CLAIMS

1. A substrate holder for supporting a substrate, the substrate holder comprising:

a main body having a surface;

a plurality of supporting pins connected to the surface of the main body at proximal ends of the plurality of supporting pins, wherein distal ends of the plurality of supporting pins form a support surface for a substrate;

a plate comprising a plurality of openings, the plate being positioned between the surface of the main body and the support surface; and

a movable member surrounding the plurality of supporting pins and protruding from the surface of the main body,

wherein the substrate holder is configured to move the movable member in the direction along the plurality of supporting pins;

all of the plurality of supporting pins connected to the surface of the main body have a corresponding opening in the plate; and

the plate is actuatable in a direction along the plurality of supporting pins between the surface of the main body and the support surface.

2. The substrate holder of claim 1, wherein the substrate holder is configured to extract fluid from between the substrate supported on the support surface and the plate.

3. The substrate holder of claim 2, wherein the main body comprises at least one extraction opening through which the fluid is extracted, and the plate comprises at least one extractor portion through which the fluid is extracted, the extractor portion corresponding to the extraction opening.

4. The substrate holder of claim 3, wherein the extractor portion comprises a protrusion with a passage therethrough.

5. The substrate holder of any of claims 1-4, wherein the plate is substantially flat and is substantially parallel to the support surface.

6. The substrate holder of any of claims 1-5, wherein the plate is actuatable to a preferred position depending on data relating to one or more of:

a shape of the substrate on the support surface;

a pressure between the substrate and the surface of the main body; and

a flow rate of fluid extracted from between the substrate and the surface of the main body.

7. The substrate holder of any of claims 1-6, wherein the substrate holder comprises a plurality of actuators configured to actuate the plate.

8. The substrate holder of any of claims 1-7, wherein the substrate holder comprises a plurality of member actuators configured to move the movable member.

9. The substrate holder of any of claims 1-7, wherein the substrate holder is configured such that a pressure gradient across the movable member provides a force to move the movable member.

10. The substrate holder of claim 1 or 9, further comprising a flexible seal forming a seal between the movable member and the main body.

11. The substrate holder of any of claims 1-7, 9 or 10, wherein the moveable member comprises a flexible connection between the base of the movable member and the main body for keeping the movable member in position whilst allowing the movable member to move in the direction along the plurality of supporting pins.

12. The substrate holder of claim 11, wherein the flexible connection comprises a spring.

13. The substrate holder of any of claim 1-12, wherein the substrate holder is configured to move the movable member to a preferred position depending on data relating to one or more of:

(i) a shape of the substrate on the support surface;

(ii) a pressure between the substrate and the surface of the main body; and

(iii) a flow rate of fluid extracted from between the substrate and the surface of the main body.

14. The substrate holder of any of claims 1-13, further comprising a fixed member protruding from the surface of the main body and having a height;

wherein the movable member is flexible and defines an enclosed cavity therein, the movable member having a height and being configured to form a seal with an underside of the substrate in a first state; and

wherein in a second state, the substrate holder is configured to reduce a pressure in the enclosed cavity of the flexible member such that the substrate is supported on the substrate holder.

15. The substrate holder of claim 14, wherein the substrate holder is configured to reduce the pressure in the enclosed cavity to reduce the height of the movable member in the second state, and to form a seal between the fixed member and the underside of the substrate.

16. The substrate holder of claim 14 or 15, where the first state is prior to clamping the substrate on the substrate holder and the second state is during clamping the substrate on the substrate holder.

17. The substrate holder of any of claims 1-16, wherein the movable member is positioned adjacent to, and radially outwards of, an edge of the plate.

18. The substrate holder of any of claims 1-17, further comprising a fixed sealing member surrounding the plurality of supporting pins and protruding from the surface of the main body, wherein the fixed sealing member is positioned adjacent to, and radially outwards of, an edge of the plate, and adjacent to, and radially inwards of, the movable member.

19. A lithographic apparatus comprising the substrate holder of any of claims 1-18.

20. A method of supporting a substrate on a substrate holder, the method comprising:

providing a substrate to the substrate holder, the substrate holder comprising:

a main body having a surface;

a plurality of supporting pins connected to the surface of the main body at proximal ends of the plurality of supporting pins, wherein distal ends of the plurality of supporting pins form a support surface for a substrate;

a plate comprising a plurality of openings, the plate being positioned between the surface of the main body and the support surface; and

a movable member surrounding the plurality of supporting pins and protruding from the surface of the main body, wherein the movable member is movable or flexible in a direction along the plurality of supporting pins,

wherein all of the plurality of supporting pins connected to the surface of the main body have a corresponding opening of the plurality of openings of the plate;

moving the plate in the direction along the plurality of supporting pins between the surface of the main body and the support surface; and

extracting fluid from a space between the plate and the substrate.