CLAIMS

1. A method for manufacturing a glass substrate that includes an opening, comprising:

forming a line of an inner circumferential portion and a line of an outer circumferential portion that are irradiated with a laser beam along substantially concentric circles in a surface of a glass blank from which the glass substrate is obtained;

separating a portion on an inner side of the line of the outer circumferential portion of the glass blank and a portion on an outer side of the line of the outer circumferential portion from each other by heating the portion on the outer side of the line of the outer circumferential portion by a radiant heat to cause thermal expansion of the portion on the outer side of the line of the outer circumferential portion relative to the portion on the inner side of the line of the outer circumferential portion and form a gap in the line of the outer circumferential portion; and

separating a portion on an inner side of the line of the inner circumferential portion of the glass blank and a portion on an outer side of the line of the inner circumferential portion from each other by heating the portion on the outer side of the line of the inner circumferential portion by the radiant heat to cause relative thermal expansion of the portion on the outer side of the line of the inner circumferential portion and form a gap in the line of the inner circumferential portion.

2. The method for manufacturing a glass substrate according to claim 1, wherein heating the portion on the outer side of the line of the outer circumferential portion by the radiant heat or heating the portion on the outer side of the line of the inner circumferential portion by the radiant heat is performed in a non-contact manner between a heat sources of the radiant heat and the glass blank.

3. The method for manufacturing a glass substrate according to claim 2, wherein the heat sources are provided on both main surface sides of the glass blank.

4. The method for manufacturing a glass substrate according to any one of claims 1-3, wherein the irradiation of the laser beam is a processing of forming holes intermittently at discrete portions on the line of the inner circumferential portion and the outer circumferential portion.

5. The method for manufacturing a glass substrate according to claim 4, wherein cracks are formed so as to develop from each hole toward adjacent holes.

6. The method for manufacturing a glass substrate according to claim 4 or 5, wherein holes are through-holes.

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

wherein the glass blank has a thickness not larger than 0.6 mm.

8. The method for manufacturing a glass substrate according to any one of claims 1 to 7, further comprising a step of grinding or polishing of the main surfaces of the glass substrate.

9. The method for manufacturing a glass substrate according to any one of claims 1 to 8, wherein the glass substrate that includes an opening is a glass substrate for magnetic disk.

10. A method for manufacturing a magnetic disk, further comprising a step of:

forming at least a magnetic layer on the main surfaces of the glass substrate for a magnetic disk obtained by the method manufacturing a glass substrate according to claim 9.