

PATENT SPECIFICATION (11)

1 552 768

1 552 768

(21) Application No. 22370/76 (22) Filed 18 Sept. 1975 (19)

(62) Divided Out of No. 38458/75

(23) Complete Specification filed 3 June 1976

(44) Complete Specification published 19 Sept. 1979

(51) INT. CL.^a G11B 21/00 9/06 21/26 21/04 21/12 H04N 5/80

(52) Index at acceptance

G5R B05 B08 B261 B263 B346 B361 B36Y B482 B545
B581 B58X B58Y B591 B59X B59Y B611 B612 B613
B614 B61X B61Y B623 B638 B650 B670 B671
B675 B789 B88

H4J 30E 31A C

(72) Inventor JAMES AUSTIN ALLEN



(54) SIGNAL PICKUP SYSTEM FOR A RECORD PLAYER

(71) We, RCA CORPORATION, a corporation organized under the laws of the State of Delaware, United States of America, of 30 Rockefeller Plaza, City and State of New York, 10020, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a cartridge enclosing a playback stylus arm unit for playback of signals prerecorded on a rotatable record, especially suitable for use in a video disc player.

In a video disc system of the type described in the U.K. Specifications Nos. 1,392,201—'206 a stylus arm, carrying a stylus at one end and a connector plate secured to its other end via a compliant member, may advantageously be treated as a replaceable unit of a size convenient to handle, whereby the stylus wear calls for a replacement, the user may readily remove and replace the stylus arm unit without requirements for mechanical skill and dexterity.

In U.K. Specifications Nos. 1,522,845 and 1,523,326, replaceable cartridge for enclosing the stylus arm unit are disclosed. In these cartridges, the stylus arm occupies one of the following positions: (a) a retracted storage position outside the player, (b) a retracted off-record rest position while installed in the player, and (c) a protruding above-record play position also while installed in the player. In the retracted positions, the compliant member is stressed and has a tendency to form a permanent "set". Formation of a permanent "set" in the compliant member is undesirable because it may cause stylus mistracking during playback.

In accordance with the present invention

in one aspect thereof, there is provided for the purpose indicated a cartridge comprising a body enclosing a stylus arm carrying a playback stylus at one end thereof and having a connector plate secured to the other end of the stylus arm via a compliant member. Means are provided for releasably clamping the stylus arm in a retracted position which provides a location for the stylus withdrawn within the confines of the cartridge remote from an opening in the bottom of the cartridge through which the stylus can otherwise protrude. The connector plate is flexibly suspended within the cartridge body by means including a flexible member having a rear surface slanted at a certain angle with respect to the front surface thereof. The cartridge has a bearing surface for engaging and locating the front surface of the flexible member and the connector plate is secured to the rear surface of that member, which establishes an angular orientation of the connector plate relative to the cartridge so that, when the stylus arm is held in the retracted position in the cartridge, the compliant member is unstressed.

In another aspect, the invention provides a system incorporating such a cartridge for playing back signals prerecorded, such as in the aforesaid video disc system, along a spiral on a rotatable disc record, the cartridge being insertable in a compartment in a carriage which is mounted for lateral motion, relatively to a base of the system, in correlation with progressive lateral motion of the stylus as it follows the record spiral during playback.

In the accompanying drawings:

Figure 1 is a video disc player incorporating a pickup cartridge embodying the present invention;

Figures 2 and 3 are, respectively, the top and the bottom perspective views of the cartridge of Figure 1;

Figure 4 is a stylus arm unit enclosed in the cartridge of Figures 1—3;

Figures 5 and 6 are perspective views showing the details of an arrangement for suspending the stylus arm unit of Figure 4 in the cartridge of Figures 1—3;

Figures 7 and 8 are, respectively, the elevation of the plan views, partly in section, of a portion of the cartridge of Figures 1—3 showing the suspending arrangement of Figures 5 and 6;

Figures 9 and 10 are, respectively, the elevation and the plan views of a flexible diaphragm incorporated in the suspending arrangement of Figures 5—8;

Figures 11 and 12 are end views of the diaphragm of Figures 9 and 10, respectively, along the section lines 11—11 and 12—12 in Figure 9;

Figure 13 illustrates a spring for releasably clamping the stylus arm unit of Figure 4 in a retracted position in the cartridge of Figures 1—3;

Figures 14, 15 and 16 illustrate front views of the cartridge of Figures 1—3 along various section lines showing the details of the arrangement of the clamping spring of Figure 13; and

Figures 17—23 illustrate, a sequence of operations involved in installing the cartridge of Figures 1—3 in the video disc player of Figure 1.

In Figure 1, numeral 30 indicates a video disc player of the general type described in U.K. Specifications Nos. 1,392,201—'206 aforesaid. A record 31 is disposed for playback on a turntable 32 rotatably mounted on a motorboard 33. A carriage 34 is mounted for lateral motion relative to the motorboard 33 in correlation with lateral motion of a stylus 55 (Figure 4) riding in a spiral-groove 35 disposed on the surface of the record 31 during playback. Slots 36 and 37 are provided in the motorboard 33 to permit lateral motion of the carriage 34 from an off-record rest position 38 to an above-record play position 39. Reference may be made to the U.K. Specification No. 1,466,925 for illustration of an apparatus for laterally driving the carriage 34 in correlation with the groove-riding stylus 55 during playback. When the carriage 34 is in the off-record rest position 38, a hinged plate 40 conceals the carriage.

There are five basic chambers in the carriage 34. Chambers 41, 42, and 43 are for enclosing respective circuit boards for respective elements of the signal processing circuitry of the playback system: (a) resonator (forming a tuned circuit with the stylus electrode/record capacitance); (b) oscillator (supplying UHF oscillations to the tuned circuit); and (c) preamplifier (responding to the detected version of modulated oscillations derived from the tuned circuit. Chamber

44 contains a replaceable stylus arm cartridge 45, a retractable armstretcher 46, and a stylus arm lifter 47. The armstretcher may be of the type shown in U.K. Specification No. 1,388,336. The stylus arm lifter 47 may be of the type shown in U.S. Specification No. 4,053,161. Chamber 48 forms a wiring channel to hold the lead wires to the various circuit boards.

Figures 2 and 3 are the top and bottom perspective views of the cartridge 45. The cartridge 45 includes a body 49 for housing an insert molded stylus arm unit 50 shown in Figure 4. The insert molded stylus arm unit 50 consists of a stylus arm 51 formed of an aluminum tube (e.g., 0.024 inch outer diameter and 0.002 inch thickness) with a plastics stylus holder 52 glued at one end of the stylus arm and a compliant member 53 molded at the other end of the stylus arm to connect the stylus arm with a metal connector plate 54. The compliant member 53 is in unstressed condition when it is aligned with the stylus arm 51. The angle between the stylus arm 51 and the connector plate 54 is 94° for reasons given subsequently. The stylus holder 52 contains a slot to hold the stylus 55 when it is glued in place. A small projection 56 is molded at the top of the stylus holder 52 to engage with an abutment 120 (Figure 17) to relieve the stylus 55 from a locked groove. Reference may be made to the U.S. Specification No. 4,049,280 for an example of a locked groove escape arrangement.

The arrangement for suspending the stylus arm unit 50 in the cartridge 45 will now be explained with reference to Figures 5—12. As shown in Figure 5, an elastic member 57 is glued to the connector plate 54 of the stylus arm unit 50. As shown in Figures 9—12, the member 57 comprises a pair of elastic straps 58 and 59 joining end ribs 60 and 61. The elastic straps 58 and 59 have central projections 62 and 63 of appropriate wedge shapes providing slanted rear surfaces 64 and 65 to which the connector plate 54 is glued as shown in Figure 4. The slanted rear surfaces 64 and 65 establish an 8° angle between the connector plate 54 and the forward surfaces 66 and 67 of the elastic straps 58 and 59 for reasons given subsequently.

A pair of hooks 68 and 69 are molded into the rear end of the cartridge body 49 as shown in Figures 6—8. In order to secure the suspension member 57 to the cartridge body 49, the end ribs 60 and 61 are stretched apart and drawn over the hooks 68 and 69. The hooks 68 and 69 have slots 70 and 71 for seating the end ribs 60 and 61 and slots 72 and 73 for seating the elastic straps 58 and 59 as shown in Figure 6. When the member 57 is properly secured to the cartridge body 49, the slots 72 and 73

establish an angular orientation of the front surfaces 66 and 67 with respect to the cartridge body 49 (i.e., perpendicular to the bottom surface of the cartridge body).

A U-shaped spring 74 (Figure 13) releasably clamps the stylus arm 51 in a retracted position in the cartridge body 49, as shown in Figures 3 and 15, during storage and handling of the cartridge 45 (i.e., outside the player compartment). The retracted position provides a location for the stylus 55 within the confines of the cartridge body 49 remote from an opening 75 (Figure 3) in the cartridge body through which the stylus protrudes when the carriage 34 is in the off-recod rest position 38 (Figure 22) and the above-record play position 39 (Figure 23).

The angular orientation of the front surfaces 66 and 67 (of the elastic straps 58 and 59) relative to the cartridge body 49 (e.g., perpendicular to the bottom surface of the cartridge body), the angular orientation of the connector plate 54 relative to the front surfaces (e.g., 8°), and the angular orientation of the compliant member 53 relative to the connector plate (e.g., 94°) is such that, when the stylus arm 51 is retained in the retracted position in the cartridge body, the compliant member is axially aligned (i.e., relaxed because not bent) with the stylus arm, as shown in Figures 18 and 19, although the stylus arm is well up into the cartridge body for protection. Axial alignment of the compliant member 53 with the stylus arm 51 is advantageous because it prevents formation of a "set" in the compliant member during storage and handling of the cartridge 45 which may interfere with ability of the stylus 55 to track the record groove.

The U-shaped spring 74, as shown in Figure 13, has a pair of spaced leg portions 76 and 77 and a cross portion 78 joining the spaced leg portions. The spaced leg portions 76 and 77 are bent to define an arched portion. End portions 79 and 80 of the spaced leg portions 76 and 77 are secured in the cartridge body 49 as shown in Figures 8 and 14.

The clamping spring 74 is locatable in one of three positions. In the top position, as shown in Figures 15, 18—20, the stylus arm 51 is retained in a retracted position against a stop 81 (Figure 15). The middle position is caused by depression of the clamping spring 74 by a spring defeat lever 82 of a hinged lid 83 of the carriage 34 when the lid is closed during containment of the cartridge 45 in the compartment 44 as shown in Figures 21—23. The defeat lever 82 enters the interior of the cartridge body 49 through an opening 84 in the cartridge body, as shown in Figure 2, to depress the clamping spring 74. In this position, the clamping spring 74 is completely out of the way of the stylus arm 51 so that a separately

controlled rod 85 of the stylus arm lifter 47 (Figures 1 and 17) can control the stylus arm during normal play cycles as shown in Figures 21—23.

The bottom position is for manufacturing purposes. When the clamping spring 74 is depressed beyond its normal middle position, the spaced leg portions 76 and 77 latch over projections 86 and 87 on the inner walls of the cartridge body 49 as illustrated in Figure 13 to anchor the clamping spring in a locked position until purposefully released. In this position, the shoe of the stylus 55 can be lapped on a drum lapper, or examined under a microscope without interference from the clamping spring 74.

The arched shape of the clamping spring 74 enables depression thereof by the defeat lever 82 of the lid 83 during containment of the cartridge 45 in the compartment 44 without any interference with the stylus arm 51. Further, the arched shape of the clamping spring 74 permits greater tolerance in the length of the defeat lever 82 without affecting satisfactory operation of the clamping spring defeat mechanism. Additionally, the U-shape of the clamping spring 74 facilitates assembly of the stylus arm unit 50 in the cartridge 45.

The cartridge 45 further includes a leaf spring 88, in the form of a ribbon, for urging the stylus 55 into the record groove 35 during playback as shown in Figure 23. One end of the leaf spring 88 is secured to the stylus 55. The second end of the leaf spring 88 is secured to a flat on a portion of a ball 89. The ball 89 is friction loaded into a socket 90 provided in the front end of the cartridge body 49 so that the flat of the ball protrudes from the socket. The cartridge body 49 has an access opening 91 in communication with the socket 90 for inserting a tool into a hex-shaped hole 92 provided in the ball 89 for the purpose of adjustment. Such adjustment may, for example, serve to center the stylus arm 51 in the cartridge body 49, to vary the stylus/record tracking pressure, etc. After such adjustment at the factory, the ball 89 may be firmly glued in place.

Where the stylus 55 incorporates an electrode for detecting signal variations in the record groove 35 as capacitance variations during playback, the leaf spring 88 may be made of conductive material to provide an electrical path between the stylus electrode and the signal processing circuitry and a contact button 93 may be provided on a resonator circuit board 94 (Figure 17) for contacting the second end of the leaf spring 88 during containment of the cartridge 45 in the stylus housing compartment 44 as shown in Figures 21—23.

Figures 17—23 illustrate a sequence of operations involved in installation of the

cartridge 45 in the compartment 44. From Figure 17, it can be seen that the armstretcher 46 has a coupling member 95 for engagement with the connector plate 54 of the cartridge 45 during containment thereof in the compartment 44. The armstretcher 46 is slidably mounted in the compartment 44 for movement between a withdrawn position when the lid 83 is open (Figure 17) and an advanced position when the lid is closed (Figures 21-23) in response to the motion of the lid. The operation of the linkage that moves the armstretcher 46 can be seen from Figures 17-23. A coil spring 96 connected between the armstretcher 46 and the carriage 34 returns the armstretcher to the withdrawn position when the lid 83 is opened.

The cartridge 45 is placed in the compartment 44 as shown in Figure 18, and the lid 83 is closed. The cartridge 45 has a compartment 97 (Figure 3) which overlies the stylus arm lifter 47 during containment of the cartridge in the compartment 44. An opening 98 (Figure 3) is provided in the inner wall 125 of the cartridge 45 for permitting manipulation of the stylus arm 51 by the controlled rod 85 of the stylus arm lifter 47.

Initial engagement of the coupling member 95 with the connector plate 54 can be seen from Figure 19. The coupling member 95 enters the interior of the cartridge body 49 through an opening 99 (Figure 19) for engagement with the connector plate 54. As the armstretcher 46 moves forward, the coupling member 95 moves the connector plate 54 from initial tilted position (e.g., 8°) to a position matching the engaging surface of the support member (e.g., perpendicular to the bottom surface of the cartridge body 49) as shown in Figure 20. The elastic suspension member 57 permits the connector plate 54 to assume the new orientation.

As the lid 83 is closed further, the defeat lever 82 enters the interior of the cartridge body 49 through the opening 84 to depress the clamping spring 74 as shown in Figure 21. When the clamping spring 74 is depressed, the stylus arm 51 drops downward to rest on the rod 85 of the stylus arm lifter 47.

As the armstretcher 46 moves from the location in Figure 20 to the location in Figure 21, the cartridge 45 is pushed forward so that the second end of the leaf spring 88 engages the contact button 93 of the resonator circuit board 94. To prevent shearing motion between the second end of the leaf spring 88 and the contact button 93, the cartridge 45 has a pair of lug portions 100 and 101 at the front end thereof (Figures 2-3). The carriage 34 is provided with a pair of ramp portions such

as 102 (Figure 17) for engagement with the cartridge lug portions 100 and 101 during the forward motion of the cartridge 45 so that the second end of the leaf spring 88 is lifted away from the contact button 93 during the forward motion. The ramp portions have slots such as 104 (Figure 17) for receiving the lug portions 100 and 101 when the second end of the leaf spring 88 overlies the contact button 93 to establish electrical connection therebetween without undesirable shearing motion.

When the lid 83 is closed, a spring 106, secured to the lid, presses the armstretcher 46 down into the compartment 44 to establish proper seating of the armstretcher as shown in Figure 21. From Figure 1, it can be seen that a spring 107, secured to the compartment 44, presses the armstretcher 46 against the sidewall of the compartment to assure lateral alignment of the armstretcher.

Another spring 108, secured to the lid 83, presses against the depressed ledge 109 (Figure 2) of the cartridge 45, when the lid 83 is closed, to assure proper seating of the cartridge in the compartment 44 and to assure the desired positive contact between the second end of the leaf spring 88 and the contact button 93 as shown in Figure 21. Further, in order to assure stable mounting of the carriage 45 in the compartment 44, the cartridge is supported at three points therein. In addition to resting on the contact button 93 of the resonator circuit board 94 at the front end, the cartridge 45 is provided with two feet 110 and 111 at the rear end as shown in Figures 3 and 19-23.

In order to assure lateral alignment of the rear end of the cartridge 45 with the armstretcher 46, the armstretcher has a projection 112 which enters a recess 113 provided in the rear end of the cartridge during relative motion between the armstretcher and the cartridge as shown in Figures 1 and 19-23.

Further, in order to assure lateral alignment of the front end of the cartridge 45 with the contact button 93, the cartridge has a cavity 114 at the front end for receiving a portion 115 provided in a structure associated with the resonator circuit board 94 during relative motion between the cartridge and the carriage 34 as shown in Figure 1.

When the hinged plate 40 is closed, a projection 116 secured to the hinged plate depresses a plunger 117 connected with the rod 85 of the stylus arm lifter 47. An aperture 118 (Figure 2) is provided at the top of the cartridge body 49 to permit passage of the plunger 117 as shown in Figure 1.

When the carriage 34 is in the off-record rest position 38, the stylus 55 rests on a brush 119 upon depression of the lifter rod 85 by the plunger 117 as shown in Figure

22. Further, when the carriage 34 moves from the off-record rest position 38 to the above-record play position 39, the lifter rod 85 lifts the stylus arm 51 as depression of the plunger 117 is no longer maintained by the projection 116. Again, when the carriage 34 reaches the above-record play position 39, the stylus 55 rests on the record 31 upon activation of the stylus arm lifter 47.

10 When the stylus 55 is resting on the stylus brush 119 or the record 31, the compliant member 53 is not bent or stressed. This feature prevents formation of a set in the compliant member during containment of the cartridge 45 in the compartment 44 under rest conditions. Thus, the compliant member is in unstressed condition while the cartridge is outside the carriage compartment, and also while the cartridge is contained in the compartment and the carriage is in the off-record rest position or in the above-record play position. The compliant member is stressed only in the interval between the off-record rest position and the above-record play position of the carriage as the stylus arm is lifted to permit the stylus to clear the outside bead of the record. This intervals is so short that it has no noticeable effect on the "set" of the compliant member.

30 An aperture 121 (Figure 3) in the outer wall 123 of the cartridge 45 permits passage of writing between the stylus arm lifter 47 and the wiring channel 48. The cartridge 45 is provided with inner walls 124 and 125 closely flanking the stylus arm unit 50 to limit access thereto. The keyed end shape and the solid cover of the cartridge 45 prevents backward or inverted insertion of the cartridge into the compartment 44.

40 In addition to the U.K. specifications already mentioned, attention is directed to our copending Applications Nos. 37847/37849/75 (Serial No. 1,543,550) 37848/75 49107/75 (Serial No. 1,522,764), 49109/75 (Serial No. 1,552,765), 22369/76 (Serial No. 1,552,767), 20224/77 (Serial No. 1,552,769), 4092/78 (Serial No. 1,552,770) and 8294/8295/78 (Serial No. 1,549,159) directed to various combinations of features that are present in the described embodiment of the present invention or may be embodied therein.

55 WHAT WE CLAIM IS:—

1. A system for playing back signals pre-recorded along a spiral on a rotatable record; said system comprising:

- 60 a playback stylus;
- a carriage mounted for lateral motion relative to a base of said system in correlation with progressive lateral motion of said stylus as it follows said spiral during playback;

65 a stylus arm unit including a stylus arm

carrying said stylus at one end thereof, a connector plate, and a compliant member securing said connector plate to the other end of said stylus arm;

a cartridge body insertable in a compartment provided in said carriage and having walls defining a protective enclosure for said stylus arm unit;

means secured to the cartridge body for releasably clamping said stylus arm in a retracted position therein, said retracted position providing a location for said stylus withdrawn within the confines of said cartridge body remote from an opening in the bottom of the cartridge body through which said stylus can otherwise protrude; and

means flexibly suspending said connector plate within said cartridge body and establishing a location of said connector plate permitting engagement thereof with a coupling member within the carriage when said cartridge body is received in said compartment, said suspending means including a flexible member secured to said cartridge body and having a rear surface secured to said connector plate and oriented at a certain non-zero angle with respect to a front surface of the flexible member, said cartridge body having a bearing surface for engagement with said front surface to establish location of said front surface in said cartridge body, and said angle being such that said compliant member is unstressed when said stylus arm is retained in said retracted position in said cartridge body with said front surface of said flexible member in engagement with said bearing surface of said cartridge body.

2. A system as defined in Claim 1 wherein said flexible member comprises a plurality of elastic straps joining a pair of spaced ribs and means for securing said flexible member to said cartridge body comprises a pair of spaced hooks for retaining said spaced pair of ribs, back surfaces of said elastic straps defining said rear surface oriented at said certain angle with respect to said front surface, the latter being defined by forward surfaces of said elastic straps.

3. A system as defined in Claim 1 or 2 wherein the angular orientation of said connector plate with respect to said cartridge body when said connector plate is rigidly engaged with said coupling member during containment of said cartridge body in said compartment, and the angular orientation of said compliant member with respect to said connector plate, are such that said compliant member is unstressed when said protrusion of said stylus through said opening is effected by release of said clamping means during said engagement of said connector plate and said coupling member.

4. A system as defined in Claim 3



13

1,552,768

22. Further, when the carriage 34 moves from the off-record rest position 38 to the above-record play position 39, the lifter rod 85 lifts the stylus arm 51 as depression of the plunger 117 is no longer maintained by the projection 116. Again, when the carriage 34 reaches the above-record play position 39, the stylus 55 rests on the record 31 upon activation of the stylus arm lifter 47.

When the stylus 55 is resting on the stylus brush 119 or the record 31, the compliant member 53 is not bent or stressed. This feature prevents formation of a set in the compliant member during containment of the cartridge 45 in the compartment 44 under rest conditions. Thus, the compliant member is in unstressed condition while the cartridge is outside the carriage compartment, and also while the cartridge is contained in the compartment and the carriage is in the off-record rest position or in the above-record play position. The compliant member is stressed only in the interval between the off-record rest position and the above-record play position of the carriage as the stylus arm is lifted to permit the stylus to clear the outside bead of the record. This interval is so short that it has no noticeable effect on the "set" of the compliant member.

An aperture 121 (Figure 3) in the outer wall 123 of the cartridge 45 permits passage of writing between the stylus arm lifter 47 and the wiring channel 48. The cartridge 45 is provided with inner walls 124 and 125 closely flanking the stylus arm unit 50 to limit access thereto. The keyed end shape and the solid cover of the cartridge 45 prevents backward or inverted insertion of the cartridge into the compartment 44.

In addition to the U.K. specifications already mentioned, attention is directed to our copending Applications Nos. 37847/37849/75 (Serial No. 1,543,550), 37848/75 49107/75 (Serial No. 1,522,764), 49109/75 (Serial No. 1,552,765), 22369/76 (Serial No. 1,552,767), 20224/77 (Serial No. 1,552,769), 4092/78 (Serial No. 1,552,770) and 8294/8295/78 (Serial No. 1,549,159) directed to various combinations of features that are present in the described embodiment of the present invention or may be embodied therein.

WHAT WE CLAIM IS:—

1. A system for playing back signals pre-recorded along a spiral on a rotatable record; said system comprising:

a playback stylus;

a carriage mounted for lateral motion relative to a base of said system in correlation with progressive lateral motion of said stylus as it follows said spiral during playback;

a stylus arm unit including a stylus arm

carrying said stylus at one end thereof, a connector plate, and a compliant member securing said connector plate to the other end of said stylus arm;

a cartridge body insertable in a compartment provided in said carriage and having walls defining a protective enclosure for said stylus arm unit;

means secured to the cartridge body for releasably clamping said stylus arm in a retracted position therein, said retracted position providing a location for said stylus withdrawn within the confines of said cartridge body remote from an opening in the bottom of the cartridge body through which said stylus can otherwise protrude; and

means flexibly suspending said connector plate within said cartridge body and establishing a location of said connector plate permitting engagement thereof with a coupling member within the carriage when said cartridge body is received in said compartment, said suspending means including a flexible member secured to said cartridge body and having a rear surface secured to said connector plate and oriented at a certain non-zero angle with respect to a front surface of the flexible member, said cartridge body having a bearing surface for engagement with said front surface to establish location of said front surface in said cartridge body, and said angle being such that said compliant member is unstressed when said stylus arm is retained in said retracted position in said cartridge body with said front surface of said flexible member in engagement with said bearing surface of said cartridge body.

2. A system as defined in Claim 1 wherein said flexible member comprises a plurality of elastic straps joining a pair of spaced ribs and means for securing said flexible member to said cartridge body comprises a pair of spaced hooks for retaining said spaced pair of ribs, back surfaces of said elastic straps defining said rear surface oriented at said certain angle with respect to said front surface, the latter being defined by forward surfaces of said elastic straps.

3. A system as defined in Claim 1 or 2 wherein the angular orientation of said connector plate with respect to said cartridge body when said connector plate is rigidly engaged with said coupling member during containment of said cartridge body in said compartment, and the angular orientation of said compliant member with respect to said connector plate, are such that said compliant member is unstressed when said protrusion of said stylus through said opening is effected by release of said clamping means during said engagement of said connector plate and said coupling member.

4. A system as defined in Claim 3



5 further including means mounted in said carriage for causing cyclical motion of said coupling member, and thus of said connector plate when engaged therewith, for varying the position of said stylus along said spiral during playback in a manner that opposes deviations of stylus relative speed along the spiral from a predetermined speed.

10 5. A system as defined in Claim 4 including means for providing relative displacement between said cyclical motion causing means and said cartridge body to effect said engagement between said connector plate and said coupling member with the cartridge body inserted into said carriage, and wherein said cyclical motion causing means has a portion engageable with a co-operating portion provided in said cartridge body for laterally aligning said cartridge body with respect to said cyclical motion causing means during said relative displacement.

25 6. A cartridge for use in a system for playing back prerecorded signals from a disc record, said cartridge comprising:

30 a stylus arm unit including a playback stylus, a stylus arm carrying said stylus at one end thereof, a connector plate, and a compliant member securing said connector plate to the other end of said stylus arm;

35 a cartridge body having walls defining a protective enclosure for said stylus arm unit; means for releasably clamping said stylus arm in a retracted position in said cartridge body, said retracted position providing a location for said stylus withdrawn within the confines of said cartridge body remote from an opening in the bottom of said cartridge body through which said stylus can otherwise protrude; and

40 means flexibly suspending said connector plate within said cartridge body; said suspending means including a flexible member secured to said cartridge body and having a rear surface slanted with respect to a front surface of the flexible member; said connector plate being secured to said rear surface; said cartridge body having a bearing surface for engagement with said front surface of said flexible member, and the slant of said rear surface being such that said

compliant member is unstressed when said stylus arm is retained in said retracted position in said cartridge body with said front surface of said flexible member in engagement with said bearing surface of said cartridge body.

7. A system or cartridge as defined in any preceding claim wherein said releasable clamping means comprises a U-shaped spring; said U-shaped spring having a pair of spaced leg portions and a cross portion joining said spaced leg portions; said spaced leg portions defining an arched portion; the end portions of said spaced leg portions being secured in said cartridge body so that the apex of said arched portion is located away from said opening in the bottom of said cartridge body; and said stylus arm resting on said cross portion and nesting between said spaced leg portions when said stylus arm is retained in said retracted position.

8. A system as defined in Claim 7 as appended to any of Claims 1—5 wherein said carriage has a lid for closing said compartment, and a spring defeat lever is secured to said lid, the location of said defeat lever relative to said carriage being such that said defeat lever depresses said arched portion of said clamping spring to a depressed location to release said stylus arm from said retracted position when said lid is closed during containment of said cartridge body in said compartment.

9. A system or cartridge as defined in Claim 7 or 8 wherein said cartridge body is provided with a pair of spaced anchor portions for engagement with spaced leg portions of said clamping spring when said arched portion is sufficiently depressed toward said opening, to permit retention of said clamping spring in a locked location.

10. Record playback apparatus or a stylus cartridge therefor, substantially as hereinbefore described with reference to the accompanying drawings.

T. I. M. SMITH,
Chartered Patent Agent,
50 Curzon Street,
London, W1Y 8EU.
Agent for the Applicants.