidic plate, and
 - the first indexing feature of the first support bracket and the second indexing feature of the first support bracket contact the first edge and the second edge, respectively, of the microfluidic plate
 - 25 when the at least one seal of the first gasket is aligned with a corresponding at least one of the one or more first fluidic ports.
- 30 2. The apparatus of claim 1, wherein:
 - the microfluidic plate has a second side opposite the first side,

the frame has a first overlapping portion that overlaps, when viewed along a direction perpendicular to a major surface of the microfluidic plate, a first portion of the microfluidic plate that includes the second edge,

5 the first overlapping portion is proximate to the second side of the microfluidic plate,

the first overlapping portion has a first clamp arm slot having a first slot width in a direction parallel to the second edge,

the second side of the microfluidic plate is visible through the first clamp arm slot,

10 the apparatus is to be interfaced with a receiver of an analysis device, the receiver having a first clamp arm that is movable from an unclamped position in which the first clamp arm does not press on the second side of the microfluidic plate and does not engage with the first clamp arm slot to a clamped position in which the first clamp arm presses on the second side of the microfluidic plate and engages with
15 the first clamp arm slot, and

the first slot width is larger than a width of the first clamp arm in a direction parallel to the second edge and located within the first clamp arm slot when the first clamp arm is in the clamped position.

20 3. The apparatus of claim 2 wherein:

the microfluidic plate has a third edge opposite the first edge and a fourth edge opposite the second edge,

the frame has a second overlapping portion that overlaps, when viewed along the direction perpendicular to the major surface of the microfluidic plate, a
25 second portion of the microfluidic plate that includes the fourth edge,

the second overlapping portion is proximate to the second side of the microfluidic plate, and

the second overlapping portion has a second clamp arm slot having a second slot width in a direction parallel to the fourth edge,

30 the second side of the microfluidic plate is visible through the second clamp arm slot,

the receiver of the analysis device within which the apparatus is to be interfaced has a second clamp arm that is movable from an unclamped position in

which the second clamp arm does not press on the second side of the microfluidic plate and does not engage with the second clamp arm slot to a clamped position in which the second clamp arm presses on the second side of the microfluidic plate and engages with the second clamp arm slot, and

- 5 the second slot width is larger than a width of the second clamp arm in a direction parallel to the fourth edge and located within the second clamp arm slot when the second clamp arm is in the clamped position.

4. The apparatus of claim 1, wherein:

- 10 there are two first fluidic ports in the microfluidic plate, and

the first gasket includes two seals, each seal having a through-hole passing through the first support bracket and aligned with a different one of the first fluidic ports when the first indexing feature of the first support bracket and the second indexing feature of the first support bracket contact the first edge and the second edge,
15 respectively, of the microfluidic plate.

5. The apparatus of claim 4, wherein:

the first gasket includes a support foot that is proud of the first side of the first support bracket and is positioned against the microfluidic plate,

- 20 a first axis is defined between center points of the two seals of the first gasket,

the support foot of the first gasket is offset by a first amount from the first axis along a second axis perpendicular to the first axis and parallel to the microfluidic plate, and

- 25 the support foot of the first gasket has an upper surface that contacts the microfluidic plate and that is co-planar with upper surfaces of the two seals of the first gasket that are also in contact with the microfluidic plate.

6. The apparatus of claim 5, wherein the support foot of the first gasket does not serve as a seal.

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7. The apparatus of claim 5, wherein the first gasket is co-molded into the first support bracket.

8. The apparatus of claim 1, wherein:

the first support bracket has a second side that faces away from the first side of the first support bracket, and

5 at least two first fluidic port indexing features protrude from the second side of the first support bracket, each first fluidic port indexing feature to engage with a corresponding fluidic port indexing hole on a first fluidic port block of an analysis device to receive the apparatus.

10 9. The apparatus of claim 1, wherein:

the frame includes two opposing first retaining clips with opposing surfaces that face one another,

the first support bracket is positioned in between the two opposing first retaining clips,

15 the opposing surfaces of the first retaining clips are spaced apart by a first distance, and

the portion of the first support bracket between the opposing surfaces of the first retaining clips has a first width in a direction spanning between the opposing surfaces of the first retaining clips that is less than the first distance.

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10. The apparatus of claim 9, wherein:

the first support bracket includes a third indexing feature that protrudes from the first side of the first support bracket and is proximate to a third edge of the microfluidic plate opposite the first edge of the microfluidic plate, and

25 the microfluidic plate is interposed between the first indexing feature of the first support bracket and the third indexing feature of the first support bracket.

11. The apparatus of claim 10, wherein:

30 the microfluidic plate is rectangular and the first edge of the microfluidic plate is orthogonal to the second edge of the microfluidic plate and the second edge of the microfluidic plate is orthogonal to the third edge of the microfluidic plate.

12. The apparatus of claim 10, wherein:

the frame has a substantially rectangular opening,

the microfluidic plate sits within the substantially rectangular opening,

5 the substantially rectangular opening has opposing side walls that face towards one another, and

the first indexing feature of the first support bracket is interposed between one of the opposing side walls of the substantially rectangular opening and the first edge of the microfluidic plate and the third indexing feature of the first support
10 bracket is interposed between the other opposing side wall of the opposing side walls of the substantially rectangular opening and the third edge of the microfluidic plate.

13. The apparatus of claim 10, wherein:

15 the substantially rectangular opening has an opening width in a direction parallel to the second edge,

a first indexing feature width exists between furthest-apart portions of the surfaces of the first indexing feature of the first support bracket and the third indexing feature of the first support bracket that face the opposing side walls of the
20 substantially rectangular opening, and

the opening width minus the first indexing feature width is less than the first distance minus the first width.

14. The apparatus of claim 9, wherein the microfluidic plate further includes one
25 or more second fluidic ports on the first side and the apparatus further comprises:

a second support bracket that is attached to the frame such that:

the microfluidic plate is interposed between the second support bracket and the frame,

30 the second support bracket floats relative to the microfluidic plate and the frame,

the microfluidic plate and the frame float relative to one another, and

a first side of the second support bracket faces towards the microfluidic plate, wherein:

5 the second support bracket includes a first indexing feature that protrudes from the first side of the second support bracket and is proximate to the first edge of the microfluidic plate,

 the second support bracket includes a second indexing feature that protrudes from the first side of the second support bracket and is proximate to a fourth edge of the microfluidic plate opposite the second edge of the microfluidic plate,

10 the microfluidic plate is interposed between the second indexing feature of the first support bracket and the second indexing feature of the second support bracket,

 the second support bracket includes a second gasket with at least one seal that is proud of the first side of the second support bracket and is positioned against the microfluidic plate, and

15 the first indexing feature of the second support bracket and the second indexing feature of the second support bracket contact the first edge and the fourth edge, respectively, of the microfluidic plate when the at least one seal of the second gasket is aligned with a
20 corresponding at least one of the one or more second fluidic ports.

15. The apparatus of claim 14, wherein:

 the frame includes two opposing second retaining clips with opposing surfaces that face one another,

25 the second support bracket is positioned in between the two opposing second retaining clips,

 the opposing surfaces of the second retaining clips are spaced apart by a second distance, and

30 the portion of the second support bracket between the opposing surfaces of the second retaining clips has a second width in a direction spanning between the opposing surfaces of the second retaining clips that is less than the second distance.

16. The apparatus of claim 15, wherein:

the second support bracket includes a third indexing feature that protrudes from the first side of the second support bracket and is proximate to the third edge of the microfluidic plate, and

5 the microfluidic plate is interposed between the first indexing feature of the second support bracket and the third indexing feature of the second support bracket.

17. The apparatus of claim 16, wherein:

the frame has a substantially rectangular opening,

10 the microfluidic plate has a third edge opposite the first edge,

the microfluidic plate sits within the substantially rectangular opening,

the substantially rectangular opening has opposing side walls that face towards one another and that define an opening width in a direction parallel to the second edge,

15 the first indexing feature of the second support bracket is interposed between one of the opposing side walls of the substantially rectangular opening and the first edge of the microfluidic plate and the third indexing feature of the second support bracket is interposed between the other opposing side wall of the opposing side walls of the substantially rectangular opening and the third edge of the
20 microfluidic plate,

the microfluidic plate has a plate width in a direction spanning between the first indexing feature of the second support bracket and the third indexing feature of the second support bracket,

25 a second indexing feature width exists between furthest-apart portions of the surfaces of the first indexing feature of the second support bracket and the third indexing feature of the second support bracket that face the opposing side walls of the substantially rectangular opening, and

the opening width minus the second indexing feature width is less than the second distance minus the second width.

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18. The apparatus of claim 14, wherein:

there are two second fluidic ports in the microfluidic plate, and

the second gasket includes two seals, each seal having a through-hole passing through the second support bracket and aligned with a different one of the second fluidic ports when the first indexing feature of the second support bracket and the second indexing feature of the second support bracket contact the first edge and the fourth edge, respectively, of the microfluidic plate.

19. The apparatus of claim 18, wherein:

the second gasket includes a support foot that is proud of the first side of the second support bracket and is positioned against the microfluidic plate,

10 a third axis is defined between center points of the two seals of the second gasket,

the support foot of the second gasket is offset by a second amount from the third axis along a fourth axis perpendicular to the third axis and parallel to the microfluidic plate, and

15 the support foot of the second gasket has an upper surface that contacts the microfluidic plate and is co-planar with upper surfaces of the two seals of the second gasket that are also in contact with the microfluidic plate.

20 20. The apparatus of claim 19, wherein the support foot of the second gasket does not serve as a seal.

21. The apparatus of claim 19, wherein the second gasket is co-molded into the second support bracket.

25 22. The apparatus of claim 14, wherein:

the second support bracket has a second side that faces away from the first side of the second support bracket, and

30 at least two second fluidic port indexing features protrude from the second side of the first support bracket, each first fluidic port indexing feature to engage with a corresponding fluidic port indexing hole on a first fluidic port block of an analysis device to receive the apparatus.