

SUMMARY OF THE INVENTION

According to an aspect of the present invention, there is provided a method of manufacturing a master carrier for magnetic transfer having a pattern which corresponds to a transfer information for high density recording and is formed of a soft magnetic layer with a track width of 0.3 μm or less, comprising the step of scanning with an electron beam of which a writing diameter is smaller than said width of track, on a same track over plural times, whereby said pattern is written and formed along the whole track width.

According to a further aspect of the present invention, there is provided a method of manufacturing a master carrier for magnetic transfer as defined above, wherein a coefficient is k which satisfies a formula of $W=[n-(n-1)k]d$ is set to be not less than 0 and not more than 0.8, provided that said width of track is W , the number of times for scanning one track is n , the writing diameter of said electron beam is d .

According to a still further aspect of the present invention, there is provided a method of manufacturing a master carrier for magnetic transfer as defined above, further comprising the steps of writing said master carrier for magnetic transfer by illuminating a disc coated with an EB resist while rotating the disc and scanning with an electron beam which has been modulated in accordance with a transfer information and has a writing diameter smaller than the width of track, on a same track over plural times; producing said substrate having an unevenness pattern by mastering based on the writing; and coating a layer of soft magnetic substance on said substrate.

~~master carrier for magnetic transfer having a pattern which~~
corresponds to a transfer information for high density recording and is formed of a soft magnetic layer with a track width of 0.3 μm or less, wherein said pattern is written and formed by scanning with an electron beam of which a writing diameter is smaller than said width of track, on a same track over plural times.

Assuming that said width of track is W , the number of times for scanning one track is n , the writing diameter is d , and a coefficient indicating an overlapping degree of electron beam is k , they have a relationship of $W=[n-(n-1)k]d$, wherein said coefficient k is set to be not less than 0 and not more than 0.8,

~~and preferably not less than 0.2 and not more than 0.8. And, the~~
number of times of scanning n is 2 or more, wherein as the number of times of scanning n is increased and as the writing diameter d is decreased, the shape of pattern approaches to a rectangular shape but the time needed for writing becomes longer.

It is preferable to manufacture said master carrier for magnetic transfer by illuminating a disc coated with an EB resist, while rotating the disc and scanning with an electron beam which has been modulated in accordance with a transfer information and has a writing diameter smaller than the width of track, on a same track over plural times to perform writing, and producing a substrate provided with an unevenness pattern by mastering based on the writing, and then coating a layer of soft magnetic substance on said substrate.

According to the master carrier of the present invention as described in the above, because the pattern, which corresponds to a transfer information for high density recording and is formed of a layer of soft magnetic substance with a width of track of 0.3 μm or less, is written and formed by scanning electron beam ~~having a writing diameter smaller than said width of track on the same track over~~

~~plural times, the end portion of prominence pattern approaches to a rectangular shape rather than a circular arc shape and a fine unevenness pattern is manufactured with a good accuracy, whereby the loss of azimuth of transfer magnetic field can be reduced at the time of magnetic transfer and the quality of transfer signal can be enhanced by transferring and recording a distinct magnetic pattern.~~

BRIEF DESCRIPTION OF THE DRAWINGS

The embodiments of the present invention will be explained with reference to the accompanying drawings, in which:

Fig.1 illustrates steps of magnetic transfer method using a master carrier according to one embodiment of the present invention;

Fig. 2 is a schematic view showing the writing of prominence pattern of *the* master carrier;

Fig. 3 is a cross sectional view showing an example of manufacturing process of the master carrier; and

Fig. 4 is a schematic view showing the writing of prominence pattern of master carrier according to another embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Herein below, embodiments of the present invention will be described in detail. Fig. 1 shows an example of magnetic transfer method using a master carrier according to one embodiment of the present invention. Fig. 2 is a schematic view showing the writing of prominence pattern of the master carrier and Fig. 3 is a cross sectional view showing an example of manufacturing process of the master carrier* The mode shown in Fig. 1 is an inplane recording method. Each of figures is a schematic view and the size of each part is depicted in a