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(19)

(54) MAGNETIC TAPE CASSETTE

(71) We, AGFA-GEVAERT AKTIENGESELLSCHAFT, a body corporate organised under the laws of the Federal Republic of Germany of 509 Leverkusen, Germany, 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:

This invention relates to magnetic tape cassettes for recording and reproduction instruments having a take-up reel and a supply reel for carrying the tape and idler rollers.

When cassetes are being manufactured in labelling and packaging machines and when they are in transport, it is impossible to avoid vibrations which are liable to loosen the reels of tape if they are not held by clamps. Furthermore, when the tape recorder is being switched off or the reel wound back, loops are liable to form in the outer layers of the tape if the reel continues to turn through several revolutions. When the apparatus is switched on again, any loops formed in this way are pulled over the deflecting elements such as pins or rolls together with the travelling tape and cause blockages in the running of the tape. Instructions for use enclosed with compact cassettes therefore generally point out that any loose layers of tape should be tightened by turning the reels before insertion in the recorder.

Spools having a self-stopping mechanism to prevent the formation of loose layers of tape on the reel are described in German Gebrauchsmuster No. 7 521 898, but such measures considerably increase the manufacturing costs of compact cassettes. Rotatable guide levers connected together by an elastic, flexible guide element for the same purpose have been described in German Offenlegungsschrift No. 2 151 628. Cassettes of this kind also can only be produced at great manufacturing cost.

It is an object of the present invention to obviate the above-mentioned disadvantages and to prevent blockage of the running of the tape in the cassette due to loose layers of tape and loops.

The invention provides a magnetic tape cassette for recording and reproduction instruments, having a take-up reel and a supply reel on spaced apart axes, a magnetic tape adapted to be wound on the take-up reel and off the supply reel or *vice versa*, idler rollers to guide the tape between the reels and a rib extending obliquely relative to the line of tape travel between one or each reel and an adjacent idler roller, the height of the or each rib being equal to the internal height of the cassette, the or each rib having a free end close to the internal side wall of the cassette to leave a narrow gap for the passage of the tape, and the or each rib being tapered at the said free end in the form of a wedge.

If several layers of tape are stuck together as a result of electro-static forces and adhesion, the outer layer is separated off as it moves past the edge of the separating rib so that the remaining layers can slip tightly back on to the reel of their own accord. Generally, two separating ribs are moulded on to the bottom of the cassette housing, one on each side of the head chamber, during manufacture of the cassette. The advantage provided by the invention does not increase the manufacturing costs.

In a practical embodiment of the cassette according to the invention, the separating rib may extend in a straight line or in the form of a circular arc having its centre on the axis of the reel. According to one particularly advantageous arrangement, the separating partition of the head chamber, which partition extends parallel to the front of the cassette, is further extended at an angle to form the separating rib. The angle between the web and the partition is preferably between 120 and 140°. The width of the gap between the end of the rib and the side wall is preferably of the order of 1 mm. If the tape is fed by hand during manufacture of the cassette, the gap is preferably wider. In that case, the internal side walls of the lower part (bottom) of the

cassette, situated opposite the free end of the rib, are sloped at an acute angle to the plane of the tape. The corresponding region of the internal side walls of the upper part or lid of the cassette is formed in mirror image thereto. Since the space between the sloping side walls and the rib is thereby widened out in the form of a cone, the tape can easily be placed into the bottom of the cassette. Moreover, there is no risk of damage to the tape when the lid is placed on the cassette. When the tape recorder is in use, the tape only touches the edge of the rib so that its torque is no more affected by the rib than it would be by the steadying pin normally provided at this point.

The invention will now be explained with reference to Figures 1 to 5.

Figure 1 is a plan view of a commercially available cassette with loose layers of tape;

Figure 2 is a plan view of the bottom of a cassette half according to the invention with a straight separating rib;

Figure 3 is a corresponding plan view showing a separating rib curved in the form of a circular arc;

Figure 4 is a section through the lower part of a cassette according to the invention in the region of the separating rib and sloping internal side walls, and

Figure 5 is a section similar to that of Figure 4 showing the cassette when closed.

At the front of a conventional cassette, there are various openings (1, 1') for the magnetic head and erasing head and pressure rollers which are separated from the rest of the space in the cassette by a separating partition (2) to form the so-called head chamber. The magnetic tape (4) runs from the core (3) along to the other side of the cassette by way of the steadying pins (5,5') and rotatably mounted idler rollers (6,6'). Layers of tape which have become loose owing to vibration are liable to block the running of the tape, for example due to wrapping round the steadying pin (Fig. 1).

In Figure 2, the separating rib (7) of the present invention is situated in the lower part of the cassette in the space between the reel and the idler roller. A similar rib will be provided in the other half of the cassette. As can be seen from Figure 2, the rib forms an angled off prolongation of the separating partition (2) of the head chamber. The length of the separating rib is such that a gap (8) of about 1 mm is left between the free end of the rib and the side wall of the cassette. The height of each separating rib is equal to the internal height of the cassette. The free end of the rib is tapered in the form of a wedge (9). If two or more layers of tape stuck together reach the edge of the rib, the outermost layer is separated from the other layers. In Figure 3 the ribs are curved in the form of a circular arc (10) centred on the axis of the reel. Both embodiments illustrated here leave sufficient space between the reel of tape and the separating rib for accommodation of additional tape guide elements such as, for example, the pivotal lever described in German Patent Specification No. 2 115 124. To facilitate manual insertion of the tape, the internal side walls (11,11') of the lower part of the cassette are arranged to slope towards the lower edge of the rib in the region of the gap for the tape, as shown in Figure 4. Due to the resulting widening out of the gap in the form of a cone (12,12'), the tape can easily be inserted. The corresponding region of the internal side walls (13,13') of the upper part of the cassette is sloped off to form the mirror image of the lower part (Fig. 5), so that the tape runs through a narrow gap both at its lower edge (14,14') and its upper edge (15,15').

WHAT WE CLAIM IS:—

1. A magnetic tape cassette for recording and reproduction instruments, having a take-up reel and a supply reel on spaced apart axes, a magnetic tape adapted to be wound on the take-up reel and off the supply reel or *vice versa*, idler rollers to guide the tape between the reels, and a rib extending obliquely relative to the line of tape travel between one or each reel and an adjacent idler roller, the height of the or each rib being equal to the internal height of the cassette, the or each rib having a free end close to the internal side wall of the cassette to leave a narrow gap for the passage of the tape, and the or each rib being tapered at the said free end in the form of a wedge.

2. A magnetic tape cassette according to claim 1, wherein a head chamber is disposed in the cassette, a separating partition being disposed in the cassette between the head chamber and the reels, and the rib is straight-lined and forms an angled off extension of the separating partition of the head chamber.

3. A magnetic tape cassette according to Claim 1, wherein the rib is curved in the form of a circular arc centred on the axis of the reel.

4. A magnetic tape cassette according to claim 2, wherein the head chamber has two sides, and a rib is arranged on each of the two sides of the head chamber.

5. A magnetic tape cassette according to any one of Claims 1 to 4, wherein the internal side walls of the lower part (bottom) of the cassette are sloped in the region of the tapered end of the rib so that the surface is inclined at an acute angle to the adjacent tape, and the internal surface of the upper part (cover) of the cassette is formed in mirror image thereto.

cassette, situated opposite the free end of the rib, are sloped at an acute angle to the plane of the tape. The corresponding region of the internal side walls of the upper part or lid of the cassette is formed in mirror image thereto. Since the space between the sloping side walls and the rib is thereby widened out in the form of a cone, the tape can easily be placed into the bottom of the cassette. Moreover, there is no risk of damage to the tape when the lid is placed on the cassette. When the tape recorder is in use, the tape only touches the edge of the rib so that its torque is no more affected by the rib than it would be by the steadying pin normally provided at this point.

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Figure 1 is a plan view of a commercially available cassette with loose layers of tape;

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Figure 5 is a section similar to that of Figure 4 showing the cassette when closed.

At the front of a conventional cassette, there are various openings (1, 1') for the magnetic head and erasing head and pressure rollers which are separated from the rest of the space in the cassette by a separating partition (2) to form the so-called head chamber. The magnetic tape (4) runs from the core (3) along to the other side of the cassette by way of the steadying pins (5,5') and rotatably mounted idler rollers (6,6'). Layers of tape which have become loose owing to vibration are liable to block the running of the tape, for example due to wrapping round the steadying pin (Fig. 1).

In Figure 2, the separating rib (7) of the present invention is situated in the lower part of the cassette in the space between the reel and the idler roller. A similar rib will be provided in the other half of the cassette. As can be seen from Figure 2, the rib forms an angled off prolongation of the separating partition (2) of the head chamber. The length of the separating rib is such that a gap (8) of about 1 mm is left between the free end of the rib and the side wall of the cassette. The height of each separating rib is equal to the internal height of the cassette. The free end of the rib is tapered in the form of a wedge (9). If two or more layers of tape stuck together reach the edge of the rib, the outermost layer is separated from the other layers. In Figure 3 the ribs are curved in the form of a circular arc (10) centred on the axis of the reel. Both embodiments illustrated here leave sufficient space between the reel of tape and the separating rib for accommodation of additional tape guide elements such as, for example, the pivotal lever described in German Patent Specification No. 2 115 124. To facilitate manual insertion of the tape, the internal side walls (11,11') of the lower part of the cassette are arranged to slope towards the lower edge of the rib in the region of the gap for the tape, as shown in Figure 4. Due to the resulting widening out of the gap in the form of a cone (12,12'), the tape can easily be inserted. The corresponding region of the internal side walls (13,13') of the upper part of the cassette is sloped off to form the mirror image of the lower part (Fig. 5), so that the tape runs through a narrow gap both at its lower edge (14,14') and its upper edge (15,15').

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2. A magnetic tape cassette according to claim 1, wherein a head chamber is disposed in the cassette, a separating partition being disposed in the cassette between the head chamber and the reels, and the rib is straight-lined and forms an angled off extension of the separating partition of the head chamber.

3. A magnetic tape cassette according to Claim 1, wherein the rib is curved in the form of a circular arc centred on the axis of the reel.

4. A magnetic tape cassette according to claim 2, wherein the head chamber has two sides, and a rib is arranged on each of the two sides of the head chamber.

5. A magnetic tape cassette according to any one of Claims 1 to 4, wherein the internal side walls of the lower part (bottom) of the cassette are sloped in the region of the tapered end of the rib so that the surface is inclined at an acute angle to the adjacent tape, and the internal surface of the upper part (cover) of the cassette is formed in mirror image thereto.

* C L M S *

6. A magnetic tape cassette according to any one of Claims 1 to 5, wherein the rib is integral with the lower part (bottom) of the cassette housing.

7. A magnetic tape cassette substantially as herein described with reference to and as shown in Figures 2 to 5 of the accompanying drawings.

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