SPECIFICATION

A disc case

FIELD OF THE INVENTION

The present invention relates to a disc case capable of accommodating a disc-shaped signal recording medium, such as a magnetic disc or an optical disc.

RELATED ART OF THE INVENTION

A conventional disc case disclosed in Japanese Utility Model No. Hei 6-2132 is described below referring to FIG. 31, a perspective view showing the conventional disc. The main unit of a disc case 80 comprises an upper half 81 and a lower half 82 so as to form a disc accommodation chamber 87. The upper half 81 and the lower half 82 of the main unit of the disc case 80 are each provided with an opening 85 (see FIG. 32). In addition, the main unit of the disc case 80 is provided with a shutter 83 being slidable in the direction indicated by arrow F or G. The shutter 83 covers the openings 85 formed in the disc case 80. The openings 85 are formed (1) so that a chucking member (including a disc table) can externally pressure-contact a disc 86 accommodated inside and (2) so that an optical head can gain access to the signal recording surface of the disc 86. The openings 85 communicate with the accommodation chamber 87 accommodating the disc 86.

In case the shutter 83 covers the openings 85 as shown in FIG. 31, a pair of engagement holes 84 provided in the shutter 83 engage a pair of elastic pawls 88 (see FIG. 32) provided on the main unit 80 so as to prevent the shutter 83 from sliding in direction F or G.

The following describe a condition when the shutter 83 is opened to expose the opening 85. In order to release the elastic pawl 88 engaging one of the engagement holes 84, an engagement release member (release pin) (not shown) is inserted into the engagement hole 84. While being kept inserted in the engagement hole 84, the engagement release member is slid toward the other engagement hole 84, thereby opening the shutter 83.

The shutter 83 being opened in this condition is closed as described below. The engagement release member remains inserted in the above-mentioned engagement hole 84. When the engagement release member is moved to its original position from this condition, the shutter 83 covers the exposed openings 85. After the shutter 83 covers the openings 85, the engagement release member is extracted from the engagement hole 84;instead of the engagement release member, the elastic pawl 88 engages the engagement hole 84 so as to restore the lock condition.

The above-mentioned opening/closing operation of the shutter 83 is performed when the disc case 80 is inserted into

or taken out of a signal recording and/or reproducing apparatus (player).

Consequently, the shutter can be opened and closed positively.

However, since the above-mentioned conventional disc case is not dustproof sufficiently, there is the danger of entry of dust into the accommodation chamber. More specifically, a concave portion 89 is formed in the range from the opening 85 to the front fringe portion of the case so as to decrease the amount of movement when the disc is dropped onto a disc table. Therefore, dust entered from the engagement holes 84 formed in the shutter 83 to the interior of the disc case 80 can further enter the accommodation chamber 87 via the concave portion 89.

DISCLOSURE OF THE INVENTION

Accordingly, in consideration of the above-mentioned problem, a first object of the present invention is to provide a disc case capable of protecting the disc accommodation chamber thereof from dust.

Furthermore, since a conventional disc case can be set in a player only in one direction, the back-and-forth direction or the lateral direction of the case, the case has a low degree of freedom.

Accordingly, a second object of the present invention is

to provide a disc case capable of being set into a player both in the back-and-forth direction and in the lateral direction.

To achieve the first object, the present invention provides a disc case comprising:

the main unit of a case provided with:

(a) an accommodation chamber capable of rotatably accommodating a disc having a signal recording surface on at least one side thereof,

(b) support member access openings provided in the top and bottom walls of the accommodation chamber so that a chucking member can externally pressure-contact the disc,

(c) a head access opening formed in the top or bottom wall of the accommodation chamber and being tangent to the side wall surface of the accommodation chamber so that a head for reading and/or recording signals on the signal recording surface can gain access to the disc, and

(d) a concave portion formed in the range from the side wall surface at the head access opening to the front fringe portion side of the main unit of the case and being concave with respect to the top or bottom surface of the main unit of the case,

a shutter installed on the main unit of the case so as to cover the support member access openings, the head access opening and the concave portion when closed, and so as to expose the support member access openings and the head access opening

by sliding in at least one direction from the covering position along the front fringe portion of the main unit of the case when open, and

a shielding portion provided on the main unit of the case so as to shield all or part of passages communicating with the accommodation chamber via the concave portion from areas which are not covered with the shutter even when the shutter is closed.

In addition, to achieve the second object, the present invention provides a disc case comprising:

the main unit of a case provided with an accommodation chamber capable of rotatably accommodating a disc, support member access openings provided in the accommodation chamber so that a chucking member can externally pressure-contact the disc, and a head access opening formed in the accommodation chamber so that a head for reading and/or recording signals can gain access to the disc, and

a shutter installed on the main unit of the case so as to cover the support member access openings and the head access opening when closed, and so as to expose the support member access openings and the head access opening by sliding in at least one direction along the front fringe portion of the main unit of the case when open,

wherein the forefront fringe portion of the shutter protrudes further forward than the forefront fringe portion

of the main unit of the case.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view showing a disc case in accordance with an embodiment of the present invention;

FIG. 2 is a perspective view showing parts constituting the disc case in accordance with the embodiment of the present invention;

FIG. 3 is a perspective view showing the outer surface of an upper half 12;

FIG. 4 is an enlarged perspective view mainly showing the bridge portion of the outer surface of the upper half 12;

FIG. 5 is a perspective view showing the inner surface of the upper half 12 constituting the upper half of an accommodation chamber 18;

FIG. 6 is a perspective view showing the inner surface of a lower half 13 constituting the lower half of the accommodation chamber 18;

FIG. 7 is a perspective view showing the outer surface of the lower half 13 constituting the lower half of the accommodation chamber 18;

FIG. 8 is a half vertical sectional view showing a disc case 10 accommodating a disc 11;

FIG. 9 is a perspective view showing the disc case 10 accommodating the disc 11 exclusive of a shutter, a spring and slide members;

FIG. 10 is a perspective view mainly showing the bridge portion of the disc case shown in FIG. 9;

FIG. 11 is a partially cutaway view showing a shutter 14;

FIG. 12 (A) is a perspective view showing a left slide member 15-L; FIG. 12 (B) is a sectional view taken on line B-B of FIG. 6; and FIG. 12 (C) is a magnified view taken near the left slide member 15-L when the shutter 14 covers an upper opening 22, a lower opening 28 and the like;

FIG. 13 (A) is a perspective view showing a right slide member 15-R; FIG. 13 (B) is a sectional view taken on line C-C of FIG. 6; and FIG. 13 (C) is a magnified view taken near the right slide member 15-R when the shutter 14 covers the upper opening 22, the lower opening 28 and the like;

FIG. 14 is a sectional view taken on line A-A of FIG. 6;

FIG. 15 (A) is a view showing a condition wherein the shutter 14 of the disc case 10 is closed; and FIG. 15 (B) is a view showing a condition wherein the shutter 14 of the disc case 10 is open;

FIG. 16 (A) is a view showing a condition wherein the shutter 14 of the disc case 10 is closed; and FIG. 16 (B) is a view showing a condition wherein the shutter 14 of the disc case 10 is open;

FIG. 17 (A) is a perspective view showing the shutter 14 positioned to cover the upper opening 22 and the like of the disc case 10; FIG. 17 (B) is a view taken on line D-D of FIG.

17 (A); and FIG. 17 (C) is a view taken on line E-E of FIG. 17 (A);

FIG. 18 a perspective view showing a disc case 10 provided with a left driven hole 40-L and a right driven hole 40-R at the center in the thickness direction of the shutter 14;

FIG. 19 is a perspective view showing a disc case in accordance with a first embodiment of other embodiments of the present invention;

FIG. 20 is a perspective view showing the case shown in FIG. 19 with the shutter open;

FIG. 21 is a plan view showing the disc case shown in FIG. 19;

FIG. 22 is a perspective view showing a case holder for the disc case of the first embodiment of the other embodiments of the present invention;

FIG. 23 is a perspective view showing a condition wherein the disc case of the first embodiment of the other embodiments is set in the holder shown in FIG. 22;

FIG. 24 is a perspective view showing another case holder for the disc case of the first embodiment of the other embodiments of the present invention;

FIG. 25 is a perspective view showing a condition wherein the disc case of the first embodiment of the other embodiments of the present invention is set in the case holder shown in FIG. 24;

FIG. 26 is a perspective view showing a disc case in accordance with a second embodiment of the other embodiments of the present invention;

FIG. 27 is a perspective view showing a condition wherein the shutter of the case shown in FIG. 26 is open;

FIG. 28 is a plan view showing the disc case 10 shown in FIG. 27;

FIG. 29 is a perspective view showing a case holder for the second embodiment of the other embodiments of the present invention;

FIG. 30 is a perspective view showing a condition wherein the disc case shown in FIG. 26 is set in the holder shown in FIG. 29;

FIG. 31 is a perspective view showing a conventional disc case disclosed in Japanese Utility Model No. Hei 6-2132; and

FIG. 32 is a perspective view showing the disc case shown in FIG. 31 exclusive of a shutter, a spring and slide members.

(EXPLANATION OF REFERENCE CODES)

10 Disc case 11 Disc 12 Upper half 13 Lower half

14 Shutter 15-L Left slide member 15-R Right slide member

16 Spring 17 Write protector 18 Accommodation chamber

19 Upper accommodation chamber 10 Top wall

21 Upper side surface 22 Upper opening

23 Upper concave portion 24 Upper front fringe portion

25 Lower accommodation chamber 26 Bottom surface

27 Lower side surface 28 Lower opening

29 Lower concave portion 30 Lower front fringe portion

31 Upper center end portion 32 Lower center end portion

33 Upper bridge portion 34 Upper surface

35 Lower bridge portion 36 Lower surface

37 Upper cover portion 38 Lower cover portion

39 Side wall portion 40-L Left driven hole

40-R Right driven hole 41-L Left driven surface

41-R Right driven surface 42-L Left engagement pawl portion

42-R Right engagement pawl portion

43-L Left engagement support portion

43-R Right engagement support portion 44 Rail

45-L Left fitting portion 45-R Right fitting portion

46 Upper surface 47 Lower surface 48 Engagement surface

49-L Left spring hook portion

50-L Left engagement pawl portion

51-L Left engagement support portion

52-L Left slide fitting portion

52-R Right slide fitting portion 53-L Left groove

54-L Left slide stop surface 55-L Left stop portion

56-L Left restriction groove 56-R Right restriction groove

57-L Left stop surface 57-R Right stop surface

58-L Left locking pawl 58-R Right locking pawl

59-L Left driven hole blocking portion

59-R Right driven hole blocking portion

60-R Right side wall surface

61 Shutter opening/closing means 62 Pin 63 Lower surface

64 Upper end portion 65 Lower end portion 66 Upper cutout

67 Lower cutout 68-L Left back surface

68-R Right back surface 101 Case holder

102 Case guide 103 Case stopper 111 Case holder

112-B, 112-F (112-F1, 112-F2) Case guides

113-B, 113-F Case stoppers 114 Gap

1140 Guide end portion 115 Case holder

116-B, 116-F Left and right case guides

117-F, 117-B Case stoppers 119 Gap

118 Projection 120-R Right fringe portion of upper half

120-R1 Right forefront fringe portion of upper half

120-L Left fringe portion of upper half

120-L1 Left forefront fringe portion of upper half

130-R Right fringe portion of lower half

130-R1 Right forefront fringe portion of lower half

130-L Left fringe portion of lower half

130-L1 Left forefront fringe portion of lower half

140 Shutter 141 Protrusion portion

1410 Forefront fringe portion 142-R Right step

142-L Left step 142-R1, 142-R2 Right step surfaces

142-L1, 142-L2 Left step surfaces

150-R Right slide member 145 Shutter

1451 Forefront fringe portion

145-R, 145-L Shutter corner portions

123-R, 124-L Gaps at right and left corner portions of front fringe portion of main unit of case

610 Shutter opener 611 Pin 612 Arm

613 Torsion spring 614 Positioning projection portion

PREFERRED EMBODIMENTS

Embodiments of the present invention are described below referring to the drawings.

A disc case in accordance with an embodiment of the present invention is described below referring to FIG. 1, a perspective view showing the disc case, and FIG. 2, a perspective view showing parts constituting the disc case. A disc case 10 accommodating a disc 11 shown in FIG. 1 comprises an upper half 12, a lower half 13, a shutter 14, a left slide member 15-L, a right slide member 15-R, a spring 16 and two write protectors 17 as shown in FIG. 2. The left slide member 15-L and the right slide member 15-R are mirror images of each other. In the present invention, the combination of the disc 11 and the case 10 is referred to as a disc cartridge.

Referring to FIG. 1, the upper half 12 and the lower half 13 constituting the main unit of the disc case 10 are each formed into a nearly plate-like rectangular solid by molding synthetic resin. An accommodation chamber 18 is formed in the

disc case 10 so as to rotatably accommodate the disc 11. The disc 11 is an optical disc, and a signal recording surface capable of reading and writing signals is formed on both sides of the disc 11. Whether signals can be written or not on the signal recording surfaces of the disc 11 can be determined depending on the positions of the write protectors 17 corresponding to the signal recording surfaces. The main unit of the case 10 of the present invention comprises the upper half 12, the lower half 13, the left slide member 15-L, the right slide member 15-R, the spring 16 and the two write protectors 17 exclusive of the shutter 14.

The upper half 12 constituting the upper half portion of the accommodation chamber 18 of the disc case 10 in accordance with the present embodiment is described below referring to FIG. 3, a perspective view showing the outer surface of the upper half, FIG. 4, an enlarged perspective view mainly showing the bridge portion 33 of the upper half, and FIG. 5, a perspective view showing the inner surface of the upper half; in addition, the lower half 13 constituting the lower half portion of the accommodation chamber 18 is described below referring to FIG. 6, a perspective view showing the inner surface of the lower half, and FIG. 7, a perspective view showing the outer surface of the lower half. Referring to FIG. 5, on the inner surface side of the upper half 12 constituting the upper half portion of the main unit of the disc case 10,

an upper accommodation chamber 19 is formed as a tray-shaped concave area so as to substantially follow the contour of the disc 11. This upper accommodation chamber 19 constitutes the upper half portion of the accommodation chamber 18. Numeral 20 represents a circular top wall of the upper accommodation chamber 19, and numeral 21 represents a cylindrical upper side surface of the upper accommodation chamber 19. The top wall 20 is partially cut to form an upper opening 22 as described below.

Furthermore, referring to FIG. 6, on the inner surface side (the upper side in FIG. 6) of the lower half 13 constituting the lower half portion of the main unit of the disc case 10, a lower accommodation chamber 25 is formed as a tray-shaped concave area so as to substantially follow the contour of the disc 11. This lower accommodation chamber 25 constitutes the lower half portion of the accommodation chamber 18. Numeral 26 represents a circular bottom wall of the lower accommodation chamber 25, and numeral 27 represents a cylindrical lower side surface of the lower accommodation chamber 25. The bottom wall 26 is partially cut to form a lower opening 28 as described below.

Accordingly, the accommodation chamber 18 is formed by abutting and securing the upper half 12 and the lower half 13 with each other so that the upper side surface 21 of the upper accommodation chamber 19 and the lower side surface 27 of the

lower accommodation chamber 25 form a single cylindrical side surface (the side surface of the entire accommodation chamber 18). In this way, the accommodation chamber 18 comprises the upper accommodation chamber 18 and the lower accommodation chamber 25.

Next, the upper opening 22 of the upper half 12 is described below. Referring to FIGS. 3, 4 and 5, the upper half 12 is provided with the upper opening 22 formed by partially cutting the circular top wall 20 as described above so that a chucking member (including a disc table) can externally pressure-contact the disc 11 and so that an optical head (not shown) for reading and writing signals on the signal recording surface of the disc 11 can gain access to the signal recording surface. The upper opening 22 ranges from the central portion of the top wall 20 to the upper side surface 21 on the side of the upper front fringe portion 24. The shape of the upper opening 22 is described as follows: the upper central portion 31 (P) of the upper opening 22 positioned at the central portion of the top wall 20 is circular, and the portion (Q) of the upper opening 22 ranging from the center of the central portion to the upper side surface 21 on the side of the upper front fringe portion 24 is nearly rectangular.

Furthermore, the lower opening 28 of the lower half 13 is described below. Referring to FIGS. 6 and 7, the lower half 13 is provided with the lower opening 28 formed in the circular

bottom wall 26 as described above so that a chucking member (including a disc table) can externally pressure-contact the disc 11 and so that an optical head for reading and writing signals on the signal recording surface of the disc 11 can gain access to the signal recording surface. The lower opening 28 ranges from the central portion of the bottom wall 26 to the lower side surface 27 on the side of the lower front fringe portion 30. The shape of the lower opening 28 is described as follows: the lower central portion 32 (P') of the lower opening 28 positioned at the central portion of the bottom wall 26 is circular, and the portion (Q') of the lower opening 28 ranging from the center of the central portion to the lower side surface 27 on the side of the lower front fringe portion 30 is nearly rectangular.

The following describe the relationships among the upper opening 22, the lower opening 28, support member access openings and a head access opening in accordance with the present invention. The circular portion formed at the circular upper central portion 31 of the upper opening 22 and the circular portion formed at the circular lower central portion 32 of the lower opening 28 correspond to the support member access openings in the disc case 10 of the present invention, the support member access openings being formed to allow the chucking member to externally pressure-contact the disc. Furthermore, a portion exclusive of a portion

corresponding to the support member access opening from the upper opening 22 or the lower opening 28 corresponds to the head access opening of the present invention.

The concave portion of the present embodiment is described below referring to FIG. 3, a perspective view showing the outer surface of the upper half 12, FIG. 4, a magnified view showing the concave portion of the upper half, FIG. 5, a perspective view showing the inner surface of the upper half, FIG. 8, a vertical sectional perspective view showing the disc case 10 accommodating the disc 11, FIG. 9, a perspective view similar to the assembly drawing of FIG. 1 exclusive of the shutter 14, the slide members 15 and the spring 16, and FIG. 10, a perspective view mainly showing the bridge portion of the disc case shown in FIG. 9. Referring to FIG. 3, the upper bridge portion 33 forming a part of the upper side surface 21 is disposed near the central portion of the upper front fringe portion 24 of the upper half 12. In addition, the upper surface 34 of the upper bridge portion 33 is recessed deeper than the lower (inner) surface of the top wall 20 of the upper half 12 (see the upper bridge portion 33 shown in FIG. 4). Further, a space 24' is formed on the side of the upper front fringe portion 24 from the upper bridge portion 33.

Furthermore, referring to FIGS. 6 and 7, a lower bridge portion 35 forming a part of the circular lower side surface 27 is disposed near the central portion of the lower front

fringe portion 30 of the lower half 13. The lower surface 36 of the lower bridge portion 35 on the outer surface side of the lower half 13 is recessed deeper than the upper (inner) surface of the bottom wall 26 of the lower half 13. In addition, as shown in FIG. 6, a rail 44 is formed on the upper surface (inner surface) of the lower bridge portion 35 near the lower front fringe portion 30. On the front side of the rail 44, a left restriction groove 56-L is formed on the left, and a right restriction groove 56-L is formed on the right. Furthermore, on the upper surface 46 of the rail 44, a left slide fitting portion 52-L, a left fitting portion 45-L, a right fitting portion 45-R and a right slide fitting portion 52-R are disposed in this order from left to right. FIG. 12 (B) is a sectional view taken on line B-B of FIG. 6 and is a sectional perspective view showing the rail 44 in more detail.

The upper concave portion 23 and the lower concave portion 29 in accordance with the present embodiment correspond to the concave portion of the disc case of the present invention. These concave portions are provided so as to decrease a dropping distance when the disc case is loaded into a recording and/or reproducing apparatus (player) and the disc is dropped onto the disc table of the apparatus.

Next, the shutter in accordance with the present embodiment is described below. Referring to FIG. 2, the shutter 14 is formed by molding synthetic resin. The shutter

14 comprises an upper cover portion 37, a lower cover portion 38, both being formed into a nearly rectangular plate-like shape, and a side wall portion 39 disposed at the end portions of the upper cover portion 37 and the lower cover portion 38 so as to connect the upper cover portion 37 to the lower cover portion 38 so that the shutter 14 can cover areas ranging from the upper opening 22 of the upper half 12 to the lower opening 28 of the lower half 13 while covering the upper bridge portion 33 disposed near the central portion of the upper front fringe portion 24 and the lower bridge portion 35 disposed near the central portion of the lower front fringe portion 30.

The shutter 14 is described below in more detail referring to FIG. 11, a partially cutaway view showing the shutter 14. At both ends of the side wall portion 39 of the shutter 14, a left driven hole 40-L and a right driven hole 40-R are formed so that the shutter 14 can be driven by shutter opening/closing means described later. The shutter 14 covering the upper opening 22, the lower opening 28 and the like can be opened when the shutter opening/closing means pushes a right driven surface 41-R, namely one of the side surfaces defining the right driven hole 40-R, in the direction toward the left driven hole 40-L. In the same way, the shutter 14 covering the upper opening 22, the lower opening 28 and the like can be opened when the shutter opening/closing means pushes a left driven surface 41-L (see FIG. 16 (A)), namely one of the side surfaces

defining the left driven hole 40-L, in the direction toward the right driven hole 40-R.

Furthermore, the shutter 14 is equipped with a left engagement pawl portion 42-L and a right engagement pawl portion 42-R having engagement pawls inside and near both ends of the side wall portion 39 of the shutter 14; the shutter 14 is connected to the main unit of the disc case 10 by virtue of the left engagement pawl portion 42-L and the right engagement pawl portion 42-R. The left engagement pawl portion 42-L and the right engagement pawl portion 42-R project from the inside of the side wall portion 39 toward the accommodation chamber 18. Moreover, the left engagement pawl portion 42-L is positioned on the upper side of the left driven hole 40-L, and the right engagement pawl portion 42-R is positioned on the upper side of the right driven hole 40-R. In order to support the connection of the left engagement pawl portion 42-L and the right engagement pawl portion 42-R to the main unit of the disc case 10, the shutter 14 is equipped with a left engagement support portion 43-L and a right engagement support portion 43-R, both being plate-like, inside and near both end portions of the side wall portion 39 of the shutter 14. These left engagement support portion 43-L and the right engagement support portion 43-R project from the inside of the side wall portion 39 toward the accommodation chamber 18; in addition, the left engagement support portion 43-L is

positioned on the lower side of the left driven hole 40-L, and the right engagement support portion 43-R is positioned on the lower side of the right driven hole 40-R.

Among the slide members in accordance with the present embodiment, the left slide member 15-L is first described below referring to FIG. 12 (A), a perspective view showing the left slide member 15-L, FIG. 12 (B), a sectional view taken on line B-B of FIG. 6, and FIG. 12 (C), a magnified view taken near the left slide member 15-L when the shutter 14 covers the upper opening 22, the lower opening 28 and the like. Referring to FIG. 12 (A), the left slide member 15-L is provided with a left spring hook portion 49-L for hooking the spring 16 shown in FIG. 2. In addition, the left slide member 15-L is equipped with a left engagement pawl portion 50-L having an engagement pawl for engaging the main unit of the disc case 10, more specifically an engagement surface 48 (see FIG. 12 (B), and FIG.14, a sectional view taken on line A-A of FIG. 6) of the rail 44 provided near the lower front fringe portion 30 of the lower half 13. Furthermore, the left slide member 15-L is provided with a plate-like left engagement support portion 51-L for supporting the engagement at the left engagement pawl portion 50-L. Moreover, the left slide member 15-L is provided with a left locking pawl 58-L for engaging the left back surface 68-L of the left driven surface 41-L of the left driven hole 40-L formed in the shutter 14 (see FIG. 12 (C) and

FIG. 16 (A)).

In the same way as described above, a right slide member 15-R in accordance with the present embodiment is described below referring to FIG. 13 (A), a perspective view showing the right slide member 15-R, FIG. 13 (B), a sectional view taken on line C-C of FIG. 6, and FIG. 13 (C), a magnified view taken near the right slide member 15-R when the shutter 14 covers the upper opening 22, the lower opening 28 and the like. The right slide member 15-R is also provided with a right spring hook portion 49-R for hooking the spring 16. In addition, the right slide member 15-R is provided with a right engagement pawl portion 50-R for engaging the rail 44 and a plate-like right engagement support portion 51-R for supporting the engagement at the right engagement pawl portion 50-R. Moreover, the right slide member 15-R is also provided with a right locking pawl for engaging the right back surface 68-R of the right driven surface 41-R of the right driven hole 40-R formed in the shutter 14 (see FIGS. 16 (A) and 16 (B)). The other portions of the right slide member are similar to those of the left slide member.

The slide members are provided with shielding portions to prevent dust from entering the accommodation chamber 18. Referring to FIG. 12 (A), the left slide member 15-L is provided with a left driven hole blocking portion 59-L having the shape of a cylindrical side wall and constituting a portion for

blocking the left driven hole 40-L of the shutter 14. In the same way, as shown in FIG. 13 (C), the right slide member 15-R is provided with a right driven hole blocking portion 59-R having the shape of a cylindrical side wall and constituting a portion for blocking the right driven hole 40-R of the shutter 14.

In addition, as shown in FIG. 12 (C), the left slide member 15-L is provided with a left side wall surface 60-L to block a gap generated between the side surface of the shutter 14 near the left driven hole 40-L and a slit S (refer to S in FIG. 10) between the upper front fringe portion 24 and the lower front fringe portion 30. In the same way, the right slide member 15-R is provided with a right side wall surface 60-R to block a gap generated on the side surface of the shutter 14 near the right driven hole 40-R.

The following describe the assembly of all the members of the disc case in accordance with the present embodiment and also describe the functions of the major members thereof.

First, the following describe the incorporation of the slide members into the main unit of the disc case 10. First, before installing the left slide member 15-L and the right slide member 15-R in the main unit of the disc case 10, one end of the spring 16 is hooked to the left spring hook portion 49-L of the left slide member 15-L, and the other end of the spring 16 is hooked to the right spring hook portion of the

right slide member 15-R.

Referring to FIGS. 12 (A) and 12 (B), the left slide member 15-L is then incorporated into the main unit of the disc case 10 as described below. First, the left engagement pawl portion 50-L of the left slide member 15-L is pushed from the upper surface 46 of the rail 44 to the accommodation chamber 18 along the left slide fitting portion 52-L formed on the rail 44 of the lower half 13 while being elastically deformed upward. At the same time, the left engagement support portion 51-L of the left slide member 15-L is inserted into a left groove 53-L defined by the lower surface 47 of the rail 44 and the inner surface (upper surface) of the lower half 13 (see FIG. 12 (B)). At this time, a convex left stop portion 55-L on the left slide member 15-L is inserted into the left restriction groove 56-L formed in the rail 44 as shown in FIG. 12 (B).

As a result, the left slide member 15-L is fit into the rail 44, and slidably incorporated into the main unit of the disc case 10. In the same way, the right slide member 15-R is incorporated into the main unit of the disc case 10 along the right slide fitting portion 52-R (see FIGS. 6, 13 (A) and 13 (B)). However, these slide members have different slidable regions. Referring to FIG. 6, the left slide member 15-L slides along a part of the rail 44 provided on the left side of the lower bridge portion 35, and the right slide member 15-R slides along a part of the rail 44 provided on the right side

of the lower bridge portion 35.

Next, the shutter 14 is incorporated into the main unit of the disc case 10 as described below. Referring to FIG. 6, the rail 44 in parallel with the lower front fringe portion 30 is formed near the lower front fringe portion 30 of the lower half 13 as described above. The left fitting portion 45-L and the right fitting portion 45-R are formed near both ends of the lower bridge portion 35 of the rail 44. As shown in FIG. 11, the left fitting portion 45-L is used to fit the left engagement pawl portion 42-L of the shutter 14 into the rail 44, and the right fitting portion 45-R is used to fit the right engagement pawl portion 42-R into the rail 44. Referring to FIGS. 6 and 11, in order to incorporate the shutter 14 into the main unit of the disc case 10, the left engagement pawl portion 42-L and the right engagement pawl portion 42-R of the shutter 14 are pushed from the upper surface 46 of the rail 44 to the accommodation chamber 18 along the left fitting portion 45-L and the right fitting portion 45-R while being elastically deformed upward. At the same time, the left engagement support portion 43-L and the right engagement support portion 43-R are pushed from the lower surface 47 of the rail 44 to the accommodation chamber 18 while being elastically deformed downward (see FIG. 6, and FIG. 14, a sectional view taken on line A-A of FIG. 6; the front fringe portion 30 of the lower half 13 is not present under an area

of the lower surface 47 of the rail 44 corresponding to a range provided with the left fitting portion 45-L and the right fitting portion 45-R). As a result, the shutter 14 is fit into the rail 44 and installed into the rail 44 formed on the lower half 13, thereby incorporated into the main unit of the disc case 10.

In this condition, the left engagement pawl 42-L and the right engagement pawl 42-R engage the engagement surface 48 of the rail 44 as shown in FIGS. 11 and 14. In addition, the upper surface of the left engagement support portion 43-L and the upper surface of the right engagement support portion 43-R make contact with the lower surface 47 of the rail 44 so as to support the engagement of the left engagement pawl portion 42-L and the right engagement pawl portion 42-R. As a result, once the shutter 14 is incorporated into the main unit of the disc case 10, the shutter 14 does not slip off spontaneously.

The function of the spring 16 is then described below. The left slide member 15-L and the right slide member 15-R installed in the lower half 13 as described above tend to come close to each other because of the shrinkage force of the spring 16 secured to the left spring hook portion 49-L and the right spring hook portion 49-R. However, as shown in FIG. 12 (A), the convex left stop portion 55-L having a left slide stop surface 54-L is formed on the left slide member 15-L. The convex left stop portion 55-L is inserted in the left

restriction groove 56-L formed in the rail 44 shown in FIG. 12 (B). The right end of the left restriction groove 56-L terminates at the left stop surface 57-L as shown in FIG. 6. Accordingly, since the left slide stop surface 54-L of the left slide member 15-L is prevented from moving further by the left stop surface 57-L of the rail 44, the left slide member 15-L cannot slide further toward the right slide member 15-R. By using a structure similar to this, since the right slide stop surface 54-R of the right slide member 15-R is prevented from moving further by the right stop surface 57-R of the rail 44, the right slide member 15-R cannot slide further toward the left slide member 15-L. For this reason, the left slide member 15-L and the right slide member 15-R are positioned at both ends of the lower bridge portion 35 if no external force is applied.

In this condition, the left stop surface 57-L and the right stop surface 57-R in accordance with the present embodiment are used as stoppers for the disc case of the present invention.

The following describe a mechanism for locking the shutter 14 by using the slide members. Referring to FIGS. 11, 12 (A) and 12 (C), the left slide member 15-L is provided with the left locking pawl 58-L for engaging the left back surface 68-L of the left driven surface 41-L of the left driven hole 40-L formed in the shutter 14 (also see FIG. 16 (A)). In the

same way, the right slide member 15-R is provided with a right locking pawl 58-R for engaging the right back surface 68-R of the right driven surface 41-R of the right driven hole 40-R formed in the shutter 14 (see FIGS. 13 (A), 13 (C) and 16 (A)).

As described above, the left slide member 15-L and the right slide member 15-R are first fit into the rail 44, and positioned at both ends of the lower bridge portion 35 by the action of the spring 16. In this condition, the shutter 14 is fit into the rail 44 as described above. As a result, the left locking pawl 58-L of the left slide member 15-L engages the left back surface 68-L of the left driven surface 41-L of the shutter 14, and the right locking pawl 58-R of the right slide member 15-R engages the right back surface 68-R of the right driven surface 41-R of the shutter 14. In this way, the shutter 14 is locked and cannot slide. The left stop surface 57-L, the right stop surface 57-R, the left fitting portion 45-L, the right fitting portion 45-R, the left locking pawl 58-L, the right locking pawl 58-R, etc. are configured in terms of position and size so that the left locking pawl 58-L and the right locking pawl 58-R accurately engage the left back surface 68-L of the left driven surface 41-L and the right back surface 68-R of the right driven surface 41-R, respectively, when the shutter 14 is fit into the rail 44 as described above.

Next, the opening/closing operation of the shutter 14 of

the disc case 10 in accordance with the present embodiment is described below referring to FIGS. 15 (A) and 16 (A), views showing a condition wherein the shutter 14 is closed, and FIGS. 15 (B) and 16 (B), views showing a condition wherein the shutter 14 is open. Referring to FIGS. 15 (A) and 16 (A), when the shutter 14 covers the upper opening 22 and the like of the disc case 10, since the left locking pawl 58-L of the left slide member 15-L engages the left back surface 68-L of the left driven surface 41-L of the shutter 14 as described above, the shutter 14 cannot move in the direction indicated by arrow L. In addition, since the right locking pawl 58-R of the right slide member 15-R engages the right back surface 68-R of the right driven surface 41-R of the shutter 14, the shutter 14 cannot move in the direction indicated by arrow R, either.

When the disc case 10 is loaded into a signal recording and/or reproducing apparatus (not shown), a pin 62 installed at the tip of shutter opening/closing means 61 provided in the apparatus is inserted into the right driven hole 40-R, while the pin 62 is in parallel with the surface of the disc 11 and the tip of the pin 62 contacts a lower surface 63, namely one of the surfaces of the right driven hole 40-R (see FIG. 11). Furthermore, the tip of the pin 62 inserted into the right driven hole 40-R pushes the right driven hole blocking portion 59-R of the right slide member 15-R toward the accommodation chamber 18. This pushing force releases the engagement at the

right locking pawl 58-R of the right slide member 15-R from the right back surface 68-R of the right driven surface 41-R of the right driven hole 40-R. As a result, the shutter 14 can move only in the direction indicated by arrow L (see FIG. 15 (B)).

The disc case 10 is then loaded further into the above-mentioned apparatus. Therefore, the pin 62 of the shutter opening/closing means 61 further pushes the right driven hole blocking portion 59-R toward the accommodation chamber 18, while the engagement release condition is maintained; however, the pin 62 cannot further push and move the right driven hole blocking portion 59-R because of the restriction at the right driven hole 40-R of the shutter 14; therefore, the pin 62 is rotated in the direction indicated by arrow C, thereby opening the shutter 14. Eventually, the shutter 14 is opened in the direction indicated by arrow L (see FIG. 15 (B)). In the same way, the shutter 14 can also be opened in the direction indicated by arrow R, when the shutter opening/closing means 61 is disposed upside down and when the pin 62 thereof is inserted into the left driven hole 40-L.

The condition shown in FIG. 15 (B) is described below in more detail. Although the right slide member 15-R is pulled by the spring 16 in the direction indicated by arrow L, since the right slide stop surface 54-R (see FIG. 13 (A)) of the right slide member 15-R interferes with the right stop surface 57-R

(see FIG. 6) of the rail 44, the right slide member 15-R cannot move further in the direction indicated by arrow L. On the other hand, the right side surfaces 500-L (see FIG. 12 (A)) of the left engagement pawl portion 50-L and the left engagement support portion 51-L of the left slide member 15-L push the left surfaces (see FIG. 11) of the left engagement pawl portion 42-L and the left engagement support portion 43-L of the shutter 14 in the direction indicated by arrow R by the force of the spring 16. While the force of the spring 16 is applied as described above, the shutter opening/closing means 61 operated to open the shutter 14 keeps pushing the right driven surface 41-R of the right driven hole 40-R by using the pin 62, thereby retaining the open condition of the shutter 14.

The following describe how the disc case 10 being in the above-mentioned condition is taken out of the apparatus (player). Referring to FIG. 15 (B), a force is applied to the shutter opening/closing means 61 in the direction opposite to the direction indicated by arrow C (see FIG. 15 (A)) by a spring, a motor or the like. As the disc case 10 is taken out of the apparatus, the shutter opening/closing means 61 is rotated in the direction opposite to the direction indicated by arrow C by the force applied in the opposite direction. However, the force in the direction indicated by arrow R has been applied to the shutter 14 by the spring 16 as described above.

Therefore, the shutter 14 is moved in the direction indicated by arrow R, while following the movement of the shutter opening/closing means 61 which is rotated in the direction opposite to the direction indicated by arrow C, thereby covering the upper opening 22 and the like. When the shutter 14 has returned to the condition shown in FIG. 15 (A), the left locking pawl 58-L of the left slide member 15-L engages the left back surface 68-L of the left driven surface 41-L of the shutter 14, and the right locking pawl 58-R of the right slide member 15-R engages the right back surface 68-R of the right driven surface 41-R of the shutter 14, thereby locking the shutter 14 (see FIGS. 11, 12 and 16).

Next, the dustproof effect at the disc case 10 in accordance with the present embodiment is described below referring to FIG. 17 (A), a perspective view showing the shutter 14 positioned to cover the upper opening 22 and the like of the disc case 10, FIG. 17 (B), a sectional view taken on line D-D of FIG. 17 (A), and FIG. 17 (C), a sectional view taken on line E-E of FIG. 17 (A).

The problem encountered in the conventional disc case is further clarified as described below referring to FIGS. 17 (A), 17 (B) and 8.

The conventional disc case is not provided with the right slide member 15-R shown in FIG. 17 (A). Therefore, dust can enter the interior of the shutter 14 through the right driven

hole 40-R of the shutter 14. In addition, dust can also enter the interior of the shutter 14 through an opening 400-R (see FIG. 11) provided at the right end portion of the shutter 14 near the right driven hole 40-R. Furthermore, dust can enter the interior of the shutter 14 through the slit S (see FIG. 10) defined by the front fringe portion 24 of the upper half 12 and the front fringe portion 30 of the lower half 13. Dust having entered the interior of the shutter 14 from the above-mentioned openings and slit can further enter the accommodation chamber 18 through the upper concave portion 23 of the bridge portion 33 or the lower concave portion 29 of the bridge portion 35 in the direction indicated by arrow F or G shown in FIG. 17 (B) (see FIG. 8). Moreover, dust can enter the accommodation chamber 18 through the left side of the shutter 14 in the same way.

In the case of the disc case 10 in accordance with the present embodiment, however, the right driven hole 40-R is blocked with the right driven hole blocking portion 59-R of the right slide member 15-R as shown in FIG. 17 (A). Additionally, the opening 400-R provided at the right end portion of the shutter 14 near the right driven hole 40-R is blocked by the right side wall surface 60-R of the right slide member 15-R (see FIG. 12 (C)). Besides, the slit S (see FIG. 10) defined by the front fringe portion 24 of the upper half 12 and the front fringe portion 30 of the lower half 13 is also

blocked by the right side wall surface 60-R of the right slide member 15-R. Therefore, dust cannot enter the interior of the shutter 14.

In the same way, the left driven hole 40-L is blocked with the left driven hole blocking portion 59-L of the left slide member 15-L. Additionally, the opening 400-L (see FIG. 12 (C)) provided at the left end portion of the shutter 14 near the left driven hole 40-L is blocked with the left side wall surface 60-L of the left slide member 15-L. Besides, the slit S (see FIG. 12 (C)) defined by the front fringe portion 24 of the upper half 12 and the front fringe portion 30 of the lower half 13 is also blocked with the left side wall surface 60-L of the left slide member 15-L. Therefore, dust cannot enter the interior of the shutter 14 in the case of the disc case in accordance with the present invention.

Next, dust entry from the shutter 14 positioned at the central portion of the disc case is also prevented as described below. Referring to FIG. 17 (C), a holding flange 600 is provided to hold down the upper end portion 64 and the lower end portion 65 of the shutter 14. The holding flange 600 is made by providing an upper cutout 66 in the upper half 12 and by providing an lower cutout 67 in the lower half 13. Accordingly, dust may enter from the upper cutout 66 and the lower cutout 67. However, when the shutter 14 covers the upper opening 22 and the like of the disc case 10, the upper end

portion 64 of the shutter 14 enters the upper cutout 66 so as to block the upper cutout 66. In the same way, when the shutter 14 covers the lower opening 28 and the like of the disc case 10, the lower cutout 67 is blocked with the lower end portion 65 of the shutter 14.

Consequently, when the shutter 14 covers the upper opening 22, the lower opening 28 and the like of the disc case 10, the accommodation chamber 18 is completely blocked.

Another embodiment is shown in FIG. 18. In other words, referring to FIG. 18, by providing the left driven hole 40-L and the right driven hole 40-R at the center in the thickness direction of the shutter 14, the step difference between the end surfaces H and I can be decreased. Or the step can be eliminated.

Although the left locking pawl 58-L and the right locking pawl 58-R are provided to lock the shutter 14 in the above-mentioned embodiment, it is not always necessary to provide a mechanism for locking the shutter 14. In case such a mechanism is unnecessary, the left driven hole blocking portion 59-L of the left slide member 15-L and the right driven hole blocking portion 59-R of the right slide member 15-R are also unnecessary. Furthermore, the left and right driven holes 40-L and 40-R of the shutter 14 are also unnecessary.

New embodiments (hereinafter referred to as other embodiments) are described below; the new embodiments are

characterized in that the shutter 14 is not locked and that when a disc case is set into a player, the disc case can be inserted into a holder both in the back-and-forth direction and the lateral direction.

FIG. 19 is a perspective view showing a disc case in accordance with a first embodiment of the other embodiments; FIG. 20 is a perspective view showing the disc case shown in FIG. 19 with the shutter open; FIG. 21 is a plan view showing the disc case shown in FIG. 19. As a rule, members similar to those used in the above-mentioned embodiment are represented by the same numerals, and not explained in detail. The first embodiment differs from the above-mentioned embodiment in that the shutter 140, the slide members 150-R and 150-L of the first embodiment are not provided with any locking mechanism as described above and that the front fringe portion of the shutter 140 projects.

(1) Since the disc case in accordance with the present embodiment has no locking mechanism, the shutter 140 being closed will open when an object hits the shutter 140; however, the structure of the disc case is made simple.

(2) The following mainly describe the feature wherein the disc case can be inserted into a holder both in the back-and-forth direction and in the lateral direction.

(a) As obviously shown in FIG. 20, in the first embodiment, a protrusion portion 141 is formed at the central portion of

the front fringe portion of the shutter 140, and steps 142-R and 142-L are formed at both corner portions of the projection portion 141. As shown in FIG. 21, the forefront fringe portion 1410 of the protrusion portion 141 is located at the position indicated by chain line B with respect to the forward direction (the shutter 140 slides along the front fringe portion of the main unit of the case), and the forefront fringe portions 120-R1 and 120-L1 of the right fringe portion 120-R and the left fringe portion 120-L of the upper half 12 of the main unit of the case are located at the position indicated by chain line C. Furthermore, the surface 142-R1 (see FIG. 20) of the steps 142-R and 142-L of the shutter 140, being in parallel with the above-mentioned slide direction, is located at the position indicated by chain line A. As shown in the figure, chain line B is located at the most forward position, chain line A is located at the most backward position, and chain line C is located therebetween. The forefront fringe portions 130-R1 and 130-L1 of the right fringe portion 130-R and the left fringe portion 130-L of the lower half 13 are also located in the same way.

At least the forefront fringe portion 1410 (the forefront fringe portion of the protrusion portion 141) of the shutter 140 is required to be protruded more forward than the forefront fringe portions 120-R1, 120-L1, 130-R1 and 130-L1 of the main unit (12, 13) of the case; however, the parallel surface 142-R1

of the step 142-R of the shutter 140 is located behind the forefront fringe portions 120-R1, 120-L1, 130-R1 and 130-L1 because of the following reason; in case the parallel surface is not located behind the forefront fringe portions, the tip 1140 of a shutter opener described below interferes with the front portion of the step 142-R and cannot push a surface 142-R2 which is orthogonal to the slide direction; therefore, the above-mentioned configuration is used to prevent this problem.

Next, the following describe a method of setting the disc case into the case holder in the back-and-forth direction.

FIG. 22 is a perspective view showing a case holder, and FIG. 23 is a perspective view showing a condition wherein the insertion direction of the disc case 10 into a holder 101 is orthogonal to the sliding direction of the shutter 140. The holder 101 is provided with L-shaped case guides 102 at the left and right ends thereof; each of the case guides 102 is provided with a case stopper 103 at the forefront portion thereof to prevent the case 10 from advancing further. Outside the stopper 103, a shutter opener 610 is installed. The tip of the rotatable arm 612 of the shutter opener 610 is provided with a cylindrical pin 611; in addition, the arm 612 is spring-loaded at all times toward the insertion side of the disc case 10 by a torsion spring 613. The arm 612 is provided with a bent projection portion 614 as shown in FIG. 23. This projection portion 614 makes contact with the front fringe

portion of the holder 101 so as to prevent the arm 612 from rotating further toward the insertion side. The position of the pin 611 determined by the projection portion 614 and the spring 613 corresponds to the position of the step 142-R of the shutter 140 of the case 10 to be inserted. As a result, when the case 10 is inserted into the holder 101, the pin 611 smoothly makes contact with the step 142-R.

FIG. 23 is a view showing a condition wherein the disc case 10 is inserted into the holder 101 in the direction indicated by arrow A; as shown in the figure, the pin 611 of the shutter opener 610 makes contact with the surfaces 142-R1 and 142-R2 of the step 142-R of the shutter 140, the arm 612 is rotated, and the shutter 140 is opened in the direction indicated by arrow B by the rotation force of the arm 612.

FIGS. 24 and 25 show an embodiment wherein the insertion direction of the disc case 10 into the holder 101 is in parallel with the sliding direction of the shutter 140. The holder 111 shown in FIG. 24 is provided with a front case guide 112-F on the front side (the lower left region in FIG. 24) of the holder 111, and is also provided with a back case guide 112-B on the back side (the upper right region in FIG. 24) of the holder 111. The guides 112-F and 112-B are L-shaped, and their end portions are provided with case stoppers 113-F and 113-B so as to prevent the case 10 from being inserted further. In addition, the front case guide 112-F is provided with a gap

114 at a midpoint thereof to form a step. The portion 112-F1, one of the two portions of the front case guide 112-F and located close to the case insertion position, is shifted forward from the other portion 112-F2 so as not to collide with the protrusion portion 141 of the shutter 140 to be inserted. On the other hand, the end portion 1140 (the end portion facing the gap 114) of the other portion 112-F2 makes contact with the step 142-R of the protrusion portion 141.

As shown in FIG. 25, the case 10 is inserted sideways into the holder 111 in the direction from upper left to lower right in the figure (see arrow A). In other words, the case 10 is inserted while the front fringe portion of the case 10 is directed lower left in the figure. Therefore, the protrusion portion 141 of the shutter 140 of the case 10 is moved along the lower left case guide 112-F of the holder 111. As the protrusion portion 141 is guided by the guide portion 112-F1 during the insertion, the surface 142-R2 of the step 142-R of the protrusion portion 141 makes contact with the end portion 1140 of the other guide portion 112-F2. Consequently, as the case 10 is inserted further, the shutter 140 is opened in the direction indicated by arrow B because of the existence of the end portion 1140 of the guide.

In this way, the disc case in accordance with the first embodiment can be inserted into the player both in the back-and-forth direction and in the lateral direction, and can

be used in the player.

The shutter 140 can be formed into a simple rectangular shape by eliminating the protrusion portion 141, the steps 142-R and 142-L. In this case, the shutter opener 610 and the end portion 1140 make contact with the corner portion of the front fringe portion of the shutter 140 (refer to the following description of a second embodiment.)

(b) Next, a second embodiment of the other embodiments is described below referring to FIGS. 26 to 30. FIG. 26 is a perspective view showing a disc case 10 in accordance with the present embodiment; FIG. 27 is a perspective view showing a condition wherein the shutter 145 of the disc case 10 is open; FIG. 28 is a plan view showing the disc case 10; FIG. 29 is a perspective view showing a case holder; and FIG. 30 is a perspective view showing a condition wherein the disc case 10 in accordance with the present embodiment is set in the holder shown in FIG. 29. As obviously shown in FIGS. 26 and 28, in the present embodiment, the front position of the forefront fringe portion 1451 of the shutter 145 is the same as the positions of the forefront fringe portions 120-R1 and 120-L1 of the right fringe portion 120-R and the left fringe portion 120-L of the upper half 12 of the main unit of the disc case 10, and is also the same as the positions of the forefront fringe portions 130-R1 and 130-L1 of the right fringe portion 130-R and the left fringe portion 130-L of the lower half 12.

In addition, as shown in the figures, the front fringe portions 24 and 30 of the upper half 12 and the lower half 13 are behind the forefront fringe portion 1451, the forefront fringe portions 120-R1, 120-L1, 130-R1 and 130-L1. Furthermore, a gap 123-R is formed between the forefront fringe portion 120-R1 of the right fringe portion 120-R of the upper half 12 and the forefront fringe portion 130-R1 of the right fringe portion 130-R of the lower half 13. Moreover, a gap 123-L is formed between the forefront fringe portion 120-L1 of the left fringe portion 120-L of the upper half 12 and the forefront fringe portion 130-L1 of the left fringe portion 130-L of the lower half 13.

The following describe a method of inserting and setting the above-mentioned disc case 10 into a case holder 115 shown in FIG. 29 in the lateral direction. A front case guide 116-F is provided on the front side (the lower left region in the figure) of the case holder 115, and a back case guide 116-B is provided on the back side (the upper right region in the figure) of the case holder 115. These guides 116-F and 116-B are L-shaped, and their end portions are provided with case stoppers 117-F and 117-B to prevent the case 10 from being inserted further. Additionally, a cutout 119 is formed at the central portion of the front case guide 116-F, and a projection 118 is formed inward in the cutout 119.

The case 10 is inserted into the case holder 115 having

the above-mentioned structure as shown in FIG. 30. More specifically, the case 10 is inserted sideways into the holder 115 in the direction from upper left to lower right in the figure (see arrow A). In other words, the case 10 is inserted while the front fringe portion of the case 10 is directed lower left. Therefore, the corner portion 145-R at the front fringe portion of the shutter 145 of the case 10 is moved along the lower left case guide 116-F of the holder 115. As the corner portion 145-R is guided by the guide 116-F during the insertion, the corner portion 145-R makes contact with the projection 118 of the guide 116-F. Consequently, as the case 10 is inserted further, the shutter 145 is opened in the direction indicated by arrow B because of the existence of the projection 118 of the guide. Even when the case 10 is inserted upside down, the case 10 can be inserted in the same way as described above.

The following describe a method of inserting and setting the above-mentioned disc case 10 into a case holder in the back-and-forth direction. In this case, the disc case 10 is inserted into the case holder 101 shown in FIG. 22. As the disc case 10 is inserted in this case, the pin 611 of the shutter opener 610 makes contact with the corner portion 145-R of the shutter 145, and opens the shutter 145 while keeping contact with the corner portion 145-R.

In this way, the disc case in accordance with the second embodiment can be inserted into and used in the player both

in the back-and-forth direction and in the lateral direction. Unlike the first embodiment, the second embodiment can have the case guides 116-F and 116-B along the full length of the holder; therefore, the second embodiment is advantageous in that the disc case can be inserted stably.

The following describe a case wherein the front position of the forefront fringe portion 1451 of the shutter 145 is behind the forefront fringe portions 120-R1 and 120-L1 of the right fringe portion 120-R and the left fringe portion 120-L of the upper half 12 of the main unit of the disc case.

In case the front position of the forefront fringe portion 1451 of the shutter 145 is behind the forefront fringe portions 120-R1 and 120-L1 of the right fringe portion 120-R and the left fringe portion 120-L of the upper half 12 of the main unit of the disc case, and is also behind the forefront fringe portions 130-R1 and 130-L1 of the right fringe portion 130-R and the left fringe portion 130-L of the lower half 12 of the main unit of the disc case, the disc case can also be set into the player both in the lateral direction and in the back-and-forth direction by making the depths of the gaps 123-R and 123-L larger than those of the gaps 123-R and 123-L of the above-mentioned embodiment.

In the present invention, the connection between the upper half 12 and the lower half 13 can be accomplished by welding or screw tightening. Alternatively, engagement pawls

provided on the upper half 12 can be engaged with engagement holes provided in the lower half 13; conversely, engagement holes provided in the upper half 12 can be engaged with engagement pawls provided on the lower half 13.

Furthermore, although it is assumed that the disc 11 is an optical disc, it can be assumed that the disc 11 is a magnetic disc. Moreover, although it is assumed that both surfaces of the disc 11 are used as signal recording surfaces on which signals can be read and written, only one surface can be used as a signal recording surface; what is more, the disc 11 can be a disc having surfaces on which no signal can be written. After all, the disc in accordance with the present invention should have at least one signal recording surface on which signals can be read and/or written.

Furthermore, in case the disc 11 has one signal recording surface, one of the two slide members can be fastened.

Additionally, in the above-mentioned embodiments, although it is assumed that the head access opening communicates with the chucking member access openings, these openings can be provided independently.

Besides, in the above-mentioned embodiments, although the upper concave portion 23 and the lower concave portion 29 are provided to decrease the movement amount of the disc 11 when the disc 11 is dropped onto the disc table, the concave portions of the present invention are not limited to those used

for decreasing the amount of drop, but can be provided for other purposes as a matter of course. In short, when there is a passage from a portion not covered with the shutter to the accommodation chamber, a shielding portion should only be provided to prevent dust from passing through the passage.

Further, it is assumed that the concave portions in accordance with the present invention designate the upper concave portion 23 and the lower concave portion 29 in the descriptions of the above-mentioned embodiments, the concave portions are not limited to such concave portions, but can also designate a space ranging from the upper concave portion 23 to a cutout on the side of the upper front fringe portion 24 and a space ranging from the lower concave portion 29 to a cutout on the side of the lower front fringe portion 30. Still more, when the bridge portion is not used to directly form the side wall surface of the accommodation chamber, but is provided closer to the front fringe portion of the case, and when a space is present therebetween just as in the case of the above-mentioned embodiment, the space can also be referred to as the concave portion of the present invention. In other words, hole-like portions can also be regarded as the concave portions of the present invention.

More and more, in the present invention, a condition wherein the shutter covers the concave portions does not mean that the concave portions are hermetically sealed, but may mean

that there are still gaps.

INDUSTRIAL APPLICABILITY

As obviously understood from the above-mentioned descriptions, the disc case of the present invention is simple in structure and can be assembled easily; in case the shutter covers part of the concave portions, the support member access openings and the head access opening, the shutter can have an effect of completely blocking the accommodation chamber.

Furthermore, the disc case of the present invention is advantageous in that the disc case can be set into a player both in the lateral direction and in the back-and-forth direction.

WHAT IS CLAIMED IS:

1. A disc case comprising:

the main unit of a case provided with:

(a) an accommodation chamber capable of rotatably accommodating a disc having a signal recording surface on at least one side thereof,

(b) support member access openings provided in the top and bottom walls of said accommodation chamber so that a chucking member can externally pressure-contact said disc,

(c) a head access opening formed in the top or bottom wall of said accommodation chamber and being tangent to the side wall surface of said accommodation chamber so that a head for reading and/or recording signals on said signal recording surface can gain access to said disc, and

(d) a concave portion formed in the range from said side wall surface at said head access opening to the front fringe portion side of said main unit of said case and being concave with respect to the top or bottom surface of said main unit of said case,

a shutter installed on said main unit of said case so as to cover said support member access openings, said head access opening and said concave portion when closed, and so as to expose said support member access openings and said head access opening by sliding in at least one direction from said covering position along said front fringe portion of said main unit of

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said case when open, and

a shielding portion provided on said main unit of said case so as to shield all or part of passages communicating with said accommodation chamber via said concave portion from areas which are not covered with said shutter even when said shutter is closed.

2. A disc case according to claim 1, wherein said head is an optical head.

3. A disc case according to claim 1, wherein said support member access openings communicate with said head access opening.

4. A disc case according to claim 1, wherein said concave portion is provided so as to decrease the amount of movement when said disc is dropped onto a disc table constituting said chucking member.

5. A disc case according to claim 1, wherein said concave portion is formed at a portion in the range from said head access opening to said front fringe portion of said main unit of said case.

6. A disc case according to claim 1, wherein said head access opening is formed in the top and bottom walls of said accommodation chamber.

7. A disc case according to claim 1, wherein areas not covered with said shutter even when said shutter is closed are holes or openings provided in said shutter and/or slits

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provided in said front fringe portion of said main unit of said case.

8. A disc case according to claim 1, wherein

said main unit of said case is provided with two slide members slidable along said front fringe portion of said main unit of said case,

said two slide members are connected and pulled to each other with a spring,

said two slide members are each prevented from entering the central portion of said front fringe portion of said main unit of said case by stoppers provided at said front fringe portion, and

said shutter is slidable in the one direction and the direction opposite thereto, and exerts a force to one of said slide members when said shutter slides so as to slide said slide member against the force of said spring,

and

said shielding portions are formed in said slide members.

9. A disc case according to claim 8, wherein

said slide members are guided by a rail provided near said front fringe portion, and

said stoppers are end portions of grooves provided in said rail.

10. A disc case according to claim 7, wherein

the side wall of said shutter is provided with a hole,



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said slide members can be locked to said shutter,

the lock condition of said shutter is released when means for releasing the lock condition is inserted into said hole from outside.

11. A disc case according to claim 8, wherein said hole in the side wall of said shutter is a hole not covered with said shutter even when said shutter is closed.

12. A disc case comprising:

the main unit of a case provided with an accommodation chamber capable of rotatably accommodating a disc, support member access openings provided in said accommodation chamber so that a chucking member can externally pressure-contact said disc, a head access opening formed in said accommodation chamber so that a head for reading and/or recording signals can gain access to said disc, and

a shutter installed on said main unit of said case so as to cover said support member access openings and said head access opening when closed, and so as to expose said support member access openings and said head access opening by sliding in at least one direction along said front fringe portion of said main unit of said case when open,

wherein the forefront fringe portion of said shutter protrudes further forward than the forefront fringe portion of said main unit of said case.

13. A disc case according to claim 12, wherein the

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insertion direction of said disc case into a case holder for holding said disc case is substantially orthogonal to the opening direction of said shutter.

14. A disc case according to claim 12, wherein the insertion direction of said disc case into said case holder for holding said disc case is substantially parallel to the opening direction of said shutter.

15. A disc case according to claim 12, wherein when said disc case is inserted into said case holder for holding said disc case, a shutter opener provided on said holder makes contact with the corner portion of the front fringe portion of said shutter so as to open said shutter.

16. A disc case according to one of claims 12 to 15, wherein said corner portion is provided with a step.

17. A disc case comprising:

the main unit of a case provided with an accommodation chamber capable of rotatably accommodating a disc, support member access openings provided in said accommodation chamber so that a chucking member can externally pressure-contact said disc, a head access opening formed in said accommodation chamber so that a head for reading and/or recording signals can gain access to said disc, and

a shutter installed on said main unit of said case so as to cover said support member access openings and said head access opening when closed, and so as to expose said support

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member access openings and said head access opening by sliding in at least one direction along said front fringe portion of said main unit of said case when open,

wherein the forefront fringe portion of said main unit of said case protrudes further forward than the forefront fringe portion of said shutter, and

a gap is formed in the slide direction of said shutter at said fringe portion of said main unit of said case, said front fringe portion being disposed further forward than said forefront fringe portion of said shutter.

18. A disc case comprising:

the main unit of a case provided with an accommodation chamber capable of rotatably accommodating a disc, support member access openings provided in said accommodation chamber so that a chucking member can externally pressure-contact said disc, a head access opening formed in said accommodation chamber so that a head for reading and/or recording signals can gain access to said disc, and

a shutter installed on said main unit of said case so as to cover said support member access openings and said head access opening when closed, and so as to expose said support member access openings and said head access opening by sliding in at least one direction along said front fringe portion of said main unit of said case when open,

wherein the forefront fringe portion of said main unit

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of said case and the forefront fringe portion of said shutter are located at the same position in the forward direction, and

a gap is formed in the slide direction of said shutter at said front fringe portion of said main unit of said case, said front fringe portion being located at the same position as that of said forefront fringe portion of said shutter.

19. A disc case according to claim 17 or 18, wherein said forefront fringe portion of said case is a corner portion of said main unit.

20. A disc case according to claim 17 or 18, wherein the insertion direction of said disc case into a holder for holding said disc case is substantially orthogonal to the opening direction of said shutter.

21. A disc case according to claim 17 or 18, wherein the insertion direction of said disc case into said holder for holding said disc case is substantially parallel to the opening direction of said shutter.

22. A disc case according to claim 21, wherein when said disc case is inserted into said holder for holding said disc case, a shutter opener provided on said holder makes contact with the corner portion of said shutter so as to open said shutter.

23. A disc cartridge comprising a disc case according to one of claims 1 to 22 and a disc accommodated therein.

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