Claims

1. A method for manufacturing a nonmagnetic substrate, comprising edge surface polishing processing for polishing an edge surface of a plate-like nonmagnetic substrate having a main surface and a side wall surface, wherein

the edge surface polishing processing is processing for polishing the edge surface of the substrate by forming a magnetic field such that magnetic field lines advance in a thickness direction of the substrate using a magnetic field generation means, forming a mass of magnetic functional fluid by causing the magnetic field to hold the magnetic functional fluid containing polishing abrasive particles, bringing the edge surface of the substrate and the mass of the magnetic functional fluid into contact with each other, and moving the substrate and the mass of the magnetic functional fluid relative to each other, and

a shape of the mass of the magnetic functional fluid which has been deformed due to contact with the substrate is modified by bringing a jig into contact with the mass of the magnetic functional fluid such that a pressing force against the substrate is kept constant.

2. A method for manufacturing a nonmagnetic substrate, comprising edge surface polishing processing for polishing an edge surface of a plate-like nonmagnetic substrate having a main surface and a side wall surface, wherein

the edge surface polishing processing is processing for polishing the edge surface of the substrate by forming a magnetic field such that magnetic field lines advance in a thickness direction of the substrate using a magnetic field generation means, forming a mass of magnetic functional fluid by causing the magnetic field to hold the magnetic functional fluid containing polishing abrasive particles, bringing the edge surface of the substrate and the mass of the magnetic functional fluid into contact with each other, and moving the substrate and the mass of the magnetic functional fluid relative to each other, and

the mass of the magnetic functional fluid which has been deformed due to contact with the substrate is caused to move by bringing a jig into contact with the mass of the magnetic functional fluid, thereby modifying the shape of the mass of the magnetic functional fluid.

3. A method for manufacturing a nonmagnetic substrate, comprising edge surface polishing processing for polishing an edge surface of a plate-like nonmagnetic substrate having a main surface and a side wall surface, wherein

the edge surface polishing processing is processing for polishing the edge surface of the substrate by forming a magnetic field such that magnetic field lines advance in a thickness direction of the substrate using a magnetic field generation means, forming a mass of magnetic functional fluid by causing the magnetic field to hold the magnetic functional fluid containing polishing abrasive particles, bringing the edge surface of the substrate and the mass of the magnetic functional fluid into contact with each other, and moving the substrate and the mass of the magnetic functional fluid relative to each other, and

a shape of the mass of the magnetic functional fluid which has been deformed due to contact with the substrate is modified by bringing a jig into contact with the mass of the magnetic functional fluid so as to recover an original shape.

4. A method for manufacturing a nonmagnetic substrate, comprising edge surface polishing processing for polishing an edge surface of a plate-like nonmagnetic substrate having a main surface and a side wall surface, wherein

the edge surface polishing processing is processing for polishing the edge surface of the substrate by forming a magnetic field such that magnetic field lines advance in a thickness direction of the substrate using a magnetic field generation means, forming a mass of magnetic functional fluid by causing the magnetic field to hold the magnetic functional fluid containing polishing abrasive particles, bringing the edge surface of the substrate and the mass of the magnetic functional fluid into contact with each other, and moving the substrate and the mass of the magnetic functional fluid relative to each other, and

a shape of the mass of the magnetic functional fluid is changed by bringing a jig into contact with the mass of the magnetic functional fluid.

5. The method for manufacturing a nonmagnetic substrate according to any one of claims 1 to 4, wherein the jig is brought into contact with the mass of the magnetic functional fluid by inserting a tip of the jig into the mass of the magnetic functional fluid.

6. The method for manufacturing a nonmagnetic substrate according to any one of claims 1 to 5, wherein the shape of the magnetic functional fluid is modified by supplying an additional mass of the magnetic functional fluid and bringing a jig into contact with the magnetic functional fluid.

7. The method for manufacturing a nonmagnetic substrate according to any one of claims 1 to 6,

wherein the magnetic field generation means includes a pair of magnets disposed in a state in which an N-pole surface and an S-pole surface are disposed apart from each other and facing each other in the thickness direction of the substrate.

8. The method for manufacturing a nonmagnetic substrate according to claim 7, wherein a spacer made of a nonmagnetic material is provided between the N-pole surface and the S-pole surface of the pair of magnets.

9. The method for manufacturing a nonmagnetic substrate according to any one of claims 1 to 8, wherein the substrate has a disk shape having a circular inner hole,

the magnetic field generation means includes an inner circumferential side means that is provided in the inner hole of the substrate and that forms a magnetic field around an inner circumferential edge surface, which is the side wall surface of the inner hole, such that inner circumferential side magnetic field lines advance in the thickness direction of the substrate, and/or an outer circumferential side means that is provided on an outer circumferential side of the substrate and that forms a magnetic field around an outer circumferential edge surface of the substrate such that outer circumferential side magnetic field lines advance in the thickness direction of the substrate, and

the inner circumferential edge surface and/or the outer circumferential edge surface of the substrate are polished in a state in which the mass of the magnetic functional fluid is held by the magnetic fields respectively formed by the inner circumferential side means and/or the outer circumferential side means.

10. The method for manufacturing a nonmagnetic substrate according to any one of claims 1 to 9, wherein the polishing abrasive particles are supplied to the mass of the magnetic functional fluid during the processing for polishing the edge surface of the substrate.

11. A method for manufacturing a nonmagnetic substrate, comprising edge surface polishing processing for polishing an edge surface of a plate-like nonmagnetic substrate having a main surface and a side wall surface, wherein

the edge surface polishing processing is processing for polishing the edge surface of the substrate by forming a magnetic field such that magnetic field lines advance in a thickness direction of the substrate using a magnetic field generation means, holding the magnetic functional fluid containing polishing abrasive particles by the magnetic field so that a mass of the magnetic functional fluid is formed,

bringing the edge surface of the substrate and the mass of the magnetic functional fluid into contact with each other, and moving the substrate and the mass of the magnetic functional fluid relative to each other, and

the polishing the edge surface of the substrate is performed while the polishing abrasive particles are supplied form the outside to the mass of the magnetic functional fluid during the edge surface polishing processing.

12. The method for manufacturing a nonmagnetic substrate according to claim 11, wherein the polishing abrasive particles are supplied by supplying a liquid containing the polishing abrasive particles during the edge surface polishing processing.

13. The method for manufacturing a nonmagnetic substrate according to claim 12, wherein a temperature of the liquid to be supplied during the edge surface polishing processing is less than or equal to room temperature.

14. The method for manufacturing a nonmagnetic substrate according to any one of claims 11 to 13, wherein the polishing abrasive particles are supplied to a position at which the edge surface of the substrate comes into contact with the magnetic functional fluid along a movement direction of the edge surface of the substrate that comes into contact with the magnetic functional fluid.

15. The method for manufacturing a nonmagnetic substrate according to any one of claims 11 to 14, wherein the magnetic field generation means includes a pair of magnets disposed in a state in which an N-pole surface and an S-pole surface are disposed apart from each other and facing each other in the thickness direction of the substrate.

16. The method for manufacturing a nonmagnetic substrate according to claim 15, wherein a spacer made of a nonmagnetic material is provided between the N-pole surface and the S-pole surface of the pair of magnets.

17. The method for manufacturing a nonmagnetic substrate according to any one of claims 11 to 16, wherein

the substrate has a disk shape having a circular inner hole,

the magnetic field generation means includes an inner circumferential side means that is provided in the inner hole of the substrate and that forms a magnetic field around an inner circumferential edge surface, which is the side wall surface of the inner hole, such that inner circumferential side magnetic field lines advance in the thickness direction of the substrate, and/or an outer circumferential side means that is provided on an outer circumferential side of the substrate and that forms a magnetic field around an outer circumferential edge surface of the substrate such that outer circumferential side magnetic field lines advance in the thickness direction of the substrate, and

the inner circumferential edge surface and/or the outer circumferential edge surface of the substrate are polished in a state in which the magnetic functional fluid is held by the magnetic fields respectively formed by the inner circumferential side means and/or the outer circumferential side means.