[0064] **FIG. 14** shows a schematic diagram of the flux guide type yoke structure and the magnetic domain control thereof. The surface viewed from the XY side in the diagram is the media-opposed surface. On the magnetoresistive sensor layer disposed on the lower shield **1002** so as to be recessed, is formed a soft magnetic layer made of, for example, Ni89Fe19, as indicated by **1401**, having a shape, which extends from the position exposed from the media-opposed surface onto the magnetoresistive sensor layer, is in contact with the surface opposite the media-opposed surface of the magnetoresistive sensor layer, and extends to a depth direction Z. This layer guides the magnetic flux from the recording media to the magnetoresistive sensor layer, and is called a flux guide. In order to magnetic domain-control this flux guide layer, in the process of forming the magnetoresistive sensor layer, ion milling, patterning, forming the flux guide layer **1401**, and forming the magnetic domain control layer **1001**, the magnetic domain control material having high electric resistivity of the present invention is used as the magnetic domain control layer **1001** to give the following advantages. Conventionally, the insulating protective layer must be formed in the track width direction of the magnetoresistive sensor layer. In the present invention, even when the magnetic domain control layer is formed directly, magnetic domain control is possible without shunting. In the flux guide type yoke structure, it is also possible to magnetic domain-control the magnetoresistive sensor layer together with the flux guide type yoke.

[0065] As shown in **FIGS. 15 and 16**, in order to increase an amount of the magnetic flux sensed by the magnetoresistive sensor layer, the portion in contact with the magnetoresistive sensor layer of the yoke is discontinuous. In such a structure, the material of the magnetic domain control layer is a layer having high electric resistivity so as to form the magnetic domain control layer of the present invention. Examples of arrangement of the magnetic domain control layer of the yoke structure of this embodiment are shown in **FIGS. 17 and 18**.

Example 6

[0066] **FIG. 19** is a diagram showing the magnetic disk apparatus of one embodiment using the magnetic head mounting the magnetoresistive sensor according to the present invention.

[0067] The magnetic disk apparatus illustrated comprises a magnetic disk **1901** as a magnetic recording media formed in disk form for recording data in a recording region called a concentric track and a magnetic transducer, a magnetic head **1906** comprising a magnetic transducer, reading and writing the data and mounting the magnetoresistive sensor according to the present invention (in detail, comprising a magnetic head **1910** and a slider **1909**), actuator means **1911** for supporting the magnetic head **1906** to move it to a predetermined position on the magnetic disk **1901**, and control means for controlling transmission and receive of data by read and written by the magnetic head and movement of the actuator means.

[0068] The structure and operation will be described below. At least one rotatable magnetic disk **1901** is supported by a rotation axis **1902**, and is rotated by the drive motor **1903**. At least one slider **1909** is placed on the magnetic disk **1901**, one or more sliders **1909** are disposed, and support the magnetic head **1910** according to the present invention for read and write.

[0069] The magnetic disk **1901** is rotated, and at the same time, the magnetic head **1906** is moved on the disk surface for access to a predetermined position in which data to be desired are recorded. The magnetic head **1906** is provided on an arm **1908** by a gimbal **1907**. The gimbal **1907** has slight elasticity and brings the magnetic head **1906** into contact with the magnetic disk **1901**. The arm **1908** is mounted on the actuator **1911**.

[0070] There is a voice coil motor (hereinafter referred to as VCM) as the actuator **1911**. VCM consists of a movable coil placed in the magnetic field fixed, and the movement direction and movement speed of the coil are controlled by an electric signal given from the control means **1912** through a line **1904**. The actuator means of this embodiment comprises, for example, the magnetic head **1906**, the gimbal **1907**, the arm **1908**, the actuator **1911** and the line **1904**.

[0071] During operation of the magnetic disk, the magnetic disk **1101** is rotated to cause air bearing due to air flow between the magnetic head **1906** and the disk surface, which lifts the magnetic head **1906** from the surface of the magnetic disk **1901**. During operation of the magnetic disk apparatus, the air bearing is balanced with the slight elasticity of the gimbal **1907**, the magnetic head **1906** is not in contact with the magnetic disk surface, and is maintained so as to be lifted from the magnetic disk **1901** at a constant interval.

[0072] The control means **1912** generally comprises a logic circuit, memory, and microprocessor. The control means **1912** transmits and receives a control signal through each line, and controls various structure means of the magnetic disk apparatus. For example, the motor **1903** is controlled by a motor driven signal transmitted through the line **1904**.

[0073] The actuator **1911** is controlled so as to optimally move and position, by means of a head position control signal and a seek control signal through the line **1904**, the magnetic head **1906** selected to a data track to be desired on the magnetic disk **1901** associated therewith.

[0074] The magnetic head **1910** reads data on the magnetic disk **1901** so as to convert the data to an electric signal. The control signal receives and decodes the electric signal through the line **1904**. In addition, an electric signal written as data to the magnetic disk **1901** is transmitted through the line **1904** to the magnetic head **1910**. In other words, the control means **1912** controls transmission and receive of information read or written by the magnetic head **1910**.

[0075] The read and write signals described above permit means directly transmitted from the magnetic head **1910**. There are, for example, an access control signal and a clock signal as the control signal. The magnetic disk apparatus may have a plurality of magnetic disks and actuators, and the actuator may have a plurality of magnetic heads.

[0076] Such plurality of mechanisms are provided, so as to form the so-called disk array apparatus.

[0077] In this apparatus, the magnetoresistive sensor of the present invention is used as the magnetoresistive sensor of the magnetic head. It is thus possible to improve reproducing resolution of the apparatus according to improved performance of the magnetoresistive sensor.