Description

Technical field

The present invention relates to a two-spool tape cartridge in which a flexible, elastic drive belt contacts the tape on the tape spools and whereby movement of the belt causes movement of the tape between the spools, and to a spool for use in said cartridge.

Background art

The belt driven tape cartridge of U.S. patent No. 3,692,255, issued to Von Behren and assigned to the assignee of the present invention, has been very successfully utilized to interface with computers where rapid acceleration and deceleration of the tape are required. In the cartridge there disclosed, a magnetic recording tape is convolutely wound on two tape spools and is bidirectionally driven between the spools by an endless flexible belt in frictional contact with the tape on both spools.

When the cartridge of the Von Behren patent was first marketed in 1972, its magnetic recording tape had a width of 6.35 mm, a thickness of 0.025 mm, and was driven at 762 mm per second. Data were originally recorded on the tape at a density of 63 flux reversals per mm. Current cartridges come in a variety of sizes and the recording tapes range in width from 3.81 mm to 6.35 mm, may be as thin as 0.015 mm, may be driven at 2286 or more mm per second, and data is recorded at densities of 394 flux reversals per mm or more. In addition, data are recorded on a plurality of independent, parallel tracks, which may number in excess of 32, spaced across the width of the magnetic recording tape.

Although no problems were encountered when the cartridge was first introduced, the higher tape speeds, recording densities, and track densities have created a need for reduced rotational friction in the tape spools and improved spool positioning during winding and unwinding of the magnetic tape.

Disclosure of invention

According to this invention there is provided a belt driven tape cartridge having two spaced, parallel walls, a cylindrical pin extending from one of said walls, a spool rotatably located on said pin and including two flanges interconnected by a hub providing a cylindrical tape winding surface, characterised by a bore extending through said hub and one of said flanges and closely but freely fitting said pin; a wear-button protrusion extending from the other of said flanges opposite and coaxial with said bore; a bearing protrusion extending from said other of said flanges and into said bore; and means abutting said wear-button protrusion for urging said bearing protrusion into contact with said pin;

wherein the extension of said pin from said one of said walls is greater than the length of said bore to said bearing protrusion so that said spool is suspended above and may rotate free of contact with said one wall.

By suspending the spool on the pin the friction between the cartridge and the spool is significantly reduced and to ensure reduced friction, preferably the bearing protrusion and the wear-button protrusion are hemispherical.

Furthermore, there is provided a tape spool for use in such a belt driven tape cartridge, as defined in claim 10.

Brief description of the drawings

The present invention will be more thoroughly described with reference to the accompanying drawings, wherein like numbers refer to like parts in the several views, and wherein:

Figure 1 is a top plan view of a belt driven tape cartridge, partially in section, containing the improved tape spool of the present invention;

Figure 2 is a cross-sectional view of the spool of the present invention taken generally along the line 2—2 of Figure 1; and

Figure 3 is an alternate embodiment of a tape spool for use in the cartridge of Figure 1.

Detailed description

Figures 1 and 2 illustrate a data cartridge 10 of the type described in U.S. patent No. 3,692,255 (Von Behren) which includes a thin base plate 12, usually of aluminum, and a clear or translucent polymeric cover 14, which, when assembled, define a thin, generally rectangular enclosure. Enclosed within the data cartridge 10 are a pair of tape spools 16 and 18, three tape wrap pins 20, 22 and 24, a pair of tape guides 26 and 28, a length of magnetic recording tape 30, a driving belt 32, a pair of belt guide rollers 34 and 36, and a belt driving roller 38.

The tape spools 16 and 18 are supported by the cartridge base plate 12 for free rotation about spaced parallel axes. The magnetic recording tape 30 is convolutely wound on the tape spools 16 and 18 in opposite directions about their axes. A tape 30 guide path between the tape spools 16 and 18 is defined by the three tape wrap pins 20, 22 and 24 and the two tape guides 26 and 28.

The cartridge 10 is formed with a cutaway portion 40 along the tape path which provides access to the magnetic tape 30 by a magnetic transducer 42. The cutaway portion 40 is normally closed by a spring-loaded door 44 which is opened as shown upon insertion of the data cartridge 10 into a tape recorder (not shown). A second opening 46 is provided in the cartridge cover 14 to provide access to the belt driving roller 38 by a drive roller 48 driven by a reversible motor 50. The magnetic transducer 42, the drive roller 48, and the reversible motor 50 are illustrated in phantom lines as they form a portion of the tape recorder rather than the data cartridge 10. The cartridge belt driving roller 38 is provided with a reduced diameter 51 to prevent contact between the driving belt 32 and the magnetic recording tape 30. The driving belt 32 is thin, continuous, flexible and elastic. It has a uniform cross-sectional area and it extends around the belt driving roller 38 and the belt guide rollers 34 and 36, contacting the tape 30

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on the tape spools 16 and 18.

The length of the belt 32 is less than the length of the path along which it extends so that when the belt 32 is stretched into position it will have an installed tension or pretension. The angle of wrap of the driving belt 32 at the tape spools 16 and 18 is at least 60 degrees and provides the necessary contact between the belt 32 and the tape 30 wound on the tape spools 16 and 18 to assure frictional driving of the tape 30 and the tape spools 16 and 18.

Rotation of the belt driving roller 38 in a counterclockwise direction (as viewed in Figure 1) by the drive roller 48 causes the belt 32 to traverse its path in a counterclockwise direction and the tape 30 to move from the tape spool 18 to the tape spool 16, the tape spool 18 serving as a supply spool and the tape spool 16 serving as a take-up spool. Opposite rotation of the driving roller 38 by the drive roller 48 will cause tape to be supplied by the tape spool 16 and convolutely wound upon the tape spool 18. A predetermined frictional coupling between the belt guide rollers 34 and 36 and their respective support shafts applies a predetermined drag to the belt 32 as it passes around the guide belt rollers 34 and 36, thereby increasing the tension of the belt 32 as it passes around each of the guide rollers 34 and 36. This increased tension in the belt 32 increases the length of the belt 32 according to its elasticity and thereby the speed at which the belt 32 passes around the spool 18 is increased compared to that at which it passes around the spool 16. This increased speed causes tension in the tape 30 as well as the ability to take up any slack developed in the tape 30 between the tape spools 16 and 18 as is more fully taught in U.S. patent No. 3,692,255.

The improved tape spool 16 or 18 of the present invention is best illustrated in Figure 2 and includes an upper flange 52 and a lower flange 54 interconnected by a hub 56 providing a cylindrical tape winding surface 58. The spool 16 or 18 is preferably molded of plastic with the hub 56 and lower flange 54 molded as a single unit and the upper flange 52 molded separately and attached to the hub 56 either by an adhesive or welding. The spool 16 or 18 is mounted to the cartridge 10 on and for rotation around a pin 60 which is press-fitted into a hole 62 in the cartridge plate 12 to extend a predetermined distance above the plate 12. The spool 16 or 18 is journalled for free rotation around the pin 60 by means of a bore 64 provided in the hub 56, which bore is sized to closely but freely fit the diameter of the pin 60.

To reduce rotative friction of the spool 16 or 18 about the pin 60, the upper flange 52 is provided with a bearing protuberance 66 which extends into the hub bore 64 and contacts the pin 60. The bearing protuberance 66 is preferably frusto-conical or hemispherical in shape and preferably has a rounded surface 68 which reduces the area of contact between the protuberance 66 and the pin 60. It will be recognized, however, that the protuberance 66 could simply be a cylindrical projection which contacts the pin 60 at a flat surface. It is desirable, however, to include the bulk of material provided by the protuberance 66 because the upper flange 52 is molded of a polymer and may be somewhat abraded or frictionally heated by contact with the pin 60. The relatively large bulk of material provided by the protuberance 66 minimizes any damaging effects caused by such heating and the rounded shape of its surface 68 further minimizes heat caused by friction and reduces abrasion caused by the pin 60.

In order to further reduce friction and abrasion generated between the pin 60 and the bearing protuberance 66, the terminal surface 70 of the pin 60 may likewise be rounded rather than flat as illustrated. The length of the pin 60, from the surface of the cartridge plate 12 to its terminal end 70, is selected to be slightly greater than the length of the hub bore 64 from the flange 54 to the protuberance 66 so that the spool 16 or 18 is suspended by contact between the pin 60 and the protuberance 66 such that the lower flange 54 rotates free of contact with the cartridge plate 12.

Thus far a tape spool 16 and 18 has been described which will be effective to greatly reduce friction between the spool 16 or 18 and the pin 60 as the spool 16 or 18 rotates in use. If it could be assured that the data cartridge 10 would only be used at low tape speeds and that the cartridge 10 would always be oriented in an upright position such that the pin 60 were vertical, the bearing protuberance 66 would be all that was required for adequate performance since gravity could be relied upon to maintain the bearing protuberance 66 in contact with the pin 60 and prevent the spool 16 or 18 from lifting with respect to the cartridge plate 12 and oscillating on the pin 60 as tape 30 was being wound or removed. However, high speed rotation of the spools 16 and 18 may cause lifting or oscillation of the spool 16 or 18 relative to the pin 60 and imperfect convolute winding of the tape 30 upon the spool 16 or 18. Such movement of the spool 16 or 18 may cause damage to the edges of the tape 30 by contact with the flanges 52 or 54 and may be detrimental to tape guidance throughout the cartridge 10. In addition, the data cartridge 10 may be oriented in use in a position other than that shown in Figure 2, in which case gravity would not assist in maintaining the protuberance 66 in contact with the pin 60.

To minimize lifting and oscillation of the spool 16 or 18 relative to the pin 60, the upper flange 52 is further provided with a wear-button protuberance 72 extending from the flange 52 opposite and coaxial with the hub bore 64. The cartridge cover 14 is provided with a spring 74 which contacts the wear-button protuberance 74 and urges the bearing protuberance 66 into contact with the pin 60. Although it might be possible to eliminate the spring 74 and allow the wear-button protuberance 74 to bear directly against the cover 14, such an arrangement would be difficult to achieve because tolerances would have to be

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controlled tightly and either a lack of contact between the cover 14 and the spool 16 or 18 or excessive pressure between the cover 14 and the spool 16 or 18 would likely exist. The spring 74 is, therefore, provided to provide resiliency and a limited amount of travel to compensate for tolerance variations in the length of the pin 60 and the manufacture of the upper flange 52.

The wear-button protuberance 72 is provided to prevent contact between the upper flange 52 and the cartridge cover 14 or the spring 74. The preferred shape of the wear-button protuberance 72 is frusto-conical or hemispherical and either shape preferably includes a rounded outer surface 76 to minimize the area of contact between the protuberance 72 and the spring 74.

The preferred type of spring 74 is illustrated in Figures 1 and 2 and consists of double-cantilever spring arms 78 and 80 extending between a central, circular spool-contacting area 82 and diametrically opposed areas 84 and 86 of a spring mounting ring 88, which ring 88 is suitably attached to the cartridge cover 14.

The spring arms 78 and 80 are preferably wound in a flat helix to increase the length of the arms 78 and 80 and thus the resilient travel of the spring 74.

Figure 3 illustrates an alternate embodiment of a tape spool 90 according to the present invention in which a bearing protuberance 92 and wear-button protuberance 94 are provided as opposite sides of a spherical ball 96 which is press-fitted, adhesively attached, or welded to a collar 98 which is in turn attached to the upper flange 100 of the spool 90 by an adhesive, welding or pressing. The sphere 96 and collar 98 may also be machined or molded as an integral unit of metal or plastic or the collar 98 may be eliminated and the sphere 96 pressed or otherwise attached to the upper flange 100 by means of a hole in the flange 100 closely fitting the sphere.

Although the arrangement of Figure 3 requires a greater number of separate pieces and greater assembly than does the arrangement of Figure 2, the arrangement illustrated by Figure 3 may be advantageous in that the sphere 96 which provides the bearing and wear-button protuberances 92 and 94 need not be of the same material used to produce the upper flange 100. Thus the sphere 96 may be manufactured of a highly abrasion-resistant material, such as metal, acetal resin or polycarbonate, while the upper flange 100 is manufactured of a softer but more economical material such as acrylonitrile-butadiene-styrene copolymer or high-impact polystyrene. Figure 3 also illustrates an alternative to the spring 74 of Figure 2 by providing a straight leaf spring 102 which includes a mounting portion 104 and spring arms 106 (only one is shown) which extend from opposite ends of the mounting portion 104 to contact each of the spools 16 and 18. The mounting portion 104 of the spring 102 may be attached to the cartridge cover 108 by any suitable method, but preferably is riveted thereto. It will be recognized that the leaf spring 102 of Figure 3 could be used in conjunction with the spool 18 or Figures 1 and 2.

Either of the alternate embodiments described herein is effective to greatly reduce friction between the rotating spool and its mounting pin and also to prevent oscillation of the spool relative to the pin.

Claims

1. A belt driven tape cartridge having two spaced, parallel walls (12, 14), a cylindrical pin (60) extending from one of said walls (12), a spool (16, 18) rotatably located on said pin (60) and including two flanges (52, 54) interconnected by a hub (56) providing a cylindrical tape winding surface (58), characterised by a bore (64) extending through said hub (56) and one of said flanges (54) and closely but freely fitting said pin (60); wear-button protrusion (72) extending from the other of said flanges (52) opposite and coaxial with said bore (64); a bearing protrusion (68) extending from said other of said flanges (52) and into said bore (64); and means (74) abutting said wear-button protrusion (72) for urging said bearing protrusion (68) into contact with said pin (60);

wherein the extension of said pin (60) from said one of said walls (12) is greater than the length of said bore (64) to said bearing protrusion (68) so that said spool (16, 18) is suspended above and may rotate free of contact with said one wall (12).

2. A cartridge according to claim 1, wherein said abutting means (74) for urging said bearing protrusion (68) into contact with said pin (60) is a spring (74) attached to the other of said cartridge walls (14) and contacting said wear-button protrusion (72).

3. A cartridge according to claim 1 or 2, wherein said protrusions (68, 72) include rounded surfaces to minimize the area of contact between said protrusions (68, 72) and said pin (60) and said spring (74).

4. A cartridge according to claim 3, wherein said protrusions (68, 72) are hemispherical.

5. A cartridge according to claim 1, wherein said other of said flanges (52) includes a hole (98) coaxial with said bore (64) and wherein said protrusions (68, 72) are opposite halves of a sphere (96) mounted in said flange hole (98).

6. A cartridge according to claim 5, wherein said sphere (96) is a material different from that of said other of said flanges (52).

7. A cartridge according to claim 6, wherein said sphere (96) is metal.

8. A cartridge according to claim 6, wherein said sphere (96) is an abrasion-resistant polymer.

9. A cartridge according to claim 8, wherein said sphere (96) is acetal resin or polycarbonate.

10. A tape spool (16, 18) for use in a cartridge as claimed in claim 1, which spool (16, 18) includes two flanges (52, 54) interconnected by a hub (56) providing a cylindrical tape winding surface (58), said spool (16, 18) being characterised by

a bore (64) extending through said hub (56) and one of said flanges (54) for closely but freely

controlled tightly and either a lack of contact between the cover 14 and the spool 16 or 18 or excessive pressure between the cover 14 and the spool 16 or 18 would likely exist. The spring 74 is, therefore, provided to provide resiliency and a limited amount of travel to compensate for tolerance variations in the length of the pin 60 and the manufacture of the upper flange 52.

The wear-button protuberance 72 is provided to prevent contact between the upper flange 52 and the cartridge cover 14 or the spring 74. The preferred shape of the wear-button protuberance 72 is frusto-conical or hemispherical and either shape preferably includes a rounded outer surface 76 to minimize the area of contact between the protuberance 72 and the spring 74.

The preferred type of spring 74 is illustrated in Figures 1 and 2 and consists of double-cantilever spring arms 78 and 80 extending between a central, circular spool-contacting area 82 and diametrically opposed areas 84 and 86 of a spring mounting ring 88, which ring 88 is suitably attached to the cartridge cover 14.

The spring arms 78 and 80 are preferably wound in a flat helix to increase the length of the arms 78 and 80 and thus the resilient travel of the spring 74.

Figure 3 illustrates an alternate embodiment of a tape spool 90 according to the present invention in which a bearing protuberance 92 and wear-button protuberance 94 are provided as opposite sides of a spherical ball 96 which is press-fitted, adhesively attached, or welded to a collar 98 which is in turn attached to the upper flange 100 of the spool 90 by an adhesive, welding or pressing. The sphere 96 and collar 98 may also be machined or molded as an integral unit of metal or plastic or the collar 98 may be eliminated and the sphere 96 pressed or otherwise attached to the upper flange 100 by means of a hole in the flange 100 closely fitting the sphere.

Although the arrangement of Figure 3 requires a greater number of separate pieces and greater assembly than does the arrangement of Figure 2, the arrangement illustrated by Figure 3 may be advantageous in that the sphere 96 which provides the bearing and wear-button protuberances 92 and 94 need not be of the same material used to produce the upper flange 100. Thus the sphere 96 may be manufactured of a highly abrasion-resistant material, such as metal, acetal resin or polycarbonate, while the upper flange 100 is manufactured of a softer but more economical material such as acrylonitrile-butadiene-styrene copolymer or high-impact polystyrene. Figure 3 also illustrates an alternative to the spring 74 of Figure 2 by providing a straight leaf spring 102 which includes a mounting portion 104 and spring arms 106 (only one is shown) which extend from opposite ends of the mounting portion 104 to contact each of the spools 16 and 18. The mounting portion 104 of the spring 102 may be attached to the cartridge cover 108 by any suitable method, but preferably is riveted thereto. It will be recognized that the leaf spring 102 of Figure 3 could be used in conjunction with the spool 18 or Figures 1 and 2.

Either of the alternate embodiments described herein is effective to greatly reduce friction between the rotating spool and its mounting pin and also to prevent oscillation of the spool relative to the pin.

Claims

1. A belt driven tape cartridge having two spaced, parallel walls (12, 14), a cylindrical pin (60) extending from one of said walls (12), a spool (16, 18) rotatably located on said pin (60) and including two flanges (52, 54) interconnected by a hub (56) providing a cylindrical tape winding surface (58), characterised by a bore (64) extending through said hub (56) and one of said flanges (54) and closely but freely fitting said pin (60); wear-button protrusion (72) extending from the other of said flanges (52) opposite and coaxial with said bore (64); a bearing protrusion (68) extending from said other of said flanges (52) and into said bore (64); and means (74) abutting said wear-button protrusion (72) for urging said bearing protrusion (68) into contact with said pin (60);

wherein the extension of said pin (60) from said one of said walls (12) is greater than the length of said bore (64) to said bearing protrusion (68) so that said spool (16, 18) is suspended above and may rotate free of contact with said one wall (12).

2. A cartridge according to claim 1, wherein said abutting means (74) for urging said bearing protrusion (68) into contact with said pin (60) is a spring (74) attached to the other of said cartridge walls (14) and contacting said wear-button protrusion (72).

3. A cartridge according to claim 1 or 2, wherein said protrusions (68, 72) include rounded surfaces to minimize the area of contact between said protrusions (68, 72) and said pin (60) and said spring (74).

4. A cartridge according to claim 3, wherein said protrusions (68, 72) are hemispherical.

5. A cartridge according to claim 1, wherein said other of said flanges (52) includes a hole (98) coaxial with said bore (64) and wherein said protrusions (68, 72) are opposite halves of a sphere (96) mounted in said flange hole (98).

6. A cartridge according to claim 5, wherein said sphere (96) is a material different from that of said other of said flanges (52).

7. A cartridge according to claim 6, wherein said sphere (96) is metal.

8. A cartridge according to claim 6, wherein said sphere (96) is an abrasion-resistant polymer.

9. A cartridge according to claim 8, wherein said sphere (96) is acetal resin or polycarbonate.

10. A tape spool (16, 18) for use in a cartridge as claimed in claim 1, which spool (16, 18) includes two flanges (52, 54) interconnected by a hub (56) providing a cylindrical tape winding surface (58), said spool (16, 18) being characterised by

a bore (64) extending through said hub (56) and one of said flanges (54) for closely but freely

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fitting a pin (60) extending from a surface (12) of said cartridge; a wear-button protrusion (72) extending from the other of said flanges (52) opposite and coaxial with said bore (64); a bearing protrusion (66) extending from the other of said flanges (52) into said bore (64) for contacting said pin (60); wherein the extension of said pin (60) from said surface (12) is greater than the length of said bore (64) to said bearing protrusion (66) so that in use said spool is suspended above said surface for free rotation about said pin.

11. A tape spool (16, 18) according to claim 10, wherein said bearing protrusion (66) terminates in a rounded surface (68) adjacent said pin (60) for minimizing the contact area between said bearing protrusion (66) and said pin (60).

12. A tape spool (16, 18) according to claim 11, wherein said bearing protrusion (66) is a wear-resistant polymeric material.

13. A tape spool (16, 18) according to claim 12, wherein said bearing protrusion (66) is acetal resin or polycarbonate.

14. A tape spool (16, 18) according to claim 10, wherein said bearing protrusion (66) is formed of a different material than said other of said flanges (52).

15. A tape spool (16, 18) according to claim 14, wherein said bearing protrusion (66) is a wear-resistant polymeric material.

16. A tape spool (16, 18) according to claim 15, wherein said bearing protrusion (66) is acetal resin or polycarbonate.

Patentansprüche

1. Riemengetriebene Bandkassette mit zwei im Abstand voneinander angeordneten, parallelen Wänden (12, 14), einem sich von einer der Wände (12) weg erstreckenden, zylindrischen Zapfen (60), und einer auf dem Zapfen (60) drehbar angeordneten Spule (16, 18), die zwei Endscheiben (52, 54) besitzt, die miteinander durch eine Nabe (56) verbunden sind, die eine zylindrische Bandaufwickelfläche (58) bildet, gekennzeichnet durch eine Bohrung (64), die die Nabe (56) und eine der Endscheiben (54) durchsetzt und den Zapfen (60) satt passend, aber frei beweglich aufnimmt; durch einen Verschleißknopfvorsprung (72), der sich von der anderen der Endscheiben (52) weg erstreckt und der genannten Bohrung (64) koaxial gegenüberliegt; durch einen Lagervorsprung (68), der sich von dem andern der Flansche (52) weg in die Bohrung (64) erstreckt; und durch eine an dem Verschleißknopfvorsprung (72) anliegende Einrichtung (74) zum Andrücken des Lagervorsprunges (68) an den Zapfen (60);

wobei sich der Zapfen (60) von der einen der Wände (12) über eine Strecke erstreckt, die größer ist als die Länge der Bohrung (64) bis zu dem Lagervorsprung (68), so daß die Spule (16, 18) oberhalb der genannten einen Wand (12) aufgehängt ist und sich ohne Berührung mit ihr drehen kann.

2. Kassette nach Anspruch 1, dadurch gekennzeichnet, daß die anliegende Einrichtung (74) zum Andrücken des Lagervorsprunges (68) an den Zapfen eine Feder (74) ist, die an der anderen der Kassettenwände (14) angebracht ist und den Verschleißknopfvorsprung (72) berührt.

3. Kassette nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Vorsprünge (68, 72) abgerundete Flächen besitzen, damit die Berührungsfläche zwischen den Vorsprüngen (68, 72) und dem Zapfen (60) und der Feder (74) möglichst klein ist.

4. Kassette nach Anspruch 3, dadurch gekennzeichnet, daß die Vorsprünge (68, 72) halbkugelig sind.

5. Kassette nach Anspruch 1, dadurch gekennzeichnet, daß die andere der Endscheiben (52) ein mit der Bohrung (64) koaxiales Loch (98) aufweist und daß die Vorsprünge (68, 72) einander entgegengesetzte Hälften einer in dem Endscheibenloch (98) montierten Kugel (96) sind.

6. Kassette nach Anspruch 5, dadurch gekennzeichnet, daß die Kugel (96) aus einem anderen Werkstoff besteht als die genannte andere der Endscheiben (52).

7. Kassette nach Anspruch 6, dadurch gekennzeichnet, daß die Kugel (96) aus Metall besteht.

8. Kassette nach Anspruch 6, dadurch gekennzeichnet, daß die Kugel (96) aus einem abriebfesten Polymer besteht.

9. Kassette nach Anspruch 8, dadurch gekennzeichnet, daß die Kugel (96) aus Acetalharz oder Polycarbonat besteht.

10. Bandspule (16, 18) für die Verwendung in einer Kassette nach Anspruch 1, wobei die Spule (16, 18) zwei Endscheiben (52, 54) besitzt, die miteinander durch eine Nabe (56) verbunden sind, die eine zylindrische Bandaufwickelfläche (58) bildet, und die Spule (16, 18) gekennzeichnet ist durch

eine Bohrung (64), die die Nabe (56) und eine der Endscheiben (54) durchsetzt und satt passend, aber frei beweglich einen Zapfen (60) aufnimmt, der sich von einer Fläche (12) der Kassette weg erstreckt; durch einen Verschleißknopfvorsprung (72), der sich von der anderen der Endscheiben (52) weg erstreckt und der genannten Bohrung (64) koaxial gegenüberliegt; und durch einen Lagervorsprung (68), der sich von dem andern der Flansche (52) weg in die Bohrung (64) erstreckt, um den Zapfen (60) zu berühren; wobei sich der Zapfen (60) von der genannten Fläche (12) über eine Strecke erstreckt, die größer ist als die Länge der Bohrung (64) bis zu dem Lagervorsprung (68), so daß die Spule (16, 18) im Gebrauch oberhalb der genannten Fläche aufgehängt ist und sich ohne Berührung mit ihr drehen kann.

11. Bandspule (16, 18) nach Anspruch 10, dadurch gekennzeichnet, daß der Lagervorsprung (66) im Bereich des Zapfens (60) in einer abgerundeten Fläche (68) endet, damit die Berührungsfläche zwischen dem Lagervorsprung (66) und dem Zapfen (60) möglichst klein ist.

12. Bandspule (16, 18) nach Anspruch 11,

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dadurch gekennzeichnet, daß der Lagervorsprung (66) ein abriebfester polymerer Werkstoff ist.

13. Bandspule (16, 18) nach Anspruch 12, dadurch gekennzeichnet, daß der Lagervorsprung (66) aus Acetalharz oder Polycarbonat besteht.

14. Bandspule (16, 18) nach Anspruch 10, dadurch gekennzeichnet, daß der Lagervorsprung (66) aus einem anderen Werkstoff besteht als die genannte andere der Endscheiben (52).

15. Bandspule (16, 18) nach Anspruch 14, dadurch gekennzeichnet, daß der Lagervorsprung (66) aus einem abriebfesten polymeren Werkstoff besteht.

16. Bandspule (16, 18) nach Anspruch 15, dadurch gekennzeichnet, daß der Lagervorsprung (66) aus Acetalharz oder Polycarbonat besteht.

Revendications

1. Cartouche de bande entraînée par courroie, comportant deux parois parallèles espacées (12, 14), une broche cylindrique (60) s'étendant à partir d'une première desdites parois (12), une bobine (16, 18) placée de façon tournante sur ladite broche (60) et comportant deux joues (52, 54) interconnectées par un moyeu (56) qui présente une surface cylindrique d'enroulement de bande (58), caractérisée par un alésage (64) qui traverse ledit moyeu (56) et l'une desdites joues (54) et s'ajuste étroitement mais librement sur ladite broche (60); une protubérance en forme de bouton (72) qui s'étend à partir de l'autre desdites joues (52), de façon opposée et coaxiale audit alésage (64); une protubérance de portée (68) qui s'étend à partir de ladite autre desdites joues (52) et pénètre dans ledit alésage (64); et des moyens (74) en butée contre ledit bouton (72) pour pousser ladite protubérance de portée (68) en contact avec ladite broche (60);

dans laquelle la longueur de ladite broche (60) à partir de ladite première desdites parois (12) est plus grande que la longueur dudit alésage (64) jusqu'à ladite protubérance de portée (68), de sorte que ladite bobine (16, 18) est suspendue au-dessus de ladite première paroi (12) et peut tourner sans contact avec celle-ci.

2. Cartouche suivant la revendication 1, dans laquelle lesdits moyens de butée (74), pour pousser ladite protubérance de portée (68) en contact avec ladite broche (60), comprennent un ressort (74) fixé à l'autre desdites parois de cartouche (14) et en contact avec ledit bouton (72).

3. Cartouche suivant la revendication 1 ou 2, dans laquelle lesdites protubérances (68, 72) comportent des surfaces arrondies, pour minimiser la surface de contact entre lesdites protubérances (68, 72) et ladite broche (60) et ledit ressort (74).

4. Cartouche suivant la revendication 3, dans laquelle lesdites protubérances (68, 72) sont hémisphériques.

5. Cartouche suivant la revendication 1, dans laquelle ladite autre desdites joues (52) comporte un trou (98) coaxial audit alésage (64), et dans laquelle lesdites protubérances (68, 72) sont les moitiés opposées d'une sphère (96) montée dans ledit trou (98) de la joue.

6. Cartouche suivant la revendication 5, dans laquelle ladite sphère (96) est en une matière différente de celle de ladite autre desdites joues (52).

7. Cartouche suivant la revendication 6, dans laquelle ladite sphère (96) est en métal.

8. Cartouche suivant la revendication 6, dans laquelle ladite sphère (96) est en un polymère résistant à l'abrasion.

9. Cartouche suivant la revendication 8, dans laquelle ladite sphère (96) est en résine acétal ou en polycarbonate.

10. Bobine de bande (16, 18) utilisable dans une cartouche suivant la revendication 1, ladite bobine (16, 18) comprenant deux joues (52, 54) interconnectées par un moyeu (56) qui présente une surface cylindrique (58) d'enroulement de bande, ladite bobine (16, 18) étant caractérisée par

un alésage (64) qui traverse ledit moyeu (56) et l'une desdites joues (54) pour s'ajuster étroitement mais librement sur une broche (60) partant d'une surface (12) de ladite cartouche; une protubérance en forme de bouton (72) s'étendant à partir de l'autre desdites joues (52), de façon opposée et coaxiale audit alésage (64); une protubérance de portée (66) s'étendant à partir de l'autre desdites joues (52) et pénétrant dans ledit alésage (64) pour venir en contact avec ladite broche (60); dans laquelle la longueur de ladite broche (60) à partir de ladite surface (12) est supérieure à la longueur dudit alésage (64) jusqu'à ladite protubérance de portée (66) de sorte que, en utilisation, ladite bobine est suspendue au-dessus de ladite surface pour une rotation libre autour de ladite broche.

11. Bobine de bande (16, 18) suivant la revendication 10, dans laquelle ladite protubérance de portée (66) se termine dans une surface arrondie (68) adjacente à ladite broche (60) pour minimiser la surface de contact entre ladite protubérance de portée (66) et ladite broche (60).

12. Bobine de bande (16, 18) suivant la revendication 11, dans laquelle ladite protubérance de portée (66) est en un polymère résistant à l'usure.

13. Bobine de bande (16, 18) suivant la revendication 12, dans laquelle ladite protubérance de portée (66) est en résine acétal ou en polycarbonate.

14. Bobine de bande (16, 18) suivant la revendication 10, dans laquelle ladite protubérance de portée (66) est en une matière différente de celle de ladite autre desdites joues (52).

15. Bobine de bande (16, 18) suivant la revendication 14, dans laquelle ladite protubérance de portée (66) est en un polymère résistant à l'usure.

16. Bobine de bande (16, 18) suivant la revendication 15, dans laquelle ladite protubérance de portée (66) est en résine acétal ou en polycarbonate.

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