**Claims**

1. An exposure apparatus for exposing a substrate (W) with illumination light (IL) via a projection optical system (PL), the apparatus comprising:

a frame member (21) for supporting the projection optical system;

a detection system (AL1) provided at the frame member apart from the projection optical system and configured to detect a mark of the substrate;

a plurality of grating members (132A, 132B, 132C, 132D), each of which having a reflecting-type grating, and each of which being supported by the frame member such that the reflecting-type grating is arranged substantially parallel with a predetermined plane (XY) perpendicular to an optical axis (AX) of the projection optical system;

a base (12) arranged below the projection optical system and the detection system;

a stage (WST) arranged on the base, the stage having a holder configured to hold the substrate and being movable below the grating members;

a drive system (124) configured to move the stage so as to arrange the substrate opposite to the projection optical system and the detection system, respectively;

an encoder system having a plurality of heads (64, 66) provided at the stage, each of which being configured to irradiate a beam onto the grating member from below the grating member, so as to obtain position information of the stage; and

a controller (20) configured to control the drive system based on the position information obtained by the encoder system,

wherein the grating members are supported via a flexural member by the frame member.

2. The exposure apparatus according to claim 1,

wherein the holder is arranged within a recess of an upper surface of the stage, and

wherein each of the heads is provided at the stage so as to be positioned outside the upper surface.

3. The exposure apparatus according to claim 1 or 2, further comprising:

a nozzle unit (32) provided to surround a lens (191), the lens being one of a plurality of optical elements of the projection optical system and being arranged closest to an image

surface, the nozzle unit being configured to form an immersion area with liquid (Lq) so as to include an optical path of the illumination light between the lens and the substrate,

wherein the grating members are arranged outside the nozzle unit, and

wherein the apparatus is configured for exposing the substrate with the illumination light via the projection optical system and the liquid of the immersion area.

4. The exposure apparatus according to claim 3,

wherein the nozzle unit includes a supply port of the liquid, a recovery port of the liquid, and an opening through which the illumination light passes, and

wherein the apparatus is configured for supplying liquid via the supply port to the optical path and for recovering the liquid of the immersion area via the recovery port.

5. The exposure apparatus according to claim 3 or 4, further comprising:

another frame member that is different from the frame member,

wherein the nozzle unit is provided at the another frame member.

6. The exposure apparatus according to claim 3 or 4,

wherein the nozzle unit is provided at the frame member.

7. The exposure apparatus according to any one of claims 3 to 6,

wherein the holder is arranged within a recess of an upper surface of the stage, and

wherein the stage is configured to hold the substrate in the recess such that a surface of the substrate is substantially flush with the upper surface.

8. An exposure method for exposing a substrate (W) with illumination light (IL) via a projection optical system (PL), the method comprising:

moving a stage (WST), having a holder configured to hold the substrate above a base (12) arranged below the projection optical system and a detection system (AL1), the detection system being supported apart from the projection optical system by a frame member (21) configured to support the projection optical system;

detecting a mark of the substrate by the detection system;

moving the stage to expose the substrate with the illumination light via the projection optical system;

obtaining position information of the stage by an encoder system having a plurality of heads (62, 64) provided at the stage; and

controlling the movement of the stage based on the position information obtained by the encoder system,

wherein each head of the plurality of heads is configured to irradiate a beam onto one of a plurality of grating members (132A, 132B, 132C, 132D), each of which having a reflecting-type grating, from below the one grating member, and

wherein the grating members are supported by the frame member via a flexural member such that the reflecting-type grating is arranged substantially parallel with a predetermined plane perpendicular to an optical axis of the projection optical system.

9. The exposure method according to claim 8,

wherein the holder is arranged within a recess of an upper surface of the stage, and wherein each of the heads is provided at the stage so as to be positioned outside the upper surface.

10. The exposure method according to claim 8 or 9,

wherein an immersion area is formed with liquid (Lq) so as to include an optical path of the illumination light between the lens and the substrate by a nozzle unit (32) provided to surround a lens (191), the lens being one of a plurality of optical elements of the projection optical system and being arranged closest to an image surface,

wherein the substrate is exposed with the illumination light via the projection optical system and the liquid of the immersion area, and

wherein the grating members are arranged outside the nozzle unit.

11. The exposure method according to claim 10,

wherein the nozzle unit includes a supply port of the liquid, a recovery port of the liquid, and an opening through which the illumination light passes, and

wherein liquid is supplied via the supply port to the optical path, and the liquid of the

immersion area is recovered via the recovery port.

12. The exposure method according to claim 10 or 11,

wherein the nozzle unit is provided at another frame member that is different from the frame member.

13. The exposure method according to claim 10 or 11,

wherein the nozzle unit is provided at the frame member.

14. The exposure method according to any one of claims 10 to 13,

wherein the holder is arranged within a recess of an upper surface of the stage, and

wherein the substrate is held in the recess such that a surface of the substrate is substantially flush with the upper surface of the stage.

15. A device manufacturing method comprising:

exposing a substrate (WST) by using the exposure method according to any one of claims 8 to 14; and

developing the exposed substrate.