Description

The present invention relates to an optical recording apparatus to form a preformat onto an optical disc.

It is proposed an optical disc on which the Table of Contents (TOC) information, a pulse signal of a predetermined period, and the like are prerecorded as pits or bumps on the lead-in track or lead-out track as well as a wide groove, for recording data signal therein, is provided. As shown in Fig. 1, the region in which pits 31 are preformed and a wide groove 32 mixedly exist on a recordable optical disc. Hitherto, in the case of forming patterns of different widths onto a mother disc, the pits 31, groove 32, and recording spots corresponding to their widths are prepared and both of these recording spots are switched.

EP-A-0108258, which forms the basis of the precharacterising portions of appended claims 1 and 6, describes a system in which a master disk is produced having recesses formed by a first converged laser beam and a wider groove formed by a second converged laser beam.

In the case of forming the pits 31 and groove 32 having the different widths independently by the different recording spots, the following problems occur.

First, in the case of changing the spot sizes by changing the effective numerical aperture (NA) by using the same lens, the ratio of the sizes of the spots cannot be set to a large value. For example, both of the spot of the width of 0.5 [μm] and the groove of the width of 1.1 [μm] cannot be formed.

Second, since it is necessary to form two beams, a laser power needs to be set to a large value.

Third, in the case of the spot of a large diameter, if its shape were not well shaped, a groove could not be performed sharp cross sectional configuration.

Fourth, the groove width is easily changed due to an exposure level and developing condition.

It is, therefore, an object of the present invention to provide an optical recording apparatus in which both of the pits and the wide groove can be formed by using only one recording spot and the foregoing drawbacks are eliminated.

According to the present invention there is provided an optical recording apparatus for forming pits and a tracking groove onto an optically recordable disc of the type having groove sections as tracking servo information and optical information recorded as a series of recesses whose presence or absence encodes the information recorded, comprising:

recording beam generating means for generating a recording beam having a predetermined spot size such as to form a pattern of a predetermined width onto the disc;

light modulating means arranged on said optical path for turning on and off the recording beam so as to form a discrete information pattern on said disc as a series of pits of said predetermined width;

means for producing a groove having a width greater than the pattern of said predetermined width; and

light deflecting means arranged on an optical path of said recording beam generating means; characterised in that

said means for producing a groove comprises drive means for driving said light deflecting means, for reciprocatingly moving the recording beam in a radial direction of the disc at a high frequency and for thereby multiply exposing the disc by the recording beam due to the movement of the recording beam in said radial direction, whereby said groove is formed by the, same recording beam used to form said series of pits of said predetermined width.

According to another aspect of the present invention, there is provided a method of forming pits and a tracking groove onto an optically recordable disc of the type having groove sections as tracking servo information and optical information recorded as a series of recesses whose presence or absence encodes the information recorded, comprising:

generating a recording beam having a predetermined spot size such as to form a pattern of a predetermined width onto the disc;

modulating the beam to turn the recording beam on and off and to thereby form a discrete information pattern on said disc as a series of pits of said predetermined width;

forming a groove having a width greater than the pattern of said predetermined width; characterised in that the step of forming a groove comprises

reciprocatingly moving the recording beam in a radial direction of the disc at a high frequency to thereby multiply expose the disc with the recording beam due to the movement of the recording beam in said radial direction, and thereby form said groove with the same recording beam as used to form said series of pits of said predetermined width.

The recording beam having a spot size to record a discrete information pattern, i.e., pits is generated. The pits are formed by this recording beam. The central locus of the pits is wobbled. On the other hand, since the recording beam is swung in the radial direction of the disc, a wide groove is formed. In this case, since the recording beam is swung by the signal of a high frequency, the mul-

tiexposure is performed. The central locus of the wide groove formed in this manner is wobbled. Both of the pits and the wide groove are formed by using the single recording beam as explained above. Thus, the foregoing problem which occurs when two beams are switched and used can be avoided.

It may be noted that US 3737589 which is concerned with modulating a signal to be formed as a groove in a disk, describes a system for deflecting a beam alternatingly transverse to its path on the disk according to the modulation signal.

The above and other objects and features of the present invention will become apparent from the following detailed description and the appended claims with reference to the accompanying drawings.

Fig. 1 is a schematic diagram showing a signal pattern on a disc to which the present invention can be applied;

Fig. 2 is a block diagram of an embodiment of the present invention;

Figs. 3A and 3B are schematic diagrams for use in the explanation of the operation of the embodiment of the invention;

Fig. 4 is a block diagram of another embodiment of the invention; and

Figs. 5A and 5B are schematic diagrams for use in explanation of the operation of another embodiment of the invention.

An embodiment of the present invention will be described hereinbelow with reference to the drawings. In Fig. 2, reference numeral 1 denotes an optically recordable disc (mother disc). For example, a photo resist is coated on the disc 1 so as to have a uniform thickness. Reference numeral 2 denotes a laser, for instance, an argon ion laser. A recording beam from the laser 2 is led to a light modulator 3 using the acoustic optical effect.

When an ultrasonic wave is generated in an ultrasonic medium such as zinc molybdate ($PbMoO_4$), tellurium dioxide (TeO_2), or the like, a periodic change in refractive index occurs and a diffraction grating of the phase type is produced. If a laser beam is input to this portion, the intensity and direction of the laser beam change depending on the intensity and frequency of the ultrasonic wave. The mutual effect of the ultrasonic wave and light is the acoustic optical effect. A light deflector, which will be explained hereinafter, also uses this acoustic optical effect.

A signal from an input terminal 4 is supplied to the light modulator 3 through a driver 5. In the case of forming pits, the signal input in the terminal 4 is the EFM (8 - 14 modulation) signal (pulse signal). The recording beam is turned on/off by the EFM signal. In the case of forming a groove, the signal input in the terminal 4 is a DC signal of a predetermined level. The recording beam is turned on by the DC signal.

The recording beam output from the light modulator 3 is supplied to a light deflector 6 using the acoustic optical effect. The foregoing light modulator 3 changes the intensity of the diffracted light with the frequency of the ultrasonic wave held constant. On the other hand, the light deflector 6 changes the frequency of the ultrasonic wave with the intensity of the diffracted light held constant, thereby causing the deflection.

The recording beam output from the light deflector 6 is irradiated onto the disc 1 through an intermediate lens 7 and an objective lens 8. The disc 1 is rotated by a spindle motor 9 at the constant linear velocity (CLV).

A high frequency signal formed by a voltage controlled oscilator (VCO) 11 is supplied to the light deflector 6 through a driver 12. The frequency of the high frequency signal is changed to wobble the recording beam by the light deflector 6. A control signal is supplied from a terminal 10 to the VCO 11.

As illustrated in Fig. 3A, when pits are formed, a control signal S_a of the frequency, f_w = 22.05 [kHz], is supplied from the terminal 10. The frequency of the high frequency signal which is generated from the VCO changes by the frequency f_w, so that the recording beam is swung by the frequency f_w. A sync signal, an address signal, and the like are recorded by frequency modulating or phase modulating the control signal S_a. On the other hand, in the case of forming a wide groove, as shown in Fig. 3A, a signal S_b of an enough high frequency f_0 is supplied as a control signal together with the signal S_a to the VCO 11. Assuming that a spot size of a predetermined width recorded by the recording beam is d and a linear velocity upon recording is v, the frequency f_0 is selected to

$$f_0 > v/d$$

For example, assuming that (d = 0.5 μm, v = 1.25 m/sec), the frequency f_0 is set to (f_0 > 2.5 MHz, e.g., 5 MHz).

As shown in Fig. 3B, in the case of forming pits, the recording spot is wobbled by the frequency (f_w = 22.05 kHz) and a pit portion 31' consisting of the same pit width as the recording spot size is obtained in correspondence to the EFM signal which is given to the light modulator 3. On the other hand, in the groove portion, the recording spot draws a locus in the width direction and multi-exposes the portion in the area, so that a wide groove portion 32' is obtained. Therefore, after the photo resist was developed, the pits corresponding to the pit portion 31' and the wide

groove corresponding to the wide groove portion 32' wobbled by the frequency f_w are derived. The width w of the groove can be changed within a range of ($d \leq w \leq q$) (q: track pitch) by the amplitude of the signal S_b.

On the other hand, it is also possible to make the linear velocity upon recording slow as necessary, thereby allowing the fine multi-exposure to be executed.

Further, the signal of the frequency f_w is not limited to a sine wave signal but may be a clock signal or the signal which was frequency modulated by the absolute time information of the CD.

Fig. 4 shows another embodiment of the present invention. In this another embodiment, the modulation and deflection are performed by a single device (called a light modulation deflector) different from the foregoing embodiment in which the different light modulator 3 and light deflector 6 are independently used.

As shown in Fig. 4, the recording beam from the laser 2 is input to a light modulation deflector 22 through an intermediate lens 21. The light modulation deflector 22 uses the acoustic optical effect. The intermediate lens 21 is provided to focus the spot size. The position of a focal distance F of the intermediate lens 21 and the center of the light modulation deflector 22 are away from each other by only a distance of d_f. Even if the light modulation defector 22 performs the deflection on the focal point of the intermediate lens 21, the wobbling is not executed on the disc 1. As the distance d_f is set to a large value, a wobbling amount on the disc increases. However, since the spot size increases, it is difficult to deflect the beam at a high speed or to modulate it at a high speed. Therefore, d_f is determined in accordance with the necessary wobbling amount. In Fig. 4, θ_d denotes a deflecting angle.

A high frequency signal from a driver 23 is supplied to the light modulation deflector 22. An EFM signal (pulse signal) is supplied from a terminal 24 to the driver 23. An output signal of the driver 23 is turned on/off in accordance with the logic levels of "0" and "1" of the EFM signal. When a groove is formed, the signal of the "1" level of the EFM signal from the terminal 24 is supplied. When the EFM signal is set to the "0" level, the output signal of the driver 23 is turned off and the recording beam is not irradiated onto the disc 1. Thus, the pit corresponding to the EFM signal supplied from the terminal 24 is formed on the disc 1.

The high frequency signal from a VCO 25 is supplied to the driver 23. A control signal from a terminal 26 is supplied to the VCO 25. When the pits are formed, this control signal is the signal having the frequency of 22.05 kHz as shown in Fig. 5A. When a groove is formed, this control signal is the multiplexed signal of the signal of 22.05 kHz and the signal of 5 MHz as shown in Fig. 5B.

The VCO 25 has a center frequency of, e.g., 224 MHz. A frequency of an output signal of the VCO 25 changes in accordance with a signal from the terminal 26. The output signal of the VCO 25 is supplied to the light modulation deflector 22 through the driver 23, so that the wobbling is performed and the wide groove is formed.

According to the present invention, in the case where both of pits and a wide groove are formed on a disc (mother disc), both of them can be formed by using a single recording beam. Therefore, different from the apparatus which independently uses different recording beams, the following advantages are obtained.

First, the width is electrically controlled and a groove of a desired width can be easily formed.

Second, since only one recording beam is used, a construction and the adjustment of the optical system are simplified.

Third, since a groove is formed by fine spots, the groove whose edge has a sharp cross section is derived.

On the other hand, according to another embodiment of the present invention, since the light modulation and light deflection are performed by using a single device, the following advantages are further obtained in addition to the foregoing advantages.

First, a distortion of the spot shape of the recording beam can be reduced.

Second, there is no need to obtain the synchronization of the light deflector and light modulator and the alignment of the optical system is simplified.

Third, the loss of laser power is small.

Fourth, as compared with the method whereby a parallel beam is input to the light deflector, a wide deflecting band is obtained.

Claims

1. An optical recording apparatus for forming pits (31) and a tracking groove (32) onto an optically recordable disc (1) of the type having groove sections as tracking servo information and optical information recorded as a series of recesses whose presence or absence encodes the information recorded, comprising:

recording beam generating means (2) for generating a recording beam having a predetermined spot size such as to form a pattern of a predetermined width onto the disc (1);

light modulating means (3) arranged on said optical path for turning on and off the recording beam so as to form a discrete in-

groove corresponding to the wide groove portion 32' wobbled by the frequency f_w are derived. The width w of the groove can be changed within a range of ($d \leq w \leq q$) (q: track pitch) by the amplitude of the signal S_b.

On the other hand, it is also possible to make the linear velocity upon recording slow as necessary, thereby allowing the fine multi-exposure to be executed.

Further, the signal of the frequency f_w is not limited to a sine wave signal but may be a clock signal or the signal which was frequency modulated by the absolute time information of the CD.

Fig. 4 shows another embodiment of the present invention. In this another embodiment, the modulation and deflection are performed by a single device (called a light modulation deflector) different from the foregoing embodiment in which the different light modulator 3 and light deflector 6 are independently used.

As shown in Fig. 4, the recording beam from the laser 2 is input to a light modulation deflector 22 through an intermediate lens 21. The light modulation deflector 22 uses the acoustic optical effect. The intermediate lens 21 is provided to focus the spot size. The position of a focal distance F of the intermediate lens 21 and the center of the light modulation deflector 22 are away from each other by only a distance of d_f. Even if the light modulation defector 22 performs the deflection on the focal point of the intermediate lens 21, the wobbling is not executed on the disc 1. As the distance d_f is set to a large value, a wobbling amount on the disc increases. However, since the spot size increases, it is difficult to deflect the beam at a high speed or to modulate it at a high speed. Therefore, d_f is determined in accordance with the necessary wobbling amount. In Fig. 4, θ_d denotes a deflecting angle.

A high frequency signal from a driver 23 is supplied to the light modulation deflector 22. An EFM signal (pulse signal) is supplied from a terminal 24 to the driver 23. An output signal of the driver 23 is turned on/off in accordance with the logic levels of "0" and "1" of the EFM signal. When a groove is formed, the signal of the "1" level of the EFM signal from the terminal 24 is supplied. When the EFM signal is set to the "0" level, the output signal of the driver 23 is turned off and the recording beam is not irradiated onto the disc 1. Thus, the pit corresponding to the EFM signal supplied from the terminal 24 is formed on the disc 1.

The high frequency signal from a VCO 25 is supplied to the driver 23. A control signal from a terminal 26 is supplied to the VCO 25. When the pits are formed, this control signal is the signal having the frequency of 22.05 kHz as shown in Fig. 5A. When a groove is formed, this control signal is the multiplexed signal of the signal of 22.05 kHz and the signal of 5 MHz as shown in Fig. 5B.

The VCO 25 has a center frequency of, e.g., 224 MHz. A frequency of an output signal of the VCO 25 changes in accordance with a signal from the terminal 26. The output signal of the VCO 25 is supplied to the light modulation deflector 22 through the driver 23, so that the wobbling is performed and the wide groove is formed.

According to the present invention, in the case where both of pits and a wide groove are formed on a disc (mother disc), both of them can be formed by using a single recording beam. Therefore, different from the apparatus which independently uses different recording beams, the following advantages are obtained.

First, the width is electrically controlled and a groove of a desired width can be easily formed.

Second, since only one recording beam is used, a construction and the adjustment of the optical system are simplified.

Third, since a groove is formed by fine spots, the groove whose edge has a sharp cross section is derived.

On the other hand, according to another embodiment of the present invention, since the light modulation and light deflection are performed by using a single device, the following advantages are further obtained in addition to the foregoing advantages.

First, a distortion of the spot shape of the recording beam can be reduced.

Second, there is no need to obtain the synchronization of the light deflector and light modulator and the alignment of the optical system is simplified.

Third, the loss of laser power is small.

Fourth, as compared with the method whereby a parallel beam is input to the light deflector, a wide deflecting band is obtained.

Claims

1. An optical recording apparatus for forming pits (31) and a tracking groove (32) onto an optically recordable disc (1) of the type having groove sections as tracking servo information and optical information recorded as a series of recesses whose presence or absence encodes the information recorded, comprising:

   recording beam generating means (2) for generating a recording beam having a predetermined spot size such as to form a pattern of a predetermined width onto the disc (1);

   light modulating means (3) arranged on said optical path for turning on and off the recording beam so as to form a discrete in-

formation pattern on said disc as a series of pits (31) of said predetermined width;

means for producing a groove (32) having a width greater than the pattern of said predetermined width; and

light deflecting means (6) arranged on an optical path of said recording beam generating means (2); characterised in that

said means for producing a groove comprises drive means (10,11,12) for driving said light deflecting means, for reciprocatingly moving the recording beam in a radial direction of the disc (1) at a high frequency and for thereby multiply exposing the disc (1) by the recording beam due to the movement of the recording beam in said radial direction, whereby said groove (32) is formed by the, same recording beam used to form said series of pits of said predetermined width.

2. An apparatus according to claim 1, wherein said high frequency f_0 is given by the following equation,

$$f_0 > v/d$$

where, v is a relative velocity between the recording beam and the disc (1) due to the rotation of the disc and d indicates a spot size of the recording beam.

3. An apparatus according to claim 1 or 2, wherein said drive means (10,11,12) is arranged to drive said light deflecting means (6) so as to reciprocatingly move the recording beam in the radial direction of the disc (1) at the high frequency, so as to multiply expose the disc (1) to the beam due to the movement of the recording beam in the radial direction, and to reciprocatingly move the recording beam in the radial direction of the disc (1) at a low frequency, and so to wobble said tracking groove having the width wider than the pattern of said predetermined width and said discrete information pattern.

4. An apparatus according to claim 1, 2 or 3, wherein said light deflecting means and said light modulating means are constructed by one acoustic optical means (2).

5. An apparatus according to claim 4, further having a lens (21) for converging the beam which enters said acoustic optical means (22).

6. A method of forming pits (31) and a tracking groove (32) onto an optically recordable disc (1) of the type having groove sections as tracking servo information and optical information recorded as a series of recesses whose presence or absence encodes the information recorded, comprising:

generating a recording beam having a predetermined spot size such as to form a pattern of a predetermined width onto the disc (1);

modulating the beam to turn the recording beam on and off and to thereby form a discrete information pattern on said disc as a series of pits (31) of said predetermined width;

forming a groove (32) having a width greater than the pattern of said predetermined width; characterised in that the step of forming a groove comprises

reciprocatingly moving the recording beam in a radial direction of the disc (1) at a high frequency to thereby multiply expose the disc (1) with the recording beam due to the movement of the recording beam in said radial direction, and thereby form said groove with the same recording beam as used to form said series of pits of said predetermined width.

Patentansprüche

1. Optische Aufzeichnungsvorrichtung zur Ausbildung von Pits (31) und einer Nachlaufrille (32) auf einer optisch beschreibbaren Platte (1), bei der gemäß ihrer Ausführungsform Rillenabschnitte als Nachlauf-Servoinformation dienen und optische Information als Reihe von Vertiefungen aufgezeichnet ist, deren An- oder Abwesenheit die aufgezeichnete Information codiert,
mit einer Einrichtung (2) zur Erzeugung eines Aufzeichnungsstrahls mit vorbestimmtem Fokusdurchmesser, so daß ein Muster vorbestimmter Breite auf der Platte (1) ausgebildet werden kann,
mit einer im optischen Weg angeordneten Lichtmodulationseinrichtung (3) zum Ein- und Ausschalten des Aufzeichnungsstrahls, so daß auf der Platte ein diskretes Informationsmuster in Form einer Reihe von Pits (31) mit der vorbestimmten Breite ausgebildet werden kann,
mit einer Einrichtung zum Erzeugen einer Rille (32), die breiter als das Muster mit der vorbestimmten Breite ist,
und mit einer im optischen Weg der Einrichtung (2) zur Erzeugung des Aufzeichnungsstrahls angeordneten Lichtbeugungseinrichtung (6),
dadurch gekennzeichnet,
daß die Einrichtung zum Erzeugen einer Rille eine Antriebseinrichtung (10, 11, 12) zum Antreiben der Lichtbeugungseinrichtung (6) um-

faßt, die den Aufzeichnungsstrahl in radialer Richtung der Platte (1) mit hoher Frequenz hin- und herbewegt und so bewirkt, daß die Platte (1) aufgrund dieser radialen Bewegung des Aufzeichnungsstrahls mehrfach durch den Aufzeichnungsstrahl belichtet wird, so daß die Rille (32) durch denselben Aufzeichnungsstrahl wie die Reihe von Pits mit der vorbestimmten Breite ausgebildet wird.

2. Vorrichtung nach Anspruch 1, wobei die hohe Frequenz f_0 durch die Gleichung

$f_0 > v/d$

gegeben ist, wenn v die relative Geschwindigkeit zwischen dem Aufzeichnungsstrahl und der Platte (1) aufgrund der Drehung der Platte ist und d den Fokusdurchmesser des Aufzeichnungsstrahls bezeichnet.

3. Vorrichtung nach Anspruch 1 oder 2, wobei die Antriebseinrichtung (10, 11, 12) gemäß ihrer Anordnung die Lichtbeugungseinrichtung (6) antreibt, so daß der Aufzeichnungsstrahl in der radialen Richtung der Platte (1) mit der hohen Frequenz hin- und herbewegt wird, um die Platte (1) aufgrund dieser radialen Bewegung des Aufzeichnungsstrahls mehrfach zu belichten, und daß der Aufzeichnungsstrahl in der radialen Richtung der Platte (1) mit einer niedrigen Frequenz hin- und herbewegt wird, wodurch die Nachlaufrille, die breiter als das Muster mit der vorbestimmten Breite sowie das diskrete Informationsmuster ist, wobbelnd erzeugt wird.

4. Vorrichtung nach Anspruch 1, 2 oder 3, wobei die Lichtbeugungseinrichtung und die Lichtmodulationseinrichtung aus einer einzigen akustooptischen Einrichtung (22) bestehen.

5. Vorrichtung nach Anspruch 4, die zusätzlich eine Linse (21) zur Fokussierung des in die akustooptische Einrichtung (22) eintretenden Strahls aufweist.

6. Verfahren zur Ausbildung von Pits (31) und einer Nachlaufrille (32) auf einer optisch beschreibbaren Platte (1), bei der gemäß ihrer Ausführungsform Rillenabschnitte als Nachlauf-Servoinformation dienen und optische Information als Reihe von Vertiefungen aufgezeichnet ist, deren An- oder Abwesenheit die aufgezeichnete Information codiert, umfassend
die Erzeugung eines Aufzeichnungsstrahls mit vorbestimmtem Fokusdurchmesser, so daß ein Muster vorbestimmter Breite auf der Platte (1) ausgebildet werden kann,
die Strahlmodulation zum Ein- und Ausschalten des Aufzeichnungsstrahls, so daß auf der Platte ein diskretes Informationsmuster in Form einer Reihe von Pits (31) mit der vorbestimmten Breite ausgebildet werden kann,
das Ausbilden einer Rille (32), die breiter als das Muster mit der vorbestimmten Breite ist,
dadurch gekennzeichnet,
daß der Schritt der Ausbildung einer Rille das Hin- und Herbewegen des Aufzeichnungsstrahls in radialer Richtung der Platte (1) mit hoher Frequenz und damit die mehrfache Belichtung der Platte (1) durch den Aufzeichnungsstrahl aufgrund dieser radialen Bewegung des Aufzeichnungsstrahls umfaßt, so daß die Rille durch denselben Aufzeichnungsstrahl wie die Reihe von Pits mit der vorbestimmten Breite ausgebildet wird.

Revendications

1. Appareil d'enregistrement optique destiné à former des creux (31) et une gorge (32) de poursuite sur un disque (1) qui peut être enregistré optiquement, du type ayant des tronçons de gorge comme informations d'asservissement de poursuite, et des informations optiques enregistrées sous forme d'une série de cavités dont la présence ou l'absence code l'information enregistrée, comprenant :
un dispositif (2) générateur d'un faisceau d'enregistrement ayant une dimension prédéterminée de tache de manière qu'il forme un dessin de largeur prédéterminée sur le disque (1),
un dispositif (3) de modulation de lumière disposé sur le trajet optique et destiné à commander par tout ou rien le faisceau d'enregistrement afin qu'il forme un dessin d'informations séparées de disque sous forme d'une série de creux (31) de la largeur prédéterminée,
un dispositif de formation d'une gorge (32) ayant une largeur supérieure au dessin de la largeur prédéterminée, et
un dispositif déflecteur de lumière (6) disposé sur un trajet optique du dispositif générateur d'un faisceau d'enregistrement (2), caractérisé en ce que
le dispositif générateur d'une gorge comporte un dispositif (10, 11, 12) de pilotage du dispositif déflecteur de lumière destiné à déplacer en alternance le faisceau d'enregistrement dans la direction radiale du disque (1) à une fréquence élevée et ainsi à multiplier l'exposition du disque (1) par le faisceau d'enregistrement étant donné le déplacement du fais-

ceau d'enregistrement dans la direction radiale, si bien que la gorge (32) est formée par le même faisceau d'enregistrement déjà utilisé pour la formation de la série de creux de largeur prédéterminée.

2. Appareil selon la revendication 1, dans lequel la haute fréquence f_0 est donnée par l'équation suivante

$$f_0 > v/d$$

v étant la vitesse relative du faisceau d'enregistrement et du disque (1) due à la rotation du disque et d désignant la dimension de la tache du faisceau d'enregistrement.

3. Appareil selon la revendication 1 ou 2, dans lequel le dispositif de pilotage (10, 11, 12) est destiné à piloter le dispositif déflecteur de lumière (6) afin qu'il déplace en translation le faisceau d'enregistrement dans la direction radiale du disque (1) à une haute fréquence et multiplie ainsi l'exposition du disque (1) par le faisceau à cause du déplacement du faisceau d'enregistrement dans la direction radiale, et qu'il déplace en translation le faisceau d'enregistrement dans la direction radiale du disque (1) à une faible fréquence et provoque ainsi l'oscillation de la gorge de poursuite ayant une largeur supérieure au dessin de largeur prédéterminée et au dessin d'informations séparées.

4. Appareil selon la revendication 1, 2 ou 3, dans lequel le dispositif déflecteur de lumière et le dispositif modulateur de lumière sont formés par un même dispositif acousto-optique (2).

5. Appareil selon la revendication 4, ayant en outre une lentille (21) destinée à faire converger le faisceau qui pénètre dans le dispositif acousto-optique (22).

6. Procédé de formation de creux (31) et d'une gorge de poursuite (32) sur un disque (1) qui peut être enregistré optiquement, du type ayant des tronçons de gorge comme informations d'asservissement de poursuite et comme information optique enregistrée sous forme d'une série de cavités dont la présence ou l'absence code l'information enregistrée, comprenant :

la création d'un faisceau d'enregistrement ayant une dimension prédéterminée de tache afin qu'un dessin de largeur prédéterminée soit formé sur le disque (1),

la modulation du faisceau afin que le faisceau d'enregistrement soit commuté par tout ou rien et forme ainsi un dessin d'informations séparé sur le disque sous forme d'une série de creux (31) de largeur prédéterminée,

la formation d'une gorge (32) ayant une largeur supérieure au dessin de largeur prédéterminée, caractérisé en ce que l'étape de formation d'une gorge comprend

le déplacement en translation du faisceau d'enregistrement dans une direction radiale du disque (1) à une haute fréquence afin que l'exposition du disque (1) par le faisceau d'enregistrement soit multipliée à cause du déplacement du faisceau d'enregistrement dans la direction radiale, et forme ainsi la gorge avec le même faisceau d'enregistrement déjà utilisé pour la formation de la série de creux de largeur prédéterminée.