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(54) VIRTUAL JUKEBOX

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(57) **ABSTRACT**

A collection management system, or virtual jukebox, is provided for a collection of recordings that is independent of the physical media upon which the material is recorded. The system forms a part of a network that includes storage media and playback devices, and provides an easy to use system for collection cataloging, archiving, and retrieval. In a preferred embodiment, a collection management system resides on a consumer electronic (CE) device, or a personal or home computer (PC), and the collection includes recordings that are stored on one or more hard drives associated with the CE device or the PC. The collection management system includes a user interface that facilitates the retrieval of recordings for playback from one or more storage devices, based on an individual selection of genre, author, and so on. By storing the recordings on a hard disc drive or other mass storage device with an associated disk operating system, immediate access is available to each recording on the drive, and additional drives can be added to the system as new material is added to the collection.

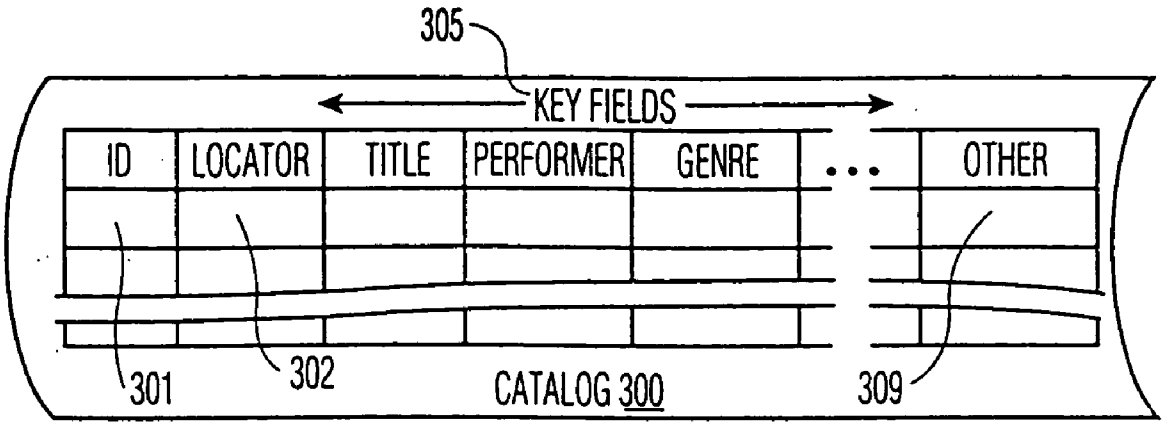


FIG. 1

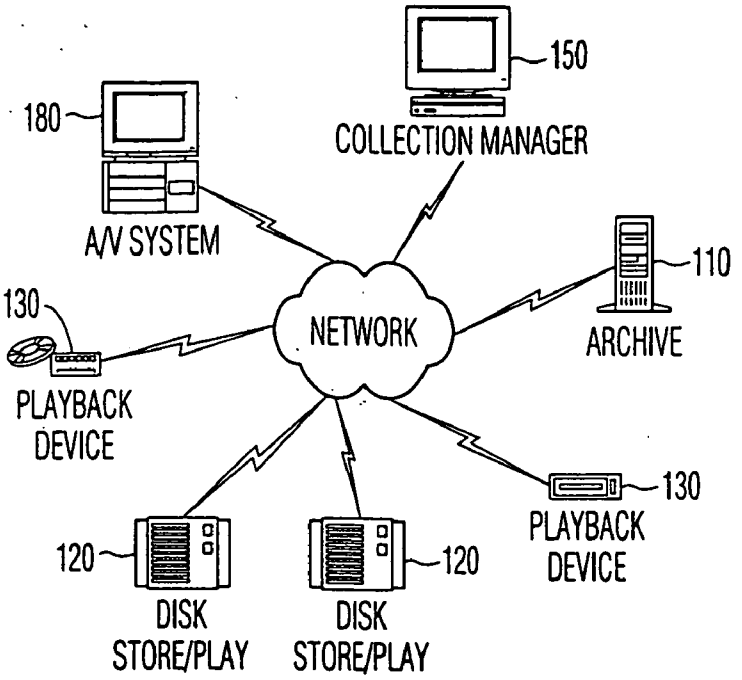


FIG. 2A

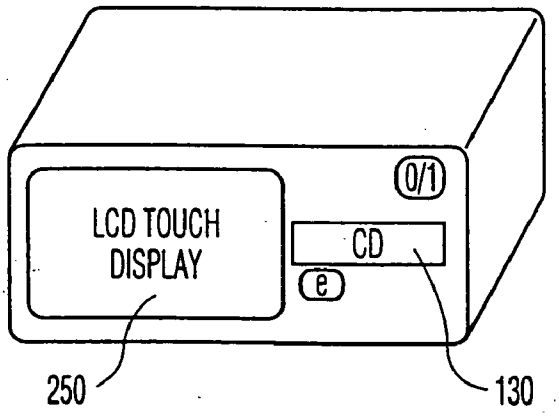
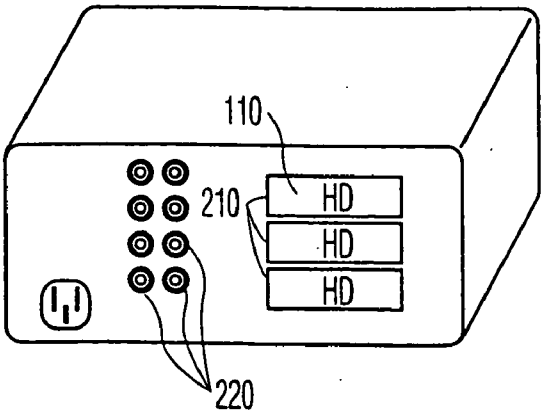


FIG. 2B



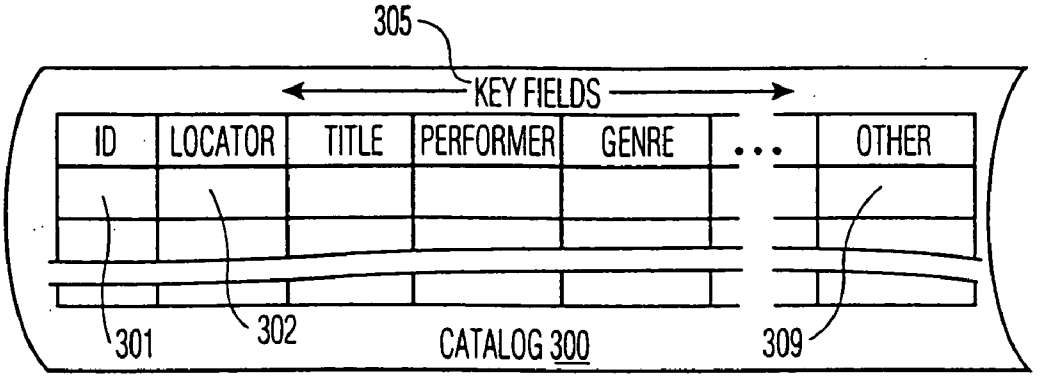

305
KEY FIELDS
ID
LOCATOR
TITLE
PERFORMER
GENRE
...
OTHER
301
302
CATALOG 300
309

FIG. 3

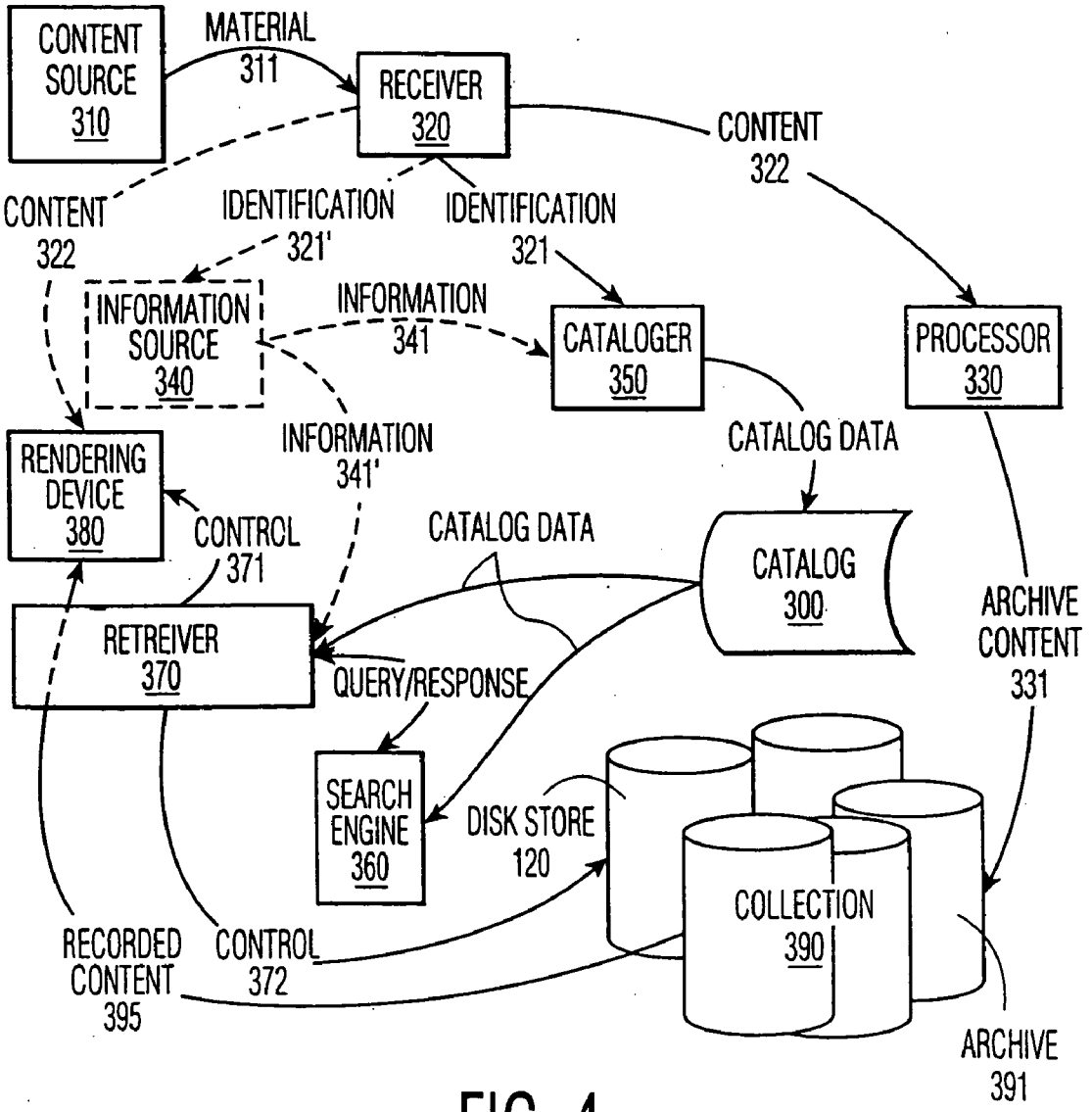

CONTENT SOURCE 310
MATERIAL 311
RECEIVER 320
CONTENT 322
CONTENT 322
IDENTIFICATION 321'
IDENTIFICATION 321
INFORMATION SOURCE 340
INFORMATION 341
CATALOGER 350
PROCESSOR 330
RENDERING DEVICE 380
INFORMATION 341'
CATALOG DATA
CONTROL 371
CATALOG DATA
CATALOG 300
ARCHIVE CONTENT 331
RETREIVER 370
QUERY/RESPONSE
SEARCH ENGINE 360
DISK STORE 120
COLLECTION 390
RECORDED CONTENT 395
CONTROL 372
ARCHIVE 391

FIG. 4

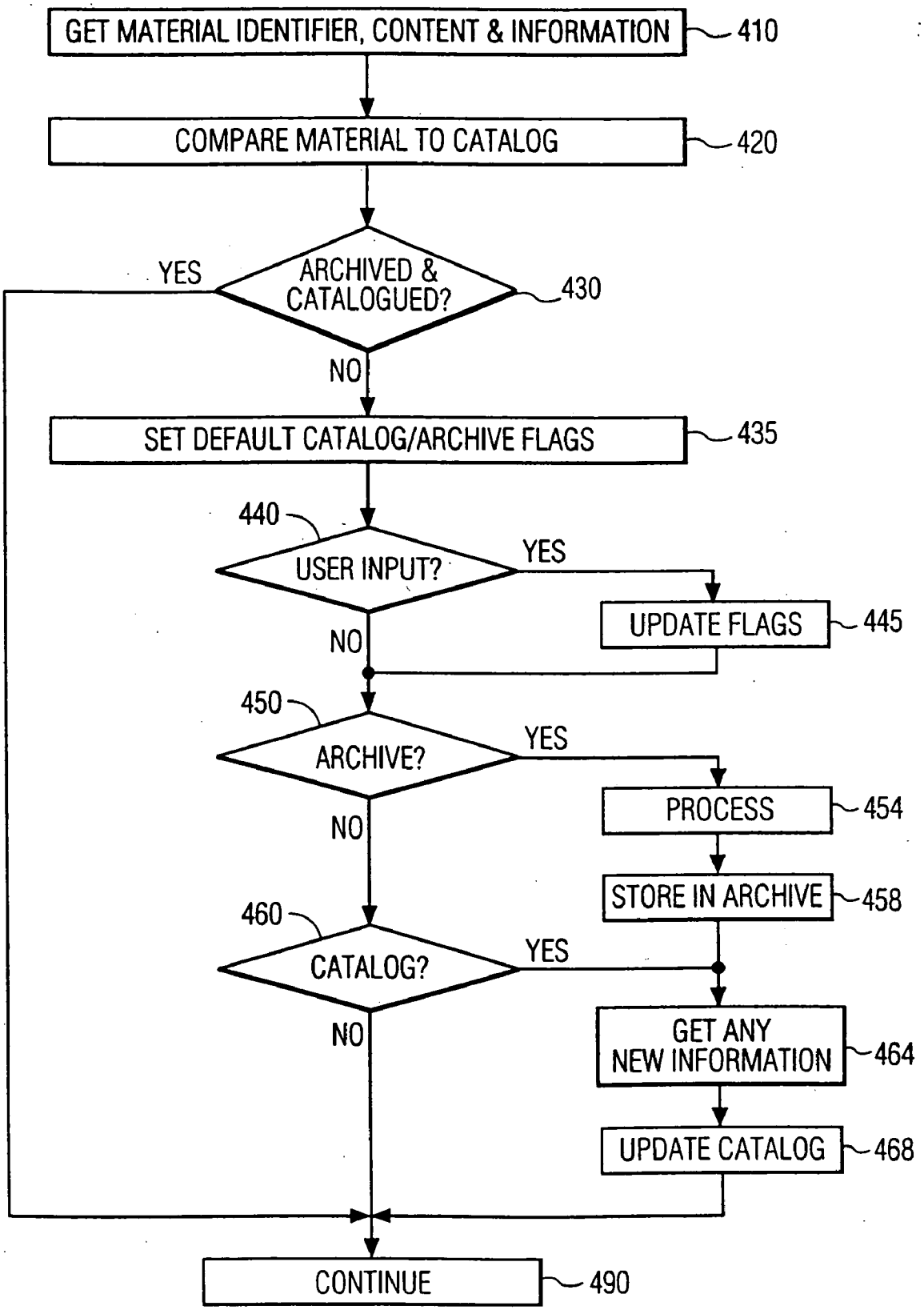

GET MATERIAL IDENTIFIER, CONTENT & INFORMATION
410
COMPARE MATERIAL TO CATALOG
420
YES
ARCHIVED & CATALOGUED?
430
NO
SET DEFAULT CATALOG/ARCHIVE FLAGS
435
440
USER INPUT?
YES
UPDATE FLAGS
445
NO
450
ARCHIVE?
YES
PROCESS
454
NO
STORE IN ARCHIVE
458
460
CATALOG?
YES
NO
GET ANY NEW INFORMATION
464
UPDATE CATALOG
468
CONTINUE
490

FIG. 5

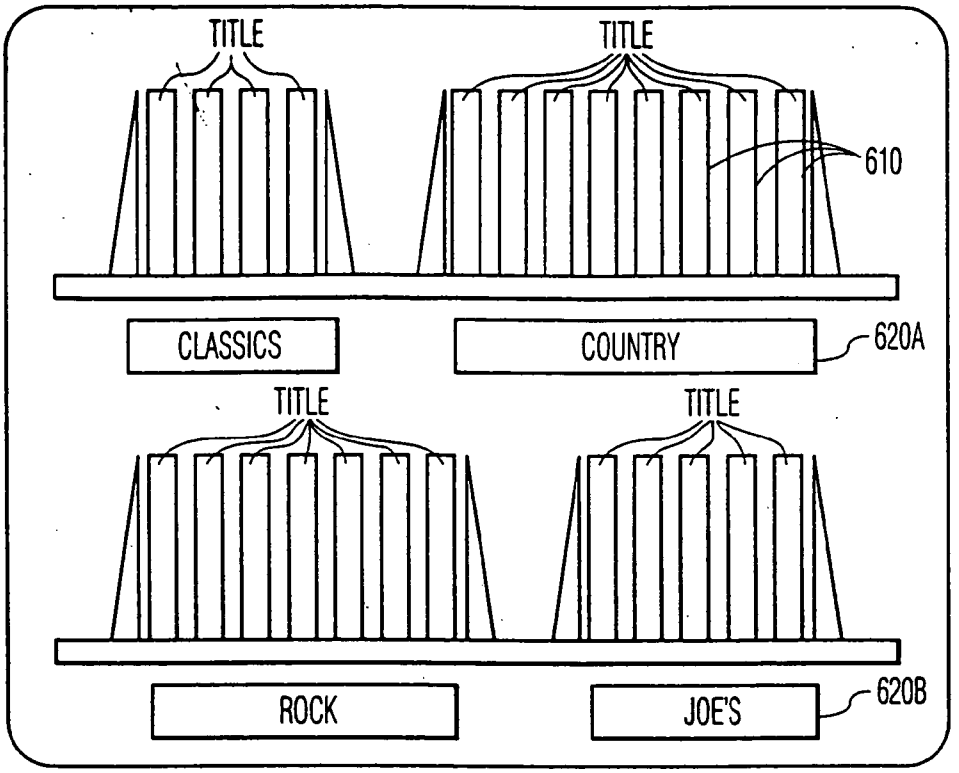

TITLE
TITLE
610
CLASSICS
COUNTRY
620A
TITLE
TITLE
ROCK
JOE'S
620B

FIG. 6A

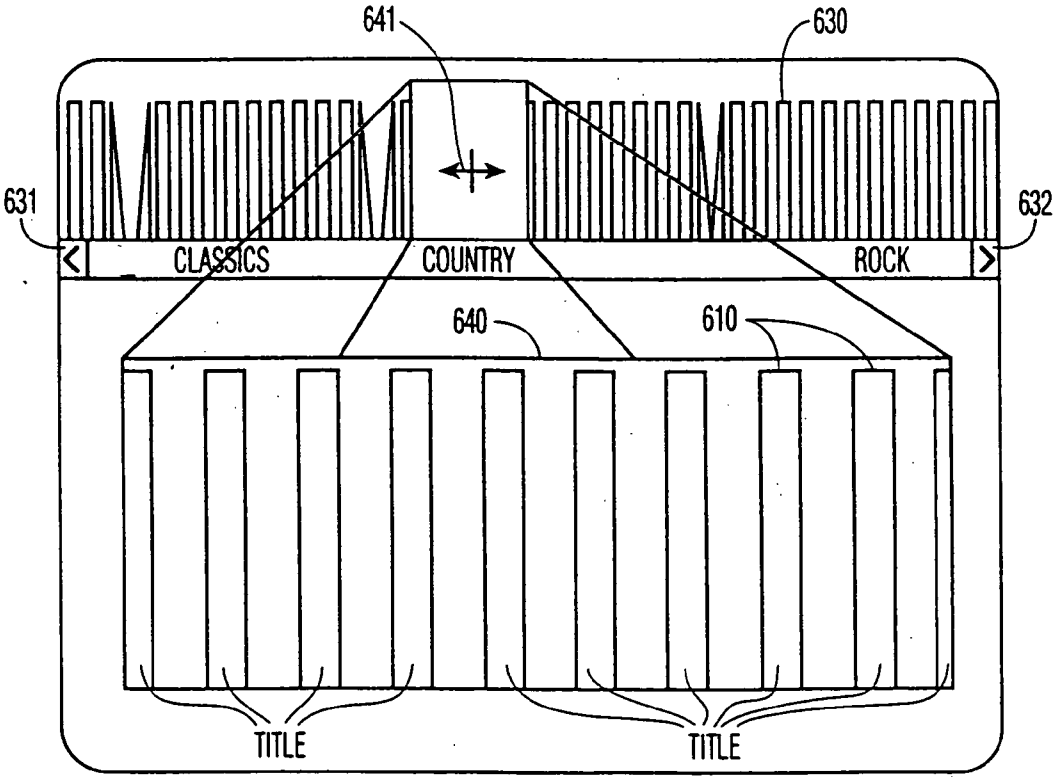

641
630
631
632
CLASSICS
COUNTRY
ROCK
640
610
TITLE
TITLE

FIG. 6B

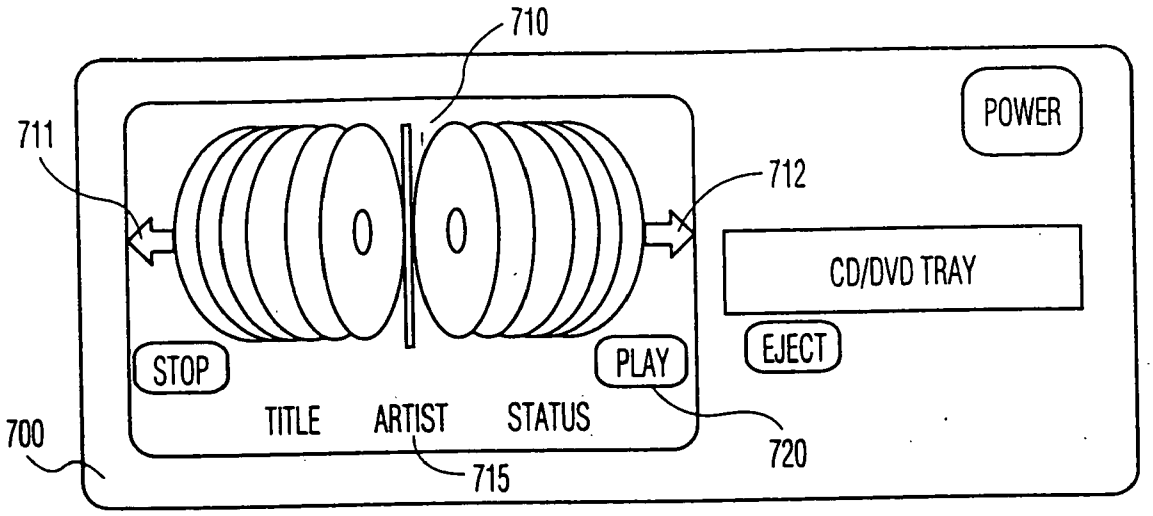

710
711
712
POWER
CD/DVD TRAY
EJECT
STOP
PLAY
TITLE
ARTIST
STATUS
700
715
720

FIG. 7A

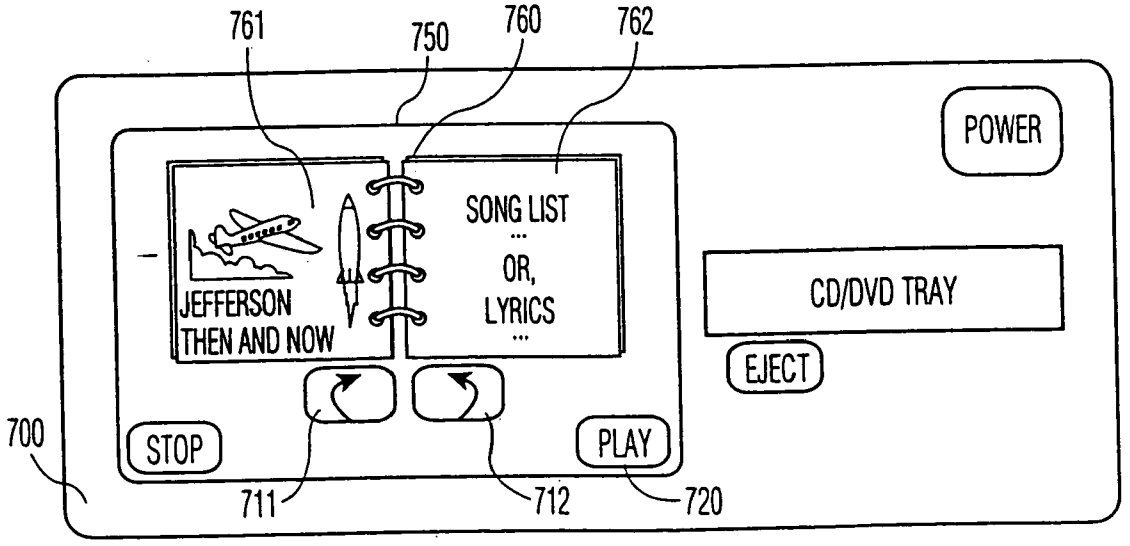

761
750
760
762
POWER
SONG LIST
...
OR,
LYRICS
...
JEFFERSON
THEN AND NOW
CD/DVD TRAY
EJECT
700
STOP
PLAY
711
712
720

FIG. 7B

VIRTUAL JUKEBOX

[0001] This application claims the benefit of U.S. Provisional Application No. 60/088,912, filed Jun. 11, 1998, Attorney Docket PHA 23,417P, and U.S. Provisional Application No. 60/093,656, filed Jul. 22, 1998, Attorney Docket PHA 23,474P.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] This invention relates to the field of consumer electronics, and in particular to recording and playback systems.

[0004] 2. Description of Related Art

[0005] Most consumers have collections of recordings in one form or another. Records, tapes, CDs, DVDs, and the like are the conventional media for these recordings, each having a corresponding means for playing back the recorded information on demand. Conventionally, racks and similar devices are used to contain these recordings. Various methods are used by consumers to order the arrangement of the recordings within their storage racks: alphabetic by author, alphabetic by title, grouped by genre, color-coded tagging, and so on. A selection of a particular recording requires locating the appropriate disk or tape on the rack and placing it in the playback device. After playback, the recording is placed back on the rack, in it's appropriate order. The physical handling and ordering task can be particularly problematic in a multi-user environment, such as a home.

[0006] With advancing technology, some playback devices are configured to allow for the storage of hundreds of disks, akin to a prior-art "jukebox" that allows for the selection of individual songs without physically handling the recorded media. These devices often include automated playback selection by genre or other categorization, random playback, and so on. Although these devices ease the media handling task, and facilitate an improved method of categorization and organization, they have a fixed physical limit. When a user's collection exceeds the capacity of the storage-playback device, the user must-either replace the existing device with a larger capacity device, if available, or select a portion of the collection for storage and organization in the storage-playback device. Purchasing a second, or third storage-playback device is not a currently practical option, because the organization and playback control capabilities of current devices are isolated from each other.

[0007] Many consumers have more than one playback device for a given medium. In a multi-playback environment, a user must typically physically divide the collection, allocating select recordings to each playback locale. For example, a user may have a few CDs in an automobile, a few CDs in an office, and the remainder of the collection in a family room. Alternatively, copies of the recordings are made, and distributed to each locale, but the recording task is typically somewhat cumbersome, requiring the finding and loading of a blank medium, creation of a label, and so on.

BRIEF SUMMARY OF THE INVENTION

[0008] It is an object of this invention to provide a device and method for creating a collection of recordings that can be readily accessed. It is another object of this invention to provide a device and method for creating a collection of recordings that is easy to create and categorize. It is another object of this invention to provide a device and method for creating a collection of recordings that is easy to expand and modify. It is another object of this invention to reduce the storage requirements for a collection of recordings. It is a further object of this invention to provide a device and method for accessing databases of information relating to items contained in a collection of recordings. It is a further object of this invention to provide a means of protecting a collection of recordings from loss. It is a further object of this invention to provide a visual interface to access a collection of recordings. It is a further object of this invention to provide a hierarchical visual interface to access a collection of recordings.

[0009] These objects and others are achieved by providing a collection management system, or virtual jukebox, for a collection of recordings that is independent of the physical media upon which the material is recorded. The system forms a part of a network that includes storage media and playback devices, and provides an easy to use system for collection cataloging, archiving, and retrieval. In a preferred embodiment, a collection management system resides on a consumer electronic (CE) device, or a personal or home computer (PC), and the collection includes recordings that are stored on one or more hard drives associated with the CE device or the PC. The collection management system includes a user interface that facilitates the retrieval of recordings for playback from one or more storage devices, based on an individual selection of genre, author, and so on. By storing the recordings on a hard disc drive or other mass storage device with an associated disk operating system, immediate access is available to each recording on the drive, and additional drives can be added to the system as new material is added to the collection.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] The invention is explained in further detail, and by way of example, with reference to the accompanying drawings wherein:

[0011] **FIG. 1** illustrates an example block diagram of a network comprising a collection management system in accordance with this invention.

[0012] **FIG. 2** illustrates an example embodiment of a collection management system in accordance with this invention.

[0013] **FIG. 3** illustrates an example embodiment of a catalog database for a collection management system in accordance with this invention.

[0014] **FIG. 4** illustrates an example block diagram of a collection management system in accordance with this invention.

[0015] **FIG. 5** illustrates an example flow diagram of a collection management process in accordance with this invention.

[0016] FIGS. **6A-6B** illustrate example user interfaces in accordance with this invention.

[0017] FIGS. **7A-7B** illustrate alternative example user interfaces in accordance with this invention.

[0018] Throughout the drawings, same reference numerals indicate similar or corresponding features or functions.

DETAILED DESCRIPTION OF THE INVENTION

[0019] **FIG. 1** illustrates an example block diagram of a network **100** comprising a collection management system in accordance with this invention. The collection resides on one or more storage devices that contain recordings of material, such as music or video recordings. The storage devices may include an archive set of files on one or more hard disk drives **110**, one or more combination storage and playback devices **120**, or some other storage devices (not shown) that are connected to the network **100**, such as to provide access to files on a server, an Internet site, and so on. Note that in a networked environment, the collection may comprise content material that the user merely has access to, such as recordings or performances provided by a service provider based on a license or purchase agreement with the user. Note also that the term "playback" is used herein in the general sense of providing an output signal corresponding to a recorded contents a transmitted content, or an other source of content material.

[0020] The collection management system comprises the collection manager **150** that contains a user interface that provides a controlled access to the one or more storage devices **110**, **120**. That is, the collection management system forms a "virtual jukebox" that allows for a selection from among a plurality of recordings in the collection contained within the associated storage devices **110**, **120**. Also illustrated on the network are playback devices **130**, such as a CD or DVD player, a tape player, a record player, and the like, and an audio/video system **180** that allows for the presentation of the material that is played from the storage and playback devices **110**, **120**, **130**.

[0021] In a preferred embodiment, a combination of components **110**, **120**, **130**, **150**, **180** is embodied as an integrated system, thereby allowing for use in a dedicated system, a distributed system, or a combination of both. **FIG. 2** illustrates an example embodiment of an integrated system **200** that includes both storage and playback capabilities. As is discussed further herein, the collection management system includes facilities to automate the playback of selected recordings, for example, via a random play of selections of the same selected genre. To facilitate a playback of a selection without the typical delays associated with the selection of a recording via mechanical means, a preferred embodiment includes an archiving of recordings onto a medium having a relatively fast selection and access time, such as a "hard drive" disk memory device with an addressable file access means. Alternative random access file devices, such as recordable DVDs and mass storage semiconductor memory, may also be used. Existing technology, such as MPEG or Philips' DCC audio compression, can be applied to compress each recording for efficient archiving. For example, using Philips' DCC audio compression, a conventional 40 minute/350 MB audio CD can be compressed into about 33 MB of data. Therefore, a conventional 10 GB hard disk drive could contain approximately 300 audio CDs, or more than 3000 songs. Although the size of video data files, such as an MPEG encoding of a fill length movie, does not currently allow for an economically viable mass storage on a hard drive disk memory, this aspect of the invention can be applied to video data files as larger capacity disk drives become available.

[0022] A preferred embodiment of the integrated system **200** includes at least one playback device **130**, at least one hard disc drive **110**, and interconnection means **220** for accessing other items, or appliances, on a network. See, for example, the HAVi architecture and the Home API initiative, for home-networks, both involving substantial contributions from Philips Electronics, the Jini technology of Sun Microsystems, Inc., etc. In a simple embodiment, the interconnection means **220** may merely connect to an amplifier, a television, a set of speakers, and so on, for rendering the recorded information. For use as a stand-alone system, the integrated system **200** may optionally include an integral amplifier and speaker system (not shown).

[0023] The integrated system **200** also includes an LCD touch display device **250** for interacting with the collection manager **150** (not shown) within the system **200**. The display device **250** may also be used as an auxiliary rendering device, or A/V system **180**, for viewing video recordings in the collection. For ease of reference, the integrated system **200** is used hereinafter as the paradigm for a collection management system in accordance with this invention, although as previously noted, the components of the system **200** could be distributed throughout a network, located in a computing device, and so on.

[0024] Of note are the multiple bays **210** of **FIG. 2**. Using conventional disk operating system techniques, the collection manager **150** stores recordings at directly addressable storage locations on a hard disk drive **110**. In a preferred embodiment, the system **200** is provided with one hard drive **110**, the remaining bays **210** being empty. As discussed above, a conventional 10 GB hard disk has the capacity to hold more than 300 audio CDs, or well over 3000 songs. If the collection becomes larger than 300 CDs, additional hard drives can be added at each bay location **201**. Thus, by using a conventional disc operating system, the collection system of this invention is limited only by the number of files that can be indexed by the collection system. By using conventional dynamic tables, linked lists, and the like for such indexing, it would be apparent to one of ordinary skill in the art that the maximum size of the collection is virtually unlimited.

[0025] Illustrated in **FIG. 3** is an example catalog **300** that contains an identification **301** of each recording in the collection, and a locator **302** associated with each recording that identifies where the recording is located. In a preferred embodiment, the locator **302** is not limited to a single physical device, or a single set of storage devices **110**, **120**. The identification **301** may be, for example, the name of the recorded song, movie, show, etc., and the locator **302** may be an identification of the particular disk array **120**, the disk number within that array **120**, and the track within the disk identified by that disk number.

[0026] In a preferred embodiment, the catalog **300** also includes key fields **305** that may contain, for example, the title of the recording, the author, the performer, the genre, and so on, and the identification **301** is an index number, to which these key fields **305** can be referenced. That is, for example, using conventional data base search techniques, one could determine the identification number **301** of each of the recordings having a specified genre, and provide a list

of the titles and performers associated with each determined identification number. In a preferred embodiment, the catalog **300** also includes an ancillary information **309** associated with each recording identifier **301**. This ancillary information **309** includes, for example, a reference to other material, such as a news item related to the recording, a reference to another recording in another collection, a hyperlink address, a file containing the script or lyrics associated with the recording, and so on. The ancillary information **309** need not be limited to information that is contained within the collection itself For example, an indexed recording of an Elvis song may contain a hyperlink to another collection that contains a movie in which Elvis sang that song. Other information, such as recording time, media type, etc., may also be associated with each recording identifier **301**.

[**0027**] As illustrated in **FIG. 4**, entries are made into the catalog **300** by a cataloger **350**, and retrieval from the catalog **300** is effected by a search engine **360** and retriever **370**. The cataloger **350** and retriever **370** form the basic collection manager **150** of **FIG. 1**. The cataloger **350** and retriever **370** are preferably embodied as a software program that is executable on a computing device (not shown). A user interface, discussed further herein, provides for user control of the cataloging and retrieval process. A preferred embodiment of this invention allows for the building of an archive of recordings from a content source **310**. The archive in a preferred embodiment is an accumulation of copies of content material from one or more content sources **310** that allows for a playback of the content material from the archive storage device in lieu of the original content source **310**. The content source may be, for example, a conventional playback device **130**, such as a CD and DVD player, a cassette tape player, record player, VCR player, laser-disc player, and so on. In the integrated system **200** of **FIG. 2**, the content source is the integral CD/DVD device **130**, or via an external connection **220**. A receiver **320** receives material **311** from the content source **310**, the content of the material being dependent upon the capabilities of the content source **310**. If the content source, for example, is a legacy record player, the material **311** is limited to the recorded audio information. In this case, the receiver obtains an identification of the material **311** from an information source **340**, such as an identification input from the user. This input may be a conventional text entry, or a spoken entry that is either converted to a text entry, or stored directly as a spoken identifier. If the content source is a CD or DVD, the material **311** includes the unique identifier that is associated with commercial CDs and DVDs. In this case, the receiver provides the identification to the information source **340** to facilitate the determination of other information **341** related to the material **311**. For example, the identification can be used to access an Internet site to obtain detailed information regarding each commercial CD, such as the title, performer, etc. of each selection on the CD. Alternatively a user can enter such information, or provide direction to other sources of information regarding this material **311**.

[**0028**] The processing of the material **311** and information **341** is best understood with reference to **FIG. 5**, which illustrates an example flow diagram of a cataloging and archiving process in accordance with this invention. Cataloging includes the storage of the identification **321** and information **341** regarding the content **322** of the recording, and archiving includes the storage of the content **322** itself. At **410**, the process discussed above is initiated to determine the identification **321** of the material **311** and related information **341**. The identification **321** is compared with the information contained within the catalog **300**, at **420**. Other means of determining whether the playback information is already within the catalog would be evident to one of ordinary skill in the art. For example, a segment of the playback material can be compared to a corresponding segment in the catalogued material, using for example, a digital signature that is derived from each segment. Incorporated by reference herein is copending U.S. patent application "BIBLIOGRAPHIC MUSIC DATA BASE WITH NORMALIZED MUSICAL THEMES", U.S. Ser. No. 08/840,356, filed Apr. 28, 1997 for Mark Hoffberg, Attorney docket PHA 23,241, now allowed for issuance as a U.S. patent. This referenced application relates to an information processing system that has a music data base. The music data base stores homophonic reference sequences of music notes. The reference sequences are normalized and stored lexicographically to facilitate a search based on a string of input music notes. Other catalog search techniques will be evident, to one of ordinary skill in the art in view of this disclosure. If the material has already been archived and cataloged, at **430**, the process is bypassed, and the system continues uninterrupted, at **490**.

[**0029**] At **435**, default flags are used to identify whether cataloging or archiving should occur. In a preferred embodiment, a variety of options are available, and the system can be configured to select a predetermined set of options upon initialization. The predetermined options remain in effect unless overridden by a user input, at **440** and **445**. In accordance with one aspect of this invention, the archive options include:

[**0030**] Archive while playing back (auto-archive);

[**0031**] Archive without playing back (fast-archive); and,

[**0032**] Store for subsequent archive processing (background-archive).

[**0033**] If any of the archive options are set, at **450**, the content **322** of the recorded material **311** is processed for storage by the processor **330** of **FIG. 3**, at **454**. In a preferred embodiment, the processing includes an encoding of the information in a compacted, or compressed, form, such as an encoding into MPEG or DCC.

[**0034**] In the auto-archive mode, the processing occurs while the material is being received. This option, however, requires that the processing be accomplished at least as quickly as the material arrives for rendering. That is, for example, if the material is a video stream having a 30 frame per second arrival rate, the collection building system must be able to process the received information at an aggregate rate of **30** frames per second, and must contain sufficient buffering to cope with potential bursts of data as the information content of frames vary. In the strict auto-archive mode, the processing of the material is bound by the presentation speed; that is, in the above example, the processing of the material can not exceed an aggregate rate of 30 frames per second, because 30 frames per second is the speed at which the information is arriving.

[**0035**] The fast-archive mode is used whenever the material need not be presented to the user while it is being processed. In this mode, the speed of processing is limited

only by the time required to effect the processing. The speed of processing may be less than or greater than the nominal presentation speed. Using the above example, if the processing is performed efficiently by a high speed processor, and if the playback device provides the material as quickly as the processing can be effected, the archive rate may be substantially greater than 30 frames per second. Conversely, if the processing is slow, the archive rate may be substantially less than 30 frames per second.

[0036] The background-archive mode is used to rapidly store the material being received, while deferring the processing until a later time, when the system is less busy. This mode can be used to rapidly load the material into the system, a process that typically requires human interaction, and then leave the system unattended. This mode can also be used to rapidly load the material into the system and then replay it at presentation speed, while the processing occurs at its own pace.

[0037] A mix of these archive modes is also supported. For example, the material can be continually buffered into storage, and then presented from storage and processed from storage simultaneously. Assuming that the average processing rate is at least as fast as the presentation rate, the processing for archiving can occur at its own pace, either faster or slower than the presentation rate, until the difference in rate causes the buffer to approach its limit of capacity, at which time the processing is slowed down.

[0038] The processing for archiving, at **454**, in a preferred embodiment includes a compression of the material, using for example, an MPEG encoding, a DCC encoding, and the like. As would be evident to one of ordinary skill in the art, if the content **322** is in the appropriate form, no further processing is required, and for example, a direct disk-to-disk transfer can be effected. U.S. patent application "SELECTIVE BY-PASS OF ANALOG MODE IN COMMUNICATION BETWEEN DIGITAL DEVICES", U.S. Ser. No. 08/994,887, filed Dec. 19, 1997 for Paul Chambers, Attorney docket PHA 23,324, presents a method for fast data transfer by avoiding the decoding and subsequent encoding associated with the transfer of content material via analog communication paths, and is incorporated by reference herein.

[0039] At **458**, the processed material is stored to an archive device **110**, typically a hard drive. Note that by archiving a recording, the archive copy also provides a safeguard in the event of a loss of the original medium providing the content **322**. If a recording is archived, it is automatically catalogued by the cataloger **350**, at **464**-**468**. If a recording is not archived, at **450**, it may or may not, at **460**, be catalogued. This option is provided for a recording that is intended to remain at its current location at the content source **310**, yet managed by the collection management system in accordance with this system. This option includes the cataloging, for example, of a CD recording in a multiple CD storage/playback device **120**, the cataloging of a recording that is located at an Internet site, and so on.

[0040] If the material **311** is to be catalogued, via **458** or **460**, any additional information **341** that is to be associated with the recorded material is determined, at **464**. As noted above, this material could be provided via input from the user, via input from an associated database, via input from an Internet site, and so on. The identifier **301** of each selection, its locator **302**, and any ancillary material **305**, **309** is stored in the archive catalog **300**, at **468**.. The identifier **301** is derived from the identification information **321**, and may be a copy of the information **321** or a translation of the information **321** into a form that is specific to the catalog **300**. The locator **302** is an identifier to a location within the collection **390** where the content **322** of the material **310** can be found. If, for example, the content **322** has been archived to a file on the archive device **391**, its locator **302** is the name of the archive storage device **391** followed by the name of the file. If the content source **310** forms a part of the collection **390**, for example a multi-disk CD storage and player device **120**, the locator **302** is the name of the player **120** followed by a disk number and track number or selection number. As noted above, the physical size of each storage device **110**, **120** does not, per se, limit the size of a collection **390**. If additional storage is required, another storage device **110**, **120** need only be added to the collection **390**. Because the catalog **300** contains a locator **302** that provides an identifier of where the recording is located, the actual location of the recording, and therefore the size of the collection **390**, is only limited by the constraints and capabilities of the catalog **300**, and not the physical bounds among storage devices **110**, **120**.

[0041] The retriever **370** uses the catalog **300** to retrieve recordings from the collection **390**. In a straightforward embodiment, the retriever **370** presents a list of the key fields **305** of the catalog data to a user. The user selects an entry from the list, and the retriever determines the locator **302** that is associated with that selected entry. Illustrated in **FIG. 4** is a rendering device **380**. The rendering device **380** is the device with which the recording is presented to the user. This rendering device **380** may be an independent component, or integrated within a content source **310**, a receiver **320**, or other component within the system. For example, if the recording is an audio recording, the rendering device **380** may be an amplifier and speaker system; if the recording is a video recording, the rendering device **380** may be a television, a computer display, and so on. The rendering device **380** is used to render the original content **322** during the "archive while playing back" option discussed above, to render retrieved recorded content **395** from the collection **390**, and so on. In most applications, the collection **390** has one associated default rendering device **380**, such as the AN system **180** of **FIG. 1**. If multiple rendering devices **380** are supported, the catalog **300** will contain an identification of the class or classes of rendering device **380** suitable for each recording in the catalog. Based on the locator **302** associated with the selected recording, the retriever **370** provides the appropriate control information **371** to the rendering device **380** to effect the rendering of the selected recording in the collection **390**. If, for example, the locator **302** indicates that the selected recording is located on a disk store/playback device **120** at a particular disk and track location, the retriever **370** instructs, via control **371**, the rendering device **380** to take its input from the disk store/playback device **120**, and instructs, via control **372**, the disk store/playback device **120** to play the identified disk, starting at the specified location. If, in another example, the locator **302** indicates that the selected recording is stored in the archive **391**, the retriever **370** receives the archive content **331** from the archive **391** and provides it to the rendering device **380** in a suitable form. If, for example, the archive content **331** is in an MPEG format, and the rendering device **380** is MPEG-

compatible, the retriever **370** provides the content **331** directly to the rendering device **380** as the recorded content **395**. If, on the other hand, the rendering device **380** is not MPEG-compatible, and only accepts NTSC format signals, the retriever **370** performs the appropriate translation, or accesses another processor (not shown) to effect this translation, to provide the required NTSC format signals as input to the rendering device **380**, as indicated by the dashed lines within the path of the recorded content **395**.

[**0042**] The retriever **370** in a preferred embodiment also allows for access to the catalog **300** via a search engine **360**. The search engine **360** includes capabilities for searching the catalog **300** based on the aforementioned key fields, and includes context-sensitive search techniques, searches based on user preferences and prior user behavior, and so on. The retriever **370** provides a query or sequence of queries to the search engine **360**, and the search engine **360** provides catalog data in response to each query. The retriever **370** formulates the query based on a user input, which can be in a variety of forms, including a keyboard entry, a touchscreen entry, a spoken entry, and so on. For example, the integrated system **200** of **FIG. 2** may be located in an automobile, and a vocal entry of "Play classics" effects the selection of all the recordings on the hard drive **110** having a genre of "classic". Depending upon the user's preference, the recordings will be played in sequential or random order, starting from the last classic recording that was rendered for this user. These and other techniques for providing selections based on a user's expressed or implied preferences will be evident to one of ordinary skill in the art in view of this invention.

[**0043**] The presentation of the information of the catalog **300** in a preferred embodiment of this invention is not limited to a text display. **FIG. 6A** illustrates a presentation of the catalog **300** in a graphic form that is representative of the conventional storage of disks on a rack, as might be presented by the retriever **370**. The individual sets of recordings **610** are illustrated as disk cases, organized by genre **620**A, ownership **620**B, or any other user definable groupings. Because this display is a virtual representation of a collection, the same disk case may be illustrated in multiple groupings. For example, the category "Joe's"**620**B may be a user defined category for Joe's favorite recordings, some of which may be country-music recordings. These favorite country-music recordings will be represented by a disk case on each illustrated shelf, in the "country" category **620**A, and in the "Joe's" category **620**B. In accordance with this invention, the virtual representation also allows for alternative arrangements of selections, without requiring a physical rearrangement of media devices. For example, a user may prefer to reorganize the collection by performer, rather than by genre, or in addition to genre. Techniques for sorting and organizing information from the catalog **300** are common in the art. The results of such sorting and organizing, in accordance with this aspect of the invention, is a visual form that is familiar to a user, thereby providing the user with a degree of comfort and familiarity that increases the perceived worth of the collection management system. An alternative presentation of the catalog **300** information that is particularly well suited for a large collection is illustrated in **FIG. 6B**. In this hierarchical presentation, the user is provided a scrollable (left **631**, right **632**) high-level view **630** of a portion of the catalog **300** information, and a scrollable (left-right **641**) "zoom" view **640** of individual selections **610**. In a preferred embodiment, the user may modify the views **630**, **640** to display more or less of the collection, with less and more detail, respectively.

[**0044**] **FIGS. 7A and 7B** illustrate other example selection presentation devices **700** for the presentation of the catalog **300** information. In **FIG. 7**A, the catalog **300** is illustrated as a carousel of disks **710**, similar to the carousels of legacy jukebox devices. The carousel **710** is rotated by the control arrows **711**, **712**, as may be implemented on the example touch screen **250** of **FIG. 2**. As the carousel **710** is rotated, the title of the selection, the name of the performing artist, and other information **715** is displayed, corresponding to each disc on the carousel. As in the example illustrations of **FIGS. 6A and 6B**, the ordering of selections on the virtual carousel **710** can be in any order that is convenient to the user for effecting a selection. When the carousel **710** is positioned at a desired recording **715**, the user touches the play **720** button to effect the retrieval and rendering of the desired recording. Note that the actual location of the recording is of no relevance to this selection process. That is, whether the selection is at one of a half dozen 100-disk CD players in the user's home, or in a hard drive that is integral to the selection display device **700** is irrelevant, provided that the selection device **700** has access to the selected device. In a preferred embodiment, the selections presented on the carousel **710** are limited to those to which the selection device **700** has access.

[**0045**] **FIG. 7B** illustrates another example graphic user interface (GUI) **750** for a presentation device **700**. In this user interface, the catalog information is presented using a representation of a book **760**, or folder, within which the recordings are illustrated graphically **761** and textually **762**. The user controls **711**, **712**, and **720** operate as in **FIG. 7A**. The controls **711**, **712**, and **720** may also be effected by vocal commands "back", "next", and "play", respectively. In a preferred embodiment of this invention, the presentation device **700** is configurable to support a choice of languages for the text items of the display, and for the vocal command processing. To enhance the ease of recognition and selection, the graphic representation **761** is preferably a recognizable image, such as the "jacket cover" that is associated with individual CDs or DVDs. The jacket cover may be obtained, for example, from an Internet set, based on the unique CD identifier, or it may be input by scanning an image from the original CD or DVD jacket. The text representation may be a listing of song titles, which automatically changes to a listing of the lyrics associated with the song that is currently selected within that song title list. In accordance with this invention, the displayed information may be obtained from an information source when the material is catalogued, or from an information source at the time the material is being considered for selection. The "displayed" information could also include renderings of samples from the recorded material. These and other display techniques will be evident to one of ordinary skill in the art in light of this invention.

[**0046**] The foregoing merely illustrates the principles of the invention. It will thus be appreciated that those skilled in the art will be able to devise various arrangements which, although not explicitly described or shown herein, embody the principles of the invention and are thus within its spirit and scope. For example, the user interface device **700** may have a programmable user interface. Copending U.S. patent application "INTERNET-BASED SERVICE FOR UPDATING A PROGRAMMABLE CONTROL DEVICE", U.S.

Ser. No. 09/311,128, filed May 13, 1999 for Joost Kemink, Attorney docket number PHA 23,501, incorporated by reference herein, discloses the downloading of information to modify the user interface, based for example on an interface schema that is developed by a third party to enhance the usability of the controlled device. With such an embodiment, each of the alternative example interfaces of **FIGS. 6A, 6B, 7A, and 7B** could be downloaded from the Internet, replacing whatever interface had been provided initially with the product.

[**0047**] In another example embodiment, the user interface to the retriever **370** may be via a remote control device that accesses the retriever **370** either directly via, for example, an infra-red link, or indirectly via the network **100**. Copending U.S. patent application "REMOTE CONTROL DEVICE WITH LOCATION DEPENDENT INTERFACE", U.S. Ser. No. 09/210,416, filed Dec. 11, 1998 for Joost Kemink, Attorney docket number PHA 23,522, discloses the use of a location determination device to select or modify the user interface in dependence upon the location of a remote control device, and is incorporated by reference herein. In like manner, the controls included in the GUI may differ depending upon the geographic location of the user, using, for example, different language text in different countries. The controls and selection criteria may also be dependent upon a time parameter, such as the time of day, season of the year, and so on.

[**0048**] The particular configurations in the accompanying figures are provided for illustration purposes. Alternative arrangements can be defined. For example, the integrated system **200** of **FIG. 2** includes an integral media player **130**; a lower cost embodiment, such as one for portable use, could include a simplified retriever **370**, catalog **300**, archive **391**, and rendering device **380**. In such an embodiment, the portable device could be "docked" to a full cataloging system that includes playback and storage devices **110**, **120**, **130**, a cataloger **350**, and a processor **330** for creating the archive content **331** that can be directly transferred to the archive **391** in the portable device. These and other system configuration and optimization features will be evident to one of ordinary skill in the art in view of this disclosure, and are included within the scope of the following claims.

I claim:

1. A content processing device comprising:

a receiver that receives content data from a content source,

a processor, operably coupled to the receiver, that processes the content data and produces therefrom archive content,

a storage device, operably coupled to the processor, that accumulates the respective archive content at a respective location,

a cataloger, operably coupled to the receiver and the storage device, that associates the location corresponding to the archive content to an identifier of the content data, and

a retriever, operably coupled to the storage device, that facilitates a selection of at least one of the archive content and the content data, based on information associated with the identifier of the content data.

2. The content processing device of claim 1, wherein the content data comprises audio information.

3. The content processing device of claim 1, wherein the retriever includes means for transforming the archive content into a form suitable for rendering by a rendering device.

4. The content processing device of claim 1, wherein the content source is a recording medium, and the receiver includes

a playback device that receives the content data by accessing information that is stored on the recording medium.

5. The content processing device of claim 4, wherein the playback device also renders the content data in an audible form while the processor is processing the content data to form the archive content.

6. The content processing device of claim 1, wherein the content source is at least one of: a playback device, a storage device, and an Internet site.

7. The content processing device of claim 1, wherein the archive content comprises at least one of a Philips DCC compression and an MPEG compression.

8. The content processing device of claim 1, wherein

the storage device is also configured to store the content data, for subsequent processing by the processor to produce the archive content.

9. The content processing device of claim 1, wherein

the cataloger associates one or more information items to the identifier, and

the retriever facilitates the selection based also on the one or more information items.

10. The content processing device of claim 1, wherein the retriever includes

a graphic user interface that facilitates the selection.

11. A collection management system comprising:

a cataloger that associates a locator and at least one information item to each recording of a collection of recordings,

a user interface that facilitates a user selection of a selected recording from the collection of recordings, based on the at least one information item associated with the selected recording,

a retriever that determines the locator associated with the selected recording, and accesses recorded content at a storage device, based on the locator.

12. The collection management system of claim 11, wherein

the user interface is a graphic user interface, and the at least one information item is rendered to the user in a graphic form that facilitates the user selection.

13. The collection management system of claim 12, wherein the graphic user interface is programmable.

14. The collection management system of claim 12, wherein

upon selection of the selected recording, the graphic user interface presents ancillary information related to the selected recording.

15. The collection management system of claim 12, wherein

the graphic user interface includes an image corresponding to each recording of the collection of recordings, and

the selection of the selected file is facilitated by a rendering of the image corresponding to the selected recording by the graphic user interface.

16. The collection management system of claim 11, wherein the at least one information item is provided by an Internet site.

17. The collection management system of claim 11, further including:

a processor that processes at least one recording of the collection of recordings to produce an archive content to facilitate a storage of the archive content, and

wherein

the retriever processes the archive content corresponding to the at least one recording to produce therefrom a corresponding content that is suitable for rendering by a rendering device.

18. The collection management system of claim 17, further including

an archive device that stores the archive content, and

wherein

the retriever receives the archive content corresponding to the selected recording from the archive device.

19. The collection management system of claim 18, wherein the archive device is at least one of a disk drive device, a DVD recorder, a CD recorder, and a semiconductor memory device.

20. A method of archiving content data, comprising

receiving the content and a content identifier,

rendering the content data in at least one of an audio form and a visual form.

processing the content data to produce archive content,

accumulating the archive content at a respective storage location in an archive storage device, and

cataloging the content data by associating the storage location to the content identifier.

21. The method of claim 20, further comprising:

determining whether the content data has been previously catalogued, based on the content identifier, and

cataloging the content data only if the content data has not been previously catalogued.

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