

TITLE OF THE INVENTION

RECORD/PLAY HEAD TOUCH MECHANISM IN CASSETTE

BACKGROUND OF THE INVENTION

1. Field of the Invention:

The present invention relates to a record/play head touch mechanism in a magnetic tape housed in a case, so-called cassette in which the magnetic tape touches a record/play head.

2. Prior Art:

A prior audio cassette in a linear trucking type comprises a case 1, a pair of hubs 2, 2 (feed hub and take-up hub) fixed to the case 1, and a magnetic tape 3 which is taken up around the hubs 2, 2 as shown in Fig. 12. The case is loaded on a driver for cassette (not shown) so that the magnetic tape 3 is wound on or unwound from the hubs 2, 2. When the case 1 is loaded, a record/play head 5 is inserted from an opening 5 for record/play head into the inside of the case 1 so that the record/play head 5 touches the magnetic tape 3 passing a front of the case 1 to record or playback an information. According to the prior cassette, a record/play head touch mechanism in a cassette as shown in Fig. 13 is employed to make the magnetic tape 3 bring into contact with the record/play head 5. The prior record/head touch mechanism in a cassette comprises a flat pressure pad 7 made of unweven fabrics, fur, wool or the like is affixed to a central portion of a flat spring 6.

Both ends of the flat spring 6 are respectively bent 90° backward and the bent portions are held by pins 9, 9. The magnetic tape 3 travels between the flat pressure pad 7 and the record/play head 5 and urged against the record/play head 5 by resiliency of the flat pressure pad 7 and the flat spring 6.

However, according to the prior touch mechanism in a cassette, the flat spring 6 can not freely move in a direction of turning about the pins 9, 9 since the flat spring 6 is a flat plate and the pins 9, 9 are cylindrical. Accordingly, when a force is applied to the flat spring 6 in a direction as shown in an arrow in Fig. 13 to turn the spring 6 due to the contact pressure toward the pressure pad 7, which is deviated or directed divergently, the flat spring 6 is twisted in proportion to a pressure applied to the flat pressure pad 7 affixed to the central portion of the flat spring 6. Due to deviation of a stress accompanied by the twist, the deviated pressure via the flat pressure pad 7 applies to the magnetic tape 3 to cause the contact pressure between the magnetic tape 3 and the record/play head 5 a partially uneven state. Due to generation of such partial uneven state in the contact pressure, there arises a spacing loss, namely, a reduction of an output caused when the magnetic tape 3 is not brought into contact with the record/play head 5 at the time of recording or play-backing. Further, due to deviation of the contact

pressure caused by the twist of the flat plate 6, the magnetic tape 3 travels in disorder to thereby causing azimuth loss, namely, a reduction of an output caused when the magnetic tape 3 is brought into contact with the record/play head 5 at an angle different from an ordinary angle, or the magnetic tape 3 is wound in disorder around the hubs.

SUMMARY OF THE THE INVENTION

It is therefore an object of the present invention to provide a record/play head touch mechanism in a cassette to prevent a spacing loss and an irregular or disordered winding of the magnetic tape around the hubs.

To achieve the above object, the present invention characterized in firstly that in a record/play head touch mechanism in the cassette comprising a case 11 having an opening 14 for record/play head, a flat spring 16 mounted within the case 11, a pressure pad 17 affixed to the central portion of the flat spring 16 and arranged at a rear side of the magnetic tape 13 in the direction of outward of the opening 14, both ends of the flat spring 16 are curved in the manner that the central portion of the flat spring 16 is projected.

Secondly, the present invention characterized in that in the record/play head touch mechanism in the cassette a member for supporting the flat spring 16 has a concave 14 which is curved lengthwise in a circular arc to rotatably support the both ends of the flat spring 16.

Thirdly, the present invention characterized in that in the record/play head touch mechanism in the cassette the both ends of the flat spring 16 are curved in the manner that the central portion of the back side thereof is projected and a member being brought in contact with the back side of the both ends of the flat spring 16 has a concave 15 in a circular arc to rotatably support the both ends of the spring 16.

The above and other objects, features and advantages of the present invention will become more apparent from the following description taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a main portion of a record/play head touch mechanism in a cassette, part of which is cut off, according to a first embodiment of the present invention;

Fig. 2 is a perspective view enlarging a main portion in Fig. 1;

Fig. 3 is an enlarged vertical sectional side view showing a peripheral portion of a record/play pad in Fig. 1;

Fig. 4 is a perspective view of a record/play head touch mechanism in the cassette, part of which is cut off, according to a second embodiment of the present invention;

Fig. 5 is an enlarged vertical sectional side view of the main portion in Fig. 4;

Fig. 6 is a perspective view of a record/play head touch mechanism in the cassette, part of which is cut off, according to a third embodiment of the present invention;

Fig. 7 is an enlarged vertical sectional side view of the main portion in Fig. 6;

Fig. 8 is a perspective view of a record/play head touch mechanism in the cassette, part of which is cut off, according to a further embodiment of the present invention;

Fig. 9 is an enlarged vertical sectional side view of the main portion in Fig. 8;

Fig. 10 is a perspective view of a record/play head touch mechanism in the cassette, part of which is cut off, according to a still further embodiment of the present invention;

Fig. 11 is an enlarged vertical sectional side view of the main portion in Fig. 10;

Fig. 12 is a plan view of a prior cassette removing a shell to cover the cassette; and

Fig. 13 is a perspective view of a prior record/play head touch mechanism in the cassette.

PREFERRED EMBODIMENTS OF THE INVENTION

A record/play head touch mechanism in a cassette in preferred embodiments of the present invention will be described in detail with reference to Figs. 1 to 11.

In the figures, all the components of the record/play head touch mechanism in a cassette are numbered with same

numerals.

FIRST EMBODIMENT (Figs. 1 to 3)

A cassette comprises a case 11 having an opening 14 for a record/play head at the front thereof, a shield plate 20 made of a metal plate mounted within the case 11, pins 19, 19 are mounted at the front of the shield plate 20, a flat spring 16 both ends of which are supported by the pins 19, 19 in the manner to be hung on the pins 19, 19, and a cubic pressure pad 17 made of a unwoven fabric, fur, wool, etc. being affixed to a central portion of the flat spring 16. A magnetic tape 13 passes the front of the record/play pad 17 and held between the pressure pad 17 and a record/play head a inserted from the opening 14. The flat spring 16 is made of a metal plate such as a phosphor bronze etc. which is elastic, thin and slender. Both ends of the flat spring 16 are bent 90° backward and hung on the pins 19, 19 to be supported by the pins 19, 19. As a state where no load is applied to the flat spring 16, the distance between the bent pieces 22, 22 of the flat spring 16 is slightly longer than the distance between the pins 19, 19 at the outer diameters thereof. The flat spring 16 is curved in the manner that the central portion of the backside thereof is projected. As shown in Fig. 2, a length I of the curved portions 18, 18 is preferable to be one third to two third of a length L between the bent pieces 22, 22 and side surface of the pressure pad 17 provided that L is more or less 5 mm, and

most preferable to be half of the distance T. A curvature radius of the curved portions 18, 18 is preferable to be 2 to 10 mm provided that the width of the flat spring 16 is more or less 2.5 mm, most preferable to be 3 to 6 mm.

According to the record/play head touch mechanism in a cassette of a first embodiment, the flat spring 16 is inclined as shown in the arrow in Fig. 3 in proportion to the pressure difference when a vertical pressure difference which is generated when a pressure is applied toward the pressure pad 17 from the record/play head a as shown in Fig. 3 since the both ends of the flat spring 16 are curved and the central portion of the flat spring 16 is projected.

Inasmuch as the pressure pad 17 is inclined in proportion to the deflection of the pressure while the flat spring 16 is scarcely twisted, a repelling force generated by the twist of the flat spring 16 does not affect the magnetic tape 13 and the pressure difference is absorbed. Furthermore, inasmuch as the both ends of the flat spring 16 are curved, an intensity of rigidity at the curved portions is increased so that a relatively high elasticity is generated at the central portion of the flat spring 16 provided that the thickness of the flat spring 16 is thin.

SECOND EMBODIMENT (Figs. 4 and 5)

According to a second embodiment, the shield plate 20 made of a U shaped metal plate is installed at the inner

portion of the opening 14 for the record/play head. Both ends of the shield plate 20 have respectively concave portions 15 curved lengthwise in circular arc. The both ends of the shield plate 20 support the flat spring 16. A curvature radius of the concave portion 15 is preferable to be same as a thickness of the pressure pad 17 described later. A pair of pins 19, 19 are mounted at the front of the shield plate 20 in the manner to be opposed with each other. The flat spring 16 is in flat shape and is engaged in the concave portion 15 defined in the both ends of the shield plate 20 at the both ends thereof. The both ends of the flat spring 16 are respectively bent 90° backward therefrom and held by the pins 19, 19 at the inside surface of the bent pieces 22, 22 of the flat spring 16 between the shield plate 20 and the pins 19, 19. At a state where no load is applied to the flat spring 16 the distance between the bent pieces 22, 22 is slightly longer than the distance between the pins 19, 19 at the outer diameter thereof.

According to the record/play head touch mechanism in the cassette of the second embodiment, the concave portion 15 is curved lengthwise in the circular arc, when the vertical pressure difference is generated toward the upper and lower portions of the pressure pad 17, the flat spring 16 per se is inclined in proportion to the pressure difference as shown in an arrow in Fig. 5. Accordingly, the flat spring 16 causes the pressure pad 17 to incline

as shown in the arrow in Fig. 5 without twisting the flat spring 16, so that the deflected pressure applied to the pressure head 17 from the record/play head a is absorbed. As a result, the record/play head a is brought into contact with the magnetic tape 13 in a uniform pressure to prevent the spacing loss and azimuth loss as well as disordered and uneven winding of the magnetic tape 13.

THIRD EMBODIMENT (Figs. 6 and 7)

According to a third embodiment of the present invention, the portion adjacent to the both ends of the flat spring 16 are curved in the manner that the central portion of the backside of the flat spring 16 is projected and the both ends of the flat spring 16 are engaged in the concave portion 15 of the shield plate 20. With such an arrangement, the flat spring 16 is moved smoothly in the direction as shown in an arrow in Fig. 7. The record/play head touch mechanism in a cassette of the third embodiment has the same function and advantage as those combined in the one in the first embodiment and the one in the second embodiment.

MODIFIED EMBODIMENT (Fig. 8 and 9)

According to a modified embodiment of the present invention, the pins 19, 19 are employed for substituting with the shield plate 20 as a member for supporting the both ends of the flat spring 16. That is, a pair of front pins 19, 19 and another pair of rear pins 19, 19 are mounted at both sides of the front of the shield plate 20,

and the concave portions 15 in the circular arc having a curvature radius same as the thickness of the pressure pad 17 are defined at the front surfaces of the rear pins 19, 19. The pressure spring 16 is held and supported between pins 19, 19 at the both ends thereof. The convexed surface both ends of the flat spring 16 are engaged in the concave portion 15 in the same manner as the third embodiment. Preferably, the both ends of the flat spring 16 are curved in the circular arc in the manner that the central portion of the backside of the flat spring plate 16 is projected and the curvature of the concave portions 15 for supporting the flat spring 16 defined in the front surfaces of the pins 19, 19 or in the both ends of the shield plate 20 is same to the curvature of the flat spring 16.

FURTHER MODIFIED EMBODIMENT (Figs. 10 and 11)

According to a further modified embodiment of the present invention, the both ends of the flat spring 16 are respectively pipe-shaped and a middle portion for supporting the pressure pad 17 is flat. Although the curvature of the concave portions defined in the pins 19, 19 (or the curvature of the concave portion defined in the both ends of the shield plate 20) is smaller than that of the embodiments set forth hereinbefore, the record/play head touch mechanism in the cassette according to the present invention achieves substantially the same functions and advantages as those in the embodiments se

forth hereinbefore. The bth ends of the flat spring 16 may be rod-shaped.

According to the record/play head touch mechanism in a cassette according to the present invention, the flat spring 16 is not twisted when a vertically deflected pressure is applied to the pressure pad 17 from the record/play head a. Furthermore, inasmuch as the pressure pad 17 is inclined in proportion to the deflection of the pressure the flat spring 16 is not twisted so that the pressure pad 17 is inclined together with the flat spring 16 to thereby absorb the deflection of the pressure. Accordingly, the magnetic tape 13 is brought into contact with the record/play head a with a uniform pressure so that generation of the spacing loss, and uneven or disordered winding of the magnetic tape are prevented.

Although the invention has been described in its preferred form with a certain degree of particularity, it is to be understood that many variations and changes are possible in the invention without departing from the scope thereof.



What is claimed is:

1. A record/play head touch mechanism in a cassette comprising:

a case having an opening for record/play head at the front thereof;

a shield plate mounted within said case;

a pair of pins mounted at the front of said shield plate;

a record/play head to be inserted from said opening;

a pressure pad being affixed to a central portion of said flat spring and arranged at a backside of a magnetic tape passing said opening, and directed outward of said opening, said magnetic tape being held between said pressure pad and said record/play head, and being brought into contact with said record/play head for recording or playbacking an information; and

a flat spring having both ends bent backward, and rotatably held and supported by said pair of pins, said flat spring being curved in the manner that central portions of backside of said both ends are projected.

2. A record/play head touch mechanism in a cassette comprising:

a case having an opening for record/play head at the front thereof;

a shield plate mounted within said case;

a pair of pins mounted at the front of said shield plate;



a record/play head to be inserted from said opening;

a pressure pad being affixed to a central portion of said flat spring and arranged at a backside of a magnetic tape passing said opening, and directed outward of said opening, said magnetic tape being held between said pressure pad and said record/play head, and being brought into contact with said record/play head for recording or playbaking an information;

a flat spring having both ends bent backward, and rotatably held and supported by said pair of pins; and

a member to be brought into contact with backsides of both ends of said flat spring having concave portions curved lengthwise in circular arc, said concave portions rotatably supporting both ends of said flat spring.

3. A record/play head touch mechanism in a cassette according to Claim 2, wherein said member being said shield plate.

4. A record/play head touch mechanism in a cassette comprising:

a case having an opening for record/play head at the front thereof;

a shield plate mounted within said case;

a pair of pins mounted at the front of said shield plate;

a record/play head to be inserted from said opening;

a pressure pad being affixed to a central portion of said flat spring and arranged at a backside of a magnetic



tape passing said opening, and directed outward of said opening, said magnetic tape being held between said pressure pad and said record/play head, and being brought into contact with said record/play head for recording or play-backing an information;

a flat spring having both ends bent backward, and rotatably held and supported by said pair of pins, said flat spring being curved in the manner that central portions of backside of said both ends are projected; and

a member to be brought into contact with backsides of both ends of said flat spring having concave portions curved lengthwise in circular arc, said concave portions rotatably supporting both ends of said flat spring.

5. A record/play head touch mechanism in a cassette according to Claim 4, wherein said member being said shield plate.

6. A record/play head touch mechanism in a cassette according to Claim 4, wherein said member being another pair of pins provided at the back of said pair of pins.

7. A record/play head touch mechanism in a cassette according to Claim 2, wherein both ends of said flat spring being respectively pipe-shaped and a middle portion for supporting said pressure pad is flat.

8. A record/play head touch mechanism substantially as hereinbefore described with reference to, and as shown in, the accompanying drawings.

9. Any novel feature or combination of features described herein.