

## **CLASS 360, DYNAMIC MAGNETIC INFORMATION STORAGE OR RETRIEVAL**

### **SECTION I - CLASS DEFINITION**

#### **GENERAL STATEMENT OF THE CLASS SUBJECT MATTER**

This class is an integral part of Class 369, Dynamic Information Storage or Retrieval, following subclass 18 and is the specific class for apparatus and corresponding processes for the storage and retrieval of information based on relative movement between a magnetic record carrier and a transducer.

This class also includes apparatus and corresponding processes for making copies or editing of records falling within the above definition.

A magnetic record carrier within the meaning of this class is an element which consists of a magnetizable material or is comprised of a coating or impregnation of magnetizable material which is intended for the storage of more than a single bit of information. Storage elements which include discrete magnetic areas, inserts, spots, etc. each intended for the storage of single bits of information, whether or not relative motion is used in transducing that information, are not included in the above definition. See elsewhere for the use of such elements. (See References to Other Classes, below.)

#### **SUBCOMBINATIONS OF DYNAMIC MAGNETIC RECORDERS OR REPRODUCERS**

This class includes elements forming subcombinations specific to apparatus within the class definition such as record carriers, transducers, etc.

Electrical circuits not specific to magnetic recording or reproducing which may constitute subcombinations of such apparatus are classified in the appropriate class for such circuits.

Mechanisms forming subcombinations of apparatus within the class definition are classified in the appropriate mechanical class providing for such subject matter unless claimed in significant combination with specific recorder structure.

### **SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS**

#### **COMBINATIONS OF OTHER APPARATUS WHICH INCLUDE APPARATUS OF THIS CLASS**

Significantly claimed apparatus external to this class, claimed in combination with apparatus under the class definition, which records or reproduces some quality or quantity related to such external apparatus or its function, is classified in the class appropriate to the external apparatus.

Nominally claimed apparatus external to this class, claimed in combination with apparatus under the class definition, is classified in this class unless provided for in the appropriate external class.

Because of the placement of Class 360 into the Class 369 schedule, this class is no longer exhaustive of dynamic magnetic storage or retrieval, as to the art now classified in subclasses 1 through 18 of Class 369.

#### **ORGANIZATION OF THIS CLASS**

For the organization of this class, refer to Subclass References to the Current Class, below.

### **SECTION III - SUBCLASS REFERENCES TO THE CURRENT CLASS**

#### **SEE OR SEARCH THIS CLASS, SUBCLASS:**

- 1, through 17, Special Purpose Devices: devices where the major significance of the device is in its use or the result which it produces.
- 18, through 54, Signal Processing: for devices which are basically electronic in nature and are used to modify, correct or insure the efficient storage or retrieval of information signals.
- 55, through 68, General Recording or Reproducing: for methods or devices which are concerned with the physics of recording or reproducing or are electronic in nature and not limited to the types of signal processing provided for in Lines With Other Classes and Within this Class, Organization of This Class, above.
- 69, through 80, Automatic Control Systems: for devices which, without proximate human intervention, will actively control a mechanism of this or an external class.
- 81, through 101, Transport Systems: for mechanical devices which produce the relative movement between record carrier and transducer required by the class definition.

- 102, through 136, Physical Elements: for physical elements forming subcombinations of apparatus within the class definition that are not classifiable elsewhere.
- 137, for subject matter not found in subclasses 1-136.

#### SECTION IV - REFERENCES TO OTHER CLASSES

##### SEE OR SEARCH CLASS:

- 29, Metal Working, subclasses 603.01+ for, methods of making magnetic transducers.
- 84, Music, subclasses 601+, recording or reproducing means in combination with musical instruments.
- 106, Compositions: Coating or Plastic, plastic compositions usable in magnetic record carriers.
- 118, Coating Apparatus, apparatus for making coated magnetic record carriers.
- 148, Metal Treatment, subclasses 300+, magnetic stock material which is the result of a Class 148 treatment or which are claimed in terms of specific magnetic properties.
- 178, Telegraphy, recording or reproducing means combined with code transmitters or receivers.
- 200, Electricity: Circuit Makers and Breakers, switching devices usable in magnetic recorders or reproducers.
- 206, Special Receptacles and Packages, subclass 62, receptacles for magnetic record carriers.
- 226, Advancing Material of Indeterminate Length, means for advancing a record carrier past a transducer.
- 235, Registers, subclasses 419+, for record controlled electromechanical calculators; subclasses 439+ and 487+, sensing or analyzing mechanism and records; subclass 154, data conversion usable in magnetic recording or reproducing.
- 235, Registers, subclasses 449+ and 493 for the use of storage elements which include discrete magnetic areas, inserts, spots, etc., each intended for the storage of single bits of information, whether or not relative motion is used in transducing that information. (Class Definition, General Statement Of The Class Subject Matter, above).
- 242, Winding, Tensioning, or Guiding, provides for technology centered on refinements of winding or unwinding, tensioning and guiding elongated material combined with a nominal work station. Accordingly Class 242 provides for inventions in winding and unwinding of magnetic tape, film, or wire where an element such as a transducer head or similar recording structure is named as a part of the winding or unwinding path. Class 360 provides for winding or guiding of a magnetic medium in combination with claimed magnetic recording or reproducing apparatus (i.e., transducing head details or closely related structure that impact the transducing function unique to this art). Class 360 provides for claimed information erasure prevention means (other than a nominally recited pin or filler), details of a single recording element (e.g., a multitract transducing head), means to extract a loop of tape from the cartridge and transfer the loop about a named transducer head, a plurality of elements peculiar to a recorder (e.g., alternately engageable record and erase heads), or structure peculiar to a recorder completely remote from winding, tensioning, or guiding (e.g., signal volume control). Search Class 242 for unwinding/rewinding drives, and subcombinations such as cartridge/cassette structure and related perfecting feature; e.g., position retainers, brakes, brake release devices, door structures, pinch rollers, guide components, cartridge/cassette housing construction and material having a specific composition, hardness, thermal property, electrical property, antistatic property, etc., particularly subclasses 324+ for unwinding and rewinding an information convertible carrier, and 335+ for guiding, unwinding, or rewinding a carrier stored in a cartridge/cassette.
- 252, Compositions, subclasses 62.51+, magnetic compositions.
- 271, Sheet Feeding or Delivering, sheet record handling.
- 307, Electrical Transmission or Interconnection Systems; subclasses 112+, class appropriate switching systems which are usable in dynamic information storage or retrieval.
- 318, Electricity: Motive Power Systems, subclasses 560+, positional servo systems; subclasses 567+, program or pattern controlled systems.
- 324, Electricity: Measuring and Testing, subclass 244, magnetic field testing means usable in reproducing magnetic records; subclass 112, voltage or current storage means including magnetic storage.
- 326, Electronic Digital Logic Circuitry, appropriate subclasses, electronic digital logic circuits

- usable in dynamic magnetic information storage or retrieval.
- 327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems; subclasses 1+ for miscellaneous signal discriminating or selecting; subclasses 100+, miscellaneous signal conversion, shaping or generating; subclasses 365+, miscellaneous gating usable in dynamic magnetic information storage or retrieval.
- 329, Demodulators, demodulators usable in magnetic reproduction.
- 330, Amplifiers, amplifiers usable in magnetic recording or reproducing.
- 331, Oscillators, oscillators usable in bias or erase circuits.
- 332, Modulators, modulators usable in magnetic recording.
- 333, Wave Transmission Lines and Networks, subclass 28, equalizers usable in magnetic recording or reproducing.
- 336, Inductor Devices, core and coil structures similar to those of magnetic recording or reproducing transducers.
- 341, Coded Data Generation or Conversion, for code converters usable in or using dynamic storage techniques.
- 345, Computer Graphics Processing and Selective Visual Display Systems, subclasses 418 through 475 for computer graphics processing.
- 346, Recorders, recorders usually of the graphic type and record carriers therefor.
- 352, Optics: Motion Pictures, motion picture apparatus in combination with recorders or reproducers.
- 353, Optics: Image Projectors, Projectors combined with recorders or reproducers.
- 358, Facsimile and Static Presentation Processing, subclasses 1.1 through 1.18 for data processing for static presentation on fixed medium (e.g., for printer).
- 359, Optical: Systems and Elements, subclasses 281+ and 484.01 through 484.1, magneto-optical polarization devices usable in magnetic signal reproduction.
- 361, Electricity: Electrical Systems and Devices, subclasses 143+, 159 and 267 for demagnetizing means for records and heads when not in combination with recorders or reproducers.
- 365, Static Information Storage and Retrieval, appropriate subclass for magnetic, electric, or optical static storage/retrieval of information.
- 370, Multiplex Communications, appropriate subclasses, particularly subclasses 351+ for multiplex switching, and subclass 531 for magnetic core for switching or storage.
- 379, Telephonic Communications, subclass 41, 51 and 67.1+, recorders or reproducers combined with telephones.
- 384, Bearings, subclasses 100+ for fluid bearings usable to space head from magnetic record carriers.
- 386, Motion Video Signal Processing for Recording or Reproducing, appropriate subclasses for recording television or video signal.
- 400, Typewriting Machines, appropriate subclasses for machine operators using magnetic records.
- 420, Alloys or Metallic Compositions, appropriate subclasses for alloys which are claimed broadly as "magnetic," "magnetized," or "permanent magnet" or alloys defined only in terms of their composition which are inherently magnetic.
- 427, Coating Processes, methods of making and coating magnetic record carriers.
- 428, Stock Material or Miscellaneous Articles, subclasses 800 through 848.9 for magnetic heads, and magnetic and magneto-optic storage medium, per se, having specific detail of physical chemistry or composition (e.g., material, microstructure, surface property, etc.).
- 430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, appropriate subclasses for radiation imagery chemistry process, composition, or product used as a storage medium.
- 434, Education and Demonstration, recording or reproducing means combined with significant education apparatus.
- 505, Superconductor Technology: Apparatus, Material, Process, subclasses 150+ for high temperature ( $T_c > 30$  K) superconducting devices, particularly subclasses 170+ for dynamic information storage or retrieval.
- 700, Data Processing: Generic Control Systems or Specific Applications, subclasses 1 through 89 for generic data processing control systems; and subclasses 90-306 for particular application of data processing systems or calculating computers, particularly subclasses 245-264 for data processing of robot control systems.
- 704, Data Processing: Speech Signal Processing, Linguistics, Language Translation and Audio Compression/Decompression, subclasses 200+ for artificial intelligence systems that process speech signals.

- 706, Data Processing: Intelligent Processing Systems and Methods, various subclasses for artificial intelligence systems that represent, apply, and acquire knowledge.
- 708, Electrical Computers: Arithmetic Processing and Calculating, subclasses 1+ for hybrid computers, subclasses 100+ for digital calculating computers, and subclasses 800+ for analog computers.
- 709, Electrical Computers and Digital Data Processing Systems: Multiple Computer or Process Coordinating, appropriate subclasses for data transferring among multiple computer and digital processing systems.
- 711, Electrical Computers and Digital Processing Systems: Memory, appropriate subclasses for storage addressing, accessing, and control in data processing systems; subclass 4 for addressing dynamic storage devices including address formation or manipulation and subclasses 111+ for data accessing and control techniques for dynamic storage devices in digital data processing systems.
- 714, Error Detection/Correction and Fault Detection/Recovery, appropriate subclasses for generic error checking systems.
- 715, Data Processing: Presentation Processing of Document, Operator Interface Processing, and Screen Saver Display Processing, subclasses 700 through 866 for a computer operator interface.
- 850, Scanning-Probe Techniques or Apparatus; Applications of Scanning-Probe Techniques, e.g., Scanning-Probe Microscopy [SPM], subclass 62 for information storage or retrieval using scanning probe microscope.

#### SUBCLASSES

### 1 RECORDING ON OR REPRODUCING FROM AN ELEMENT OF DIVERSE UTILITY:

This subclass is indented under the class definition. Subject matter which includes recording on or reproducing from an element which has utility in addition to being a magnetic record carrier.

- (1) Note. Examples of devices classified herein are devices which record on or reproduce from razor blades, tire beads, food cans, price tags, etc.

- (2) Note. Elements used as record carriers in this and indented subclasses which are not inherently magnetic may have magnetic strips, coatings or other magnetic elements affixed thereto to allow for their use as magnetic record carriers.

### 2 Card:

This subclass is indented under subclass 1. Subject matter wherein the element used as a record carrier is in a flat geometric form.

#### SEE OR SEARCH CLASS:

- 235, Registers, subclass 449 and 450 for sensing mechanisms utilized to sense discrete bits of magnetic material, the discrete bits being coded markings on a record.
- 434, Education and Demonstration, subclass 308 and indented subclasses, particularly subclasses 311+ for card shaped elements used in teaching and having information recorded thereon.

### 3 Motion picture film:

This subclass is indented under subclass 1. Subject matter wherein the element used as a record carrier is a motion picture film.

#### SEE OR SEARCH CLASS:

- 352, Optics: Motion Pictures, subclasses 1+ for sound recording and reproducing combined with motion pictures.

### 4 MANUAL INPUT RECORDING:

This subclass is indented under the class definition. Subject matter including apparatus which is to be manually manipulated and it is the manipulation of such apparatus which generates the information signal that is to be recorded.

#### SEE OR SEARCH CLASS:

- 400, Typewriting Machines, appropriate subclasses for machine operators including magnetic records.

### 5 RECORDING FOR SELECTIVE RETENTION OF A SPECIAL OCCURRENCE:

This subclass is indented under the class definition. Subject matter for automatically sensing the occurrence of a condition, retaining infor-

mation concerning that occurrence and deleting or disregarding unwanted information.

- (1) Note. Examples of devices classified herein are crash, transient and surveillance recorders.

SEE OR SEARCH CLASS:

369, Dynamic Information Storage or Retrieval, subclasses 47.36 through 47.55 for mechanism control by control signal.

## 6 RECORDING COMBINED WITH METERING OR SENSING:

This subclass is indented under the class definition. Subject matter in combination with meters or sensors of particular application.

- (1) Note. See Lines With Other Classes and Within This Class, Combinations of Other Apparatus Which Include Apparatus of This Class, in the Class Definition, above.
- (2) Note. Examples of devices classified herein are recorders associated with utility meters, sensors of seismic or other natural phenomena and body tissue analyzing devices.
- (3) Note. Ordinary sound microphones and video cameras are not considered sensors of particular application as defined above. Recorders in combination with such microphones or cameras are classified in subclasses provided below.

SEE OR SEARCH CLASS:

346, Recorders, subclasses 14 through 18, for non-magnetic recorders combined with registers, indicators or alarms.

## 7 RECORDING FOR MONETARY DELAY OF AN ANALOG SIGNAL:

This subclass is indented under the class definition. Subject matter wherein a nondigital signal is recorded and momentarily reproduced for the specific purpose of introducing a delay in the signal.

- (1) Note. Apparatus classified herein is used for purposes such as censoring and generating artificial reverberation.

SEE OR SEARCH THIS CLASS, SUBCLASS:

54, for recirculation or delay of a digital signal.

## 8 RECORDING FOR CHANGING DURATION, FREQUENCY OR REDUNDANT CONTENT OF AN ANALOG SIGNAL:

This subclass is indented under the class definition. Subject matter specifically arranged for recording or reproducing a signal in such a manner that the signal, as recorded, has redundant portions deleted therefrom or, as reproduced, occupies a different amount of time or a different band of frequencies than that occupied by the original signal.

- (1) Note. Changes in either or both of duration and frequency may be produced by the subject matter of this and indented subclasses.

SEE OR SEARCH CLASS:

704, Data Processing: Speech Signal Processing, Linguistics, Language Translation, and Audio Compression/Decompression, subclasses 500 through 504 for bandwidth, or time compression, or expansion of audio signals.

## 12 RECORDING OR REPRODUCING FOR AUTOMATIC ANNOUNCING:

This subclass is indented under the class definition. Subject matter for recording or reproducing information in such a manner that an appropriate announcement may be selected or synthesized in response to a sensed condition or predetermined command.

- (1) Note. Examples of devices classified herein are: Time or temperature announcing machines, talking voltmeters and travelogue reproducers responsive to location.

SEE OR SEARCH CLASS:

379, Telephonic Communications, subclasses 41 and 67+ for subject matter of this type in combination with a telephone.

- 13 RECORD EDITING:**  
This subclass is indented under the class definition. Subject matter for deleting, adding or rearranging portions of a recording.
- (1) Note. Both manual cutting and splicing of record carrier portions and reproducing from one record carrier and recording onto the same or another record carrier are included in this subclass.
- 15 RECORD COPYING:**  
This subclass is indented under the class definition. Subject matter for duplicating records.
- SEE OR SEARCH CLASS:  
369, Dynamic Information Storage or Retrieval, subclasses 84+ for duplicating nonmagnetic sound records.
- 16 Contact transfer:**  
This subclass is indented under subclass 15. Subject matter wherein a blank record carrier is placed in contact with the record carrier to be copied and duplication occurs at the point of contact.
- 17 With magnetic bias:**  
This subclass is indented under subclass 16. Subject matter wherein a magnetic field in addition to that of the record carrier to be copied is applied at the point of contact.
- 18 RECORDING OR REPRODUCING PLURAL INFORMATION SIGNALS ON THE SAME TRACK:**  
This subclass is indented under the class definition. Subject matter wherein separate information signals are recorded in such a manner that they occupy co-extensive or overlapping areas on a record carrier and, during reproduction, are again separable.
- (1) Note. Separable components of single signals such as video and synchronizing components of a normal television signal or data and timing components of a digital signal are not considered separate information signals within the meaning of the above definition.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
33+, for recording television signals including synchronizing components.  
39+, for recording digital signals including timing components.
- SEE OR SEARCH CLASS:  
370, Multiplex Communications, appropriate subclasses for multiplexing systems and techniques.
- 20 Frequency multiplex:**  
This subclass is indented under subclass 18. Subject matter wherein the separate signals occupy different frequency bands.
- 21 Head gap azimuth multiplex:**  
This subclass is indented under subclass 18. Subject matter wherein the separate signals are recorded using a head or heads with gaps positioned at different angles with respect to the record carrier for each of the separate signals.
- 22 SPLITTING ONE INFORMATION SIGNAL FOR RECORDING ON PLURAL DISTINCT TRACKS OR REPRODUCING SUCH SIGNAL:**  
This subclass is indented under the class definition. Subject matter wherein a single information signal is divided and recorded on plural distinct tracks or reproduced from such tracks and recombined into a single signal.
- (1) Note. Transverse track portions such as that produced by moving a head at an angle to the direction of movement of a tape are not considered distinct tracks within the meaning of the above definition.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
26, for electronically correcting phasing errors between signals which may be recorded on plural distinct tracks.  
76, for physically moving a multi-track head with respect to a record for skew correction.

- 23 Time division:**  
This subclass is indented under subclass 22. Subject matter wherein the signal is divided into increments separate in time and sequential increments are commutated between plural distinct tracks.
- 24 SPLITTING, PROCESSING AND RECOMBINING ONE INFORMATION SIGNAL FOR RECORDING OR REPRODUCING ON THE SAME TRACK:**  
This subclass is indented under the class definition. Subject matter wherein a signal is divided, the divided portions are separately processed and are then recorded on the same track of a record carrier.
- (1) Note. Apparatus wherein a single reproduced signal is divided, separately processed and recombined is also included in this subclass.
- SEE OR SEARCH CLASS:  
327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 407+ for miscellaneous gating of plural inputs to a single output.
- 25 CHECKING RECORD CHARACTERISTICS OR MODIFYING RECORDING SIGNAL FOR CHARACTERISTIC COMPENSATION:**  
This subclass is indented under the class definition. Subject matter wherein the characteristics of a particular record carrier are determined or a signal to be recorded is modified to compensate for the determined characteristics of a particular record carrier.
- (1) Note. Examples of record carrier characteristics are: inhomogeneous magnetic coating, incomplete erasure of a prior recording and peculiar hysteresis.
- (2) Note. Characteristics of magnetic recording or reproducing which are dictated by physical law and are not attributable to peculiarities of the record carrier are not included in this subclass.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
65, for equalization circuits.
- 26 ELECTRONICALLY CORRECTING PHASING ERRORS BETWEEN RELATED INFORMATION SIGNALS:**  
This subclass is indented under the class definition. Subject matter which is electronic in nature (e.g., adjustable delay lines, gates, registers) for producing time coincidence between plural related information signals.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
51, for apparatus which corrects timing errors in a digital signal.  
76, for apparatus which physically moves multiple track heads to produce an effect similar to that of the apparatus of this subclass.
- SEE OR SEARCH CLASS:  
386, Motion Video Signal Processing for Recording or Reproducing, subclass 274 for phase-crosstalk correction, subclass 310 for phase shifting a frequency modulated luminance or chrominance of a color video signal, and subclass 312 for phase modulation of a luminance or chrominance of a color video signal in a video recording and reproduction device.  
714, Error Detection/Correction and Fault Detection/Recovery, the appropriate subclass for an error checking system and subclass 700 for generic skew detection or correction.
- 27 RECORDING OR REPRODUCING AN INFORMATION SIGNAL AND A CONTROL SIGNAL FOR CONTROLLING ELECTRONICS OF REPRODUCER:**  
This subclass is indented under the class definition. Subject matter wherein, during recording of an information signal, a control signal is generated and recorded and is used during reproduction to control the electronic circuitry through which the information signal is processed.
- (1) Note. The control signal used herein is distinct from or in addition to the normal

clock and synchronizing signals associated with digital and video signals, respectively.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 13+, for magnetic record editing where a recorded control signal may be used.
- 51, for controlling digital signal reproduction using clock signals.
- 69+, for controlling the recorder mechanism in response to a recorded control signal.

SEE OR SEARCH CLASS:

- 386, Motion Video Signal Processing for Recording or Reproducing, appropriate subclasses for recording television or video signal, particularly subclasses 239 through 262 for generating additional data useful in processing or controlling of a video signal in a video recording and reproduction device.

**28 Reference carrier to control demodulator:**  
This subclass is indented under subclass 27. Subject matter wherein the control signal is a recorded reference carrier which is used to control the demodulation of the reproduced information signal.

**29 MODULATING OR DEMODULATING:**  
This subclass is indented under the class definition. Subject matter including specific modulator or demodulator circuitry or techniques.

SEE OR SEARCH CLASS:

- 329, Demodulators, appropriate subclasses for demodulators of general utility.
- 332, Modulators, appropriate subclasses, for modulators and demodulators of general utility.

**30 Frequency:**  
This subclass is indented under subclass 29. Subject matter including specific frequency modulation or demodulation of a signal.

**31 MONITORING OR TESTING THE PROGRESS OF RECORDING:**

This subclass is indented under the class definition. Subject matter wherein, during recording, the recorded information signal is reproduced in whole or in part for qualitative analysis of the operation of the recorder system or a part thereof.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 25, for record carrier characteristic determination and compensation.
- 53, for digital data error checking.

**32 CONVERTING AN ANALOG SIGNAL TO DIGITAL FORM FOR RECORDING; REPRODUCING AND RECONVERTING:**

This subclass is indented under the class definition. Subject matter including producing a digital equivalent of a nondigital signal for recording, or producing a nondigital equivalent of a reproduced digital signal.

SEE OR SEARCH CLASS:

- 235, Registers, subclasses 321+, for analog-digital converters.

**39 GENERAL PROCESSING OF A DIGITAL SIGNAL:**

This subclass is indented under the class definition. Subject matter of specific utility in treating a digital signal for recording or reproducing.

(1) Note. This subclass is the residual area for devices and methods concerned with processing digital signals in a manner not provided for above. Digital signal processing properly classified above should not, as a matter of course, be cross-referenced here.

(2) Note. Although specific mechanical apparatus may be included in the subject matter of this and indented subclasses, the subject matter herein remains generally electronic in nature and its utility is in distinctive handling of a digital signal.



SEE OR SEARCH THIS CLASS, SUBCLASS:

- 55+, for generally usable recording or reproducing techniques.
- 69+, for automatically controlling recorder or reproducer mechanisms.
- 79, for recorder or reproducer control of an external device
- 81+, 88 and 101, for recorder or reproducer mechanisms.
- 220 through 224, 230-237.1, 240-246.8, 110-130.34, and 131-136, for recorder or reproducer elements.

SEE OR SEARCH CLASS:

- 178, Telegraphy, appropriate subclasses, particularly 17+ for code recorders.
- 235, Registers, subclasses 61+, for calculators combined with recorders.
- 326, Electronic Digital Logic Circuitry, for electronic digital circuits operating on a digital signal.
- 327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 1+ for pulse discriminating or selecting and subclasses 100+ for pulse parameter (e.g., amplitude) control.
- 341, Coded Data Generation or Conversion, subclass 15 for a magnetic pattern reading type analog to digital converter and subclasses 50+ for code converters.
- 365, Static Information Storage and Retrieval, appropriate subclass for the static storage/retrieval of information.
- 700, Data Processing: Generic Control Systems or Specific Applications, subclasses 1 through 89 for general-purpose digital control systems (e.g., computer arrangements for open and closed loop feedback control).
- 708, Electrical Computers: Arithmetic Processing and Calculating, subclasses 100+ for digital calculating computers and generic digital arithmetic processing circuits and methods.
- 711, Electrical Computers and Digital Processing Systems: Memory, subclasses 1+ for addressing combined with specific memory configurations (e.g., extended, expanded, dynamic, etc.) in a digital data processing sys-

tem, subclasses 100+ for generalized address forming, and subclasses 200+ for generalized storage accessing and control in a digital data processing system.

- 714, Error Detection/Correction and Fault Detection/Recovery, subclasses 1+ for reliability and availability in a digital data processing system.

**40 In specific code or form:**

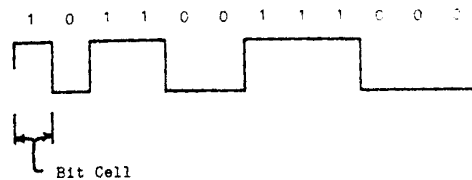
This subclass is indented under subclass 39. Subject matter including generating a waveform from digital data or reproducing such a waveform, the frequency, shape, polarity or other characteristic thereof being indicative of the digital data.

SEE OR SEARCH CLASS:

- 341, Coded Data Generation or Conversion, appropriate subclasses for code converters.

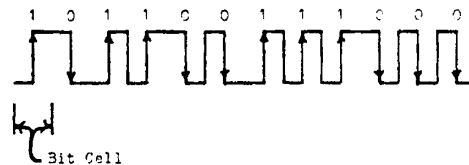
**41 Nonreturn to zero:**

This subclass is indented under subclass 40. Subject matter wherein a first or opposite polarization of the record throughout an entire bit cell is indicative of a first or second binary digit and transitions in polarity occur only between unlike digits. Example:



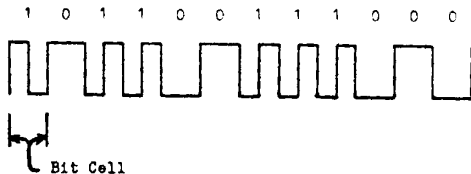
**42 Phase code:**

This subclass is indented under subclass 40. Subject matter wherein a transition in polarity in a first direction is indicative of a first binary digit and a transition in polarity in an opposite direction is indicative of the second binary digit. Example:

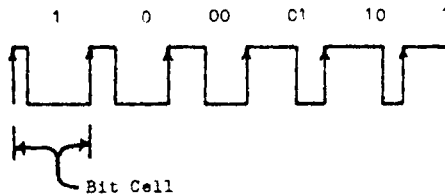


**43 Multi-frequency:**

This subclass is indented under subclass 40. Subject matter wherein a first binary digit is indicated by one full cycle of the waveform per bit cell and the second binary digit is indicated by one-half cycle of the waveform per bit cell. Example:

**44 Intra-cell transition:**

This subclass is indented under subclass 40. Subject matter wherein a transition in polarity occurs within the boundaries of each bit cell and the position of that transition is indicative of the data recorded. Example:

**45 Pulse crowding correction:**

This subclass is indented under subclass 39. Subject matter wherein the fringing effects of high density recording are subdued.

**46 Head amplifier circuit:**

This subclass is indented under subclass 39. Subject matter including circuitry proximate to the recording transducer for producing sufficient current in response to an input signal to properly polarize the record.

**47 Redundant or complimentary tracks:**

This subclass is indented under subclass 39. Subject matter wherein the same data is recorded in plural tracks in the same or complimentary forms.

**48 Data in specific format:**

This subclass is indented under subclass 39. Subject matter wherein the data is recorded in words or blocks of specific numbers of bits or wherein words or blocks of data are arranged in a specific manner on the record.

**49 Address coding:**

This subclass is indented under subclass 39. Subject matter including specific patterns of digits which are used to indicate the location of selected blocks of data.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

72, for automatically positioning a particular portion of a record carrier at a transducing station.

**50 Inter-record gap processing:**

This subclass is indented under subclass 39. Subject matter including controlling the spacing between blocks of data.

**51 Data clocking:**

This subclass is indented under subclass 39. Subject matter including developing or using a timing signal for gating digits or data during recording or reproducing.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

26, for electronic skew correction using data clocking.

**52 With incremental movement between record and head:**

This subclass is indented under subclass 51. Subject matter including producing an increment of movement between record and head for each digit of data transduced.

**53 Data verification:**

This subclass is indented under subclass 39. Subject matter including checking reproduced data for errors in content.

SEE OR SEARCH CLASS:

714, Error Detection/Correction and Fault Detection/Recovery, appropriate subclasses for error checking system.

**54 Data recirculation:**

This subclass is indented under subclass 39. Subject matter including recording, reproducing and re-recording data in one continuing operation.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

7, for momentary delay of an analog signal.

**55 GENERAL RECORDING OR REPRODUCING:**

This subclass is indented under the class definition. Subject matter including the use of magnetic or other physical phenomena, specific techniques or specific circuitry for magnetically recording or reproducing information in any signal form.

(1) Note. This subclass is the residual area for devices and methods concerned with processing of signals in a manner not provided for above. Subject matter properly classified above should not, as a matter of course, be cross-referenced here.

(2) Note. Documents including general descriptions of the phenomena of magnetic recording but are principally concerned with mechanisms or elements falling within the class definition should not be classified in this subclass. See mechanism or element subclasses below.

**57 Selective erase recording:**

This subclass is indented under subclass 55. Subject matter including recording information by selectively erasing a prerecorded signal.

**58 Boundary displacement recording or transducers:**

This subclass is indented under subclass 55. Subject matter including shifting the boundary between oppositely polarized regions of a record carrier in response to an information signal.

**59 Thermomagnetic recording or transducers:**

This subclass is indented under subclass 55. Subject matter including changing the coercivity of a record carrier by applying heat thereto

in proportion to an information signal or in addition to a magnetic field which is proportional to an information signal.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

16+, for thermo-magnetic record copying.

SEE OR SEARCH CLASS:

346, Recorders, subclass 74.2, for thermo-magnetic pictorial recording.

**60 Recording-or erasing-prevention:**

This subclass is indented under subclass 55. Subject matter including sensing or indicating the existence of an earlier recording on a record carrier and preventing erasure or double exposure of the carrier.

SEE OR SEARCH CLASS:

705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, subclasses 51 through 54 for usage protection of a distributed data file.

**61 Signal switching:**

This subclass is indented under subclass 55. Subject matter including specific switching elements or techniques within the information signal circuitry.

SEE OR SEARCH CLASS:

200, Electricity: Circuit Makers and Breakers, appropriate subclasses, for switching devices.

307, Electrical Transmission or Interconnection Systems, subclasses 112+ for class appropriate switching systems.

327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 365+ for miscellaneous gating circuits.

**62 Record-reproduce:**

This subclass is indented under subclass 61. Subject matter wherein the switching accomplishes a change between recording and reproducing modes of operation.

**63 Between plural stationary heads:**  
This subclass is indented under subclass 61. Subject matter wherein the switching accomplishes the selection of one or more of a plurality of stationary transducers.

**64 Between heads in alternate engagement with medium:**  
This subclass is indented under subclass 61. Subject matter wherein the switching accomplishes the selection of that transducer which is in engagement with the record carrier from a plurality of transducers which are alternately in engagement with the record carrier.

**65 Specifics of equalizing:**  
This subclass is indented under subclass 55. Subject matter including specific circuitry or techniques for correcting the inherent nonlinear frequency characteristics of magnetic recording or reproducing.

SEE OR SEARCH THIS CLASS, SUBCLASS:

24, for split signal equalizers.  
25, for compensating for record carrier peculiarities.

SEE OR SEARCH CLASS:

333, Wave Transmission Lines and Networks, subclass 28 and the classes indicated in the definition of that subclass for equalizers in general.

**66 Specifics of biasing or erasing:**  
This subclass is indented under subclass 55. Subject matter including specific circuitry or techniques for correcting the inherent nonlinear amplitude characteristics of magnetic recording or for erasing existing recordings.

SEE OR SEARCH THIS CLASS, SUBCLASS:

25, for modifying information or bias signal to accommodate for record carrier characteristics.

SEE OR SEARCH CLASS:

331, Oscillators, appropriate subclasses, for oscillators usable in biasing or erasing.

**67 Specifics of the amplifier:**  
This subclass is indented under subclass 55. Subject matter including specific circuitry or techniques for amplifying an information signal.

SEE OR SEARCH CLASS:

330, Amplifiers, appropriate subclasses, for amplifiers usable in magnetic recording or reproducing.

**68 Recording amplifier:**  
This subclass is indented under subclass 67. Subject matter wherein the amplification is specifically adapted for recording.

**69 AUTOMATIC CONTROL OF A RECORDER MECHANISM:**

This subclass is indented under the class definition. Subject matter which, without proximate human intervention, will actively control a recorder or reproducer mechanism.

(1) Note. Apparatus of this and indented subclasses usually require the sensing of a control signal from the record carrier to control the recorder or reproducer mechanism. However, devices responsive to signals emanating from external devices, or devices responsive to control signals which normally accompany or are a part of an information signal to be recorded or reproduced, are also included in this and indented subclasses.

(2) Note. The signal sensed from the record carrier may be a signal which was magnetically recorded thereon or an electrical or mechanical signal generated by mechanically, electrically or optically sensing an attachment to or modification of the record carrier.

SEE OR SEARCH CLASS:

226, Advancing Material of Indeterminate Length, subclasses 10+, for material-responsive control means.

242, Winding, Tensioning, or Guiding, subclasses 324+ for means for unwinding and rewinding a machine convertible information carrier; e.g., a magnetic tape, particularly subclasses 333+ for automated stop or reversal

- control for the carrier, subclasses 334+ for a carrier speed or tension control, and subclass 357 for a detector or stop.
- 318, Electricity: Motive Power Systems, appropriate subclasses, particularly 560+, for automatic motor control devices.
- 70 Synchronizing moving-head moving-record recorders:**  
This subclass is indented under subclass 69. Subject matter including controlling the speed or position of movement of a head with respect to a moving record carrier or vice versa.
- (1) Note. This subclass includes rotating head pressure shoe servos.
- 71 Controlling the record:**  
This subclass is indented under subclass 69. Subject matter including controlling record carrier movement or position with respect to a transducing position.
- 72.1 Locating specific areas:**  
This subclass is indented under subclass 71. Subject matter wherein the record carrier movement is controlled to bring selected areas of the record into operative position at the recording head to transduce the information recorded thereat.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
13+, for editing magnetic records which may involve locating specific areas.  
74.1, for stopping and reversing per se.
- 72.2 Responsive to recorded address:**  
This subclass is indented under subclass 72.1. Subject matter wherein the record carrier has address signals recorded thereon and these are read to locate the selected area.
- SEE OR SEARCH CLASS:  
386, Motion Video Signal Processing for Recording or Reproducing, appropriate subclasses for recording television or video signal, particularly subclass 320 for servo control in a video recording and reproduction device.
- 72.3 Responsive to tape transport:**  
This subclass is indented under subclass 72.1. Subject matter wherein the transport mechanism itself is monitored to control the location of the selected area (e.g., reel or capstan shaft rotation).
- 73.01 Speed:**  
This subclass is indented under subclass 71. Subject matter which controls the speed of a record carrier past a transducing position.
- 73.02 Control of relative speed between carriers:**  
This subclass is indented under subclass 73.01. Subject matter which controls the difference in speed between plural record carriers.
- 73.03 Rotary carrier:**  
This subclass is indented under subclass 73.01. Subject matter including structure to advance the record medium in a circular path past the transducing position.
- 73.04 Linear carrier:**  
This subclass is indented under subclass 73.01. Subject matter in which the motion of the record carrier is substantially along a single axis.
- 73.05 Plural speed transport:**  
This subclass is indented under subclass 73.04. Subject matter having structure to provide differing speeds for the record carrier.
- 73.06 Automatic change between fixed speeds:**  
This subclass is indented under subclass 73.05. Subject matter for changing between two predetermined speeds in the same direction in response to a sensed condition or signal.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
74.1+, for stopping and reversing of a magnetic record carrier.
- 73.07 Automatic selection of carrier or track speed:**  
This subclass is indented under subclass 73.05. Subject matter for selection of the speed of advance of the carrier in response to a record carrier or track parameter.

- 73.08 Variable speed:**  
This subclass is indented under subclass 73.05. Subject matter including adjustment or variation of the speed of the record carrier.
- 73.09 Constant speed:**  
This subclass is indented under subclass 73.04. Subject matter for advancing an elongate record carrier past a transducing position at a constant speed.
- 73.11 By reproduced control signal and transport derived signal:**  
This subclass is indented under subclass 73.09. Subject matter wherein the speed of the record carrier is controlled by a signal reproduced from the record carrier and a signal sensed by a condition of the carrier advancing mechanism.
- 73.12 By reproduced control signal:**  
This subclass is indented under subclass 73.09. Subject matter wherein a constant speed record carrier advancing mechanism is controlled by a signal reproduced from the carrier.
- 73.13 From separate track:**  
This subclass is indented under subclass 73.12. Subject matter wherein the control signal is stored on a track on the record carrier distinct from other information recorded thereon.
- 73.14 By signal derived from transport:**  
This subclass is indented under subclass 73.09. Subject matter wherein the speed of the record carrier is controlled by a signal sensed by a condition of the carrier advancing mechanism.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
73.11, for record carrier speed control by a signal derived from the record transport combined with a signal reproduced from the record carrier.
- 74.1 Stopping or reversing:**  
This subclass is indented under subclass 71. Subject matter wherein stopping or reversing of the record carrier's movement is controlled.
- 74.2 Responsive to real rotation:**  
This subclass is indented under subclass 74.1. Subject matter where the stopping or reversing is controlled by detecting stoppage of reel rotation.
- 74.3 Responsive to tape tension:**  
This subclass is indented under subclass 74.1. Subject matter where the stopping or reversing is controlled by detecting a predetermined tape tension.
- (1) Note. The subject matter of this subclass includes detecting the absence of tape.
- 74.4 Responsive to magnetic recorded signals:**  
This subclass is indented under subclass 74.1. Subject matter where signals are magnetically recorded on the record and the stopping or reversing is controlled by detecting these signals.
- (1) Note. The subject matter of this subclass includes sensing the absence of the magnetic signals.
- (2) Note. The magnetic signals are either the information signals or separate control signals recorded on the record.
- 74.5 Responsive to physical property of record:**  
This subclass is indented under subclass 74.1. Subject matter where the stopping or reversing is controlled by detecting a physical property of the record (i.e., notch, slot, etc.).
- 74.6 Photoelectric:**  
This subclass is indented under subclass 74.5. Subject matter where a portion of the record has a light transmitting or reflecting property that differs from the rest of the record and photoelectric means are used to detect such to control the stopping or reversing.
- 74.7 Conductive:**  
This subclass is indented under subclass 74.5. Subject matter where a portion of the record has an electrical conductivity that differs from the rest of the record and the stopping or reversing is controlled by detecting such.

**75 Controlling the head:**

This subclass is indented under subclass 69. Subject matter including controlling head position.

**SEE OR SEARCH CLASS:**

386, Motion Video Signal Processing for Recording or Reproducing, appropriate subclasses for recording television or video signal, particularly subclasses 315 through 321 for controlling head position in a video recording and reproduction device.

**76 Azimuth or skew:**

This subclass is indented under subclass 75. Subject matter wherein the angle between head gap or gaps and record track or tracks is controlled.

**77.01 Track centering:**

This subclass is indented under subclass 75. Subject matter for aligning a transducer head with the midpoint of a continuous information containing path.

**SEE OR SEARCH CLASS:**

369, Dynamic Information Storage or Retrieval, subclasses 43+ for a transducer tracking servomechanism in a nonmagnetic dynamic recording or reproducing device.

428, Stock Material or Miscellaneous Articles, subclass 845.6 for magnetic storage medium having backcoat layer for servo tracking, with specific physical chemistry or chemical composition; and subclass 848.5 for magnetic storage medium having specified pits, tracks, or indicia with specific physical chemistry or chemical composition.

**77.02 Rotary carrier:**

This subclass is indented under subclass 77.01. Subject matter which controls a transducer centering position relative to a circular revolving medium.

**77.03 By nonmagnetic sensing (e.g., optical, capacitive):**

This subclass is indented under subclass 77.02. Subject matter responsive to a signal produced in response to a property of the record carrier other than a magnetic property, or by a nonmagnetic auxiliary element.

- (1) Note. Such an auxiliary element may include a potentiometer, or an optical grating, mechanically coupled to the transducer element.

**SEE OR SEARCH CLASS:**

369, Dynamic Information Storage or Retrieval, subclass 14 for simultaneous magnetic and nonmagnetic signal reproduction; subclasses 43+ for servo positioning of a nonmagnetic reproduction transducer; subclasses 100+ for signal reproduction from an optical track; and subclass 126 for signal reproduction from a capacitive track.

**77.04 By memory storage of repeatable error or correction:**

This subclass is indented under subclass 77.02. Subject matter including a signal storage device which is used to generate a transducer head position control signal.

**77.05 By servo signal component from carrier surface separate from information signal bearing surface:**

This subclass is indented under subclass 77.02. Subject matter wherein the record carrier includes two surfaces one of which has a continuous path along which an information signal is stored and the other has a continuous path along which at least a component of a transducer head positioning servo control signal is stored.

**77.06 Reproduced data signal used for tracking:**

This subclass is indented under subclass 77.02. Subject matter for processing a reproduced information signal to control the transducer position.

- 77.07 By tracking signal recorded on or immediately beneath surface:**  
This subclass is indented under subclass 77.02. Subject matter for processing a signal reproduced from the record carrier for controlling transducer head motion and which signal is distinct from a reproduced information signal.
- 77.08 Distinct servo sector:**  
This subclass is indented under subclass 77.07. Subject matter wherein a transducer head motor control signal is stored in a disk sector distinct from sectors containing information signals.
- 77.11 Continuous servo signal:**  
This subclass is indented under subclass 77.07. Subject matter wherein the record carrier includes a continuous path along which a transducer positioning servo control signal is stored.
- 77.12 Elongate web carrier (i.e., tape):**  
This subclass is indented under subclass 77.01. Subject matter wherein the transducer head is aligned with the midpoint of a track on a record carrier the length of which is much greater than its width.
- 77.13 Transverse scan path:**  
This subclass is indented under subclass 77.12. Subject matter where the resultant motion of the transducer head is at an angle to the forward motion of the record carrier.
- 77.14 By pilot signal:**  
This subclass is indented under subclass 77.13. Subject matter wherein the centering of the transducer head over the transverse track on the record carrier is controlled by a reference signal recorded on the transverse track.
- 77.15 Plural pilot signals along single transverse path:**  
This subclass is indented under subclass 77.14. Subject matter wherein multiple reference signals recorded along a transverse track on the record carrier are used to control the motion of the transducer head.
- 77.16 Having head deflection drive (e.g., piezoelectric bimorph):**  
This subclass is indented under subclass 77.13. Subject matter having an electrostatically actuated device for moving the transducer head.
- 77.17 Dithering:**  
This subclass is indented under subclass 77.16. Subject matter in which a low amplitude A.C. signal is applied to the transducer head deflection drive.
- 78.01 Track changing:**  
This subclass is indented under subclass 75. Subject matter having structure to change the path of the head on the record medium from one continuous information containing path to another.
- 78.02 Tape:**  
This subclass is indented under subclass 78.01. Subject matter wherein the length of the record carrier is much greater than its width.
- 78.03 Plural tapes:**  
This subclass is indented under subclass 78.02. Subject matter wherein the transducer head changes between tracks on plural magnetic tapes.
- 78.04 For rotary carrier (e.g., disc):**  
This subclass is indented under subclass 78.01. Subject matter which causes a change in transducing position between tracks on a record carrier moving in circular motion.
- 78.05 Coarse and fine head drive motors:**  
This subclass is indented under subclass 78.04. Subject matter in which the transducer head is moved over the disk by plural motors having different resolution.
- 78.06 Specified velocity pattern during access:**  
This subclass is indented under subclass 78.04. Subject matter having a device for moving the transducer head in a particular sequence of velocities to access the desired track.
- 78.07 Controlled by memory device:**  
This subclass is indented under subclass 78.06. Subject matter having a signal storage device which is used to generate a transducer head velocity control signal.



**78.08 Specified spatial pattern during access:**

This subclass is indented under subclass 78.04. Subject matter wherein the motion of the transducer head between tracks has at least one controlled change in direction.

**78.09 Including model of servo system or element:**

This subclass is indented under subclass 78.04. Subject matter in which the track changing arrangement includes a device which simulates the operation of a servo system which controls the motion of a transducer head, or a component of such a system.

**78.11 Including nonmagnetic position sensing:**

This subclass is indented under subclass 78.04. Subject matter having track changing structure responsive to a signal produced in response to a property of the record carrier other than a magnetic property, or by a nonmagnetic auxiliary element.

- (1) Note. Such an auxiliary element may include a potentiometer, or an optical grating, mechanically coupled to the transducer element.

**SEE OR SEARCH CLASS:**

369, Dynamic Information Storage or Retrieval, subclasses 13.01 through 14 for combined magnetic and nonmagnetic (e.g., magneto-optical) signal reproduction, subclasses 30.01-30.99 for track selection in a nonmagnetic reproducing arrangement, subclasses 100-125 for signal reproduction from an optical track, and subclass 126 for signal reproduction from a capacitive track.

**78.12 Including particular head actuator:**

This subclass is indented under subclass 78.04. Subject matter including a detail of a transducer head moving mechanism.

**78.13 Stepping motor:**

This subclass is indented under subclass 78.12. Subject matter wherein the head is moved by an electric motor which produces motion in a series of discrete steps.

**78.14 By recorded servo reference or address signal:**

This subclass is indented under subclass 78.04. Subject matter wherein the head is controlled by a reproduced signal representing the position or address of the transducer head on the record carrier disk.

**78.15 Drum:**

This subclass is indented under subclass 78.04. Subject matter wherein the transducer head moves between tracks on the curved surface of a cylindrical record carrier.

**79 RECORDER CONTROL OF AN EXTERNAL DEVICE:**

This subclass is indented under the class definition. Subject matter wherein a signal sensed from the record carrier is used to control an external device.

- (1) Note. The signal sensed from the record carrier may be a signal which was magnetically recorded thereon or an electrical or mechanical signal generated by mechanically, electrically or optically sensing an attachment to or modification of the record carrier.
- (2) Note. A device which is extraneous to the normal function of recorders such as a printer for printing a label on the record from which the control signal is developed, although included within the same housing as the recorder, is considered an external device.

**SEE OR SEARCH CLASS:**

318, Electricity: Motive Power Systems, subclasses 567+ and classes indicated in the search notes thereunder, for program or pattern controlled devices.

**80 Slide or movie projectors:**

This subclass is indented under subclass 79. Subject matter wherein the external device is a slide or movie projector.

**SEE OR SEARCH CLASS:**

352, Optics: Motion Pictures, subclasses 15+, for this subject matter with significant motion picture structure.

- 353, Optics: Image Projectors, subclasses 15+, for this subject matter with significant slide projector structure.
- 81 RECORD TRANSPORT WITH HEAD MOVING DURING TRANSDUCING:**  
This subclass is indented under the class definition. Subject matter including a specific mechanism for moving a record carrier past a head which is also moving relative to both record carrier and the mechanism base during the recording or reproducing process.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
101, and 270-274, for moving head mounting means.
- SEE OR SEARCH CLASS:  
369, Dynamic Information Storage or Retrieval, subclass 97 for storage or retrieval by other than magnetic recording or reproduction with transverse head motion.
- 82 Belt record:**  
This subclass is indented under subclass 81. Subject matter wherein the record carrier is in the form of a closed loop.
- 83 Tape record:**  
This subclass is indented under subclass 81. Subject matter wherein the record carrier is in the form of an elongated tape.
- SEE OR SEARCH CLASS:  
226, Advancing Material of Indeterminate Length, appropriate subclasses, for tape drive means.  
242, Winding, Tensioning, or Guiding, subclasses 324+ for means for unwinding and rewinding a machine convertible information carrier; e.g., a magnetic tape, particularly subclasses 333+ for automated stop or reversal control for the carrier, subclasses 334+ for a carrier speed or tension control, and subclass 357 for a detector or stop.
- 84 Rotating head:**  
This subclass is indented under subclass 83. Subject matter wherein the movement of the head is a rotational movement.
- 85 Tape in container:**  
This subclass is indented under subclass 84. Subject matter wherein the record carrier is enclosed in a removable container.
- SEE OR SEARCH CLASS:  
242, Winding, Tensioning, or Guiding, subclass 324.2, 326+, and 335+ for a cartridge storage for a magnet carrier.
- 86 Disk record:**  
This subclass is indented under subclass 81. Subject matter wherein the record carrier is in the form of a disk.
- 87 Drum record:**  
This subclass is indented under subclass 81. Subject matter wherein the record carrier is in the form of a drum.
- 88 RECORD TRANSPORT WITH HEAD STATIONARY DURING TRANSDUCING:**  
This subclass is indented under the class definition. Subject matter including a specific mechanism for moving a record carrier past a head which is stationary during the recording or reproducing process.
- SEE OR SEARCH CLASS:  
369, Dynamic Information Storage or Retrieval, subclasses 258+, for non-magnetic devices of this type.
- 89 Wire record:**  
This subclass is indented under subclass 88. Subject matter wherein the record carrier is in the form of a wire.
- SEE OR SEARCH CLASS:  
242, Winding, Tensioning, or Guiding, subclasses 324.1+ for a wire-type, magnetic, signal carrier.
- 90 Tape record:**  
This subclass is indented under subclass 88. Subject matter wherein the record carrier is in the form of a tape.
- SEE OR SEARCH CLASS:  
226, Advancing Material of Indeterminate Length, appropriate subclasses for tape drive means.

- 242, Winding, Tensioning, or Guiding, subclasses 324+ for a device for unwinding and rewinding a machine convertible information carrier; e.g., a magnetic tape or image film.
- 91 Plural tapes:**  
This subclass is indented under subclass 90. Subject matter including means for handling a plurality of tapes.
- SEE OR SEARCH CLASS:  
352, Optics: Motion Pictures, subclass 6 and 123, for multiple motion picture recorders and reproducers.
- 92.1 Tape in container:**  
This subclass is indented under subclass 91. Subject matter wherein the plural tapes are enclosed in single or plural containers.
- 93 Tape in container:**  
This subclass is indented under subclass 90. Subject matter wherein the tape is enclosed in a removable container.
- SEE OR SEARCH CLASS:  
242, Winding, Tensioning, or Guiding, subclass 324.2, 326+, and 335+ for a cartridge storage for an information bearing carrier.
- 94 Transport accommodates different types:**  
This subclass is indented under subclass 93. Subject matter including means for accommodating or for adapting the recorder for use with different types of record containers.
- SEE OR SEARCH CLASS:  
242, Winding, Tensioning, or Guiding, subclass 336 for an adaptive or convertible cartridge or cartridge utilization device adapting a cartridge for a magnetic tape or the like to be used with different components.
- 95 With tape extraction:**  
This subclass is indented under subclass 93. Subject matter including means for extracting a portion of the tape from the container.
- 96.1 Plural reels:**  
This subclass is indented under subclass 93. Subject matter wherein the tape is wound on plural reels within the container.
- SEE OR SEARCH CLASS:  
242, Winding, Tensioning, or Guiding, subclasses 335+, particularly subclasses 341+ for a cartridge containing separate supply and take-up coils.
- 96.2 With dual capstan drive:**  
This subclass is indented under subclass 96.1. Subject matter including dual capstan drive for moving the tape.
- 96.3 Reel drive details:**  
This subclass is indented under subclass 96.1. Subject matter including details of the reel drive mechanism.
- SEE OR SEARCH CLASS:  
242, Winding, Tensioning, or Guiding, subclass 340 and 349+ for a particular coil drive.
- 96.4 With common capstan drive:**  
This subclass is indented under subclass 96.3. Subject matter wherein a single motor provides both the reel and capstan drive.
- 96.51 Container mounting details:**  
This subclass is indented under subclass 96.1. Subject matter includes details of the container mounting mechanism.
- (1) Note. This subclass and its indents also include container mounting structure where there is only a nominal recitation of the transport.
- SEE OR SEARCH CLASS:  
242, Winding, Tensioning, or Guiding, subclasses 338 through 242 and subclass 339 for details of a cartridge mounting.
- 96.61 With pivotal holder:**  
This subclass is indented under subclass 96.51. Subject matter wherein the container mounting mechanism includes a pivoted container holder that moves in an arc between a container loading position and a transducing position.

- 97.11 Disk record:**  
This subclass is indented under subclass 88. Subject matter in which the record carrier is a flat circular element.
- (1) Note. The mechanism for imparting motion for recording and reproduction is generally in a drive assembly and rotates the disk about the axis of symmetry of the disk.
- SEE OR SEARCH CLASS:  
341, Coded Data Generation or Conversion, subclass 15 for a digital pattern reading code converter or generator with a movable magnetically coded disk.
- 97.12 Environmental control:**  
This subclass is indented under subclass 97.11. Subject matter wherein an ambient condition in the enclosure is controlled.
- 97.13 Airflow:**  
This subclass is indented under subclass 97.12. Subject matter wherein the ambient condition is controlled by an air flow.
- 97.14 Having shroud:**  
This subclass is indented under subclass 97.13. Subject matter wherein the ambient conditions are controlled by a wall or similar structure surrounding the peripheral wall of the enclosure.
- 97.15 Having fins:**  
This subclass is indented under subclass 97.13. Subject matter wherein the ambient conditions are controlled by blades positioned within the enclosure; e.g., air stripper.
- 97.16 With filter:**  
This subclass is indented under subclass 97.13. Subject matter including means to clean or purify the air flow.
- 97.17 Recirculating filter:**  
This subclass is indented under subclass 94.16. Subject matter wherein the filter cleans or purifies air moving internally within the disk drive enclosure.
- 97.18 External air filter:**  
This subclass is indented under subclass 97.16. Subject matter wherein the filter cleans air coming from outside the enclosure.
- 97.19 Vibration or resonance suppression:**  
This subclass is indented under subclass 97.12. Subject matter comprising means for reducing undesired mechanical energy from translating to components within the enclosure.
- 97.2 Snubber:**  
This subclass is indented under subclass 97.12. Subject matter comprising details of structure that prevents the peripheral edges of the disk to come into contact with a base plate or head/arm assembly during impact or external forces.
- 97.21 EMI shielding:**  
This subclass is indented under subclass 97.12. Subject matter comprising means for reducing undesired electromagnetic interference from reaching the magnetic disk or head structure.
- 97.22 Using a fluid:**  
This subclass is indented under subclass 97.12. Subject matter wherein contamination in the enclosure is reduced by means of filling the enclosure with a particular liquid or gas; e.g., helium.
- 98.01 Plural disks:**  
This subclass is indented under subclass 97.11. Subject matter including structure for concurrent accommodation of multiple disks.
- 98.02 Axially fixed flexible disks:**  
This subclass is indented under subclass 98.01. Subject matter having structure for holding multiple flexible disks about a common axis.
- 98.03 With pneumatic partitioning of disks:**  
This subclass is indented under subclass 98.02. Subject matter with separation of a stack of flexible disks by use of a flowing stream of air.
- 98.04 Changer:**  
This subclass is indented under subclass 98.01. Subject matter for selectively moving a disk to the rotating mechanism in the drive.

- 98.05 Control detail:**  
This subclass is indented under subclass 98.04. Subject matter including a detail of a changer motion controlling mechanism.
- 98.06 Mechanical detail:**  
This subclass is indented under subclass 98.04. Subject matter including a detail of disk manipulating structure.
- 98.07 Rotational drive detail:**  
This subclass is indented under subclass 98.01. Subject matter including a structural detail of the disk rotating device in the drive.
- 98.08 Seating of disks:**  
This subclass is indented under subclass 98.01. Subject matter including a feature for retaining one of the disks in or on a disk rotating device.
- 99.01 Flexible disk:**  
This subclass is indented under subclass 97.11. Subject matter wherein the disk record carrier is bendable or pliable without permanent change.
- 99.02 Loading or ejecting mechanism:**  
This subclass is indented under subclass 99.01. Subject matter for moving the disk to or from the drive location where recording or reproduction is performed.
- 99.03 Motorized:**  
This subclass is indented under subclass 99.02. Subject matter wherein the loading or ejecting mechanism is operated by an electric motor.
- 99.04 Rotational drive detail:**  
This subclass is indented under subclass 99.01. Subject matter including a structural detail of the disk rotating device in the drive.
- 99.05 Disk seating:**  
This subclass is indented under subclass 99.01. Subject matter for retaining the flexible disk in or on a disk rotating device.
- 99.06 Loading or ejecting mechanism:**  
This subclass is indented under subclass 97.11. Subject matter for moving the disk to or from the drive location where recording or reproduction is performed.
- 99.07 Motorized:**  
This subclass is indented under subclass 99.06. Subject matter wherein the loading or ejecting mechanism is operated by an electric motor.
- 99.08 Rotational drive detail:**  
This subclass is indented under subclass 97.11. Subject matter including a structural detail of the disk rotating device in the drive.
- 99.09 Movable drive:**  
This subclass is indented under subclass 99.08. Subject matter for moving the drive to a disk storage location.
- 99.11 Stationary drive:**  
This subclass is indented under subclass 99.08. Subject matter with structure to move a disk from a storage location to the drive.
- 99.12 Disk seating:**  
This subclass is indented under subclass 97.11. Subject matter including a feature for retaining the disk in or on a disk rotating device.
- 99.13 Removable drive cartridge:**  
This subclass is indented under subclass 97.11. Subject matter in which an assembly of at least a disk record and a drive motor are encased in a self-contained enclosure unit that can be removed from an external structure; e.g., a computer housing.
- 99.14 Removable hard disk cartridge:**  
This subclass is indented under subclass 97.11. Subject matter in which a drive accepts a housed flat circular element that is not bendable or pliable.
- 99.15 Housing details:**  
This subclass is indented under subclass 97.11. Subject matter comprising details of an enclosure of the moving mechanism or head.
- 99.16 Base plate:**  
This subclass is indented under subclass 99.15. Subject matter comprising details of a bottom structure of the enclosure.
- 99.17 Laminated:**  
This subclass is indented under subclass 99.16. Subject matter wherein the bottom structure

- comprises two or more layers of material in contact.
- 99.18 Cover:**  
This subclass is indented under subclass 99.15. Subject matter comprising details of a top structure of the enclosure.
- 99.19 Laminated:**  
This subclass is indented under subclass 99.18. Subject matter wherein the top structure comprises two or more layers of material in contact.
- 99.2 Having fastening details of housing parts:**  
This subclass is indented under subclass 99.15. Subject matter comprising a structure for connecting elements of the enclosure.
- 99.21 Sealing:**  
This subclass is indented under subclass 99.2. Subject matter comprising means for reducing undesired external contaminants from entering the enclosure.
- 99.22 Gasket:**  
This subclass is indented under subclass 99.21. Subject matter wherein the means for reducing undesired external contaminants from entering the enclosure is a mechanical seal that fills the space between two mating surfaces.
- 99.23 Circuit board:**  
This subclass is indented under subclass 99.15. Subject matter including details of a means for mechanically supporting and electrically connecting electronic components using conductive pathways etched from copper sheets laminated onto a non-conductive substrate in the enclosure.
- 99.24 Attachment detail:**  
This subclass is indented under subclass 99.23. Subject matter comprising fastening means or other structure to facilitate attachment of the means for supporting and electrically connecting components in the enclosure.
- 99.25 Electrical interconnector:**  
This subclass is indented under subclass 99.23. Subject matter comprising details of a device to electrically connect the means for supporting and electrically connecting components to other electrical components in the enclosure.
- 100.1 Drum record:**  
This subclass is indented under subclass 88. Subject matter in which the record carrier is the curved surface of a cylindrical element.
- 101 HEAD TRANSPORT WITH RECORD STATIONARY DURING TRANSDUCING:**  
This subclass is indented under the class definition. Subject matter including a specific mechanism for moving a head past a record carrier which is stationary during the recording or reproducing process.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
81, for moving-head and moving-record devices.
- 110 HEAD:**  
This subclass is indented under the class definition. Subject matter including specific structure of a transducer.
- SEE OR SEARCH CLASS:  
29, Metal Working, subclass 603, for methods of manufacturing magnetic transducers.  
336, Inductor Devices, appropriate subclasses, for inductors in general.  
428, Stock Material or Miscellaneous Articles, subclasses 810 through 816 for magnetic recording component or stock with specified composition or physical chemistry, such as microstructure, or property resulting from microstructure, composition, or chemistry.
- 111 Flux gate:**  
This subclass is indented under subclass 110. Subject matter wherein the intensity of the flux emanating from a record is determined by applying a carrier wave to the head and detecting the modulation of that carrier wave caused by the flux.
- (1) Note. Excitation circuitry for flux gate heads is included herein.
- SEE OR SEARCH CLASS:  
324, Electricity: Measuring and Testing, subclasses 253+, for magnetometers.

- 112 Hall effect:**  
This subclass is indented under subclass 110. Subject matter wherein the intensity of the flux emanating from a record is determined by generating an electric field in an element exhibiting the Hall effect and detecting the modulation of the field caused by the flux.
- SEE OR SEARCH CLASS:  
324, Electricity: Measuring and Testing, subclass 251, for Hall effect magnetic sensors in general.  
365, Static Information Storage and Retrieval, subclass 9 for Hall effect magnetic bubble devices, subclass 170 for static storage systems which use Hall effect devices.
- 114.01 Read only detector using light for reading magnetically recorded information on tape:**  
This subclass is indented under subclass 110. Subject matter wherein the intensity of the flux emanating from a record in the form of a tape is determined by directing a beam of polarized light at the tape and detecting the rotation of polarization caused by the flux.
- 114.02 Light beam generator detail:**  
This subclass is indented under subclass 114.01. Subject matter including specifics of a structure generating the light beam.
- 114.03 Focus detail:**  
This subclass is indented under subclass 114.02. Subject matter including specifics of a structure providing focus of the light beam.
- 114.04 Beam splitter detail:**  
This subclass is indented under subclass 114.01. Subject matter including specifics of a structure dividing the light beam into multiple parts.
- 114.05 Readout detector detail:**  
This subclass is indented under subclass 114.01. Subject matter including specifics of a structure receiving the light beam after it interacts with the flux on the tape and analyzes the light beam to determine its rotation.
- 114.06 Focus detail:**  
This subclass is indented under subclass 114.05. Subject matter including specifics of a structure providing focus of the light beam after it interacts with the flux on the tape.
- 114.07 Circuit detail:**  
This subclass is indented under subclass 114.05. Subject matter including specifics of the circuit used in analyzing the light beam after it interacts with the flux on the tape.
- 114.08 Detector material detail:**  
This subclass is indented under subclass 114.05. Subject matter including specifics of the material used for the detector.
- 114.09 Mounting detail:**  
This subclass is indented under subclass 114.05. Subject matter including specifics of a structure used to attach the detector on the tape recorder.
- 114.1 Rotary head:**  
This subclass is indented under subclass 114.01. Subject matter wherein the read only detector is utilized in the tape recorder where the heads are moved in a rotary path during transducing.
- 115 Flux scanning:**  
This subclass is indented under subclass 110. Subject matter wherein the transducing area of a head is of substantially lesser width than that of the head and the transducing area is caused to move by applying opposing fluxes to different regions of the head.
- 116 Cathode ray:**  
This subclass is indented under subclass 110. Subject matter wherein the transducer includes a means of generating a cathode ray and the cathode ray is used to produce, detect or control production or detection of magnetic flux.
- SEE OR SEARCH CLASS:  
324, Electricity: Measuring and Testing, subclass 250, for cathode ray magnetic field detectors.

- 117 Hand-held:**  
This subclass is indented under subclass 110. Subject matter wherein the transducer is specifically adapted to be held in the hand of the user.
- 118 Erase:**  
This subclass is indented under subclass 110. Subject matter wherein the transducer is specifically adapted for use in erasing a magnetic record.
- SEE OR SEARCH CLASS:  
361, Electricity: Electrical Systems and Devices, subclasses 143+, 159 and 267 for magnetic record erasers not associated with recorders or reproducers.
- 119.01 Gap spacer:**  
This subclass is indented under subclass 110. Subject matter including a detail of a nonmagnetic element located between poles of a head to define the transducing area.
- 119.02 For perpendicular recording head:**  
This subclass is indented under subclass 119.01. Subject matter wherein the transducer is configured to record data in a storage medium by orienting magnetic domains normal to the plane of the storage medium.
- (1) Note. Although this definition refers to the plane of a storage medium, it is understood that media may have a non-planar macroscopic shape.
- 119.03 Laminated spacer:**  
This subclass is indented under subclass 119.02. Subject matter wherein the gap spacer is made up of a plurality of layers.
- 119.04 Configuration detail:**  
This subclass is indented under subclass 119.02. Subject matter including a detail of the structural form of the gap spacer.
- 119.05 For longitudinal thin film recording head:**  
This subclass is indented under subclass 119.01. Subject matter wherein the transducer comprises a plurality of thin layers and is configured to record data in a storage medium by orienting magnetic domains parallel to the plane of the storage medium.
- (1) Note. Although this definition refers to the plane of the storage medium, it is understood that media may have a non-planar macroscopic shape.
- 119.06 Pancake type:**  
This subclass is indented under subclass 119.05. Subject matter wherein the layers are located in planes parallel to the plane of the storage medium.
- 119.07 Laminated spacer:**  
This subclass is indented under subclass 119.05. Subject matter wherein the gap spacer is made up of a plurality of layers.
- (1) Note. Metal in gap (MIG) can be found in this subclass.
- 119.08 With thermally conductive material:**  
This subclass is indented under subclass 119.07. Subject matter wherein one of the layers of the spacer is a material which transfers heat.
- 119.09 With diffusion barrier:**  
This subclass is indented under subclass 119.07. Subject matter wherein one of the layers of the spacer is a layer for preventing particles of spacer material from migrating out of the spacer area and into other layers of the transducer.
- 119.1 Three or more layers:**  
This subclass is indented under subclass 119.07. Subject matter wherein the number of layers is greater than two.
- 119.11 Configuration detail:**  
This subclass is indented under subclass 119.05. Subject matter includes a detail of the structural form of the gap spacer.
- 119.12 Nonuniform width transducing face:**  
This subclass is indented under subclass 119.11. Subject matter wherein the surface of the gap spacer facing the medium has a varying side-to-side measurement in the transverse direction of a recorded track.



**119.13 Nonuniform width vertically:**

This subclass is indented under subclass 119.11. Subject matter wherein a cross section of the gap spacer, in the transverse direction of a recorded track, varies along its extent normal to the storage medium.

**121 Plural gaps:**

This subclass is indented under subclass 110. Subject matter includes detailed structure of plural gap transducers.

**122 Head surface structure:**

This subclass is indented under subclass 110. Subject matter wherein the shape, composition or other characteristic of that surface of the head which is proximate the record is specifically described.

**123.01 Coil:**

This subclass is indented under subclass 110. Subject matter including a detail of the position, size, inductance or other feature of the traces used to generate magnetic flux in the head.

- (1) Note. The term "trace" in the art is a singular wire or ribbon or strand of conductive material. Typically, multiple traces make up a coil.

SEE OR SEARCH CLASS:

336, Inductor Devices, subclasses 5 through 234 for inductor windings.

**123.02 For perpendicular recording head:**

This subclass is indented under subclass 123.01. Subject matter wherein a transducer is configured to record data in a storage medium by orienting magnetic domains normal to the plane of the storage medium.

- (1) Note. Although this definition refers to the plane of the storage medium, it is understood that the medium may have a nonplanar macroscopic shape.

**123.03 Location:**

This subclass is indented under subclass 123.02. Subject matter includes a detail of the position of the coil with respect to a specific part of the head structure.

**123.04 On return pole:**

This subclass is indented under subclass 123.03. Subject matter wherein the coil is positioned on or about a flux returning pole of the head structure.

**123.05 On main/recording pole:**

This subclass is indented under subclass 123.03. Subject matter wherein the coil is positioned on or about a flux-emanating pole of the head structure.

**123.06 Configuration detail:**

This subclass is indented under subclass 123.02. Subject matter including a detail of the structural form of the coil.

**123.07 Nonuniform trace spacing:**

This subclass is indented under subclass 123.06. Subject matter including a detail of the spacing between individual traces of the coil, where that spacing is not constant.

**123.08 Trace cross section shape:**

This subclass is indented under subclass 123.06. Subject matter including a detail of the cross-sectional configuration of an individual trace.

**123.09 Insulation detail:**

This subclass is indented under subclass 123.02. Subject matter including a detail of a nonmagnetic, nonelectrically conductive material used to encapsulate and isolate the coil.

**123.1 Electrical connection detail:**

This subclass is indented under subclass 123.02. Subject matter including a detail of a structure that provides a conductive path between the coil and an external device.

**123.11 Plural separate coils:**

This subclass is indented under subclass 123.02. Subject matter wherein the coil is made up of at least two distinct groups of turns of traces.

**123.12 Shielding/protection:**

This subclass is indented under subclass 123.02. Subject matter including a detail of a material or structure which protects or shields the coil, e.g., electrical shielding, corrosion protection.

**SEE OR SEARCH CLASS:**

320, Electricity: Battery or Capacitor Charging or Discharging, subclasses 100 through 167 for detail of magnetic shielding, head insulation, respectively, accompanied with a magnetoresistive (MR) type read head.

**123.13 For thin film longitudinal recording head:**

This subclass is indented under subclass 123.01. Subject matter wherein the transducer comprises a plurality of thin layers and is configured to record data in a storage medium by orienting magnetic domains parallel to the plane of the storage medium.

- (1) Note. Although this definition refers to the plane of the storage medium, it is understood that the medium may have a nonplanar macroscopic shape.

**123.14 Pancake type:**

This subclass is indented under subclass 123.13. Subject matter wherein the layers are located in planes parallel to the plane of the medium.

**123.15 Plural coil layers:**

This subclass is indented under subclass 123.14. Subject matter wherein the coil is made up of more than one layer, with each layer positioned in a plane parallel to the plane of the medium.

**123.16 Insulation detail:**

This subclass is indented under subclass 123.14. Subject matter including a detail of the nonmagnetic, nonelectrically conductive material used to encapsulate and isolate the coil.

**123.17 Plural separate coils:**

This subclass is indented under subclass 123.13. Subject matter wherein coil is made up of at least two distinct groups of turns of traces.

**123.18 Single plane coil:**

This subclass is indented under subclass 123.13. Subject matter wherein the coil is made up of plural connected conductive traces located in one plane perpendicular to the plane of the medium.

**123.19 Configuration detail:**

This subclass is indented under subclass 123.18. Subject matter including a detail of the structural form of the winding.

**123.2 Trace cross section shape:**

This subclass is indented under subclass 123.19. Subject matter including a detail of the cross-sectional configuration of an individual trace.

**123.21 Trace spacing:**

This subclass is indented under subclass 123.19. Subject matter including a detail of the spacing between individual traces of the winding.

**123.22 Coil spacing from storage medium:**

This subclass is indented under subclass 123.19. Subject matter including a detail of the spacing of the trace closest to the medium.

**123.23 Coil spacing from plane of gap:**

This subclass is indented under subclass 123.19. Subject matter includes a detail of the spacing from the plane of the coil to a plane of the gap, the spacing being measured in the direction of travel of the medium.

- (1) Note. The gap is the transducing gap that allows the flux to pass through during the writing/recording process.

**123.24 Seed layer:**

This subclass is indented under subclass 123.18. Subject matter wherein one or more additional layers are provided to promote disposition or growth of coil material.

**123.25 Insulation detail:**

This subclass is indented under subclass 123.18. Subject matter includes a detail of a nonmagnetic, nonelectrically conductive material used to encapsulate and isolate the coil.

**123.26 Zero throat height detail:**

This subclass is indented under subclass 123.25. Subject matter wherein the detail of the insulation pertains to the point at which the distance between the poles begins to increase.

**123.27 Apex angle:**

This subclass is indented under subclass 123.25. Subject matter includes a detail of the configuration of the nonmagnetic, nonelectrically conductive insulation that defines the slope of a pole adjacent a pole tip region.

- (1) Note. A pole tip region is the area closest to the storage medium.

**123.28 Plural layers:**

This subclass is indented under subclass 123.25. Subject matter wherein the nonmagnetic, nonelectrically conductive insulation is made up of more than one layer.

**123.29 Diverse materials:**

This subclass is indented under subclass 123.28. Subject matter wherein at least one of the plural layers is of a material different from that of the other layers.

**123.3 Planarizing layer:**

This subclass is indented under subclass 123.28. Subject matter wherein at least one of the plural insulation layers is provided to form a flat surface.

**123.31 Below coil:**

This subclass is indented under subclass 123.28. Subject matter wherein more than one of the plural insulation layers are positioned below the plane of the coil.

**123.32 Above coil:**

This subclass is indented under subclass 123.28. Subject matter wherein more than one of the plural insulation layers are positioned above the plane of the coil.

**123.33 Between traces:**

This subclass is indented under subclass 123.28. Subject matter wherein more than one of the plural insulation layers are positioned between individual conductive traces of the coil.

**123.34 Between coil and medium:**

This subclass is indented under subclass 123.28. Subject matter wherein more than one of the plural insulation layers are positioned between the medium and the trace closest to the medium.

**123.35 Plural diverse layers:**

This subclass is indented under subclass 123.18. Subject matter wherein each trace of the coil is made up of more than one layer, at least one of which is of a material different from that of the other layers.

**123.36 Electrical connection detail:**

This subclass is indented under subclass 123.18. Subject matter including a specific feature that provides a conductive path between the coil and an external device.

**123.37 Shielding/protection:**

This subclass is indented under subclass 123.18. Subject matter including a detail of a material or structure that protects or shields the coil, e.g., electrical shielding, corrosive protection.

**SEE OR SEARCH CLASS:**

320, Electricity: Battery or Capacitor Charging or Discharging, subclasses 100 through 167 for detail of magnetic shielding, head insulation, respectively, accompanied with a magnetoresistive (MR) type read head.

**123.38 Plural plane coil:**

This subclass is indented under subclass 123.13. Subject matter wherein the coil is made up of plural connected conductive traces located in more than one plane perpendicular to the plane of the storage medium.

**123.39 Intercoil layer electrical connection detail:**

This subclass is indented under subclass 123.38. Subject matter including a specific feature that provides a conductive path between two or more coil segments.

**123.4 Configuration detail:**

This subclass is indented under subclass 123.38. Subject matter including a detail of the structural form of a coil layer.

**123.41 Trace cross section shape:**

This subclass is indented under subclass 123.4. Subject matter including a detail of the cross-sectional configuration of an individual trace.

**123.42 Trace spacing:**

This subclass is indented under subclass 123.4. Subject matter including a detail of the spacing between individual traces of the coil.

**123.43 Coil spacing from storage medium:**

This subclass is indented under subclass 123.4. Subject matter including a detail of the spacing of the trace closest to the medium.

**123.44 Coil spacing from plane of gap:**

This subclass is indented under subclass 123.4. Subject matter including a detail of the spacing from the plane of the coil to the plane of the gap, the spacing being measured in the direction of travel of the medium.

**123.45 Seed layer:**

This subclass is indented under subclass 123.38. Subject matter wherein one or more additional layers are provided to promote disposition or growth of coil material.

**123.46 Insulation detail:**

This subclass is indented under subclass 123.38. Subject matter including a detail of a nonmagnetic, nonelectrically conductive material used to encapsulate and isolate the coil.

**123.47 Zero throat height detail:**

This subclass is indented under subclass 123.46. Subject matter wherein the detail of the insulation pertains to the point at which the distance between the poles begins increase.

**123.48 Apex angle:**

This subclass is indented under subclass 123.46. Subject matter including a detail of the configuration of the nonmagnetic, nonelectrically conductive insulation that defines the slope of a core adjacent the pole tip region.

**123.49 Plural layers:**

This subclass is indented under subclass 123.46. Subject matter wherein the nonmagnetic, nonelectrically conductive insulation is made up of more than one layer.

**123.5 Diverse materials:**

This subclass is indented under subclass 123.49. Subject matter wherein at least one of the plural layers is of a material different from that of other layers.

**123.51 Planarizing layer:**

This subclass is indented under subclass 123.49. Subject matter wherein at least one of the plural layers is provided to form a flat surface.

**123.52 Below coil:**

This subclass is indented under subclass 123.49. Subject matter wherein more than one of the layers are positioned below the plane of the lowermost coil segment.

**123.53 Above coil:**

This subclass is indented under subclass 123.49. Subject matter wherein more than one of the layers are positioned above the plane of the uppermost coil segment.

**123.54 Between traces:**

This subclass is indented under subclass 123.49. Subject matter wherein more than one of the plural layers are positioned between the adjacent segments of the coil.

**123.55 Between coil and medium:**

This subclass is indented under subclass 123.49. Subject matter wherein more than one of the plural layers are positioned between the medium and the traces closest the medium.

**123.56 Plural diverse layers:**

This subclass is indented under subclass 123.38. Subject matter wherein each trace of the coil is made up of more than one layer, at least one of which is of a material different from that of the other layers.

**123.57 Electrical connection detail:**

This subclass is indented under subclass 123.38. Subject matter including a specific feature that provides a conductive path between the coil and an external device.

**123.58 Shielding/protection:**

This subclass is indented under subclass 123.38. Subject matter including a detail of a material or structure that protects or shields one or more of the coil segments, e.g., electrical shielding, corrosion protection.

## SEE OR SEARCH CLASS:

320, Electricity: Battery or Capacitor Charging or Discharging, subclasses 100 through 167 for detail of magnetic shielding, head insulation, respectively, accompanied with a magnetoresistive (MR) type read head.

**123.59 Location:**

This subclass is indented under subclass 123.13. Subject matter including a detail of the position of the winding with respect to a specific part of the head structure.

**123.6 Coil around pole adjacent substrate:**

This subclass is indented under subclass 123.59. Subject matter wherein the coil is positioned on or about the pole closest to a supporting base layer.

**123.61 Coil around pole remote from substrate:**

This subclass is indented under subclass 123.59. Subject matter wherein the coil is positioned on or about the pole remote from a supporting base layer.

**125.01 Core:**

This subclass is indented under subclass 110. Subject matter comprising a position, size, configuration, or other feature of a magnetic flux conducting element of the head.

**125.02 Perpendicular recording head:**

This subclass is indented under subclass 125.01. Subject matter wherein a transducer is configured to record data in a storage medium by orienting magnetic domains normal to the plane of the storage medium.

**125.03 Main/recording pole:**

This subclass is indented under subclass 125.02. Subject matter including a detail of the magnetic element from which the recording flux projects into the medium.

**125.04 Plural poles:**

This subclass is indented under subclass 125.03. Subject matter wherein the recording pole is made up of a plurality of separate poles.

**125.05 Offset from track centerline:**

This subclass is indented under subclass 125.03. Subject matter wherein the recording pole is asymmetrically located relative to the center of a recorded track in the transverse direction.

**125.06 Separate pole tip:**

This subclass is indented under subclass 125.03. Subject matter wherein the recording pole includes an additional tip element immediately adjacent the medium.

**125.07 Junction detail:**

This subclass is indented under subclass 125.06. Subject matter including a detail of the area where the separate tip element is joined to the recording pole.

**125.08 Laminated:**

This subclass is indented under subclass 125.06. Subject matter wherein the separate tip element is made up of more than one layer.

**125.09 Nonuniform width transducing face:**

This subclass is indented under subclass 125.06. Subject matter wherein the surface of the separate tip element facing the medium has a varying side to side measurement in the transverse direction of a recorded track.

**125.1 Nonuniform width vertically:**

This subclass is indented under subclass 125.06. Subject matter wherein a cross section of the separate tip element, in the transverse direction of a recorded track, varies along its extent normal to the recorded track.

**125.11 Nonuniform thickness vertically:**

This subclass is indented under subclass 125.06. Subject matter wherein a cross section of the separate tip element, in the traveling direction of the medium, varies along its extent normal to the medium.

**125.12 Laminated:**

This subclass is indented under subclass 125.03. Subject matter wherein the recording pole is made up of more than one layer.

**125.13 Nonuniform width transducing face:**

This subclass is indented under subclass 125.03. Subject matter wherein the surface of the recording pole facing the medium has a varying side to side measurement in the transverse direction of a recorded track.

**125.14 Nonuniform width vertically:**

This subclass is indented under subclass 125.03. Subject matter wherein a cross section of the recording pole, in the transverse direction of a recorded track, varies along its extent normal to the medium.

**125.15 Nonuniform thickness vertically:**

This subclass is indented under subclass 125.03. Subject matter wherein a cross section of the recording pole, in the traveling direction of the medium, varies along its extent normal to the medium.

**125.16 Return pole:**

This subclass is indented under subclass 125.02. Subject matter including a detail of the magnetic element to which the recording flux returns from the medium.

**125.17 Plural poles:**

This subclass is indented under subclass 125.16. Subject matter wherein the return pole is made up of a plurality of separate poles.

**125.18 Offset from track centerline:**

This subclass is indented under subclass 125.16. Subject matter wherein the return pole is asymmetrically located relative to the center of a recorded track in the transverse direction.

**125.19 Nonuniform width transducing face:**

This subclass is indented under subclass 125.16. Subject matter wherein the surface of the return pole facing the medium has a varying side to side measurement in the transverse direction of a recorded track.

**125.2 Nonuniform width vertically:**

This subclass is indented under subclass 125.16. Subject matter wherein a cross section of the return pole, in the transverse direction of a recorded track, varies along its extent normal to the recorded track.

**125.21 Nonuniform thickness vertically:**

This subclass is indented under subclass 125.16. Subject matter wherein a cross section of the return pole, in the traveling direction of the medium, varies along its extent normal to the medium.

**125.22 Separate pole tip:**

This subclass is indented under subclass 125.16. Subject matter wherein the return pole comprises an additional tip element immediately adjacent the medium which is joined to the return pole.

**125.23 Junction detail:**

This subclass is indented under subclass 125.22. Subject matter including a details of the area where the separate tip element is joined to the return pole.

**125.24 Laminated:**

This subclass is indented under subclass 125.22. Subject matter wherein the separate tip element is made up of more than one layer.

**125.25 Configuration detail:**

This subclass is indented under subclass 125.22. Subject matter including a detail of the structural form of the separate tip element.

**125.26 Laminated:**

This subclass is indented under subclass 125.16. Subject matter wherein the return pole is made up of more than one layer.

**125.27 Coupling section:**

This subclass is indented under subclass 125.02. Subject matter including a detail of an element remote from the storage medium which connects the recording pole to the return pole.

**125.28 Laminated:**

This subclass is indented under subclass 125.27. Subject matter wherein the coupling section is made up of more than one layer.

**125.29 Junction detail:**

This subclass is indented under subclass 125.27. Subject matter including a detail of the area where the coupling section is joined to either the recording pole or return pole.

**125.3 Accessory feature:**

This subclass is indented under subclass 125.02. Subject matter including a detail of an element providing a function other than magnetic flux conduction, e.g., abrasion protection, corrosion protection, electrical shielding, magnetic shielding.

**125.31 Heat generating structure:**

This subclass is indented under subclass 125.3. Subject matter wherein the function involved is the generation of heat.

**125.32 Heat transfer structure:**

This subclass is indented under subclass 125.3. Subject matter wherein the function involved is the removal of heat.

**125.33 Thin film longitudinal recording head:**

This subclass is indented under subclass 125.01. Subject matter wherein a transducer comprises a plurality of thin layers and is configured to record data in a storage medium by orienting magnetic domains parallel to the plane of the storage medium.

**125.34 Pancake type:**

This subclass is indented under subclass 125.33. Subject matter wherein the layers are located in planes parallel to the plane of the medium.

**125.35 Core section adjacent medium:**

This subclass is indented under subclass 125.34. Subject matter including a detail of an element forming the front core section located immediately adjacent and parallel to the plane of the medium.

**125.36 Back core section remote from medium:**

This subclass is indented under subclass 125.34. Subject matter including a detail of an element forming the rear core section remote from and parallel to the plane of the medium.

**125.37 Coupling section:**

This subclass is indented under subclass 125.34. Subject matter including a detail of an element remote from the storage medium which connects the parallel front and rear core sections.

**125.38 Substrate:**

This subclass is indented under subclass 125.33. Subject matter including a detail of a nonmagnetic support for the head.

**125.39 Laminated:**

This subclass is indented under subclass 125.38. Subject matter wherein the substrate is made up of more than one layer.

**125.4 Nonuniform thickness vertically:**

This subclass is indented under subclass 125.38. Subject matter wherein a cross section of the substrate, in the traveling direction of the medium, varies along its extent normal to the medium.

**125.41 Pole adjacent substrate:**

This subclass is indented under subclass 125.33. Subject matter including a detail of the magnetic core section immediately adjacent a supporting base layer.

**125.42 Zero throat height detail:**

This subclass is indented under subclass 125.41. Subject matter wherein the detail of the insulation pertains to the point at which the distance between the poles begins increase.

**125.43 Separate pole tip:**

This subclass is indented under subclass 125.41. Subject matter wherein the pole adjacent the substrate includes an additional tip element immediately adjacent the medium.

**125.44 Junction detail:**

This subclass is indented under subclass 125.43. Subject matter including a detail of the area where the separate tip element is joined to the pole adjacent the substrate.

**125.45 Laminated:**

This subclass is indented under subclass 125.43. Subject matter wherein the separate tip element is made up of more than one layer.

**125.46 Nonuniform width transducing face:**

This subclass is indented under subclass 125.43. Subject matter wherein the surface facing the medium of the separate tip element has a varying side to side measurement in the transverse direction of a recorded track.

**125.47 Nonuniform width vertically:**

This subclass is indented under subclass 125.43. Subject matter wherein a cross section of the separate tip element, in the transverse direction of a recorded track, varies along its extent normal to the recorded track.

**125.48 Nonuniform thickness vertically:**

This subclass is indented under subclass 125.43. Subject matter wherein a cross section of the separate tip element, in the traveling direction of the medium, varies along its extent normal to the medium.

**125.49 Projecting:**

This subclass is indented under subclass 125.43. Subject matter where the medium-facing surface of the separate tip element is closer to the medium than the medium-facing surface of the pole it is attached to.

**125.5 Laminated:**

This subclass is indented under subclass 125.41. Subject matter wherein the pole adjacent the substrate is made up of more than one layer.

**125.51 Nonuniform width transducing face:**

This subclass is indented under subclass 125.41. Subject matter wherein the surface facing the medium of the pole adjacent the substrate has a varying side to side measurement in the transverse direction of a recorded track.

**125.52 Nonuniform width vertically:**

This subclass is indented under subclass 125.41. Subject matter wherein a cross section of the pole adjacent the substrate, in the transverse direction of a recorded track, varies along its extent normal to the recorded track.

**125.53 Nonuniform thickness vertically:**

This subclass is indented under subclass 125.41. Subject matter wherein a cross section of the pole adjacent the substrate, in the traveling direction of the medium, varies along its extent normal to the medium.

**125.54 Pole remote from substrate:**

This subclass is indented under subclass 125.33. Subject matter including a detail of the magnetic core section remote from a supporting base layer.

**125.55 Zero throat height detail:**

This subclass is indented under subclass 125.54. Subject matter wherein the detail of the insulation pertains to the point at which the distance between the poles begins increase.

**125.56 Separate pole tip:**

This subclass is indented under subclass 125.54. Subject matter wherein the pole remote from the substrate includes an additional tip element immediately adjacent the medium.

**125.57 Junction detail:**

This subclass is indented under subclass 125.56. Subject matter including a detail of the area where the separate tip element is joined to the pole remote from the substrate.

**125.58 Laminated:**

This subclass is indented under subclass 125.56. Subject matter wherein the separate tip element is made up of more than one layer.

**125.59 Nonuniform width transducing face:**

This subclass is indented under subclass 125.56. Subject matter wherein the surface facing the medium of the separate tip element has a varying side to side measurement in the transverse direction of a recorded track.

**125.6 Nonuniform width vertically:**

This subclass is indented under subclass 125.56. Subject matter wherein a cross section of the separate tip element, in the transverse direction of a recorded track, varies along its extent normal to the recorded track.

**125.61 Nonuniform thickness vertically:**

This subclass is indented under subclass 125.56. Subject matter wherein a cross section of the separate tip element, in the traveling direction of the medium, varies along its extent normal to the medium.

**125.62 Projecting:**

This subclass is indented under subclass 125.56. Subject matter where the medium-facing surface of the separate tip element is closer to the medium than the medium-facing surface of the pole it is attached to.



**125.63 Laminated:**

This subclass is indented under subclass 125.54. Subject matter wherein the pole remote from the substrate is made up of more than one layer.

**125.64 Nonuniform width transducing face:**

This subclass is indented under subclass 125.54. Subject matter wherein the surface facing the medium of the pole remote from the substrate has a varying side to side measurement in the transverse direction of a recorded track.

**125.65 Nonuniform width vertically:**

This subclass is indented under subclass 125.54. Subject matter wherein a cross section of the pole remote from the substrate, in the transverse direction of a recorded track, varies along its extent normal to the recorded track.

**125.66 Nonuniform thickness vertically:**

This subclass is indented under subclass 125.54. Subject matter wherein a cross section of the pole remote from the substrate, in the traveling direction of the medium, varies along its extent normal to the medium.

**125.67 Coupling section:**

This subclass is indented under subclass 125.33. Subject matter including a detail of an element remote from the medium which connects the pole adjacent the substrate to the pole remote from the substrate.

**125.68 Junction detail:**

This subclass is indented under subclass 125.67. Subject matter including a detail of the area where the coupling section is joined to either the pole adjacent the substrate or the pole remote from the substrate.

**125.69 Laminated:**

This subclass is indented under subclass 125.67. Subject matter wherein the coupling section is made up of more than one layer.

**125.7 Nonuniform cross section:**

This subclass is indented under subclass 125.67. Subject matter wherein the coupling section has a nonconstant cross-sectional configuration.

**125.71 Accessory feature:**

This subclass is indented under subclass 125.33. Subject matter including a detail of an element providing a function other than magnetic flux conduction.

**125.72 Protective structure:**

This subclass is indented under subclass 125.71. Subject matter wherein the function is protection, e.g., abrasion protection, corrosion protection, electrical shielding, magnetic shielding.

**125.73 Laminated:**

This subclass is indented under subclass 125.72. Subject matter wherein the protective structure is made up of more than one layer.

**125.74 Heat generating structure:**

This subclass is indented under subclass 125.71. Subject matter wherein the function involved is the generation of heat.

**125.75 Heat transfer structure:**

This subclass is indented under subclass 125.71. Subject matter wherein the function involved is the removal of heat.

**128 Head accessory:**

This subclass is indented under subclass 110. Subject matter wherein an element which is intimately associated with the head or its surroundings is described in detail.

**129 Housing:**

This subclass is indented under subclass 128. Subject matter including detailed structure or characteristics of the head housing.

**130.1 Record separator:**

This subclass is indented under subclass 128. Subject matter where the record transducing relationship with the head is normally recited and the element selectively moves the record out of the transducing position.

**130.2 Record guide:**

This subclass is indented under subclass 128. Subject matter where the element aligns and/or supports the record in its transducing position with respect to the head.

- (1) Note. The element must be directly associated with the head.
- (2) Note. This subclass is limited to details of the record guide element with no more than a nominal recitation of the transport; detailed recitations of the transport system must be classified or searched in the appropriate transport subclass.
- 130.21 Tape record:**  
Subject matter under 130.2 where the record involved is a tape.
- 130.22 Rotating head:**  
This subclass is indented under subclass 130.21. Subject matter where the head rotates during transducing.
- 130.23 Helical scan:**  
This subclass is indented under subclass 130.22. Subject matter where the head rotation involves a helical scan of the record
- 130.24 Head drum details:**  
This subclass is indented under subclass 130.23. Subject matter where the guide element is mounted on or a part of the head drum.
- 130.3 Pressure element:**  
This subclass is indented under subclass 128. Subject matter where the element biases the record into transducing relationship with the head.
- 130.31 Tape record:**  
This subclass is indented under subclass 130.3. Subject matter where the record involved is a tape.
- 130.32 Element mounting details:**  
This subclass is indented under subclass 130.31. Subject matter including details of the mounting structure for the pressure element.
- 130.33 Element in tape container:**  
This subclass is indented under subclass 130.31. Subject matter where the tape is housed in a removable container and the pressure element is also mounted in the container.
- SEE OR SEARCH CLASS:**  
242, Winding, Tensioning, or Guiding, subclass 324.2, 326+, and 335+ for a coil on or within a cartridge.
- 130.34 Disc record:**  
This subclass is indented under subclass 130.3. Subject matter where the record involved is a disc.
- 131 RECORD MEDIUM:**  
This subclass is indented under the class definition. Subject matter including specific structure of a record carrier.
- (1) Note. Magnetic records which are defined only by their composition are not classified in this subclass. Magnetic records which include no more structure than a base having one or more coatings thereon are also excluded from this subclass. Merely naming the record as a wire, filament, rod, ribbon, strand, or record will not be sufficient to classify the patent in Class 360. For magnetic records and analogous articles which are defined only by their composition or which include no more structure than a base having one or more coatings thereon see Classes below.
- SEE OR SEARCH CLASS:**  
106, Compositions: Coating or Plastic, for strands, filaments and records distinguished solely by being made of plastic compositions.  
148, Metal Treatment, subclasses 400+ for metallic stock or strands which are the product of a Class 148 process, particularly indented subclasses 300+ drawn to magnetic products of a Class 148 process.  
206, Special Receptacle or Package, subclasses 307+ for a container under the class definition for removably containing an article which includes machine readable information registered thereon.  
235, Registers, subclass 493 for a record containing discrete bits of magnetic material, said bits being coded markings on a record.

- 252, Compositions, subclasses 62.51+ for compositions specialized and designed for use as magnetic materials, substances peculiar to such compositions or processes of making compositions or substances.
- 346, Recorders, subclasses 134+ for non magnetic records.
- 352, Optics: Motion Picture, subclasses 1+ for sound recording, including magnetic sound records, combined with motion picture structure.
- 420, Alloys or Metallic Compositions, appropriate subclasses for alloy stock or strands which are claimed broadly as 'magnetic', or 'magnetized' or 'permanent magnet' or are defined only in terms of their composition but are inherently magnetic and for metallic stock or strands composed of a single metal.
- 428, Stock Material or Miscellaneous Articles, subclasses 800 through 848.9 for magnetic recording component or stock distinguished by composition or physical chemistry (e.g., materials, microstructure, surface property, etc.), usable as magnetic record carrier or component; subclasses 817-825.1 for media or magnetizable material free of polymeric binder; subclasses 826-837 for magneto-optical stock material; subclasses 838-845.7 for media wherein the magnetizable material is in particulate form dispersed in a binder; and subclasses 846-848.9 for media substrates.
- 132 In container:**  
This subclass is indented under subclass 131. Subject matter wherein the record carrier is distinguished by the container in which it is housed.
- 133 For disk:**  
This subclass is indented under subclass 132. Subject matter wherein the record is in the form of a disk.
- SEE OR SEARCH CLASS:  
428, Stock Material or Miscellaneous Articles, subclass 848.7 for stock articles distinguished by composition or physical chemistry, usable as magnetic record carriers in the form of the disk within enclosure.
- 134 Tape:**  
This subclass is indented under subclass 131. Subject matter wherein the record is in the form of a tape.
- 135 Disk:**  
This subclass is indented under subclass 131. Subject matter wherein the record is in the form of a disk.
- 136 Drum:**  
This subclass is indented under subclass 131. Subject matter wherein the record is in the form of a drum.
- 137 MISCELLANEOUS:**  
This subclass is indented under the class definition. Subject matter not provided for above.
- 220 FLUID BEARING RECORD SUPPORT:**  
This subclass is indented under the class definition. Subject matter wherein a fluid bearing is utilized to support and space a medium away from a head.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
230 through 237.1, for fluid bearing head support.
- 221 Tape record:**  
This subclass is indented under subclass 220. Subject matter wherein the medium is in the form of an elongated ribbon.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
231, for fluid bearing head support for a tape record.
- 221.1 Liquid bearing:**  
This subclass is indented under subclass 221. Subject matter wherein the fluid bearing is a liquid bearing.
- 224 Disk record:**  
This subclass is indented under subclass 220. Subject matter wherein the medium is a circular element adapted for rotation.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
234 through 237.1, for fluid bearing head support for a disk record.
- 230 FLUID BEARING HEAD SUPPORT:**  
This subclass is indented under the class definition. Subject matter wherein a fluid bearing is utilized to support and space a head away from a medium.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
220 through 224, for fluid bearing record support.
- 231 Tape record:**  
This subclass is indented under subclass 230. Subject matter wherein the medium is in the form of an elongated ribbon.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
221 through 221.1, for fluid bearing record support of a tape record.
- 234 Disk record:**  
This subclass is indented under subclass 230. Subject matter wherein the medium is a circular element adapted for rotation.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
224, for fluid bearing record support of a disk record.
- 234.1 Liquid bearing:**  
This subclass is indented under subclass 234. Subject matter wherein the fluid bearing is a liquid bearing.
- 234.2 Flexible disk:**  
This subclass is indented under subclass 234. Subject matter wherein the disk is pliable.
- 234.3 Air bearing slider detail:**  
This subclass is indented under subclass 234. Subject matter including specifics of an element which mounts a head and which has a configuration involved in the generation of an air bearing.
- (1) Note. Air bearing sliders for fluid bearing head support include a body having protrusions therefrom (rails) which assist in generating an air bearing.
- (2) Note. The term "air bearing" in the art includes any gaseous bearing.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
246.2, for a full contact slider.
- 234.4 IC/circuit component on slider:**  
This subclass is indented under subclass 234.3. Subject matter wherein an integrated circuit or discrete electrical component is mounted on the slider.
- 234.5 Electrical attachment of slider/head:**  
This subclass is indented under subclass 234.3. Subject matter including structure making electrical connection to the slider, to a head on the slider or between the slider and a head.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
245.8 through 246 for electrical connection detail in general for disk record head mounting, subclass 264.2 for electrical connection detail onto actuator arm for shifting head in an arcuate path between tracks on a disk record, subclass 266.3 for electrical connection detail onto an actuator arm for shifting head in a linear path between tracks on a disk record, subclass 271.9 for electrical connection detail at a stationary drum in rotary head transducing on a tape record, and subclass 281.7, for electrical connection between head and a rotary part of transformer in signal transfer to/from head in rotary head transducing on tape record.
- SEE OR SEARCH CLASS:  
439, Electrical Connectors, appropriate subclasses for details of an electrical connector, per se.

- 234.6 Mechanical attachment of slider to its support:**  
This subclass is indented under subclass 234.3. Subject matter including the physical connection of the slider to the element supporting it.
- 234.7 Head attachment to slider:**  
This subclass is indented under subclass 234.3. Subject matter involving particulars of the physical joining of a head to a slider.
- (1) Note. This may involve such things as adhesive details, particularly configured recesses in a slider to accommodate a particular head, etc.
- 234.8 On/in side of slider:**  
This subclass is indented under subclass 234.7. Subject matter wherein a head is attached on or embedded in the side surfaces of a slider.
- 234.9 In slot of rail:**  
This subclass is indented under subclass 234.7. Subject matter wherein a head is mounted in a groove within the rail.
- 235 Signal winding mount/access detail:**  
This subclass is indented under subclass 234.7. Subject matter including specifics of the mounting of or access to a signal winding.
- 235.1 Slider material:**  
This subclass is indented under subclass 234.3. Subject matter wherein a particular material is specified for a slider or a part thereof.
- (1) Note. Included in this subclass is the material of a coating on the entire slider assembly, for example.
- 235.2 Rail material:**  
This subclass is indented under subclass 235.1. Subject matter which specifies a particular material used for a slider rail.
- 235.3 Body material:**  
This subclass is indented under subclass 235.1. Subject matter which specifies a particular material used for the body of a slider.
- 235.4 Air bearing surface detail:**  
This subclass is indented under subclass 234.3. Subject matter including specifics of the con-
- figuration of a disk confronting slider that generates an air bearing.
- (1) Note. The term "air bearing" in the art includes any gaseous bearing.
- (2) Note. Generation of the air bearing often utilizes protrusions from the body of the slider termed "rails".
- 235.5 Negative pressure type:**  
This subclass is indented under subclass 235.4. Subject matter wherein the slider in part uses subambient pressure.
- 235.6 Leading end detail:**  
This subclass is indented under subclass 235.5. Subject matter including specifics of the slider leading end.
- (1) Note. Airflow enters a slider's leading end in the direction of the trailing end where it exits.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
236.4, for fluid bearing head support on a disk record including a detail of the leading end of an air bearing slider, in general.
- 235.7 Trailing end detail:**  
This subclass is indented under subclass 235.5. Subject matter including specifics of the slider trailing end.
- (1) Note. Airflow enters a slider's leading end in the direction of the trailing end where it exits.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
236.5, for fluid bearing head support on a disk record including a detail of the trailing end of an air bearing slider, in general.
- 235.8 Rail surface detail:**  
This subclass is indented under subclass 235.5. Subject matter including the specifics of the exterior surface of a rail facing the medium.
- (1) Note. This may include, for example, such things as rail surface texture.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

236.6, for fluid bearing head support on a disk record including a detail of a rail surface of an air bearing slider, in general.

**235.9 Rail side edge detail:**

This subclass is indented under subclass 235.5. Subject matter including specifics of the side boundaries of the rail.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

236.7, for fluid bearing head support on a disk record including a detail of a rail side edge of an air bearing slider, in general.

**236 Cross rail detail:**

This subclass is indented under subclass 235.5. Subject matter including specifics of a rail that is substantially transverse to airflow.

**236.1 Varying width rail:**

This subclass is indented under subclass 235.5. Subject matter wherein a negative pressure type air bearing is produced by a slider having at least one rail whose width differs along its length.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

236.8, for fluid bearing head support on a disk record including a variable width rail of an air bearing slider, in general.

**236.2 Asymmetrical rail arrangement:**

This subclass is indented under subclass 235.5. Subject matter wherein a negative pressure type air bearing is produced by a configuration of multiple rails which is not symmetrical.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

236.9, for fluid bearing head support on a disk record including an asymmetrical rail arrangement of an air bearing slider, in general.

**236.3 Three or more rails/pads:**

This subclass is indented under subclass 235.5. Subject matter wherein at least three rails (or

pads) are utilized in producing the negative pressure type air bearing.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

237, for fluid bearing head support on a disk record including three or more rails/pads on an air bearing slider, in general.

**236.4 Leading end detail:**

This subclass is indented under subclass 235.4. Subject matter including specifics of the slider leading end.

(1) Note. Airflow enters a slider's leading end in the direction of the trailing end where it exits.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

235.6, for fluid bearing head support on a disk record including a detail of the leading end of a negative pressure type air bearing slider.

**236.5 Trailing end detail:**

This subclass is indented under subclass 235.4. Subject matter including specifics of a slider trailing end.

(1) Note. Airflow enters a slider's leading end in the direction of the trailing end where it exits.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

235.7, for fluid bearing head support on a disk record including a detail of the trailing end of a negative pressure type air bearing slider.

**236.6 Rail surface detail:**

This subclass is indented under subclass 235.4. Subject matter including specifics of the exterior surface of a rail facing the medium.

(1) Note. This may include, for example, such things as rail surface texture.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

235.8, for fluid bearing head support on a disk record including a detail of a rail

surface of a negative pressure type air bearing slider.

**236.7 Rail side edge detail:**

This subclass is indented under subclass 235.4. Subject matter including specifics of the side boundaries of the rail.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

235.9, for fluid bearing head support on a disk record including a detail of a rail side surface of a negative pressure type air bearing slider.

**236.8 Varying width rail:**

This subclass is indented under subclass 235.4. Subject matter wherein the width of a given rail differs along its length.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

236.1, for fluid bearing head support on a disk record including a variable width rail of a negative pressure type air bearing slider.

**236.9 Asymmetrical rail arrangement:**

This subclass is indented under subclass 235.4. Subject matter wherein the configuration of multiple rails is not symmetrical.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

236.2, for fluid bearing head support on a disk record including an asymmetrical rail arrangement of a negative pressure type air bearing slider.

**237 Three or more rails/pads:**

This subclass is indented under subclass 235.4. Subject matter wherein at least three rails (or pads) produce the air bearing.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

236.3, for fluid bearing head support on a disk record including three or more rails/pads on a negative pressure type air bearing slider.

**237.1 Partial contact:**

This subclass is indented under subclass 235.4. Subject matter including some specified degree

of contact but less than full contact between slider and disk.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

246.1 through 246.5, for head mounting for disk record having full contact suspension.

**240 HEAD MOUNTING:**

This subclass is indented under the class definition. Subject matter including a specific mechanical structure for holding a head in a position with respect to a record medium.

**241 Tape record:**

This subclass is indented under subclass 240. Subject matter wherein the medium is in the form of an elongated ribbon.

**241.1 Plural head mounting on only one tape side:**

This subclass is indented under subclass 241. Subject matter including multiple heads located on only a single tape side.

**241.2 Plural head mounting on opposite tape sides:**

This subclass is indented under subclass 241. Subject matter including multiple heads located on both tape sides.

**241.3 Head urging detail:**

This subclass is indented under subclass 241. Subject matter including specifics of some structure that biases a head into contact with the tape.

**244 Disk record:**

This subclass is indented under subclass 240. Subject matter wherein the medium is a circular element adapted for rotation.

**244.1 IC/circuit component on suspension element:**

This subclass is indented under subclass 244. Subject matter wherein an integrated circuit or discrete electrical component is mounted on a suspension element.

**244.2 Load beam detail:**

This subclass is indented under subclass 244. Subject matter including specifics of a load beam i.e., a structure attached to an actuator arm to which a head/slider is mounted.

- (1) Note. An actuator arm provides motion to a load beam.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
245.5, for details of a gimbal which is integral with a load beam.
- 244.3 Laminated beam:**  
This subclass is indented under subclass 244.2. Subject matter wherein the load beam is formed of plural layers.
- 244.4 Nonmetallic beam:**  
This subclass is indented under subclass 244.2. Subject matter wherein the load beam is formed from material other than metal.
- 244.5 Actuator mount region detail:**  
This subclass is indented under subclass 244.2. Subject matter including detail of the portion of the load beam that is attached to the actuator arm.
- 244.6 Ball staking:**  
This subclass is indented under subclass 244.5. Subject matter wherein the load beam is attached to an actuator arm by swaging.
- (1) Note. Ball staking and swaging are equivalent terms.
- 244.7 Adhesive:**  
This subclass is indented under subclass 244.5. Subject matter wherein the load beam is attached to the actuator arm by an adhesive.
- 244.8 Spring region detail:**  
This subclass is indented under subclass 244.2. Subject matter including specifics of the portion of a load beam which allows some degree of flexing and which is located between the actuator mount area and a rigid intermediate section.
- 244.9 Rigid intermediate section detail:**  
This subclass is indented under subclass 244.2. Subject matter including specifics of the portion of the load beam designed to be substantially inflexible which is located between a spring region and a gimbal mounting region.
- 245 Gimbal mounting region detail:**  
This subclass is indented under subclass 244.2. Subject matter including specifics of the portion of a load beam which provides for the attachment of a gimbal.
- 245.1 Pivot/load button detail:**  
This subclass is indented under subclass 245. Subject matter including specifics of an element which allows the rotation of a gimbal.
- 245.2 Assembly feature:**  
This subclass is indented under subclass 244.2. Subject matter including some physical structure related to the assembly of a load beam.
- 245.3 Gimbal detail:**  
This subclass is indented under subclass 244. Subject matter including specifics of a structure that maintains the head parallel to the medium.
- (1) Note. Excluded herein are gimbal details of a full contact suspension that are classified elsewhere.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
246.4, for a gimbal detail of a full contact suspension.
- 245.4 Attachment detail:**  
This subclass is indented under subclass 245.3. Subject matter including specifics of the mechanical connection between a gimbal and the suspension member that physically supports it.
- 245.5 Integral with load beam:**  
This subclass is indented under subclass 245.3. Subject matter wherein the gimbal is a constituent part of a load beam.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
244.2, 245.2, for generic load beam detail.
- 245.6 Plural axis components:**  
This subclass is indented under subclass 245.3. Subject matter wherein the gimbal may pivot about multiple axes.



**245.7 Motion limiter detail:**

This subclass is indented under subclass 245.3. Subject matter wherein specifics of a structure is provided to restrain the motion of a gimbal to some degree.

**245.8 Electrical connection detail:**

This subclass is indented under subclass 244. Subject matter including specifics of electrical attachment in the head mounting for a disk record.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

234.5, for electrical attachment of slider/head in fluid bearing head support, subclass 264.2 for electrical connection detail onto an actuator arm for shifting head in an arcuate path between tracks on a disk record, subclass 266.3 for electrical connection detail onto an actuator arm for shifting head in a linear path between tracks on a disk record, subclass 271.9 for electrical connection detail at a stationary drum in rotary head transducing on a tape record, and subclass 281.7 for electrical connection between head and a rotary part of transformer in signal transfer to/from head in rotary head transducing on tape record.

SEE OR SEARCH CLASS:

439, Electrical Connectors, appropriate subclasses for details of an electrical connector, per se.

**245.9 Flexible printed circuit type:**

This subclass is indented under subclass 245.8. Subject matter wherein the electrical connection includes a pliable printed circuit element.

**246 Noise reduction:**

This subclass is indented under subclass 245.8. Subject matter wherein the electrical connection provides electrical noise diminishing.

**246.1 Full contact suspension:**

This subclass is indented under subclass 244. Subject matter wherein a head is in direct physical contact with the disk record.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

237.1, for fluid bearing head support having partial contact between a disk record and slider.

**246.2 Slider detail:**

This subclass is indented under subclass 246.1. Subject matter including specifics of an element which directly mounts a head for full contact with the disk record.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

234.3 through 237.1, for a floating slider in a fluid bearing head support.

**246.3 Pivot detail:**

This subclass is indented under subclass 246.1. Subject matter including specifics of the structure about which a head, gimbal or mounting arm rotate.

**246.4 Gimbal detail:**

This subclass is indented under subclass 246.1. Subject matter including specifics of an element providing proper orientation of a head relative to a disk record.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

245.3 through 245.7, for a disk record gimbal detail, in general.

**246.5 Single head:**

This subclass is indented under subclass 246.1. Subject matter wherein only one head is provided.

**246.6 Plural heads for each disk side:**

This subclass is indented under subclass 244. Subject matter including multiple heads on each disk side.

**246.7 Plural actuators:**

This subclass is indented under subclass 246.6. Subject matter having multiple drivers (i.e., actuators).

**246.8 Offset heads on opposite sides of disk:**

This subclass is indented under subclass 244. Subject matter including heads which are not

- directly opposite each other on the opposite sides of a disk.
- 250 For moving head into/out of transducing position:**  
This subclass is indented under subclass 240. Subject matter wherein selective movement of the head to or from a position other than a transducing position relative to a medium is provided.
- 251 Tape record having arcuate head retraction movement:**  
This subclass is indented under subclass 250. Subject matter wherein the head is moved in a curved path between transducing and nontransducing positions relative to a tape.
- 251.1 Tape record having linear head retraction movement:**  
This subclass is indented under subclass 250. Subject matter wherein the head is moved in a straight line between transducing and nontransducing positions relative to a tape.
- 251.2 Driven by tape driver:**  
This subclass is indented under subclass 251.1. Subject matter wherein the drive for the head movement is provided in part by a driver for a tape transport system.
- 251.3 Cam type:**  
This subclass is indented under subclass 251.1. Subject matter wherein a cam element provides the linear head retraction movement.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
261.2, for head mounting for shifting head between tracks on tape record which includes linear movement by cam.
- 251.4 Solenoid type:**  
This subclass is indented under subclass 251.1. Subject matter wherein the linear head retraction is provided by a device which is driven by an energizing electromagnet that causes movement of an associated mechanical part.
- 251.5 Rotary head type:**  
This subclass is indented under subclass 251.1. Subject matter including a head of the type that is rotated during transducing.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
271, for a tape record having rotary head during transducing, and 291.4 for head mounting allowing for minor repositioning of rotary head in transducing position on a tape record.
- 254 Disk record:**  
This subclass is indented under subclass 250. Subject matter wherein the medium is a circular element adapted for rotation.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
244 through 246.8, for head mounting for disk record, in general.
- 254.1 Flexible disk:**  
This subclass is indented under subclass 254. Subject matter wherein the disk is pliable.
- 254.2 Arcuate track change type:**  
This subclass is indented under subclass 254. Subject matter wherein track changing is effected by head movement in a curved path.
- 254.3 Moving lifter:**  
This subclass is indented under subclass 254.2. Subject matter wherein a lifter is moved to produce or effect movement of a head between transducing and nontransducing positions.
- 254.4 Lifter surface detail:**  
This subclass is indented under subclass 254.3. Subject matter including specifics of the surface of an element contacting the head suspension to provide movement between transducing and nontransducing positions.
- 254.5 Adjustment detail:**  
This subclass is indented under subclass 254.3. Subject matter including specifics of a structure providing for adjustment of the lifter.
- 254.6 Actuator side detail:**  
This subclass is indented under subclass 254.3. Subject matter including specifics of a portion of an actuator that contacts the lifter.
- 254.7 Fixed lifter:**  
This subclass is indented under subclass 254.2. Subject matter wherein a stationary lifter con-

- tributes to movement of a head between transducing and nontransducing positions.
- 254.8 Lifter surface detail:**  
This subclass is indented under subclass 254.7. Subject matter including specifics of the surface of an element contacting the head suspension to provide movement between transducing and nontransducing positions.
- 254.9 Adjustment detail:**  
This subclass is indented under subclass 254.7. Subject matter including specifics of a structure providing for adjustment of the lifter.
- 255 Actuator side detail:**  
This subclass is indented under subclass 254.7. Subject matter including specifics of a portion of an actuator that contacts the lifter.
- 255.1 Linear track change type:**  
This subclass is indented under subclass 254. Subject matter wherein track changing is effected by linear head movement.
- 255.2 Moving lifter:**  
This subclass is indented under subclass 255.1. Subject matter wherein a lifter is moved to produce or effect movement of a head between transducing and nontransducing positions.
- 255.3 Lifter surface detail:**  
This subclass is indented under subclass 255.2. Subject matter including specifics of the surface of an element contacting the head suspension to provide movement between transducing and nontransducing positions.
- 255.4 Adjustment detail:**  
This subclass is indented under subclass 255.2. Subject matter including specifics of a structure providing for adjustment of the lifter mechanism.
- 255.5 Actuator side detail:**  
This subclass is indented under subclass 255.2. Subject matter including specifics of a portion of an actuator that contacts the lifter.
- 255.6 Fixed lifter:**  
This subclass is indented under subclass 255.1. Subject matter wherein a stationary lifter contributes to movement of a head between transducing and nontransducing positions.
- 255.7 Lifter surface detail:**  
This subclass is indented under subclass 255.6. Subject matter including specifics of the surface of an element contacting the head suspension to provide movement between transducing and nontransducing positions.
- 255.8 Adjustment detail:**  
This subclass is indented under subclass 255.6. Subject matter including specifics of a structure providing for adjustment of the lifter mechanism.
- 255.9 Actuator side detail:**  
This subclass is indented under subclass 255.6. Subject matter including specifics of a portion of an actuator that contacts the lifter.
- 256 Latch:**  
This subclass is indented under subclass 254. Subject matter wherein a structure is provided to positively retain a head at a nontransducing position.
- 256.1 Air vane:**  
This subclass is indented under subclass 256. Subject matter including a structure that acts in response to airflow caused by rotation of a disk.
- 256.2 Magnetic:**  
This subclass is indented under subclass 256. Subject matter utilizing magnetic attraction for latching.
- 256.3 Electrically driven:**  
This subclass is indented under subclass 256. Subject matter wherein an electrically powered device provides movement of a latch member.
- 256.4 Inertial:**  
This subclass is indented under subclass 256. Subject matter which utilizes the property of inertia to achieve latching action.
- (1) Note. Inertia is that property of matter where an object in motion tends to stay in motion and an object at rest tends to stay at rest unless an external force acts upon the object.

- 256.5 Plural latches:**  
This subclass is indented under subclass 256.  
Subject matter including multiple latches.
- 256.6 Adjustment detail:**  
This subclass is indented under subclass 256.  
Subject matter including structure providing for adjustment of the latch mechanism.
- 260 For shifting head between tracks:**  
This subclass is indented under subclass 240.  
Subject matter wherein the positioning structure includes mechanical structure for moving a head from one track to another track on the medium.
- 261 Tape record having rotary head movement:**  
This subclass is indented under subclass 260.  
Subject matter wherein the head is rotated to effect movement from one track to the next on a tape.
- 261.1 Tape record having linear head movement:**  
This subclass is indented under subclass 260.  
Subject matter wherein the head is moved in a substantially straight line to effect movement from one track to the next on a tape.
- 261.2 Cam:**  
This subclass is indented under subclass 261.1.  
Subject matter wherein an element (i.e., cam) has surfaces representing track positions.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
251.3, for head mounting for moving head into/out of transducing position on tape record which includes linear head retraction movement by cam.
- 261.3 Screw:**  
This subclass is indented under subclass 261.1.  
Subject matter utilizing a threaded element to effect track changing.
- 264 Disk record:**  
This subclass is indented under subclass 260.  
Subject matter wherein the medium is a circular element adapted for rotation.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
244 through 246.8, for head mounting for disk record, in general.
- 264.1 Arcuate head movement:**  
This subclass is indented under subclass 264.  
Subject matter wherein track changing is effected by head movement in a curved path.
- 264.2 Electrical connection detail onto actuator arm:**  
This subclass is indented under subclass 264.1.  
Subject matter including specifics of electrical attachment at an arm of an actuator.
- SEE OR SEARCH CLASS:  
439, Electrical Connectors, appropriate subclasses for details of an electrical connector, per se.
- 264.3 Driver detail:**  
This subclass is indented under subclass 264.1.  
Subject matter including specifics of a mechanism that produces the arcuate movement.
- 264.4 Independent head movement:**  
This subclass is indented under subclass 264.3.  
Subject matter wherein each of multiple heads are moved separately from each other.
- 264.5 Plural drivers for each head:**  
This subclass is indented under subclass 264.3.  
Subject matter including multiple drivers for each head.
- 264.6 Band:**  
This subclass is indented under subclass 264.3.  
Subject matter wherein a strip (i.e., band) which is usually metallic is utilized to effect the arcuate head movement.
- 264.7 Voice coil:**  
This subclass is indented under subclass 264.3.  
Subject matter wherein a voice coil provides motive power for the arcuate head movement.
- 264.8 Core detail:**  
This subclass is indented under subclass 264.7.  
Subject matter including specifics of the mechanism providing a magnetic flux path of the driver.

- 264.9 Magnet detail:**  
This subclass is indented under subclass 264.7. Subject matter including specifics of a permanent magnet structure of the driver.
- 265 Winding detail:**  
This subclass is indented under subclass 264.7. Subject matter including specifics of a turn of wire in the driver.
- 265.1 Limiter/stop:**  
This subclass is indented under subclass 264.1. Subject matter including structure which restricts the arcuate motion of an actuator.
- 265.2 Bearing:**  
This subclass is indented under subclass 264.1. Subject matter including specifics of a bearing used in the mechanism providing the arcuate head movement.
- 265.3 Seal:**  
This subclass is indented under subclass 265.2. Subject matter wherein a structure is provided to restrict migration of bearing lubricant.
- 265.4 Radial:**  
This subclass is indented under subclass 265.2. Subject matter wherein the bearing provides support perpendicular to the pivot axis of the arcuate path.
- 265.5 Thrust:**  
This subclass is indented under subclass 265.2. Subject matter wherein the bearing provides support about the pivot axis of the arcuate path.
- 265.6 Mounting detail:**  
This subclass is indented under subclass 265.2. Subject matter including specifics of structure locating and retaining bearing elements.
- 265.7 E block detail:**  
This subclass is indented under subclass 264.1. Subject matter including specifics of structure mounting driver or head suspension.
- 265.8 Detail of coil support:**  
This subclass is indented under subclass 265.7. Subject matter including specifics of the support of a coil attached to an E block.
- 265.9 Detail of actuator arm supporting head suspension:**  
This subclass is indented under subclass 265.7. Subject matter including specifics of an actuator arm to which a head suspension is attached.
- 266 Arm shape:**  
This subclass is indented under subclass 265.9. Subject matter including specifics of the geometrical configuration of an actuator arm.
- 266.1 Arm mounting:**  
This subclass is indented under subclass 265.9. Subject matter including specifics of the attachment of an actuator arm to an E block.
- 266.2 Linear head movement:**  
This subclass is indented under subclass 264. Subject matter wherein track changing is effected by head movement in a straight path.
- 266.3 Electrical connection detail onto actuator arm:**  
This subclass is indented under subclass 266.2. Subject matter including specifics of electrical attachment at an arm of an actuator.
- SEE OR SEARCH CLASS:  
439, Electrical Connectors, appropriate subclasses for details of an electrical connector, per se.
- 266.4 Voice coil:**  
This subclass is indented under subclass 266.2. Subject matter wherein a voice coil provides motive power for the track changing.
- 266.5 Carriage detail:**  
This subclass is indented under subclass 266.4. Subject matter including specifics of structure mounting voice coil or head suspension.
- 266.6 Guide detail:**  
This subclass is indented under subclass 266.5. Subject matter including specifics of structure supporting and constraining the carriage during its movement.
- 266.7 Core detail:**  
This subclass is indented under subclass 266.4. Subject matter including detail of the structure providing magnetic flux path of the voice coil.

- 266.8 Magnet detail:**  
This subclass is indented under subclass 266.4. Subject matter including detail of a permanent magnet structure of the voice coil.
- 266.9 Winding detail:**  
This subclass is indented under subclass 266.4. Subject matter including detail of a turn of wire in the voice coil.
- 267 Band:**  
This subclass is indented under subclass 266.2. Subject matter wherein a strip (i.e. band) which is usually metallic is utilized to effect the linear motion.
- 267.1 Cam:**  
This subclass is indented under subclass 266.2. Subject matter wherein linear head movement is achieved through the use of a cam element.
- 267.2 Rack:**  
This subclass is indented under subclass 266.2. Subject matter including a bar that interacts with a rotating gear element to transform rotary motion into linear head movement.
- 267.3 Screw:**  
This subclass is indented under subclass 266.2. Subject matter wherein a threaded element is utilized to effect the linear motion.
- 267.4 Screw/follower detail:**  
This subclass is indented under subclass 267.3. Subject matter including specifics of the screw itself or an element coaxing with the screw.
- 267.5 Carriage detail:**  
This subclass is indented under subclass 267.3. Subject matter including specifics of structure mounting voice coil or head suspension.
- 267.6 Guide detail:**  
This subclass is indented under subclass 267.5. Subject matter including specifics of structure supporting and constraining the carriage during its movement.
- 267.7 Screw mount detail:**  
This subclass is indented under subclass 267.3. Subject matter including detail of an element that locates or retains a screw.
- 267.8 Adjustable:**  
This subclass is indented under subclass 267.7. Subject matter including a provision for adjusting the location or position of the screw mechanism.
- 267.9 Including shifting head to different disks:**  
This subclass is indented under subclass 264. Subject matter wherein provision is made for shifting a head between plural disks in addition to shifting a head between tracks on a disk record.
- 270 For moving head during transducing:**  
This subclass is indented under subclass 240. Subject matter wherein specific mechanical structure allows for or causes movement of the head during the process of recording or reproducing.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
81 through 87, for record transport with head moving during transducing, and subclass 101 for head transport with record stationary during transducing.
- 271 Tape record having rotary head:**  
This subclass is indented under subclass 270. Subject matter wherein a head is rotated in some fashion during transducing on a tape.
- (1) Note. Head mounting allowing for minor repositioning of rotary head in transducing position on a tape record is classified elsewhere.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:  
251.5, for moving a head into/out of transducing position on a tape where the head is of rotary type, and subclasses 291.4-292 for head mounting allowing for minor repositioning of rotary head in transducing position on a tape record.
- 271.1 Rotating drum:**  
This subclass is indented under subclass 271. Subject matter wherein a head is mounted on a cylinder (i.e., drum) which is rotated during transducing.

**271.2 Axle bearing:**

This subclass is indented under subclass 271.1. Subject matter including specifics of a bearing that supports a drum axle.

**271.3 Hydrodynamic:**

This subclass is indented under subclass 271.2. Subject matter wherein the bearing utilizes moving fluid.

**271.4 Axle seal:**

This subclass is indented under subclass 271.1. Subject matter wherein a structure is provided to restrict migration of lubricant along the drum axle.

**271.5 Head mount to drum:**

This subclass is indented under subclass 271.1. Subject matter including specifics of the mounting of a head to the rotating drum.

**271.6 Drum mounting:**

This subclass is indented under subclass 271.1. Subject matter including specifics of the support or attachment of a drum.

**271.7 Drum motor:**

This subclass is indented under subclass 271.1. Subject matter including specifics of the motor that rotates the drum.

**271.8 Stationary drum:**

This subclass is indented under subclass 271. Subject matter including specifics of a non-moving drum used in rotary head transducing.

**271.9 Electrical connection detail:**

This subclass is indented under subclass 271.8. Subject matter including specifics of an electrical attachment from a stationary drum to an external point.

SEE OR SEARCH THIS CLASS, SUBCLASS:

234.5, for electrical attachment of slider/head in fluid bearing head support, subclasses 245.8-246 for electrical connection detail in general for disk record head mounting, subclass 264.2 for electrical connection detail onto actuator arm for shifting head in an arcuate path between tracks on a disk record, subclass 266.3 for electrical

connection detail onto an actuator arm for shifting head in a linear path between tracks on a disk record, and subclass 281.7 for electrical connection between head and a rotary part of transformer in signal transfer to/from head in rotary head transducing on tape record.

SEE OR SEARCH CLASS:

439, Electrical Connectors, appropriate subclasses for details of an electrical connector, per se.

**272 Power supply:**

This subclass is indented under subclass 271. Subject matter including structure providing electrical power to a transformer or a signal processing system.

**274 Disk record:**

This subclass is indented under subclass 270. Subject matter wherein the medium is a circular element adapted for rotation.

SEE OR SEARCH THIS CLASS, SUBCLASS:

244 through 246.8, for head mounting for disk record, in general.

**281 Signal transfer to/from head**

This subclass is indented under subclass 271. Subject matter including structure communicating a signal between a moving head and a stationary part of a recorder.

**281.1 Transformer mounting detail:**

This subclass is indented under subclass 281. Subject matter including specific structure securing or positioning a transformer.

**281.2 Transformer axis parallel to axis of head rotation:**

This subclass is indented under subclass 281. Subject matter wherein the axis of the transformer is parallel to the rotational axis of the head.

(1) Note. The transformer axis as used here is defined as the plane of the gap between stationary and moving parts of a transformer.

**281.3 Transformer axis perpendicular to axis of head rotation:**

This subclass is indented under subclass 281. Subject matter wherein the axis of the transformer is perpendicular to the rotational axis of the head.

- (1) Note. The transformer axis as used here is defined as the plane of the gap between stationary and moving parts of a transformer.

**281.4 Coil/winding detail:**

This subclass is indented under subclass 281. Subject matter including specifics of a turn of wire in the transformer.

**281.5 Core detail:**

This subclass is indented under subclass 281. Subject matter including specifics of the structure providing a flux path for the transformer.

**281.6 Electrical or magnetic shielding:**

This subclass is indented under subclass 281. Subject matter including structure providing shielding from electrical or magnetic fields.

**281.7 Electrical connection between head and rotary part of transformer:**

This subclass is indented under subclass 281. Subject matter including structure electrically joining a head and the rotating part of a transformer.

SEE OR SEARCH CLASS:

439, Electrical Connectors, appropriate subclasses for details of an electrical connector, per se.

**281.8 Plural transformers:**

This subclass is indented under subclass 281. Subject matter wherein multiple transformers are utilized in the signal transfer.

**281.9 Photoelectric:**

This subclass is indented under subclass 281. Subject matter wherein a photoelectric element is utilized in the signal transfer.

**282 Contact type transformer:**

This subclass is indented under subclass 281. Subject matter wherein transformer elements are in physical contact.

**290 For adjusting head position:**

This subclass is indented under subclass 240. Subject matter wherein the positioning structure allows minor repositioning of the head within a transducing position.

**291 Tape record:**

This subclass is indented under subclass 290. Subject matter wherein the medium is in the form of an elongated ribbon.

SEE OR SEARCH THIS CLASS, SUBCLASS:

241 through 241.3, for head mounting for tape record, in general.

**291.1 Cam adjuster:**

This subclass is indented under subclass 291. Subject matter wherein a cam element provides head adjustment.

**291.2 Screw adjuster:**

This subclass is indented under subclass 291. Subject matter wherein a threaded element provides head adjustment.

**291.3 Plural screws:**

This subclass is indented under subclass 291.2. Subject matter wherein head adjustment is provided by multiple threaded elements.

**291.4 Rotary head:**

This subclass is indented under subclass 291. Subject matter wherein a head is rotated during transducing.

SEE OR SEARCH THIS CLASS, SUBCLASS:

251.5, for moving a head into/out of transducing position on a tape where the head is of rotary type, and subclass 271 for a tape record having rotary head during transducing.

**291.5 Adjustment of drum axis:**

This subclass is indented under subclass 291.4. Subject matter including adjustment of the axis of rotation of a drum that supports a head for rotation.

**291.6 Adjustable head mount:**

This subclass is indented under subclass 291.4. Subject matter wherein the immediate head



- mounting structure on a drum provides the adjustment.
- 291.7 Adjuster core detail:**  
This subclass is indented under subclass 291.6. Subject matter including specifics of the structure providing magnetic flux path of an adjuster.
- 291.8 Adjuster coil detail:**  
This subclass is indented under subclass 291.6. Subject matter including specifics of a turn of wire in an adjuster.
- 291.9 Piezoelectric adjuster:**  
This subclass is indented under subclass 291.6. Subject matter wherein a piezoelectric element is utilized to provide adjustment.
- 292 Plural piezoelectric adjusters:**  
This subclass is indented under subclass 291.9. Subject matter wherein adjustment is provided by multiple piezoelectric elements.
- 294 Disk record:**  
This subclass is indented under subclass 290. Subject matter wherein the medium is a circular element adapted for rotation.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
244 through 246.8, for head mounting for a disk, in general.
- 294.1 Adjustment parallel to disk plane:**  
This subclass is indented under subclass 294. Subject matter wherein a head is moved parallel to the plane of the disk during adjustment.
- 294.2 Linear adjustment:**  
This subclass is indented under subclass 294.1. Subject matter wherein a head is moved in a straight line to achieve adjustment.
- 294.3 Driver detail:**  
This subclass is indented under subclass 294.1. Subject matter including specifics of a mechanism that provides adjustment movement.
- 294.4 Piezoelectric adjuster:**  
This subclass is indented under subclass 294.3. Subject matter wherein a piezoelectric element is utilized to provide adjustment.
- 294.5 Voice coil adjuster:**  
This subclass is indented under subclass 294.3. Subject matter wherein a voice coil mechanism is utilized to provide adjustment.
- 294.6 Pivot structure detail:**  
This subclass is indented under subclass 294.1. Subject matter including detail of a structure permitting a turning about a point (i.e., pivot) for adjustment.
- 294.7 Adjustment along rotational axis of disk:**  
This subclass is indented under subclass 294. Subject matter wherein a head is moved perpendicular to the plane of the disk during adjustment.
- 313 Magneto-resistive (MR) reproducing head:**  
This subclass is indented under subclass 110. Subject matter including a sensor for reproducing magnetic information by utilizing a material whose resistance varies in accordance with a magnetic field.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
328, for a magnetostrictive head.
- SEE OR SEARCH CLASS:  
324, Electricity: Measuring and Testing, subclass 252, for magneto-resistive sensing means.  
338, Electrical Resistors, subclass 32 for an electrical resistor which is responsive to a magnetic field.  
365, Static Information Storage and Retrieval, subclass 8 for magnetic bubbles which use magneto-resistive devices, and subclass 158 for static storage systems which use magneto-resistive type storage elements.
- 314 Having multiple interconnected multiple film MR sensors (e.g., dual spin valve magneto-resistive sensor):**  
This subclass is indented under subclass 313. Subject matter wherein plural MR sensors are connected together to reproduce information from a single track wherein one of the MR sensors is formed of multiple thin films.

- 315 Having multiple interconnected single film MR sensors (e.g., dual magnetoresistive sensor):**  
This subclass is indented under subclass 313. Subject matter wherein plural MR sensors are connected together to reproduce information from a single track wherein all of the MR sensors are formed of a single film.
- 316 Having multiple independent MR sensors:**  
This subclass is indented under subclass 313. Subject matter wherein plural unrelated MR sensors reproduce information from plural tracks.
- 317 Combined with inductive write head in piggyback/merged configuration:**  
This subclass is indented under subclass 313. Subject matter having a magnetoresistive head used for reproducing information and an inductive head used for recording information wherein the magnetoresistive head and the inductive head are stacked.
- 318 Combined with inductive write head and having MR inside of inductive head:**  
Subject matter under 313 having a magnetoresistive head used for reproducing information and an inductive head used for recording information wherein the magnetoresistive head is located inside of the inductive head.
- 318.1 In horizontal head configuration:**  
This subclass is indented under subclass 318. Subject matter wherein the substrate of the inductive head is in a horizontal orientation.
- 319 Detail of magnetic shielding:**  
This subclass is indented under subclass 313. Subject matter including specifics of material which blocks undesired magnetic flux from an MR sensor.
- 320 Detail of head insulation:**  
This subclass is indented under subclass 313. Subject matter including specifics of material that provides electrical isolation for a head.
- 321 Having flux guide detail:**  
This subclass is indented under subclass 313. Subject matter including specifics of material that delivers flux from a magnetic medium to an MR sensor.
- 322 Detail of sense conductor:**  
This subclass is indented under subclass 313. Subject matter including specifics of the leads that provide a sense current.
- 323 Electrostatic Discharge (ESD) protection:**  
This subclass is indented under subclass 313. Subject matter wherein damage to an MR sensor by static electrical discharge is prevented.
- 324 Having Giant Magnetoresistive (GMR) or Colossal Magnetoresistive (CMR) sensor formed of multiple thin films:**  
This subclass is indented under subclass 313. Subject matter wherein plural films form a single MR sensor that exhibits a large change in resistance to a small amount of magnetic flux.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
326, for a GMR or CMR sensor formed of a single thin film.
- 324.1 Having one film pinned (e.g., spin valve):**  
This subclass is indented under subclass 324. Subject matter wherein the magnetization direction of one of the layers is fixed.
- 324.11 Detail of pinned film or additional film for affecting or biasing the pinned film:**  
This subclass is indented under subclass 324.1. Subject matter including specifics of a layer having fixed magnetization direction or an additional layer that affects or biases such a pinned layer.
- 324.12 Detail of free layer or additional film for affecting or biasing the free layer:**  
This subclass is indented under subclass 324.1. Subject matter including specifics of a layer having a freely rotatable direction of magnetization or an additional layer that affects or biases such a free layer.
- 324.2 Having tunnel junction effect:**  
This subclass is indented under subclass 324. Subject matter including a nonmetal film between two films having distinct magnetization directions wherein an electron tunnels through the nonmetal film.

- 325 Having Anisotropic Magnetoresistive (AMR) sensor formed of multiple thin films:**  
This subclass is indented under subclass 313. Subject matter wherein the resistance of a multiple film sensor changes in accordance with a change in the angle between the magnetization direction of the multiple film sensor and a sense current.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
327 through 327.33, for an AMR sensor formed of a single thin film.
- 326 Having Giant Magnetorestrictive (GMR) or Colossal Magnetoresistive (CMR) sensor formed of a single thin film:**  
This subclass is indented under subclass 313. Subject matter wherein a single film forms an MR sensor that exhibits a large change in resistance to a small amount of magnetic flux.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
324 through 324.2, for a GMR or CMR sensor formed of multiple thin films.
- 327 Having Anisotropic Magnetoresistive (AMR) sensor formed of a single thin film:**  
This subclass is indented under subclass 313. Subject matter wherein the resistance of a single thin film changes in accordance with a change in the angle between the magnetization direction of the single thin film and a sense current.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
325, for an AMR sensor formed of multiple thin films.
- 327.1 Detail of transverse and longitudinal biasing:**  
This subclass is indented under subclass 327. Subject matter wherein an additional film is provided to linearize the MR sensor and to create a single magnetic domain within the MR sensor.
- 327.11 In barber-pole configuration:**  
This subclass is indented under subclass 327.1. Subject matter having slanted conductive strips that overlay the MR sensor.
- 327.2 Detail of transverse biasing:**  
This subclass is indented under subclass 327. Subject matter wherein an additional film is provided to linearize the MR sensor.
- 327.21 Using a shunt:**  
This subclass is indented under subclass 327.2. Subject matter wherein the additional film diverts a portion of the sense current to provide the transverse bias.
- 327.22 Using a soft adjacent layer:**  
This subclass is indented under subclass 327.2. Subject matter wherein the additional film is magnetized by a sense current flowing in the MR sensor and this film then sets up a magnetizing field for transversely biasing the MR sensor.
- 327.23 Using a permanent magnet:**  
This subclass is indented under subclass 327.2. Subject matter wherein the additional film is a permanently magnetized material.
- 327.24 Using conductor:**  
This subclass is indented under subclass 327.2. Subject matter wherein the additional film uses a current to create the transverse bias.
- SEE OR SEARCH THIS CLASS, SUBCLASS:  
327.21, for transverse biasing using a shunt.
- 327.3 Detail of longitudinal biasing:**  
This subclass is indented under subclass 327. Subject matter wherein an additional film is used to create a single magnetic domain within the MR sensor.
- 327.31 Using a permanent magnet:**  
This subclass is indented under subclass 327.3. Subject matter wherein the additional film is a permanently magnetized material.
- 327.32 Using exchange couple biasing:**  
This subclass is indented under subclass 327.3. Subject matter wherein a film is in direct atomic contact with the MR sensor to unidirectionally bias the MR sensor into a single domain.

**327.33 Using conductor:**  
This subclass is indented under subclass 327.3. Subject matter wherein the additional film uses a current to create the longitudinal bias.

**328 Magnetostrictive head:**  
This subclass is indented under subclass 110. Subject matter including a sensor for recording/reproducing magnetic information by utilizing a material that expands or contracts in accordance with a magnetic field.

SEE OR SEARCH THIS CLASS, SUBCLASS:

313 through 327.33, for a magnetoresistive reproducing head.

SEE OR SEARCH CLASS:

338, Electrical Resistors, subclass 32 for an electrical resistor which is responsive to a magnetic field.

365, Static Information Storage and Retrieval, subclass 157 for static storage systems which use magnetostrictive type storage elements.

#### CROSS-REFERENCE ART COLLECTIONS

**900 DISK DRIVE PACKAGING:**  
Subject matter comprising a magnetic disk information storage and retrieval device and its associated circuitry having miniaturized features.

**901 Access time:**  
This subclass is indented under subclass 900. Subject matter wherein an interval between seeking data from a disk drive to an instant of completion of (b) data delivery to an output device, or (a) head positioning to transduce the data.

**902 Storage density (e.g., bpi, tpi):**  
This subclass is indented under subclass 900. Subject matter wherein spacing or placement of individual data bits are stored per unit length on the disk.

**903 Physical parameter (e.g., form factor):**  
This subclass is indented under subclass 900. Subject matter comprising physical properties such as geometrical shape or dimensions of a disk drive.

**904 Weight:**  
This subclass is indented under subclass 903. Subject matter wherein the physical parameter is the weight of the disk drive or a component thereof that the magnetic disk drive weighs.

#### FOREIGN ART COLLECTIONS

Any foreign patents/nonpatent literature, which were reclassified, have been transferred directly to the art collection listed below. This art collection contains ONLY foreign documents/nonpatent literature. [Note: Parenthetical references in the titles refer to the abolished U.S. classifications from which these art collections were derived.]

**FOR 202 FLUID BEARING HEAD (360/102):**  
Foreign art collection under the class definition including the generation of a fluid bearing between a record carrier and a head.

**FOR 203 Flying head (360/103):**  
Foreign art collection under collection FOR 202 wherein the head is mounted in such a fashion as to allow it to move into a floating position with respect to a record carrier.

**FOR 204 HEAD MOUNTING (360/104):**  
Foreign art collection under the class definition including specific mechanical means for holding a head in a proper position with respect to a record carrier.

**FOR 205 For moving head into and out of transducing position (360/105):**  
Foreign art collection under collection FOR 204 wherein the positioning means allows selective movement of the head to a position other than the transducing position.

**FOR 206 For shifting head between tracks (360/106):**  
Foreign art collection under collection FOR 204 wherein the positioning means allows selective movement of the head between several transducing positions.

**FOR 207 For moving head during transducing (360/107):**  
Foreign art collection under collection FOR 204 wherein the positioning means allows for or causes movement of the head during the process of recording or reproducing.

**FOR 208 Signal transfer to and from head (360/108):**

Foreign art collection under collection FOR 207 including means for communicating a signal between the moving head and a stationary part of the recorder.

**FOR 209 For adjusting head position (360/109):**

Foreign art collection under collection FOR 204 wherein the positioning means allows minor repositioning of a head within a transducing position.

**FOR 213 MAGNETORESISTIVE OR MAGNETOSTRICTIVE HEAD(360/113):**

Foreign art collection under the class definition including specific structure of a transducer which includes an element exhibiting a magnetoresistive or magnetostrictive effect and that element and its associated effect is used to produce, detect, or control production or detection of magnetic flux.

**FOR 214 Magneto optic:**

Foreign art collection wherein the intensity of the flux emanating from a record is determined by directing a beam of polarized light at the record and detecting the rotation of polarization caused by the flux.

**FOR 225 Disk record (360/97.01):**

This foreign art collection is indented under unnumbered placeholder 360/88. Foreign art collection in which the record carrier is a flat circular element.

- (1) Note. The mechanism for imparting motion for recording and reproduction is generally in a drive assembly and rotates the disk about its axis of symmetry.

**FOR 226 Environmental control (e.g., air filter, temperature control) (360/97.02):**

This foreign art collection is indented under FOR 225. Foreign art collection wherein an ambient condition of the disk drive is controlled.

**FOR 227 Plural disks (360/97.03):**

This foreign art collection is indented under FOR 226. Foreign art collection for varying or maintaining an environmental condition

for a disk drive which has structure for concurrent accommodation of multiple disks.

**FOR 228 Flexible disk (360/97.04):**

This foreign art collection is indented under FOR 226. Foreign art collection for varying or maintaining an environmental condition in a disk drive for a disk record carrier which is bendable or pliable without permanent change.

END