[0297] The direction of the sum of the magnetic moments of the first free magnetic layer **85** and the second free magnetic layer **87** becomes the magnetization direction of the free magnetic layer F. However, those which directly contribute to the reproduction output are a relative angle made between the second pinned magnetic layer **83** and the first free magnetic layer **85**.

[0298] The hard bias layers **89** and **89** are magnetized in the X direction (i.e., the direction of the track width), and the magnetization direction of the free magnetic layer F is aligned in the X direction under the bias magnetic field in the X direction given by the hard bias layers **89** and **89**.

[0299] The two end portions of the free magnetic layer F, having disturbed magnetization directions, present a poor reproduction gain, and become insensitive regions unable to exhibit no substantial magnetoresistive effect.

[0300] In the eleventh embodiment again, the sensitive region E and the insensitive regions D and D of the multilayer film **201** are measured using the micro track profile method. Referring to **FIG. 11**, the portion having the width dimension T**45** of the multilayer film **201** is the sensitive region E, and the portions, each having the width dimension T**46**, are the insensitive regions D and D.

[0301] In the sensitive region E, the magnetization direction of the pinned magnetic layer P is pinned correctly in a direction parallel to the Y direction, and the magnetization direction of the free magnetic layer F is correctly aligned in the X direction. The pinned magnetic layer P and the free magnetic layer F are thus perpendicular in magnetization direction. The magnetization of the free magnetic layer F varies sensitively in response to an external magnetic field from the recording medium. An electrical resistance varies in accordance with the relationship between the variation in the magnetization direction of the free magnetic layer F and the pinned magnetic field of the pinned magnetic layer P. A leakage magnetic field from the recording medium is thus detected in response to a variation in voltage due to the electrical resistance variation. However, those which directly contribute to the variation in the electrical resistance (i.e., the reproduction output) are a relative angle made between the magnetization direction of the second pinned magnetic layer **83** and the magnetization direction of the first free magnetic layer **85**. These magnetization directions are preferably perpendicular with a sense current conducted in the absence of a signal magnetic field.

[0302] Electrode layers **91** and **91**, formed on both sides of the multilayer film **201**, extend over the multilayer film **201**. The width dimension of the top layer of the multilayer film **201** not covered with the electrode layers **91** and **91** is the optical read track width O-Tw.

[0303] The magnetic read track width M-Tw, determined by the width dimension of the sensitive region E not covered with the electrode layers **91** and **91**, is a width dimension T**45**, which is also the dimension of the sensitive region E.

[0304] In this embodiment, the electrode layers **91** and **91** formed above the multilayer film **201** fully cover the insensitive regions D and D, setting the optical read track width O-Tw and the magnetic read track width M-Tw (i.e., the width dimension of the sensitive region E) to approximately the same dimension.

[0305] It is not a requirement that the electrode layers **91** and **91** formed above the multilayer film **201** fully cover the insensitive regions D and D, and the electrode layer **91** may be narrower than the insensitive region D. In this case, the optical read track width O-Tw becomes larger than the magnetic read track width M-Tw.

[0306] The percentage of the sense current flowing from the electrode **91** to the multilayer film **201** without passing through the hard bias layers **89** and **89** is increased.

[0307] The electrode layers **91** and **91** respectively extending over the insensitive regions D and D prevent the sense current from flowing into the insensitive regions D and D, thereby controlling the generation of noise.

[0308] Referring to **FIG. 11**, the width dimension T**47** of each of the electrode layers **91** and **91** extending over the insensitive region D of the multilayer film **201** preferably falls within a range from 0 μm to 0.08 μm. More preferably, the width dimension T**47** of each of the electrode layers **91** and **91** falls within a range from 0.05 μm to 0.08 μm.

[0309] The angle θ**11** made between the top surface of the multilayer film **201** with the protective layer **15** removed, namely, the top surface **87***a* of the second free magnetic layer **87** in **FIG. 11**, and an end face **91***a* of the electrode layer **91** extending over the insensitive region of the multilayer film **201** is preferably 20 degrees or greater, and more preferably 25 degrees or greater. This arrangement prevents the sense current from shunting into the insensitive region, thereby controlling the generation of noise.

[0310] If the angle θ**11** made between the top surface **87***a* and the end face **91***a* is too large, a short is likely to occur between the electrode layers **91** and **91** and a top shield layer of a soft magnetic material when the top shield layer is deposited over the protective layer **15** and the electrode layers **91** and **91**. The angle θ**11** made between the top surface **87***a* and the end face **91***a* is preferably 60 degrees or smaller, and more preferably, 45 degrees or smaller.

[0311] Referring to **FIG. 11, a** magnetic coupling junction M between the multilayer film **201** and each of the hard bias layers **89** and **89** is fabricated of an interface with the end face of only the first free magnetic layer **85**, of both the first free magnetic layer **85** and the second free magnetic layer **87**.

[0312] It is sufficient if the hard bias layers **89** and **89** are aligned with the magnetization direction of one of the first free magnetic layer **85** and the second free magnetic layer **87**. If the magnetization direction of one of the free magnetic layers is aligned in one direction, another free magnetic layer adjacent thereto is put into a ferrimagnetic state with a magnetization direction thereof being antiparallel. The direction of the sum of the magnetic moments of the first and second free magnetic layers is aligned in a certain direction, namely, the direction of the track width in **FIG. 11**.

[0313] If the hard bias layers **89** and **89** are magnetically coupled with each of the first free magnetic layer **85** and the second free magnetic layer **87**, the first free magnetic layer **85** and the second free magnetic layer **87** suffer from a larger magnetization direction disturbance on end portions thereof. However, the construction shown in **FIG. 11** controls the magnetization direction disturbance on both end portions of