[0050] **FIG. 14** is a graph showing the change of the characteristic value of the magnetoresistive transfer curve when the thickness of the magnetic domain control film is changed in Embodiment 4 of the present invention. It shows cases of application of the structure according to the present invention and the existent structure.

[0051] **FIG. 15** is a schematic view of a magnetic head structure when a reading sensor provided in Embodiment 5 of the present invention is formed and then a writing head is formed to manufacture a magnetic head for demonstrating the present invention.

[0052] **FIG. 16** is a schematic cross sectional view of Embodiment 6 of the present invention.

[0053] **FIG. 17** is a schematic cross sectional view of Embodiment 7 of the present invention.

[0054] The following table includes a description of reference numerals.

| | |
|---|---|
| 1 | lower shield layer |
| 2 | lower gap layer |
| 3 | under layer of a stack of magnetoresistive layers |
| 4 | anti-ferromagnetic layer constituting a pinned layer |
| 4U | anti-ferromagnetic layer disposed on an upper portion of a free layer constituting a pinned layer |
| 5 | ferromagnetic layer constituting a pinned layer |
| 5U | ferromagnetic layer constituting a pinned layer disposed on the upper portion of a free layer |
| 6 | non-magnetic layer |
| 6U | non-magnetic layer disposed on the upper portion of a free layer |
| 7 | free layer |
| 8 | protection layer |
| 9 | magnetic domain control film amorphous layer |
| 10 | magnetic domain control film underlayer |
| 11 | magnetic domain control film layer |
| 12 | electrode film layer |
| 13 | upper gap layer |
| 14 | upper shield layer |
| 15 | vertical position of the lower surface of a free layer |
| 16 | vertical position of the upper surface of a free layer |
| 17 | vertical position of the lower surface of a magnetic domain control film at a position near the end of the stack of magnetoresistive layers |
| 18 | vertical position of the upper surface of a magnetic domain control film at a position near the end of the stack of magnetoresistive layers |
| 19 | central height of a free layer |
| 20 | central height of a magnetic domain control film at a position near the end of a stack of magnetoresistive layers |
| 21 | lower portion of lift-off resist |
| 22 | upper portion of lift-off resist |
| 23 | re-deposition film in ion milling step |
| 24 | re-deposition film in magnetic domain control layer deposition step |
| 34 | lower shield |
| 35 | insulative layer |
| 36 | stack of magnetoresistive layers |
| 37 | insulative layer |
| 38 | upper shield |
| 39 | insulative layer |
| 40a | lower magnetic pole |
| 40b | lower magnetic pole protrusion |
| 41a | upper magnetic pole 1 |
| 41b | upper magnetic pole 2 |
| 42 | coil |
| Portion A | end of a stack of magnetoresistive layers |
| Twf | track width of a free layer |
| α | angle at the end of a free layer |
| S | gap distance between end of free layer and a magnetic control film |
| Blank arrow H | magnetization direction of magnetic domain control film |
| Gray arrow Hd | demagnetization direction generated in magnetic domain control film |
| "+" and "−" symbols | magnetic charges generated due to tapered shape of magnetic domain control film |
| arrow | schematic view for magnetic fluxes generated from the end of the magnetic domain control film |

## DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

[0055] **FIG. 1** shows a schematic cross sectional structural view showing the structure of the present invention. In the existent structure (**FIG. 3**), the stack of magnetoresistive layers has a shape etched as far as the lower gap layer **2** by ion beam etching, whereas etching is conducted only as far as an anti-ferromagnetic layer **4** of a pinned layer **5** for aligning the respective vertical positions of a free layer **7** and a magnetic domain control film **11** in the structure of the present invention. For the ion beam etched surface of the stack of magnetoresistive layers, the surface of the anti-ferromagnetic body **4** constituting the pinned layer **5** is exposed, while the surface for each of the layers constituting the stack of magnetoresistive layers, that is, the fixed layer ferromagnetic layer **5**, the non-magnetic layer **6**, the free layer **7** and a protection layer **8** is exposed on an inclined surface, and a magnetic domain control amorphous layer **9** is formed on the exposed surfaces thereof. In this case, the amorphous thin film desirably has a structure of covering the surface of the inclined portion (refer to the lower view of **FIG. 1**). Then, the magnetic domain control under layer **10**, a magnetic domain control layer **11** and the electrode film layer **12** are formed in the structure. Further, it is constituted in this case that the respective central heights **19**, **20** of the free layer **7** and the ferromagnetic layer of the magnetic domain control film **11** formed to the end of the free layer are adjusted to identical or substantially identical levels. Further, it may also be constituted such that the central height **20** of the magnetic domain control film **11** is within a range from the lower surface height **15** and the upper surface height **16** of the free layer **7**, or such that the central height **19** of the free layer **7** is within a range between the lower surface height **17** of the magnetic domain control film **11** and the upper surface height **18** of an indent near the stack of magnetoresistive layers.

[0056] **FIG. 2** is a view showing a structure that can be manufactured basically by the same order for the layer constitution which has a shape aligning the lower surface position **15** of the free layer **7** with the lower surface position **17** of the magnetic domain control film **11** and, further, a bias magnetic field is localized more by constituting the thickness of the magnetic domain control film **11** less than that of the free layer **7** thereby making it possible to apply a more appropriate bias magnetic field to the free layer **7**. Further,