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Vibration damping suspension mechanism for recorded data reproducing apparatus
Schwingungsdämpfender Aufhängemechanismus für Wiedergabegerät von aufgezeichneten Daten
Mécanisme de suspension à amortissement de vibrations pour appareil de reproduction de données enregistrées

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Description

The present invention relates to a vibration damping support mechanism for a recorded data reproducing apparatus for playback of data recorded on a data recording medium such as a CD.

Recorded data reproducing apparatuses, e.g., home CD players, are substantially designed for use in a horizontal position. However, a car CD player is limited to the size which should be accommodated in a narrow, given space of the interior or trunk room of the car. More particularly, its construction is determined to set in a vertical or horizontal position depending on the shape of an available installation area and the relation to other components. To this end, car CD players or recorded data reproducing apparatuses are required to offer the freedom of installation.

We, the inventors, developed a number of CD players capable of being installed in either a horizontal or vertical position and also, performing an optimum data pickup action in its position. As disclosed in Japanese Patent Application No. 1-109666 (1989), one of the invented car CD players is for example illustrated in Fig. 1 where a support frame 1 is suspended by a floating suspension system in an outer casing 2. The floating suspension system comprises four dampers to 2a to 2aq filled with a viscous fluid, e.g., silicon oil, and fixedly mounted to the four inside corners of the outer casing 2 and four support bars 2b to 2bq inserted at one end to their respective dampers 2a to 2aq. The other ends of the support bars 2b to 2bq are mounted to four support plates 1a to 1aq respectively which are fixedly attached to the support frame 1.

The support frame 1 contains a magazine 3 which has a plurality of trays placed one over the other and serves as a disk changer for replacement of a disk by advancing a selected one of the trays to a pickup station. In action, the selected tray 3b, carrying a desired disk 3aa, is moved out by a given kickout mechanism to a playback position shown in Fig. 1. The disk 3aa is then held at the position by a clapper (not shown) and its recorded data is read out with a pickup 3c for playback.

In addition, a vibration damping mechanism 4 is provided between the outer side of the support frame 1 and the inner side of the outer casing 2. The vibration damping mechanism 4 comprises four damper springs 4a to 4aq mounted at one end to the outer side of the support frame 1 and at the other end to the inner side of the outer casing 2. More particularly, the damper springs 4a to 4aq are pivotally fitted at lower end to four pivot pins 4b to 4bq respectively mounted on the outer side of the support frame 1 and at upper end to projecting portions 4j to 4jq of four rotary plates 4c to 4cq respectively mounted to the inner side of the outer casing 2.

The rotary plate 4cq is mounted by a pivot pin 4dq to the inner side of the outer casing 2 for rotating movement. The rotary plate 4cq has two arcuate slots 4eq and 4fq arranged therein symmetrical about the pivot pin 4dq each slot extending through 90 degrees. The two arcuate slots 4eq, 4fq are adapted to engage with a pair of guide pins 4gr and 4hr fixedly mounted to the inner side of the outer casing 2. The other three rotary plates 4c1, 4c3, 4c2 are constructed in the same manner.

As the CD player is placed in a horizontal position, the projecting portions 4j to 4jq of the rotary plates 4c1 to 4cq come upward and the damper springs 4a to 4aq extend almost vertically so that the support frame 1 is suspended by the outer casing 2. During the running of a vehicle carrying the CD player, resultant upward and downward stress caused by vibration or shaking will be absorbed by the elastic action of the damper springs 4a to 4aq thus hardly affecting the support frame 1.

When the CD player is shifted from its horizontal position to a vertical position, the four rotary plates 4c1 to 4cq are turned 90 degrees in the same direction so that the damper springs 4a to 4aq extend deepthwise of the outer casing 2. As the result, the support frame 1 can be suspended upright in the outer casing 2 placed vertically. During the running, external stress resulting from vibration and shaking will also be absorbed by the elastic actions of the damper springs 4a to 4aq thus hardly acting on the support frame 1.

The car CD player can be placed in either a horizontal or vertical position after the tensioning direction of the damper springs 4a to 4aq is adjusted by turning their respective rotary plates 4c1 to 4cq. Accordingly, the installation of the CD player will arbitrarily be determined depending on an applicable space in the interior of a car. However, the disadvantage is that all the damper springs 4a to 4aq have to be manually reset to extend in one direction whenever the CD player is shifted from one position to the other.

The turning of the rotary plates 4c1 to 4cq for resetting the damper springs 4a to 4aq in a given direction is a troublesome task. It may hence happen that the CD player is placed to a desired position while one or more of the rotary plates, e.g., 4c1 to 4cq shown in Fig. 1, remain unturned in the original position. Also, after the installation, it will be hard to examine whether the damper springs 4a to 4aq are correctly reset to extend in the same direction.

If any of the damper springs 4a to 4aq is placed in a different direction, external stress resulting from vibration or shaking during the running will not effectively be absorbed but transmitted through the dampers 2a to 2aq to the support frame 1 which in turn starts vibrating. This will result in functional deterioration of the dampers 2a to 2aq and cause a disk loading and a playback mechanism of the magazine 3, including the pickup 3c, contained in the support frame 1 to perform fault actions or become defective.

It is an object of the present invention, for elimination of the foregoing disadvantage, to provide a vibration damping support mechanism for a recorded data reproducing apparatus in which the tensioning direction of
damper springs is automatically shifted corresponding to either the horizontal or vertical installation position in order to perform an optimum cushioning action for suspending the weight of a main recorded data reproducing unit of which loading mechanism and playback device are thus protected from external vibration and shock.

It is another object of the present invention to provide a vibration damping support mechanism for a recorded data reproducing apparatus in which the support frame is mounted by oppositely extending damper springs to an outer casing. In action, external vibrations can efficiently be absorbed by the elastic action of the damper springs without resetting the damper springs when the reproducing apparatus is changed from its original position to a horizontal or vertical position. As the result, the loading mechanism and playback device in the support frame will be protected from the external vibrations.

In accordance with a first aspect of the present invention, there is provided a vibration damping support mechanism as set out in appended Claim 1.

In particular, a vibration damping support mechanism for a recorded data reproducing apparatus having the first feature of the present invention is provided for supporting a main recorded data reproducing unit by the elastic action of vibration damping elements mounted on both sides of the main recorded data reproducing unit in an outer casing. The vibration damping element comprises a holding projection provided on the side panel of the main recorded data reproducing unit, two holding portions provided on the inner surfaces of the side panel of the outer casing, and a pair of damper springs mounted between the holding portions and the holding projection to extend in different directions so that one of the two damper springs absorbs vibrations appearing in the thicknesswise direction of the main recorded data reproducing unit while the other absorbs vibrations appearing in the depthwise direction of the same.

In the action of the vibration damping support mechanism for a recorded data reproducing apparatus having the first feature, when the recorded data reproducing apparatus is changed from its original position to a horizontal or vertical position e.g. on the floor of a vehicle, one of each two damping springs works corresponding to the new position and prevents external stresses caused by vibration and shaking during the running of the vehicle from transmitting directly to the main reproducing unit. If the apparatus has to be placed in a tilting position due to an applicable space for the installation inside the vehicle, the two damper springs serve in combination as a damping element to prevent direct propagation of the external vibrations to the main reproducing unit.

In accordance with a second aspect of the present invention, there is provided a vibration damping support mechanism as set out in appended Claim 2.

Still furthermore, a vibration damping support mechanism for a recorded data reproducing apparatus having the second feature of the present invention is provided for supporting a main recorded data reproducing unit by the elastic action of vibration damping elements mounted on both sides of the main recorded data reproducing unit in an outer casing. The vibration damping element comprises a holding projection provided on the side panel of the main recorded data reproducing unit, two holding portions provided on the inner surface of the side panel of the outer casing, and a pair of damper springs mounted between the holding portions and the holding projection. The tensioning direction of the two damper springs is set at a predetermined angle such that the movement of the holding projection is limited to a small area while a load is applied in different directions.

In the action of the vibration damping support mechanism for a recorded data reproducing apparatus having the second feature, one of each two damper springs of which tensioning direction is set at such an angle that the movement of the holding projection to which the two springs are coupled at one end is limited to a small area, is hardly interfered in the elastic action by the other damper spring. Accordingly, unwanted propagation of external vibration to the main reproducing unit will successfully be avoided.

Fig. 1 is a view of a prior art vibration damping support mechanism for a recorded data reproducing apparatus introduced by the same inventors; Fig. 2 is a view of a vibration damping support mechanism showing an embodiment of the present invention associated with a first feature; Fig. 3 is an enlarged view of the vibration damping support mechanism shown in Fig. 2; Fig. 4 is a view of a vibration damping support mechanism in which each damper spring consists of a pair of springs coupled directly to each other; Fig. 5 is a view showing the joint between the two springs of Fig. 4 displaced; Fig. 6 is a view of the damper spring fitted loosely to a holding portion; Fig. 7 is a view of a vibration damping support mechanism showing another embodiment of the present invention associated with a second feature; Fig. 8 is an enlarged view of the vibration damping support mechanism shown in Fig. 7; Fig. 9 is an explanatory view showing determination of a setting angle of the damper springs; Fig. 10 is a view showing two horizontally placed springs being loaded at their joint point; and Fig. 11 is a diagram of different displaced points of the joint between the two springs showing high and low density parts of a distribution.

Preferred embodiments of the present invention will be described in more detail referring to the accompanying drawings.

As shown in Fig. 2, a vibration damping support
mechanism of the present invention having the first feature is provided with two vibration damping elements on each side of the main reproducing unit of a reproducing apparatus. More particularly, the main reproducing unit 10 is floatingly suspended by four dampers arranged at the inner corners of an outer casing 20, similar to the construction shown in Fig. 1. Hence, the damping elements 30 are to be disposed between the main reproducing unit 10 and the outer casing 20 of the reproducing apparatus.

The two, front and rear, damping elements 30 are mounted on each side of the main reproducing unit 10; four in total are identical in the construction. The damping element 30 has two damper springs 31a, 31b arranged in the thicknesswise and depthwise directions of the main reproducing unit 10 respectively or at a right angle to each other.

The two damper springs 31a, 31b of each damping element 30 are coupled at the same ends to a hook 15 formed on the top of a projection extending outwardly from the side panel of the main reproducing unit 10.

Each side panel of the outer casing 20 incorporates a chassis plate 22 having two openings 23 formed therein to match the two damping elements 30 in one side. In each opening 23, two projections 24a, 24b are arranged extending from the chassis plate 22 as shown in Fig. 3. More specifically, the projection 24a extends in the depthwise direction of the main reproducing unit 10 while the other projection 24b extends in the thicknesswise direction of the same.

The projections 24a, 24b have at distal end holding portions 25a, 25b for holding the other ends of the two damper springs 31a, 31b respectively. The projections 24a, 24b also have at proximal end reinforcement ribs 26a, 26b arranged thereon respectively for minimizing deformation or distortion of the projections 24a, 24b caused by the opposing forces of the damper springs 31a, 31b and spacing the hook ends of the damper springs 31a, 31b in engagement with the projections 24a, 24b of the chassis plate 22 from the inner wall of an enclosure.

As the damper springs 31a, 31b are set in the thickness- and depthwise directions respectively of the main reproducing unit 10, the shifting of the damper springs 4a, 4b, 4c, 4d of their respective rotary plates 4c, 4d from one position to the other explained in Fig. 1 will be no more needed.

When the reproducing apparatus is placed in the horizontal position as shown in Fig. 2, its main reproducing unit 10 is suspended by the damper springs 31a in the outer casing 20. During the running, external vibration and shock provide stresses in the thicknesswise direction of the main reproducing unit 10. In motion, the vibration and shock are absorbed by the elastic action of a group of the thicknesswisely or vertically extending damper springs 31a. The other group of the damper springs 31b remains free in the depthwise direction.

Similarly, when the reproducing apparatus is placed in the vertical position, its main reproducing unit 10 is suspended by a group of the depthwisely extending damper springs 31b in the outer casing 20. The vibration and shock which provide stresses in the depthwise direction of the main reproducing unit 10 during the running are absorbed by the elastic action of the damper springs 31b with equal success. Also, the other group of the damper springs 31a remains elastic in the thicknesswise direction of the main reproducing unit 10.

In action, either group of the damper springs 31a or 31b works corresponding to the position of the main reproducing unit 10 and during the running, prevents external vibrations from propagating directly to the main reproducing unit 10. In case that the reproducing apparatus has to be placed in a tilt position due to the availability of an installation space limited by the other components, the damper springs 31a, 31b serve in combination as cushion elements to avoid direct propagation of unwanted vibrations to the main reproducing unit 10.

The elastic action of one group of the damper springs (31a as illustrated in Figs. 2 and 3) by which the main reproducing unit 10 is suspended may be interfered by the other group of the damper springs (31b). For elimination of the interference of the opposite damper spring 31b or 31a, the damper spring 31a or 31b is preferably consisted of a couple of springs 31a1 and 31a2 or 31b1 and 31b2 which are coupled to each other in a row, as shown in Fig. 4.

When the damper springs 31a suspending the main reproducing unit 10 are in action with the other damper springs 31b set stationary between the hooks 15 and the holding portions 25b, their elastic effect will be attenuated more or less due to interference thus providing an unsatisfactory damping action. In an equal case, the damper spring 31b consisting of the two springs 31b1, 31b2 can have a joint 32 between the two springs 31b1 and 31b2 to move upward and downward as best shown in Fig. 5. Accordingly, the interference effect of the damper springs 31b is minimized and the damper springs 31a will perform an optimum elastic action preventing the direct propagation of external vibrations to the main reproducing unit 10.

It is also a good idea that the damper springs 31a, 31b are coupled to their respective holding portions 25a, 25b with looseness but securely so that they are never disengaged from the same, as shown in Fig. 6. This loose coupling will also permit the elastic action of the damper springs 31a to be less interfered by the opposite damper springs 31b and thus provide maximum effects to absorb the external vibrations.

In more particular, the holding portions 25a, 25b have deep notches 27a, 27b therein respectively so that the remaining regions 25a, 25b are smaller in width than the inner diameter of end rings 33a, 33b of their respective damper springs 31a, 31b. The end ring 33a or 33b is fitted on the remaining region 25a or 25b with a proper clearance. In action, as the damper spring 31a is loaded by the weight of the main reproducing unit 10, the op-
posite damper spring 31b also moves with its end ring 33b due to the clearance and will rarely interfere the elastic action of the damper spring 31a. Such a clearance may be provided between the other end of each of the damper springs 31a, 31b and the hook 15 of the main reproducing unit 10.

Fig. 7 illustrates a further embodiment of the present invention showing a still further vibration damping support mechanism associated with the second feature, in which the outer casing 20 has two projections 24a, 24b at each opening 23 provided therein. The two projections 24a, 24b have holding portions 25a, 25b respectively to which two damper springs 31a, 31b are coupled at one end. The damper springs 31a, 31b are coupled at the other end to a hook 15 provided on the main reproducing unit 10 so that they extend diagonally in the opening 23 between the two holding portions 25a, 25b while being unloaded.

When the reproducing apparatus is placed in a horizontal position, the weight of the main reproducing unit 10 is supported by the damper springs 31a mounted between the holding portion 25a and the hook 15. As the result, each damper spring 31a is tensioned as shown in Figs. 7 and 8. Also, the opposite damper spring 31b mounted between the holding portion 25b and the hook 15 extends as being tensioned but less than the damper spring 31a. The elastic actions of the two damper springs 31a, 31b are rendered in combination for absorbing external vibrations exerted on the reproducing apparatus.

With the reproducing apparatus placed in a vertical position, the damper spring 31b is tensioned harder and extends more than the damper spring 31a. Accordingly, the external vibrations are absorbed mainly by the elastic action of the damper springs 31b.

As the main reproducing unit 10 is suspended in the outer casing 20, its hook 15 moves downward from its original position on a line extending between the two holding portions 25a and 25b thus producing an angle between the two damper springs 31a and 31b. This will allow the elastic action of one of the two damper springs 31a, 31b to be less interfered by the other. Accordingly, the main reproducing unit 10 placed in either the horizontal or vertical position will effectively be prevented from receiving a direct load of the external vibrations.

For minimizing the movement of the two diagonally aligned damper springs 31a, 31b in shifting from the original position to a horizontal or vertical position and ensuring the optimum elastic action of the same, the tilting angle of the two damper springs 31a, 31b is preferably predetermined to a specific degree. More particularly, the tilting angle will be determined in the following manner.

It is assumed as shown in Fig. 9 that two springs S1 and S2 of the same spring constant which extend from their respective support points P1 and P2 are coupled at a joint point P0 to each other. While no load is applied to the joint P0, the springs S1, S2 which are L10 and L20 respectively in the initial length rest on a reference line between the two support points P1 and P2. The tilting angle α of the two springs S1, S2 is expressed by an angle between the reference line from the support point P1 to P2 and the horizontal line.

As a load mg of weight is applied to the joint P0, the spring S1 is compressed to L11 which is smaller than L10 and the other spring S2 extends to L21 as being mostly tensioned by mg. Simultaneously, the joint P0 is displaced downward from the reference line between the two support points P1 and P2. If the reproducing apparatus is an automotive disk changer, the counter movement or damping stroke of the main reproducing unit 10 for offsetting the energy of vibrations has to be commissioned in all directions. The displacement of the joint P0 results from the action of the load mg depending on the horizontal or vertical position of the reproducing apparatus. The damping stroke of the main reproducing unit 10 will hence be guaranteed by decreasing the displacement of the joint P0 to a minimum.

To this end, the relation of the tilting angle α to the displacement of the joint P0 was examined. Two support points P1 and P2 were first determined to align in horizontal as shown in Fig. 10. A couple of springs S1 and S2 coupled at a joint point P0 to each other were mounted between the two support points P1 and P2. The joint P0 stayed at the original point 0 when no load was applied. When a downward force F was applied to the joint P0, the two springs S1, S2 started extending and their joint P0 moved downward from the original point 0.

As the applying direction of the force F to the joint P0 was varied every 15 degrees, the joint P0 moved to different points Pn shown in Fig. 11. As apparent from Fig. 11, a distribution of the points Pn contains high and low density profiles. A low density of the points Pn means that the joint P0 is displaced a greater distance when the direction of application of the force F varies 15 degrees. This greater displacement will decrease the damping stroke of the main reproducing unit 10.

A high density of the points Pn indicates that the joint P0 was displaced a smaller distance with the force F being altered in the applying direction. Accordingly, the high density profile of the points Pn is appropriated to a desired tilting range for the reproducing apparatus to minimize the displacement of the joint P0 in response to shifting of the installation position and to ensure the damping stroke with consistency. When the reproducing apparatus is shifted from the horizontal position to the vertical, the direction of application of the force F varies 90 degrees.

In more particular, the high density profile of the points Pn in 90 degrees is defined by two, right and left, 45-degree ranges of the application of the force F at the upper (or lower) half of the distribution of Pn of which form is symmetrical about the horizontal line of Fig. 11. When the two support points P1, P2 and the joint P0 are designated as the holding portions 25a, 25b and the hook 15 respectively (See Figs. 7 and 8), the two damp-
er springs 31a, 31b are tensioned by a force \( F_H \) in the horizontal position or a force \( F_V \) in the vertical position. In either case, the joint \( P_P \) stays within a range of the high density profile of the points \( P_P \). As apparent, the displacement of the joint between the two damper springs 31a, 31b remains small in shifting of the position of the main reproducing unit 10 regardless of the horizontal or vertical position of the reproducing apparatus and thus, the damping stroke of the main reproducing unit 10 can be maintained optimum.

The above description with Figs. 9 to 11 employs the two damper springs \( S_1 \) and \( S_2 \) having the same spring factor. However, the damper springs 31a, 31b of the damping mechanism are not limited to \( S_1 \) and \( S_2 \) and will be used of different spring factors with equal success. In that case, the application angle of a force \( F \) corresponding to the high density profile of the points \( P_P \) in 90 degrees varies due to the spring factor difference between the two damper springs. The tilting angle \( \alpha \) of the damper springs should be recalculated according to an applicable range of the applying directions of the force \( F \).

As set forth above, the vibration damping support mechanism of the present invention allows any external stress caused by vibration and shaking during the running of a vehicle to be efficiently absorbed by the elastic action of its damper springs regardless of the horizontal or vertical position of a recorded data reproducing apparatus, thus preventing the direct propagation of the external stress to the main reproducing unit of the apparatus suspended by a floating support device. Also, when the apparatus is shifted from its original position to a horizontal, vertical, or tilting position at a given angle between 0 and 90 degrees, the resetting of the damper springs is not needed and the installation of the apparatus itself will be carried out with much ease. The reproducing apparatus equipped with the vibration damping support mechanism of the present invention will hence ensure quality playback actions for a long period of time with absence of unnecessary error, fault, and troubles.

**Claims**

1. A vibration damping support mechanism for a recorded data reproducing apparatus which comprises a main recorded data reproducing unit (10) having at least two side panels, each side panel being provided with at least one holding projection (15); the vibration damping support mechanism comprising an outer casing (20) for containing the main recorded data reproducing unit (10), the outer casing comprising a pair of side panels, two holding portions (25a,25b) provided on inner surfaces of each of the side panels and respective pairs of damper springs (31a,31b) for connection at first respective ends thereof to the at least one holding projection (15) on each side panel of the main recorded data reproducing unit in order to support that unit, second respective ends of the damper springs being connected to the holding portions (25a,25b) to extend in different directions so that one (31a) of each of said pair of damper springs absorbs vibrations appearing in the thickness direction of said main recorded data reproducing unit (10) while the other (31b) absorbs vibrations appearing in the depthwise direction of the main recorded data reproducing unit.

2. A vibration damping support mechanism for a recorded data reproducing apparatus which comprises a main recorded data reproducing unit (10) having at least two side panels, each side panel being provided with at least one holding projection (15); the vibration damping support mechanism comprising an outer casing (20) for containing the main recorded data reproducing unit (10), the outer casing comprising a pair of side panels, two holding portions (25a,25b) provided on inner surfaces of each of the side panels and respective pairs of damper springs (31a,31b) for connection at first respective ends thereof to the at least one holding projection (15) on each side panel of the main recorded data reproducing unit in order to support that unit, second respective ends of the damper springs being connected to the holding portions (25a,25b) so that each said pair of damper springs are arranged at a non-orthogonal angle to one another such that the movement of said holding projection (15) is limited to a small area while a load is applied in different directions.

3. A vibration damping support mechanism as set forth in Claim 1, wherein each spring (31a,31b) of each respective pair of damper springs comprises a couple of springs (31a1, 31a2, 31b1, 31b2) coupled to each other in a row.

4. A vibration damping support mechanism as set forth in Claim 1 or Claim 3, wherein one spring of each said pair of damper springs extends in the horizontal direction and the other spring of each said pair of damper springs extends in the vertical direction.

5. A vibration damping support mechanism as set forth in Claim 2, wherein one of said two holding portions on each side panel is situated above said holding projection in the gravitational direction and the other of said two holding portions is situated below said holding projection in the gravitational direction.
Patentansprüche

1. Schwingungsdämpfender Trägermechanismus für eine Wiedergabevorrichtung von aufgenommenen Daten, welcher eine Hauptwiedergabeeinheit (10) von aufgenommenen Daten mit zumindest zwei Seitenverkleidungen aufweist, wobei jede Seitenverkleidung mit zumindest einer Halterungsauskrümmung (15) versehen ist: wobei der schwingungsdämpfende Trägermechanismus ein äußeres Gehäuse (20) zum Aufnehmen der Hauptwiedergabeeinheit (10) von den aufgenommenen Daten aufweist, wobei das äußere Gehäuse ein Paar von Seitenverkleidungen, zwei Halteabschnitte (25a, 25b), die auf den Innenoberflächen jeder der Seitenverkleidungen vorgesehen sind, und jeweilige Paare von Dämpfungsfedern (31a, 31b) zur Verbindung an ihren ersten jeweiligen Enden mit der zumindest eine Halterungsauskrümmung (15) auf jeder Seitenverkleidung der Hauptwiedergabeeinheit von den aufgenommenen Daten zum Tragen dieser Einheit aufweist, wobei jeweilige zweite Enden der Dämpfungsfedern mit den Halteabschnitten (25a, 25b) derart verbunden sind, daß sie in verschiedene Richtungen laufen, so daß eine (31a) von jeweils einem Paar von Dämpfungsfedern Schwingungen absorbiert, die in der Dickenrichtung der Hauptwiedergabeeinheit (10) für aufgenommene Daten auftreten, während die andere (31b) Schwingungen absorbiert, die in der Tiefenrichtung der Hauptwiedergabeeinheit für aufgenommene Daten auftreten.

2. Schwingungsdämpfender Trägermechanismus für eine Wiedergabevorrichtung für aufgenommene Daten, welche eine Hauptwiedergabeeinheit (10) für die aufgenommenen Daten mit zumindest zwei Seitenverkleidungen aufweist, wobei jede Seitenverkleidung mit zumindest einer Halterungsauskrümmung (15) versehen ist: wobei der schwingungsdämpfende Trägermechanismus ein äußeres Gehäuse (20) zum Aufnehmen der Hauptwiedergabeeinheit (10) der aufgenommenen Daten aufweist, wobei das äußere Gehäuse ein Paar von Seitenverkleidungen, zwei Halteabschnitte (25a, 25b), die auf den Innenoberflächen jeder der Seitenverkleidungen vorgesehen sind, und jeweilige Paare von Dämpfungsfedern (31a, 31b) zur Verbindung an ihren ersten jeweiligen Enden mit der zumindest einen Halteauskrümmung (15) auf jeder Seitenverkleidung der Hauptwiedergabeeinheit der aufgenommenen Daten zum Tragen dieser Einheit, wobei jeweilige zweite Enden der Dämpfungsfedern mit den Halteabschnitten (25a, 25b) derart verbunden sind, daß jedes Paar an Dämpfungsfedern unter einem nicht senkrechten Winkel zueinander angeordnet ist, so daß die Bewegung der Halterungsauskrümmung (15) auf einen kleinen Bereich be- grenzt ist, wenn eine Belastung in unterschiedliche Richtungen angelegt wird.

3. Schwingungsdämpfende Trägermechanismus nach Anspruch 1, wobei jede Feder (31a; 31b) des jeweiligen Paars von Dämpfungsfedern ein Paar von Federn (31a1; 31a2; 31b1; 31b2) aufweist, welche miteinander in einer Reihe verbunden sind.

4. Schwingungsdämpfender Trägermechanismus nach Anspruch 1 oder Anspruch 3, wobei eine Feder von jedem Paar Dämpfungsfedern in der horizontalen Richtung verläuft, und die andere Feder von jedem Paar der Dämpfungsfedern in der vertikalen Richtung verläuft.

5. Schwingungsdämpfender Trägermechanismus nach Anspruch 2, wobei einer der zwei Halteabschnitte auf jeder Seitenverkleidung oberhalb der Halterungsauskrümmung in der Schwerkraftrichtung liegt und der andere der zwei Halteabschnitte unterhalb der Halterungsauskrümmung in der Schwerkraftrichtung liegt.

Revidierungen

1. Mécanisme de support amortisseur de vibrations pour appareil de reproduction de données enregistrées, comprenant une unité principale de reproduction de données enregistrées (10) comportant au moins deux panneaux latéraux, chaque panneau latéral étant muni d'au moins une saillie de maintien (15), le mécanisme de support amortisseur de vibrations comprenant un boîtier externe (20) pour loger l'unité principale (10) de reproduction de données enregistrées, le dit boîtier extérieur comprenant deux panneaux latéraux, deux portions de support (25a, 25b) prévues sur des faces internes de chacun des panneaux latéraux, et des couples respectifs de ressorts d'amortissement (31a, 31b) reliés à leurs premières extrémités respectives à au moins une saillie de maintien (15) de chaque panneau latéral de l'unité principale de reproduction de données enregistrées, en vue de maintenir ladite unité, les secondes extrémités respectives des ressorts d'amortissement étant reliées aux portions de support (25a, 25b) et s'étendant dans des directions différentes, de manière à ce que l'un (31a) de chaque couple de ressorts d'amortissement absorbe les vibrations qui apparaissent dans la direction de l'épaisseur de l'unité principale (10) de reproduction de données enregistrées, tandis que l'autre (31b) absorbe les vibrations qui apparaissent dans la direction de la profondeur de l'unité principale de reproduction de données enregistrées.

2. Mécanisme de support amortisseur de vibrations
pour appareil de reproduction de données enregistrées, comprenant une unité principale (10) de reproduction de données enregistrées comportant au moins deux panneaux latéraux, chaque panneau latéral étant muni d'au moins une saillie de maintien (15), le mécanisme de support amortisseur de vibrations comprenant un boîtier externe (20) pour loger l'unité principale (10) de reproduction de données enregistrées, le boîtier externe comprenant deux panneaux latéraux, deux portions de support (25a, 25b) prévues sur la face interne de chacun des panneaux latéraux, et des couples respectifs de ressorts (31a, 31b) dont les premières extrémités respectives sont reliées à au moins une saillie de maintien (15) de chaque panneau latéral de l'unité principale de reproduction de données enregistrées pour maintenir ladite unité, les deuxièmes extrémités respectives des ressorts d'amortissement étant reliées aux portions de support (25a, 25b), de manière à ce que les ressorts d'amortissement de chaque couple soient agencés l'un par rapport à l'autre sous un angle non orthogonal, le mouvement de la saillie de maintien (15) étant de ce fait limité à une région de petites dimensions, alors qu'une charge est appliquée dans différentes directions.

3. Mécanisme de support amortisseur de vibrations selon la revendication 1, dans lequel chaque ressort (31a, 31b) de chaque couple de ressorts d'amortissement comprend un couple de ressorts (31a1, 31a2 ; 31b1, 31b2) couplés entre eux en ligne.

4. Mécanisme de support amortisseur de vibrations selon la revendication 1 ou 3, dans lequel un ressort de chaque couple de ressorts d'amortissement s'étend dans la direction horizontale, et l'autre ressort de chaque couple de ressorts d'amortissement s'étend dans la direction verticale.

5. Mécanisme de support amortisseur de vibrations selon la revendication 2, dans lequel l'une des deux portions de support de chaque panneau latéral est située au-dessus de la saillie de maintien dans la direction de gravité, et l'autre des deux portions de support est située au-dessous de la saillie de maintien, dans la direction de gravité.
FIG. 1
FIG. 2