CLAIMS

What is claimed is:

1. A slide assembly device for repeatably and accurately aligning and assembling a first slide and a second slide into an assembled slide for subsequent processing of the assembled slide, the device comprising:

a static tooling base having a first surface;

a connection module;

a moveable tooling base that is operably connected with the static tooling base via the connection module, said moveable tooling base having a second surface,

wherein the moveable tooling base is configured to rotate about the connection module from a first position that is parallel, and in line, with the static tooling base to a second position that is substantially 180 degrees with respect to the first position, such that the second surface becomes parallel with, and oriented to face, the first surface,

wherein the static tooling base is configured to hold the first slide on the first surface,

wherein the moveable tooling base is configured to hold the second slide on the second surface, such that the second slide remains engagedly held on the second surface when the moveable tooling base is rotated from the first position to the second position, and

wherein when the moveable tooling base is in the second position, the slide assembly device is configured to release the second slide onto the first slide.

2. The slide assembly device as in claim 1, further comprising a base to which the static tooling base is statically and solidly affixed.

3. The slide assembly device as in claim 2, wherein the base is mounted on a stable and static mounting.

4. The slide assembly device as in claim 3, wherein said stable and static mounting includes one of a table, lab bench, and non-moving stand.

5. The slide assembly device as in claim 1, wherein the connection module includes a hinge.

6. The slide assembly device as in claim 1, wherein the connection module includes a plurality of hinges, and wherein the moveable tooling base includes a plurality of moveable tooling bases, each of the plurality of moveable tooling bases being operably connected with the static tooling base via one of the plurality of hinges, such that each of the plurality of moveable tooling bases is rotatable from the first position to the second position in relation to the static tooling base.

7. The slide assembly device as in claim 1, further comprising a first slide receiver that is removably attachable to the first surface of the static tooling base, wherein the first slide receiver comprises a third surface, and wherein the first slide receiver is configured to hold the first slide on the third surface.

8. The slide assembly device as in claim 7, further comprising a hybridization chamber base affixed on the first surface of the static tooling base, wherein the first slide receiver is configured to be part of the hybridization chamber base.

9. The slide assembly device as in claim 7, wherein the first slide receiver comprises first tooling points that are configured to hold the first slide so as to prevent the first slide from shifting with respect to the first slide receiver, and configured such that, when the moveable tooling base is rotated from the first position to the second position, the first tooling points, the first slide receiver, and the first slide do not interfere with the rotation of the moveable tooling base, nor interfere with the second slide receiver or the second slide.

10. The slide assembly device as in claim 7, further comprising a second slide receiver that is removably attachable to the second surface of the moveable tooling base, wherein the second slide comprises a fourth surface, and wherein the second slide receiver is configured to hold the second slide on the fourth surface, such that the second slide remains engagedly held on the fourth surface when the moveable tooling base is rotated from the first position to the second position.

11. The slide assembly device as in claim 10, further comprising a vacuum source, wherein the vacuum source is configured to generate a vacuum sufficient to hold the second slide on the fourth surface when the moveable tooling base is rotated from the first position to the second position, and configured to release the vacuum to atmospheric pressure when the moveable tooling base is in the second position, so as to release the second slide onto the first slide by force of gravity.

12. The slide assembly device as in claim 11, wherein the fourth surface has a groove thereon, and wherein the second slide receiver further comprises:

a vacuum opening in the fourth surface, wherein the groove forms a closed path around said vacuum opening, and wherein a flexible seal is fitted within the groove;

a vacuum connection to which the vacuum source is connected;

a vacuum path under the fourth surface, said vacuum path being configured between the vacuum opening and the vacuum connection,

wherein the second slide receiver is configured to engagedly hold the second slide against the flexible seal on the fourth surface, using the vacuum generated by the vacuum source, when the moveable tooling base is rotated from the first position to the second position.

13. The slide assembly device as in claim 12, wherein the flexible seal includes an o-ring.

14. The slide assembly device as in claim 12, wherein the second slide receiver further comprises a side surface substantially perpendicular to the fourth surface, and wherein the vacuum connection is located on the side surface.

15. The slide assembly device as in claim 12, wherein the vacuum is set to a pressure on the order of a few inches of water (or about 2.5 to 25 mbar), which is sufficient to hold the second slide against the flexible seal.

16. The slide assembly device as in claim 12, further comprises at least one valve through which air is released when the vacuum is generated or when the vacuum is released to atmospheric pressure.

17. The slide assembly device as in claim 16, wherein the at least one valve is located in at least one of the second slide receiver and the vacuum source.

18. The slide assembly device as in claim 12, wherein the vacuum source is an external vacuum source.

19. The slide assembly device as in claim 12, wherein the vacuum source is an on-board vacuum source including a pipette bulb.

20. The slide assembly device as in claim 12, wherein the vacuum source is an on-board vacuum source including an air cylinder.

21. The slide assembly device as in claim 20, wherein the air cylinder is configured to provide the vacuum, which is sufficient to pull the second slide against the flexible seal, and wherein the air cylinder is connected to the vacuum connection via a flexible tube.

22. The slide assembly device as in claim 21, wherein the air cylinder comprises:

a spring return cylinder having a spring therein;

an air-tight piston moveable within the spring return cylinder from a first piston position to a second piston position;

a manually actuated button connected to the piston; and

a cylinder vacuum connection to which the flexible tube is connected,

wherein when the manually actuated button is depressed a first time, the piston is pushed from the first piston position to the second piston position within the spring return cylinder, which causes the spring to push the piston from the second piston position back to the first piston position thereby creating the vacuum, which is sufficient to pull the second slide against the flexible seal, and

wherein when the manually actuated button is depressed a second time, the piston is pushed again from the first piston position to the second piston position within the spring return cylinder, thereby releasing the vacuum to atmospheric pressure, and thus releasing the second slide.

23. The slide assembly device as in claim 10, wherein the second slide receiver further comprises second tooling points that are configured to hold the second slide so as to prevent the second slide from shifting with respect to the second slide receiver, and configured such that, when the moveable tooling base is rotated from the first position to the second position, the second tooling points, the second slide receiver, and the second slide do not interfere with the first tooling points, the first slide receiver, or the first slide.

24. The slide assembly device as in claim 1, wherein the slide assembly device is configured such that, when the moveable tooling base is in the second position, a distance between the first slide and the second slide is about 1 mm or less.

25. The slide assembly device as in claim 1, wherein the static tooling base comprises extraction grooves thereon that are configured to allow an extraction device to be positioned between the static tooling base and the assembled slide in order to remove the assembled slide from the slide assembly device.

26. The slide assembly device as in claim 25, wherein the extraction device is by hand and enabled by fixating the whole assembly together via a clamp.

27. The slide assembly device as in claim 1, further comprising a robotic mechanism that is configured to robotically rotate the moveable tooling base from the first position to the second position.

28. The slide assembly device as in claim 27, wherein the robotic mechanism is further configured to cause the second slide to be engagedly held on the second surface when the moveable tooling base is rotated from the first position to the second position, and to cause the second slide to be released onto the first slide when the moveable tooling base is in the second position.

29. The slide assembly device as in claim 1, wherein prior to the first slide and the second slide being placed on the slide assembly device, at least one of the first slide and the second slide is in at least one of the following sets of conditions: (a) used or unused, (b) prepared or unprepared, or (c) already processed or not yet processed.

30. A method of repeatably and accurately aligning and assembling a first slide and a second slide into an assembled slide for subsequent processing of the assembled slide, the method comprising:

providing a slide assembly device comprising:

a static tooling base having a first surface,

a connection module,

a moveable tooling base that is operably connected with the static tooling base via the connection module, said moveable tooling base having a second surface,

wherein the moveable tooling base is configured to rotate about the connection module from a first position that is parallel, and in line, with the static tooling base to a second position that is substantially 180 degrees with respect to the first position, such that the second surface becomes parallel with, and oriented to face, the first surface,

wherein the static tooling base is configured to hold the first slide on the first surface, and

wherein the moveable tooling base is configured to hold the second slide on the second surface;

positioning the first slide on the static tooling base;

positioning the second slide on the moveable tooling base;

causing the slide assembly device to engagedly hold the second slide on the second surface, such that the second slide does not move with respect to the second surface even when the moveable tooling base is moved;

rotating the moveable tooling base about the connection module from the first position to the second position; and

causing the slide assembly device to release the second slide onto the first slide when the moveable tooling base is in the second position.

31. The method as in claim 30, further comprising statically and solidly mounting the static tooling base on a base, prior to the steps of positioning the first slide on the static tooling base and positioning the second slide on the moveable tooling base.

32. The method as in claim 31, further comprising mounting the base on a stable and static mounting, prior to mounting the static tooling base on the base, wherein said stable and static mounting includes one of a table, lab bench, and non-moving stand.

33. The method as in claim 30, wherein the connection module includes a plurality of hinges, wherein the moveable tooling base includes a plurality of moveable tooling bases, each of the plurality of moveable tooling bases being operably connected with the static tooling base via one of the plurality of hinges, the method further comprising rotating at least one of the plurality of moveable tooling bases from the first position to the second position in relation to the static tooling base.

34. The method as in claim 30, further comprising removably attaching a first slide receiver to the first surface of the static tooling base, prior to the step of positioning the first slide on the static tooling base, wherein the first slide receiver includes a third surface and wherein the first slide receiver is configured to hold the first slide on the third surface.

35. The method as in claim 34, wherein the slide assembly device further comprises a Hybridization chamber base affixed on the first surface of the static tooling base, and wherein the first slide receiver is configured to be part of the hybridization chamber base, the method further comprising processing the second slide on the hybridization chamber base during assembly of the assembled slide.

36. The method as in claim 34, further comprising removably attaching a second slide receiver to the second surface of the moveable tooling base, prior to the step of positioning the second slide on the moveable tooling base, wherein the second slide receiver includes a fourth surface and wherein the second slide receiver is configured to hold the second slide on the fourth surface even when the moveable tooling base is moved.

37. The method as in claim 36, wherein the slide assembly device further comprises a vacuum source that is connected to the second slide receiver and that is configured to generate a vacuum sufficient to hold the second slide on the fourth surface,

wherein the step of causing the slide assembly device to engagedly hold the second slide on the second surface includes causing the vacuum source to generate the vacuum in

order to hold the second slide on the fourth surface during the step of rotating the moveable tooling base, and

wherein the step of causing the slide assembly device to release the second slide includes causing the vacuum source to release the vacuum to atmospheric pressure.

38. The method as in claim 37, wherein step of causing the vacuum source to generate the vacuum includes setting the vacuum to a pressure on the order of a few inches of water (or about 2.5 to 25 mbar), which is sufficient to hold the second slide on the fourth surface.

39. The method as in claim 37, wherein the slide assembly device further comprises at least one valve located in at least one of the second slide receiver and the vacuum source, wherein at least one of the steps of causing the vacuum source to generate the vacuum and causing the vacuum source to release the vacuum to atmospheric pressure includes releasing air through the at least one valve.

40. The method as in claim 37, wherein the vacuum source is an external vacuum source, wherein the step of causing the vacuum source to generate the vacuum includes turning on the external vacuum source or opening a valve between the second slide receiver and the external vacuum source, and wherein the step of causing the vacuum source to release the vacuum to atmospheric pressure includes turning off the external vacuum source or closing said valve between the second slide receiver and the external vacuum source.

41. The method as in claim 37, wherein the vacuum source is an on-board vacuum source including a pipette bulb, wherein the step of causing the vacuum source to generate the vacuum includes squeezing the pipette bulb a first time from a first state to a second state and allowing the pipette bulb to return from second state back to the first state, and wherein the step of causing the vacuum source to release the vacuum to atmospheric pressure includes squeezing the pipette bulb a second time.

42. The method as in claim 37, wherein the vacuum source is an on-board vacuum source including an air cylinder that is connected to the second slide receiver, the air cylinder comprising a spring return cylinder having a spring therein, an air-tight piston moveable within the spring return cylinder from a first piston position to a second piston position, a manually

actuated button connected to the piston, and a cylinder vacuum connection to which the flexible tube is connected,

wherein the step of causing the vacuum source to generate the vacuum includes depressing the manually actuated button a first time, which causes the piston to move from the first piston position to the second piston position within the spring return cylinder, which in turn causes the spring to push the piston from the second piston position back to the first piston position thereby creating the vacuum, which is sufficient to pull the second slide against the flexible seal, and

wherein the step of causing the vacuum source to release the vacuum to atmospheric pressure includes depressing the manually actuated button a second time, which causes the piston to move again from the first piston position to the second piston position within the spring return cylinder, thereby releasing the vacuum to atmospheric pressure, and thus releasing the second slide.

43. The method as in claim 36, wherein step of rotating the moveable tooling base about the connection module from the first position to the second position includes rotating the moveable tooling base without the second slide receiver or the second slide interfering with the first slide receiver or the first slide.

44. The method as in claim 30, wherein step of rotating the moveable tooling base about the connection module from the first position to the second position includes moving the second slide such that a distance between the first slide and the second slide is about 1 mm or less.

45. The method as in claim 30, wherein the static tooling base comprises extraction grooves thereon that are configured to allow an extraction device to be positioned between the static tooling base and the assembled slide, the method further comprising:

inserting the extraction device in the grooves and between the static tooling base and the assembled slide; and

lifting the assembled slide from the slide assembly device,

wherein the extraction device is a clamp.

46. The method as in claim 30, wherein the slide assembly device further comprises a robotic mechanism that is configured to robotically rotate the moveable tooling base from the first position to the second position, wherein the step of rotating the moveable tooling base includes instructing the robotic mechanism to rotate the moveable tooling base about the connection module from the first position to the second position.

47. The method as in claim 46, wherein the robotic mechanism is further configured to cause the second slide to be engagedly held on the second surface when the moveable tooling base is rotated from the first position to the second position, and to cause the second slide to be released onto the first slide when the moveable tooling base is in the second position,

wherein the step of causing the slide assembly device to engagedly hold the second slide includes instructing the robotic mechanism to cause the slide assembly device to engagedly hold the second slide on the second surface, such that the second slide does not move with respect to the second surface even when the moveable tooling base is moved; and

wherein the step of causing the slide assembly device to release the second slide includes instructing the robotic mechanism to cause the slide assembly device to release the second slide onto the first slide when the moveable tooling base is in the second position.

48. The method as in claim 30, wherein prior to the steps of positioning the first slide on the static tooling base and positioning the second slide on the moveable tooling base, at least one of the first slide and the second slide is in at least one of the following sets of conditions: (a) used or unused, (b) prepared or unprepared, or (c) already processed or not yet processed.

What is claimed is:

1. A device comprising:

a static tooling base having a first surface;

a moveable arm that is operably connected with the static tooling base, said moveable arm having a second surface;

wherein the moveable arm is configured to rotate from a first position to a second position, such that the second surface becomes parallel with, and oriented to face, the first surface;

wherein the static tooling base is configured to hold a first slide on the first surface;

wherein the moveable arm is configured to hold a second slide on the second surface, such that the second slide remains held on the second surface when the moveable arm is rotated from the first position to the second position; and

wherein when the moveable arm is in the second position, the device is configured to release the second slide onto the first slide.

2. The device as in claim 1, further comprising a base to which the static tooling base is affixed.

3. The device as in claim 2, wherein the base is mounted on a mounting.

4. The device as in claim 3, wherein said mounting comprises one of a table, lab bench, and stand.

5. The device as in claim 1, wherein the moveable arm is operably connected with the static tooling base by a connection module.

6. The device as in claim 5, wherein the connection module comprises a hinge or a plurality of hinges, and wherein the moveable arm comprises a plurality of moveable arms, each of the plurality of moveable arms being operably connected with the static tooling base via one of the plurality of hinges, such that each of the plurality of moveable arms is rotatable from the first position to the second position in relation to the static tooling base.

7. The device as in claim 1, further comprising a first slide receiver that is removably attachable to the first surface of the static tooling base, wherein the first slide receiver comprises a third surface, and wherein the first slide receiver is configured to hold the first slide on the third surface.

8. The device as in claim 7, further comprising a hybridization chamber base affixed on the first surface of the static tooling base, wherein the first slide receiver is configured to be part of the hybridization chamber base.

9. The device as in claim 7, wherein the first slide receiver comprises first tooling points that are configured to hold the first slide so as to prevent the first slide from shifting with respect to the first slide receiver, and configured such that, when the moveable arm is rotated from the first position to the second position, the first tooling points, the first slide receiver, and the first slide do not interfere with the rotation of the moveable arm, nor interfere with the second slide receiver or the second slide.

10. The device as in claim 7, further comprising a second slide receiver that is removably attachable to the second surface of the moveable arm, wherein the second slide receiver comprises a fourth surface, and wherein the second slide receiver is configured to hold the second slide on the fourth surface, such that the second slide remains held on the fourth surface when the moveable arm is rotated from the first position to the second position.

11. The device as in claim 10, further comprising a vacuum source, wherein the vacuum source is configured to generate a vacuum sufficient to hold the second slide on the fourth surface when the moveable arm is rotated from the first position to the second position, and the vacuum source is further configured to release the vacuum to atmospheric pressure when the moveable arm is in the second position, so as to release the second slide onto the first slide by force of gravity.

12. The device as in claim 11, wherein the fourth surface has a groove thereon, and wherein the second slide receiver further comprises:

a vacuum opening in the fourth surface, wherein the groove forms a closed path around said vacuum opening, and wherein a flexible seal is fitted within the groove;

a vacuum connection to which the vacuum source is connected; and

a vacuum path under the fourth surface, said vacuum path being configured between the vacuum opening and the vacuum connection, wherein the second slide receiver is configured to hold the second slide against the flexible seal on the fourth surface, using the vacuum generated by the vacuum source, when the moveable arm is rotated from the first position to the second position.

13. The device as in claim 12, wherein the flexible seal includes an o-ring.

14. The device as in claim 12, wherein the second slide receiver further comprises a side surface substantially perpendicular to the fourth surface, and wherein the vacuum connection is located on the side surface.

15. The device as in claim 12, wherein the vacuum is set to a pressure of about 2.5 to 25 mbar.

16. The device as in claim 12, further comprising at least one valve through which air is released when the vacuum is generated or when the vacuum is released to atmospheric pressure.

17. The device as in claim 16, wherein the at least one valve is located in at least one of the second slide receiver and the vacuum source.

18. The device as in claim 12, wherein the vacuum source is an external vacuum source.

19. The device as in claim 12, wherein the vacuum source is an on-board vacuum source including a pipette bulb.

20. The device as in claim 12, wherein the vacuum source is an on-board vacuum source including an air cylinder.

21. The device as in claim 20, wherein the air cylinder is configured to provide the vacuum, which is sufficient to pull the second slide against the flexible seal, and wherein the air cylinder is connected to the vacuum connection via a flexible tube.

22. The device as in claim 21, wherein the air cylinder comprises:

a spring return cylinder having a spring therein;

an air-tight piston moveable within the spring return cylinder from a first piston position to a second piston position;

a manually actuated button connected to the piston; and

a cylinder vacuum connection to which the flexible tube is connected, wherein when the manually actuated button is depressed a first time, the piston is pushed from the first piston position to the second piston position within the spring return cylinder, which causes the spring to push the piston from the second piston position back to the first piston position thereby creating the vacuum, which is sufficient to pull the second slide against the flexible seal, and wherein when the manually actuated button is depressed a second time, the piston is pushed again from the first piston position to the second piston position within the spring return cylinder, thereby releasing the vacuum to atmospheric pressure, and thus releasing the second slide.

23. The device as in claim 10, wherein the second slide receiver further comprises second tooling points that are configured to hold the second slide so as to prevent the second slide from shifting with respect to the second slide receiver, and configured such that, when the moveable arm is rotated from the first position to the second position, the second tooling points, the second slide receiver, and the second slide do not interfere with the first tooling points, the first slide receiver, or the first slide.

24. The device as in claim 1, configured such that, when the moveable arm is in the second position, a distance between the first slide and the second slide is about 1 mm or less.

25. The device as in claim 1, wherein the static tooling base comprises extraction grooves thereon that are configured to allow an extraction device to be positioned between the static tooling base and the assembled slide to remove the assembled slide from the device.

26. The device as in claim 25, wherein the extraction device is operated by hand and comprises a clamp.

27. The device as in claim 1, further comprising a rotation mechanism that is configured to rotate the moveable arm from the first position to the second position.

28. The device as in claim 27, wherein the rotation mechanism is further configured to cause the second slide to be held on the second surface when the moveable arm is rotated from the first position to the second position, and to cause the second slide to be released onto the first slide when the moveable arm is in the second position.

29. The device as in claim 1, wherein prior to the first slide and the second slide being placed on the device, at least one of the first slide and the second slide is in at least one of the following sets of conditions: (a) used or unused, (b) prepared or unprepared, or (c) already processed or not yet processed.

30. A method comprising:

providing a device comprising:

a static tooling base having a first surface;

a moveable arm that is operably connected with the static tooling base, said moveable arm having a second surface;

wherein the moveable arm is configured to rotate about the connection module from a first position to a second position, such that the second surface becomes parallel with, and oriented to face, the first surface;

wherein the static tooling base is configured to hold a first slide on the first surface; and

wherein the moveable arm is configured to hold a second slide on the second surface;

positioning the first slide on the static tooling base;

positioning the second slide on the moveable arm;

causing the device to hold the second slide on the second surface, such that the second slide does not move with respect to the second surface even when the moveable arm is moved;

rotating the moveable arm from the first position to the second position; and

causing the device to release the second slide onto the first slide when the moveable arm is in the second position.

31. The method as in claim 30, further comprising mounting the static tooling base on a mounting.

32. The method as in claim 31, further comprising mounting the base on a mounting comprising one of a table, lab bench, and stand.

33. The method as in claim 30, wherein the moveable arm is operably connected with the static tooling base by a connection module and wherein the connection module comprises a plurality of hinges, and wherein the moveable arm includes a plurality of moveable arms, each of the plurality of moveable arms being operably connected with the static tooling base via one of the plurality of hinges, the method further comprising rotating at least one of the plurality of moveable arms from the first position to the second position in relation to the static tooling base.

34. The method as in claim 30, further comprising removably attaching a first slide receiver to the first surface of the static tooling base, prior to the step of positioning the first slide on the static tooling base, wherein the first slide receiver includes a third surface and wherein the first slide receiver is configured to hold the first slide on the third surface.

35. The method as in claim 34, wherein the device further comprises a hybridization chamber base affixed on the first surface of the static tooling base, and wherein the first slide receiver is configured to be part of the hybridization chamber base, the method further comprising processing the second slide on the hybridization chamber base during assembly of the assembled slide.

36. The method as in claim 34, further comprising removably attaching a second slide receiver to the second surface of the moveable arm, prior to the step of positioning the second slide on the moveable arm, wherein the second slide receiver includes a fourth surface and wherein the second slide receiver is configured to hold the second slide on the fourth surface even when the moveable arm is moved.

37. The method as in claim 36, wherein the device further comprises a vacuum source that is connected to the second slide receiver and that is configured to generate a vacuum sufficient to hold the second slide on the fourth surface, wherein the step of causing the device to hold the second slide on the second surface includes causing the vacuum source to generate the vacuum in order to hold the second slide on the fourth surface during the step of rotating the moveable arm, and wherein the step of causing the device to release the second slide includes causing the vacuum source to release the vacuum to atmospheric pressure.

38. The method as in claim 37, wherein step of causing the vacuum source to generate the vacuum comprises causing a vacuum of about 2.5 to 25 mbar.

39. The method as in claim 37, wherein the device further comprises at least one valve located in at least one of the second slide receiver and the vacuum source, wherein at least one of the steps of causing the vacuum source to generate the vacuum and causing the vacuum source to release the vacuum to atmospheric pressure includes releasing air through the at least one valve.

40. The method as in claim 37, wherein the vacuum source is an external vacuum source, wherein the step of causing the vacuum source to generate the vacuum includes turning on the external vacuum source or opening a valve between the second slide receiver and the external vacuum source, and wherein the step of causing the vacuum source to release the vacuum to atmospheric pressure includes turning off the external vacuum source or closing said valve between the second slide receiver and the external vacuum source.

41. The method as in claim 37, wherein the vacuum source is an on-board vacuum source including a pipette bulb, wherein the step of causing the vacuum source to generate the vacuum includes squeezing the pipette bulb a first time from a first state to a second state and allowing the pipette bulb to return from second state back to the first state, and wherein the step of causing the vacuum source to release the vacuum to atmospheric pressure includes squeezing the pipette bulb a second time.

42. The method as in claim 37, wherein the vacuum source is an on-board vacuum source including an air cylinder that is connected to the second slide receiver, the air cylinder

comprising a spring return cylinder having a spring therein, an air-tight piston moveable within the spring return cylinder from a first piston position to a second piston position, a manually actuated button connected to the piston, and a cylinder vacuum connection to which the flexible tube is connected, wherein the step of causing the vacuum source to generate the vacuum includes depressing the manually actuated button a first time, which causes the piston to move from the first piston position to the second piston position within the spring return cylinder, which in turn causes the spring to push the piston from the second piston position back to the first piston position thereby creating the vacuum, which is sufficient to pull the second slide against the flexible seal, and wherein the step of causing the vacuum source to release the vacuum to atmospheric pressure includes depressing the manually actuated button a second time, which causes the piston to move again from the first piston position to the second piston position within the spring return cylinder, thereby releasing the vacuum to atmospheric pressure, and thus releasing the second slide.

43. The method as in claim 36, wherein step of rotating the moveable arm about the connection module from the first position to the second position includes rotating the moveable arm without the second slide receiver or the second slide interfering with the first slide receiver or the first slide.

44. The method as in claim 30, wherein step of rotating the moveable arm about the connection module from the first position to the second position includes moving the second slide such that a distance between the first slide and the second slide is about 1 mm or less.

45. The method as in claim 30, wherein the static tooling base comprises extraction grooves thereon that are configured to allow an extraction device to be positioned between the static tooling base and the assembled slide, the method further comprising:

inserting the extraction device in the grooves and between the static tooling base and the assembled slide; and

lifting the assembled slide from the device, wherein the extraction device is a clamp.

46. The method as in claim 30, wherein the device further comprises a rotation mechanism that is configured to rotate the moveable arm from the first position to the second position, wherein the step of rotating the moveable arm includes instructing the rotation mechanism to rotate the moveable arm about the connection module from the first position to the second position.

47. The method as in claim 46, wherein the rotation mechanism is further configured to cause the second slide to be held on the second surface when the moveable arm is rotated from the first position to the second position, and to cause the second slide to be released onto the first slide when the moveable arm is in the second position, wherein the step of causing the device to hold the second slide includes instructing the rotation mechanism to cause the device to hold the second slide on the second surface, such that the second slide does not move with respect to the second surface even when the moveable arm is moved, and wherein the step of causing the device to release the second slide includes instructing the rotation mechanism to cause the device to release the second slide onto the first slide when the moveable arm is in the second position.

48. The method as in claim 30, wherein prior to the steps of positioning the first slide on the static tooling base and positioning the second slide on the moveable arm, at least one of the first slide and the second slide is in at least one of the following sets of conditions: (a) used or unused, (b) prepared or unprepared, or (c) already processed or not yet processed.