Description

The present invention relates generally to a disk drive apparatus for rotating a disk, such as a floppy disk, a microfloppy disk and so forth. More specifically, the invention relates to a chucking mechanism for a disk drive, which can accurately position or center the disk.

As is well known, magnetic disks, such as floppy disks, microfloppy disks and so forth, most commonly have a center aperture and a drive aperture offset from the center aperture. Generally, a disk drive is provided with a center positioning pin engageable to the center aperture of the disk, and a drive pin engageable to the drive aperture of the disk. The center positioning pin and the drive pin project from a turntable which is driven to rotate by means of a known drive mechanism.

This type of magnetic disk and the disk drive apparatus adapted therefor is disclosed in United States Patent 4,445,155, to Takahashi et al, on April 24, 1984, which is assigned to the owner of the present invention. Disclosed in United States Patent 4,445,155 is a flexible magnetic disk of typical microfloppy construction and a disk drive therefor.

The disclosed flexible magnetic disk cassette has a flexible disk enclosed in a cassette casing made of an upper half and a lower half. The lower half has a drive hole through which a center positioning pin of a disk drive apparatus may extend into the center aperture of a center core disk rigidly and non- removably secured at the center of the disk. The center core disk also has a driving and positioning means for receiving a drive pin of the disk drive apparatus. The driving and positioning means is structured so that engagement with the drive pin will cause the disk to move until the center aperture of the attached center core disk is in proper centering engagement with the positioning pin.

In order to drive the flexible magnetic disk as set forth above, the disk drive apparatus comprises a center positioning pin and a spring-biased drive pin provided on a rotational drive. The center positioning pin is inserted in the center aperture means. The spring-biased drive pin is inserted in the driving and positioning aperature means during operation. The spring-biased drive pin is spring-biased so as to permit tilting of the pin to effect an at least partial radial displacement of at least the top of the pin in a vicinity of the driving and positioning aperture means when engaged with the positioning aperture.

The prior-art disk drive apparatus discussed above encounters a drawback in that the rotational torque that can be applied to the disk is limited. In other words, when rotational torque in excess of the predetermined value is applied, the spring-biased drive pin can no longer be biased toward the peripheral edge of an opening constituting the driving and positioning means, i.e. the biasing force exerted on the drive pin will no longer be sufficient to establish firm contact between the peripheral edge of the opening and the drive pin. As a result, the disk cannot be accurately centered.

On the other hand, when driving a magnetic disk the highest possible rotational torque is considered to be desirable in order to reduce the need for highly accurate adjustment of the friction between the disk or a disk-lifting pad and a magnetic head of a recording and/or reproducing apparatus.

Document EP-A-152 266 discloses an other disc drive apparatus of the same type presenting rotary base means, a center pin and a drive pin wherein the drive pin is mounted on a base plate which is pivotably mounted on the rotary base means supporting the disc.

SUMMARY OF THE INVENTION

Therefore, it is a principle object of the present invention to provide a disk drive apparatus which allows higher rotational torque to be used without adversely affecting the accuracy of centering of the magnetic disk being driven.

Another object of the present invention is to provide a disk drive apparatus which can minimize displacement of the chucking point so as to prevent offset of the disk from a predetermined position.

A further object of the invention is to provide a disk drive apparatus which reduces the shock of chucking and thus minimizes or eliminates wear and/or deformation of a drive opening and a drive pin.

The aforementioned and other objects is accomplished by a disk drive apparatus, according to the present invention, and to the claims.

The present invention will be understood more fully from the detailed description given herebelow and from the accompanying drawings of the preferred embodiment of the invention.

In the drawings:

Fig. 1 is an exploded perspective view of a flexible magnetic disk cassette which can be driven by the preferred embodiment of a disk drive apparatus according to the present invention;

Fig. 2 is a perspective view of the flexible magnetic disk cassette of Fig. 1, as viewed from below;

Fig. 3 is an exploded perspective view of the major part of the preferred embodiment of the disk drive apparatus according to the invention;

Fig. 4 is a plan view of the preferred embodi-

ment of the disk drive apparatus of Fig. 2;

Fig. 5 is a bottom view of the the preferred embodiment of the disk drive apparatus of Fig. 2;

Fig. 6 is a plan view of the preferred embodiment of the disc drive apparatus when driving a magnetic disk;

Fig. 7 is a sectional view taken along line VII-VII of Fig. 6;

Fig. 8 is a sectional view taken along line VIII-VIII of Fig. 6; and

Fig. 9 is a perspective view showing the drive pin in its inclined position;

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings, particularly to Figs. 1 and 2, a flexible magnetic disk cassette 10 which is applicable to the preferred embodiment of a disk drive apparatus according to the present invention has a cassette casing 12 housing a flexible magnetic disk 14. The magnetic disk 14 is made of, for example, a thin disk-like high-density polymer film 0.4 mm thick, and a magnetic layer uniformly deposited on both surfaces to which a recording and/or reproducing magnetic head can be brought into contact. At the center of the magnetic disk 14, a center core disk 16 is fixedly attached to the magnetic disk 14. The center core disk 16 is made of a ferromagnetic material, such as iron.

The center core disk 16 has an essentially square center aperture 18 at its center. The center aperture 18 is designed to receive a motor shaft 20 (shown in Fig. 3) of a disk drive device. An essentially rectangular driving and positioning aperture 22 is formed at a predetermined distance from the center aperture 18. The driving and positioning aperture 22 receives a drive pin 24 of the disk drive device. The center aperture 18 and the driving and positioning aperture 22 are so arranged that the diagonals of the square center aperture lie parallel to the sides of the driving and positioning aperture. The sides of the center aperture 18 are slightly longer than the diameter of the motor shaft 20 so that the motor shaft fits loosely in the center aperture. This permits the axis of the center aperture to be slightly offset from the center axis of the center core disk 16.

The cassette casing 12 comprises an upper half 26 and a lower half 28, both, for example, injection molded from ABS resin containing an antistatic agent. The upper and lower halves 26 and 28 are assembled to define an internal space which rotatably accommodates the magnetic disk 14. The lower half 28 has a center opening 30 near its center. The center core disk 16 is exposed through the center opening 30 of the lower half 28.

Further details of the construction of the flexible magnetic disk cassette of the type illustrated in Fig. 1 are available from United States Patent 4,445,115 mentioned above. The contents of the aforementioned United States Patent are hereby incorporated by reference for the sake of disclosure.

Figs. 3 to 9 show the preferred embodiment of the disk drive apparatus according to the invention. The disk drive apparatus has a turntable assembly 40 on which the magnetic disk cassette 10 can be mounted. The turntable assembly 40 comprises a rotary base 42, a center pin 44, a drive pin 46, a drive pin support 48, a spring 50, a magnet plate 52, and a bearing sheet 54. The rotary base 42 is of a substantially disc-shaped configuration. The rotary base 42 has a center boss section 56. The rotary base 42 fixedly engages a motor shaft 20 of a disk drive motor (not shown), which extends vertically and firmly engages the center boss section 56 to transmit the driving force of the disk drive motor. Therefore, the rotary base 42 is driven to rotate by the disk drive motor. The rotary base 42 also has an essentially rectangular opening 58.

The upper end of the motor shaft 20, which protrudes upward through the center boss section 56 of the rotary base 42, serves as the center pin 44. The magnet plate 52 is essentially C-shaped and is made of magnetizable elastic or the like. The magnet plate 52 is fastened or bonded to the upper surface of the rotary base 42 so as to surround the center boss section 56. The bearing sheet 54 is made of a non-magnetic material and is in the form of an annular sheet matching the configuration and size of the uppermost face of the center boss section 56 of the rotary base 42. The bearing sheet 54 is fastened or bonded to the upper face of the center boss section 56 around the center pin 44.

The drive pin support 48 is mounted beneath the rotary base 42. The drive pin support 48 is made of stainless steel or the like and is essentially annular. The drive pin support 48 has an essentially U-shaped, non-resilient section 60 and an adjoining essentially U-shaped, resilient section 62 forming the integral annular configuration.

A pair of substantially straight sections 64 join the non-resilient section 60 and the resilient section 62. A resilient piece 68 integral with the cross bar of the "U" of the resilient section 62 extends therefrom oblique to the straight sections 64.

The drive pin 46 is mounted upright on the resilient piece 68. An annular bearing 70 is mounted atop the drive pin 46. The drive pin support 48 opposes the lower surface of the rotary base 42 so that the drive pin 46 extends upward through the rectangular opening 58 in the rotary base 42. The

rectangular opening 58 is positioned relative to the center pin 44 in essentially the same relationship that the driving and positioning aperture 22 has relative to the center aperture 18 of the magnetic disk cassette 10.

A pivot 72 pivotally supports the drive pin support 48 beneath the rotary base 42. The pivot 72 comprises a stem section 74 and a base section 76. The stem section 74 serves as a pivot axle of the drive pin support 48. The stem section 74 thus extends through an opening 78 in the non-resilient section 60 of the drive pin support 48 and engages an opening 80 through the rotary base 42. The opening 78 in the drive pin support 48 is offset from the drive pin 46 at an angle $\theta 2$ equal to about 90^0 in the direction opposite to the direction (represented by the arrow in Fig. 4) of rotation of the turntable assembly 40. A resilient spring 82 engages the stem section 74 of the pivot 72 by means of a press-fit recess 84. The resilient spring 82 is held between the lower surface of the drive pin support 48 and the upper surface of the base section 76 of the pivot. The resilient spring 82 exerts a resilient force biasing the drive pin support 48 toward the lower surface of the rotary base 42.

The top of the stem section 74 of the pivot 72 is caulked so as to couple the rotary base 42 to the drive pin support 48 and the resilient spring 82 while compressing the resilient spring.

Thus, as the drive pin support 48 swivels, the drive pin 46 moves along the path indicated by arrows c and d in Fig. 4. As will be appreciated herefrom, the radial component of the travel of the drive pin 46 is greater than the angular component within the rectangular opening 58 of the rotary base 42. Therefore, the travel of the drive pin 46 within the rectangular opening 58 is predominantly radial as illustrated by the arrows c and d. Furthermore, the resilient section 62 of the drive pin support 48 can deform to allow pivotal movement of the drive pin relative to the vertical axis, as illustrated by arrows g and h in Fig. 7.

The spring 50 is a coil spring connecting the rotary base 42 and the drive pin support 48. One end of the coil spring 50 engages a hooking opening 88 in the rotary base 42. The other end of the coil spring 50 engages a hook 90 of the drive pin support 48 extending from the non-resilient section 60. The coil spring 50 is accommodated by a cutout 92 in the outer periphery of the rotary base 42. The coil spring 50 urges the drive pin support 48 and the drive pin 46 to rotate in the direction indicated by arrow d in Fig. 4, i.e., it tends to drive the drive pin 46 away from the center of the rotary base 42.

In operation, first a microfloppy disc cassette 40 is placed on the turntable assembly 40 with the aid of the center aperture 18 and the driving and positioning aperture 20 of the center core disk 16 of the magnetic disk cassette 10, as shown in Figs. 6 to 9. The center core disk 16 is drawn against the bearing sheet 54 by the magnetic attraction of the magnet plate 52.

If the driving and positioning aperture 20 of the center core disk 16 happens to be out of alignment with the drive pin 46, the center core disk will push the drive pin downward, causing deformation of the resilient piece 64 of the drive pin support and downward shifting of the drive pin. At this time, the axis of the drive pin 46 inclines relative to the vertical in the direction indicated by arrow h in Fig. 7 against the resilient force of the leaf spring 82. As a result, the drive pin 46 abuts the lower surface of the center core disk 16 against the force of the resilient piece 64 and the resilient spring 82. When the turntable assembly 40 rotates in the direction indicated by arrow e in Fig. 6, as described later, the drive pin 46 shifts in the direction of arrow e with respect to the center core disk 16 until it is aligned with the driving and positioning aperture 20 of the center core disk 16. As a result, the drive pin 46 becomes free to move in the direction indicated by arrow g in Fig. 7, and thus loosely engages the driving and positioning aperture 20 due to the force of the resilient spring 82 and the resilient piece 64. Thus, the drive pin 46 rotating with the rotary base 42 drives the magnetic disk 14 to rotate in the direction e.

Further rotation of the turntable assembly 40 in the direction e after establishing loose engagement between the drive pin 46 and the driving and positioning aperture 16, as shown in Fig. 6, actuates chucking of the magnetic disk cassette 10 on the turntable assembly 40 for centering and firm engagement between the center pin 144 and the center aperture 18 and between the drive pin 46 and the driving and positioning aperture 22. In the chucking operation, the drive pin in the driving and positioning aperture 18 shifts with the drive pin support 48 about the pivot 72 in the direction c due to the centrifugal force exerted on the drive pin 46 against the resilient force of the coil spring 50 in the direction d. This causes the drive pin 46 to urge the driving and positioning aperture 22 in the direction f away from the center of the turntable assembly 40. At the same time, the drive pin 46 also pushes the driving and positioning aperture 22 in the direction e. As a result, the center pin 44 is pressed against the two edges of the center aperture 18. As a result, the magnetic disk 14 is accurately centered and firmly fixed on the rotary base 42 for rotation therewith. This condition of the magnetic disk 14 will be hereafter referred to as "chucking position".

The chucking position, at which the drive pin 46 chucks the center core disk 16, is retained by

the balance of forces urging the center pin 44 against the peripheral edges of the center aperture 18 and urging the drive pin against the outer and front side peripheral edges of the driving and positioning aperture 22.

According to the shown embodiment, since chucking of the center core disk 16 of the magnetic disk cassette 10 does not cause significant angular offset of the drive pin 46 relative to the driving and positioning aperture 22, the tracks can be recorded at fixed locations on the disk.

In addition, according to the invention, the drive pin 46 inclines to an angle of about 45° with respect to the radius of the turntable assembly 40 (arrow i) so that the function of the combination of the resilient section 62 of the drive pin support 48 and the resilient piece 64 permits the drive pin 46 to escape from the outer and front side peripheral edges of the driving and positioning aperture 22.

Since the drive pin support 48 is essentially annular, the strength of the resilient section 62 of the drive pin support is sufficient to hold the drive pin 46 essentially vertical. Accordingly, the drive pin 46 can be inclined in the direction labelled i and then return quickly in the direction i' to its vertical position drawn in the phantom lines of Figs. 7 to 9, wherein the drive pin 46 occupies its normal position perpendicular to the center core disk 16 within the driving and positioning aperture 22 so as to drive the magnetic disk 14.

The angular offset θ_2 of the pivot 72 with respect to the drive pin 46 is limited in no way to 90° but may be any desired angle permitting the drive pin 46 to move predominantly radially.

The annular shape of the drive pin support 48 and the shape of the resilient section 62 of the drive pin support may be modified to any desired configuration appropriate for implementing the desired operation explained above.

The present invention is not limited to use in microfloppy disk drive apparatus, but is applicable to various recording and/or reproducing disk drive apparatus.

Claims

1. A disk drive apparatus for rotatingly driving a magnetic disk having a center positioning aperture means (18) and a driving and positioning aperture means (22) which is located at a position offset from said center positioning aperture means (18) in a given distance,
said apparatus comprising
a center pin (44) engageable with said center positioning aperture means (18);
a drive pin (46) engageable with said driving and positioning aperture means (22);
a rotary base means (42) for mounting said center pin (44) at essentially center position thereof and rotating with said center pin (44), said rotary base means (42) has an upper plane surface for mounting said magnetic disk (14) thereon; and
a drive pin support means (48) for mounting said drive pin (46) at a position essentially corresponding to said driving and positioning aperture (22), and said drive pin supporting means being pivotably mounted on said rotary base means (42) for pivotal movement on a plane substantially parallel to said upper surface of said rotary base means (42) further characterized in that said drive pin support means (48) is deformable for inclining the axis of said drive pin (46) relative to an axis parallel to the axis of said center pin (44) in a direction other than the circumferential direction.

2. A disk drive apparatus according to claim 1, characterized in that said drive pin support means (48) comprises a resilient member (62) resiliently deformable to cause inclination of said drive pin axis.

3. A disk drive apparatus according to claim 1 or 2,
characterized in that said drive pin support means (48) is provided with a resiliency characteristic for causing inclination of said drive pin axis in a radial direction.

4. A disk drive apparatus according to any one of claims 1 to 3,
characterized in that said drive pin support means (48) is pivotally displaceable relative to said rotary base means (42) for causing displacement of said drive pin (46) in a direction other than the circumferential direction.

5. A disk drive apparatus according to claim 3 or 4,
characterized in that said displacement of said drive pin (46) includes a radial component for shifting said drive pin (46) relative to said center pin (44) for varying relative radial distance therebetween.

6. A disk drive apparatus according to claim 5, characterized in that it is adapted to drive said magnetic disk (14) with said center positioning aperture means (18) which has first and second centering edges (18a, 18b) abutting against said center pin (44), and said driving and positioning aperture means (22) which has a centering edge and a driving edge abutting said drive pin (46), wherein said drive pin support means (48) pivotally displaces for

the balance of forces urging the center pin 44 against the peripheral edges of the center aperture 18 and urging the drive pin against the outer and ont side peripheral edges of the driving and positioning aperture 22.

According to the shown embodiment, since chucking of the center core disk 16 of the magnetic disk cassette 10 does not cause significant angular offset of the drive pin 46 relative to the driving and positioning aperture 22, the tracks can be recorded at fixed locations on the disk.

In addition, according to the invention, the drive pin 46 inclines to an angle of about 45° with respect to the radius of the turntable assembly 40 (arrow i) so that the function of the combination of the resilient section 62 of the drive pin support 48 and the resilient piece 64 permits the drive pin 46 to escape from the outer and front side peripheral edges of the driving and positioning aperture 22.

Since the drive pin support 48 is essentially annular, the strength of the resilient section 62 of the drive pin support is sufficient to hold the drive pin 46 essentially vertical. Accordingly, the drive pin 46 can be inclined in the direction labelled i and then return quickly in the direction i' to its vertical position drawn in the phantom lines of Figs. 7 to 9, wherein the drive pin 46 occupies its normal position perpendicular to the center core disk 16 within the driving and positioning aperture 22 so as to drive the magnetic disk 14.

The angular offset θ_2 of the pivot 72 with respect to the drive pin 46 is limited in no way to 90° but may be any desired angle permitting the drive pin 46 to move predominantly radially.

The annular shape of the drive pin support 48 and the shape of the resilient section 62 of the drive pin support may be modified to any desired configuration appropriate for implementing the desired operation explained above.

The present invention is not limited to use in microfloppy disk drive apparatus, but is applicable to various recording and/or reproducing disk drive apparatus.

Claims

1. A disk drive apparatus for rotatingly driving a magnetic disk having a center positioning aperture means (18) and a driving and positioning aperture means (22) which is located at a position offset from said center positioning aperture means (18) in a given distance,
said apparatus comprising
a center pin (44) engageable with said center positioning aperture means (18);
a drive pin (46) engageable with said driving and positioning aperture means (22);
a rotary base means (42) for mounting said center pin (44) at essentially center position thereof and rotating with said center pin (44),
said rotary base means (42) has an upper plane surface for mounting said magnetic disk (14) thereon; and
a drive pin support means (48) for mounting said drive pin (46) at a position essentially corresponding to said driving and positioning aperture (22), and said drive pin supporting means being pivotably mounted on said rotary base means (42) for pivotal movement on a plane substantially parallel to said upper surface of said rotary base means (42) further characterized in that said drive pin support means (48) is deformable for inclining the axis of said drive pin (46) relative to an axis parallel to the axis of said center pin (44) in a direction other than the circumferential direction.

2. A disk drive apparatus according to claim 1, characterized in that said drive pin support means (48) comprises a resilient member (62) resiliently deformable to cause inclination of said drive pin axis.

3. A disk drive apparatus according to claim 1 or 2,
characterized in that said drive pin support means (48) is provided with a resiliency characteristic for causing inclination of said drive pin axis in a radial direction.

4. A disk drive apparatus according to any one of claims 1 to 3,
characterized in that said drive pin support means (48) is pivotally displaceable relative to said rotary base means (42) for causing displacement of said drive pin (46) in a direction other than the circumferential direction.

5. A disk drive apparatus according to claim 3 or 4,
characterized in that said displacement of said drive pin (46) includes a radial component for shifting said drive pin (46) relative to said center pin (44) for varying relative radial distance therebetween.

6. A disk drive apparatus according to claim 5,
characterized in that it is adapted to drive said magnetic disk (14) with said center positioning aperture means (18) which has first and second centering edges (18a, 18b) abutting against said center pin (44), and said driving and positioning aperture means (22) which has a centering edge and a driving edge abutting said drive pin (46), wherein said drive pin support means (48) pivotally displaces for

causing varying of relative radial distance between said center pin (44) and said drive pin (46) for chucking engagement between said center pin (44) and said first and second centering edges (18a, 18b) of said center positioning aperture (18) and between said drive pin (46) and said centering edge and said driving edge of said driving and positioning aperture (22).

7. A combination of a flexible magnetic disk cassette (10) and a disk drive apparatus for driving the same according to claims 1 to 6, wherein said flexible magnetic disk cassette (10) includes
a flexible magnetic disk (14);
a cover (12) containing said flexible magnetic disk (14), said cover (12) having a driving hole means (22) for driving said flexible disk (14) therethrough;
and a center core disk (16) rigidly and nonmovably secured at a center of said flexible magnetic disk (14), said center core disk (16) having said center aperture means (18) with first and second converging centering sides (18a, 18b) and said driving and positioning aperture means (22) having a positioning and a driving edge means.

Revendications

1. Appareil d'entraînement de disque pour entraîner en rotation un disque magnétique présentant un moyen (18) constituant une ouverture centrale de positionnement et un moyen (72), constituant une ouverture d'entraînement et de positionnement, situé en une position décalée par rapport audit moyen (18) constituant une ouverture centrale de positionnement, à une distance donnée, ledit appareil comportant:

une broche centrale (44) qui peut venir en prise avec ledit moyen (18), constituant ouverture centrale de positionnement;

une broche d'entraînement (46) qui peut venir en prise ledit moyen (22) constituant ouverture d'entraînement et de positionnement;

un moyen (42) constituant une base tournante pour monter ladite broche centrale (44) à la position sensiblement centrale de cette broche et être entraîné en rotation avec ladite broche centrale (44);

ledit moyen (42) constituant la base tournante présentant une surface supérieure plane pour permettre d'y monter ledit disque magnétique (14); et

un moyen (48) constituant support de la broche d'entraînement pour monter ladite broche d'entraînement (46) en une position correspondant sensiblement à ladite ouverture d'entraînement et de positionnement (22) et ledit moyen supportant la broche d'entraînement étant monté, avec liberté de pivotement, sur ledit moyen (42) constituant la base tournante pour permettre un mouvement de pivotement sur un plan sensiblement parallèle à ladite surface supérieure dudit moyen (42) constituant la base tournante,

appareil caractérisé par le fait que ledit moyen (48) constituant le support de la broche d'entraînement est en outre déformable pour permettre à l'axe de ladite broche d'entraînement (46) de s'incliner par rapport à un axe parallèle à l'axe de ladite broche centrale (44) dans une direction autre que la direction circonférentielle.

2. Appareil d'entraînement de disque selon la revendication 1, caractérisé par le fait que ledit moyen (48) constituant le support de 11a broche d'entraînement, comporte un élément élastique (62) élastiquement déformable pour permettre l'inclinaison dudit axe de la broche d'entraînement.

3. Appareil d'entraînement de disque selon la revendication 1 ou 2,

caractérisé par le fait que ledit moyen (48) constituant le support de la broche d'entraînement présente une caractéristique élastique pour permettre l'inclinaison dudit axe de la broche d'entraînement dans la direction radiale.

4. Appareil d'entraînement de disque selon l'une quelconque des revendications 1 à 3, caractérisé par le fait que ledit moyen (48) constituant le support de la broche d'entraînement peut se déplacer par pivotement par rapport audit moyen (42) constituant la base tournante pour permettre le déplacement de ladite broche d'entraînement (46) dans une direction autre que la direction circonférentielle.

5. Appareil d'entraînement de disque selon la revendication 3 ou 4,

caractérisé par le fait que ledit déplacement de ladite broche d'entraînement (46) comporte une composante radiale pour décaler ladite broche d'entraînement (46) par rapport à ladite broche centrale (44) pour permettre de faire varier la distance radiale relative entre elles.

6. Appareil d'entraînement selon la revendication 5, caractérisé par le fait qu'il est conçu pour entraîner ledit disque magnétique (14) avec

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ledit moyen (18) constituant ouverture centrale de positionnement qui présente un premier et un second bords de centrage (18a,18b) butant contre ladite broche centrale (44), et avec ledit moyen (32) constituant ouverture d'entraînement et de positionnement qui présente un bord de centrage et un bord d'entraînement contre lequel bute ladite broche d'entraînement (46), étant précisé que ledit moyen (48) constituant support de la broche d'entraînement se déplace par pivotement pour permettre de faire varier la distance radiale relative entre ladite broche centrale (44) et ladite broche d'entraînement (46) pour permettre la saisie entre ladite broche centrale (44) et ledit premier et ledit second bords de centrage (18a,18b) de ladite ouverture centrale de positionnement (18) ainsi qu'entre ladite broche d'entraînement (46) et ledit bord de centrage et ledit bord d'entraînement de ladite ouverture d'entraînement et de positionnement (22).

7. Combinaison d'une cassette (10) pour disque magnétique souple et d'un appareil d'entraînement de disque pour entraîner ce disque, conformément aux revendications 1 à 6,

dans lequel ladite cassette (10) de disque magnétique souple comporte:

un disque magnétique souple (14);

une enveloppe (12) contenant ledit disque magnétique souple (14), ladite enveloppe (12) présentant, la traversant, un moyen (22) constituant trou d'entraînement pour entraîner ledit disque souple (14);

et un disque (16) constituant un noyau central, fixé, rigidement et de façon non amovible, au centre dudit disque magnétique souple (14), ledit disque (16) constituant un noyau central présentant ledit moyen (18) constituant ouverture centrale avec un premier et un second côtés de centrage convergents (18a,18b) et ledit moyen (22) constituant ouverture d'entraînement et de positionnement présentant des moyens constituant un bord de positionnement et un bord d'entraînement.

Patentansprüche

1. Magnetplattantriebsgerät für den Drehantrieb einer Magnetplatte mit einer zentralen Positionierungsöffnung (18) und einer gegenüber dieser um einen vorgegebenen Abstand versetzten Antriebs- und Positionierungsöffnung (22),

wobei das Gerät aufweist:

einen zentralen Stift (44), der mit der zentralen Positionierungsöffnung (18) in Eingriff bringbar ist,

einen Antriebsstift (46), der mit der Antriebs- und Positionierungsöffnung (22) in Eingriff bringbar ist,

eine drehbare Basisanordnung (42) zur Halterung des zentralen Stifts (44) in einer im wesentlichen zentralen Position, die mit dem zentralen Stift (44) rotiert und eine ebene Oberseite zur Halterung der Magnetplatte (14) besitzt,

und ein Antriebsstift-Trägermittel (48) zur Halterung des Antriebsstifts (46) in einer Position, die im wesentlichen der Antriebs- und Positionierungsöffnung (22) entspricht, wobei dieses Antriebsstift-Trägermittel (48) an der drehbaren Basisanordnung (42) schwenkbar montiert ist, derart daß es eine Schwenkbewegung in einer Ebene ausführen kann, im wesentlichen parallel zur Oberseite der drehbaren Basisanordnung (42) verläuft,

dadurch gekennzeichnet,

daß das Antriebsstift-Trägermittel (48) verformbar ist, um eine Neigung der Achse des Antriebsstifts (46) relativ zu einer zur Achse des zentralen Stifts (44) parallelen Achse in einer von der Umfangsrichtung abweichenden Richtung zu ermöglichen.

2. Magnetplattenantriebsgerät nach Anspruch 1, dadurch gekennzeichnet, daß das Antriebsstift-Trägermittel (48) ein elastisches Glied (62) aufweist, das elastisch verformbar ist, um eine Neigung der Achse des Antriebsstifts herbeizuführen.

3. Magnetplattenantriebsgerät nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß das Antriebsstift-Trägermittel (48) elastische Eigenschaft besitzt, um eine Neigung der Achse des Antriebsstifts in radialer Richtung herbeizuführen.

4. Magnetplattenantriebsgerät nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß das Antriebsstift-Trägermittel (48) relativ zu der drehbaren Basisanordnung (42) verschwenkbar ist, um eine Bewegung des Antriebsstifts (46) in einer von der Umfangsrichtung abweichenden Richtung herbeizuführen.

5. Magnetplattenantriebsgerät nach Anspruch 3 oder 4, dadurch gekennzeichnet, daß die Bewegung des Antriebsstifts (46) eine radiale Komponente aufweist, um den Antriebsstift (46) relativ zu dem zentralen Stift (44) zu verschieben und den relativen radialen Abstand zwischen ihnen zu verändern.

6. Magnetplattenantriebsgerät nach Anspruch 5, gekennzeichnet durch seine Anpassung für

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den Antrieb der genannten Magnetplatte (14) mit der zentralen Positionierungsöffnung (18), die eine erste und eine zweite Zentrierkante (18a, 18b) besitzt, die an dem zentralen Stift (44) zur Anlage kommen, und der Antriebs- und Positionierungsöffnung (22), die eine Zentrierkante und eine Antriebskante besitzt, die an dem Antriebsstift (46) zur Anlage kommen, wobei das Antriebsstift-Trägermittel (48) eine Schwenkbewegung ausführt, um den relativen radialen Abstand zwischen dem zentralen Stift (44) und dem Antriebsstift (46) zu verändern und den Eingriff zwischen dem zentralen Stift (44) und der ersten und der zweiten Zentrierkante (18a, 18b) der zentralen Positionierungsöffnung (18) und zwischen dem Antriebsstift (46) und der Zentrierkante und der Antriebskante der Antriebs- und Positionierungsöffnung (22) zu verspannen.

7. Kombination aus einer Kassette (10) für eine flexible Magnetplatte und einem für deren Antrieb bestimmten Magnetplattenantriebsgerät nach einem der Ansprüche 1 bis 6, wobei die Kassette aufweist:

eine flexible Magnetplatte (14),

eine die flexible Magnetplatte (14) enthaltende Abdeckung (12) mit einer Antriebsöffnung (22), durch das hindurch die flexible Magnetplatte (14) antreibbar ist, und

eine zentrale Kernscheibe (16), die im Zentrum der flexiblen Magnetplatte (14) starr und unbeweglich befestigt ist und die die genannte zentrale Positionierungsöffnung (18) mit der ersten und der mit dieser konvergierenden zweiten Zentrierkante (18a, 18b) sowie die genannte Antriebs- und Positionierungsöffnung (22) mit der Positionierungs- und der Antriebskante aufweist.