Claims

1. An imprint apparatus configured to bring an imprinting material on a substrate and a mold into contact with each other to form a pattern of the imprinting material, the apparatus comprising an alignment unit that aligns the mold and the substrate on the basis of a result of a mark detection detecting a light from a first mold-side mark and a second mold-side mark that are formed on the mold, a first substrate-side mark and a second substrate-side mark that are formed on the substrate with a single field of view using an image pickup element,

wherein the alignment unit compares, with a threshold, a difference between a first amount of positional deviation, in a predetermined direction, between the first mold-side mark and the first substrate-side mark and a second amount of positional deviation, in the predetermined direction, between the second mold-side mark and the second substrate-side mark or a ratio of the first amount of positional deviation to the second amount of positional deviation, and determines whether the mark detection is abnormal by a magnitude relation between the difference or the ratio and the threshold.

2. The imprint apparatus according to Claim 1, wherein the alignment unit detects the first mold-side mark, the first substrate-side mark, the second mold-side mark, and the second substrate-side mark with the imprinting material being in contact with the pattern on the mold.

3. The imprint apparatus according to Claim 1, wherein the alignment unit comprises a driving unit that drives a substrate holder for holding the substrate and a shape correcting part that corrects a shape of the mold by applying pressure to the mold from an outer circumference thereof, and corrects, by controlling the driving part and the shape correcting part, one or both of a positional deviation and a shape difference between the pattern on the mold and a shot area of the substrate.

4. The imprint apparatus according to Claim 3, wherein the alignment unit corrects, for each shot area from a plurality of shot areas of the substrate, one or both of a positional deviation and the

shape difference between the pattern on the mold and the shot area of the substrate.

5. The imprint apparatus according to Claim 1, wherein a shape of the first mold-side mark and a shape of the second mold-side mark are different from each other, and a shape of the first substrate-side mark and a shape of the second substrate-side mark are different from each other.

6. The imprint apparatus according to Claim 1, wherein the first mold-side mark and the first substrate-side mark are rough detection marks, and the second mold-side mark and the second substrate-side mark are precise detection marks for more accurate measurement than measurement using the rough detection marks.

7. The imprint apparatus according to Claim 6, wherein the precise detection marks are grating-pattern marks that generate a moire fringe, and the second amount of positional deviation is detected with the moire fringe.

8. The imprint apparatus according to Claim 1, wherein a determination threshold used to determine whether the mark detection is abnormal or not is changeable.

9. The imprint apparatus according to Claim 1, wherein, when the alignment unit determines that the mark detection is abnormal, the alignment unit does not use the first amount of positional deviation and the second amount of positional deviation for a calculation of a correction value to correct one or both of a positional deviation and a shape difference between the pattern on the mold and a shot area of the substrate, or minimizes respective influences of the first amount of positional deviation and the second amount of positional deviation on the calculation of the correction value.

10. The imprint apparatus according to Claim 1, wherein, when the alignment unit determines that the mark detection is abnormal, the alignment unit detects another mold-side mark that is different from the first mold-side mark and the second mold-side mark and another substrate-side mark that is different from the first substrate -side mark and the second substrate -side mark.

11. The imprint apparatus according to Claim 6, wherein the first mold-side mark, the first substrate-side mark, the second mold-side mark, and the second substrate-side mark are detected simultaneously with a single image pickup surface of the image pickup element.

12. The imprint apparatus according to Claim 1, wherein, in a case where there are two or more consecutive shot areas in each of which the mark detection has been determined to be abnormal, the alignment unit terminates substrate processing.

13. The imprint apparatus according to Claim 1, wherein the second mold-side mark and the second substrate-side mark are grating-pattern marks that generate a moire fringe, and the alignment unit aligns the mold and the substrate on the basis of a result of a mark detection detecting the moire fringe.

14. An article manufacturing method comprising:

a process of forming a pattern on a substrate by using the imprint apparatus according to Claim 1; and

a process of processing the substrate on which the pattern is formed in the process of forming the pattern.

15. An alignment method for aligning a first object and a second object on the basis of a result of a mark detection detecting a light from a first mark and a second mark that are formed on the first object, a third mark and a fourth mark that are formed on the second object with a single field of view using an image pickup element, the method comprising:

a detection process of detecting a first amount of positional deviation between the first mark and the third mark in a predetermined direction and a second amount of positional deviation between the second mark and the fourth mark in the predetermined direction;

a comparing process of comparing, with a threshold, a difference between a first amount of positional deviation, in a predetermined direction, between the first mark and the third mark and a second amount of positional deviation, in the predetermined direction, between the second mark and

the fourth mark or a ratio of the first amount of positional deviation to the second amount of positional deviation and

a determination process of determining whether the mark detection is abnormal by a magnitude relation between the difference or the ratio and the threshold.

16. The alignment method according to Claim 15, wherein a shape of the first mark and a shape of the second mark are different from each other, and a shape of the third mark and a shape of the fourth mark are different from each other.

17. The alignment method according to Claim 15, wherein the first mark and the third mark are rough detection marks, and the second mark and the fourth mark are precise detection marks for more accurate measurement than measurement using the rough detection marks.

18. The alignment method according to Claim 17, wherein the precise detection marks are grating-pattern marks that generate a moire fringe, and the second amount of positional deviation is detected with the moire fringe.

19. The alignment method according to Claim 15, wherein the first mark, the second mark, the third mark, and the fourth mark are detected simultaneously with a single image pickup surface of the image pickup element.

20. The alignment method according to Claim 15, wherein the second mark and the fourth mark are grating-pattern marks that generate a moire fringe, and the alignment unit aligns the first object and the second object on the basis of a result of a mark detection detecting the moire fringe.

21. A alignment apparatus configured to align a first object and a second object, the apparatus comprising an alignment unit that aligns the first object and the second object on the basis of a result of a mark detection detecting a light from a first mark and a second mark that are formed on the first object, a third mark and a fourth mark that are formed on the second object with a single

field of view using an image pickup element,

wherein the alignment unit compares, with a threshold, a difference between a first amount of positional deviation, in a predetermined direction, between the first mark and the third mark and a second amount of positional deviation, in the predetermined direction, between the second mark and the fourth mark or a ratio of the first amount of positional deviation to the second amount of positional deviation, and determines whether the mark detection is abnormal by a magnitude relation between the difference or the ratio and the threshold.

22. The alignment apparatus according to Claim 21, wherein a shape of the first mark and a shape of the second mark are different from each other, and a shape of the third mark and a shape of the fourth mark are different from each other.

23. The alignment apparatus according to Claim 21, wherein the first mark and the third mark are rough detection marks, and the second mark and the fourth mark are precise detection marks for more accurate measurement than measurement using the rough detection marks.

24. The alignment apparatus according to Claim 23, wherein the precise detection marks are grating-pattern marks that generate a moire fringe, and the second amount of positional deviation is detected with the moire fringe.

25. The alignment apparatus according to Claim 21, wherein the first mark, the second mark, the third mark, and the fourth mark are detected simultaneously with a single image pickup surface of the image pickup element.

26. The alignment apparatus according to Claim 21, wherein the second mark and the fourth mark are grating-pattern marks that generate a moire fringe, and the alignment unit aligns the first object and the second object on the basis of a result of a mark detection detecting the moire fringe.