into the sensitive region E that substantially exhibits the magnetoresistive effect, rather than flowing into the insensitive regions D and D. The reproduction output is even more increased.

[0592] Particularly when the optical read track width O-Tw and the width dimension T2 (i.e., the magnetic read track width M-Tw) of the sensitive region E are set to be approximately the same dimension, the sense current more easily flows into the sensitive region E, thereby further improving the reproduction characteristics.

[0593] Although the electrode layers **318** and **318** fully cover the insensitive regions D and D in the twentieth embodiment shown in **FIG. 35**, it is not a requirement that the electrode layers **318** and **318** fully cover the insensitive regions D and D. The insensitive regions D and D may be partly exposed. In this case, the optical read track width O-Tw becomes larger than the width dimension T2 of the sensitive region E (the magnetic read track width M-Tw).

[0594] However, the electrode layers **318** and **318** formed to extend over the multilayer film **316** must not extend into the sensitive region E.

[0595] The sense current flows out, chiefly from the tip of the electrode layer **318** extending over the multilayer film **316**. When the electrode layers **318** and **318** are formed on the sensitive region E that substantially exhibits the magnetoresistive effect, the area of the sensitive region E covered with the electrode layer **18** permits the sense current to less flow. The sensitive region E that presents an otherwise excellent magnetoresistive effect is partly degraded, and a drop in the reproduction output occurs. Since the area of the sensitive region E-covered with the electrode layer **318** still has some sensitivity, a variation in the magnetoresistance occurs in both ends of the magnetic read track width M-Tw, inconveniently generating noise.

[0596] **FIG. 36** shows a multilayer film **322** in a spin-valve type thin-film device of a twenty-first embodiment of the present invention shown in **FIG. 36**, in which the order of the lamination of the multilayer film **316** of the spin-valve type thin-film device shown in **FIG. 35** is inverted. Specifically, a free magnetic layer **314**, a nonmagnetic electrically conductive layer **313**, a pinned magnetic layer **312**, and an antiferromagnetic layer **320** are successively laminated from the substrate **319** as shown in **FIG. 36**.

[0597] In the twenty-first embodiment, the free magnetic layer **314** of the multilayer film **322** shown in **FIG. 36** is formed below the antiferromagnetic layer **320**, and is in contact with the thick portion of the hard bias layers **317** and **317**. The magnetization of the free magnetic layer **314** is thus easily aligned in the X direction. The generation of Barkhausen noise is thus controlled.

[0598] In the twenty-first embodiment, again, the intermediate layers **321** and **321**, made of a high-resistivity material having a resistance higher than that of the electrode layers **318** and **318** or an insulating material, are interposed between the hard bias layers **317** and **317** and the electrode layers **318** and **318**, and the shunting of the sense current from the electrode layer **318** into the hard bias layer **317** is controlled. As in the magnetoresistive-effect device shown in **FIG. 35**, the nonmagnetic material layers **323** and **324**, made of Ta, may be laminated under and over the intermediate layer **321**.

[0599] The electrode layers **318** and **318** are formed to extend over the multilayer film **322**, specifically extends over the insensitive region D of the multilayer film **322** by a width dimension of T5.

[0600] In the twenty-first embodiment, the multilayer film **322** is produced by successively laminating the free magnetic layer **314**, the nonmagnetic electrically conductive layer **313**, the pinned magnetic layer **312**, and the antiferromagnetic layer **320** in that order from below. The sense current flowing to the nonmagnetic electrically conductive layer **313** from the electrode layer **318** formed on the multilayer film **322** is also shunted to the pinned magnetic layer **312** and the antiferromagnetic layer **320**, formed over the nonmagnetic electrically conductive layer **313**. The sense current flowing into the nonmagnetic electrically conductive layer **313** can be reduced from the one flowing in the magnetoresistive-effect device of **FIG. 35** in which the free magnetic layer **314** only is formed over the nonmagnetic electrically conductive layer **313**.

[0601] In the twenty-first embodiment, however, the intermediate layers **321** and **321**, formed between the hard bias layers **317** and **317** and the electrode layers **318** and **318**, control the sense current shunting into the hard bias layer **317**. With the electrode layers **318** and **318** extending over the multilayer film **322**, the sense current directly flows from the electrode layer **318** to the multilayer film **322**. Furthermore, since the electrode layers **318** and **318** extend over the insensitive regions D and D, the sense current is allowed to predominantly flow into the sensitive region E. The magnetoresistive-effect device of this embodiment results in a high reproduction gain and a high reproduction output, compared with the conventional magnetoresistive-effect device shown in **FIG. 33**, in which the multilayer film **9** is produced by successively laminating the free magnetic layer **4**, the nonmagnetic conductive layer **3**, the pinned magnetic layer **2** and the antiferromagnetic layer **1** in that order from below.

[0602] The use of the thin electrode layer **318**, having a thickness of h**5**, formed in contact with the multilayer film **322** reduces the size of a step between the top surface of the electrode layer **318** and the top surface of the multilayer film **322**. This arrangement allows an upper gap layer **379** to be formed over the border area between the electrode layer **318** and the multilayer film **322** with an improved step coverage and with no film discontinuity involved, and provides sufficient insulation.

[0603] **FIG. 37** is a cross-sectional view showing the construction of the magnetoresistive-effect device of a twenty-second embodiment of the present invention, viewed from an ABS side thereof.

[0604] In a spin-valve type thin-film device shown in **FIG. 37**, an antiferromagnetic layer **330** is formed over and along a substrate **319** in the X direction, and has a projected portion having a height dl on the center thereof. Laminated on the projected portion of the antiferromagnetic layer **330** are a pinned magnetic layer **331**, a nonmagnetic electrically conductive layer **332**, a free magnetic layer **333**, and a protective layer **315** to form a multilayer film **335**.

[0605] The antiferromagnetic layer **330** is made of a Pt—Mn (platinum-manganese) alloy. Instead of the Pt—Mn alloy, the antiferromagnetic layer **330** may be made of an