G11B

INFORMATION STORAGE BASED ON RELATIVE MOVEMENT BETWEEN RECORD CARRIER AND TRANSDUCER (recording measured values in a way that does not require playback through a transducer G01D 9/00; recording or playback apparatus using mechanically marked tape, e.g. punched paper tape, or using unit records, e.g. punched or magnetically marked cards G06K; transferring data from one type of record carrier to another G06K 1/18; circuits for coupling output of reproducer to radio receiver H04B 1/20; gramophone pick-ups or like acoustic electromechanical transducers or circuits therefor H04R)

Definition statement

This place covers:

Recording or playback of information by relative movement between a record track and a transducer, the transducer directly producing, or being directly actuated by, modulation in the track being recorded or played-back, and the extent of modulation corresponding to the signal being recorded or played-back;

Apparatus and machines for recording or playback, and parts thereof, such as heads;

Record carriers for use with such apparatus and machines;

Associated working of other apparatus with such apparatus and machines.

Relationships with other classification places

The specific application specified in G11B is mentioned in the document, the document is classified in G11B. However, experience shows that many documents also contain features relevant to H01F. In this case the documents are classified in both places.

When the document is more about magneto-optical elements as such, it goes in G02F 1/09 or lower groups. However, if the field of application (G11B) is mentioned in the document or if the expert recognizes that the magneto-optical elements looks like those typically used in the G11B then the document should also be classified in the G11B

References

Limiting references

This place does not cover:

Recording measured values in a way that does not require playback through a transducer	G01D 9/00
Recording or playback apparatus using mechanically marked tape, e.g. punched paper tape, or using unit records, e.g. punched or magnetically marked cards	G06K
Transferring data from one type of record carrier to another type of record carrier	G06K 1/18
Circuits for coupling output of reproducer to radio receiver	H04B 1/20
Loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers or circuits therefor	H04R

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Associated working of cameras or projectors with sound-recording or -reproducing means	G03B 31/00
Substation equipment for recording telephonic conversations or messages for absent subscribers	H04M 1/65
Television signal recording	H04N 5/76, H04N 9/79

Informative references

Attention is drawn to the following places, which may be of interest for search:

Working of plastics; working of substances in a plastic state in general	B29
Layered products in general	B32B
Thermography	B41M 5/26
Containers, packaging elements or packages, specially adapted for particular articles or materials	B65D 85/00
Storing webs, tapes or filamentary material in general	B65H 75/00
Coating metallic material; coating material with metallic material; coating by vacuum evaporation, by sputtering, by ion implantation or by chemical vapour deposition, in general	C23C
Details of scanning-probe apparatus	G01Q 10/00 - G01Q 90/00
Measuring electric or magnetic properties	G01R
Devices or arrangements for the control of the intensity, colour, phase, polarization or direction of light	G02F
Magneto-optical materials in general	G02F 1/0036
Photosensitive materials or processes for photographic purposes	G03C
Electrography; electrophotography; magnetography	G03G
Holographic processes or apparatus	G03H
Electric digital data processing	G06F
Printing of data from record carriers	G06K 3/00
Guiding cards or sheets	G06K 13/00
Arrangements for producing a permanent visual presentation of the output data	G06K 15/00
Record carriers for use with machines and with at least a part designed to carry digital markings	G06K 19/00
Arrangements or circuits for control of indicating devices using static means to present variable information	G09G
Static stores	G11C
Selection of magnetic materials; thin magnetic films	H01F
Thin magnetic films	H01F 10/00
Semiconductor lasers	H01S 5/00
Coding, decoding or code conversion, in general	H03M

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Record carrier	means a body, such as a cylinder, disc, card, tape, or wire, capable of permanently holding information, which can be read-off by a sensing element movable relatively to the record carrier
Head	includes any means for converting sinusoidal or non-sinusoidal electric wave-forms into variations of the physical condition of at least the adjacent surface of the record carrier, or vice versa
Near-field interaction	means a very short distance interaction using scanning-probe techniques, e.g. quasi- contact or evanescent contact between head and record carrier

Synonyms and Keywords

In patent documents the terms "transducer", "head" and "pickup" are often used as synonyms.

1.) Medium, media are synonyms of "record carrier".

2) "thin film" and "binderless" both apply to coated films of a (generally) uniformly deposited material, differing from "binder media" which comprises magnetic particles in a (usually organic) binder resin

3) vertical or perpendicular are used interchangeably in the art to refer to magnetization directions normal to the plane of the film

4) horizontal, longitudinal, in-plane are used interchangeably in the art to refer to magnetization directions lying in the plane of the film.

5) substrate, support, base are used interchangeably in the art to refer to the underlying rigid or flexible (in terms of tapes or floppy disks, for example) layer upon which other layers are deposited thereon.

6) seed layer, under layer, intermediate layer, orientation control layer, adhesion layer, crystal growth layer are all generally used terminology to describe (usually non-magnetic) layers deposited under the main magnetic layer(s) to assist in crystal growth and tuning of the magnetic properties of the main magnetic layer(s).

7) soft under layer (SUL) and keeper layer are used interchangeably to describe a soft magnetic layer used under a hard magnetic recording layer to provide a flux path.

G11B 3/00

Recording by mechanical cutting, deforming or pressing, e.g. of grooves or pits; Reproducing by mechanical sensing; Record carriers therefor (G11B 11/00, {G11B 13/00} take precedence)

Definition statement

This place covers:

Mainly vinyl disks and apparatuses for playing them

References

Limiting references

This place does not cover:

Recording on or reproducing from the same record carrier wherein for these two operations the methods are covered by different main groups of groups G11B 3/00 - G11B 7/00 or by different subgroups of group G11B 9/00	G11B 11/00
Recording simultaneously or selectively by methods covered by different main groups	G11B 13/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Recording by cutting or deforming using laser beam	G11B 7/00
Recording by cutting or deforming using electron beam	G11B 9/10
Mounting or connecting stylus to transducer with or without damping means	H04R 1/16

G11B 3/58

Cleaning record carriers or styli, e.g. removing shavings or dust {or electrostatic charges}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Carrying-off electrostatic charges in general	H05F 3/00

G11B 5/00

Recording by magnetisation or demagnetisation of a record carrier; Reproducing by magnetic means; Record carriers therefor (G11B 11/00 {and G11B 13/00} take precedence)

Definition statement

This place covers:

- Methods for magnetic recording of information on any type of record carrier (disks, tapes, drums, cards), for reproducing magnetic information and for erasing said information, wherein there is a relative movement between the record carrier and the transducer
- Structure and manufacture of sliders
- Structure and manufacture of transducers, i.e. recording (e.g. inductive) heads and reproducing heads (e.g. magnetoresistive)
- Means for protecting, cleaning, testing and demagnetizing a head
- Means for supporting the head relative to the record carrier (arm assembly) -- Means for moving the head(s) relative to the record carrier or into or out of the recording or reproducing position or for maintaining position relative to the record carrier.
- Magnetic record carriers characterised by the selection of materials from which they are made.

- Magnetic record carriers characterised by their form (e.g. disk, drum, etc.).
- Magnetic record carriers characterised by the selection of the material.
- Processes and apparatuses specially adapted for the manufacturing of magnetic record carriers.
- Rerecording or transcribing data from one magnetic carrier to another.

Relationships with other classification places

Marking record carriers in digital fashion: G06K

Selection of magnetic materials; thin magnetic films: H01F

Measuring electric or magnetic properties: G01R

References

Limiting references

This place does not cover:

Record carriers	G11B 11/00, G11B 13/00
Magneto-optical recording method and record carriers therefore, wherein the magnetic information is reproduced by optical means	G11B 11/105
Driving, starting or stopping carriers of filamentary (wire) or web (tape) form	G11B 15/00
Guiding record carriers not specifically of filamentary or web form (e.g. disks, cards)	G11B 17/00
Driving, starting or stopping carriers not specifically of filamentary or web form (e.g. disks, cards)	G11B 19/20
Magnetic flux sensitive sensors per se, i.e not specific for recording or reproducing	G01R 33/00
Digital input from or digital output to record carriers, Buffering and Formatting arrangements	G06F 3/06
Magnetic ID or credit cards	G06K 19/00
Static magnetic recording methods and memories, i.e. methods wherein there is no relative movement between the record carrier and the transducer	G11C 11/02
Devices using galvano-magnetic or similar magnetic effects not specific for recording or reproducing; Processes or apparatus peculiar to the manufacture or treatment thereof or of parts thereof	H10N 50/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Head arrangements not specific for the method of recording or reproducing	G11B 21/00
Protection against unauthorized use of memory	G06F 12/14
Security arrangements for protecting computers or computer systems against unauthorised activity	G06F 21/00
Methods or arrangements for marking record carriers in a digital fashion	G06K 1/12
Methods or arrangements for the sensing of record carriers	G06K 7/08
Handling of record carriers	G06K 13/02

Record carriers characterised by the type of digital marking	G06K 19/06
Methods and devices for demagnetising of magnetic bodies (e.g. workpieces, sheet material)	H01F 13/00

Special rules of classification

- G11B 5/00 has a number of main areas, which can be seen from the above definition. Although these areas are fairly self-contained, there are some overlapping definitions which may lead to unnecessary dual classification. Obviously, however, it may often be necessary to classify documents across several areas (method, apparatus, carrier) if a document contains matter which is interesting from several points of view.
- The rules of classification below point out specific examples of places where dual classification should be avoided.
- General note: for reasons obvious to those who work in the field, the majority of documents in G11B 5/00 now relate to magnetic disk drives, specifically hard disks, although a significant minority relate to tape systems, which are still widely used in e.g. large-scale data backup. Magnetic drums represent an older technology which has largely disappeared. Magnetic cards (e.g. ATM cards, 'swipe' cards) are also represented, but there is much overlap with areas of G06K (see 'Informative references' above). This is reflected in the structure of much of G11B 5/00, which refers explicitly to aspects of disk drives.

Because of this situation, the following general rules apply:

Documents relating to the 'minority' carriers, e.g. tapes, webs, wires, cards, drums, are always classified in one of the subgroups concerning methods and apparatuses for a specific carrier form (G11B 5/004, G11B 5/008).

However, the 'record carrier' subgroups (G11B 5/76 and the subgroups which depend upon it) are only used if there is something interesting about the carrier itself (other than the materials of which it is made, for which see G11B 5/62 et seq.) e.g. a disk has a series of timing slots or holes in it, or a drum is made removable by separating into two halves longitudinally, etc.

If an aspect (e.g. head, method of recording, servo tracking, etc.) is of more general application, or if there is a place more specific to it elsewhere in the scheme (e.g. G11B 5/584 is specifically for track following on tapes), it is also classified there.

G11B 5/00 partially overlaps with H01F, G01R, H01L. The following general rules apply:

In H01F 10/00 are classified "Magnetic thin films" in general, i.e. thin films whose application is not specific or not limited for magnetic recording or reproducing. Examples are Magnetic Spin Tunnel Junctions (STJ) or Spin Valve structures (SV) which are classified in H01F 10/3254 and H01F 10/3268 respectively and not in G11B 5/39 if the invention does only relate to the magnetic films and their magnetic coupling, without a specific adaptation of the junction or Spin valve to MR reproducing heads, i.e. if the use of the STJ or SV as reproducing head is not mentioned or mentioned among other possibilities and the invention has no specific information related e.g. to the shaping, shielding and biasing necessary for a STJ to be adapted as reproducing head. If, on the contrary, the invention only refers specifically to an adaptation of the STJ or SV thin film structure as reading head, then only the code G11B 5/39 (or subcodes) is given. When the invention has both aspects, i.e. the thin film structure in general and the specific application as reproducing head, then both codes are given.

The same rule applies to G01R, in particular G01R 33/09, where are classified magnetoresistive devices in general (i.e. MR devices whose application is not specific or not limited or specially adapted for magnetic recording or reproducing) and to H01L, in particular H10N 50/00, where are classified devices using galvano-magnetic or similar magnetic effects in general, i.e. not specially adapted for magnetic recording or reproducing.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Perpendicular Magnetic Recording	In perpendicular magnetic recording the magnetization directions representing the data bits are perpendicular to or out-of-the-plane of the recording layer
Longitudinal Magnetic Recording	In longitudinal magnetic recording the magnetization directions representing the data bits are parallel to or in the plane of the recording layer
MAMR	Microwave Assisted Magnetic Recording
TAMR or TMR	Thermally Assisted Magnetic Recording
NF or NFL	Near Field Light
ATE	Adjacent Track Erasure

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

PMR	Perpendicular Magnetic Recording
MAMR	Microwave Assisted Magnetic Recording
TAMR or TMR	Thermally Assisted Magnetic Recording

The terms "thin film" and "binderless" both apply to coated films of a (generally) uniformly deposited material, differing from "binder media" which comprises magnetic particles in a (usually organic) binder resin.

Vertical or perpendicular are used interchangeably in the art to refer to magnetization directions normal to the plane of the film.

Horizontal, longitudinal, in-plane are used interchangeably in the art to refer to magnetization directions lying in the plane of the film.

Substrate, support and base are used interchangeably in the art to refer to the underlying rigid or flexible (in terms of tapes or floppy disks, for example) layer upon which other layers are deposited thereon.

Seed layer, under layer, intermediate layer, orientation control layer, adhesion layer and crystal growth layer are all generally used terminology to describe (usually non-magnetic) layers deposited under the main magnetic layer(s) to assist in crystal growth and tuning of the magnetic properties of the main magnetic layer(s).

Soft under layer (SUL) and keeper layer are used interchangeably to describe a soft magnetic layer used under a hard magnetic recording layer to provide a flux path.

G11B 5/004

Recording on, or reproducing or erasing from, magnetic drums (G11B 19/00 takes precedence)

References

Limiting references

This place does not cover:

Driving, starting, stopping record carriers not specifically of filamentary or web form, or of supports therefor; Control thereof; Control of operating function	G11B 19/00

Special rules of classification

This group refers to an obsolete technology.

G11B 5/008

Recording on, or reproducing or erasing from, magnetic tapes, {sheets, e.g. cards,} or wires (G11B 15/00 {G11B 19/00} take precedence; {bulk transferring of information magnetisation for re-recording G11B 5/865; marking record carriers in digital fashion G06K})

Definition statement

This place covers:

- Methods for recording, reproducing or erasing from magnetic cards in G11B 5/00808
- Methods for recording, reproducing or erasing from magnetic tapes in longitudinal and/or transverse tracks in G11B 5/00813, heads therefore, including stationary (G11B 5/00821 and G11B 5/00852) or cyclically driven heads (G11B 5/00839 and G11B 5/0086)

References

Limiting references

This place does not cover:

Disposition or mounting of heads relative to moving tape	G11B 5/4893
Fixed mounting of heads	G11B 5/49
Mounting with simultaneous movement of head and tape	G11B 5/52
Track change selection or acquisition by movement of the head across tape tracks	G11B 5/5504
Provisions for track following on tapes	G11B 5/588
Driving, starting, stopping, guiding recording tapes	G11B 15/00
Guiding cards or sheets	G06K 13/00
Record carriers for use with machines and with at least a part designed to carry digital markings	G06K 19/00

Special rules of classification

- Bulk transferring of information magnetisation for re-recording G11B 5/865;

- Methods or arrangements for marking record carriers in digital fashion G06K 1/12;
- Structures and methods of manufacture of recording or reproducing heads for magnetic tapes or wires are also classified in G11B 5/127 and subgroups

G11B 5/012

Recording on, or reproducing or erasing from, magnetic disks (G11B 17/00, G11B 19/00 take precedence)

Definition statement

This place covers:

Recording, reproducing and erasing methods and corresponding apparatuses specific for magnetic recording disks (e.g. definition of tracks, control of skew angle between head and tracks, subdivision in sectors etc.)

References

Limiting references

This place does not cover:

Guiding magnetic or nonmagnetic discs	G11B 17/00
Guiding record carriers not specifically of filamentary or web form, or of supports therefor	G11B 17/00
Driving, starting, stopping record carriers not specifically of filamentary or web form, or of supports therefor; Control thereof; Control of operating function	G11B 19/00
Control of disk drives operating functions	G11B 19/02
Turntables, hubs and motors for disk drives and control thereof	G11B 19/20

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

HDD	Hard Disk Drive
HGA	Head Gimbal Assembly

G11B 5/02

Recording, reproducing, or erasing methods; Read, write or erase circuits therefor

Definition statement

This place covers:

- Recording methods (e.g. thermally assisted magnetic recording)
- Reproducing methods
- Erasing methods
- Circuitry for driving the load of a write head of a hard disk drive, e.g. H-bridge configurations to inverse the current direction in the head in order to write data on the recording medium and circuits for boosting said inversion.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Improvement or modification of read or write signals (magnetic read/write channels, equalizers, Viterbi detectors etc.)	G11B 20/10009
Timing or synchronising arrangements	G11B 27/10

Special rules of classification

Timing or synchronising arrangements are classified in G11B 27/10

Signal processing for digital recording or reproducing is generally classified in G11B 20/10 unless specific for the recording method, in which case the class G11B 5/09 is given.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Shingled writing	Tracks are written in a sequential manner from an inner diameter (ID) to an outer diameter (OD), from OD to ID, or from OD and ID towards a middle diameter (MD) in a radial region of a disk in a hard disk drive (HDD). In other words, a first track is partially overwritten on one side when a second track adjacent to the first track is written, and subsequently a third track is written that partially overwrites the second track, and so forth

G11B 5/10

Structure or manufacture of housings or shields for heads

Definition statement

This place covers:

Structure or manufacture of head housing, e.g. sliders

Structure or manufacture of shields for shielding the head against electric or magnetic fields

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Grounding of static charges, shielding from Electro-Magnetic Interference (EMI)	G11B 33/1493

Special rules of classification

- Fluid dynamic spacing of the slider from the record carrier and specific structures of the slider Air Bearing Surface therefore are classified in G11B 5/60
- Shields specific for thin film magnetic inductive heads are classified in G11B 5/3146
- Shields specific for Magnetoresistive reproducing heads are classified in G11B 5/3912

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

ABS	Air Bearing Surface

G11B 5/127

Structure or manufacture of heads, e.g. inductive

References

Limiting references

This place does not cover:

Magnetic thin films in general (i.e. thin film whose application is not specific or not limited for magnetic recording or reproducing, e.g. MR)	H01F 10/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Optical recording using near field effect	G11B 7/1387
Lapping machines	B24B 37/00
Thin film devices manufacturing methods per se, metallic coating e.g. by evaporation, sputtering	C23C 14/00
MR elements	G11C 11/16, H01F 10/3254, H01F 10/3272, H10N 50/10, G01R 33/093

Special rules of classification

- Thin film heads comprising extra layers for thermally assisted recording, e.g. optical wave guides, optical near filed generators are classified in G11B 5/314.
- Manufacturing of thin film heads (inductive or not, i.e. also magnetoresistive) is classified in G11B 5/3163 if it is related to manufacturing aspects which are specific for thin film (e.g. thin film deposition). It is noted that almost all modern heads are thin film heads.
- G11B 5/3967 (composite structural arrangements of transducers, e.g. inductive write head and magnetoresistive read head): since almost all recent heads have this composite structure, documents are classified in this subclass only if the invention relates to this composite structure, e.g. to the positioning or shielding of one head with respect to the other.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

ABS	Air Bearing Surface
AFM	Anti-FerroMagnetic
TMR	Tunnelling Magneto-Resistance
GMR	Giant Magneto-Resistance

EMR	Extraordinary Magneto-Resistance,i.e. Magneto-resistance in thin film head using narrow-gap semiconductors with metallic impurity in place of ferromagnetic layers.
AMR	Anisotropic Magneto-Resistance
CPP-GMR	Current Perpendicular-to-the-Plane- GMR
CIP-GMR	Current In-Plane-GMR
STO	Spin Torque Oscillator (spin-torque oscillator used in perpendicular write heads to apply a high-frequency auxiliary field to the recording layer to assist writing)

G11B 5/245

comprising means for controlling the reluctance of the magnetic circuit {in a head with single gap, for co-operation with one track} (G11B 5/255 takes precedence)

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Structure or manufacture of heads, e.g. inductive	G11B 5/127
Structure or manufacture of a head with more than one gap for erasing, recording or reproducing on the same track	G11B 5/265
Structure or manufacture of unitary devices formed of plural heads for more than one track	G11B 5/29
Fixed mounting	G11B 5/49

G11B 5/40

Protective measures on heads, e.g. against excessive temperature (G11B 5/31 takes precedence; protection against wear G11B 5/255 {; protective structure of the head: see under structures, e.g. G11B 5/3106})

Definition statement

This place covers:

Measures and methods (e.g. control of the operating functions) to protect the head against damages, e.g. against excessive temperature, head-record carrier collisions (means for their prediction, detection and avoidance), wear.

References

Limiting references

This place does not cover:

Fluid-dynamic spacing of heads from record carriers per se	G11B 5/60

Special rules of classification

Structural means (e.g. extra layer included in the recording or reproducing head or special layer compositions thereof) to reduce physical detrimental influence (e.g. contamination, humidity) are classified in G11B 5/3103. Structural means to reduce the influence of wear are classified in G11B 5/3103 if they refer to thin film heads and in G11B 5/255 in all other cases.

Structural means (e.g. extra layer included in the recording or reproducing head or special layer compositions thereof) for reducing the influence of temperature changes (e.g. heat dissipation layers or structures avoiding deformation of the head or the pole tip protrusion due to temperature expansion of the pole are classified in G11B 5/3133

G11B 5/41

Cleaning of heads {(of record carriers G11B 23/50)}

References

Limiting references

This place does not cover:

Cleaning of record carriers	G11B 23/50

G11B 5/455

Arrangements for functional testing of heads; Measuring arrangements for heads

Definition statement

This place covers:

Functional testing of the heads when the manufacturing is completed and arrangements therefore, e.g. spin stands or test beds.

Relationships with other classification places

Measuring electric or magnetic properties: G01R

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Testing of disk drives	G11B 19/048
Monitoring, i.e. supervising the progress of recording or reproducing (monitoring defects of the apparatus and of the recording medium)	G11B 27/36

Special rules of classification

- Testing of the manufacturing process is classified in G11B 5/127
- Testing of the manufacturing process of thin film heads or indicating thereto, e.g. before the manufacturing is completed, is classified in G11B 5/3163

G11B 5/465

Arrangements for demagnetisation of heads

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Demagnetisation of record carriers, e.g. bulk erasing	G11B 5/0245
Demagnetisation in general	H01F 13/00

G11B 5/62

Record carriers characterised by the selection of the material

Definition statement

This place covers:

Record carriers comprising a laminate of one or more layers deposited on a substrate. The record carrier consists of a layer of magnetisable material deposited on a substrate intended for information storage.

Relationships with other classification places

Aspects of magnetic recording media are classified as follows:

- G11B 5/64 concerns thin film-type media directed to the selection of magnetic material for the recording layers.
- G11B 5/68 concerns binder-type media directed to the selection of magnetic particles, binder composition, or binder additives to the recording layers.
- G11B 5/72 concerns protective layers used on magnetic recording media. This includes protective layers over both thin film-type and binder-type media.
- G11B 5/73 concerns underlayers (including substrates) used in magnetic recording media. This includes underlayers and substrates for both thin film-type and binder-type media.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Record carriers characterised by form	G11B 5/74
Manufacturing of record carriers	G11B 5/84
Optical media - material aspects, e.g. materials used in recording layers, protective layers, substrates	G11B 7/241 - G11B 7/258
Optical media - manufacture, e.g. depositing a layer of recording material, pressing pits into substrate material, arrangements of multiple types of machinery in a production line	G11B 7/26
Ferroelectric record carriers	G11B 9/02
Magnetic record carriers characterised by the selection of the material or by the structure or form	G11B 11/10582
Magnetic recording elements for measuring arrangements not specifically adapted for a specific variable	G01D 15/12

Magnets or magnetic bodies characterised by the magnetic materials therefor; Selection of materials for their magnetic properties	H01F 1/00
Thin magnetic films, e.g. of one-domain structure	H01F 10/00

Special rules of classification

Documents directed to patterned media appropriate for G11B 5/74 that also contain a specific reference to layer structure, composition, etc. should be classified in G11B 5/62 and in G11B 5/74.

Documents that also contain features relevant to the specific selection of magnetic materials in general should also be classified in H01F 1/00 (bulk magnetic materials) or H01F 10/00 (for thin films).

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Antiferromagnetism	Antiferromagnetism occurs when the exchange interactions between neighboring atoms cancel each other, so the net magnetic moment is zero. Examples of antiferromagnetic materials are (Pt, Ir, Cr and Pd) Mn alloys, and select transition metal oxides.
Bonding agent	Secondary material that is usually an organic polymer holding a layer having magnetic particulate material together.
Continuous (magnetic) layer	Hard magnetic material formed as a grain (e.g. CoCr, $L1_0$ CoPt, or Co/Pt superlattices) wherein there is no distinct phase dielectric material separating the magnetic grains. Examples include CoCrPtB alloy layers and $(Co/Pt)_n$ multilayers.
Exchange Spring Medium	A type of recording medium utilizing a high coercive force magnetic layer exchange coupled to low coercive force magnetic layer; whereby the lower coercive force magnetic layer switched orientation prior to the high coercive force layer, thereby generating a 'torque' that assists in the switching of the bits in the high coercive force layer.
Ferrimagnetic material	Ferrimagnetic materials exhibit exchange interaction between neighboring atoms leading to adjacent moments; however, the magnetic moments are unequal and opposite in direction. The magnetic properties of ferrimagnetic materials are strongly temperature dependent and are characterised by their Curie temperature. Examples of ferrimagnetic materials are rare earth-transition metal amorphous alloys, such as GdFeCo, TbFeCo, and select granular transition-metal alloys.
Ferromagnetic material	Ferromagnetic materials exhibit exchange interaction between neighboring atoms leading to adjacent moments. Ferromagnetism is temperature dependent and field strength dependent. Typical ferromagnetic materials include transition metals such as Fe, Ni, and Co and their alloys.
Granular (magnetic) layer	Hard magnetic material formed as a grain (e.g. CoCr or FePt) with a dielectric material segregated to the grain boundaries and separating the grains from each other. Examples include CoCrPt-SiO_2 layers and FePt:C layers.
Hard magnetic material	Hard magnetic materials possess large coercive force, are difficult to demagnetize and retain their magnetization upon removal of an external applied magnetic field. Typical hard magnetic materials have coercive force values of several hundred Oe or higher (often reaching several kOe).

Longitudinal Anisotropy	Films possessing anisotropy or magnetization directed along/in the plane of the film (Figure 1).
Magnetic Recording Layer	Any magnetic layer that forms part of the lamina used in storing/ recording a recorded bit. This does not include soft magnetic underlayer/keeper layers solely for assisting in the flux return from a magnetic head.
Paramagnetic material	Paramagnetic materials have magnetic moments not completely cancelled because of electronic configuration and exhibit a resultant moment. Paramagnetic susceptibility is strongly temperature dependent. Examples of paramagnetic materials are CoCr alloys at specific Cr concentrations and materials exhibiting specific size ranges of either the magnetic grains or particle dimensions.
Soft magnetic material	Soft magnetic materials possess low coercive force, are easy to demagnetize and lose substantially all their magnetization upon removal of any external applied magnetic field. Typical soft magnetic materials have coercive force values under 100 Oe (often under 10 Oe).
Vertical Anisotropy	Films possessing anisotropy or magnetization directed out of the plane of the film (Figure 2).

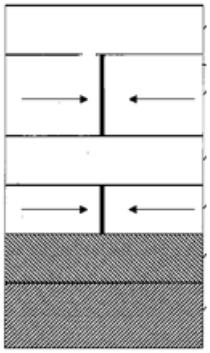


Figure 1. Example of Longitudinal Anisotropy.

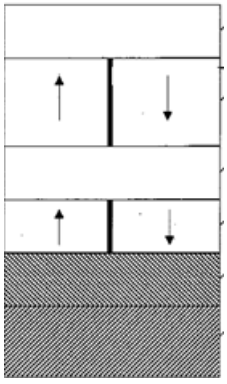


Figure 2. Example of Vertical Anisotropy.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

AFC	Antiferromagnetically Coupled

BPM	Bit Patterned Media
DLC	Diamond-Like Carbon
DTM	Discrete Track Medium
EAMR	Energy Assisted Magnetic Recording
HAMR	Heat Assisted Magnetic Recording
MAMR	Microwave Assisted Magnetic Recording
MR	Magnetoresistive
PMA	Perpendicular Magnetic Anisotropy
SUL	Soft (magnetic) Under Layer
SyAF or SAF	Synthetic Antiferromagnet (refers to two magnetic layers exchange coupled across a spacer layer such that the magnetization directions are anti-parallel to each other).
TAMR	Thermally Assisted Magnetic Recording

In patent documents, the following words/expressions are often used as synonyms:

- "base layer", "under layer", "inter layer", "seed layer", "onset layer", "intermediate layer", "underlayer", "crystallographic growth layer", "adhesion layer", "plating layer" and "orientation layer" for (usually) non-magnetic layers located between a substrate and a recording layer to establish proper crystal growth, orientation, magnetization and surface characteristics of the upper-lying magnetic layers. In many cases the exact intended use indicated by the nomenclature is not critical, nor uniform from one inventive entity to another (e.g. what one patent document might term a 'seed layer', another patent document might call an 'onset layer' or 'intermediate layer').
- "Heat Assisted" and "Thermally Assisted" for a system using heat energy to reduce the coercive force of the recording layer lamina during writing of the recording bit.
- "longitudinal anisotropy" and "in-plane anisotropy" and "horizontal anisotropy" and "longitudinal magnetization" and "in-plane magnetization" and "horizontal magnetization".
- "Microwave Assisted" uses microwaves to heat the recording lamina in a similar manner and "Energy Assisted" is generically used for either heat- or microwave- assistance.
- "Soft Magnetic Underlayer", "Soft Underlayer", and "Keeper layer" for a layer separated from the main recording layer lamina and comprising a soft magnetic material used to assist in the direction of the flux from the magnetic head to return to a write pole. These type of media are almost exclusively media exhibiting PMA.
- "vertical anisotropy" and "perpendicular anisotropy" and "vertical magnetization" and "perpendicular magnetization".

G11B 5/64

comprising only the magnetic material without bonding agent

Definition statement

This place covers:

Media or magnetic material including a thin-film magnetic layer represented by a continuous layer free of polymeric binder having a thickness typically ranging from Angstrom level to several micrometres.

Media characterised by aspects of the magnetic layers other than the composition or the requirement that a plurality of magnetic layers exist in a specific interaction. For example, media where the orientation of a single magnetic layer is the inventive feature (tilted media), how the magnetic layer is utilized (servo tracking), etc.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Structures of magnetic heads used with magnetic record carriers	G11B 5/127 - G11B 5/40
Magnetic media characterised by the protective layers	G11B 5/72 - G11B 5/7268
Magnetic media characterised by the base layers	G11B 5/73 - G11B 5/73937
Layered products comprising a layer of metal, e.g. magnetic layered products	B32B 15/00
Alloys having magnetic physical properties	C22C 2202/02
Component parts for measuring arrangements not specifically adapted for a specific variable, e.g. nonmagnetic records	G01D 15/00
Sound recordings, including magnetic sound recordings combined with motion picture structures	G03B 31/00
Products or processes where magnetic force forms an image, i.e. radiation imagery	G03G 19/00
Static memory systems, apparatus, or processes using thin films	G11C 11/14
Magnetic material resulting from metal treatment	H01F 1/00

Special rules of classification

A soft magnetic layer or SUL is classified in this subgroup and its indents, not under G11B 5/73.

Each inventive embodiment in the document should be classified separately and if one embodiment is directed to two or more magnetic layers and another embodiment is directed to the magnetic compositions of the layers, classification is in G11B 5/66 – G11B 5/678 and also in G11B 5/65 – G11B 5/658.

G11B 5/65

characterised by its composition (G11B 5/66 takes precedence)

Definition statement

This place covers:

Magnetic medium having a single magnetic layer that is characterised by its composition.

Example: A Mn-Al recording layer.

References

Limiting references

This place does not cover:

Record carriers consisting of several layers	G11B 5/66

G11B 5/653

{containing Fe or Ni (containing Co G11B 5/656; containing inorganic, non-oxide compounds of Si, N, P, B, H or C G11B 5/657; containing oxygen G11B 5/658)}

Definition statement

This place covers:

Magnetic medium in which the magnetic layer includes a majority component (by weight %, volume % or mole %) of iron or nickel, but does not also contain cobalt, oxygen or an inorganic, non-oxide compound of Si, N, P, B, H or C.

References

Limiting references

This place does not cover:

Containing cobalt	G11B 5/656
Containing inorganic, non-oxide compounds of Si, N, P, B, H or C	G11B 5/657
Containing oxygen	G11B 5/658

G11B 5/656

{containing Co (containing inorganic, non-oxide compounds of Si, N, P, B, H or C G11B 5/657; containing oxygen G11B 5/658)}

Definition statement

This place covers:

Magnetic medium in which the magnetic layer includes a majority component (by weight %, volume % or mole %) of cobalt, but does not also contain oxygen or an inorganic, non-oxide compound of Si, N, P, B, H or C.

References

Limiting references

This place does not cover:

Containing inorganic, non-oxide compounds of Si, N, P, B, H or C	G11B 5/657
Containing oxygen	G11B 5/658

G11B 5/657

{containing inorganic, non-oxide compound of Si, N, P, B, H or C, e.g. in metal alloy or compound (containing oxygen G11B 5/658)}

Definition statement

This place covers:

Magnetic medium in which the magnetic layer includes an inorganic, non-oxide compound of Si, N, P, B, H, or C. This compound can be part of the alloy (e.g. CoCrPtB) or as a segregant compound separating the magnetic grains in the layer (e.g. FePt grains separated by a carbon or boron-nitride segregant material).

References

Limiting references

This place does not cover:

Containing oxygen	G11B 5/658

Special rules of classification

Magnetic layers containing organic compounds should be classified in G11B 5/65 for a thin film-type magnetic layer or in the G11B 5/68 area for a binder-type magnetic layer.

G11B 5/658

{containing oxygen, e.g. molecular oxygen or magnetic oxide}

Definition statement

This place covers:

Magnetic medium in which the magnetic layer includes magnetic metal oxide or a magnetic layer with uncombined oxygen present within the magnetic elemental metal or the alloy lattice structure, e.g. CoO_x or CoCrPt-SiO_2 magnetic layers.

G11B 5/66

the record carriers consisting of several layers

Definition statement

This place covers:

Magnetic medium that contains more than one magnetic layer on the same side of the substrate. This includes soft, hard or paramagnetic layers, but excludes antiferromagnetic layers.

Multiple magnetic layers separated by non-magnetic or antiferromagnetic layers are classified in G11B 5/676.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Material and compositional limitations directed to spin-exchange coupled multilayers independent of use	H01F 10/32-H01F 10/3295

Special rules of classification

In this subgroup, a record carrier must include a plurality of magnetic layers and not a single magnetic layer with two or more non-magnetic layers.

A classification symbol is given related to the composition and structural arrangements of a spin-exchange coupled multilayer in the corresponding subgroups H01F 10/32 - H01F 10/3295.

G11B 5/667

including a soft magnetic layer

Definition statement

This place covers:

Magnetic medium including two or more magnetic layers, in which at least one of the magnetic layers is a soft magnetic layer.

G11B 5/672

{having different compositions in a plurality of magnetic layers, e.g. layer compositions having differing elemental components or differing proportions of elements}

Definition statement

This place covers:

Magnetic medium including two or more magnetic layers, and in which each layer has a different composition.

Example:

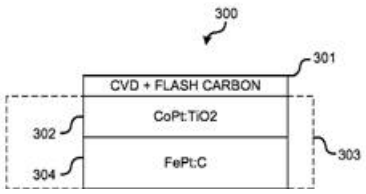


Figure 1. A FePt:C / CoPt:TiO_2 layer structure or a laminate magnetic layer structure of FePt:C / FePt:SiO_2 / FePt:C.

G11B 5/674

{having differing macroscopic or microscopic structures, e.g. differing crystalline lattices, varying atomic structures or differing roughnesses}

Definition statement

This place covers:

Magnetic medium including two or more magnetic layers, each having the same chemical constituents, but differing in crystal lattice or molecular arrangement.

Examples:

Figure 2:

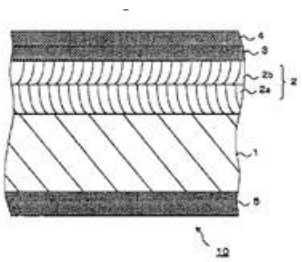
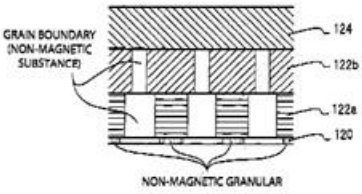


Figure 3:



Figures 2 and 3. Unique magnetic layers with distinct oblique inclination angles (Figure 2) and unique magnetic layers with distinct grain size requirements (Figure 3).

G11B 5/676

{having magnetic layers separated by a nonmagnetic layer, e.g. antiferromagnetic layer, Cu layer or coupling layer}

Definition statement

This place covers:

Magnetic medium including two or more magnetic layers, wherein at least one intervening nonmagnetic or antiferromagnetic layer is between the magnetic layers.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Recording media characterised by the selection of the non-magnetic material of an underlayer between a soft magnetic layer and a substrate (i.e. under the soft magnetic layer)	G11B 5/736 - G11B 5/7367
Recording media characterised by the selection of the non-magnetic material of an underlayer between a soft magnetic layer and the lowermost hard magnetic layer	G11B 5/7368 - G11B 5/7379
Recording media characterised by the selection of the non-magnetic material of an underlayer under the lowermost magnetic layer in media with no soft magnetic layer	G11B 5/7368 - G11B 5/7379
Material and compositional limitations directed to spin-exchange coupled multilayers independent of use	H01F 10/32 - H01F 10/3295

Special rules of classification

A classification symbol is given related to the composition and structural arrangements of a spin-exchange coupled multilayer in the corresponding subgroups H01F 10/32 - H01F 10/3295.

If a document discloses an inventive embodiment having exactly two magnetic layers separated by at least one intervening nonmagnetic or antiferromagnetic layer and another different inventive embodiment having three or more magnetic layers separated by intervening nonmagnetic or antiferromagnetic layers, an Inventive classification is given in G11B 5/676 and an Inventive classification is also given in G11B 5/678.

G11B 5/678

{having three or more magnetic layers}

Definition statement

This place covers:

Magnetic medium in which the medium has at least three magnetic layers on a single side of the substrate, with at least one intervening non-magnetic or antiferromagnetic layer.

Examples: $(Co/Pt)_n$ or $(Co/Pd)_n$ superlattice-type media layers.

Special rules of classification

If a document discloses an inventive embodiment having exactly two magnetic layers separated by at least one intervening nonmagnetic or antiferromagnetic layer and another different inventive embodiment having three or more magnetic layers separated by intervening nonmagnetic or antiferromagnetic layers, an Inventive classification is given in G11B 5/676 and an Inventive classification is also given in G11B 5/678.

G11B 5/72

Protective coatings, e.g. anti-static {or antifriction}

Definition statement

This place covers:

One or more coatings having specific utility for protecting the record carrier, e.g. from shock, static, head-medium crash, friction or corrosion.

The protective coatings on the outermost layer of the record carrier above any magnetic recording layer structure – the "outermost" being the layer furthest from the substrate and closest to the surface facing a recording or reproducing apparatus.

Relationships with other classification places

Documents directed to protective layers used on magnetic record carriers, as well as on magnetic recording or reproducing apparatus components, should be given an additional symbol in G11B 5/255, G11B 5/31, G11B 5/40 or G11B 5/3106, as appropriate.

Documents directed to protective layers used on a plurality of media types, e.g. optical, ferroelectric or optomagnetic, should be given a classification here if they also recite use on magnetic record carriers.

Other aspects of magnetic recording media are classified as follows:

- G11B 5/64 concerns thin film-type media directed to the selection of magnetic material for the recording layer(s).
- G11B 5/68 concerns binder-type media directed to the selection of magnetic particles, binder composition, or binder additives to the recording layer(s).
- G11B 5/73 concerns underlayers (including substrates) used in magnetic recording media of both thin-film and binder-type.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Protective measures on heads – on pole pieces, etc.	G11B 5/255
Protective measures on heads – thin film structures	G11B 5/3106

Protective measures on heads, e.g. against excessive temperature	G11B 5/40
Manufacturing methods of depositing protective layers	G11B 5/8408
Protective layers exclusive to optical media	G11B 7/254
Protective layers exclusive to magneto-optic (i.e. thermomagnetic, optomagnetic) record carriers	G11B 11/10586
Compounds of non-metallic elements – oxides	C01B 11/00
Compounds of non-metallic elements – nitrides	C01B 21/00
Compounds of non-metallic elements – carbides	C01B 32/00
General utility lubricant compositions	C10M
Indexing scheme for lubricant composition - specific for use on magnetic media	C10N 2040/18
Coatings of C, O, Ni, Si, e.g. as carbides or nitrides	C22C 29/00
Sputtering of carbon, including DLC	C23C 14/0605
Coating methods of coating carbon, including DLC	C23C 16/26
Plural inorganic coatings with specific use for wear protection – methodology thereof	C23C 28/044
General utility magnetic layers characterized by the composition of a diffusion preventing, cap, "protective" layer	H01F 10/30

Special rules of classification

Protective coatings including a bonding agent, such as for use above binder media type record carriers (i.e. those whose magnetic layers would be covered under G11B 5/68), should be classified in G11B 5/728.

Protective coatings that are specific to thin-film media type record carriers (i.e. those whose magnetic layers would be covered under G11B 5/64) or protective coatings that are generic to both binder-type and thin-film-type record carriers should be classified in G11B 5/72 – G11B 5/727. If the use with binder-type media is deemed critical, an additional classification can be given in G11B 5/728.

Classification within this area follows the general rules below:

- If the invention concerns a single carbon protective layer, either without other recited protective layers or where the other protective layers are recited in name only, classification should be in G11B 5/727. If an anticorrosive function is indicated, classification should be in G11B 5/722, either alone or in addition to G11B 5/727, if both features are important.
- If the invention concerns one or more lubricants, classification should be in G11B 5/725 – G11B 5/7257. If additional protective layers also represent the invention, then it should be classified in G11B 5/725 - G11B 5/7257 and in G11B 5/726 - G11B 5/7268.
- If the invention concerns a plurality of protective layers, then classification should be in G11B 5/726 – G11B 5/7268. The invention can be related to specific materials or compositions, or to the interaction between the layers, e.g. an initial protective layer given a surface treatment to enhance the bonding to a subsequent protective layer.
- If the invention concerns the inclusion of a bonding agent in the protective layer, such as for use above binder-type media, then classification should be in G11B 5/728.
- Single non-carbon protective layers are classified in G11B 5/72, e.g. silicon based protective layers.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

DLC	Diamond-like Carbon
PFPE	Perfluoropolyether
PE	Polyether

In patent documents, the following words/expressions are often used as synonyms:

- protective layer
- capping layer
- topcoat layer
- overcoat layer
- protection layer

G11B 5/722

{containing an anticorrosive material}

Definition statement

This place covers:

Protective coatings in which the material used has an express anti-corrosion activity or the protective coatings contain a material that is art-recognized as serving an anti-corrosive function, e.g. Cr.

Examples of corrosion resistance include tests in the description, e.g.

Corrosion Resistance Tests

[0063] Corrosion resistance of a protective layer **104** was evaluated by dripping acid onto the surface of the magnetic recording medium A. The magnetic layer **103** of the magnetic recording medium A comprises a CoCr alloy, and thus by evaluating the amount of Co eluted in acid through the protective layer **104**, it is possible to judge the corrosion resistance of the protective layer **104**.

or corrosion resistance in the claims.

G11B 5/725

containing a lubricant {, e.g. organic compounds (inorganic carbon protective coating G11B 5/727)}

Definition statement

This place covers:

Protective coatings that include at least one lubricant material, i.e., a substance for reducing friction or wear.

Relationships with other classification places

If both a carbon protective coating and the lubricant concern the invention, classification should be done in G11B 5/7266 and in G11B 5/725 – G11B 5/7257 (based on the type of lubricant).

References

Limiting references

This place does not cover:

Inorganic carbon protective coating	G11B 5/727

Informative references

Attention is drawn to the following places, which may be of interest for search:

General utility lubricant compositions	C10M
Non-macromolecular based lubricant compositions	C10M 105/00
Macromolecular based lubricant compositions	C10M 107/00
Organic macromolecular based lubricant compositions that further include nitrogen (e.g. nitrogen containing lubricants)	C10M 2217/00
Phosphorous-nitrogen lubricants	C10M 2223/08
Phosphorous (e.g. Phosphagene) based lubricant compositions	C10M 2225/00
Indexing scheme for lubricant composition - specific for use on magnetic media	C10N 2040/18

Special rules of classification

Carbon coatings, unless explicitly stated as being used for their lubricity, are not considered lubricants within the scope of this subgroup. In those situations, an additional symbol should also be given in the appropriate Inorganic Protective Coating subgroups G11B 5/7264 – G11B 5/727, when the carbon coating is explicitly disclosed.

G11B 5/7253

{Fluorocarbon lubricant}

Definition statement

This place covers:

The lubricant is an organic compound of fluorine.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Lubricating compositions characterised by the base-material being a macromolecular compound containing halogen	C10M 107/38
Organic macromolecular compounds containing halogen as ingredients in lubricant compositions	C10M 2213/00

G11B 5/7257

{Perfluoropolyether lubricant}

Definition statement

This place covers:

The fluorine containing lubricant that includes a perfluoropolyether compound.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Lubricant compositions including perfluoropolyethers	C10M 2213/06

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

PFPE	Perfluoropolyether
PE	Polyether
Fomblin	Perfluoropolyether lubricant composition having a Wide range of end group formulations

G11B 5/726

{Two or more protective coatings (inorganic carbon protective coating G11B 5/727)}

Definition statement

This place covers:

Protective coating including two or more coatings, where each coating is explicitly disclosed.

Relationships with other classification places

Most record carriers include a protective inorganic (usually carbon) coating along with a lubricant coating. If one of these coatings is lacking an indication of critical interaction with another of these coatings (e.g. modified for improved lubricant bonding), classification should only be done in the corresponding single coating areas: G11B 5/72, G11B 5/725 or G11B 5/727.

References

Limiting references

This place does not cover:

Inorganic carbon protective coating	G11B 5/727

G11B 5/7262

{Inorganic protective coating}

Definition statement

This place covers:

At least one of the protective coatings that includes an inorganic coating material that is a non-carbon containing coating.

G11B 5/7264

{Inorganic carbon protective coating, e.g. graphite, diamond like carbon or doped carbon}

Definition statement

This place covers:

At least one of the protective coatings that includes a non-organic carbon-based coating material.

Example 1:

1. A planarized bit-patterned magnetic medium comprising:

a magnetic layer comprising island regions and trench regions;

a first carbon layer applied over the magnetic layer; and

a second carbon layer applied over the first carbon layer;

wherein the second carbon layer has been substantially removed from above the island regions.

Example 2:

forming a magnetic layer on a substrate;

forming an underlayer on the magnetic layer, the underlayer comprising a material selected from the group consisting of silicon, silicon carbide and germanium, a thickness of the underlayer being 0.3 nm or greater and 1.8 nm or less, and

forming a carbon layer comprising amorphous carbon containing hydrogen on the underlayer, an amount of hydrogen included in the carbon layer being 24.7 at % or higher and 46.8 at % or lower, and a thickness of the carbon layer being 0.2 nm or greater and 1.7 nm or less.

G11B 5/7266

{comprising a lubricant over the inorganic carbon coating}

Definition statement

This place covers:

Protective coatings that include at least one non-organic carbon-based coating material and at least one lubricant coating; the lubricant can be physically or chemically bonded to the carbon-based coating; classification should also be done in G11B 5/725 – G11B 5/7257, depending on the type of lubricant.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

General utility lubricant compositions	C10M
Non-macromolecular based lubricant compositions	C10M 105/00
Macromolecular based lubricant compositions	C10M 107/00
Indexing scheme for lubricant composition - specific for use on magnetic media	C10N 2040/18

Example 1:

1. A magnetic recording medium comprising at minimum a magnetic layer, a protective layer and a lubricant agent layer on a non-magnetic substrate in sequential order,
wherein the protective layer is formed of carbon or silicon carbide,
the lubricant agent layer is formed by being in contact with the protective layer, and contains compound A represented in the below general formula (1) and compound B, ...

Example 2:

a protective overcoat for protecting said magnetic layer, said overcoat comprising carbon; and
a lubricant, comprising:
a perfluoropolyether main chain having a first end and a second end;
a hexa(trifluoromethylphenoxy)cyclotriphosphazene attached to said first end of perfluoropolyether main chain; and
a bonding enhancer attached to said second end of perfluoropolyether main chain for enhancing bonding to the overcoat, the bonding enhancer selected from the group consisting of multiple hydroxyl groups, multiple amide groups, acetamide, methacrylate, methyl methacrylate and glycidyl ether.

G11B 5/7268

{comprising elemental nitrogen in the inorganic carbon coating}

Definition statement

This place covers:

Protective coatings that include at least one non-organic carbon-based coating material, where that carbon-based coating further includes uncombined nitrogen.

Example:

magnetic patterns, comprising a protruded ferromagnetic layer, separated from each other on the soft magnetic layer;
a nonmagnetic layer formed between the magnetic patterns; and
a protective layer formed on the magnetic patterns and the nonmagnetic layer,
the nonmagnetic layer comprising a nitride of a first element selected from the group consisting of Si, Ti, V, Cr, Ni, Cu, Ga, Y, Zr, Nb, Mo, Hf, Ta, W and Al and an alloy thereof, the first element being distributed over the entire thickness of the nonmagnetic layer, a nitrogen concentration in the nonmagnetic layer being higher on a surface side than on a substrate side, and the protective layer comprising carbon nitride.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Organic macromolecular based lubricant compositions that further include nitrogen (e.g. nitrogen containing lubricants)	C10M 2217/00
Phosphorous-nitrogen lubricants	C10M 2223/08
Phosphorous (e.g. Phosphagene) based lubricant compositions	C10M 2225/00

G11B 5/727

{Inorganic carbon protective coating, e.g. graphite, diamond like carbon or doped carbon}

Definition statement

This place covers:

Single protective coating, which is an inorganic carbon-based material, i.e. a compound that does not include organic carbon bonds.

G11B 5/728

{containing a bonding agent in the protective coating}

Definition statement

This place covers:

Protective coating that is a bonding-agent type of coating, such as for use above binder-type media.

Special rules of classification

Protective coatings that are specific to thin-film media type record carriers (i.e. those whose magnetic layers would be covered under G11B 5/64) or protective coatings that are generic to either binder-type or thin-film-type record carriers should be classified in G11B 5/72 – G11B 5/727.

If the use of a specific protective layer above a binder-type media layer is disclosed even though the protective layer(s) would be classified in G11B 5/72 – G11B 5/727, an additional symbol may be given in G11B 5/728.

G11B 5/73

Base layers {, i.e. all non-magnetic layers lying under a lowermost magnetic recording layer, e.g. including any non-magnetic layer in between a first magnetic recording layer and either an underlying substrate or a soft magnetic underlayer}

Definition statement

This place covers:

Magnetic media in which each medium includes one or more non-magnetic layers under a lowermost magnetic recording layer.

Base layers are substrates or non-magnetic layers designated either by position (e.g. precoat layer, prelayer, base layer, underlayer, intermediate layer, lower layer, sublayer, ground layer, etc.) or function (e.g. nucleation layer, seed layer, barrier layer, corrosion prevention layer, diffusion prevention layer, texture layer, etc.).

Relationships with other classification places

Other aspects of magnetic recording media are classified as follows:

- G11B 5/64 concerns thin film-type media directed to the selection of magnetic material for the recording layer(s).
- G11B 5/68 concerns binder-type media directed to the selection of magnetic particles, binder composition, or binder additives to the recording layer(s).
- G11B 5/72 concerns protective layers used on magnetic recording media.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Magnetic media characterised by the patterning of the magnetic layer (bit patterned, discrete track, etc.)	G11B 5/743 - G11B 5/746
Magneto-optic or opto-magnetic media substrates	G11B 7/253 - G11B 7/2539
Magneto-optic or opto-magnetic underlayers	G11B 7/256 - G11B 7/2595
Energy assisted record carriers	G11B 11/10582 - G11B 11/10593
Thin film-type magnetic layers characterized by material or structural arrangement, characterized by the coupling or physical contact with other layers	H01F 10/06
Thin film-type magnetic layers characterized by material or structural arrangement, characterized by the substrate or intermediate layers	H01F 10/26 - H01F 10/30
General utility Synthetic Antiferromagnetic exchange coupled magnetic layers	H01F 10/324 - H01F 10/3259

Special rules of classification

Layers formed by chemically modifying a surface layer (e.g. an oxidized surface layer formed from a previously deposited layer) are considered a separate layer and should be placed in the appropriate subgroup. Note that a surface layer formed as part of a recording medium substrate is still considered

part of the substrate for classification purposes (i.e. placement would be in the coated or composite substrate areas).

Classification in this area is primarily of the claimed invention with each embodiment of claimed subject matter being Inventive unless the subject matter recited is nominal and well known in the art. Relevant disclosure in the specification should be classified primarily as Additional information unless deemed particularly relevant to the invention as a whole, in which case it may be given an Inventive symbol.

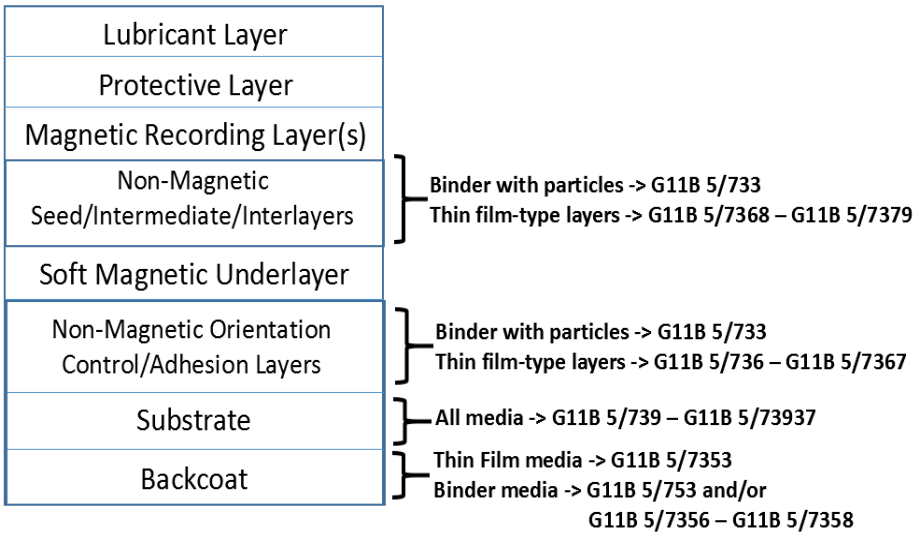
Base layers in which the invention is directed to the initial substrate or support upon which all other layers are deposited are classified in G11B 5/739 - G11B 5/73937.

Base layers in which the recording or magnetizable layer is a continuous-type layer free of polymeric binder (i.e. "thin film media") are classified in G11B 5/736 - G11B 5/7379 if on the same side of the substrate as the magnetic layer or G11B 5/7353 if a backcoat layer.

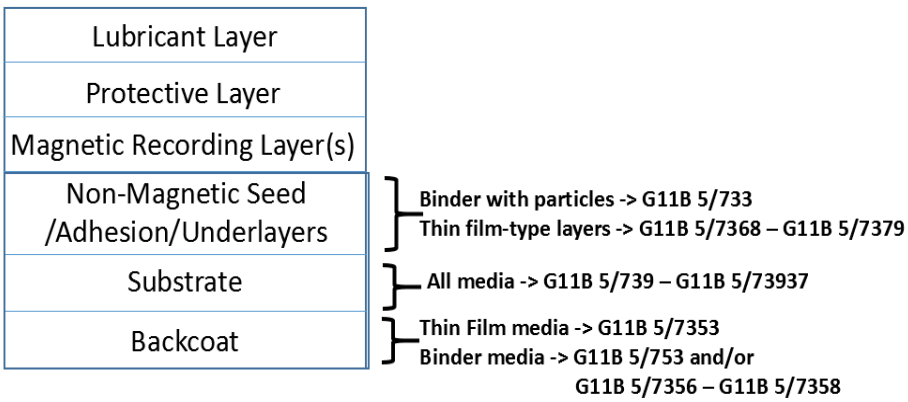
Base layers in which the recording or magnetizable layer is a mixture of magnetic particles and a polymeric binder (i.e. "binder media") are classified in G11B 5/733 - G11B 5/7334 if on the same side of the substrate as the magnetic layer or G11B 5/735, G11B 5/7356, or G11B 5/7358 if a backcoat layer.

The following figures illustrate where appropriate base layers should be classified, depending on whether the media in question includes a soft under layer (SUL) (also termed a 'Keeper layer').

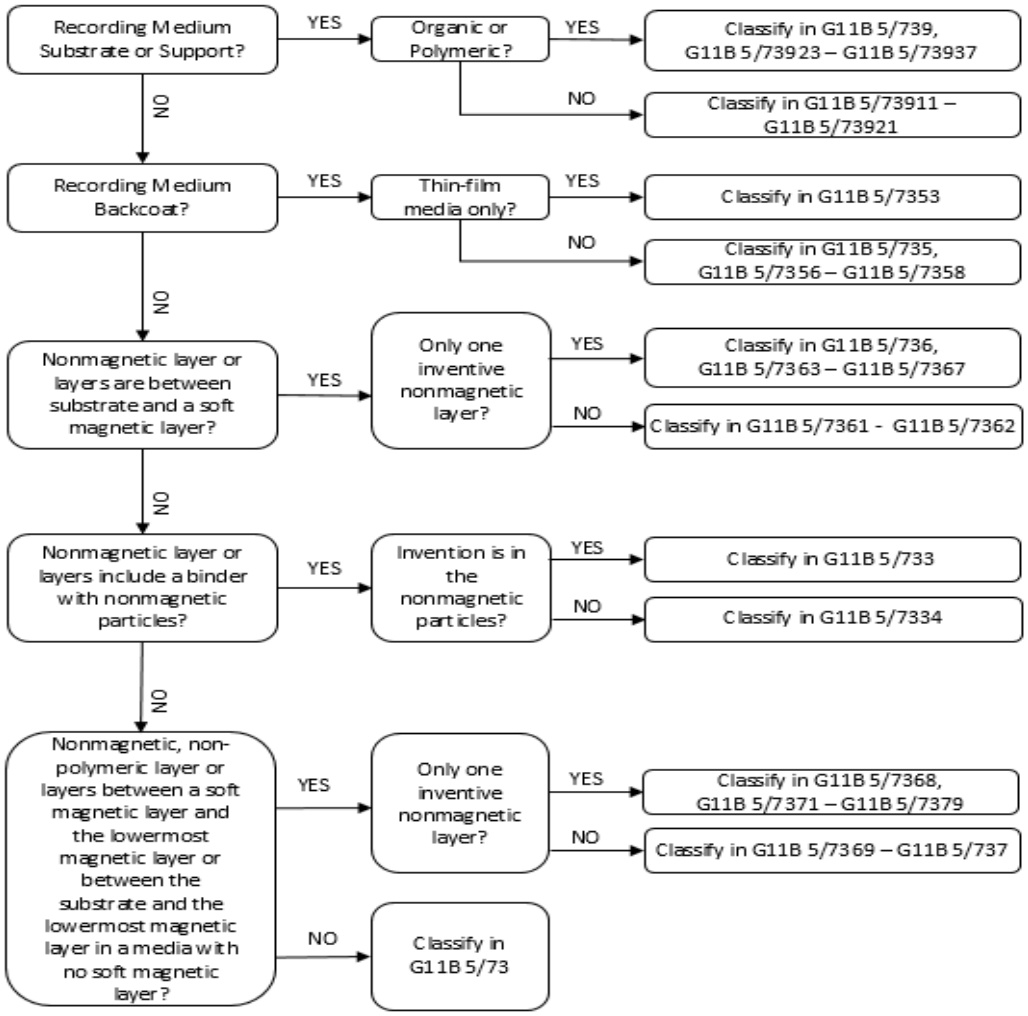
Media with SUL or Keeper Layer



Non-Keepered (or without SUL) Media



The following flow-chart provides guidance on the precedent notes within this portion of the scheme.



An invention is to 'plural inventive non-magnetic layers' for the purpose of placement in appropriate subgroups of G11B 5/736 - G11B 5/7379 if the independent claim is directed to multiple non-magnetic layers, even if these layers are recited in name only or if dependent claims recite multiple non-magnetic layers in other than name only. The sole exception would be if a dependent claim further limits the structural location of one of the inventive non-magnetic layers relative to an included soft magnetic layer (such that only a single non-magnetic layer is now above or below an included soft magnetic layer - see example 2, below).

Examples:

(1)	What is claimed is: **1**. A magnetic recording medium comprising: a substrate; a seed layer; an under layer; and a perpendicular recording layer having a granular structure, wherein $(Ms \cdot \alpha \cdot \delta^{1.5}(1-Rs)^{0.33})$, Ms, and α satisfy the following relations: $(Ms \cdot \alpha \cdot \delta^{1.5}(1-Rs)^{0.33}) \geq 0.1$ [μ·emu·(mm)$^{-1.5}$], $Ms \geq 450$ [emu/cc], and $\alpha \geq 1.2$, and wherein in the above formulas, Ms indicates a saturated magnetization amount, α indicates the gradient of a M-H loop around a coercive force Hc, δ indicates the thickness of the perpendicular recording layer, and Rs indicates a squareness ratio. **2**. The magnetic recording medium according to claim **1**, wherein the seed layer has an amorphous state and includes a metal having a melting point of 2,000° C. or less.	(1) The invention at the left would be placed in a subgroup directed to plural inventive nonmagnetic layers as both the seed layer and underlayer are recited in claim 1, even though the seed layer is the only layer further limited in the dependent claim (i.e. the underlayer is recited in name only).
(2)	Claim 1: A magnetic recording medium comprising a magnetic layer having … Claim 2: The invention of claim 1, further comprising a base substrate and a laminated film thereon. … Claim 5: The invention of claim 2, wherein the laminated film has an amorphous TiCr seed layer, a Ru foundation layer, and a recording layer formed in this order. … Claim 15: The invention of claim 5, further comprising a soft magnetic layer provided between the seed layer and the foundation layer.	(2) Claim 1 does not recite any 'inventive nonmagnetic layers', but the dependent claims, e.g. claim 5, recites a seed layer and a foundation layer. This aspect is classified in G11B 5/7369. However, claim 15 adds a soft magnetic layer between the seed and foundation layers, resulting in a {base substrate/seed layer/soft magnetic layer/foundation layer/recording layer} structure, which is classified in G11B 5/736.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Binder-type media	A recording medium where the recording layer includes (a usually polymeric) binder mixed with magnetisable particles.
Thin film-type media	A recording medium where the recording layer is substantially free of any polymeric material.
Non-magnetic	A material that has a zero magnetic moment.
Magnetic	A material that has a non-zero magnetic moment, including paramagnetic, ferromagnetic, and ferrimagnetic materials.
SUL	Soft Under Layer - a soft magnetic layer usually located between a substrate and a recording layer to direct the flux from the magnetic head through the media recording layer and back to a return head.
Soft Magnetic	A material exhibiting a (relatively) low coercivity, typically under 100 Oe.
Hard Magnetic	A material exhibiting a (relatively) high coercivity capable of storing data, typically over 1000 Oe.

Synonyms and Keywords

In patent documents, the following words/expressions are often used as synonyms:

- Base layer, precoat, prelayer, under layer, inter layer, intermediate layer, onset layer, lower layer, sublayer, ground layer, barrier layer, corrosion prevention layer, diffusion barrier layer, or texture layer.

In patent documents, the word/expression in the first column is often used instead of the word/ expression in the second column, which is used in the classification scheme of this place:

Any base layer used in a binder-type medium	Characterized by the addition of non-magnetic particles (i.e. G11B 5/733)

G11B 5/733

characterised by the addition of non-magnetic particles {(base layers having a non-magnetic layer under a soft magnetic layer G11B 5/736; magnetic recording media substrates G11B 5/739)}

Definition statement

This place covers:

Magnetic recording media having one or more base layers formed from a binder with included non-magnetic particles or filler.

References

Limiting references

This place does not cover:

Base layers having a non-magnetic layer under a soft magnetic layer	G11B 5/736
Magnetic recording media substrates	G11B 5/739

Informative references

Attention is drawn to the following places, which may be of interest for search:

Layers above a recording layer (relative to a substrate), even if including non-magnetic particles (i.e. protective layers)	G11B 5/72
Base layers on the opposite side of the substrate from the magnetic recording layer, even if including non-magnetic particles (i.e. backcoat layers)	G11B 5/735
Base layers having a non-polymeric layer under the lowermost magnetic recording layer, but without binder material and without non-magnetic particles (i.e. thin film-type layers)	G11B 5/7368

Special rules of classification

A base layer deposited solely as part of a substrate that has no disclosed utility in establishing the magnetic properties of the recording layer would not be classified here, even if containing non-magnetic particles. Such a layer would be classified in G11B 5/739 according to the scheme title of G11B 5/733 and would include layers typically denoted as smoothing layers, coating layers, etc. that are taught as part of the substrate, per se.

Underlayers used in binder-type media cases are typically referred to as lower layers, primer layers, undercoats, etc. and would be classified here if including non-magnetic particles. If without non-magnetic particles they are classified in G11B 5/73.

Where the non-magnetic particles included in the base layer are only nominally recited and the inventive subject matter is directed to the base layer binder composition (or structure) or the composition (or structure) of a non-particulate additive (e.g. lubricant, viscosity aid, etc.), classification is in G11B 5/7334.

G11B 5/7334

{Base layer characterised by composition or structure}

Definition statement

This place covers:

Magnetic recording media having one or more base layers formed from a binder with included non-magnetic particles or filler, where the particles are recited in name only and the inventive subject matter is in the binder composition (or structure) or a non-particulate additive composition (or structure).

Special rules of classification

If the non-magnetic particles are recited in more than name only and are deemed inventive, classification should be in G11B 5/733. If inventive subject matter is directed to both the particles and the binder (or additive), then classification should be given in both G11B 5/733 and G11B 5/7334.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Structure	The chemical structure of an organic compound, i.e. the arrangement of the atoms or molecules of one or more of the underlayers.

G11B 5/735

characterised by the back layer {(magnetic recording media substrates G11B 5/739)}

Definition statement

This place covers:

Magnetic recording media having one or more base layers formed on the opposite side of a support from where the recording layer is located (i.e. back layers).

Also included are back layers including a binder with non-magnetic particles or filler, where the particles or filler are nominal and recited in name only.

References

Limiting references

This place does not cover:

Magnetic recording media substrates	G11B 5/739

Informative references

Attention is drawn to the following places, which may be of interest for search:

Layers above a recording layer (relative to a substrate), even if including non-magnetic particles (i.e. protective layers)	G11B 5/72
Base layers on the same side of the substrate as the recording layer structure for single sided media	G11B 5/733 - G11B 5/7334, G11B 5/736 - G11B 5/7379

Special rules of classification

If the back layer includes non-magnetic particles or filler and the particles or filler are recited in no more than name only, classification is in G11B 5/735 and not in G11B 5/7356 - G11B 5/7358. If any inventive subject matter is directed to the particles, classification is in G11B 5/7356 or G11B 5/7358 .

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Back layer	A layer on the opposite side of a substrate from the recording layer structure; typically used for controlling the running and electrostatic properties of a tape-form medium.

Synonyms and Keywords

In patent documents, the following words/expressions are often used as synonyms:

- Back layer, backcoat, back coat

G11B 5/7353

{for a thin film medium where the magnetic recording layer structure has no bonding agent}

Definition statement

This place covers:

Magnetic recording media, each having one or more back layers wherein the recording layer is a thin-film type structure, e.g. sputtered layer, CoCrPt alloy layer, Co/Pt multilayers.

G11B 5/7356

{comprising non-magnetic particles in the back layer, e.g. particles of TiO_2, ZnO or SiO_2}

Definition statement

This place covers:

Magnetic recording media having one or more back layers characterized by inventive non-magnetic particles (e.g. oxides, carbon black, etc.).

Special rules of classification

If the back layer includes non-magnetic particles or filler and the particles or filler are recited in no more than name only, classification is in G11B 5/735.

If the non-magnetic particles or filler are recited as being added to achieve a specified inventive or non-conventional physical property, classification is in G11B 5/7358.

G11B 5/7358

{specially adapted for achieving a specific property, e.g. average roughness [Ra]}

Definition statement

This place covers:

Back layers including non-magnetic particles or filler recited as being added to achieve a specified inventive or non-conventional physical property.

Special rules of classification

If the recited property is nominal or conventional (e.g. carbon black is added to control the electrostatic property of the back layer to known, conventional ranges), classification is in G11B 5/735 and its subgroups.

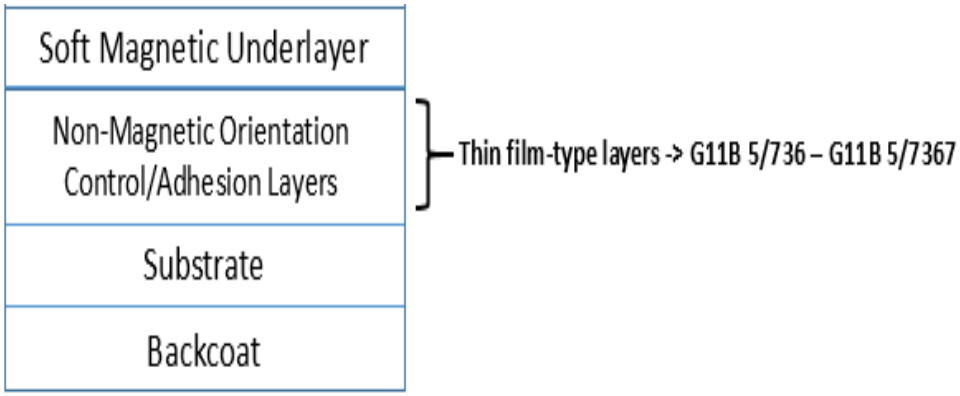
G11B 5/736

{Non-magnetic layer under a soft magnetic layer, e.g. between a substrate and a soft magnetic underlayer [SUL] or a keeper layer (magnetic recording media substrates G11B 5/739)}

Definition statement

This place covers:

Base layers between a substrate and a soft magnetic underlayer.



References

Limiting references

This place does not cover:

Magnetic recording media substrates	G11B 5/739

Informative references

Attention is drawn to the following places, which may be of interest for search:

Surface layers comprising particles mixed in a binder or resin wherein the layer is set forth as distinct from the substrate and used for establishing the surface properties of a magnetic layer	G11B 5/733 - G11B 5/7334
Substrates only characterised by having a specific form or shape	G11B 5/74 - G11B 5/825
Magnetic media substrates characterised by the patterning of the magnetic layer (bit patterned, discrete track, etc.)	G11B 5/743 - G11B 5/746
Magneto-optic or opto-magnetic media substrates	G11B 7/253 - G11B 7/2539

G11B 5/7361

{Two or more non-magnetic layers}

Definition statement

This place covers:

Base layers including two or more inventive layers between a substrate and a soft magnetic underlayer wherein the inventive subject matter lies in the composition or structural arrangement of the layers.

Special rules of classification

For a base layer to be considered 'inventive' it should be recited in the independent claim (even if recited in name only) or have non-nominal, inventive features.

G11B 5/7362

{Physical structure of underlayer, e.g. texture}

Definition statement

This place covers:

Base layers including two or more inventive layers between a substrate and a soft magnetic underlayer wherein the physical macroscopic structure (e.g. texture, patterning, etc.) or microstructure (crystal plane, crystallographic texture, etc.) of at least one layer is also deemed inventive.

Special rules of classification

If the physical structure is recited in name only and is not deemed inventive, classification should be based on other aspects of the recording media base layers.

G11B 5/7363

{Non-magnetic single underlayer comprising nickel}

Definition statement

This place covers:

Base layers including only a single inventive layer between a substrate and a soft magnetic underlayer wherein the layer is recited as including non-trace amounts of nickel.

Special rules of classification

If the composition of the underlayer is not inventive, classification should be based on other aspects of the recording media base layers (e.g. circa 2010, NiP underlayers are well established and mere recitation of an NiP underlayer would not result in placement in this subgroup without additional, inventive features).

G11B 5/7364

{Non-magnetic single underlayer comprising chromium}

Definition statement

This place covers:

Base layers including only a single inventive layer between a substrate and a soft magnetic underlayer wherein the layer is recited as including non-trace amounts of chromium.

Special rules of classification

If the composition of the underlayer is not inventive, classification should be based on other aspects of the recording media base layers (e.g. circa 2010, Cr-alloy underlayers are well established and mere recitation of a Cr-alloy underlayer would not result in placement in this subgroup without additional, inventive features).

G11B 5/7365

{Non-magnetic single underlayer comprising a polymeric structure, e.g. polymeric adhesion layer or plasma-polymerized carbon layer}

Definition statement

This place covers:

Base layers including only a single inventive layer between a substrate and a soft magnetic underlayer wherein the layer is recited as being polymeric or a resin-based underlayer.

This includes polymeric or resin-based non-magnetic underlayers having particles, provided they are located under a soft-magnetic layer.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Polymeric or resin-based underlayers without particles, wherein the layer is under a recording layer, but either above a soft magnetic underlayer or in a medium without a soft magnetic underlayer	G11B 5/73
Polymeric or resin-based underlayers with particles, wherein the layer is under a recording layer, but either above a soft magnetic underlayer or in a medium without a soft magnetic underlayer	G11B 5/733 - G11B 5/7334

G11B 5/7366

{for heat-assisted or thermally-assisted magnetic recording [HAMR, TAMR]}

Definition statement

This place covers:

Base layers having specific utility for use in energy assisted (HAMR, TAMR, etc.) magnetic recording.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Optical Recording	G11B 7/00
Magneto-optical Recording	G11B 11/00

Special rules of classification

Barring exceptional circumstances, most classification into G11B 5/7366 will be Additional information. If the base layer is critical and inventive to the energy assisted recording medium, an Inventive symbol may be placed in this subgroup.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Energy Assisted	A recording process where, in addition to a magnetic field from a magnetic head, the reading and/or writing process is assisted by energy in the form of heat, microwaves, etc.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

EAMR	Energy Assisted Magnetic Recording
HAMR	Heat Assisted Magnetic Recording
MAMR	Microwave Assisted Magnetic Recording
TAMR	Thermally Assisted Magnetic Recording

In patent documents, the following words/expressions are often used as synonyms:

- HAMR, TAMR, Heat Assisted Magnetic Recording, or Thermally Assisted Magnetic Recording

G11B 5/7367

{Physical structure of underlayer, e.g. texture}

Definition statement

This place covers:

Base layers including one inventive layer between a substrate and a soft magnetic underlayer wherein the physical macroscopic structure (e.g. texture, patterning, etc.) or microstructure (crystal plane, crystallographic texture, etc.) of the layer is also deemed inventive.

Special rules of classification

If the physical structure is recited in name only and is not deemed inventive, classification should be based on other aspects of the recording media base layers.

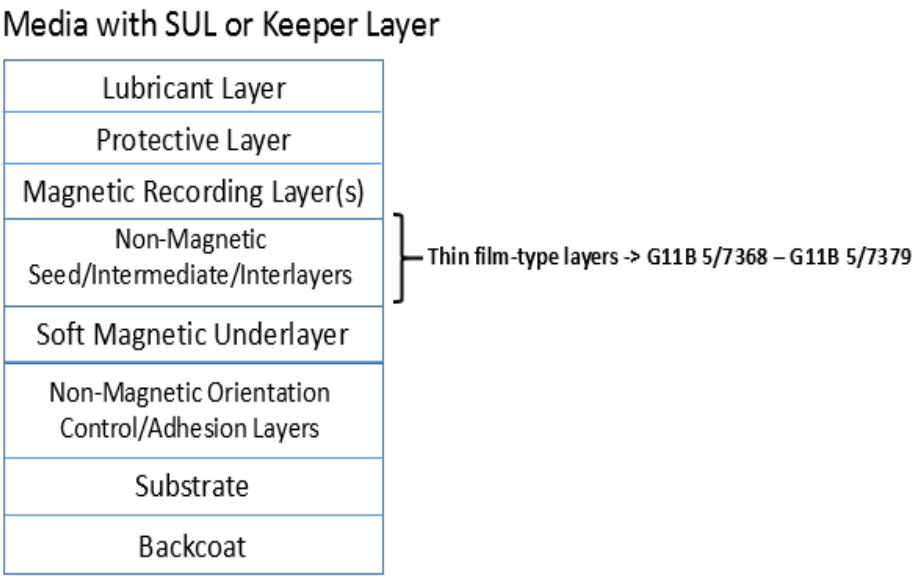
G11B 5/7368

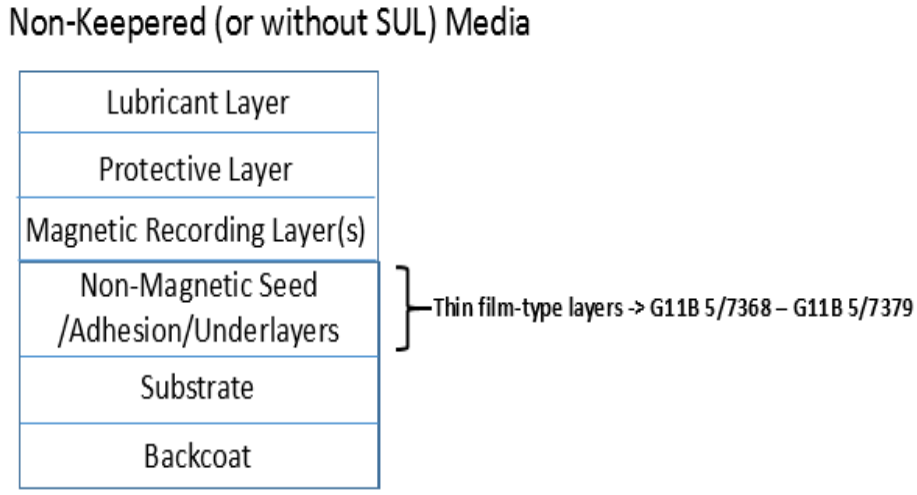
{Non-polymeric layer under the lowermost magnetic recording layer (base layers having a non-magnetic layer under a soft magnetic layer G11B 5/736; magnetic recording media substrates G11B 5/739)}

Definition statement

This place covers:

Non-Polymeric base layers between a soft magnetic underlayer and the recording layer structure or, if no soft magnetic underlayer in the recording medium, any base layers under the recording layer structure.





References

Limiting references

This place does not cover:

Base layers having a non-magnetic layer under a soft magnetic layer	G11B 5/736
Magnetic recording media substrates	G11B 5/739

Informative references

Attention is drawn to the following places, which may be of interest for search:

Polymeric or resin-based underlayers without particles, wherein the layer is under a recording layer, but either above a soft magnetic underlayer or in a medium without a soft magnetic underlayer	G11B 5/73
Polymeric or resin-based underlayers with particles, wherein the layer is under a recording layer, but either above a soft magnetic underlayer or in a medium without a soft magnetic underlayer	G11B 5/733 - G11B 5/7334

G11B 5/7369

{Two or more non-magnetic underlayers, e.g. seed layers or barrier layers}

Definition statement

This place covers:

Base layers including two or more inventive layers in the required structural location within the media wherein the inventive subject matter lies in the composition or structural arrangement of the layers.

Special rules of classification

For a base layer to be considered 'inventive' it should be recited in the independent claim (even if recited in name only) or have non-nominal, inventive features.

G11B 5/737

{Physical structure of underlayer, e.g. texture}

Definition statement

This place covers:

Base layers including two or more inventive layers in the required structural location within the media wherein the physical macroscopic structure (e.g. texture, patterning, etc.) or microstructure (crystal plane, crystallographic texture, etc.) of at least one layer is also deemed inventive.

Special rules of classification

If the physical structure is recited in name only and is not deemed inventive, classification should be based on other aspects of the recording media base layers.

G11B 5/7371

{Non-magnetic single underlayer comprising nickel}

Definition statement

This place covers:

Base layers including only a single inventive layer in the required structural location within the media wherein the layer is recited as including non-trace amounts of nickel.

Special rules of classification

If the composition of the underlayer is not inventive, classification should be based on other aspects of the recording media base layers (e.g. circa 2010, NiP underlayers are well established and mere recitation of an NiP underlayer would not result in placement in this subgroup without additional, inventive features).

G11B 5/7373

{Non-magnetic single underlayer comprising chromium}

Definition statement

This place covers:

Base layers including only a single inventive layer in the required structural location within the media wherein the layer is recited as including non-trace amounts of chromium.

Special rules of classification

If the composition of the underlayer is not inventive, classification should be based on other aspects of the recording media base layers (e.g. circa 2010, Cr-alloy underlayers are well established and mere recitation of a Cr-alloy underlayer would not result in placement in this subgroup without additional, inventive features).

G11B 5/7375

{for heat-assisted or thermally-assisted magnetic recording [HAMR, TAMR]}

Definition statement

This place covers:

Base layers in the required structural location within the media having specific utility for use in energy assisted (HAMR, TAMR, etc.) magnetic recording.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Optical Recording	G11B 7/00
Magneto-optical Recording	G11B 11/00

Special rules of classification

Barring exceptional circumstances, most classification into G11B 5/7375 will be Additional information. If the base layer is critical and inventive to the energy assisted recording medium, an Inventive symbol may be placed in this subgroup.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Energy Assisted	A recording process where, in addition to a magnetic field from a magnetic head, the reading and/or writing process is assisted by energy in the form of heat, microwaves, etc.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

EAMR	Energy Assisted Magnetic Recording
HAMR	Heat Assisted Magnetic Recording
MAMR	Microwave Assisted Magnetic Recording
TAMR	Thermally-assisted Magnetic Recording

In patent documents, the following words/expressions are often used as synonyms:

- HAMR, TAMR, Heat Assisted Magnetic Recording, or Thermally Assisted Magnetic Recording

G11B 5/7377

{Physical structure of underlayer, e.g. texture}

Definition statement

This place covers:

Base layers including two or more inventive layers in the required structural location within the media wherein the physical macroscopic structure (e.g. texture, patterning, etc.) or microstructure (crystal plane, crystallographic texture, etc.) of at least one layer is also deemed inventive.

Special rules of classification

If the physical structure is recited in name only and is not deemed inventive, classification should be based on other aspects of the recording media base layers.

G11B 5/7379

{Seed layer, e.g. at least one non-magnetic layer is specifically adapted as a seed or seeding layer}

Definition statement

This place covers:

Base layers in the required structural location within the media having specific utility for use as seed or seeding layers.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Seed or Seeding Layer	A non-magnetic layer explicitly recited as a 'seed' or 'seeding' layer or that is explicitly disclosed as only used for seeding the crystallographic growth of the immediately following layer in the deposition process.

Synonyms and Keywords

In patent documents, the following words/expressions are often used as synonyms:

- Seed Layer, Seeding Layer, or Nucleation Layer

G11B 5/739

{Magnetic recording media substrates}

Definition statement

This place covers:

Base layers in which a layer or laminate provides physical integrity to a magnetic recording media by acting as substrate or support for a magnetic recording layer.

This subgroup and its subgroups provide for substrates set forth with chemical or structural specificity.

Care must be taken to distinguish between (a) a composite or coated substrate and (b) a subsequently formed non-magnetic base layer when considering binder media type structures. A layer recited as an "underlayer", "undercoat", "lower layer" or "intermediate layer" is a layer distinct from a substrate. For a layer to be considered as a part of a substrate, it must be recited specifically in the disclosure of forming the substrate or as part of a substrate prior to any deposition of a recording layer structure.

Examples:

(1)	What is claimed is: 1. A magnetic recording medium comprising a flexible support containing polyethylene naphthalate or polyethylene terephthalate and having a thickness of 10 to 200 μm, an undercoating layer containing at least one of polyimide resins, polyamide-imide resins, and silicone resins, and fluorine resins, and a magnetic layer selected from a cobalt/palladium multilayer film and a cobalt/platinum multilayer film, wherein the undercoating is located between the support and the magnetic layer, wherein a surface of the undercoating layer has projections having a height of 5 to 60 nm, and a density of the projections is 0.1 to 100 μm^2.	(1) In claim 1 at left, the "undercoating layer" is part of the recording layer structure and is distinct from the substrate.
(2)	1. A multi-layer biaxially oriented film comprising a first layer (A) comprising an aromatic polyester (a) and a second layer (B) comprising a polyolefin (b) having a melting point of from 230 to 290° C. wherein said polyolefin is a styrene polymer, and an adhesive interlayer (C) between a layer (A) and a layer (B), wherein said adhesive interlayer (C) comprises a tie-layer material (c) selected from anhydride-modified ethylene copolymers in which the proportion of anhydride present in the copolymer is no more than 3.0% by weight of the polymer, and in which the ethylene copolymer comprises one or more additional comonomers other than styrene.	(2) In claim 1 at left, layers (A), (B), and (C) are all part of a composite substrate including at least one polyester layer.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Surface layers that are not part of a substrate, but are provided for the electromagnetic or crystallographic growth properties of a recording medium	G11B 5/73 - G11B 5/7379
Surface layers comprising particles mixed in a binder or resin wherein the layer is set forth as distinct from the substrate and used for establishing the surface properties of a magnetic layer	G11B 5/733 - G11B 5/7334
Substrates only characterised by having a specific form or shape	G11B 5/74 - G11B 5/825
Magnetic media substrates characterised by the patterning of the magnetic layer (bit patterned, discrete track, etc.)	G11B 5/743 - G11B 5/746
Methods of making substrates	G11B 5/8404
Magneto-optic or opto-magnetic media substrates	G11B 7/253 - G11B 7/2539

Synonyms and Keywords

In patent documents, the following words/expressions are often used as synonyms:

- Substrate, Support, or Base Layer

G11B 5/73911

{Inorganic substrates}

Definition statement

This place covers:

Base layers including a substrate having at least one formed layer or portion comprising inorganic material.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Substrates including a non-esterfied polymeric binder layer containing inorganic particles or particulate	G11B 5/73925
Substrates including an esterfied polymeric binder layer containing inorganic particles or particulate	G11B 5/73935

Special rules of classification

Resin or binder material including inorganic particles wherein the substrate, in total, would be considered a polymeric or organic substrate are classified in the appropriate subgroup, i.e. G11B 5/73923 - G11B 5/73937.

Substrates which are formed from inorganic compounds and are disclosed primarily in terms of property values are classified in G11B 5/739, i.e. the inorganic materials are nominal and recited in name only.

G11B 5/73913

{Composites or coated substrates}

Definition statement

This place covers:

Inorganic substrates having two or more contiguous layers or portions of distinct components (e.g. glass containing metallic particles, etc.).

Included in this subgroup are an inorganic structural element and an organic compound; e.g. metallic particles and resin, provided that the substrate as a whole would be considered an inorganic substrate.

Special rules of classification

Substrates having only a single alloy layer, i.e. heterogeneous mixtures of elements that are not separate phases, are not classified in this subgroup, but in other subgroups appropriate to the recited alloy.

Included herein are NiP plated substrates wherein the NiP plating layer is inventive and is clearly taught as part of the substrate. NiP layers deposited with the purpose of corrosion prevention, adhesion, or establishing the microstructure of the recording layer are classified in G11B 5/7363 or G11B 5/7371 . The lines between these subgroups and the current subgroup can often be ascertained by looking at the method of depositing the NiP layer and/or whether the NiP layer is deposited on an already commercially formed substrate (as opposed to being deposited to form the substrate).

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

NiP	Nickel-Phosphorous (a conventional pre-coat deposited on substrates for smoothing and texturing purposes).
AlMg/NiP	An aluminium-magnesium alloy substrate coated with an NiP coating layer
Plating layer	A layer deposited by either an electrolytic or electroless plating method; typically an NiP layer.

G11B 5/73915

{Silicon compound based coating}

Definition statement

This place covers:

Base layers including a substrate having at least one contiguous layer of a silicon compound.

G11B 5/73917

{Metallic substrates, i.e. elemental metal or metal alloy substrates}

Definition statement

This place covers:

Base layers including a substrate that is an elemental metal or a metal alloy.

G11B 5/73919

{Aluminium or titanium elemental or alloy substrates}

Definition statement

This place covers:

Base layers including a substrate that is elemental aluminium or titanium or an aluminium or titanium alloy (i.e., an alloy containing 40% or more aluminum and/or titanium).

G11B 5/73921

{Glass or ceramic substrates}

Definition statement

This place covers:

Base layers including a substrate that is composed of glass or ceramic, including amorphous or crystalline glasses.

Included in this subgroup are glass or ceramic substrates including texturing.

G11B 5/73923

{Organic polymer substrates}

Definition statement

This place covers:

Substrates composed of a solid polymer compound or polymeric composition (e.g. polyurethane, melamine resin, polyamide, etc.).

Special rules of classification

Substrates that are formed from organic polymer compounds and that are disclosed primarily in terms of property values are classified in G11B 5/739, i.e. when the polymer materials are nominal and recited in name only.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

PEN	Polyethylene naphthalate (poly(ethylene 2,6-naphthalate)
PET	Polyethylene terephthalate

G11B 5/73925

{Composite or coated non-esterified substrates}

Definition statement

This place covers:

Substrates that are materials other than an ester and are composed of a plurality of layers (e.g. a laminate or distinct particulate or non-particulate compounds containing in a single layer).

This subgroup includes coatings on an organic substrate directed to the improvement of the properties of the substrate and not affecting the crystalline anisotropy or magnetic orientations of a subsequently deposited layer (e.g. a coating solely for adhesive, texture, etc.).

Special rules of classification

The distinction between a lower layer used in a binder-type media and a coating layer for purpose of classification here depends on the recited end use of the layer, as most are composed of similar mixtures of binder material plus non-magnetic particulate filler. If the layer is recited as a "lower layer", "under layer", "first layer", it is usually directed to establishing the deposition of the magnetic layer and are classified in G11B 5/733 - G11B 5/7334. The same applies if the deposition is a "wet-on-wet" process where the magnetic layer is immediately deposited following the non-magnetic layer.

If the invention is directed to the substrate and the layer is included to tailor the surface properties of the substrate (e.g. a binder and particulate layer deposited on a polyamide base to create a polyamide substrate having specific roughness profile), then classification should be in this subgroup only.

G11B 5/73927

{Polyester substrates, e.g. polyethylene terephthalate}

Definition statement

This place covers:

Base layers including a substrate in which the polymer substrate includes an ester group thereon such as carboxylic acid ester.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Esterified substrates having two or more layers	G11B 5/73931
Composite esterified substrates formed from a mixture of an ester-based resin and particles	G11B 5/73935

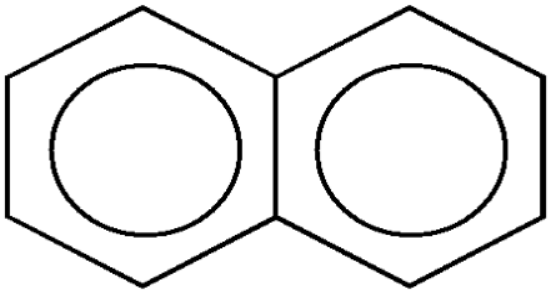
G11B 5/73929

{comprising naphthalene ring compounds, e.g. polyethylene naphthalate substrates}

Definition statement

This place covers:

Base layers including a substrate that comprises a polyester substrate including a naphthalene ring structure.



Example of a naphthalene ring structure.

G11B 5/73931

{Two or more layers, at least one layer being polyester}

Definition statement

This place covers:

Substrates that are composed of a plurality of layers, wherein at least one inventive layer is a polyester.

This subgroup includes coatings on a polyester substrate directed to the improvement of the properties of the substrate and not affecting the crystalline anisotropy or magnetic orientations of a subsequently deposited layer (e.g. a coating solely for adhesive, texture, etc.).

Special rules of classification

The distinction between a lower layer used in a binder-type media and a coating layer for purpose of classification here depends on the recited end use of the layer, as most are composed of similar mixtures of binder material plus non-magnetic particulate filler. If the layer is recited as a "lower layer", "under layer", "first layer", it is usually directed to establishing the deposition of the magnetic layer and are classified in G11B 5/733 - G11B 5/7334. The same applies if the deposition is a "wet-on-wet" process where the magnetic layer is immediately deposited following the non-magnetic layer.

If the invention is directed to the substrate and the layer is included to tailor the surface properties of the substrate (e.g. a binder and particulate layer deposited on a polyester base to create a polyester substrate having specific roughness profile), then classification should be in this subgroup only.

G11B 5/73933

{Surface treated layers, e.g. treated by corona discharge}

Definition statement

This place covers:

Base layers including a polyester substrate that has been coated or surface treated.

Included in this subgroup are polyester substrate leader and trailer tapes.

G11B 5/73935

{characterised by roughness or surface features, e.g. by added particles}

Definition statement

This place covers:

Base layers including a polyester substrate, typically containing particles, which has a defined and inventive roughness profile/property or surface feature, e.g. protrusion density.

G11B 5/73937

{Substrates having an organic polymer comprising a ring structure}

Definition statement

This place covers:

Base layers including a substrate that has a specific organic ring structure, e.g. benzyl groups or 1,4-dihydroxydimethylbenzene.

G11B 5/74

Record carriers characterised by the form, e.g. sheet shaped to wrap around a drum

Definition statement

This place covers:

Record carriers (tapes, cards, disks) specially shaped, e.g., bit patterned media, or discrete-track media

References

Limiting references

This place does not cover:

Manufacturing of record carriers	G11B 5/84

Informative references

Attention is drawn to the following places, which may be of interest for search:

Manufacturing of patterned magnetic recording media	G11B 5/855
Photomechanical, e.g. photolithographic, production of textured or patterned surfaces	G03F 7/00

Special rules of classification

Acquisition of servo patterns and processing thereof G11B 5/596

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Patterned Media and Bit Patterned Media	In Patterned Media (PM) and Bit-patterned-media (BPM), the magnetic recording layer on the media is patterned into small magnetic isolated data islands. In Bit-patterned media each island corresponds to a bit and is arranged e.g. in concentric data tracks in the case of disks media, while in patterned media the islands may correspond to discrete tracks or to servo patterns. Patterned-media may be longitudinal magnetic recording disks, wherein the magnetization directions are parallel to or in the plane of the recording layer, or perpendicular magnetic recording disks, wherein the magnetization directions are perpendicular to or out-of-the-plane of the recording layer. To produce magnetic isolation of the patterned data islands, the magnetization of the spaces between the islands is destroyed or substantially reduced to render these spaces essentially nonmagnetic. Alternatively, the media may be fabricated so that that there is no magnetic material in the spaces between the islands

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

BPM	Bit-Patterned-Media
PM	Patterned Media
DTM	Discrete Track Media

G11B 5/86

Re-recording, i.e. transcribing information from one magnetisable record carrier on to one or more similar or dissimilar record carriers {(by varying the order of the information G11B 27/029, G11B 27/036)}

Definition statement

This place covers:

Master disks - i.e. original disks drawn preliminarily with magnetic information corresponding to a preformatted signal to be magnetically transferred (e.g. servo patterns or reference servo patterns for self-servo- writing) - used to duplicate information on lave disks

References

Limiting references

This place does not cover:

Re-recording by varying the order of the information	G11B 27/029, G11B 27/036
Transferring data from one type of record carrier to another type of record carrier	G06K 1/18

Special rules of classification

When the medium to which information has to be transferred is in direct contact with the master disk the method or apparatus is classified in G11B 5/865.

G11B 7/00

Recording or reproducing by optical means, e.g. recording using a thermal beam of optical radiation {by modifying optical properties or the physical structure}, reproducing using an optical beam at lower power {by sensing optical properties}; Record carriers therefor (G11B 11/00, G11B 13/00 take precedence)

Definition statement

This place covers:

- purely optical aspects of magneto-optical recording (for example a focus error method)
- optical recording of label information on optical recording media such as CDs, where the recording is done using the optical head that records the coded main data

In general terms, this group is subdivided into:

systems (G11B 7/002- G11B 7/003) e.g. tape, card, disc

methods of recording or reproduction (also erasing, overwriting), including holographic recording of coded data (G11B 7/004 - G11B 7/0065); re-recording of data (transcription) (G11B 7/28)

arrangement of information e.g. control area, land and groove structure, including details of discrete physical structures such as "pits" (G11B 7/007- G11B 7/013)

access e.g. moving the optical pickup (G11B 7/085)

servo e.g. moving the objective lens (G11B 7/09)

heads e.g. types of heads (G11B 7/12, G11B 7/14)

- details of head components e.g. lasers, detectors, optical elements in the light path between laser and record carrier or between record carrier and detector (G11B 7/125 - G11B 7/135)
- manufacture of heads (G11B 7/22)

record carriers e.g. CD, DVD, BD (G11B 7/24)

- structural aspects e.g. multiple data layers
- material aspects e.g. materials used in recording layers, protective layers, substrates (G11B 7/241 -G11B 7/258)
- manufacture e.g. depositing a layer of recording material, pressing pits into substrate material, arrangements of multiple types of machinery in a production line (G11B 7/26)

In principle, only aspects of the above subjects that are particularly adapted as a result of using light for recording/reproduction (e.g. track pitch, pit depth adapted to the wavelength of light used) should be classified in G11B 7/00.

Relationships with other classification places

- optical recording/writing of uncoded images e.g.
- holographic storage of images (see G03H 1/10)
- thermography (B41M 5/26)
- laser (electrophotographic)/thermographic printers (B41J 2/435)
- facsimile (H04N 1/00)

- xerography i.e. photocopiers (G03G)
- optical displays based on liquid crystals (G02F 1/135)
- optical storage of small amounts of coded data e.g. on credit card size carriers or bar codes (see G06K 7/10 for methods or arrangements, or G06K 19/06009 for the media e.g. G06K 19/06028 for bar codes)
- static optical memories G11C
- applications of optical carriers such as CD, DVD, BD e.g.
- games (A63F 13/00);
- audio visual presentations of educational apparatus (G09B 5/06);
- addressable supports for biological samples (G01N 35/00069)
- advertising (G09F 23/00)
- greeting cards (G09F 1/00)

References

Limiting references

This place does not cover:

Recording on or reproducing from the same record carrier	G11B 11/00
Recording simultaneously	G11B 13/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Optical arrangements for thermally assisted magnetic recording	G11B 5/314
Optical servo for magnetic recording	G11B 5/59677
Near field interactions that do not involve optical radiation	G11B 9/12
Using microscopic probe means	G11B 9/14
If recording and reproducing are covered by different main groups	G11B 11/14
Microscopic probe means	G11B 11/26
Control of operating function, e.g. general control aspects of preventing overwriting of data	G11B 19/02, G11B 19/04
Starting, stopping record carriers, e.g. spindle control discrimination of media type	G11B 19/20, G11B 19/12
Aspects for data formats for standards such as CD, DVD, BD unless the technical problem underlying the invention arises because of the optical nature of the recording	G11B 20/12
Defect management for optical media such as CD, DVD, BD	G11B 20/1889
Aspects of record carriers not specific to method of recording or reproducing e.g. hub details are generally not specific to whether or not the recording is optical or magneto-optical	G11B 23/0028
Aspects of editing, addressing, timing etc for standards such as CD, DVD, BD unless the technical problem underlying the invention arises because of the optical nature of the recording	G11B 27/00
Computer systems involving digital I/O from or to direct access storage devices involving optical discs	G06F 3/0601

Special rules of classification

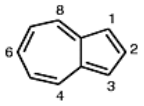
The following "horizontal" Indexing Codes are assigned where appropriate:

- G11B 2007/0006 recording, reproducing or erasing systems adapted for scanning different types of carriers e.g. CD & DVD
- G11B 2007/0009 recording, reproducing or erasing systems for carriers having data stored in three dimensions e.g. volume storage
- G11B 2007/0013 recording, reproducing or erasing systems for carriers having data stored in three dimensions and having multiple discrete layers
- G11B 2007/0016 recording, reproducing or erasing systems for carriers adapted to have label information written on the non-data side by the optical head used for recording (e.g. lightscribe, labelflash)

Further information of subgroups:

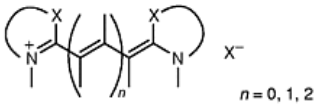
G11B 7/241: should be used as little as possible e.g. where different materials for various layers are disclosed and the invention does not reside in one particular layer (e.g. EP2224444, US2005129899)

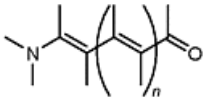
G11B 7/242: this group and subgroups are used when the recording material does not fall (exclusively) into one of the higher dot subgroups; e.g. comprising inorganic and organic material (US2003175616, JP58062094)

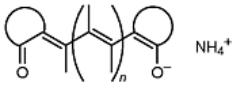
G11B 2007/2445 : 

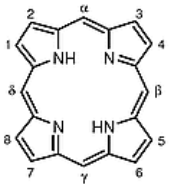
G11B 7/2467 : R1−N=N−R2

G11B 7/247: styryl dye

G11B 7/2472 : 

G11B 7/2475 : 

G11B 7/2478 : 

G11B 7/248: 

G11B 7/25: in the recording layer

Examples:

- e.g. light-shielding layer, reactive compounds, recording blocking particles, subbing layer (US5100766), smoothing layer,

- mask (=shutter) layer (for Super-RENS application; if in direct contact with recording layer, G11B 7/257 takes precedence) e.g.US5470628, WO2006135180;
- labelling layer; ink receiving layer
- limit-play layer
- third dielectric layer(US5681632), heat sink layer or heat radiating layer (not in direct contact with the recording layer);
- auxiliary layer (US5442619), electrodes, filters;
- parting layer (e.g. WO2005035237A1);
- peelable sheet (e.g. WO2008126524)
- decomposition reaction layer (see EP1645429A1);
- compensating layer (WO2004008446);
- thermochromic layer (WO2004010424)
- flat-plate lens (EP1365394);
- stabilization layer (EP1069556);
- delamination-proof layer (EP0896328);
- shutter layer (DE4214978);
- record-blocking portions (WO2006022360);
- solvent barrier layer (US4423427);
- reflectivity adjustment layer (US5846625);
- super-resolution film (US6385162);
- pyrotechnic layer (WO0000453);
- Servo layers (WO0178068);
- subbing layer (US4753861);
- ultraviolet absorption film (EP0259151);

G11B 7/254: topcoat layers = outermost layer

G11B 7/2542 ;

Examples:

- in case of printing layer on the top of the protective layer,
- class G11B 7/254 is given to the printing layer,
- G11B 7/252 to the protective layer (cf. e.g. EP0628956, US5510164);
- if cover layer on the protective coat, then G11B 7/254 to cover layer,
- and G11B 7/252 to protective coat; anti-staining layer e.g. see doc. No US2005158558);
- when there is an inorganic material film (G11B 7/252) provided on the surface, which
- in turn has a protective layer provided thereon (G11B 7/2542), see doc. No EP0123223);
- vibration prevention layer (US2003224136);
- lubricant layer as outermost layer (e.g. US2002054974)

G11B 7/2545 : e.g. carbon containing coating , DLC coating - (EP0410704)

G11B 7/256: (EP1343159)

G11B 7/257: Only layers provided in direct contact with the recording layer are classified here. Other protecting layers, which are not toplayers (G11B 7/254) are classified under G11B 7/252.

Examples:

- antireflection layer (US5398232);
- A heat-deformable dye binder layer (US4336545);
- Oxidisable (oxidation) layer (JP57163597);
- Hollow spaces above recording layers (e.g. spacers) (US4791044);

- Charge transfer layer (EP0183168);
- Mask (= shutter layer for near-field applications) (EP1071086)

G11B 7/2575 ;

Examples:
- high modulus layer (WO03021588);
- heat insulation layer (FR2435779);

G11B 7/2578 ;

Examples:
- flattening layer (US5095478);
- light-to-heat converting film (EP0596339);
- reinforcement layer (US4408213)

G11B 7/0025

with cylinders or cylinder-like carriers {or cylindrical sections or flat carriers loaded onto a cylindrical surface}, e.g. truncated cones

Definition statement

This place covers:

Uncommon or outdated technology (in 2011)

G11B 7/003

with webs {, filaments or wires}, e.g. belts, spooled tapes or films of quasi-infinite extent

Definition statement

This place covers:

Uncommon or outdated technology (in 2011)

G11B 7/0031

{using a rotating head, e.g. helicoidal recording}

Definition statement

This place covers:

Optical tape data storage systems that feed an optical tape helically around a drum while writing and/or reading digital data on the optical tape see e.g. US5524105

Uncommon or outdated technology (in 2011)

G11B 7/0032

{for moving-picture soundtracks, i.e. cinema (cameras or projectors with sound recording or reproducing means G03B 31/02)}

Definition statement

This place covers:

Uncommon or outdated technology (in 2011)

G11B 7/0033

with cards {or other card-like flat carriers, e.g. flat sheets of optical film}

Definition statement

This place covers:

Optical storage of small amounts of data on cards (analogous to magnetic strip on bank cards) is normally classified in G06K 19/06009 (media) or G06K 7/10 (methods and apparatus)

G11B 7/0037

with discs

Definition statement

This place covers:

This sub-group is a residual sub-group and should only be assigned if there is something about an optical disc system related to the optical nature of recording and reproduction that is not classifiable elsewhere in G11B 7/00

this sub-group includes systems in which the label information is written optically on the non-data side of disc e.g. technologies such as Hewlett Packard LightScribe and Yamaha/FujiFilm LabelFlash

for labelling of optical data carriers that does not write the label data with the optical head used to write the main data, see G11B 23/40

G11B 7/00375

{arrangements for detection of physical defects, e.g. of recording layer}

Definition statement

This place covers:

This sub-group is a residual sub-group and should only be assigned if (part of) the subject-matter can not be classifed elsewhere, in particular in one of the following:

G11B 7/0948: servo control specially adapted for detection and avoidance or compensatin of imprefections on the carrier e.g. dust, scratches, dropouts

G11B 20/1889: defect management

G11B 20/1816 testing e.g. of dropouts

G11B 7/268: checking for defects during/after manufacture

G01N 21/9506: Systems specially adapted for investigating the presence of flaws or contamination in optical discs

G11B 7/0045

Recording (G11B 7/006, G11B 7/0065 take precedence)

Definition statement

This place covers:

Indexing Code G11B 2007/00457 is assigned for two photon recording (including two photon recording in holographic data storage media

G11B 7/00451

{involving ablation of the recording layer}

Definition statement

This place covers:

For example, recording data as "pits" in a dye recording layer (e.g. CD-R, DVD-R, BD-R) not to be confused with spectral hole burning (see G11B 7/00453) for materials used in recording layers see G11B 7/242 and subgroups

G11B 7/00452

{involving bubble or bump forming}

Definition statement

This place covers:

Uncommon or outdated technology (in 2011)

Generally involves thermal expansion of a recording layer to form bumps which alter the amount of reflected light because ot the phase difference (interference effect) between light reflected by the protuberance and light reflected by the surface which is not raised.

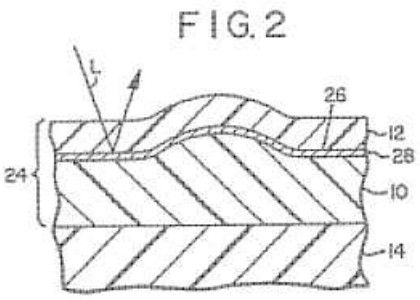


Figure from EP 338776

For materials used in recording layers see G11B 7/242 and subgroups.

G11B 7/00453

{involving spectral or photochemical hole burning}

Definition statement

This place covers:

Uncommon or outdated technology (in 2011)

Multiple bits can be stored in the same space using different frequencies atoms or molecules which are in different environments. The absorption line of a material is inhomogeneously broadened (comprised of many homogeneously broadened lines, due to the slightly different energies and therefore frequencies/wavelengths corresponding to the different environments.

Not to be confused with ablative recording (which is a thermal effect, not a spectral one).

For materials used in recording layers see G11B 7/242 and subgroups.

G11B 7/00454

{involving phase-change effects}

Definition statement

This place covers:

For example, recording using chalcogenide materials e.g. GeSbTe.

This classification should only be assigned if:

- the invention is about the phase change recording mechanism (note that this is now rare, since phase change recording is a "mature" technology), or
- if the invention is specifically adapted for recording based on a phase change of the material AND there is no better classification (see below)

Recording pulse sequences are classified in G11B 7/0062 (for overwritable media) or in G11B 7/00456 (for write-once media)

Phase change materials are classified in G11B 7/243 and subgroups.

G11B 7/00455

{involving reflectivity, absorption or colour changes}

Definition statement

This place covers:

For example, photochromic recording in which the colour is changed; documents concerning recording in which the texture of the surface is changed to change the reflectivity are classifiable here.

References

Limiting references

This place does not cover:

Involving ablation of the recording layer	G11B 7/00451
Involving bubble or bump forming	G11B 7/00452
Involving spectral or photochemical hole burning	G11B 7/00453
Involving phase-change effects	G11B 7/00454

G11B 7/00456

{Recording strategies, e.g. pulse sequences (G11B 7/0062 takes precedence)}

References

Limiting references

This place does not cover:

Overwriting strategies, e.g. recording pulse sequences with erasing level used for phase-change media	G11B 7/0062

Special rules of classification

Both G11B 7/00456 and G11B 7/0062 are assigned if the strategy or strategies disclosed is/are applicable to both write-once and rewritable media. Example:

FIG. 1A

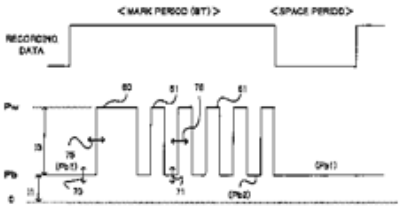


FIG. 1B

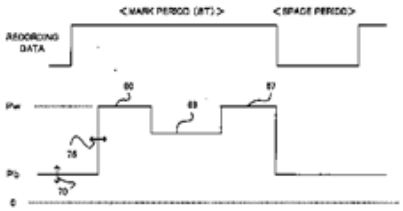


Figure taken from EP1548710

G11B 7/00458

{Verification, i.e. checking data during or after recording}

Definition statement

This place covers:

This class should only be assigned for invention information (mostly older technology) in which the actual data is read during recording and compared with the data that should have been recorded, or verification using a separate read/verify beam.

Running optical power control (ROPC): G11B 7/1263

Walking optical power control : G11B 7/1263

G11B 7/0051

{involving phase depth effects}

Definition statement

This place covers:

Documents are only assigned this class (or code) if the particular problem or solution of the invention disclosed relates to the aspect of phase depth AND if there is no better classification (see below). (Phase depth effects are the most common basis for reproduction of information in G11B 7/00: the reproduction of the usual data pits in a CD, DVD, BD (i.e. pits in the plastic substrate, covered with a reflective layer) relies on this effect.)

Also reproduction of phase change media normally involves a phase depth effect, because the refractive indices of the various layers are adjusted to give a particular optical path length difference. (n.b. "phase" here has two different meaning - the physical state of the material ("phase change material") and the optical or physical difference in path length between two aread resulting in contructive or destruction optical interference "phase depth")

G11B 7/24085 (Arrangement of the information on the record carrier) Details of discrete information structures, e.g. shape or dimensions of pits, prepits

(n.b. From 2012 revision of the IPC introduces new group G11B 7/2407 for media characterised by the pits, and ECLA will be revised correspondingly)

G11B 7/0052

{involving reflectivity, absorption or colour changes}

Definition statement

This place covers:

For example, reproduction of data recorded in a photochromic material.

G11B 7/0055

Erasing (G11B 7/006, G11B 7/0065 take precedence)

Definition statement

This place covers:

Mostly uncommon or outdated technology (in 2011) - nearly all modern commercial disc technology is of the write-once type (e.g. recording in dye layer) or of the overwritable type (e.g. recording in a layer of phase change material).

References

Limiting references

This place does not cover:

Overwriting	G11B 7/006
Recording, reproducing or erasing by using optical interference patterns, e.g. holograms.	G11B 7/0065

G11B 7/00557

{involving phase-change media}

Definition statement

This place covers:

Mostly uncommon or outdated technology (in 2011) - most modern phase change materials are overwritable.

G11B 7/006

Overwriting (G11B 7/0065 takes precedence)

Definition statement

This place covers:

Rewritable is often synonymous with overwritable (but rewritable may mean merely erasable in old documents).

G11B 7/0062

{Overwriting strategies, e.g. recording pulse sequences with erasing level used for phase-change media}

Definition statement

This place covers:

Both G11B 7/00456 and G11B 7/0062 are assigned if the strategy or strategies disclosed is/are applicable to both write-once and rewritable media.

See Figure of a pulse strategy under G11B 7/00456.

G11B 7/0065

Recording, reproducing or erasing by using optical interference patterns, e.g. holograms

Definition statement

This place covers:

Relationship between groups:

There are subgroups for certain aspects of holographic recording and where one (or more) or those subgroups is relevant they are assigned, and G11B 7/0065 or Indexing Code G11B 7/0065 are not assigned unless

there is "invention" information relevant to the system as a whole, or

if there is no better classification for the invention information.

Warning: These "holographic" subgroups were created in the second half of 2009, and the reclassification from G11B 7/0065 has not been systematically done. For documents published before 2010, G11B 7/0065 and Indexing Code G11B 7/0065 should be searched.

If there is no subgroup specific to holography for the invention subject-matter (e.g. there are no specific subgroups under G11B 7/242 for specific materials for holography), then the relevant general class is assigned and the Indexing Code G11B 7/0065. For example:

G11B 7/08564 for galvanomirrors e.g. used in angular multiplexing G11B 7/128 for SLM, acousto-optical, electro-optical, magneto optical modulators G11B 7/128 and G11B 7/1369 if modulator is liquid crystal device

G11B 7/1392 for a diffuser (e.g. in speckle holography)

G11B 7/1365 for polarization rotators G11B 7/1372, or subgroup, for lenses G11B 7/1356 for double prism beam splitter G11B 7/1395 for other beam splitters

References

Limiting references

This place does not cover:

Where the recording mechanism of the holographic storage is of interest e.g. G11B 2007/00457 is assigned for two-photon recording of holograms	G11B 7/0045
Collinear holography: Where the object and reference beams are substantially parallel or coaxial before being focused (synonym: "coaxial", "common path", co-propagating)	G11B 2007/00653
Counter propagating holography: Where the object and reference beams are directed to opposite sides of the medium (synonym: "standing wave" or "stationary wave")	G11B 2007/00656
Holographic storage of images	G03H

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Arrangement of holographic information, including multiplexing of information	G11B 7/00772
Arrangement of auxiliary information for holographic storage	G11B 7/00781
Concerning access of holographic information	G11B 7/083
Concerning structural aspect of media for holographic storages	G11B 2007/240025

G11B 7/007

Arrangement of the information on the record carrier, e.g. form of tracks {, actual track shape, e.g. wobbled, or cross-section, e.g. v-shaped; Sequential information structures, e.g. sectoring or header formats within a track}

Definition statement

This place covers:

Aspects for data formats for standards such as CD, DVD, BD are not classified in G11B 7/007 unless the technical problem underlying the invention arises because of the optical nature of the recording. In such cases the documents may be classifiable both in G11B 7/007 and in G11B 20/00.

Standards for various aspects of the formats of optical discs are available from the Internet site of ECMA (www.ecma.org).

(e.g. CD-ROM, DVD-ROM, DVD-RAM, DVD-R, DVD-RW, CD-RW Ultra-speed)

White Papers for the Blu-ray Disc Format are available from the Internet site of the Blu-ray Disc Association (www.blu-raydisc.com)

e.g. the Physical Format Specifications for BD-RE and for BD-ROM

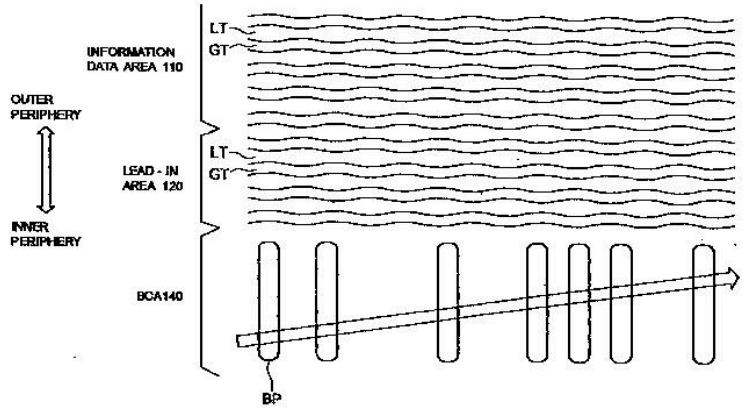
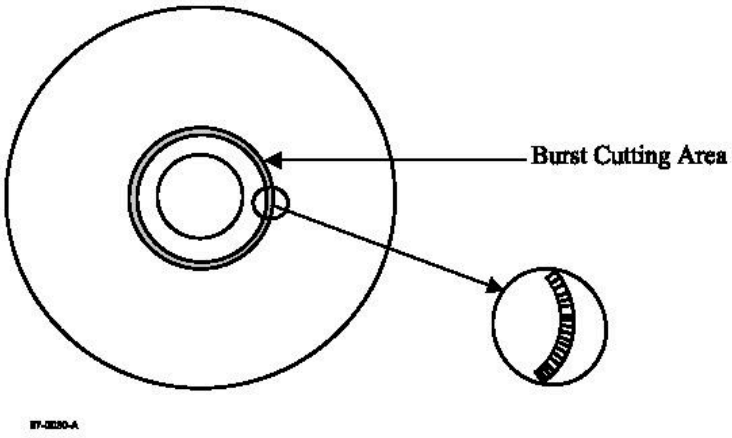
There are also ECMA standards for holographic discs (HVD-ROM, HVD)

G11B 7/00736

{Auxiliary data, e.g. lead-in, lead-out, Power Calibration Area [PCA], Burst Cutting Area [BCA], control information (sector headers or adresses in prepits G11B 7/00745; address data in track wobble G11B 7/24082)}

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Burst cutting area	Auxiliary data recorded towards the inner periphery of the disc, as a type of bar code (stripes) . Because it is recorded as stripes, it can be read before the tracking servo is on. The data is phase-encoded (i.e. "0" is represented by 2 channel bits set to "1 0", and "1" by "0 1"), and the sequence of data bits is return-to-zero modulated.  for more information see ECMA-267 standard for 120mm Read Only DVDs, Appendix H  Figure H.1 - Burst Cutting Area

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

BCA	burst cutting area

In patent documents, the following words/expressions are often used with the meaning indicated:

"read in (area)"	"lead in (area)", based on Japanese applications.
"read out (area)"	"lead out (area)".

G11B 7/00772

{on record carriers storing information in the form of optical interference patterns, e.g. holograms}

Definition statement

This place covers:

When the invention information concerns multiplexing, the document should be classified in G11B 7/00772 (since it has to do with the arrangement of the information) and assigned the relevant EC for the means (elements) by which the multiplexing is done. For example:

angular (azimuth) multiplexing:

G11B 7/08564 for deformable or movable mirrors and G11B 7/1362 when the movable mirror cooperates with stationary mirror(s):

- for angular (azimuth) multiplexing or peristrophic multiplexing, when the medium is moved relative to the (reference) light beam G11B 7/083
- for wavelength multiplexing, G11B 7/127 if tuneable lasers are involved, G11B 7/1275 if multiple lasers with different wavelengths are used
- phase multiplexing:
- G11B 7/1365 for stationary REFRACTIVE plates that change the phase;
- G11B 7/1369 for MOVABLE refractive plates; G11B 7/128 for other phase modulators
- for shift modulation (overlapping holograms) and spatial modulation G11B 7/083
- speckle modulation G11B 7/1392

Special rules of classification

This subgroup was created in the second half of 2009, and the reclassification from G11B 7/0065 has not been systematically done. For documents published before 2010, G11B 7/0065 and G11B 7/0065 should be searched.

G11B 7/00781

{Auxiliary information, e.g. index marks, address marks, pre-pits, gray codes}

Definition statement

This place covers:

For example, separate layers containing servo information for holographic discs, or marks around the edge for aligning page type holographic media.

Servo information for volume storage media that are not holographic: classify G11B 7/0938 (or Indexing Code G11B 7/0938 if the document discloses these details, but it is not particularly relevant

to the invention information) in addition to the Indexing Code G11B 7/00:**00S4** to indicate the volumetric aspect of the storage medium itself.

Warning: This subgroup was created in the second half of 2009, and the reclassification from G11B 7/0065 has not been systematically done. For documents published before 2010, G11B 7/0065 and Indexing Code G11B 7/0065 should be searched.

G11B 7/013

for discrete information, i.e. where each information unit is stored in a distinct discrete location {, e.g. digital information formats within a data block or sector}

Definition statement

This place covers:

Only aspects of format that are adapted to solve a problem related to the optical recording. (In general, the data formats for optical recording media are not very closely related to the optical aspect and are classified in G11B 20/12)

G11B 7/081

{for time base error correction by moving the light beam}

Definition statement

This place covers:

Uncommon or outdated technology (in 2011)

G11B 7/083

{relative to record carriers storing information in the form of optical interference patterns, e.g. holograms}

Definition statement

This place covers:

Apparatus/methods aspects of access e.g. multiplexing are classified here, and if appropriate in the relevant optical element group.

If the optical elements used are not especially adapted for the type of access, but e.g. just used or controlled in a special way then the document should be classified in G11B 7/083 and coded in the appropriate optical element group (e.g. galvanomirror G11B 7/08564 or G11B 7/00:**0085B3**).

If it is the arrangement of the information aspect of the multiplexing that is "invention information" it is classified in G11B 7/00772

Warning: This subgroup was created in the second half of 2009, and the reclassification from G11B 7/0065 has not been systematically done. For documents published before 2010, G11B 7/0065 and G11B 7/0065 should be searched.

G11B 7/08505

{Methods for track change, selection or preliminary positioning by moving the head}

References

Limiting references

This place does not cover:

Arrangements for moving the whole head	G11B 7/0857

G11B 7/08511

{with focus pull-in only}

Definition statement

This place covers:

Changing layers in media with multiple data layers e.g. dual layer DVD.

References

Limiting references

This place does not cover:

Focus search for distinguishing between types of discs	G11B 19/127

G11B 7/08564

{using galvanomirrors}

Definition statement

This place covers:

For example, multiplexing in holographic storage of data.

G11B 7/0904

{Dithered tracking systems}

Definition statement

This place covers:

Uncommon or outdated technology in 2011.

Methods in which the beam is driven back and forth to generated the tracking error signal.

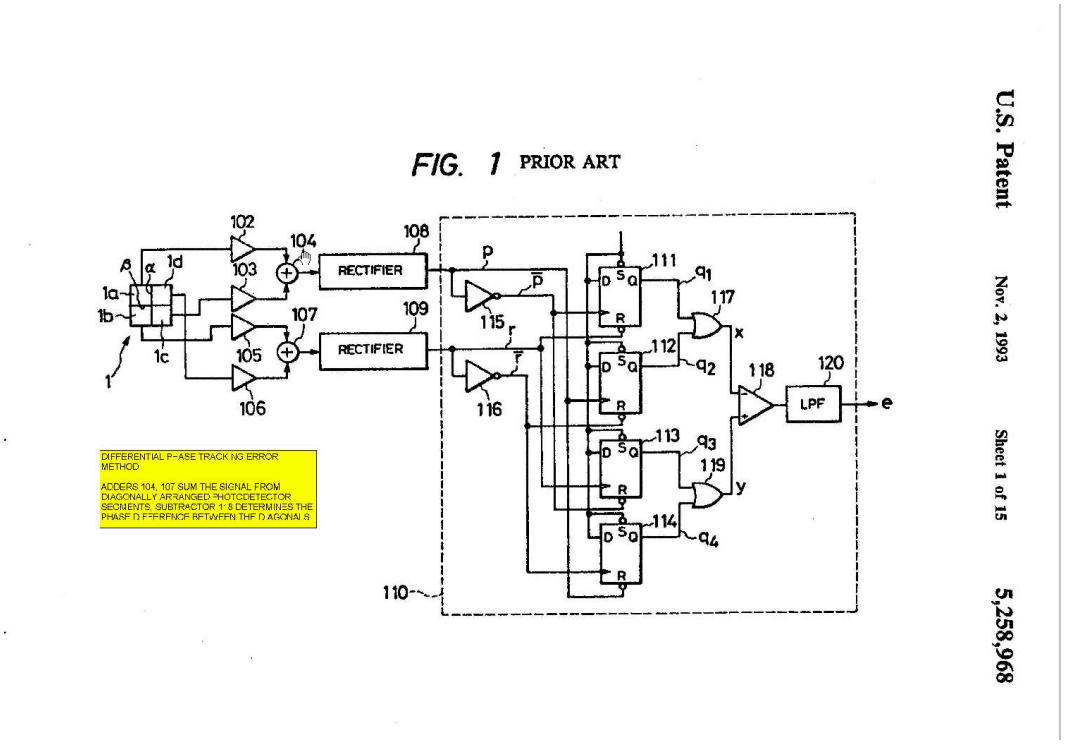
G11B 7/0906

{Differential phase difference systems}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group:



Synonyms and Keywords

In patent documents the following expressions:

"phase difference tracking error method"

"differential phase detection" (DPD)

"phase variation method"

"time difference detection method"

"heterodyne"

"phase contrast method"

"phase comparison method "

are often used instead of "differential phase difference method".

G11B 7/0908

{for focusing only (G11B 7/0925, G11B 7/094, G11B 7/0941, G11B 7/0943, G11B 7/0945, G11B 7/0946, G11B 7/0948 take precedence)}

References

Limiting references

This place does not cover:

Electromechanical actuators for lens positioning (G11B 7/0857 takes precedence)	G11B 7/0925
Methods and circuits for servo offset compensation	G11B 7/094
Methods and circuits for servo gain or phase compensation during operation (for initialising servos G11B 7/0945)	G11B 7/0941
Methods and circuits for performing mathematical operations on individual detector segment outputs	G11B 7/0943
Methods for initialising servos, start-up sequences	G11B 7/0945
Specially adapted for operation during external perturbations not related to the carrier or servo beam, e.g. vibration	G11B 7/0946
Specially adapted for detection and avoidance or compensation of imperfections on the carrier, e.g. dust, scratches, dropouts (G11B 7/095 takes precedence)	G11B 7/0948

G11B 7/0909

{by astigmatic methods}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group:

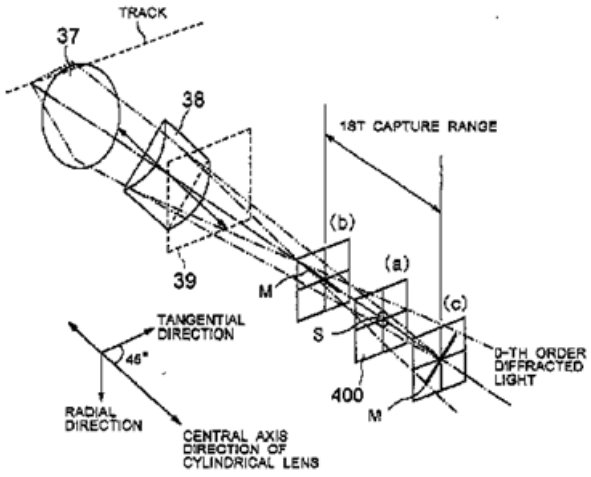


Figure from EP1220210

G11B 7/0912

{by push-pull method}

References

Limiting references

This place does not cover:

Push-pull tracking	G11B 7/0901

Synonyms and Keywords

In patent documents, the following words/expressions are often used with the meaning indicated:

"spot size focus error method"	"push-pull method".

G11B 7/0916

{Foucault or knife-edge methods}

Definition statement

This place covers:

Illustrative example of subject matter classified in this group:

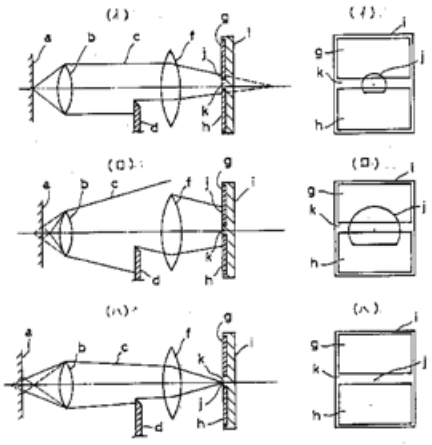


Figure taken from JP60010424

G11B 7/0917

{Focus-error methods other than those covered by G11B 7/0909 - G11B 7/0916}

Definition statement

This place covers:

Uncommon or outdated technology (in 2011).

Further classification information:

The following Indexing Codes are assigned:

G11B 2007/0919 critical angle methods

G11B 2007/0919 dither methods

S11B/09B8F far-field methods

G11B 2007/0924 skewed beams method

G11B 7/0932

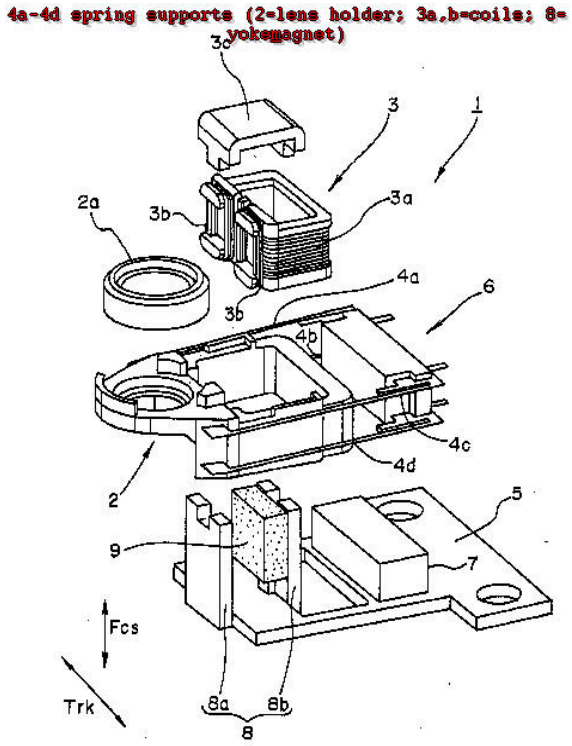
{Details of sprung supports}

Definition statement

This place covers:

Sprung supports - e.g. lens holder support by wires or flat springs

also contains other support systems such as liquid, magnetic, combinations.



G11B 7/0933

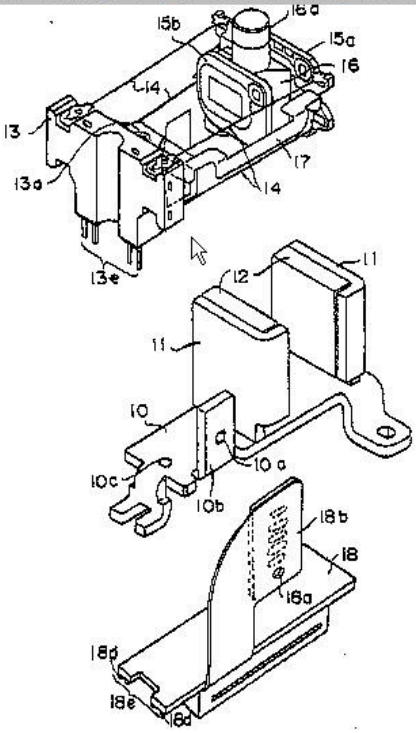
{Details of stationary parts}

Definition statement

This place covers:

Stationary parts: e.g. the magnets on the sled, e.g. the yokes and magnets of a "normal" four-wire-sprung actuator.

11=yoke; 12=magnet (16=lens holder, 14=springs)



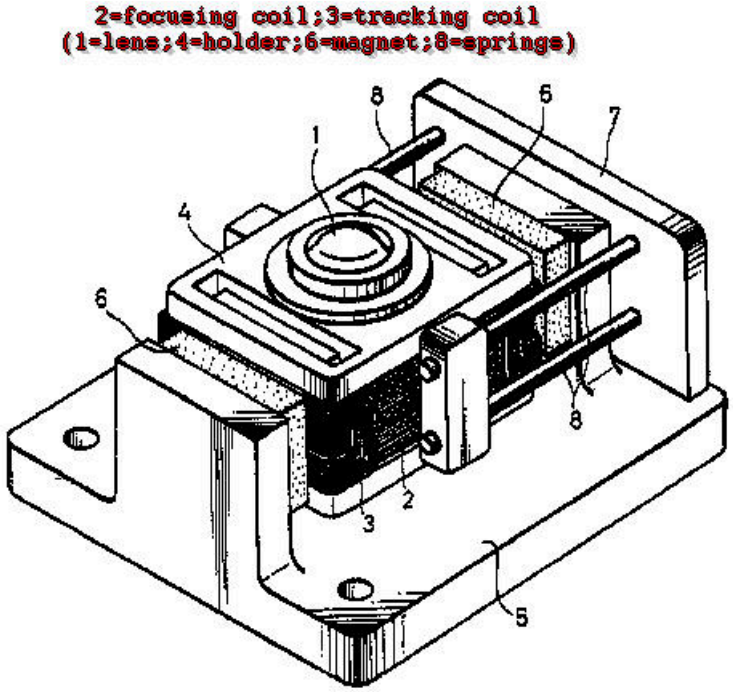
G11B 7/0935

{Details of the moving parts}

Definition statement

This place covers:

Moving parts: lens holder and coils (or, occasionally, magnets) attached to it. Example:



G11B 7/0945

{Methods for initialising servos, start-up sequences}

References

Limiting references

This place does not cover:

Distinguishing between types of discs by using an initial focus search or scan	G11B 19/12

G11B 7/0953

{to compensate for eccentricity of the disc or disc tracks}

Definition statement

This place covers:

Acting on the tracking actuator.

Synonyms and Keywords

In patent documents, the following words/expressions are often used with the meaning indicated:

"radial runout"	"eccentricity".

G11B 7/0956

{to compensate for tilt, skew, warp or inclination of the disc, i.e. maintain the optical axis at right angles to the disc}

Definition statement

This place covers:

Acting on focusing or tilt actuator

Synonyms and Keywords

In patent documents, the following words/expressions are often used with the meaning indicated:

"axial runout"	"tilt", "skew" or " inclination of the disc"

G11B 7/12

Heads, e.g. forming of the optical beam spot or modulation of the optical beam (disposition or mounting of head elements within housing or with provision for moving of light source, optical beam or detector, irrelevant to the transducing method G11B 7/08 {; modulating lasers H01S 3/10; controlling the intensity, colour, phase, polarisation or direction of light beams arriving from an independent light source, e.g. switching gating or modulating G02F 1/00})

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Controlling the intensity, colour, phase, polarization or direction of light beams arriving from an independent light source, e.g. switching gating or modulating	G02F 1/00
Modulating lasers	H01S 3/10

G11B 7/121

Protecting the head, e.g. against dust or impact with the record carrier

Definition statement

This place covers:

Brushes incorporated into CD form factor discs for cleaning e.g. EP1411505

G11B 7/1245

the waveguides including means for electro-optical or acousto-optical deflection

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Electro or acousto optical deflection in general	G02F 1/29, G02F 1/33

G11B 7/125

Optical beam sources therefor, e.g. laser control circuitry specially adapted for optical storage devices; Modulators, e.g. means for controlling the size or intensity of optical spots or optical traces

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Electro-, magneto-, or acousto-optical modulators	G02F 1/00
Optical diaphragm	G03B 9/02
Semiconductor lasers	H01S 5/00
Light emitting diodes	H10H 20/00

G11B 7/1263

Power control during transducing, e.g. by monitoring

Definition statement

This place covers:

"Running optimum power control"

"walking optimum power control".

OPC carried out as a preparation when the medium is loaded or just before the transducing mode is started: G11B 7/1267 Power calibration

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Running OPC	Continuous adjustment of the writing power to the optimum power during recording. This compensates for changes in the optimum power during recording due changing conditions e.g. temperature change. (see for example the standard ECMA-394 "Recordable Compact Disc Systems CD-R - Multi-speed", Chapter 13 "Attachments", Annex 13 "Running OPC")

Walking OPC	According to wo 2006 018810 "Walking OPC calibration as disclosed in WO 03/065357 adapts the writing power at different instances during the writing process"

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

OPC, ROPC	running optimum power control

In patent documents, the following words/expressions are often used as synonyms:

- "running optimum power control", "running OPC", "DRDW" and " dynamical power control"

G11B 7/127

Lasers; Multiple laser arrays {(lasers per se H01S)}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Lasers per se	H01S
Semiconductor lasers	H01S 5/00
Light emitting diodes	H10H 20/00

G11B 7/128

Modulators (G11B 7/1245 takes precedence)

Definition statement

This place covers:

Speckle modulation in holographic storage, the following should be assigned as appropriate:

- for the diffuser G11B 7/1392
- for multimode optical fibers G11B 7/1384

References

Limiting references

This place does not cover:

The waveguides including means for electro-optical or acousto-optical deflection	G11B 7/1245

Informative references

Attention is drawn to the following places, which may be of interest for search:

Electro, magneto or acousto optical modulators	G02F 1/00
Optical diaphragm	G03B 9/02

G11B 7/13

Optical detectors therefor

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Optical detectors per se	G01J
Demodulating light, transferring the modulation of modulated light, frequency changing of light	G02F 2/00

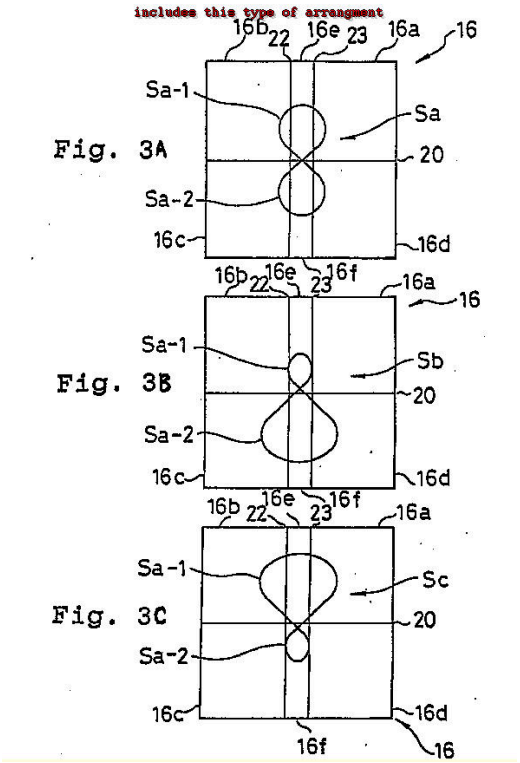
G11B 7/133

Shape of individual detector elements

Definition statement

This place covers:

Illustrative example of subject matter classified in this group:



G11B 7/135

Means for guiding the beam from the source to the record carrier or from the record carrier to the detector

Definition statement

This place covers:

Documents in which the invention information concerns a common optical path

Documents in which the invention information concern the relative arrangement of different optical elements

Anti-reflection films on optical elements where the particular type of element is not important

Further classification information:

There is no specific classification in G11B 7/00 for the manufacture of optical elements per se, therefore the manufacture of the optical elements is classified in the most relevant optical element group itself if this is closely related to the application of the element to optical recording/reproduction. (For mounting, aligning of elements in the head see G11B 7/22).

Where subgroups of G11B 7/135 are available for the means and for the function, both classification(s) for the elements and for the function are assigned.

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

If the application concerns a system adapted for scanning different types of carrier such as CD & DVD	G11B 2007/0006
If the application concerns recording/reproduction of multiple data layers,	G11B 2007/0013

G11B 7/1353

Diffractive elements, e.g. holograms or gratings {(diffraction gratings per se G02B 5/18; holograms per se G02B 5/32; grating systems G02B 27/44)}

Relationships with other classification places

The borderline between G11B 7/1367 and G11B 7/1353 is not a distinct one, but generally diffraction gratings are regular, repetitive phase steps on a relatively small scale. In borderline cases both are assigned.

Gratings integrated into other elements e.g. lenses are assigned both relevant classes, unless noted otherwise below (e.g. in G11B 7/1367)

Classify also the function if a group exists e.g. diffractive elements used in Foucault (knife edge) method of generating focus error servo signals are also classified in G11B 7/1381

References

Limiting references

This place does not cover:

Irregular, non-repetitive phase steps on a relatively large scale	G11B 7/1367

Informative references

Attention is drawn to the following places, which may be of interest for search:

Diffraction gratings per se	G02B 5/18
Holograms per se	G02B 5/32
Grating systems	G02B 27/44

G11B 7/1359

Single prisms

Relationships with other classification places

Classify also the function if a specific group exists e.g. beam shaping G11B 7/1398

G11B 7/1365

Separate or integrated refractive elements, e.g. wave plates

Definition statement

This place covers:

- Integrated combinations of a refractive element, such as a coating element or phase plate, with another element, such as a lens, are classified in this group and in other appropriate groups for the other element.
- Polarisation plates.

Relationships with other classification places

Classify also the function if a specific group exists e.g. beam shaping: G11B 7/1398

Plates used as beam splitters are classified in both G11B 7/1365 and G11B 7/1395

Special rules of classification

G11B 7/1365 is not assigned if the plate is merely a support for a diffraction grating with no particularly adapted feature

G11B 7/1367

Stepped phase plates

Definition statement

This place covers:

For example, plates used in apparatus compatible with multiple disc standards to control the aberration at one or more wavelengths

Any plate with a lateral spatially varying effect on the phase of the beam (i.e. in the plane of the plate) e.g. Figure 4 WO 2006/135053

This class is also assigned when the spatial variation is integrated into another element such as an objective lens (since this is essentially equivalent to a plate with the phase structure cooperating with the lens).

Relationships with other classification places

The borderline between G11B 7/1367 and G11B 7/1353 is not a distinct one, but generally the phase steps referred to are not regular, repetitive steps as in most diffraction gratings and/or are on a larger scale that a diffraction grating. In borderline cases both are assigned.

Classify also the function if a specific group exists e.g. aberration correction G11B 7/13922.

G11B 7/1369

Active plates, e.g. liquid crystal panels or electrostrictive elements

Definition statement

This place covers:

- Acousto optical deflectors (because they work by changing the refractive index)
- Plates that are mechanically moved e.g. for aberration correction for one or more media types in apparatus compatible with different formats

Relationships with other classification places

Classify also the function if a specific group exists e.g. aberration correction G11B 7/13925 or G11B 7/13927

G11B 7/1372

Lenses

Definition statement

This place covers:

Relative positioning of more than one type of lens (e.g. collimator and objective lens) e.g. for controlling magnification

G11B 7/1374

Objective lenses {(optical objectives per se G02B 9/00)}

Definition statement

This place covers:

The SIL of compound objective lenses i.e. where SIL is between the objective lens and the optical data carrier

Further classification information.

Relationships with other classification places

Also assign Indexing Code for the specific type of lens (G11B 2007/13722 for Fresnel lenses, G11B 2007/13725 for catadioptric lenses, G11B 2007/13727 for compound lenses)

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Optical objectives per se	G02B 9/00

G11B 7/1376

Collimator lenses {(collimators per se G02B 27/30)}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Collimators per se	G02B 27/30

G11B 7/1378

Separate aberration correction lenses; Cylindrical lenses to generate astigmatism; Beam expanders

Relationships with other classification places

Lenses not coming within the scope of G11B 7/1374, G11B 7/1376 or G11B 7/1378 should be classified in G11B 7/1372.

Note that after a recent reorganization (Q4/2011) the scope of this group has changed from "other lenses".

G11B 7/1381

Non-lens elements for altering the properties of the beam, e.g. knife edges, slits, filters or stops (G11B 7/1353 - G11B 7/1369 take precedence)

Definition statement

This place covers:

Elements that:

- reduce stray light at the detector (e.g. US 2006 0062101)
- are used to generate servo signals (e.g. diffractive areas for focus error detection using the Foucault method)
- comprise one or more annular areas that diffract part of the beam out of the main beam, or that block part of the beam or that deliberately introduce a larger aberration into part of the beam, for the purpose of reducing noise e.g. in apparatus compatible with different standards, since this is a type of filtering
- optically modify the power of the beam (e.g. US 2010 165823, US 2003 0169667).

Elements for apodisation (e.g. for "super-resolution" i.e. to reduce the beam width of a main lobe of the beam below the diffraction limit for that wavelength) but G11B 7/1387 has precedence (i.e. if a lens for near-field apparatus includes a shielding element it is classified in G11B 7/1387, and not also G11B 7/1381).

Note that after a recent reorganization (Q4/2011) the scope of this group has been broadened (it is no longer has the qualifier "as it falls on the detector")

References

Limiting references

This place does not cover:

Diffractive elements, e.g. holograms or gratings	G11B 7/1353

Double or multiple prisms, i.e. having two or more prisms in cooperation	G11B 7/1356
Single prisms	G11B 7/1359
Mirrors	G11B 7/1362
Separate or integrated refractive elements, e.g. wave plates	G11B 7/1365
Stepped phase plates	G11B 7/1367
Active plates, e.g. liquid crystal panels or electrostrictive elements	G11B 7/1369

G11B 7/1384

Fibre optics

Definition statement

This place covers:

Waveguide elements (mostly older technology), because they work using a similar principle.

References

Limiting references

This place does not cover:

Waveguide heads	G11B 7/1245

G11B 7/1387

using the near-field effect

Definition statement

This place covers:

In a hemispherical lens, the rays that come in at large angles (relative to optical axis) from the previous lens are totally internally reflected at the interface due to the refractive index difference BUT there is an evanescent wave which doesn't die to zero immediately. This can be used to read/write on a medium, as long as the medium is very close (e.g. if the hemispherical lens is on a flying head); Recording may also use the evanescent wave from a very fine tip held near a medium.

Warning: This subgroup was created in 2008 and the reclassification of documents published before 2009 has not been systematically done. For earlier documents G11B 7/12, G11B 7/122, G11B 7/123 should be searched.

A sharply elongated optical fibre may act is a local emitter, similar to scanning near field optical microscopy (SNOM)

Relationships with other classification places

Solid Immersion Lenses (SIL) are also be assigned Indexing Code G11B 2007/13727

Catadioptric lenses are also assigned Indexing Code G11B 2007/13725

G11B 7/1372 is not assigned if there is no particular adaptation of the (compound) objective lens.

Where a shielding element is involved, this group has precedence over G11B 7/1381

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Optical recording carriers adapted to be used in near-field such as super-RENS (super resolution near field structure) media	G11B 7/24065
Scanning near field optical microscopes	G01Q 60/18
(non waveguide) optics using evanescent waves	G02B 27/56

Synonyms and Keywords

In patent documents, the following words/expressions are often used with the meaning indicated:

"evanescent field"	"the exponentially dying electromagnetic field near the surface, which does not cross a gap according to classical optics, because of total internal reflection"

G11B 7/139

Numerical aperture control means

Definition statement

This place covers:

Means to control the angle of the outermost parts of the beam to the optical axis, therefore controlling the size of the spot at the focus.

For apparatus compatible with different standards this often involves some way to block the outer part of the beam for a particular wavelength (see e.g. US6396791 Figure 10(a)(b), paragraph 63, and the prior art shown in Figure 11, paragraph 14) using dichroic effects, diffraction grating or phase difference that affect one wavelength more than another, or polarisation (e.g. by using beams polarised in different directions for different wavelengths), but it may involve elements located elsewhere (e.g. US6160646 Figure 6-9, the asymmetrical grating in the central part of the lens is used for CD medium)

G11B 7/139 is assigned for elements that allow a single lens to be used for different standards. Although switching between objective lenses in apparatus compatible with different standards e.g. CD, DVD, BD, changes the numerical aperture (as well as changing the aberration correction), such documents are not assigned G11B 7/139.

References

Limiting references

This place does not cover:

Objective lenses with NA > 1 (i.e. for near field apparatus)	G11B 7/1387

Informative references

Attention is drawn to the following places, which may be of interest for search:

Means for shaping the cross-section of the beam, e.g. into circular or elliptical cross-section	G11B 7/1398

Special rules of classification

G11B 7/139 has precedence over G11B 7/1392 and subgroups.

G11B 7/1392

Means for controlling the beam wavefront, e.g. for correction of aberration {(optical systems for aberration correction per se G02B 27/00)}

Definition statement

This place covers:

Spherical aberration, coma (also referred to as comatic aberration) and chromatic (i.e. varying with wavelength)

References

Limiting references

This place does not cover:

Numerical aperture control means	G11B 7/139
Means for shaping the cross-section of the beam, e.g. into circular or elliptical cross-section	G11B 7/1398

Informative references

Attention is drawn to the following places, which may be of interest for search:

Optical systems for aberration correction per se	G02B 27/0025

G11B 7/13922

{passive}

Definition statement

This place covers:

- The use of elements with one or more annular areas that diffract part of the beam out of the main beam, or that block part of the beam or that deliberately introduce a larger aberration into part of the beam, for the purpose of reducing noise.
- Passive elements that change the beam from a Gaussian intensity profile to a flat(ter) intensity profile.

Relationships with other classification places

In apparatus compatible with different standards:

- where the annular area is a phase step, the class G11B 7/1367 is also assigned,
- where the annular area blocks the beam, the class G11B 7/1381 is also assigned, because it is a type of filtering.

The element specifically adapted for this purpose should also be classified, e.g. lenses designed to minimize aberrations are classified here (as well as in G11B 7/1372 and subgroups).

References

Limiting references

This place does not cover:

Numerical aperture control means	G11B 7/139

Special rules of classification

G11B 7/13922 is not assigned to lenses or plates adapted to control numerical aperture, since the purpose of this adaptation is to control the aberration (i.e. assigning this class would amount to assigning two classes for the same aspect).

G11B 7/13925

{active, e.g. controlled by electrical or mechanical means}

Definition statement

This place covers:

- The use of switchable objective lenses in apparatus compatible with different standards e.g. CD, DVD, BD, because the purpose of the switch includes changing the aberration correction (as well as changing the numerical aperture).
- Active elements that change the beam from a Gaussian intensity profile to a flat(ter) intensity profile.

The element specifically adapted for this purpose should also be classified.

References

Limiting references

This place does not cover:

Numerical aperture control means	G11B 7/139

Special rules of classification

G11B 7/13922 is not assigned to lenses or plates adapted to control numerical aperture, since the purpose of this adaptation is to control the aberration (i.e. assigning this class would amount to assigning two classes for the same aspect).

G11B 7/13927

{during transducing, e.g. to correct for variation of the spherical aberration due to disc tilt or irregularities in the cover layer thickness}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Tilt servo aspect	G11B 7/0956

G11B 7/1395

Beam splitters or combiners (G11B 7/1353, G11B 7/1356 take precedence {; beam splitting or combining per se G02B 27/10})

Relationships with other classification places

G11B 7/1365 is also assigned for plate beams splitters.

References

Limiting references

This place does not cover:

Diffractive elements, e.g. holograms or gratings	G11B 7/1353
Double or multiple prisms, i.e. having two or more prisms in cooperation	G11B 7/1356

Informative references

Attention is drawn to the following places, which may be of interest for search:

Beam splitting or combining per se	G02B 27/10

G11B 7/1398

Means for shaping the cross-section of the beam, e.g. into circular or elliptical cross-section

Definition statement

This place covers:

The shape of a contour of equal intensity

G11B 2007/240025

{for storing optical interference patterns, e.g. holograms}

Relationships with other classification places

- If the holographic carrier is multilayered carrier also classify in **G11B7/24S4**, or coded in Indexing Code **S11B7/24S4** if not "invention" information
- If one of the holographic layers has additional information (i.e. auxiliary information, control information, also classify or code, as appropriate in in G11B 7/00781 or G11B 7/00781

Warning: This subgroup was created in the second half of 2009, and the reclassification from G11B 7/0065 has not been systematically done. For documents published before 2010, G11B 7/0065 and G11B 7/0065 should be searched.

References

Limiting references

This place does not cover:

Volumetric holographic storage	G11B 2007/0009
Holographic carriers in the form of a card or other rectangular shape, if not invention information	**G11B7/24F2** , G11B 2007/240008

Holographic tape carriers, if not invention information	**G11B7/24F4** , G11B 2007/240017

G11B 7/24065

Layers assisting in recording or reproduction below the optical diffraction limit, e.g. non-linear optical layers or structures (cover layers for near-field media G11B 7/24059)

Definition statement

This place covers:

Optical recording carriers adapted to be used in near-field or adapted to provide resolution below the diffraction limit e.g. provided with layers that act as masks. For example, "Super-RENS" (super resolution near field structure) media in which a low melting temperature layer such as Sb that acts as a controllable aperture.

References

Limiting references

This place does not cover:

N: Conditioning of record carrier e.g. mechanised protection or means for reducing influence of physical parameters	**G11B7/24C**

G11B 7/241

characterised by the selection of the material

Definition statement

This place covers:

Optical recording media such as CDs, DVDs, Blu-Ray discs and Holographic Versatile Discs (HVDs), Optical Cards etc. characterised by the materials.

Relationships with other classification places

- Polymers as such are covered by C08F and C08G
- Dyes as such are covered by C09B
- Photosensitive materials as such are covered by G03C

References

Limiting references

This place does not cover:

Recording, reproducing or erasing methods	G11B 7/004
Record carriers Indicating prior or unauthorized use by changing the physical properties of the record carrier - Limited play	G11B 23/282
Sheet materials for thermography incl. laser writable labels (e.g. LightScribe®)	B41M 5/26
Sputtering targets for producing e.g. the reflective layer	C23C 14/3407
Photosensitive materials for photography	G03C 1/00

Materials for phase modulating patterns i.e. holographic images	G03F 7/001

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Recording or reproducing by optical means, e.g. recording using a thermal beam of optical radiation - Record carriers for holograms	G11B 2007/240025

Informative references

Attention is drawn to the following places, which may be of interest for search:

3D recording by using multiple recording layers (not holographic)	G11B 2007/0009
Recording methods involving bubble or bump forming	G11B 7/00452
Recording methods involving phase change effects	G11B 7/00454
Recording methods involving reflectivity, absorption or colour changes e.g. photochromic recording	G11B 7/00455
Recording methods for holographic recording	G11B 7/0065
Nanotechnology for information processing, storage or transmission, e.g. quantum computing or single electron logic	B82Y 10/00

Special rules of classification

- In general only the subject matter of
- claims
- specific embodiments e.g. examples, figures...is classified.
- Materials disclosed in long non-binding listings are not classified.
- No classes are given for materials which are considered standard and consequently trivial e.g. :
- Dielectric layers made of ZnS-SiO2, (G11B 7/2578)
- Base layers made of polycarbonate if the polycarbonate is not further specified (G11B 7/2534)
- Reflective layers made from silver if no specific alloy is mentioned (G11B 7/259)
- Recording layers:
- made of or containing "dye" - if no specific dyes is mentioned (G11B 7/246)
- made of "GeSbTe" - if the alloy is not further specified (**G11B7/243B**)
- Please also refer to Annex 1:

Annotated CPC G11B 7/241-G11B 7/2595

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

3D	three dimensional
Super-RENS	Super REsolution Near field Structure
Blue wavelength	390 - 500 nm
"nanosize" or "nanoscale"	related to a controlled geometrical size below 100 nanometres in one or more dimensions

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

BD	Blu-Ray Disc
CD	Compact Disc
DVD	Digital Versatile Disc
HVD	Holographic Versatile Disc
COC	Cyclic Olefin Copolymer

In patent documents, the following words/expressions are often used as synonyms:

- "mask layer", "shutter layer" and "aperture control layer"
- "data layer" and "recording layer"
- "topcoat(ing)" and "outer layer"

In patent documents, the word/expression in the first column is often used instead of the word/ expression in the second column, which is used in the classification scheme of this place:

"substrate", "support layer" and "board	"base layer"
"colo(u)rant" and "pigment"	"dye"
"bonding"	"adhesion"
"compostable"	"(bio)-degradable" for substrate/base materials

G11B 7/26

Apparatus or processes specially adapted for the manufacture of record carriers

Definition statement

This place covers:

Joining of disc substrates e.g. for DVDs.

G11B 7/26 or a subclass is assigned when the process involves a single technical art for which provision exists elsewhere but where the adaptation is specific to the optical record carrier.

In this subgroup, special care should be taken to circulate the document to classifiers for the relevant "single technical art" - see the informative references.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Reconditioning e.g. cleaning of disk carriers (including destroying CDs)	G11B 23/505
Recovery of plastics or other constituents of waste material containing plastics	B29B 17/00
Joining of preformed parts; using adhesives	B29C 65/48
Methods or apparatus for laminating (e.g. by curing) by pressing	B32B 37/10

G11B 7/261

{Preparing a master, e.g. exposing photoresist, electroforming}

References

Limiting references

This place does not cover:

Electronic editing of signals on discs	G11B 27/034

Informative references

Attention is drawn to the following places, which may be of interest for search:

Photosensitive materials for photomechanical, e.g. photolithographic production of textured or patterned surfaces	G03F 7/004
Exposure apparatus for photomechanical, e.g. photolithographic production of textured or patterned surfaces	G03F 7/20
Making masks on semiconductor bodies for further photolithographic processing	H01L 21/027

G11B 7/263

{Preparing and using a stamper, e.g. pressing or injection molding substrates (production of optical record carriers, e.g. optical discs B29D 17/005)}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Moulds or cores for shaping or joining of plastics	B29C 33/00
Injection moulding	B29C 45/00
Producing (from plastics) optically read record carriers, e.g. optical discs	B29D 17/005

G11B 7/265

{Apparatus for the mass production of optical record carriers, e.g. complete production stations, transport systems}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Vacuum work holders	B25B 11/005
Conveyors	B65G 25/00

G11B 7/266

{Sputtering or spin-coating layers (sputtering in general C23C 14/24; spin-coating in general B05D 1/005)}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Spin coating	B05D 1/005
Sputtering	C23C 14/24

G11B 7/268

{Post-production operations, e.g. initialising phase-change recording layers, checking for defects (investigating the presence of flaws or contamination in optical discs G01N 21/9506)}

Definition statement

This place covers:

This class is assigned for writing the BCA, which occurs during manufacture (not done by end user apparatus).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Photographic or thermographic registration for marking record carriers	G06K 1/126

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Burst code area	see Glossary of terms Figure in G11B 7/00736

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

BCA	Burst code area

G11B 9/00

Recording or reproducing using a method not covered by one of the main groups G11B 3/00 - G11B 7/00; Record carriers therefor (G11B 11/00 takes precedence {driving or moving of heads G11B 21/02})

Definition statement

This place covers:

- Recording or reproducing using near-field interactions, e.g. recording by means directly associated with the tip of a microscopic electrical probe as used in Scanning Tunneling Microscopy (STM) or Atomic Force Microscopy (AFM) for inducing physical or electrical perturbations in a recording medium, the permanent effect of which being the writing of at least one information unit of a sequence disposed along a track; Reproducing such memorised information by such association of tip and means; Record carriers or media specially adapted for such transducing of information; Structure and manufacture of said microscopic probe and means for moving the microscopic probe or the record carrier relatively to each other for track access and/or for controlling the relative spacing;
- Recording or reproducing using ferroelectric record carriers and record carriers therefor;
- Recording or reproducing using record carriers with variable electric resistance and record carriers therefor;
- Recording or reproducing using electrostatic charge injection and record carriers therefor;
- Recording or reproducing using electron beams and record carriers therefor.

Relationships with other classification places

Scanning probe Microscopy: G01Q

Microstructural devices: B81B

References

Limiting references

This place does not cover:

Recording on or reproducing from the same record carrier wherein for these two operations the methods are covered by different main groups of groups G11B 3/00 - G11B 7/00 or by different subgroups of group G11B 9/00; Record carriers therefor driving or moving of heads G11B 3/02, G11B 5/48, G11B 7/08, G11B 21/02	G11B 11/00
Marking using electrical current	B41M 5/20
Measuring roughness or irregularity of surfaces	G01B 7/34

Informative references

Attention is drawn to the following places, which may be of interest for search:

Driving or moving of heads	G11B 21/02
Microstructural systems	B81B 7/00
Manufacture or treatment of nanostructures by manipulation of individual atoms or molecules, or limited collections of atoms or molecules as discrete units	B82B 3/00
Investigating or analysing materials by the use of electric, electro-chemical, or magnetic means	G01N 27/00

Scanning or positioning arrangements, i.e. arrangements for actively controlling the movement or position of the probe	G01Q 10/00
Monitoring the movement or position of the probe	G01Q 20/00
Particular type of SPM [Scanning Probe Microscopy]	G01Q 60/00
Applications, other than SPM, of scanning-probe techniques	G01Q 80/00

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Near-field interaction	A very short distance interaction using scanning-probe techniques, e.g. quasi- contact or evanescent contact between head and record carrier

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

SP	Scanning Probe
SPM	Scanning Probe Microscopy
STM	Scanning Tunnel Microscopy
AFM	Atomic Force Microscopy
MFM	Magnetic Force Microscopy
SNOM	Scanning Near-field Optical Microscopy
SCM	Scanning Capacitance Microscopy

G11B 11/00

Recording on or reproducing from the same record carrier wherein for these two operations the methods are covered by different main groups of groups G11B 3/00 - G11B 7/00 or by different subgroups of group G11B 9/00; Record carriers therefor {(driving or moving of heads G11B 3/02, G11B 5/48, G11B 7/08, G11B 21/02)}

Definition statement

This place covers:

Only the cases wherein the method of recording differs from the method of reproducing. The following recording methods (when associated to a different reproducing method) are covered:

- recording by perturbation of the physical or electrical structure;
- recording by deforming with non-mechanical means, e.g. laser, beam of particles;
- recording by electric charge or by variation of electric resistance or capacitance;
- recording by magnetic means or other means for magnetisation or demagnetisation of a record carrier, e.g. light induced spin magnetisation, demagnetisation by thermal or stress means in the presence or not of an orienting magnetic field; and in particular magneto-optical recording, i.e. using a beam of light or a magnetic field for recording by change of magnetisation and a beam of light for reproducing, e.g. light-induced thermo-magnetic recording, spin magnetisation recording, Kerr or Faraday effect reproducing;
- recording by optical means;
- recording by mechanical cutting, deforming or pressing;

- recording by near-field interactions.

Relationships with other classification places

Microstructural devices	B81B
Scanning probe Microscopy	G01Q
Recording or playback apparatus using mechanically marked tape, e.g. punched paper tape, or using unit records, e.g. punched or magnetically marked cards	G06K

References

Limiting references

This place does not cover:

Reading only or recording only using mechanical, magnetic, optical or other methods is covered respectively by groups	G11B 3/00, G11B 5/00, G11B 7/00, G11B 9/00
Driving or moving of heads	G11B 3/02, G11B 5/48, G11B 7/08, G11B 21/02

Informative references

Attention is drawn to the following places, which may be of interest for search:

Recording by mechanical cutting, deforming or pressing, e.g. of grooves or pits; Reproducing by mechanical sensing; Record carriers therefor	G11B 3/00
Recording by magnetisation or demagnetisation of a record carrier; Reproducing by magnetic means; Record carriers therefor	G11B 5/00
Recording or reproducing by optical means, e.g. recording using a thermal beam of optical radiation, by modifying optical properties or the physical structure, reproducing using an optical beam at lower power by sensing optical properties; Record carriers therefor	G11B 7/00
Recording or reproducing using a method not covered by one of the main groups G11B 3/00 - G11B 7/00;Record carriers therefor	G11B 9/00

Special rules of classification

Recording by magnetic means or other means for magnetisation or demagnetisation of a record carrier G11B 11/10 takes precedence over G11B 11/08 recording by electric charge or by variation of electric resistance or capacitance.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Near-field interaction	Means a very short distance interaction using scanning-probe techniques, e.g. quasi- contact or evanescent contact between head and record carrier

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

MO	Magneto-Optical

G11B 13/00

Recording simultaneously or selectively by methods covered by different main groups {among G11B 3/00, G11B 5/00, G11B 7/00 and G11B 9/00}; Record carriers therefor {not otherwise provided for}; Reproducing therefrom {not otherwise provided for (G11B 9/14, G11B 11/002 take precedence; driving or moving of heads G11B 3/02, G11B 5/48, G11B 7/08, G11B 21/02)}

Definition statement

This place covers:

This group is limited to the combination of recording and reproducing on the same record carrier by more than one of the different method covered by groups G11B 3/00, G11B 5/00, G11B 7/00 and G11B 9/00

Recording simultaneously or selectively:

- magnetically and by styli
- magnetically and optically
- optically and by styli.

Using near-field interactions or transducing means and at least one other method or means for recording or reproducing

Relationships with other classification places

Microstructural devices: B81B

References

Limiting references

This place does not cover:

Reading only or recording only using mechanical, magnetic, optical or other methods is covered respectively by groups	G11B 3/00, G11B 5/00, G11B 7/00, G11B 9/00
Takes precedence	G11B 9/14
Using recording by perturbation of the physical or electrical structure	G11B 11/002

Informative references

Attention is drawn to the following places, which may be of interest for search:

Recording by mechanical cutting, deforming or pressing, e.g. of grooves or pits; Reproducing by mechanical sensing;	G11B 3/00
Recording by magnetisation or demagnetisation of a record carrier; Reproducing by magnetic means;	G11B 5/00
Recording or reproducing by optical means, e.g. recording using a thermal beam of optical radiation, by modifying optical properties or the physical structure, reproducing using an optical beam at lower power by sensing optical properties;	G11B 7/00
Recording or reproducing using a method not covered by one of the main groups G11B 3/00 - G11B 7/00;	G11B 9/00

Special rules of classification

- Assisted magnetic recording, e.g. thermally or microwave assisted magnetic recording are classified in G11B 5/00;
- Driving or moving of heads G11B 3/02, G11B 5/48, G11B 7/08, G11B 21/02

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Near-field interaction	Means a very short distance interaction using scanning-probe techniques, e.g. quasi- contact or evanescent contact between head and record carrier

G11B 15/00

Driving, starting or stopping record carriers of filamentary or web form; Driving both such record carriers and heads; Guiding such record carriers or containers therefor; Control thereof; Control of operating function (driving or guiding heads G11B 3/00 - G11B 7/00, G11B 21/00)

Definition statement

This place covers:

- Mechanism for loading/unloading/guiding single tape cartridges in/from tape drives.
- Libraries of tape cartridges in which the cartridges are transported from a random access magazine to a tape drive or viceversa.
- Means for guiding the tape within the tape drive.
- Means for extracting the tape from the cartridge.
- Means for controlling the tension of the tape within the tape drive.
- Means for sensing features present on the record carrier or on the cartridge.

Relationships with other classification places

The user interface aspects of tape drives are classified also in G11B 25/06.

Analogue recording or reproducing G11B 20/02.

Digital recording or reproducing G11B 20/10.

Transmission of digital information H04L.

References

Limiting references

This place does not cover:

Recording/reproducing operations	G11B 5/00, G11B 7/00, G11B 9/00, G11B 11/00
Magnetic heads	G11B 5/127
Signal processing	G11B 20/00
Record carriers, tape cartridges	G11B 23/00
User interface aspects of drives	G11B 25/00
Recording/reproducing apparatuses in combination with television sets	G11B 31/00

Recording/reproducing apparatuses in combination with video cameras	G11B 31/006, H04N 23/00
Vibration damping means	G11B 33/08

Informative references

Attention is drawn to the following places, which may be of interest for search:

Apparatuses using web form record carriers, e.g. tapes	G11B 25/06
Apparatuses using web form record carriers in combination with non web form record carriers; combi apparatuses	G11B 25/10
Telephones answering machines	**H01M1/64**
Telephones with dictation recording systems	H04M 11/10
Apparatuses for television signal recording	H04N 5/76

G11B 17/00

Guiding record carriers not specifically of filamentary or web form, or of supports therefor (guiding cards or sheets G06K 13/00)

Definition statement

This place covers:

- Mechanisms for loading/unloading/guiding single disk cartridges or naked disks in/from disk drives.
- Mechanisms in which the disks are transported from a consecutive access magazine to a disk drive.
- Libraries of disks or disk cartridges, in which the disks or cartridges are transported from a random access magazine to a disk drive and viceversa.

Relationships with other classification places

- Hard disk drives are classified in G11B 25/043.
- Analogue recording or reproducing G11B 20/02.
- Digital recording or reproducing G11B 20/10.
- Transmission of digital information H04L.
- Libraries of tape cartridges G11B 15/68.

References

Limiting references

This place does not cover:

Tape drives	G11B 15/00
Tape libraries	G11B 15/68
Driving means for disks turntables	G11B 19/20
Tape cartridges	G11B 23/04, G11B 23/087
Hard disk drives	G11B 25/043
Chassis of disk drives	G11B 33/02
Vibration damping means	G11B 33/08

Electrical connections	G11B 33/12
Preventing/reducing contamination of the disk drive	G11B 33/14
Transport devices	B65G

Informative references

Attention is drawn to the following places, which may be of interest for search:

Constructional details of computers	G06F 1/16, G06F 1/18, G06F 1/20
Transport of card shaped record carriers	G06K 13/00, G06K 17/00
Adhesive labels	G09F 3/00

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

Disk tray	Disk drawer, caddy, pallet, receiver
Disks magazine	Storage means, stowage means, stocker
Disk accessor	Picker, gripper, take out, hand, transport unit, carriage, shuttle

G11B 19/00

Driving, starting, stopping record carriers not specifically of filamentary or web form, or of supports therefor; Control thereof; Control of operating function {; Driving both disc and head}

Definition statement

This place covers:

Any aspect of control regarding recording and reproducing devices which use carriers moving with respect to the transducer but which are not of filamentary (wire) or web (tape) form. This includes disks and drums, but is predominantly to do with disks.

Any form of control whether externally generated (e.g. user control, external shock) or internally (e.g. a response generated by the sensing of a feature of the record carrier).

Driving, starting and stopping such carriers, including details of control systems used for starting, stopping or altering the speed of motion of the carrier and details of the electromechanical arrangements used in driving, starting, speed-changing and stopping.

Relationships with other classification places

G11B 19/2009 and G11B 19/2036 are used to classify spindle motors for disk drives. Electric motors in general are also classified in H02K (Dynamo-electric machines), but only those specifically mentioned as having applications in disk drives are classified in G11B 19/2009 or G11B 19/2036.

G11B 19/2036 is used specifically for the classification of spindle motors characterised by having fluid-dynamic bearings. Such bearings per se are also classified in F16C 17/00, but only those specifically mentioned as having applications in disk drives are classified in G11B 19/2036.

G11B 19/20 is used to classify any other spindle motor arrangements (e.g. for drums).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Signal processing	G11B 20/00
Editing, Indexing, Addressing	G11B 27/00

Special rules of classification

Control of operating function (G11B 19/02 and subgroups) should not be confused with speed control (G11B 19/20 and subgroups).

The development of battery-powered portable media devices using moving media has led to a number of applications regarding power-saving arrangements and methods. These are considered to have a control aspect, but not of operating function as such. They are generally classified in G11B 19/00.

An exception to this is methods and arrangements for powering down or reducing the speed of the spindle motor in order to save power during idle time, which aspects are classified in G11B 19/2072.

Any other control aspects which do not fall under G11B 19/02 or G11B 19/20 should be classified in G11B 19/00.

Most sub-groups of G11B 19/00 have definitions which are self-explanatory, but exceptions are shown below.

The definition of the G11B 19/04 sub-group according to the IPC is so general that it could cover almost any problem or error experienced while using a recording and reproducing device. It explicitly does NOT cover the following, however:

Data error detection and correction: this is to be found in G11B 20/18 and sub-groups.

Defect management i.e. the detection and management of bad sectors and reallocation of data to good sectors: this is to be found in G11B 27/00.

The sub-groups of G11B 19/04 are self-explanatory and cover the majority of problems often encountered. Other problems not explicitly mentioned are classified in G11B 19/04 itself.

G11B 20/00

Signal processing not specific to the method of recording or reproducing; Circuits therefor

Definition statement

This place covers:

any kind of signal processing which is performed when reading data from or recording data to record carriers. This signal processing specifically includes analogue and digital filtering, equalisation, carrier and symbol synchronization (adjustment of read/write clocks), and the corresponding ways of assessing and improving the quality of the recorded/reproduced signal. Modulation and demodulation techniques (i.e. the actual codes and the stochastical methods for recovering the bit sequences that are reproduced from a record carrier), in the context of recording and reproducing. Techniques of applying error correcting codes in recording / reproducing devices, and likewise how interleaving techniques can be used to mitigate the effects of local burst errors. Techniques for actually detecting media errors (e.g. bad sectors), or data structures and algorithms for coping with these errors, e.g. by relocating data from defective sectors to non-defective spare sectors. The sub-group G11B 20/12 also covers the actual format of the record carriers (in the sense of how different kinds of data are arranged on the medium, e.g. documents which describe dedicated areas for storing specific kinds of user or

control data, or documents which relate to the data structure of individual sectors). G11B 20/00086 is a prominent sub-group, which comprises documents about all sorts of copy protection and digital rights management for record carriers. Since recent copy protection initiatives address the copyright protection issue with techniques which apply likewise to all kinds of different storage media, this sub-group nowadays also includes copyright protection for record carriers which do not necessarily involve any physical movement between a head and the medium.

Relationships with other classification places

- The scope of this group is in principle restricted to record carriers that involve some relative movement between the record carrier and a transducer, i.e. record carriers that are fed forward or spinned (grammophone/vinyl records: G11B 3/00; magnetic tapes/discs: G11B 5/00; optical cards/ tapes/discs: G11B 7/00). Recording processes that do not involve any physical movement (i.e. semiconductor memories, G11C) were not considered under G11B in the past. This has changed to some extent, since various techniques (in particular: copy protection / DRM schemes, see G11B 20/00086) equally apply to both kinds of record carriers. Historically, there was also a strict separation from anything related to computer I/O (G06F 3/00). To some extent, this separation is about to diminish as well.
- The subject-matter classified in G11B 20/00 is conceptually tied to, on the one hand, the technology classified in G11B 5/00 and G11B 7/00, and on the other hand, the one classified in G11B 27/00. G11B 5/00 and G11B 7/00 define physical properties of magnetic and optical recording media, respectively, and the physical structure and the physical operation of different components in the corresponding drives. They also do involve some basic signal processing to the extent that certain signals need to be measured and evaluated in order to adjust the physical properties of the magnetic or optical heads (e.g., for optimising the power of the laser, or for choosing the appropriate write strategy). However, if some more elaborate signal processing is involved to improve the signal quality, or if formatting aspects are discussed which go beyond the mere physical structure of the medium, it would fall within the scope of G11B 20/00.
- The group G11B 27/00 covers more high-level aspects, in the sense that it relates to data processing (e.g., editing) or data structures (e.g., tables of contents) which are independent of the specific signal processing that takes place right before writing data to or reading data from a medium (modulation, error correction, etc).
- The sub-group H04N 5/76 deals with video recording, which covers as opposed to G11B 20/00, data processing techniques, which are specifically adapted to video signals and which are independent of the low-level processing required for actually writing the data on the record carrier, Sub-group H04N 5/76 also covers aspects not specific to how the data actually appear on the medium. In particular, copy protection strategies for protecting broadcast video signals when recording them may be classified in H04N 5/913, but also in G11B 20/00086 if they are specific to the medium used, or if they have applications beyond the limited context of a PVR or a STB.
- The sub-group G06F 21/10 is used for general DRM concepts that are fully independent of the actual recording medium used. If the copy protection involves features of a storage medium, then it would be classified in G11B 20/00086.
- The sub-group G06F 21/80 covers computer-related access protection for magnetic and optical storage media. If this access protection is part of a copy-protection scheme, e.g., for A/V data, then it should be classified in G11B 20/00086 instead.

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Computer storage devices which use signal processing when accessing a record carrier, but the main focus is on the processing needed for the I/O interface rather than on some specific processing tailored to the recording medium	G06F 3/06

Computer storage devices in which each record medium is protected by common error correction codes, as found in G11B 20/18, but the main focus is on aspects that are specific to the application in computer systems (e.g., redundant hardware, such as RAID systems)	G06F 11/10
PVRs, STBs, which record broadcast data streams on a record carrier, wherein the recorder makes use of signal processing technology generally covered in G11B 20/00, but the main focus is either on a very specific signal processing that is especially adapted to TV signals and or on the broadcasting / transmission aspects	H04N 5/76

Special rules of classification

The main group G11B 20/00 is not used for classification. Documents are classified in its subgroups instead.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Linear replacement	defect management by relocating the data of defective sectors to a separate spare area
Slipping algorithm	defect management by shifting the beginning of the user area, at the expense of the primary spare area, so as to compensate for defective sectors listed in the PDL. Each defective sector will be replaced by the first good sector following the defective sector.
Skip replacement	defective sectors are skipped; data recording continues at a subsequent good sector
Pre-pit	pre-recorded address pattern on a recordable optical disc
Wobble	radially oscillating pattern of the recording track of an optical disc

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

(d,k) constraint	constraint on the minimum and maximum runlength between two transitions of a NRZI modulated signal
17PP	Parity Preserving RLL(1,7) code, the modulation code used for Blu-Ray discs
AAC	Advanced Audio Coding, lossy compression scheme for audio data, standardised in MPEG-2 and MPEG-4
AACS	Advanced Access Content System, copy protection scheme used on Blu-Ray discs, HD-DVDs, etc.
ADC	Analog to Digital Converter
ADIP	Address In Pregroove, address data modulated onto the wobble frequency of an optical disc, used e.g. on a DVD+R
AES	Advanced Encryption Standard, also called Rijndael, designed to supersede DES, published as FIPS 197
AGC	Adaptive Gain Control, Automatic Gain Control
AIT	Advanced Intelligent Tape, standard for magnetic tape recording
AKE	Authentication and Key Exchange

ATIP	Absolute Time In Pregroove, CD-R/RW term for control information which is retrievable from a wobbled pre-groove, see also ADIP
ATRAC	Adaptive Transform Acoustic Coding, lossy compression scheme for audio data
AV	Audio/Video
AWGN	Additive White Gaussian Noise
BCA	Burst Cutting Area, barcode pattern appearing as radial stripes at the inner rim of an optical disc
BCH code	Bose Chaudhuri Hocquenghem code, a specific class of error-correcting block codes
BD	Blu-ray Disc
BD-J	Blu-Ray Disc Java, a specific variant of the Java programming language which is implemented in BD players
BPSK	Binary Phase Shift Keying
BSC	Binary Symmetric Channel
C2	Cryptomeria Cipher, Feistel network-based block cipher
CBC	Cipher Block Chaining, encryption mode in which each block of a message is XORed with the encrypted previous block before being encrypted
CBHD	China Blue High Definition disc, competes with the BD format
CCI	Copy Control Information, two bits indicating Copy Free, Copy No More, Copy Once, or Copy Never
CD	Compact Disc
CE	Consumer Electronics, typically standalone devices designed specifically for processing audio/video data, unlike a general-purpose computer
CGMS	Copy Generation Management System, similar to CCI
CIRC	Cross-interleaved Reed Salomon code, the ECC used on CDs
CPPM	4C Content Protection for Prerecorded Media
CPRM	4C Content Protection for Recordable Media
CPSA	5C Content Protection System Architecture
CPU	Central Processing Unit
CRC	Cyclic Redundancy Check, a specific EDC
CSS	Content Scrambling System, copy protection scheme used on prerecorded DVDs
D	usually, the unit delay operator
DA	Data Area
DAC	Digital to Analog Converter
DAT	Digital Audio Tape
DC	Direct Current, Bias, Offset
DCT	Discrete Cosine Transform
DDS	Disc Definition Structure, control structure recorded, e.g., in the DMA of a DVD-RAM; also : Digital Data Storage

DES	Data Encryption Standard, published as FIPS 46
DFE	Decision Feedback Equaliser
DFT	Discrete Fourier Transform
DLT	Digital Linear Tape, standard for magnetic tape recording
DM	Delta Modulation
DMA	Defect Management Area, sometimes also: Defect Managed Area; also: Direct Memory Access
DMCA	Digital Millennium Copyright Act
DPCM	Differential PCM
DPSK	Differential Phase Shift Keying
DRM	Digital Rights Management
DSA	Digital Signature Algorithm, published as FIPS-186
DSP	Digital Signal Processor
DSV	Digital Sum Variation, the difference between the minimum and maximum RDS; DSV may also denote the Digital Sum Value, which is a synonym of the RDS
DTCP	5C Digital Transmission Content Protection
DVD	Digital Versatile Disc, Digital Video Disc
DVR	Digital Video Recorder, usually used as a synonym of PVR
E2PR	see EEPR
ECB	Electronic Codebook, encryption mode in which each block of a message is encrypted separately
ECC	Error Correcting Code, code used for repairing a bit sequence that was altered by the transmission channel
EDC	Error Detecting Code, provides enough redundancy for detecting errors, but not necessarily for correcting them
EEPR	PR channel with transfer function (1-D)(1+D)^3
EFM	Eight-to-Fourteen Modulation, the modulation code used for CDs, transforms 8 input bits into 14-bit codewords
EFM+	Eight-to-Sixteen Modulation, the modulation code used for DVDs, transforms 8 input bits into 16-bit codewords
EKB	Enabling Key Block, data structure on a recording medium which authorises devices to process encrypted content
EPR4	PR channel with transfer function (1-D)(1+D)^2
FE	Frequency Encoding, frequency modulation
FEC	Forward Error Correction, error correction without a return channel, no retransmission of data
FFT	Fast Fourier Transform
FIR	Finite Impulse Response
FM	Frequency Modulation, frequency encoding
FSK	Frequency Shift Keying
HD	High Density; also: High Definition
HDCP	High Bandwidth Digital Content Protection

HDD	Hard-Disk Drive
ID	Identifier, unique number, such as a serial number
IF	Intermediate Frequency
IID	Independently and Identically Distributed
ISCR	International Standard Recording Code, globally unique identifier for sound recordings and music videos
ISI	Inter-Symbol Interference
KEK	Key Encrypting Key, a cryptographic key used for encrypting another key
LBN	Logical Block Number
LDPC code	Low Density Parity Check code, also known as Gallager codes
LFSR	Linear Feedback Shift Register
LIA	Lead-In Area, area near the inner rim of an optical disc
LMS	Least Mean Squares
LOA	Lead-Out Area, area near the outer rim of an optical disc
LPP	Land Pre-Pit, prerecorded address information on, e.g., a DVD-R
LSN	Logical Sector Number
LTO	Linear Tape Open, also marketed as Ultrium, standard for magnetic tape recording
MAC	Message Authentication Code; also : Medium Access Control
MAP	Maximum A-Posteriori
MD	Mini Disk
MD5	Message Digest Algorithm 5, cryptographic hash algorithm
MFM	Modified Frequency Modulation, Delay Modulation, Miller Code
MKB	Media Key Block
ML	Maximum Likelihood
MMC	Multi-Media Command, command specifically designed for accessing multimedia data on a recording medium
MMSE	Minimum Mean Squared Error, a general paradigm for setting up the objective function in the context of parameter optimisation
MO	Magneto-Optical
MP3	MPEG-1 Layer 3, lossy data compression for audio data
MPEG	Moving Picture Experts Group
MRW	Mount Rainier, specific format for rewritable optical discs
MSE	Mean Square Error
NA	Numerical Aperture; also: Not Applicable (N/A)
NRZ	Non Return to Zero
NRZI	Non Return to Zero Inverted
OPC	Optimum Power Calibration, adjusting the laser power of an optical write head

OTP	Opposite Track Path, recording on a multi-layer disc alternates between radially outwards on one layer and radially inwards on the following layer
PAM	Pulse Amplitude Modulation
PBN	Physical Block Number
PC	Personal Computer
PCA	Power Calibration Area, specific area used for OPC
PCM	Pulse Coded Modulation
PDL	Primary Defect List, lists defective sectors found at formatting a disc
PE	Phase Encoding, phase modulation
PI	Parity Inner, parity bits of the inner code of a product code
PIC zone	Permanent Information and Control Data zone, prerecorded area of a Blu-Ray disc
PLL	Phase Locked Loop
PM	Phase Modulation, phase encoding
PO	Parity Outer, parity bits of the outer code of a product code
PR	Partial Response; a PR(a,b,c) channel maps binary samples x,y,z to a*x*D+b*y*D^2+c*z*D^3
PR4	Class 4 Partial Response channel, PR channel with transfer function (1-D^2)
PRML	Partial Response Maximum Likelihood
PSK	Phase Shift Keying
PSN	Physical Sector Number
PTP	Parallel Track Path, on all layers of a multi-layer disc, recording proceeds from the inner to the outer diameter
PVR	Personal Video Recorder, usually used as a synonym of DVR
QAM	Quadrature Amplitude Modulation
QPSK	Quadrature Phase Shift Keying
RAM	Random Access Memory, rewritable storage
RC4	a specific cryptographic stream cipher ("Rivest Cipher 4")
RDS	Running Digital Sum; see also DSV
RF	Radio Frequency
RLL	Run Length Limited
RLS	Recursive Least Squares
RS code	Reed-Solomon code
RSA	public-key encryption algorithm developed by Rivest, Shamir and Adleman
SA	Spare Area, replacement area, area on a recording medium used for replacing defective sectors
SAC	Secure Authenticated Channel
SACD	Super Audio CD

SAIT	Super AIT, variant of AIT having a higher capacity,
SDL	Secondary Defect List, lists defective sectors found when trying to record data on a disc
SDM	Sigma-Delta Modulation
SDMI	Secure Digital Music Initiative
SHA	Secure Hash Algorithm, cryptographic one-way function published as FIPS 180
SNR	Signal to Noise Ratio
STB	Set-Top Box
TCM	Trellis Coded Modulation
TDL	Tapped Delay Line
TOC	Table Of Contents
VCO	Voltage Controlled Oscillator
VCPS	Video Content Protection System, DRM standard for DVD+R and DVD+RW
VCR	Video Cassette Recorder
VFO	Variable Frequency Oscillator
WO	Write Once, not rewritable
WORM	Write Once Read Many, not rewritable
XOR	exclusive OR
ZF	Zero Forcing, zero forcing equalisers multiply the read signal with the reciprocal of the transfer function of the recording channel

G11B 20/00007

{Time or data compression or expansion (audio compression based on psychoacoustics G10L 19/00; data processing for reproducing audio data at different playback speeds G10L 21/04; video compression H04N 19/00; data compression per se H03M 7/30)}

Definition statement

This place covers:

Data compression in the context of recording, both for A/V signals (ATRAC, MP3 etc) and for digital signals in general, e.g. subband coding, transform coding. Also analogue compression, e.g. "time compression/expansion" by altering the density at which the data are recorded, e.g. on an analog tape).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Image compression	G06T 9/00
Lossy or lossless audio compression, e.g. MP3 encoding, speech encoding etc., streaming, transcoding	G10L 19/00
Time compression for audio data, e.g. by increasing the pitch	G10L 21/04

Theory of data compression	H03M 7/30
Data compression in computer networks	H04L 69/04
Video compression for transmission purposes	H04N 19/00

G11B 20/00086

{Circuits for prevention of unauthorised reproduction or copying, e.g. piracy (indicating unauthorised use of record carriers in general G11B 23/28; scrambling for television signal recording H04N 5/913; network architectures or network protocols for network security H04L 63/00; cryptographic mechanisms or cryptographic arrangements for secret or secure communication H04L 9/00)}

Definition statement

This place covers:

Copy protection for record carriers; preventing unauthorised access to recorded data; providing means for recognising unauthorised use of data or for distinguishing between authorised and illicit copies; tracing back users, recording devices, or media manufacturers; encryption, decryption, and scrambling algorithms; distributing, updating or revoking encryption keys; secure content acquisition and transmission for recording contents on record carriers; limiting access to a content to certain conditions (certain duration, geographical region, restricted set of users or devices, restricted number of copies, reduced quality). For both digital and analog recording.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Labels, i.e. visible patterns, formed on an optical disc, e.g. by modifying the pit width or the groove width	G11B 2007/00727
Optical discs having specific layers or comprising specific materials which limit the time the disc can be played back	G11B 7/24
Testing for media defects	G11B 20/1816
Record carrier with additional integrated circuitry, such as transponder tags	G11B 23/0042
Physical arrangements for indicating or preventing unauthorised use of record carriers, e.g. cassettes which can be locked mechanically etc.	G11B 23/28
Time limited playback by modifying physical properties of the record carrier	G11B 23/282
Digital codes on the record carrier	G11B 23/284
Cryptography for protecting computer memory devices	G06F 12/1408
Digital rights management and copyright protection in a more general context, commonly with computers accessing the data, not necessarily bound to the features of specific record carriers	G06F 21/10
Software watermarking	G06F 21/16
Mutual authentication	G06F 21/445
Testing the integrity of files, message authentication	G06F 21/50
Secure communication between devices or processes, see also H04L 9/00	G06F 21/60

Security arrangements for protecting various kinds of record carriers	G06F 21/78
Mutual authentication	G06F 2211/003
Public key encryption	G06F 2211/008
Record carriers with integrated chips in general	G06K 19/07
Record carriers comprising integrated circuitry, e.g. CDs with transponder tags	G06K 19/07
Transponder cards	G06K 19/0723
Record carriers with active circuitry for preventing them to be read out	G06K 19/07336
Record carriers with built-in fingerprint detectors or other biometrical devices	G06K 19/07354
Record carriers with RFID tag	G06K 19/14
Data processing for e-commerce	G06Q 30/06
Image watermarking	G06T 1/0021
A/V downloading, e.g. buying MP3 files on the web	G07F 17/16
Audio watermarking	G10L 19/018
Secret or secure communication in general	H04L 9/00
Distributing encryption keys	H04L 9/08
User or message authentication, digital signatures	H04L 9/32
Protocols for digital signatures, certificates	H04L 9/3247
Public key certificates	H04L 9/3263
Content encryption in computer networks	H04L 63/0428
Protocols for symmetric cryptography	H04L 63/0435
Protocols for asymmetric cryptography	H04L 63/0442
Protocols for key distribution	H04L 63/06
Hierarchical key distribution	H04L 63/064
Network protocols for multimedia communication, e.g., home networks, authorised domains, also: downloading music etc.	H04L 65/1101
Secure data transmission over networks	H04L 67/00
Copy protection for picture information; security feature of banknotes	H04N 1/00838
Image watermarking	H04N 1/32144
Copy protection, e.g. scrambling, for TV signal recording	H04N 5/913
Inserting a copy protection signal in the vertical blanking interval	H04N 2005/91314
Inserting a record or copy inhibit flag for TV signal recording	H04N 2005/91321
Inserting a CGMS flag for TV signal recording	H04N 2005/91328
Inserting a watermark for TV signal recording	H04N 2005/91335
Inserting an authentication signal for TV signal recording	H04N 2005/91342
Scrambling for TV signal recording	H04N 2005/91364
Scrambling TV signals for transmission/broadcast	H04N 7/167
Downloading video from a server, video on demand, etc., the client actively requesting a content from the server	H04N 7/173
Video watermarking	H04N 19/467

DRM and copyright management for video signals	H04N 21/23406

Special rules of classification

Although the definition of the sub-class G11B suggests otherwise, the copy protection techniques which are classified in G11B 20/00086 are not necessarily limited to storage media which involve a relative movement between the medium and the transducer, but they relate to all sorts of physical record carriers in general.

G11B 20/00992

{Circuits for stereophonic or quadraphonic recording or reproducing}

Definition statement

This place covers:

Recording multichannel signals, e.g., stereo or quadraphonic signals, but also if more than 2 or 4 channels are involved.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Stereo or multi-channel audio processing	G10L 19/008
Earpieces for telephones	**H03R1/10**
Stereo broadcasting, AM/FM radio transmission	H04H 20/47
Audio signal processing for stereo playback	H04S 1/002
Audio processing with more than two channels, e.g., surround sound systems	H04S 3/00
Pseudo-stereo systems	H04S 5/00
Electronically adapting the sound field	H04S 7/30

G11B 20/02

Analogue recording or reproducing

Definition statement

This place covers:

Analogue recording or reproducing, e.g. audio cassettes, grammophone records, laser discs etc. A further refinement of this subgroup addresses error detection and correction (G11B 20/025), direct recording or reproducing (G11B 20/04), recording and reproducing angle-modulated signals (G11B 20/06, mostly FM modulated audio signals), recording and reproducing pulse-modulated signals (e.g. FM audio in video tapes).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Recording PCM signals digitally	G11B 20/10527
Angle modulation in general	H03C 3/00

Demodulating angle modulated signals	H03D 3/00
Pulse modulation	H03K 7/00
Pulse demodulation	H03K 9/00

G11B 20/10

Digital recording or reproducing

Definition statement

This place covers:

Digital recording or reproducing. Processing pipeline of a typical recording apparatus: an A/V signal is compressed (G11B 20/00007), error correction codes are added (G11B 20/1833, G11B 20/1866), the signal is modulated (G11B 20/14), equalisers and filters improve the signal quality (G11B 20/10009), then the signal is recorded to the record carrier according to a given format (G11B 20/12).

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Magnetic recording	G11B 5/00
Optical recording; for holographic recording see also G11C 13/042	G11B 7/00
Operating tape devices, e.g. starting, stopping, altering the speed	G11B 15/00
Operating recording and playback devices for record carriers other than tapes, including user interfaces	G11B 19/00
Dictating devices, dictaphones	G11B 25/00
Editing A/V data, data formats, addressing and indexing	G11B 27/00
Radio recorders	G11B 31/003
Physical connectors for disc or phase drives, e.g., cables, USB or IDE sockets, etc.	G11B 33/122
Mountings for plural disk drives	G11B 33/128
Digital I/O for computers, e.g. hard disk controllers	G06F 3/0601
Information transfer via an I/O bus, bus controllers, interface protocols, direct memory access (DMA) architectures	G06F 13/28
Semiconductor memories	G11C
Transmission of digital information	H04L
Video recorders	H04N 5/76
Hard disk recorders	H04N 5/781
Optical video recorders	H04N 5/85
Video transmission	H04N 7/24

Special rules of classification

It is the default group for anything which cannot be classified elsewhere.

G11B 20/10009

{Improvement or modification of read or write signals}

Definition statement

This place covers:

Modifying and improving the read or write signals (i.e. removing jitter, increasing the SNR), e.g. by using equalisers and filters; anything about how to adjust the frequency and phase of the read/write clock or the bit clock of the demodulation circuit, e.g. clock adjustment with a PLL; anything related to PRML techniques (Partial Response Maximum Likelihood); A/D conversion, recovering the bit string from the analogue HF signal; maximum likelihood estimation and related techniques for recognising the correct bit sequences, e.g. using the Viterbi algorithm. Wobble detection can also be classified here if the document is linked to clocking.

References

Limiting references

This place does not cover:

Code-related aspects of clock adjustment, e.g. documents which describe specific synchronisation patterns	G11B 20/1403
Specific modulation schemes to be applied to a wobbled pre-groove	G11B 20/1419

Informative references

Attention is drawn to the following places, which may be of interest for search:

Magnetic recording, hardware aspects	G11B 5/00
Optical recording, hardware aspects	G11B 7/00
Applying suitable write strategies, i.e. giving an optical mark the desired shape by burning it as a certain sequence of write pulses	G11B 7/00456
Measuring jitter specifically on optical discs	G11B 7/005
Algorithms/circuits for keeping an optical head on the track	G11B 7/09
Optimum power calibration	G11B 7/1267
Measuring noise, SNR, jitter, phase jitter in general	G01R 29/26
A/D converters for computer interfaces	G06F 3/05
Interpolation, smoothing, least mean squares	G06F 17/17
Gain control for digital amplifiers	H03G 3/3089
Phase-locked loops	H03L 7/06
AD/DA converters in general	H03M 1/00
Calibrating AD converters in general	H03M 1/1014
DC removal for AD converters in general	H03M 1/1023
Equalisers for line transmission	H04B 3/04
Digital PLL in a transmitter-receiver setup	H04L 7/0331
DC equalisers in transmitters and receivers	H04L 25/03
Removing inter-symbol interference in such a DC equaliser	H04L 25/03006
Adaptive equalizers for transmission lines	H04L 25/03885

Modulators for data transmission	H04L 27/36

G11B 20/10194

{using predistortion during writing (G11B 20/10055 takes precedence)}

Definition statement

This place covers:

Applying pre-distortion (e.g. by modifying the timing) during writing, e.g. by modifying the signal according to the known characteristics of the read/write channel

G11B 20/10203

{baseline correction (DC correction by choosing codewords of the modulation code G11B 20/1426)}

Definition statement

This place covers:

Correcting the DC baseline of the read signal, slicing (adapting the threshold at which the signal will be recognised as a binary zero or one)

G11B 20/10212

{compensation for data shift, e.g. pulse-crowding effects}

Definition statement

This place covers:

Compensating for data shift, e.g. addressing the fact that the timing of a peak value might be affected (advanced, delayed) by inter-symbol interference (ISI)

G11B 20/10527

{Audio or video recording; Data buffering arrangements (G11B 20/12 - G11B 20/18 take precedence)}

Definition statement

This place covers:

Initially, G11B 20/10527 was supposed contain all documents about how to record PCM audio data. Nowadays it also comprises many documents about how to use intermediate memories (buffers), e.g., playback buffers for ensuring a seamless playback of a recorded video stream while reading the data intermittently in high-speed bursts, or recording buffers for making sure that even in case discontinuous data reception the recording process will not be interrupted; G11B 20/10527 will particularly be assigned if the aspect "memory" is important (e.g., addressing within the buffer, adjusting the read/write clock of the buffer, etc.). In the past (when people started recording digitised audio signals on record carriers), G11B 20/10527 was also used for documents about A/D conversion, filtering, quantisation errors, dithering, oversampling, or sampling frequency conversion; these aspects are now classified in G11B 20/10009.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Buffers for preventing read/write errors in recording/playback apparatuses, e.g., for portable devices	G11B 19/044
Data compression in the context of recording, also for audio data	G11B 20/00007
I/O interfaces for radio receivers	G11B 31/003
Buffering for I/O devices of computers, caching	G06F 3/0656
Sound input/output	G06F 3/16
Audio streaming	G10L 19/167
Audio transcoding	G10L 19/173
Audio filtering in combination with compression	G10L 19/26
Audio filtering, speech enhancement	G10L 21/00
Noise filtering for audio signals	G10L 21/0208
Audio processing for audio quality enhancement	G10L 21/0364
Audio compression	G10L 21/04
I/O buffers for semiconductor memories	G11C 7/10
Audio amplifiers	H03G 3/3005
Audio processing circuitry for TV receivers	H04N 5/60
Interfaces between A/V recorders and other devices	H04N 5/765
Interfaces to a digital video camera	H04N 5/77
Buffer level management for the transmission of digital TV signals	H04N 21/44004
Recording devices in a set-top box	H04N 21/4627
Audio signal processing for stereo playback	H04S 1/002
Digital audio processing for stereo signals	H04S 1/007
Audio processing with more than two channels, e.g., surround sound systems	H04S 3/00
Pseudo-stereo systems	H04S 5/00

G11B 20/12

Formatting, e.g. arrangement of data block or words on the record carriers {(within interface between computers and data recorders G06F 3/06)}

Definition statement

This place covers:

Formatting, e.g. arrangement of data block or words on the record carriers. General low-level structure of a record carrier (what to store where), e.g. the format of sector headers, the size of the lead-in area, etc.

Relationships with other classification places

Broadly speaking, the sub-group G11B 20/12 covers formatting aspects which are at an intermediate level between, on the one hand, those covered by G11B 27/00 and, on the other hand, those covered

by G11B 5/00 or G11B 7/00. The group G11B 27/00 relates to formatting aspects at the higher system level (e.g., formatting aspects which one would usually associate with the operating system, including specific file formats and the format of control structures such as the TOC, but also the format of playlists and data formats for organising separate A/V data streams, etc.). The groups G11B 5/00(magnetic recording media) and G11B 7/00(optical recording media) cover aspects that pertain to the physical structure of the recording medium, such as the physical arrangement of separate layers, and physical characteristics such as the chemical components of which the recording medium is made, the shape of the media, etc.

References

Limiting references

This place does not cover:

Documents related to defect management	G11B 20/18
File format conversion	G06F 16/1794
File format or the syntax of recorded video streams	H04N 7/24

Informative references

Attention is drawn to the following places, which may be of interest for search:

Wobble format of optical discs	G11B 7/0053
Optical aspects of the Burst Cutting Area, BCA, lead-in, lead-out, Power Calibration Area	G11B 7/00736
Physical structure of optical media with multiple layers	G11B 7/2403
Detecting the data format of a data carrier	G11B 19/125
Formatting aspects related to defect management, e.g., documents defining the structure of DMAs, TDDS, SDLs, PDLs, etc.	G11B 20/18
High-level formatting, e.g. file formats, formatting aspects particular to the operating system, file indices such as a TOC	G11B 27/00
Formatting aspects of computers exchanging data with disk drives	G06F 3/0661
Record carriers having barcodes	G06K 19/06028

Special rules of classification

Usually, if a document defines formatting aspects related to defect management, e.g. structure of DMAs, TDDS, SDLs, PDLs, etc., then this document should be classified in G11B 20/18; if a document defines the location of such a structure on the medium (e.g. DMA1 and DMA2 being radially opposed), it should be classified in both G11B 20/12 and G11B 20/18.

G11B 20/1201

{on tapes}

Definition statement

This place covers:

Formatting aspects of tape storage devices; a distinction is made between tapes with longitudinal tracks, G11B 20/1202, transverse tracks, G11B 20/1207, and combinations of both, G11B 20/1211; if applicable, a further distinction can be made between tapes which are specifically designed for storing A/V data (G11B 20/1204) and those designed for storing computer data (G11B 20/1205).

G11B 20/1215

{on cards (optical aspect of optical cards G11B 7/0033)}

Definition statement

This place covers:

Formatting aspects record media if the form factor is a card.

References

Limiting references

This place does not cover:

Optical aspects of optical cards	G11B 7/0033

G11B 20/1217

{on discs}

Definition statement

This place covers:

Formatting aspects of magnetic or optical disks; this is where most documents in G11B 20/12 are currently being classified; a distinction can be made between recording A/V data, G11B 20/1251, recording computer or control/management data, G11B 20/1252, and recording mixtures of both, G11B 20/1254: of some relevance is G11B 20/1258, disks having a structure defined by multiple radial zones, e.g. zone constant angular velocity discs, ZCAV.

Special rules of classification

This sub-group comes with various complementing Indexing Codes, which are not mirrored by respective ECLA symbols, see in particular G11B 2220/2545 + for various CD formats, G11B 2020/1257 for the count key data format, G06F 3/04815 for the floppy disk formats, and G11B 2020/1259 for hybrid discs having a ROM and a RAM area.

G11B 2020/1222

{ECC block, i.e. a block of error correction encoded symbols which includes all parity data needed for decoding}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Error detection or correction of digital recording or reproducing; Testing	G11B 20/18

G11B 20/1261

{on films, e.g. for optical moving-picture soundtracks (optical aspect G11B 7/0032)}

Definition statement

This place covers:

Formatting aspect of films, i.e. transparent record carriers which are primarily meant for recording photographic frames and accompanying audio or control data.

References

Limiting references

This place does not cover:

Formatting aspects of how to record movies on digital tapes or different kinds of disks	G11B 20/1201 , G11B 20/1217

G11B 20/1262

{with more than one format/standard, e.g. conversion from CD-audio format to R-DAT format}

Definition statement

This place covers:

Record carriers involving more than one format/standard, e.g. conversion from CD-audio format to R-DAT format, disks having a CD and a DVD layer, discs storing normal PCM signal and additional MP3 tracks, etc.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Optical aspects of how to record the same data in two different forms of an optical record carrier	G11B 7/14

G11B 2020/1287

{Synchronisation pattern, e.g. VCO fields}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Digital recording or reproducing using self-clocking codes characterised by the use of two levels	G11B 20/1403
Timing or synchronising; Measuring tape travel	G11B 27/00

G11B 20/14

using self-clocking codes

Definition statement

This place covers:

In the strict sense, self-clocking codes for digital recording. Today virtually all codes are self-clocking, however, current record carriers do not have a separate track for bit clock synchronisation. G11B 20/14 hence encompasses all kinds of modulation codes (e.g., the EFM code used on audio CDs).

Relationships with other classification places

This group covers different coding schemes in the context of recording and reproducing apparatuses. Documents which discuss theoretical aspects of these coding schemes in general, without any reference to an application in recording / reproduction context, will commonly be classified in subgroups of H03M 5/00 instead.

References

Limiting references

This place does not cover:

Error correcting codes, error detecting codes in the context of recording and reproducing systems	G11B 20/1833
Theory of error correcting codes, error correcting codes per se	H03M 13/00

G11B 20/1403

{characterised by the use of two levels}

Definition statement

This place covers:

Although originally being meant to comprise binary modulation codes in general, this sub-group is now mainly used for documents about synchronisation patterns for bit clock recovery.

References

Limiting references

This place does not cover:

Synchronisation of separate data streams, e.g. audio and video channels	G11B 27/10
Synchronisation patterns for stream synchronisation	G11B 27/3027
Theory of binary codes in general, not in the specific context of record carriers	H03M 5/04

Informative references

Attention is drawn to the following places, which may be of interest for search:

Sync patterns specifically for the servo patterns of hard disks	G11B 5/59688
Certain old documents about sync patterns in general	G11B 27/3027

G11B 20/1407

{code representation depending on a single bit, i.e. where a one is always represented by a first code symbol while a zero is always represented by a second code symbol}

Definition statement

This place covers:

Bit-by-bit coding, binary codes having one symbol representing a zero and another symbol representing a one, no interdependence between subsequent information bits.

References

Limiting references

This place does not cover:

Theory of bit-by-bit coding in general, not in the specific context of record carriers	H03M 5/06

G11B 20/1411

{conversion to or from pulse width coding}

Definition statement

This place covers:

Pulse width modulation. A signal to be recorded is encoded by varying the pulse width of a square wave at a constant frequency. Examples: delta modulation, sigma-delta modulation.

References

Limiting references

This place does not cover:

Sigma-delta encoded audio signals	G11B 20/10527
Theory of pulse width modulation in general, not in the specific context of record carriers	H03M 5/08

G11B 20/1415

{conversion to or from pulse frequency coding}

Definition statement

This place covers:

Pulse frequency modulation, information encoded by altering the repetition rate of the pulses, every pulse having the same fixed length. As pulse width modulation, this modulation scheme alters the duty cycle of the square wave.

References

Limiting references

This place does not cover:

Theory of pulse frequency modulation in general, not in the specific context of record carriers	H03M 5/10

G11B 20/1419

{to or from biphase level coding, i.e. to or from codes where a one is coded as a transition from a high to a low level during the middle of a bit cell and a zero is encoded as a transition from a low to a high level during the middle of a bit cell or vice versa, e.g. split phase code, Manchester code conversion to or from biphase space or mark coding, i.e. to or from codes where there is a transition at the beginning of every bit cell and a one has no second transition and a zero has a second transition one half of a bit period later or vice versa, e.g. double frequency code, FM code}

Definition statement

This place covers:

E.g. binary phase modulation (Manchester codes); also phase or frequency modulation of wobbles. G11B 20/1419 generally relates to codes where a one is coded as a transition from a high to a low level during the middle of a bit cell and a zero is encoded as a transition from a low to a high level during the middle of a bit cell or vice versa, e.g. split phase code, Manchester code conversion to or from biphase space or mark coding, i.e. to or from codes where there is a transition at the beginning of every bit cell and a one has no second transition and a zero has a second transition one half of a bit period later or vice versa, e.g. double frequency code, FM code. Biphase level codes in general: H03M 5/12.

References

Limiting references

This place does not cover:

Theory of biphase level codes in general, not in the specific context of record carriers	H03M 5/12

G11B 20/1423

{Code representation depending on subsequent bits, e.g. delay modulation, double density code, Miller code}

Definition statement

This place covers:

Basic coding schemes wherein the input bits are not coded independently of each other, but their code representation depends on subsequent bits, e.g. delay modulation, double density code, Miller code.

G11B 20/1426

{conversion to or from block codes or representations thereof}

Definition statement

This place covers:

Binary block codes. This very prominent subgroup also includes run-length limited (RLL) codes and various kinds of DSV optimised codes, e.g. the Modified Frequency Modulation (MFM) used on floppy discs, the EFM and EFM+ codes used on CDs and DVDs, or the 17PP code used on Blu-Ray discs.

References

Limiting references

This place does not cover:

Theory of block codes in general, not in the specific context of record carriers	H03M 5/145

G11B 20/1488

{characterised by the use of three levels}

Definition statement

This place covers:

Ternary codes, i.e. modulation codes wherein the code may contain three different symbols which are commonly represented by three discrete signal levels.

References

Limiting references

This place does not cover:

Partial response signals exhibiting three possible signal levels	G11B 20/10009
Theory of ternary codes in general, not in the specific context of record carriers	H03M 5/16

G11B 20/1492

{two levels are symmetric, in respect of the sign to the third level which is "zero"}

Definition statement

This place covers:

Termary codes wherein the possible signal levels are -a, 0, and a.

G11B 20/1496

{characterised by the use of more than three levels}

Definition statement

This place covers:

n-ary digital modulation codes with n=4 and above, e.g. quaternary modulation codes (4 possible signal levels, i.e. each symbol can per se convey two bits).

References

Limiting references

This place does not cover:

Partial response signals with n>3 signal values	G11B 20/10009
Theory of n-ary codes, n>3, in general, not in the specific context of record carriers	H03M 5/20

G11B 20/16

using non self-clocking codes, i.e. the clock signals are either recorded in a separate clocking track or in a combination of several information tracks

Definition statement

This place covers:

Non self-clocking codes, i.e. the clock signals are not derivable from the modulated data sequence itself (which is the case for any modern RLL code) but instead they are either recorded in a separate clocking track or in a combination of several information tracks.

G11B 20/18

Error detection or correction; Testing {, e.g. of drop-outs}

Definition statement

This place covers:

Detecting and correcting errors, e.g. erroneous bits or sectors; testing the medium for defects. This sub-group covers, e.g., the detection of bad sectors, strategies for replacing these sectors by other sectors, the application of various kinds of error correction codes and error detection codes so as to reliably recover the recorded bit sequence, the usage of interleaving schemes for spreading the effect of local defects, the actual detection of such defects by verification and certification processes, the idea of mitigating the effects of a local defect by data interpolation, and the documentation of defects by maintaining different kinds of defect lists.

References

Limiting references

This place does not cover:

Defect management by using redundant hardware (e.g. RAID systems per se)	G06F 11/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Testing the correct function of read/write heads for magnetic disk drives	G11B 5/455
Detecting defects on optical discs	G11B 7/00375
Read-after-write verification for optical discs	G11B 7/00458
Protection against errors caused by vibration or physical shock	G11B 19/042
Protection against errors caused by free fall	G11B 19/043
Protection against power failures in recording/playback apparatuses	G11B 19/047
Testing disk drives	G11B 19/048
Controlling recording/reproduction using identification or authentication marks	G11B 19/12
Finding physical defects on optical discs by optical inspection	G01N 21/9506
Testing digital circuits	G01R 31/317
Detecting and correcting errors in computer systems, e.g., repairing inconsistencies / bad sectors on file system level, without the use of error correcting codes	G06F 11/07
Error correcting codes for computers	G06F 11/08
Computers performing error processing by retrying	G06F 11/1402
Backup and data recovery, possibly by mirroring	G06F 11/1402
Error correction at file system level	G06F 11/1435
Computers recovering from power failure	G06F 11/1441
RAID systems	G06F 11/2087
Testing and diagnosis of idle hardware	G06F 11/22
Verifying the correctness of markings on a record carrier	G06K 5/00
Testing while recording	G06K 5/02
Verifying the correct alignment of markings	G06K 5/04
Testing digital memory circuits for defects / correct operation	G11C 29/00
Theory of error correcting codes	H03M 13/00
Monitoring audio equipment, e.g. loudspeakers or microphones	H04R 29/00

G11B 20/1803

{by redundancy in data representation}

Definition statement

This place covers:

Obtaining additional robustness by simple redundancy, i.e. by recording the same data multiple times at different locations.

References

Limiting references

This place does not cover:

Redundancy generating ECC schemes that are more advanced than such a simple repetition code	G11B 20/1833

G11B 20/1806

{Pulse code modulation systems for audio signals (G11B 20/1803 takes precedence)}

Definition statement

This place covers:

Approaches particularly designed for audio signals (G11B 20/1809: purely by interleaving, i.e. for mitigating the perceptual effect of a burst error; G11B 20/1813: by error correcting codes involving parity symbols).

G11B 20/1816

{Testing}

Definition statement

This place covers:

Testing the medium, recognising bad sectors, determining whether the medium is actually usable. If such tests take place during the recording/playback operation, see also G11B 27/36 (monitoring). If the test involves recording a particular test pattern, the document will be classified in G11B 20/182.

G11B 20/1833

{by adding special lists or symbols to the coded information (G11B 20/1806, G11B 20/1866 take precedence)}

Definition statement

This place covers:

Any error-correcting code (ECC) or Error-Detecting Code (EDC) used on record carriers.

References

Limiting references

This place does not cover:

ECC in the specific context of dedicated computer hardware	G06F 11/00
Theory of ECC, not in the specific context of record carriers	**H03M3/13**

G11B 20/1866

{by interleaving (G11B 20/1809 takes precedence)}

Definition statement

This place covers:

Any interleaving used for mitigating the effects of read/write errors, also if being combined with additional parity symbols.

Special rules of classification

ECC schemes, which also use an interleaver (e.g., LDPC and turbo codes) must also be classified in G11B 20/1833 or H03M 13/00

G11B 20/1876

{Interpolating methods}

Definition statement

This place covers:

Interpolation, missing or defective information is recovered by estimating the correct data values based on adjacent data items.

G11B 20/1879

{Direct read-after-write methods}

Definition statement

This place covers:

Read-after-write methods. During a normal recording operation, a data item is read from the medium for immediate verification that it has been recorded correctly.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Optical / physical aspects of read-after-write methods when applied to optical discs	G11B 7/00458

G11B 20/1883

{Methods for assignment of alternate areas for defective areas}

Definition statement

This place covers:

In case of defective areas (e.g., bad sectors), relocating the data that was supposed to be recorded to the defective area to another area. This other area can be part of a dedicated spare area (linear replacement), or it can be a sector following the defective sector (skip replacement). Subgroups for applying this principle to tapes (G11B 20/1886) and discs (G11B 20/1889).

G11B 20/20

for correction of skew for multitrack recording

Definition statement

This place covers:

Correcting skew for multitrack recording, mainly in the context of magnetic tapes.

G11B 20/22

for reducing distortions

Definition statement

This place covers:

Strategies for reducing distortions, i.e. occasionally occurring degradations of the signal quality.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Reducing noise or correcting distortions on record carriers	G11B 23/0007

Special rules of classification

This subgroup is obsolete. New documents about signal quality enhancement must also be classified in G11B 20/10009.

G11B 20/24

for reducing noise {(control of amplification in general, e.g. dependent upon noise level H03G)}

Definition statement

This place covers:

Strategies for reducing noise, i.e. systematically occuring degradations of the signal quality.

Obsolete technology

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Reducing noise or correcting distortions on record carriers	G11B 23/0007
Noise filtering for audio signals	G10L 21/0208

Special rules of classification

This subgroup is obsolete. New documents about noise removal must also be classified in G11B 20/10009.

G11B 21/00

Head arrangements not specific to the method of recording or reproducing

Definition statement

This place covers:

Any details of head arrangements for any type of moving record carrier which are not already covered by subgroups specific to a particular method of recording.

G11B 21/00 has two main areas: Driving and Moving (G11B 21/02) and Supporting (G11B 21/16).

Relationships with other classification places

G11B 21/02 and subgroups have parallel structures in G11B 5/54 - G11B 5/58 and their subgroups and these should be used for details regarding magnetic recording.

G11B 21/02 and subgroups have parallel structures in G11B 7/085 and G11B 7/09 and subgroups and these should be used for details regarding optical recording.

Most other areas (G11B 3/00, G11B 9/00, G11B 11/00, G11B 13/00) also have their own structures which deal with the aspects covered in general by G11B 21/00, which are often very specific to the technology in use (e.g. Scanning Tunnelling Microscopy). These aspects should not be classified in G11B 21/00.

Special rules of classification

In practice, most of the details of heads are specific to the recording method and should be classified in those subgroups, unless there is no suitable place for them.

NB: the above practice has not always been followed in the past, which has led to much double classification between specific areas and the general area, predominantly in G11B 5/00(magnetic recording).

As noted above, where possible, documents should be classified in recording-method-specific areas only.

G11B 21/12 is used to classify documents regarding loading and unloading of heads to and from magnetic disks, particularly emergency head unloading in the case of e.g. power failure or mechanical shock.

G11B 21/22 is used to classify arrangements for supporting or holding magnetic heads and arms while they are outside the recording area e.g. ramps, buffers and latches.

G11B 23/00

Record carriers not specific to the method of recording or reproducing; Accessories, e.g. containers, specially adapted for co-operation with the recording or reproducing apparatus {; Intermediate mediums; Apparatus or processes specially adapted for their manufacture (processes involving a single technical art and for which provision exists elsewhere, see the relevant class, e.g. B29, B41M, B05D, C08L, F16N)}

Definition statement

This place covers:

- Disk shaped record carriers, disk cartridges, tape cartridges, reels of tapes.
- Apparatuses or processes for the manufacture of cartridges.

- Record carriers with means for indicating/preventing prior or unauthorised use
- Disks with visible labels
- Reconditioning or destruction of record carriers.

Relationships with other classification places

Punched cards, magnetic or optical cards, conveying cards, G06K.

References

Limiting references

This place does not cover:

Materials for record carriers	G11B 5/62, G11B 7/241
Manufacture of record carriers	G11B 5/84, G11B 7/26

Informative references

Attention is drawn to the following places, which may be of interest for search:

Record carriers characterised by the form	G11B 5/74, G11B 7/24
Circuits for preventing unauthorised use or copy	G11B 20/00086
Magnetic or optical cards, conveying cards	G06K
Antennas	H01H 1/00

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Form factor	the size of a cartridge

Synonyms and Keywords

In patent documents the following expressions/words "cartridge"

Cartridge	cassette, container, magazine

G11B 25/00

Apparatus characterised by the shape of record carrier employed but not specific to the method of recording or reproducing {, e.g. dictating apparatus; Combinations of such apparatus}

Definition statement

This place covers:

Mechanical structure of such apparatuses.

Documents which do not find a more appropriate classification in the depending subgroups.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Recording/reproducing methods	G11B 5/00, G11B 7/00, G11B 9/00, G11B 11/00, G11B 20/00, G11B 27/00
Controlling the operating functions	G11B 15/02, G11B 19/00
Driving, starting, stopping the tape	G11B 15/18
Guiding the tape within the apparatus	G11B 15/60
Guiding the tape cartridges within the apparatus	G11B 15/675
Library of tape cartridges	G11B 15/68
Recording and reproducing apparatuses in combination with television sets	G11B 31/00
Recording and reproducing apparatuses in combination with video cameras	G11B 31/006, H04N 23/00
Registering or indicating the working of vehicles	G07C 5/00
Registering performance data other than driving of vehicles	G07C 5/0891
Static data storage memories	G11C, H10B 12/00 - H10B 69/00
Telephones with dictation recording systems	H04M 1/10
Telephone answering machines	H04M 1/64
Telephone answering machines	H04M 1/64
Telephones with dictation recording systems	H04M 11/10
Apparatuses for television signal recording	H04N 5/76

G11B 25/04

using flat record carriers, e.g. disc, card

Definition statement

This place covers:

- Apparatus for card shaped record carrier.
- Feeding or guiding non disc shaped (i.e. mainly card shaped) record carriers G11B 17/0408.

References

Limiting references

This place does not cover:

Card shaped record carrier having a circular recording area	G11B 23/0014
Hard disk drives	G11B 25/043
Card shaped record carriers and apparatus for such carriers	G06K

Informative references

Attention is drawn to the following places, which may be of interest for search:

Methods or arrangements for sensing record carrier	G06K 7/08
Record carriers characterised by the type of digital marking	G06K 19/067

G11B 25/043

{using rotating discs}

Definition statement

This place covers:

The mechanical aspects of disk drives in which the disk or disks are permanently installed (e.g. hard disk drives HDD)

References

Limiting references

This place does not cover:

Heads of HDD	G11B 5/127
Motors for HDD	G11B 19/2009

G11B 25/046

{using stationary discs, or cards provided with a circular recording area (driving heads relatively to stationary record carriers for mechanical transducing G11B 3/40; automatic feed mechanism producing a transducing traverse of the head across stationary disk tracks G11B 21/043)}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

The card shaped record carrier having a circular recording area	G06K, G11B 23/0014.
Methods and arrangements for sensing card shaped record carriers	G06K 7/00
Record carriers characterised by the type of digital marking	G06K 19/067, G06K 7/0021

G11B 25/06

using web-form record carriers, e.g. tape

References

Limiting references

This place does not cover:

Mechanisms which find adequate	G11B 15/00

G11B 25/063

{using tape inside container}

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Tape container	tape cassette, tape cartridge

G11B 25/066

{adapted for use with containers of different sizes or configurations; adaptor devices therefor}

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Form factor	It refers to the specific (possibly standard) shape and dimension of a cartridge

G11B 25/08

using filamentary record carriers, e.g. wire

Definition statement

This place covers:

Apparatuses using wire shaped record carriers .

G11B 25/10

Apparatus capable of using record carriers defined in more than one of the sub-groups G11B 25/02 - G11B 25/08; {Adaptor devices therefor}

Definition statement

This place covers:

combi apparatus,

apparatus which combine a tape player(s) with a disc player(s),

apparatus which combine a tape or disc player with a hard disc drive (HDD).

References

Limiting references

This place does not cover:

The aspect of backing up data	G11B 7/28, G06F 11/14

Informative references

Attention is drawn to the following places, which may be of interest for search:

Re-recording, i.e. transcribing information from one optical record carrier on to one or more similar or dissimilar record carriers	G11B 7/28

G11B 27/00

Editing; Indexing; Addressing; Timing or synchronising; Monitoring; Measuring tape travel

Definition statement

This place covers:

Editing;

editing operations performed on audio or video content recorded on the type of recording medium historically falling under the subclass G11B and extended to any type of recording medium storing physically audio and video content in a permanent manner, resulting in a modified or new recorded content. This covers as well the physical implementations of operations such as cut, paste, merge, adding sound track as well as the definition of the editing operations to be performed within an editor (non-destructive editing, playlist arrangements, editing operations in a video editor).

Indexing and addressing;

details concerning the type of information attached to a recording content which allows to access said content as well as information indicating reproduction of a sequence of addressed parts of recorded contents (play list typically). This can be with respect to the physical details of the recording medium (subcodes, lead-in, lead-out in case of a CD, AIT track for tape, prepits for DVD) carrying the information as long as the type of the recording medium falls under the subclass G11B. In addition, it covers the case of indexing or addressing information in a audio or video content which are not specific to the physical characteristics of the recording medium such as table of content, metadata and other information which allow navigation within a file containing audio video content (typically a specific file format with indexing and addressing information embedded) or other special modes of reproduction. Special modes of reproduction (trickplay, repeat) are also classified in G11B 27/00.

Timing or synchronizing;

Details relating to the synchronized reproduction of different components making up an audio video recording. By extension, synchronization of content between a main unit and an auxiliary video or audio player.

Monitoring;

Monitoring concerns the supervision of the progress of recording or reproducing, mainly monitoring power failure during recording or reproduction and logging the use of medium or apparatus for fault prevention It covers also the testing of the medium as a direct step in a recording and reproducing method and the use of information about the execution of the reproduction and/or recording (flags, power failure).

Measuring tape travel;

obsolete. Technical details concerning the measuring of tape travel are classified in G11B 15/00.

Relationships with other classification places

The group G11B 27/00 is in close relationship with the area of television recording H04N 5/76, computers G06F and the other domains of the subclass G11B, notably, G11B 20/00 for the formatting

aspects related to channel encoding modulation, error correction, spatial arrangement of different kinds of information on the medium and G11B 5/00, G11B 7/00 for the physical aspect (shape, layer, structure, etc...) of the recording medium.

In particular, the group G11B 27/00 deals with content management (space management, erasure of programs) concerning pre-recorded material or recorded material such as television programs, once these programs have been recorded on the recording medium. The other aspects of television recording such as the reservation of programs to be recorded are not dealt with in G11B 27/00 but in H04N 5/76, unless it involves using information pertaining to the recording medium usage (dedicated recording area, free space, other meta information such as date for erasure).

The group G11B 27/00 does not deal with the details of the video coding technique found in subgroup H04N 19/00 but is concerned with the application thereof in a corresponding editing and addressing operation or if it refers to coding parameters that are recorded for indexing purposes.

The group is also linked to G06F 16/00 (database structures), and deals with the specific application to audio, video and leaves out the general and not specific database management techniques.

Synchronization aspects related to the extraction of a bitstream from the recording (e.g. bit clock extraction during channel decoding) are covered in the group G11B 20/00 and not G11B 27/00.

Likewise, the basic error corrections, or defect area management, are dealt with in G11B 20/18 and not G11B 27/00.

In general, G11B 20/00 deals with lower level (Channel, buffering) whereas in G11B 27/00, the main focus is at the system level.

References

Limiting references

This place does not cover:

Testing the correct function of read/write heads for magnetic disk drives	G11B 5/455
Testing recording/reproducing heads	G11B 7/00, G11B 5/00
Detecting defects on optical discs	G11B 7/00375
Testing disk drives	G11B 19/048
Synchronization linked to channel decoding	G11B 20/10009, G11B 20/1403
Management of defective sectors, error correction	G11B 20/18
Finding physical defects on optical discs by optical inspection	G01N 21/9506
Peripheral management in general	G06F 3/00
User interface in general	G06F 3/048
Testing computer peripherals	G06F 11/2268
Image processing	G06T
Audio broadcast recording	H04H 60/27
Television studio equipment	H04N 5/222
Television broadcast recording	H04N 5/76
Video Broadcasting	H04N 7/24
A/V synchronization in transmission	H04N 7/52
Video display of recorded content	H04N 9/00
Video/audio coding aspects	H04N 19/00, G11B 20/00

Network broadcasting	H04N 21/20 , H04N 7/24

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

(tape) libraries	G06F 3/06, G11B 15/68
Music or video database	G06F 16/00
Pvr	H04N 5/76
Camera with a recording entity	H04N 5/772

Informative references

Attention is drawn to the following places, which may be of interest for search:

Specific for magnetic recording (hdd)	G11B 5/00
Hdd testing	G11B 5/127
Optical disc formats (physical level details)	G11B 7/007
Magneto-optical, minidisc (physical level details)	G11B 11/00
Tape in general (physical/mechanical level, servo)	G11B 15/00
Disc changers, jukeboxes (mechanical details)	G11B 17/00
Control of operating function at player/recorder level	G11B 19/02
Malfunction prevention	G11B 19/04
Recognizing media	G11B 19/12
DRM, copy protection,encryption	G11B 20/00086
Recording/reproducing signal processing, buffering; Digital recording	G11B 20/10
Recording format (sector level); Format (disc)	G11B 20/12
Error detection/correction, defect lists	G11B 20/18
Medium container/cartridge details	G11B 23/023, G11B 33/02
Recording or reproducing apparatus associated with related apparatus (cameras, projectors,...)	G11B 31/00
Apparatus constructional details	G11B 33/00
Car navigation	G01C 21/26
(graphical/manual/vr) user interfaces in general, also eye tracking, brain signals	G06F 3/033, G06F 3/048
General User interface	G06F 3/048
Storage media in computer environment (I/O, device drivers)	G06F 3/06
RAID systems in general	G06F 3/0673
Application software, xlets	G06F 9/44
File backup; hierarchical storage management	G06F 11/14
Interfaces, busses, program control of peripheral devices	G06F 13/10
Databases, retrieval	G06F 16/00

"Multimedia"; File format	G06F 16/40
Intelligent playlist building; Library content management	G06F 16/4387; G06F 16/70; G06F 16/60; G06F 16/783
Pattern recognition	G06F 18/00
Annotations to text, e.g. comment data or footnotes	G06F 40/169
Business methods (selling, renting, ordering DVDs, accounting, billing)	G06Q 30/00
Image analysis e.g. motion based segmentation	G06T 7/20
Animation (editing)	G06T 13/00
Image or video recognition of video content	G06V 20/40
Payment aspects in relation with video playback	G07F 17/16
Surveillance systems	G08B 13/24, G08B 13/196 , H04N 7/18
Learning systems	G09B 5/00
DJ equipment, scratching, midi, music analysis (rhythm, genre,...)	G10H 1/00, G10H 1/36
Karaoke	G10H 1/00, G10K 15/04
Musical instruments	G10H 7/00
Speech analysis	G10L 19/00
Audio coding	G10L 19/167
Audio processing in general	G10L 21/00
Picture (photo) editing	**G10T11/60**, H04N 1/387
Solid state memories	G11C 7/16
Broadcast equipment	H04H 60/00
User behavior with respect to received broadcast signal	**H04H60/26**, H04H 60/56
User preferences in broadcasting	H04H 60/38
Broadcast metadata	**H04H60/69**
A/V home networks (HAVI,UPnP)	H04L 12/2805
Protocols for multimedia communication	H04L 65/1101
Still image editing	H04N 1/387, G06T 11/60
Scene detection	H04N 5/147, G06F 16/4387; G06F 16/70; G06F 16/60; G06F 16/783
Studio equipment	H04N 5/222
OSD, subtitle and menu display	H04N 5/445, G09G 5/00
Television recording; (Broadcast) video recording in general	H04N 5/76
Still cameras (capturing aspects)	H04N 5/772
Trick mode reproduction (no matter what recording medium)	H04N 5/783
Video conferencing	H04N 7/15
Video transmission	H04N 7/16, H04N 7/24, **H04N7/73**, H04N 21/00
Video source coding	H04N 19/00

Multimedia server	H04N 21/20
Multimedia settop box	H04N 21/40
Tv studio equipment	H04N 23/00, H04N 5/262

Special rules of classification

A document relevant to G11B 27/00 (e.g. containing invention information or additional information relating to G11B 27/00 EC) will be given an G11B 27/00 EC group

Indexing Codes are not used.

Circulation rules :

- When a camera is involved : H04N 5/772
- scene detection : H04N 5/147
- When auxiliary content is retrieved from a network to supplement primary information on a recording medium : H04N 7/24, H04N 21/00
- When a pvr is involved : H04N 5/76
- When a set-top box : H04N 7/24
- Building a collection of information concerning video or audio items : G06F 16/00
- When the data are arranged on the recording medium (of the type covered by the subclass G11B) in a specific way : G11B 20/12

Check also to the neighbouring fields listed in the informative references for circulation

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

TOC	(Table of content) : collection of information allowing the definition and retrieval of individual pieces of audio and video content .
EDL	(Edit Decision List); collection of information (part of content used, editing commands to be executed and their chronological and spatial order, leading when executed to the creation of a piece of audio /video content
Playlist	collection of information in sequential order defining the reproduction order of recorded content, e.g. (user defined) program chain in dvd, mp3 playlist; merely a list of objects that are to be reproduced in sequence with no common timeline defined

Synonyms and Keywords

In patent documents the following expressions/words are often used as synonyms (or close concepts):

"Comment", "annotation" and "label"

"Defect", "damage", "scratch" and "corrupted"

"Edit point", "edit mark, "In point", "Out Point", "Mark in", "Mark out", "cue point" and "cue mark"

"Random" and "shuffle"

"Segment", "portion", "part", "fragment", "section" and "sequence"

"Summary", "abstract", "highlight" and "digest"

G11B 31/00

Arrangements for the associated working of recording or reproducing apparatus with related apparatus (with cameras or projectors G03B 31/00 {; recording/reproducing of music for electrophonic musical instruments G10H 1/0033; automatic arrangements for answering calls or for recording messages for absent subscribers H04M 1/64; telephonic communication systems adapted for combination with dictation recording and playback systems H04M 11/10; connection of TV recorder with other related apparatus, e.g. TV camera or receiver, in which the TV signal is significantly involved H04N, e.g. H04N 23/00, H04N 5/765; combination of radio or TV with other apparatus, e.g. with vehicles H05K 11/00})

Definition statement

This place covers:

Apparatus where the recording and reproducing device is interfaced with the user.

Take-up mechanisms for earphones cable.

Relationships with other classification places

Television signal recording H04N 5/78, H04N 5/84.

Registering or indicating the working of vehicles (black boxes) G07C 5/00.

Electrically operated educational appliances in combination with videotapes or videodisks G09B 5/00.

References

Limiting references

This place does not cover:

Constructional details or arrangements of data processing systems	G06F 1/16
Output arrangements for transferring data from processing unit to output unit	G06F 3/00
Accessing, addressing, or allocating within memories	G06F 12/00
Protection against unauthorised use of memories	G06F 12/14
Transfer of information between memories, I/O devices or central processing units	G06F 13/00
Recording/reproducing of accompaniment for use with an external source, e.g. karaoke systems	G10H 1/361
Transmission systems	H04B
Transmission of digital information	H04L
Data switching networks	H04L 12/00
Loudspeakers, microphones	H04R
Wireless communication network	H04W

Informative references

Attention is drawn to the following places, which may be of interest for search:

The recording apparatus and the television camera being placed in the same enclosure	H04N 5/772
Portable videocameras	H04N 23/00

G11B 33/00

Constructional parts, details or accessories not provided for in the other groups of this subclass

Definition statement

This place covers:

- Chassis for recording/reproducing apparatuses.
- Portable recording/reproducing apparatuses.
- Covers, lids, front bezels of recording/reproducing apparatuses.
- Jewel boxes and similar containers, packaging containers for single disks or for multiple disks, racks for disks.
- Means for dampening vibrations or sounds.
- Means for indicating the working conditions of recording/reproducing apparatuses (e.g. displays).
- Layout of components within the housing.
- Electrical connections of/within recording/reproducing apparatuses.
- Docking stations for recording/reproducing apparatuses.
- Means for reducing/controlling the influence of the temperature in recording/reproducing apparatuses.
- Means for reducing contaminations.
- Means for shielding against electromagnetic interference, means for grounding.

Relationships with other classification places

- Constructional details of computers, personal computers, laptops G06F 1/16, G06F 1/18, G06F 1/20.
- Electrical connectors H01R.
- Cabinets for electrical apparatuses H05K 5/00.
- Furniture aspects of cabinets A47B 81/06.
- Anti-theft devices for disks or cartridges E05B 73/0023.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Magazines for naked disks or for cartridges, which are part of the recording/reproducing apparatuses	G11B 15/68, G11B 17/22, G11B 17/30, G11B 23/023, G11B 23/03
Hard disk drives	G11B 25/043
Liquid crystal displays LCD	G02F 1/13
Photocopy machines	G03G

Constructional details of computers, personal computers, laptops	G06F 1/16, G06F 1/18, G06F 1/20
Electrical connectors	H01R
Cabinets for electrical apparatuses	H05K 5/00
Heat transfer	H05K 7/20, F28D 15/00, H04B 1/036, G06F 1/20, H01L 23/34

G11B 2220/60

Solid state media

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Static stores	G11C

G11B 2220/61

wherein solid state memory is used for storing A/V content

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Electrical digital data processing	G06F