

CERTIFICATE OF TRANSLATION ACCURACY

I am a professional reviewer and coordinator specializing in translating Japanese, Korean, and Chinese to English and vice versa.

I served as Chief Examiner of the certified court interpreter test for the State of California and as a contract translator and interpreter for various federal agencies through the U.S. Department of State for more than a decade. I served as an instructor at the University of California at Berkeley and the Middlebury Institute of International Studies at Monterey (MIIS) Graduate Program in Translation.

I have more than 30 years of experience reviewing thousands of technical, legal, and business documents from Japanese to English submitted to, among others, Japanese judicial authorities, U.S. federal courts, the U.S. International Trade Commission (ITC), and the USPTO Patent Trial and Appeal Board (PTAB).

I certify that the following document translated from Japanese to English is a true, correct, and complete translation of the corresponding source text to the best of my knowledge and ability.

I certify under penalty of perjury that the foregoing is true and correct.

Executed this 7th day of January 2025 in Contra Costa County of the State of California.

By:



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(54) [Title of the Invention] INFORMATION PROCESSING DEVICE, METHOD, AND MEDIUM

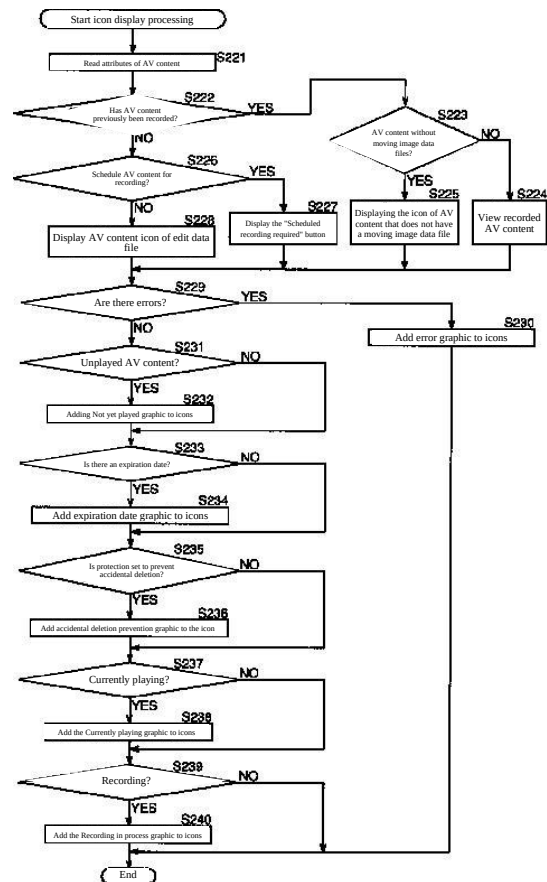
(57) ABSTRACT (Amended)

PROBLEM

To be able to understand at a glance the state of manipulation of a video in a personal computer capable of manipulating video.

SOLUTION

A personal computer changes display of an icon depending on processing or state of a video. In other words, an icon corresponding to each state is displayed when a video is being played, when a video is being recorded, when a time limit has been set for video data, or the like.



What is claimed is:

[Claim 1] An information processing device for manipulating video, comprising:

display controlling means for controlling a display in response to manipulation of a video or data for playing a video, or a state of the video.

[Claim 2] The information processing device according to claim 1, wherein the display controlling means displays a first icon when a video is being played.

[Claim 3] The information processing device according to claim 1, wherein the display controlling means displays a second icon when a video is being recorded.

[Claim 4] The information processing device according to claim 1, wherein the display controlling means displays a third icon when a video or data for playing a video has never been played.

[Claim 5] The information processing device according to claim 1, wherein the display controlling means displays a fourth icon when a time limit is set for a video or data for playing a video.

[Claim 6] The information processing device according to claim 1, wherein the display controlling means displays a fifth icon when a video or data for playing a video is set to be protected from deletion.

[Claim 7] The information processing device according to claim 1, wherein the display controlling means displays a sixth icon when the video or data for playing the video has an error.

[Claim 8] An information processing method for an information processing device that manipulates video, comprising:

a display controlling step of controlling display in response to manipulation of a video or data for playing a video, or a state of the video.

[Claim 9] A medium for causing a computer to execute a program for information processing by an information processing device that manipulates video, the program including a display controlling step for controlling display in response to manipulation on a video or data for playing a video, or a state of the video.

DETAILED DESCRIPTION OF THE INVENTION

[0001]

TECHNICAL FIELD OF THE INVENTION

The present invention relates to an information processing device and method, and to a medium, and more particularly to an information processing device and method, and to a medium for recording video.

[0002]

BACKGROUND ART

A technology is becoming popular in which a personal computer has a built-in tuner that receives video and audio signals from a television broadcast station, converts the received video and audio into prescribed digital data,

records the data on a storage medium such as a hard disk, and plays the data as needed.

[0003]

PROBLEM TO BE SOLVED BY THE INVENTION

In a personal computer capable of manipulating video, there has been a problem that understanding the state of manipulations being performed on the video is difficult.

[0004] In light of the foregoing, an object of the present invention is to enable understanding the state of manipulation of a video at a glance.

[0005]

MEANS FOR SOLVING THE PROBLEM

The information processing device of claim 1 includes display controlling means for controlling a display in response to manipulation of a video or data for playing a video, or a state of the video.

[0006] The display controlling means can display a first icon when a video is being played.

[0007] The display controlling means can display a second icon when a video is being recorded.

[0008] The display controlling means can display a third icon when a video or data for playing a video has never been played.

[0009] The display controlling means can display a fourth icon when a time limit is set for a video or data for playing a video.

[0010] The display controlling means can display a fifth icon when deletion protection is set for a video or data for playing a video.

[0011] The display controlling means can display a sixth icon when a video or data for playing a video contains an error.

[0012] The information processing method of claim 8 includes a display controlling step for controlling a display in response to manipulation of a video or data for playing a video, or a state of the video.

[0013] The program on a medium according to Claim 9, including a display controlling step for controlling a display in response to manipulation of a video or data for playing a video, or a state of the video.

[0014] In the information processing device of claim 1, the information processing method of claim 8, and the medium of claim 9, display is controlled in response to manipulation on a video or data for playing a video, or a state of the video.

[0015]

PREFERRED EMBODIMENT OF THE INVENTION

FIG. 1 is a diagram depicting an embodiment of a video recording and playing system according to the present invention. The personal computer 1 inputs a signal supplied from an antenna 2 which receives radio waves transmitted from the prescribed television broadcast station, plays prescribed video and audio (so-called program video and audio), and records the video and audio.

The personal computer 1 also plays video and audio corresponding to analog signals supplied from a VCR (Video Cassette Recorder) 3, or digital data supplied from a DVCR (Digital Video Cassette Recorder) 4 or a DVCR 5 with a video function via networks 6-1 and 6-2 in accordance with IEEE (Institute of Electrical and Electronic Engineers) 1394, and records the video and audio.

[0016] The personal computer 1 supplies analog signals (for example, analog signals in the NTSC (National Television System Committee) format) corresponding to the recorded audio and video to the VCR3, or supplies digital data corresponding to the recorded audio and video to the DVCR4.

[0017] Furthermore, a personal computer 1 searches for the prescribed file (which records data indicating the content of the audio and video recorded on a video tape cassette) associated with the audio and video recorded on the video tape cassette to which a label is affixed, based on the video data of a label printed with a 2D barcode, described below, and supplied from the DVCR 5 via networks 6-1 and 6-2. In addition, the personal computer 1 determines whether or not a specified audio and video have been recorded on a video tape cassette having a label printed with a two-dimensional barcode, based on video data of the label printed with the prescribed 2D barcode (described later) supplied from the DVCR 5 via the networks 6-1 and 6-2.

[0018] In addition, the personal computer 1 can edit the recorded audio and video.

[0019] FIG. 2 is a block diagram for describing a configuration of the personal computer 1. A CPU (central processing unit) 21 executes various application programs and a basic OS (operating system). A ROM (read-only memory) 22 generally stores essentially fixed data among programs and parameters for calculations used by the CPU 21. A RAM (random-access memory) 23 stores programs used during execution by the CPU 21 and parameters that change as appropriate during execution of the programs. These are mutually connected by a host bus 24 such as a CPU bus, a memory bus, and the like.

[0020] The host bus 24 connects to an external bus 26 such as a PCI (Peripheral Component Interconnect/Interface) via a bridge 25.

[0021] A keyboard 28 is operated by a user for inputting various commands to the CPU 21. The mouse 29 is operated by the user when specifying or selecting a point

on a screen of a CRT (cathode ray tube) 30. The CRT 30 displays various information in the form of text and images. The hard disk drives (HDD) 31-1 and 31-2 and the floppy disk drive (FDD) 32 drive hard disks and floppy disks, respectively, and cause programs to be executed by the CPU 21 and information to be recorded on or played back from these disks. A speaker 33 generates prescribed audio. This keyboard 28 and speaker 33 are connected to the interface 27 and the interface 27 is connected to the CPU 71 via the external bus 26, bridge 25, or host bus 24. Hereinafter, when distinguishing between HDD 31-1 and HDD 31-2 is not required, they will simply be referred to as HDD 31.

[0022] Under the control of the CPU 21, the video processing board 34 generates prescribed video or audio data based on the signal supplied from the antenna 2, the video or audio analog signal supplied from the VCR 3, or the video or audio digital data supplied from the DVCR 4 or DVCR 5 via the network 6-1, and outputs the data to the HDD 31-1 or HDD 31-2 via the external bus 26 and the interface 27.

[0023] In addition, the video processing board 34 inputs video or audio data recorded on the HDD 31-1 or HDD 31-2 via the external bus 26 and the interface 27, generates an analog signal corresponding to the input video or audio data and supplies the analog signal to the VCR 3, or generates digital data corresponding to the input video or audio data and supplies the data to the DVCR 4 via the network 6-1.

[0024] The video processing board 34 is connected to the CPU 71 via the external bus 26, the bridge 25, and the host bus 24.

[0025] Next, the configuration of the video processing board 34 will be described. FIG. 3 is a diagram depicting the configuration of the video processing board 34. The 1394 interface 51 has a configuration conforming to the IEEE 1394 standard, is connected to the network 6-1, receives DVCR format digital data of video or audio supplied from the DVCR 4 or DVCR 5 based on a protocol conforming to the IEEE 1394 standard, and supplies the digital data to a DV (Digital Video) data interface 52.

[0026] Furthermore, the 1394 interface 51 also supplies the DVCR format digital data of video or audio supplied from the DV data interface 52 to the DVCR 4 based on a protocol conforming to the IEEE 1394 standard.

[0027] The DV data interface 52 outputs the DVCR format video or audio digital data supplied from the 1394 interface 51, or the video or audio digital data supplied from the digital selector 57 (for example, so-called uncompressed digital data such as 4:1:1 and the like) to the DV data compression/decompression circuit 53, outputs the DVCR format video or audio digital data supplied from the DV data compression/decompression circuit 53 to the 1394 interface 51, and outputs the video or audio digital data (uncompressed) supplied from the digital selector 57 and from the DV data compression/decompression circuit 53 to the digital selector 57.

[0028] The DV data compression/decompression circuit 53 decompresses the DVCR format video or audio digital data supplied from the DV data interface 52 into uncompressed video or audio digital data and outputs the data to the DV data interface 52, or compresses the uncompressed video or audio digital data supplied from the DV data interface 52 into DVCR format video or audio digital data and outputs the data to the DV data interface 52.

[0029] The tuner 54 receives an RF (radio frequency) signal supplied from the antenna 2 and outputs analog signals of video and audio from the prescribed channel to an analog selector 55. The analog selector 55 selects either the video or audio analog signal supplied from the tuner 54, the VCR 3, or a D/A (Digital/Analog) conversion circuit 61, and outputs the signal to the A/D (Analog/Digital) conversion circuit 56 or the VCR 3.

[0030] The A/D conversion circuit 56 converts the video and audio analog signals supplied from the analog selector 55 into digital data (such as so-called 4:1:1 video data and the like) and outputs the data to the digital selector 57. The digital selector 57 inputs the video and audio digital data output from the DV data interface 52, the A/D conversion circuit 56, or the MPEG (Moving Picture Experts Group) decoder 60, selects one of the video and audio digital data, and outputs the data to the DV data interface 52, the MPEG encoder 58, or the D/A conversion circuit 61, as well as to the bridge 59, and outputs information on the scene change position to the bridge 59.

[0031] The MPEG encoder 58 compresses the video and audio digital data supplied from the digital selector 57 into MPEG format digital data, and outputs the data to the bridge 59. Furthermore, the MPEG encoder 58 converts the video at a scene change into a still image and outputs the still image to the bridge 59.

[0032] The bridge 59 outputs the video and audio digital data (uncompressed) supplied from the digital selector 57 to the CRT 30 via the PCI bus 26 and interface 27 of the personal

computer 1 with a mounted video processing board 34. The bridge 59 outputs the MPEG format video or audio digital data supplied from the MPEG encoder 58 to the HDD 31-1 or 31-2, or the CPU 21 via a PCI bus 26 of the personal computer 1 with a mounted video processing board 34. Furthermore, the bridge 59 receives MPEG format video or audio digital data from the HDD 31-1 or 31-2 of the personal computer 1 via the PCI bus 26, and outputs the data to the MPEG decoder 60.

[0033] The MPEG decoder 60 decompresses the MPEG format video or audio digital data supplied from the bridge 59 to generate uncompressed video or audio digital data, and outputs the data to the digital selector 57.

[0034] The D/A conversion circuit 61 converts the image and audio digital data supplied from the digital selector 57 into an analog signal, and outputs the signal to the analog selector 55.

[0035] Note that the processing corresponding to the MPEG encoder 58 or the MPEG decoder 60 may be executed by the CPU 21 in accordance with the prescribed program.

[0036] FIG. 4 is a diagram for describing an application program executed by the personal computer 1. The recording and playback program 81 causes the video processing board 34 to select either the video and audio analog signals of the prescribed channel received by the tuner 54, the video and audio analog signals supplied from the VCR 3, or the video and audio digital data supplied from the DVCR 4 via the network 6-1, convert the selected analog signal or digital data into MPEG-formatted video or audio digital data, and record the data on the HDD 31-1 or 31-2, or on both HDD 31-1 and 31-2, as AV (Audio Visual) content containing one or more files of the prescribed format.

[0037] In addition, the recording and playback program 81 causes the video processing board 34 to decompress the AV content recorded on the HDD 31-1 or 31-2, or on both HDD 31-1 and 31-2, as one or more files of the prescribed format, to generate uncompressed digital data of the prescribed video or audio, and causes the video to be displayed on the CRT 30 and the audio to be played through the speaker 33.

[0038] The AV content management search program 82 displays prescribed information such as the details of AV content recorded in HDD 31-1 or 31-2, or in both HDD 31-1 and 31-2, the recording date, and the like. In addition, the AV content management search program 82 instructs the recording and playback program 81 to playback prescribed AV content, selects the AV content to be edited, supplies information on the selected AV content to the AV content editing program 83, and instructs the scheduled recording setting program 84 to perform scheduled recording.

[0039] The AV content editing program 83 edits prescribed video and audio of selected AV content (joins video and audio contained in the prescribed AV content) based on the AV content recorded in HDD 31-1 or 31-2, or in HDDs 31-1 and 31-2, and generates AV content in the prescribed format that plays back the edited video or audio.

[0040] As described later, the AV content does not contain video or audio digital data, but is composed of information identifying the selected AV content and information identifying the video and audio to be used, and can be played using the recording and playback program 81.

[0041] The scheduled recording setting program 84 generates AV content for scheduled recording based on the settings. The AV content corresponds to the settings (recording time and recording mode that determines the video quality) and a storage region of the HDD 31-1 or 31-2, or both HDD 31-1 and 31-2 is reserved in advance.

[0042] A schedule monitoring program 85 always operates (or in other words, is resident) when the personal computer 1 is operating (when the OS is operating), and executes scheduled recording based on the AV content for which the scheduled recording is to be executed, which is generated by the scheduled recording setting program 84, and the time supplied from an RTC (Real Time Clock), not depicted. Furthermore, the schedule monitoring program 85 changes the settings of the AV content for which scheduled recording is to be executed.

[0043] FIG. 5 is a diagram for describing the configuration of application programs, middleware, and drivers executed by the personal computer 1. The middleware responds to requests from application programs and operates prescribed drivers. The drivers actually operate prescribed hardware resources, such as the MPEG encoder 58 on the video processing board 34.

[0044] The hardware interface 91 arbitrates the use of hardware resources requested by the recording and playback program 81, the AV content management search program 82, the AV content editing program 83, the scheduled recording setting program 84, or the scheduled monitoring program 85, and enables the application program to appropriately use the prescribed hardware resources based on various settings such as priority levels.

[0045] The content database 92 is a database that manages data on the attributes of the AV content, which will be described later, and provides the recording and playback program 81, the AV content management search program 82, the AV content editing program 83, the scheduled recording setting program 84, or the scheduled monitoring program 85 with data on the attributes of AV content,

which will be described later, or data that identifies files that store video or audio digital data corresponding to the AV content.

[0046] The file I/O (Input/Output) 93 responds to requests to read or write specific AV content (containing one or more files) from the recording and playback program 81, the AV content management search program 82, the AV content editing program 83, the scheduled recording setting program 84, or the schedule monitoring program 85 via the content database 92, and actually reads or writes data from or to the prescribed files.

[0047] The encoder 94 executes control for compressing the video or audio data input from the digital selector 57 into MPEG format digital data in the MPEG encoder 58 of the video processing board 34.

[0048] The decoder 95 executes control for causing the MPEG decoder 60 of the video processing board 34 to decompress the MPEG format video or audio digital data input from the bridge 59.

[0049] The output switch 96 operates the analog selector 55 and the 1394 interface 51 of the video processing board 34 to control the output of the analog signal from the video processing board 34 or digital data via the network 6-1.

[0050] The input switch 97 operates the analog selector 55, the 1394 interface 51, the DV data interface 52, and the digital selector 57 of the video processing board 34 to select the analog signal or digital data to be input to the video processing board 34.

[0051] The screen display 98 operates the digital selector 57 and the bridge 59 and controls the display of video on the CRT 30.

[0052] The driver 99 is a program that responds to requests from the encoder 94, decoder 95, output switch 96, input switch 97, and screen display 98, and actually operates the video processing board 34.

[0053] A description of audio processing is omitted from the following description.

[0054] FIG. 6 is a diagram for describing an example of the structure of AV content. The content database 92 recorded in HDD 31-1 or 31-2 records the attributes of the AV content. The AV content attribute record 102-1 recorded in the content database 92 stores data such as the attributes of the AV content 101-1, such as name, ID (Identification data), creation date and time, modification date and time, recording time, channel name, recording mode, status, expiration date (indicated by date and time), settings to prevent accidental deletion, presence or absence of errors, a two-dimensional barcode (for example, CyberCode (trademark)), notes, and the like.

The AV content attribute record 102-2 recorded in the content database 92 stores data such as the name, ID, creation date and time, modification date and time, recording time, channel name, recording mode, status, expiration date, settings to prevent accidental deletion, the presence or absence of errors, and notes, which are attributes of the AV content 101-2.

[0055] The recording mode data stored in the AV content attribute record 102-1 indicates that the moving image data files 111-1-1 to 111-1-3 are either high quality, standard, or video CD compatible (indicating that the video data is in the MPEG1 format). Similarly, the status data stored in the AV content attribute record 102-1 indicates that the AV content 101-1 is in any one of the following states: waiting for schedule, currently recording, currently recording and playing (recording and playing the recorded video data), never played, currently playing, or previously played.

[0056] An error indicates a state of the AV content 101-1, for example, when the personal computer 1 malfunctions during recording such that recording is only partially completed, when reception is poor during recording and the image cannot be reproduced using the signal input from the antenna 2, or when a portion of the video data file 111-1-1 is missing.

[0057] The settings of the expiration date and prevention of accidental deletion may be set either individually or in combination, but both the expiration date and the prevention of accidental deletion are not necessarily set at the same time.

[0058] The recording mode data stored in the AV content attribute record 102-2 indicates that the moving image data files 111-2-1 to 111-2-3 are either high quality, standard, or video CD compatible. Similarly, the status data stored in the AV content attribute record 102-2 indicates that the AV content 101-2 is in any one of the following states: waiting for schedule, currently recording, currently recording and playing, never played, currently playing, or previously played.

[0059] The AV content 101-1 contains moving image data files 111-1-1 through 111-1-3 recorded on HDD 31-1 or 31-2, and still image data files 112-1-1 through 112-1-3 recorded on HDD 31-1 or 31-2. The moving image data files 111-1-1 to 111-1-3 store video data in the MPEG format. The video corresponding to the video data stored at the beginning of the moving image data file 111-1-2 is continuous with the video corresponding to the video data stored at the end of the moving image data file 111-1-1. Similarly, the video corresponding to the video data stored at the beginning of the moving image data file 111-1-3 is continuous with the video corresponding to the video data stored at the end of the moving image data file 111-1-2.

[0060] The still image data file 112-1-1 stores video data obtained by converting scene change video of the video data stored in moving image data file 111-1-1 to still images, as well as data on the time of the scene change (or the offset position on the moving image data file 111-1-1). The still image data file 112-1-2 stores video data obtained by converting scene change video of the video data stored in moving image data file 111-1-2 to still images, as well as data on the time of the scene change (or the offset position on the moving image data file 111-1-2). The still image data file 112-1-3 stores video data obtained by converting scene change video of the video data stored in moving image data file 111-1-3 to still images, as well as data on the time of the scene change (or the offset position on the moving image data file 111-1-3).

[0061] The AV content 101-2 is composed of moving image data files 111-2-1 and 111-2-2, and still image data files 112-2-1 and 112-2-2, and is similar to the AV content 101-1, so a description thereof will be omitted.

[0062] Hereinafter, when there is no need to distinguish between AV content 101-1 and AV content 101-2, they will be simply referred to as AV content 101. Hereinafter, when there is no need to distinguish between AV content attribute record 102-1 and AV content attribute record 102-2, they will be simply referred to as AV content attribute record 102. Hereinafter, when there is no need to distinguish between the moving image data files 111-1-1 through 111-1-3 or the moving image data files 111-2-1 and 111-2-2, they will be simply referred to as moving image data files 111.

[0063] FIG. 7 is a diagram for describing an example of AV content 101 that does not include a moving image data file. For example, when video and audio corresponding to moving image data files 111-1-1 through 111-1-3 stored in AV content 101-1 are recorded onto the prescribed video tape cassette and then moving image data files 111-1-1 through 111-1-3 are deleted, AV content 101-1 is composed of still image data files 112-1-1 through 112-1-3 and does not include moving image data file 111. Hereinafter, when there is no need to individually distinguish the still image data files 112-1-1 through 112-1-3 or the still image data files 112-2-1 and 112-2-2, the files will be simply referred to as still image data files 112.

[0064] By searching for and using AV content 101 that does not include moving image data file 111 corresponding to the prescribed video tape cassette, the content of the video and audio recorded on the prescribed video tape cassette can be known.

[0065] FIG. 8 is a diagram for describing an example of AV content generated when the AV content editing program 83 edits prescribed AV content 101. The AV content 121-1 generated by the AV content editing program 83 is composed of an editing data file 131-1 that stores data such as the ID of the referenced AV content a, the playback start position of the AV content a, and playback end position of the AV content a, the ID of the referenced AV content b, the playback start position of the AV content b, and playback end position of the AV content b, and the ID of the referenced AV content c, the playback start position of the AV content c, and playback end position of the AV content c.

[0066] Similarly, the AV content 121-2 generated by the AV content editing program 83 is composed of an editing data file 131-2 that stores data such as the ID of the referenced AV content p, the playback start position of the AV content p, and playback end position of the AV content p, the ID of the referenced AV content q, the playback start position of the AV content q, and playback end position of the AV content q, and the ID of the referenced AV content r, the playback start position of the AV content r, and playback end position of the AV content r.

[0067] The AV content attribute record 132-1 corresponding to the AV content 121-1 generated by the AV content editing program 83 stores data such as the name, ID, creation date and time, modification date and time, recording time, status, expiration date, settings to prevent accidental deletion, the presence or absence of errors, and notes, which are attributes of the AV content 121-1. The AV content attribute record 132-2 corresponding to the AV content 121-2 stores data such as the name, ID, creation date and time, modification date and time, recording time, status, expiration date, settings to prevent accidental deletion, the presence or absence of errors, and notes, which are attributes of the AV content 121-2.

[0068] The status data stored in the AV content attribute record 132-1 indicates that the AV content 131-1 is in any one of the following states: never played, currently playing, or previously played. The status data stored in the AV content attribute record 132-2 indicates that the AV content 131-2 is in any one of the following states: never played, currently playing, or previously played.

[0069] Video and audio can be edited using only a small storage region by using the AV contents 121-1 or 121-2.

[0070] Hereinafter, when there is no need to distinguish between AV content 121-1 and 121-2, they will be simply referred to as AV content 121. Hereinafter, when there is no need to distinguish between AV content attribute record

132-1 and AV content attribute record 132-2, they will be simply referred to as AV content attribute record 132.

[0071] Next, a screen that the recording and playback program 81 causes to be displayed on the CRT 30 of the personal computer 1 will be described. FIG. 9 is a diagram for describing a screen displayed on the CRT 30 of the personal computer 1 when the recording and playback program 81 is capable of performing the recording.

[0072] The channel to be recorded, the recording mode, and the like are set in the recording window 141. When recording starts, the recording and playback program 81 sets the manipulation of the tuner 54 or MPEG encoder 58 of the video processing board 34 based on the settings of the recording window 141, generates the prescribed AV content 101 and AV content attribute record 102, and records this content on the HDD 31.

[0073] When the recording window 141 is selected and active, the Record button 142 and the Stop button 143 become active and can be operated. In other words, when the recording window 141 is selected and active, the recording and playback program 81 starts recording when the record button 142 is clicked, and stops recording when the stop button 143 is clicked.

[0074] On the other hand, when the recording window 141 is selected and active, the play button 144 and the pause button 145 are inactive, and the recording and playback program 81 does not operate even if the play button 144 or the pause button 145 is clicked.

[0075] FIG. 10 is a diagram for describing a screen displayed on the CRT 30 of the personal computer 1 when the recording and playback program 81 starts recording. The recording window 141 displays the channel to be recorded and the recording mode, as well as the time elapsed since the start of recording and the current time. [0076] When recording starts, the Record button 142 is changed to a recording time change button 151. The recording time is changed every time the recording time change button 151 is clicked.

[0077] FIG. 11 is a diagram for describing the change in recording time by clicking the recording time change button 151. When recording starts, the recording start time is set to the maximum recordable time calculated from the size of data that can be recorded on HDD 31-1 and 31-2 (or in other words, free space) and the amount of video data per unit recording time determined by the recording mode. [0078] For example, if the size of recordable data on HDD 31-1 is 3 GB, the size of recordable data on HDD 31-2 is 6 GB, and the amount of video data per second in standard recording mode is 5 Mbits, the maximum recordable time can be calculated using the following formula.

[0079] $(3 \text{ GB} + 6 \text{ GB}) * (8 \text{ bits/byte}) / (5 \text{ Mbits/sec}) = 14400 \text{ seconds} = 4 \text{ hours}$

If less than 30 minutes has elapsed since the start of recording, when the maximum recordable time is set for the recording time as depicted in FIG. 11(A), clicking the recording time change button 151 sets the recording time to 30 minutes. From this point on, each time the recording time change button 151 is clicked, the recording time is changed as follows: 1 hour, 1 hour and 30 minutes, 2 hours, 2 hours and 30 minutes, and 3 hours. When the recording time is set to 3 hours, clicking the recording time change button 151 returns the recording time to the maximum recordable time.

[0080] If 30 minutes or more but less than one hour has passed since the start of recording, when the maximum recordable time is set as the recording time as depicted in FIG. 11(B), clicking the recording time change button 151 sets the recording time to 1 hour. From this point on, each time the recording time change button 151 is clicked, the recording time is changed as follows: 1 hour and 30 minutes, 2 hours, 2 hours and 30 minutes, and 3 hours. When the recording time is set to 3 hours, clicking the recording time change button 151 returns the recording time to the maximum recordable time.

[0081] If more than 1 hour and 30 minutes but less than 2 hours have passed since the start of recording, when the maximum recordable time is set for the recording time, as depicted in Figure 11 (C), clicking the recording time change button 151 will set the recording time to 2 hours. From this point on, each time the recording time change button 151 is clicked, the recording time is changed as follows: 2 hours and 30 minutes, and 3 hours. When the recording time is set to 3 hours, clicking the recording time change button 151 returns the recording time to the maximum recordable time.

[0082] In this manner, the user can easily and appropriately change the recording time by simply clicking the recording time change button 151.

[0083] The recording time can also be set from a recording time setting window that is displayed by selecting the prescribed menu command from the screen of the recording and playback program 81. FIG. 12 and FIG. 13 are diagrams depicting the recording time setting window. FIG. 12 is a diagram depicting a screen for selecting the recording time from the start time using a pull-down menu. FIG. 13 is a diagram depicting a screen for selecting the maximum recordable time.

[0084] The user can quickly set the recording time by using the recording time setting window.

[0085] Next, a screen displayed when the prescribed AV content 101 or AV content 121 is played by the recording and playback program 81 will be described. FIG. 14 is a diagram for describing a screen displayed on the CRT 30 of the personal computer 1 when the recording and playback program 81 is capable of performing playback.

[0086] The playback window 161 displays the recording mode of the AV content to be played, and the like. When the playback window 161 is selected and active, the stop button 143, the play button 144, and the pause button 145 become active and can be operated. In other words, when the playback window 161 is selected and active, the recording and playback program 81 starts playback when the play button 144 is clicked, pauses playback when the pause button 145 is clicked, and stops playback when the stop button 143 is clicked.

[0087] On the other hand, when the playback window 161 is selected and active, the record button 142 becomes inactive, and the recording and playback program 81 does not operate even if the record button 142 is clicked.

[0088] As described above, in response to the selection of recording window 141 or playback window 161, recording and playback program 81 changes the state of the record button 142, stop button 143, play button 144, and pause button 145 to either active or inactive, so that the user can confirm which buttons can be operated, allowing the user to quickly operate the buttons, and preventing erroneous manipulations.

[0089] FIG. 15 is a diagram for describing a screen that the recording and playback program 81 displays on the CRT 30 of the personal computer 1 when a plurality of recording manipulations can be executed simultaneously and a plurality of playback manipulations can be executed simultaneously (for example, when a plurality of video processing boards 34 are attached to the personal computer 1, when the video processing board 34 has a plurality of MPEG encoders 58 or a plurality of MPEG decoders 60, or when the CPU 21 executes processing of the MPEG encoders 58 or MPEG decoders 60). When a recording window 141 for instructing any recording manipulation is selected, the record button 142 and the stop button 143 become active, and the play button 144 and the pause button 145 become inactive. When a playback window 161 instructing any playback manipulation is selected, the play button 144, pause button 145, and stop button 143 become active, and the record button 142 becomes inactive.

[0090] In this manner, even when a plurality of recording manipulations can be executed simultaneously, the recording and playback program 81 changes the state of the record button 142, stop button 143, play button 144, or pause button 145 to either the active or inactive state in response to the selection of the recording window 141 or the playback window 161, so that the user can confirm which buttons can be operated, allowing the user to perform manipulations quickly and preventing erroneous manipulations.

[0091] FIG. 16 is a diagram for describing a screen displayed on the CRT 30 of the personal computer 1 when, for example, the recording and playback program 81 plays back the AV content 101-1 and displays the still images stored in the still image data files 112-1-1 through 112-1-3.

The still image display window 171 displays still images (still image at scene change) stored in the still image data files 112-1-1 to 112-1-3 as thumbnail images with the prescribed size. The horizontal position of the still image display window 171 in the figure corresponds to the time axis of the video to be played.

[0092] The position indicated by the current position indication gauge 172 corresponds to the present, or in other words, the point in time of the video being played. The left side of the figure indicates the prescribed past point in time (when a video has already been played) after the prescribed time corresponding to the distance from the position of the current position indication gauge 172 has elapsed. The right side of the figure indicates a future point in time (from which the video will be played) corresponding to a distance from the position of the current position indication gauge 172 until the prescribed time.

[0093] The thumbnail image is provided at a position corresponding to the point in time of the scene change and is displayed in the still image display window 171. If the scene changes occur quickly, the thumbnail images will be displayed while overlapping each other. As the display of the played video progresses (as time passes), the display position of the thumbnail image moves from the right to the left in the figure.

[0094] By dragging the thumbnail image, only the thumbnail image displayed in the still image display window 171 can be scrolled separate from the video being played. The thumbnail image can also be scrolled by operating the scroll bar. In either case, the distance between thumbnail images always reflects the time between scene changes, and does not change.

[0095] The still image display window 171 displays a hole shape resembling that of a movie film, and as the video is played over time, the position of the hole moves from the right to the left in the graphic, in accordance with the position of the thumbnail image. The user can intuitively grasp the passage of playback time by the movement of the hole shaped like a film in the still image display window 171.

[0096] In this manner, the user can quickly identify scene changes within the prescribed range from the thumbnail image displayed in the still image display window 171, and can immediately view a desired scene.

[0097] As depicted in FIG. 17, the AV content editing program 83 can also display a still image display window 171 on the screen displayed on the CRT 30 of the personal computer 1. The AV content editing program 83 can generate the AV content 121 described in FIG. 8 by selecting one or more prescribed AV content 101 and selecting one or more video (video specified by start and end positions) contained in the AV content 101 at the prescribed time.

[0098] A content selection window 181 displays the name, creation date and time, and the like of the AV content 101 to be edited. A video playback window 182 displays the played video in synchrony with the display of the still image display window 171.

[0099] The edit start video display window 183 displays a video at the start position of a video included in the prescribed AV content 101 to be edited and used. The edit end video display window 184 displays the video at the end position of the video included in the prescribed AV content 101 to be edited and used.

[0100] The edited video list display window 185 displays the name of the original AV content 101, the start position of the video, or the end position of the video, for the video included in the AV content 121 edited and generated by the AV content editing program 83.

[0101] The still image display window 171 of the AV content editing program 83 displays thumbnail images of still images contained in the still image data file 112 of the prescribed AV content 101 selected to be edited (AV content 101 actively displayed in the content selection window 181). The positions of the thumbnail images on the still image display window 171 are the same as those in the case of the recording and playback program 81.

[0102] As described above, the user can quickly recognize scene changes within the prescribed range from the thumbnail image displayed in the still image display window 171, and can quickly edit the AV content 121 including a desired scene.

[0103] Next, a process of switching the recording and playback screen when the recording and playback program 81 is loaded into the RAM 23 and the recording and playback program 81 is executed by the CPU 21 will be described with reference to a flowchart in FIG. 18. In step S11, the recording and playback program 81 determines whether or not the recording window 141 has been selected based on input from the keyboard 28 or mouse 29, and if a determination is made that the recording window 141 has been selected, the program proceeds to step S12 and activates the record button 142 and the stop button 143.

[0104] In step S13, the recording and playback program 81 deactivates the play button 144 and the pause button 145, and the process returns to step S11 to be repeated.

[0105] If a determination is made in step S11 that the recording window 141 has not been selected, the process proceeds to step S14, where the recording and playback program 81 determines whether or not the playback window 161 has been selected based on input from the keyboard 28 or mouse 29. If a determination is made that the playback window 161 has been selected, the process proceeds to step S15, where the recording and playback program 81 deactivates the record button 142.

In step S16, the recording and playback program 81 deactivates the stop button 143, the play button 144, and the pause button 145, and the process returns to step S11 to be repeated.

[0106] If a determination is made in step S14 that the playback window 161 has not been selected, neither the recording window 141 nor the playback window 161 will have been selected, so the process returns to step S11 and continues.

[0107] The process of switching the recording and playback screen ends when the recording and playback program 81 ends.

[0108] As described above, the state of the record button 142, the play button 144, and the pause button 145 can be changed in response to the selection of the record window 141 or the playback window 161.

[0109] Next, a process of determining the recording time when the recording and playback program 81 is loaded into the RAM 23 and the recording and playback program 81 is executed by the CPU 21 will be described with reference to a flowchart in FIG. 19. In step S31, the recording and playback program 81 determines whether or not the record button 142 has been clicked based on input from the mouse 29, and if a determination is made that the record button 142 has not been clicked, the process of step S31 is repeated until the record button 142 is clicked.

[0110] If a determination is made in step S31 that the record button 142 has been clicked, the process proceeds to step S32, where the recording and playback program 81 executes the recording process. The details of the recording process in step S32 will be described later with reference to the flowchart of FIG. 20.

[0111] In step S33, the recording and playback program 81 sets the maximum recordable time as the recording time based on the amount of video data per unit time for the set recording mode and the free space of the HDD 31-1 and 31-2. In step S34, the recording and playback program 81 changes the record button 142 to a recording time change button 151.

[0112] In step S35, the recording and playback program 81 determines whether or not the recording time change button 151 has been clicked based on the input from the mouse 29, and if a determination is made that the recording time change button 151 has not been clicked, the process is repeated until the recording time change button 151 is clicked.

[0113] If a determination is made that the recording time change button 151 has been clicked, the process proceeds to step S36, where a determination is made as to whether the maximum recordable time has been set to the current recording time. If a determination is made in step S36 that the current recording time is set to the maximum recordable time, the process proceeds to step S37, where the recording and playback program 81 sets the recording time to a time that exceeds the recorded time in 30-minute increments, and the process returns to step S35 and repeats.

[0114] If a determination is made in step S36 that the maximum recordable time is not set for the current recording time, the process proceeds to step S38, where the recording and playback program 81 determines whether the recording time is three hours or not, and if a determination is made that the recording time is not three hours, the process proceeds to step S39, where the recording time is increased by 30 minutes, and the process returns to step S35 and repeats.

[0115] If a determination is made in step S38 that the recording time is three hours, the process proceeds to step S40, where the recording and playback program 81 sets the recording time to the maximum recordable time, and the process returns to step S35 and repeats.

[0116] The process of determining the recording time ends when the recording and playback program 81 is terminated or when recording ends.

[0117] In this manner, a recording time that exceeds the already recorded time can be set by simply clicking the recording time change button 151.

[0118] Next, the details of the recording process of step S32 in FIG. 19 will be described. In step S61, the recording and playback program 81 registers in the content database 92 an attribute indicating that the prescribed AV content is being recorded. In step S62, the hardware interface 91 causes the MPEG encoder 58 to compress the video to be recorded in the prescribed recording mode such as high quality or standard, based on instructions from the recording and playback program 81. In step S63, the hardware interface 91 based on the recording and playback program 81 determines whether or not the scene of the recorded video has changed, based on the output of the MPEG encoder 58. If a determination is made that the scene of the recorded video has changed, the process proceeds to step S64, and causes the MPEG encoder 58 to generate a still image corresponding to the video (moving image).

[0119] If a determination is made in step S63 that the scene of the video being recorded has not changed, a still image will not need to be generated, so step S64 is skipped and the process proceeds to step S65.

[0120] In step S65, the file I/O 93 determines whether the moving image data file 111 where the compressed video is recorded has reached the prescribed size or larger based on instructions from the recording and playback program 81. If a determination is made that the moving image data file 111 has reached the prescribed size or larger, the process proceeds to step S66, where a determination is made as to whether the HDD 31 where the moving image data file 111 is recorded has run out of free space.

[0121] If a determination is made in step S66 that the HDD 31 where the moving image data file 111 is recorded has no free space, the process proceeds to step S67, where the recording and playback program 81 selects another HDD 31.

[0122] If a determination is made in step S66 that there is free space on the HDD 31 where the moving image data file 111 is being recorded, another moving image data file 111 can be recorded on the HDD 31, so step S67 is skipped and the process proceeds to step S68.

[0123] In step S68, the file I/O 93 generates a new moving image data file 111 and a new still image data file 112 in the prescribed HDD 31 based on the instructions of the recording and playback program 81, records the compressed video in the new moving image data file 111, and sets the generated still image to be recorded in the new still image data file 112. The process then proceeds to step S69.

[0124] If a determination is made in step S65 that the size of the moving image data file 111 is not greater than the prescribed size, compressed video can be continuously recorded in the moving image data file 111, so the process proceeds to step S69.

[0125] In step S69, the file I/O 93 records the video compressed by the MPEG encoder 58 in the prescribed moving image data file 111 on the HDD 31, based on an instruction from the recording and playback program 81. In step S70, the recording and playback program 81 records the still image generated by the MPEG encoder 58 in a still image data file 112 on the prescribed HDD 31 together with prescribed data such as the scene playback time.

[0126] In step S71, the recording and playback program 81 determines whether or not to end recording based on the recording time setting or input from the mouse 29, and if a determination is made that recording should not be ended, the program returns to step S62 and continues the recording process.

[0127] If a determination is made in step S71 that the recording is to be ended, the process proceeds to step S72, where the recording and playback program 81 registers an attribute indicating that the recording of the prescribed AV content 101 is ended in the content database 92, and the process ends.

[0128] As described above, the recording and playback program 81, the hardware interface 91, and the file I/O 93 can record the prescribed video. The process of generating a still image corresponding to the video (moving image) in step S64 may be executed by the CPU 21.

[0129] Next, the process of playing back the AV content 101 will be described with reference to the flowchart of FIG. 21 for the case where the recording and playback program 81, hardware interface 91, and file I/O 93 are loaded into RAM 23, and the CPU 21 executes the recording and playback program 81, hardware interface 91, and file I/O 93. In step S91, the recording and playback program 81 reads data of the prescribed attribute stored in the AV content attribute record 102 corresponding to the

prescribed AV content 101 from the content database 92. In step S92, the recording and playback program 81 determines whether or not the prescribed AV content 101 can be played based on the attributes of the AV content 101 read in step S91, and if a determination is made that the AV content 101 can be played, the process proceeds to step S93 and registers an attribute in the content database 92 indicating that the prescribed AV content 101 is being played.

[0130] In step S94, the file I/O 93 determines whether or not there is any unplayed data in the moving image data file 111 of the prescribed AV content 101 based on the instructions of the recording and playback program 81. If a determination is made that there is no unplayed data in the moving image data file 111 of the prescribed AV content 101, the process proceeds to step S95, where the next moving image data file 111 is selected, and the process proceeds to step S96.

[0131] If a determination is made in step S94 that there is unplayed data in the moving image data file 111 of the prescribed AV content 101, the unplayed data is to be played, so step S95 is skipped and the process proceeds to step S96.

[0132] In step S96, the file I/O 93 reads data from the prescribed moving image data file 111 of the AV content 101 based on an instruction from the recording and playback program 81. In step S97, the hardware interface 91 causes the MPEG decoder 60 to decompress the data of the read moving image data file 111 based on instruction from the recording and playback program 81. In step S98, the hardware interface 91 causes the CRT 30 to display the prescribed video based on the data decompressed in step S97, based on instruction of the recording and playback program 81.

[0133] In step S99, the recording and playback program 81 determines whether or not to end playback based on an input from the mouse 29, and the like, and if a determination is made that the playback should not be ended, the process returns to step S94 and the playback process is repeated.

[0134] If a determination is made in step S99 that playback is to end, the process proceeds to step S100, where the recording and playback program 81 registers an attribute in the content database 92 indicating that playback of the prescribed AV content 101 has ended, and the process ends.

[0135] If a determination is made in step S92 that the AV contents 101 cannot be played, then in step S101, the recording and playback program 81 displays on the CRT 30 a message indicating that the AV contents 101 cannot be played, and the process ends.

[0136] As described above, the recording and playback program 81, the hardware interface 91, and the file I/O 93 playback the prescribed AV content 101.

[0137] Next, the process of processing display of a still image will be described with reference to the flowchart of FIG. 22 for the case where the recording and playback program 81, hardware interface 91, and file I/O 93 are loaded into RAM 23, and the CPU 21 executes the recording and playback program 81, hardware interface 91, and file I/O 93. In step S121, the recording and playback program 81 sets a synchronous mode in which the position of the video being played and the position of the thumbnail image on the still image display window 171 correspond to each other. In step S122, the file I/O 93 reads out still image data in the prescribed time range from the still image data file 112 based on the time of the video being played, in response to an instruction from the recording and playback program 81.

[0138] In step S123, the recording and playback program 81 calculates the display position of the thumbnail image to be displayed based on the still image video data, based on the time corresponding to the still image data read in step S122. In step S124, the recording and playback program 81 causes the hardware interface 91 to display the thumbnail image generated from the still image data at the prescribed position on the still image display window 171 calculated in step S123.

[0139] In step S125, the recording and playback program 81 determines, based on input from the mouse 29, whether or not the thumbnail image in the still image display window 171 has been clicked. If a determination is made that the thumbnail image in the still image display window 171 has been clicked, the process proceeds to step S126, where the clicked thumbnail image is activated. In step S127, the recording and playback program 81 sets the mode to asynchronous mode where the position of the video being played does not correspond to the position of the thumbnail image in the still image display window 171, and the process proceeds to step S132.

[0140] If a determination is made in step S125 that the thumbnail image in the still image display window 171 has not been clicked, the process proceeds to step S128, where the recording and playback program 81 determines whether the thumbnail image in the still image display window 171 has been dragged, and if a determination is made that the thumbnail image in the still image display window 171 has been dragged, the process proceeds to step S129, where the file I/O 93 reads the still image data for the prescribed range of times from the still image data file 112, based on the position and time of the thumbnail image being dragged, based on the instructions of the recording and playback program 81.

[0141] In step S130, the recording and playback program 81 calculates the display position of the thumbnail image to be displayed based on the still image video data, based on the time corresponding to the still image data read in step S129. In step S131, the recording and playback program 81 causes the hardware interface 91 to display the thumbnail image generated from the still image data at the prescribed position on the still image display window 171 calculated

in step S130, the process then proceeds to step S127 where the mode is set to asynchronous mode, and processing continues.

[0142] If a determination is made in step S128 that the thumbnail image in the still image display window 171 has not been dragged, the process proceeds to step S132, where the recording and playback program 81 determines, based on input from the mouse 29, whether or not the thumbnail image in the still image display window 171 has been double-clicked. If a determination is made that the thumbnail image in the still image display window 171 has been double-clicked, the process proceeds to step S133, where video playback begins from the time corresponding to the double-clicked thumbnail image. In step S134, the recording and playback program 81 sets the mode to synchronous mode, and the process returns to step S122 to repeat the process of displaying the still image.

[0143] If a determination is made in step S132 that the thumbnail image in the still image display window 171 has not been double-clicked, the process proceeds to step S135, where the recording and playback program 81 determines, based on input from the keyboard 28 or mouse 29, whether or not synchronization with the still image display window 171 has been instructed. If a determination is made that synchronization with the still image display window 171 has been instructed, the process proceeds to step S136, where video playback begins from the time corresponding to the center position of the still image display window 171, the process proceeds to step S134 where the synchronization mode is set, and processing continues.

[0144] If a determination is made in step S135 that synchronization with the still image display window 171 has not been instructed, the process proceeds to step S137, where the recording and playback program 81 determines, based on input from the keyboard 28 or mouse 29, whether or not synchronization with the video being played has been instructed. If a determination is made that synchronization with the video being played has been instructed, the process proceeds to step S134, where the synchronization mode is set, and processing continues.

[0145] If a determination is made in step S137 that synchronization with the video being played has not been instructed, the process proceeds to step S138, where the recording and playback program 81 determines whether or not the mode is synchronous mode, and if a determination is made that the mode is synchronous mode, the process proceeds to step S139, where a determination is made as to whether or not the prescribed playback time has elapsed. If a determination is made in step S139 that the prescribed playback time has elapsed, the process proceeds to step S122, where processing display of the still image continues.

[0146] If a determination is made in step S138 that the mode is not synchronous, or in other words, that the mode is asynchronous, and if a determination is made in step S139 that the prescribed playback time has not elapsed, there is no need to update the display of the still image, so the process proceeds to step S125 and processing continues.

[0147] As described above, the recording and playback program 81, hardware interface 91, and file I/O 93 update the display of still images based on the operation of the mouse 29, the display time, and the like, so the user can quickly play back images of a specific scene change.

[0148] The still image display process of the AV content editing program 83 is similar to the process described with reference to the flowchart depicted in FIG. 22.

[0149] Next, the AV content management search program 82 will be described. FIG. 23 and FIG. 24 are diagrams for describing screens that the AV content management search program 82 displays on the CRT 30 of the personal computer 1.

[0150] FIG. 23 is a diagram for describing a screen that the AV content management search program 82 causes to be displayed on the CRT 30 of the personal computer 1 when the icon of the prescribed AV content 101 and AV content 121 are not active. The AV content information display window 201 displays attribute data such as the name and creation date and time recorded in either the AV content attribute record 102 or the AV content attribute record 132 corresponding to the active AV content 101 or AV content 121, and the prescribed still image recorded in the still image data file 112 corresponding to the active AV content 101. The AV content information display window 201 depicted in FIG. 23 does not display any data since none of the AV contents 101 are active.

[0151] The recording time display window 202 displays the status of data recording to HDD 31-1 and HDD 31-2 (the amount of data already stored and the amount of data that can be recorded in the future), as well as an estimate of the recording time available in each recording mode (the amount of data that can be recorded in the future on HDD 31-1 and HDD 31-2, and the time calculated from the amount of video data per unit time in each recording mode).

[0152] In the AV content classification display window 203, icons indicating the classification of the AV content 101 or the AV content 121 are displayed. The classification of the AV content 101 or the AV content 121 is set for the AV content 101 or the AV content 121. An icon indicating the prescribed classification of AV content 101 or AV content 121 can be made active by operating the mouse 29. In the example depicted in FIG. 23, the drama icon is active.

[0153] The AV content icon display window 204 displays an icon corresponding to the AV content 101 or AV content 121 in the prescribed classification where the icon depicting the classification of the AV content classification display window 203 is active. In the example depicted in

FIG. 23, the drama icon in the AV content classification display window 203 is active, so the AV content icon display window 204 displays icons corresponding to the AV content 101 "Great Mountain Drama", "Great Mountain Drama 2", and "Great Mountain Drama 3" which are classified as dramas.

[0154] FIG. 24 is a diagram for describing a screen that the AV content management search program 82 causes to be displayed on the CRT 30 of the personal computer 1 when the icon of the prescribed AV content 101 or AV content 121 is active. The icon of the AV content 101 "Great Mountain Drama 2" displayed in the AV content icon display window 204 is active. At this time, the AV content information display window 201 displays attribute data such as the name and creation date and time recorded in the AV content attribute record 102 corresponding to the active AV content 101, "Great Mountain Drama 2," and the prescribed still image recorded in the still image data file 112 corresponding to the active AV content 101.

[0155] Hereinafter, the display on the screen of the AV content management search program 82 depicted in FIG. 23 and FIG. 24 will be referred to as an icon display.

[0156] Next, the icons displayed in the AV content icon display window 204 will be described. FIG. 25 and FIG. 26 are diagrams for describing icons displayed in the AV content icon display window 204. The icon depicted in FIG. 25 (A) indicates AV content 101 for which: the prescribed moving image data file 111 is provided, no expiration date is set, no protection against accidental deletion is set, no errors exist, that has been played before, that is not currently being played, and that is not currently being recorded. The icon depicted in FIG. 25 (B) indicates AV content 101 for which: the prescribed moving image data file 111 is provided, an expiration date is set, no errors exist, that has been played before, that is not currently being played, and that is not currently being recorded. The icon depicted in FIG. 25 (C) indicates AV content 101 for which: the prescribed moving image data file 111 is provided, accidental deletion protection is set, no errors exist, that has been played before, that is not currently being played, and that is not currently being recorded. The icon depicted in FIG. 25 (D) indicates AV content 101 that has the prescribed moving image data file 111 having an error.

[0157] The icon depicted in FIG. 25 (E) indicates AV content 101 for which: the prescribed moving image data file 111 is provided, no expiration date is set, no protection against accidental deletion is set, no errors exist, that has never been played before, that is not currently being played, and that is not currently being recorded.

The icon depicted in FIG. 25 (E) indicates AV content 101 for which: the prescribed moving image data file 111 is provided, an expiration date is set, no errors exist, that has never been played before, that is not currently being played, and that is not currently being recorded. The icon depicted in FIG. 25 (G) indicates AV content 101 for which: the prescribed moving image data file 111 is provided, accidental deletion protection is set, no errors exist, that has never been played before, that is not currently being played, and that is not currently being recorded.

[0158] The icon depicted in FIG. 25 (H) indicates AV content 101 for which: the prescribed moving image data file 111 is provided, no expiration date is set, no protection against accidental deletion is set, no errors exist, that is currently being played, and that is not currently being recorded. The icon depicted in FIG. 25 (I) indicates AV content 101 for which: the prescribed moving image data file 111 is provided, an expiration date is set, no errors exist, that is currently being played, and that is not currently being recorded. The icon depicted in FIG. 25 (J) indicates AV content 101 for which: the prescribed moving image data file 111 is provided, accidental deletion prevention is not set, no errors exist, that is currently being played, and that is not currently being recorded.

[0159] The icon depicted in FIG. 25 (K) indicates AV content 101 for which: the prescribed moving image data file 111 is provided, no expiration date is set, no protection against accidental deletion is set, no errors exist, that is not currently being played, and that is currently being recorded. The icon depicted in FIG. 25 (L) indicates AV content 101 for which: the prescribed moving image data file 111 is provided, an expiration date is set, no errors exist, that is not currently being played, and that is currently being recorded. The icon depicted in FIG. 25 (M) indicates AV content 101 for which: the prescribed moving image data file 111 is provided, accidental deletion prevention is set, no errors exist, that is not currently being played, and that is currently being recorded.

[0160] The icon depicted in FIG. 26 (A) indicates AV content 101 for which: the prescribed moving image data file 111 is provided, no expiration date is set, no protection against accidental deletion is set, no errors exist, that is currently being played, and that is currently being recorded. The icon depicted in FIG. 26 (B) indicates AV content 101 for which: the prescribed moving image data file 111 is provided, an expiration date is set, no errors exist, that is currently being played, and that is currently being recorded. The icon depicted in FIG. 26 (C) indicates AV content 101 for which: the prescribed moving image data file 111 is provided, accidental deletion prevention is set, no errors exist, that is currently being played, and that is currently being recorded.

[0161] The icon depicted in FIG. 26 (D) indicates AV content 101 for which: an unrecorded prescribed moving image data file 111 is provided, an expiration date is not set, no errors exist, and that is scheduled for recording. The

icon depicted in FIG. 26 (E) indicates AV content 101 for which: an unrecorded prescribed moving image data file 111 is provided, an expiration date is set, no errors exist, and that is scheduled for recording. The icon depicted in FIG. 26 (F) indicates AV content 101 that is scheduled for recording and has an error.

[0162] The icon depicted in FIG. 26 (G) indicates AV content 101 for which: a moving image data file 111 is not provided, an expiration date is not set, and no errors exist. The icon depicted in FIG. 26 (H) indicates AV content 101 for which: a moving image data file 111 is not provided, an expiration date is set, and no errors exist. The icon depicted in FIG. 26 (I) indicates AV content 101 that does not have a moving image data file 111, and has an error.

[0163] The icon depicted in FIG. 26 (J) indicates AV content 121 for which: an edit data file 131 is provided, that has been played before, that does not have an error, and that is not currently being played back. The icon depicted in FIG. 26 (K) indicates AV content 121 for which: an edit data file 131 is provided, that has never been played before, that does not have an error, and that is not currently being played back. The icon depicted in FIG. 26 (L) indicates AV content 121 for which: an edit data file 131 is provided, that does not have an error, and that is currently being played back. The icon depicted in FIG. 26 (M) indicates AV content 121 for which: an edit data file 131 is provided, and that does have an error.

[0164] As described above, the AV content management search program 82 changes the icon displayed in the AV content icon display window 204 depending on the files or attributes that make up the AV content 101 or AV content 121, so the user can know at a glance the contents or attributes of the AV content 101 or AV content 121.

[0165] FIG. 27 are diagrams for describing another screen that the AV content management search program 82 displays on the CRT 30 of the personal computer 1. An AV content information display window 201 and a recording time display window 202 are displayed on the screen displayed by the AV content management search program 82 depicted in FIG. 27, similar to the cases depicted in FIG. 23 and FIG. 24. The AV content classification display window 203 and the AV content icon display window 204 are not displayed on the screen displayed by the AV content management search program 82 depicted in FIG. 27, but an AV content list display window 251 is displayed.

[0166] The AV content list display window 251 displays in text form the name, creation date and time, and other attributes of all AV content 101 and all the AV content 121 recorded on the HDD 31-1 and HDD 31-2. As in the case of FIG. 24, when the name, creation date and time, and other attributes of the AV content 101 or AV content 121 displayed in text form are clicked on with the mouse 29, the AV content 101 or AV content 121 becomes active, and the attributes of the AV content 101 or AV content 121, and the like are displayed in the AV content information display window 201.

[0167] In this manner, the AV content list display window 251 can simultaneously display a large number of AV contents 101 or AV contents 121 across a plurality of categories.

[0168] Hereinafter, the display on the screen of the AV content management search program 82 depicted in FIG. 27 will be referred to as a list display.

[0169] FIG. 28 is a diagram for describing yet another screen that the AV content management search program 82 displays on the CRT 30 of the personal computer 1. An AV content information display window 201 and a recording time display window 202 are displayed on the screen displayed by the AV content management search program 82 depicted in FIG. 28, similar to the cases depicted in FIG. 23 and FIG. 24. The AV content classification display window 203 and the AV content icon display window 204 are not displayed on the screen displayed by the AV content management search program 82 depicted in FIG. 28, but an AV content calendar display window 261 is displayed.

[0170] The AV content calendar display window 261 has a display area for each day of January. When the AV content management search program 82 displays the AV content calendar display window 261, the display area for each day displays a thumbnail image of the prescribed still image contained in the still image data file 112 of the AV content 101 created on that day. If the AV content 101 is to be schedule recorded, the AV content management search program 82 displays the prescribed icon 262 in the display area for the date on which the AV content is scheduled to be recorded.

[0171] As described above, when the AV content management search program 82 displays the AV content calendar display window 261, the user can see the creation date and time of a plurality of AV contents 101 at a glance, just like looking at a TV program guide.

[0172] Hereinafter, the display on the screen of the AV content management search program 82 depicted in FIG. 28 will be referred to as a calendar display.

[0173] Next, a display switching process where the AV content management search program 82 is loaded into the RAM 22 of the personal computer 1 and the CPU 21 executes the AV content management search program 82 will be described with reference to the flowchart of FIG. 29. In step S201, the AV content management search program 82 determines whether or not an icon display has been selected based on input from the keyboard 28 or mouse 29, and if a determination is made that an icon display has been selected, the program proceeds to step S202, where the screen displayed on the CRT 30 is switched to an icon display, and the process returns to step S201 where the process is repeated.

[0174] In step S201, if a determination is made that the icon display of the AV content 101 has not been selected, the process proceeds to step S203, and the AV content management search program 82 determines whether or not a list display has been selected based on input from the keyboard 28 or mouse 29, and if a determination is made that a list display has been selected, the program proceeds to step S204, where the screen displayed on the CRT 30 is switched to a list display, and the process returns to step S201 where the process is repeated.

[0175] In step S203, if a determination is made that the list display has not been selected, the process proceeds to step S205, and the AV content management search program 82 determines whether or not a calendar display has been selected based on input from the keyboard 28 or mouse 29, and if a determination is made that a calendar display has been selected, the program proceeds to step S206, where the screen displayed on the CRT 30 is switched to a calendar display, and the process returns to step S201 where the process is repeated.

[0176] If a determination is made in step S205 that the calendar display has not been selected, instructions will not have been given to change the display, and so the process proceeds directly to step S201 to repeat the process.

[0177] As described above, the AV content management search program 82 can display information about the AV content 101 or the AV content 121 in any one of the icon display, list display, and calendar display formats.

[0178] Next, an icon display process where the AV content management search program 82 is loaded into the RAM 22 of the personal computer 1 and the CPU 21 executes the AV content management search program 82 will be described with reference to the flowchart of FIG. 30. In step S221, the AV content management search program 82 reads the content database 92 data contained in either the AV content attribute record 102 or the AV content attribute record 132 corresponding to either the prescribed AV content 101 or the AV content 121 that displays the icon.

[0179] In step S222, the AV content management search program 82 determines whether or not the prescribed AV content 101 or the AV content 121 is recorded AV content 101 based on the data read in step S221, and if a determination is made that the prescribed AV content 101 or the AV content 121 is recorded AV content 101, the process proceeds to step S223 to determine whether or not the AV content 101 has a moving image data file 111.

[0180] If a determination is made in step S223 that there is no AV content 101 that does not have a moving image data file 111, or in other words, that the AV content 101 has a moving image data file 111, the process proceeds to step S224, where the AV content management search program 82 displays an icon of the recorded AV content 101, and the process proceeds to step S229.

[0181] If a determination is made in step S223 that the AV content 101 does not have a moving image data file 111, or in other words, if a determination is made that only a still image data file 112 is contained, the process proceeds to step S225, where the AV content management search program 82 displays an icon for the AV content 101 without a moving image data file 11, and the process proceeds to step S229.

[0182] If a determination is made in step S222 that the prescribed AV content 101 is not AV content 101 that has already been recorded, that is, if a determination is made that either AV content 101 or AV content 121 is scheduled for recording, the process proceeds to step S226, where the AV content management search program 82 determines whether the prescribed AV content 101 or AV content 121 is AV content 101 to be scheduled for recording based on the data read in step S221, and if a determination is made that either the prescribed AV content 101 or AV content 121 is AV content 101 to be scheduled for recording, the process proceeds to step S227, where an icon of the AV content 101 to be scheduled for recording is displayed, and the process proceeds to step S229.

[0183] If a determination is made in step S226 that the prescribed AV content 101 is not AV content 101 to be scheduled for recording, or in other words, if a determination is made that the AV content is AV content 121, the process proceeds to step S228, where the AV content management search program 82 displays an icon indicating the AV content 121 containing the edited data file 131, and the process proceeds to step S229.

[0184] In step S229, the AV content management search program 82 determines whether or not the prescribed AV content 101 or the AV content 121 has an error based on the data read in step S221, and if a determination is made that the prescribed AV content 101 or the AV content 121 has an error, the process proceeds to step S230, where a graphic of the error is added to the icon, and then the process ends.

[0185] If a determination is made in step S229 that either the prescribed AV content 101 or the AV content 121 does not have an error, the process proceeds to step S231, where the AV content management search program 82 determines whether or not either the prescribed AV content 101 or the AV content 121 has previously been played based on the data read in step S221, and if a determination is made that either the prescribed AV content 101 or the AV content 121 has not been played, an unplayed graphic is added to the icon, and the process proceeds to step S233. If it is determined in step S231 that either the prescribed AV

content 101 or AV content 121 has been previously played back, step S232 is skipped and the process proceeds to step S233.

[0186] In step S233, the AV content management search program 82 determines whether or not an expiration date is set for either the prescribed AV content 101 or AV content 121, and if it is determined that an expiration date is set, the program proceeds to step S234 and adds a graphic of the expiration date to the icon. If it is determined in step S233 that either the prescribed AV content 101 or AV content 121 has no expiration date, step S234 is skipped and the process proceeds to step S235.

[0187] In step S235, the AV content management search program 82 determines whether or not accidental deletion prevention is set for either the prescribed AV content 101 or AV content 121, and if a determination is made that accidental deletion prevention is set, the program proceeds to step S236 and adds a graphic of accidental deletion prevention to the icon. If it is determined in step S235 that either the prescribed AV content 101 or AV content 121 does not have accidental deletion prevention, step S236 is skipped and the process proceeds to step S237.

[0188] In step S237, the AV content management search program 82 determines whether or not the prescribed AV content 101 or AV content 121 is being played, and if a determination is made that either AV content 101 or AV content 121 is currently being played, the process proceeds to step S238, and a graphic indicating that either AV content 101 or AV content 121 is being played is added to the icon. If it is determined in step S237 that either the prescribed AV content 101 or AV content 121 is not currently being played back, step S238 is skipped and the process proceeds to step S239.

[0189] In step S239, the AV content management search program 82 determines whether or not the prescribed AV content 101 has been recorded, and if a determination is made that the AV content 101 has been recorded, the program proceeds to step S240, where a graphic indicating that the AV content 101 has been recorded is added to the icon, and the process ends. If a determination is made in step S239 that the prescribed AV content 101 has not been recorded, step S240 is skipped and the process ends. If the target is the AV content 121, the processes of step S239 and step S240 are skipped.

[0190] As described above, the AV content management search program 82 can display an icon corresponding to the attributes or the like of the AV content 101 or the AV content 121.

[0191] Next, the process of deleting AV content 101 for which an expiration date is set is executed with reference to the flowchart of FIG. 31 when the schedule monitoring program 85, hardware interface 91, and file I/O 93 are loaded into the RAM 22 of the personal computer 1 and the CPU 21 executes the schedule monitoring program 85, hardware interface 91, and file I/O 93. In step S251, the schedule monitoring program 85 reads the data contained in the AV content attribute record 102 corresponding to the prescribed AV content 101 from the content database 92. In step S252, the schedule monitoring program 85 reads the current date and the time from the RTC (not depicted) via the hardware interface 91.

[0192] In step S253, the schedule monitoring program 85 determines whether or not the current date and time are past the expiration date of the AV content 101 based on the data indicating the attributes of the prescribed AV content 101 read in step S251 and the current date and time read in step S252. If a determination is made that the current time is past the expiration date of the AV content 101, the program proceeds to step S254 and causes the file I/O 93 to delete one or more moving image data files 111 of the AV content 101. In step S255, the schedule monitoring program 85 causes the file I/O 93 to delete one or more still image data files 112 of the AV content 101. In step S256, the schedule monitoring program 85 causes the content database 92 to delete the AV content attribute record 102 corresponding to the AV content 101, and the process ends.

[0193] If a determination is made in step S253 that the current date and time does not exceed the expiration period of the AV content 101, there is no need to delete the AV content 101, and the process ends.

[0194] As described above, the AV content 101 whose expiration date has passed is deleted by the schedule monitoring program 85. Note that the same process may be executed for the AV content 121.

[0195] Next, the process of deleting AV content 101 is executed with reference to the flowchart of FIG. 32 when the AV content management search program 82, hardware interface 91, and file I/O 93 are loaded into the RAM 22 of the personal computer 1 and the CPU 21 executes the AV content management search program 82, hardware interface 91, and file I/O 93. In step S271, the AV content management search program 82 reads the data contained in the AV content attribute record 102 corresponding to the prescribed AV content 101 from the content database 92.

[0196] In step S272, the AV content management search program 82 determines whether or not the attributes of the AV content 101 are set to prevent accidental deletion based on the data read in step S271, and if a determination is

made that the attributes of the AV content 101 are not set to prevent accidental deletion, the program proceeds to step S273 and causes the file I/O 93 to delete the moving image data file 111 of the AV content 101.

[0197] In step S274, the AV content management search program 82 determines whether or not to leave the still image data file 112, and if a determination is made that the still image data file 112 should not be left, the process proceeds to step S275 and the AV content management search program 82 causes the file I/O 93 to delete the still image data file 112 of the AV content 101. In step S276, the AV content management search program 82 causes the content database 92 to delete the AV content attribute record 102 corresponding to the AV content 101, and the process ends.

[0198] If a determination is made in step S274 that the still image data file 112 is to be left, the process ends.

[0199] If a determination is made in step S272 that the attributes of the AV content 101 does not have accidental deletion protection, the process proceeds to step S277, and the AV content management search program 82 causes the CRT 30 to display a message via the hardware interface 91 indicating that the AV content 101 cannot be deleted, and the process then ends.

[0200] In this manner, even if a deletion instruction is given, the AV content 101 for which accidental deletion protection is set will not be deleted. Furthermore, the AV content management search program 82 can delete only the moving image data file 111 of the prescribed AV content 101. Note that the same process may be executed for the AV content 121.

[0201] Next, search for a video tape cassette storing a video corresponding to the moving image data file 111 of the AV content 101, and search for AV content 101 corresponding to a video recorded on the video tape cassette 301 will be described.

[0202] FIG. 33 is a diagram for describing an operation of searching for a video tape cassette 301 in which a video corresponding to a moving image data file 111 of AV content 101 is stored, or an operation of searching for AV content 101 corresponding to a video recorded on the video tape cassette 301.

[0203] A label 302 on which the prescribed two-dimensional bar code is printed is attached to a video tape cassette 301. The DVCR 5 with an imaging function captures an image of the label 302 on which the two-dimensional bar code is printed and which is affixed to the video tape cassette 301, and supplies the image to the personal computer 1 via the network 6.

The personal computer 1 determines whether or not the video tape cassette 301 has recorded the prescribed video based on the image supplied from the DVCR 5 via the network 6.

[0204] Alternatively, the personal computer 1 searches for the AV content 101 corresponding to the video recorded on the video tape cassette 301, based on the image supplied from the DVCR 5 via the network 6.

[0205] Note that the image of the label 302 on which a two-dimensional barcode is printed may be input as an analog signal (for example, an NTSC analog signal) via the analog selector 55 of the video processing board 34.

[0206] As depicted in FIG. 34, the two-dimensional barcode has a cell part A and a logo part B that are arranged to be separated by one block in a rectangular area that is 9.5 blocks long in the vertical direction and 7 blocks long in the horizontal direction, where one block is one unit. In cell part A, rectangular cells are arranged in a two-dimensional pattern within a square range having a length of seven blocks in both the vertical and horizontal directions. In other words, for example, identification information of a two-dimensional barcode associated with prescribed AV content 101 is encoded here. In the logo part B, a large rectangular cell is provided that is 1.5 blocks long in the vertical direction and 7 blocks long in the horizontal direction, in which, for example, the name of the user is written.

[0207] FIG. 35, FIG. 36 and FIG. 37 are diagrams for describing windows that are displayed on the CRT 30 when the function of determining whether or not the bar code is a registered two-dimensional bar code of the AV contents management search program 82 is performed. When the function of searching for a registered two-dimensional barcode of the AV content management search program 82 is initiated, the AV content management search program 82 displays the window depicted in FIG. 35, which displays the prescribed message and image supplied from the DVCR 5 with imaging function.

[0208] When a user causes a DVCR 5 with imaging function to capture the two-dimensional barcode on a video tape cassette 301 to which a label 302 is affixed, the image of the two-dimensional barcode is displayed in the window of the AV content management search program 82, as depicted in FIG. 36. The AV content management search program 82 determines whether the two-dimensional barcode displayed in the window corresponds to the prescribed AV content 101 (is associated through a process described below) and displays the result corresponding to the determination.

[0209] If a determination is made that the two-dimensional barcode displayed in the window corresponds to the prescribed AV content 101, the AV content management search program 82 changes, for example, the dotted circle displayed in the window to a solid circle, as depicted in FIG. 37.

[0210] If a determination is made that the two-dimensional barcode displayed in the window corresponds to the prescribed AV content 101, the AV content management search program 82 may display the prescribed message in text in the window indicating that the imaged video tape cassette 301 corresponds to the AV content 101.

[0211] If a determination is made that the two-dimensional barcode displayed in the window does not correspond to the prescribed AV content 101, the AV content management search program 82 does not change the display in the window. Alternatively, the AV content management search program 82 displays the prescribed message in text in a window, indicating that the imaged video tape cassette 301 does not correspond to the AV content 101.

[0212] FIG. 38 and FIG. 39 are diagrams for describing windows that are displayed on the CRT 30 when another function is performed for searching for a bar code that is a two-dimensional bar code registered with the AV content management search program 82. A user causes a DVCR 5 with an imaging function to capture an image of a plurality of video tape cassettes 301, each having a label 302 with a different two-dimensional barcode printed thereon.

[0213] For example, a plurality of video tape cassettes 301 are arranged on the prescribed storage shelf or the like so that the labels 302 on which the two-dimensional bar codes are printed are visible. When a video tape cassette 301-1 having a label 302-1 printed with a two-dimensional bar code attached thereto, a video tape cassette 301-2 having a label 302-2 attached thereto, a video tape cassette 301-3 having a label 302-3 attached thereto, a video tape cassette 301-4 having a label 302-4 attached thereto, a video tape cassette 301-5 having a label 302-5 attached thereto, a video tape cassette 301-6 having a label 302-6 attached thereto, a video tape cassette 301-7 having a label 302-7 attached thereto, a video tape cassette 301-8 having a label 302-8 attached thereto, a video tape cassette 301-9 having a label 302-9 attached thereto, a video tape cassette 301-10 having a label 302-10 attached thereto, a video tape cassette 301-11 having a label 302-11 attached thereto, and a video tape cassette 301-12 having a label 302-12 attached thereto are imaged by the DVCR 5 with imaging function, images of the video tape cassettes 301-1 to 301-12 are displayed in the window of AV content management search program 82, as depicted in FIG. 38.

[0214] When the DVCR 5 with imaging function captures an image of the video tape cassettes 301-1 to 301-12 and transmits the image to the personal computer 1 via the network 6, the AV content management search program 82 searches for a two-dimensional barcode contained in the received image that corresponds to the prescribed AV content 101, and for example, as depicted in FIG. 39, changes the dotted circle display in the window to a solid circle, and displays the image of the searched two-dimensional barcode so as to be positioned in the center of the window.

[0215] In the example of FIG. 39, the two-dimensional barcode printed on the label 302-9 is displayed so as to be positioned in the center of the window, so it can be seen that the video tape cassette 301-9 corresponds to the prescribed AV content 101.

[0216] Alternatively, the personal computer 1 can search for the AV content 101 corresponding to the video recorded on the video tape cassette 301, based on the image supplied from the DVCR 5 via the network 6.

[0217] When the function of searching for the AV content 101 corresponding to the captured two-dimensional barcode of the AV content management search program 82 is activated, the window depicted in FIG. 40 will be displayed on the CRT 30. When a video tape cassette 301 with a label 302 printed with a two-dimensional bar code attached is imaged by a DVCR 5 with an imaging function, an AV content management search program 82 activates an icon of the AV content 101 corresponding to the two-dimensional bar code printed on the label 302.

[0218] The user can quickly know the content of the video recorded on the video tape cassette 301 by displaying the attributes of the AV content 101 or a still image corresponding to the activated icon using the AV content management search program 82.

[0219] In this manner, the user can quickly understand the content of the video recorded on the video tape cassette 301.

[0220] Next, the process of associating a preset AV content 101 or AV content 121 with a two-dimensional barcode when the AV content management search program 82 is loaded into RAM 22 of the personal computer 1 and the CPU 21 executes the AV content management search program 82 will be described with reference to the flowchart of FIG. 41. In step S301, the AV content management search program 82 imports an image of the two-dimensional barcode captured by the DVCR 5 with an imaging function via the network 6. In step S302, the AV content management search program 82 recognizes the two-dimensional barcode contained in the image captured in step S301.

[0221] In step S303, the AV content management search program 82 registers in the content database 92 the association between the preset AV content 101 (or any one AV content 121) and the recognized two-dimensional barcode, and then the process ends.

[0222] As described above, the AV content management search program 82 can register in the content database 92 the association between the AV content 101 (or any one of the AV content 121) and the two-dimensional barcode.

[0223] Next, the process of determining whether or not a two-dimensional barcode is associated with a preset AV

content 101 when the AV content management search program 82 is loaded into RAM 22 of the personal computer 1 and the CPU 21 executes the AV content management search program 82 will be described with reference to the flowchart of FIG. 42. In step S321, the AV content management search program 82 imports an image supplied from the DVCR 5 with an imaging function via the network 6. In step S322, the AV content management search program 82 determines whether or not the image captured in step S321 includes a two-dimensional barcode video. If a determination is made that the captured image does not include a two-dimensional barcode image, the program returns to step S321 and repeats the process of step S321 until an image including a two-dimensional barcode image is captured.

[0224] If a determination is made in step S322 that the captured image contains a two-dimensional barcode image, the process proceeds to step S323, where the AV content management search program 82 recognizes the two-dimensional barcode image. In step S324, the AV content management search program 82 determines whether or not the previously set AV content 101 is associated with the recognized two-dimensional barcode. If a determination is made that the previously set AV content 101 is associated with the recognized two-dimensional barcode, the program proceeds to step S325, where a message indicating that the previously set AV content 101 is associated with the recognized two-dimensional barcode is displayed on the CRT 30, and then the process proceeds to step S326.

[0225] If a determination is made in step S324 that the previously set AV content 101 is not associated with the recognized two-dimensional barcode, the AV content management search program 82 displays a message on the CRT 30 indicating that the previously set AV content 101 is not associated with the recognized two-dimensional barcode, and then the process proceeds to step S326.

[0226] In step S326, the AV content management search program 82 determines whether or not to end the processing based on input from the mouse 29 or the like, and if a determination is made that the processing should not be ended, the process proceeds to step S321 and the determination process is repeated.

[0227] If a determination is made in step S326 that the process is to be ended, the process ends.

[0228] In this manner, the AV content management search program 82 can quickly determine whether the imaged video tape cassette 301 is associated with the prescribed AV content 101. The process of determining whether or not the barcode is a two-dimensional barcode associated with the preset AV content 121 is also executed in the same manner as in the flowchart of FIG. 42.

[0229] Next, the process of searching for a two-dimensional barcode that is associated with a preset AV content 101 when the AV content management search program 82 is loaded into RAM 22 of the personal computer 1 and the CPU 21 executes the AV content management search program 82 will be described with reference to the flowchart of FIG. 43. The processing in steps S341 to S343 is similar to the processing in steps S321 to S323 in FIG. 42, and therefore a description thereof will be omitted.

[0230] In step S344, the AV content management search program 82 determines whether or not all of the two-dimensional barcodes contained in the image supplied from the DVCR 5 with imaging function have been recognized, and if a determination is made that all of the two-dimensional barcodes contained in the image have not been recognized, the program returns to step S343 and repeats the two-dimensional barcode recognition process.

[0231] If a determination is made in step S344 that all two-dimensional barcodes contained in the image have been recognized, the process proceeds to step S345, where the AV content management search program 82 selects the prescribed two-dimensional barcode recognized in step S343. In step S346, the AV content management search program 82 determines whether or not the preset AV content 101 is associated with the selected two-dimensional barcode. If a determination is made that the preset AV content 101 is associated with the selected two-dimensional barcode, the program proceeds to step S347 displaying that the selected two-dimensional barcode is associated with the preset AV content 101, and the process ends.

[0232] If a determination is made in step S346 that the preset AV content 101 and the selected two-dimensional barcode are not associated, the process proceeds to step S348, where the AV content management search program 82 determines whether or not all two-dimensional barcodes have been selected. If a determination is made that all two-dimensional barcodes have not been selected, the process proceeds to step S349, where another two-dimensional barcode is selected, and the process proceeds to step S346.

[0233] If a determination is made in step S348 that all two-dimensional barcodes have been selected, the process proceeds to step S350, where the AV content management search program 82 causes the CRT 30 to display a message indicating that the image supplied from the DVCR 5 with imaging function does not contain a two-dimensional barcode associated with the preset AV content 101, and the process then ends.

[0234] As described above, the AV content management search program 82 searches for a two-dimensional barcode associated with the prescribed AV content 101 from an image containing a plurality of two-dimensional barcodes, so that the user can quickly identify the video tape cassette 301 on which the prescribed image is recorded. The process

of searching for a two-dimensional barcode associated with the preset AV content 121 is also executed in a similar manner to the process depicted in the flowchart of FIG. 43.

[0235] Next, the process of searching for AV content 101 associated with a two-dimensional barcode when the AV content management search program 82 is loaded into the RAM 22 of the personal computer 1 and the CPU 21 executes the AV content management search program 82 will be described with reference to the flowchart of FIG. 44. In step S371, the AV content management search program 82 imports an image including a two-dimensional barcode supplied from the DVCR 5 with imaging function via the network 6. In step S372, the AV content management search program 82 recognizes the image of the two-dimensional barcode.

[0236] In step S373, the AV content management search program 82 reads data on the attributes of the prescribed AV content 101 from the content database 92. In step S374, the AV content management search program 82 determines whether or not the prescribed AV content 101 is associated with the two-dimensional barcode recognized in step S372, based on the attribute data of the AV content 101 read in step S373, and if a determination is made that the prescribed AV content 101 is associated with the two-dimensional barcode, the program proceeds to step S375 and activates the icon corresponding to the prescribed AV content 101.

[0237] If a determination is made in step S376 that the prescribed AV content 101 is not associated with the two-dimensional barcode, the process proceeds to step S376, where the AV content management search program 82 determines whether or not all AV content 101 has been selected. If a determination is made that all AV content 101 has not been selected, the process proceeds to step S377, where attribute data of other AV content 101 is read from the content database 92, the process returns to step S374, and the process is repeated.

[0238] If a determination is made in step S376 that all AV content 101 has been selected, the process proceeds to step S378, in which the AV content management search program 82 displays on the CRT 30 a message indicating that the AV content 101 associated with the two-dimensional barcode have not been recorded, and the process ends.

[0239] As described above, the AV content management search program 82 quickly searches for AV content 101 corresponding to the captured two-dimensional barcode, so the user can quickly understand the content of the video recorded on the video tape cassette 301 on which is attached the label 302 having a printed two-dimensional barcode affixed. The process of searching for the AV content 121 associated with the two-dimensional barcode is executed in a similar manner.

[0240] Next, with reference to FIG. 45, a medium used for installing the program for executing the series of processes described above in a personal computer 1 and causing the program to be executed by the personal computer 1 will be described.

[0241] As depicted in FIG. 45 (A), the program can be provided to the user in a pre-installed state on a hard disk 502 (corresponding to the hard disk built into HDD 31-1 or 31-2 in FIG. 2) or as a semiconductor memory 503 as a storage medium built into the personal computer 1.

[0242] Alternatively, the program can be temporarily or permanently stored on a storage medium such as a floppy disk 511, a CD-ROM (Compact Disk-Read Only Disk) 512, an MO (Magneto-Optical) disk 513, a DVD (Digital Versatile Disk) 514, a magnetic disk 515, or a semiconductor memory 516, as depicted in FIG. 45 (B), and provided as a package software.

[0243] Furthermore, as depicted in FIG. 45 (C), the program can be transferred wirelessly from a download site 521 to the personal computer 1 via a satellite 522 for digital satellite broadcasting, or transferred via cable to the personal computer 1 via a network 531 such as a local area network or the Internet, and stored on a built-in hard disk or the like in the personal computer 1.

[0244] In this specification, the term "medium" refers to a broad concept including all of these media.

[0245] Furthermore, in the present specification, the steps describing the program provided on the medium include performing the processes in the chronological order described as well as processing not necessarily in chronological order and processes executed in parallel or individually.

[0246] Note that in the present specification, the system is defined as an overall device composed of a plurality of devices.

[0247]

EFFECT OF THE INVENTION

With the information processing device of claim 1, the information processing method of claim 8, and the medium of claim 9, the display is controlled in response to manipulations of a video or data for playing a video or the state of the video, so that the state of manipulations on the video can be seen at a glance.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a diagram depicting an embodiment of a video recording and playback system according to the present invention;

FIG. 2 is a block diagram for describing a configuration of the personal computer 1;

FIG. 3 is a diagram depicting the configuration of the video processing board 34;

FIG. 4 is a diagram for describing application programs executed by the personal computer 1;

FIG. 5 is a diagram for describing the configuration of application programs, middleware, and drivers executed by the personal computer 1;

FIG. 6 is a diagram for describing an example of the structure of AV content;

FIG. 7 is a diagram for describing an example of the structure of AV content;

FIG. 8 is a diagram for describing an example of the structure of AV content;

FIG. 9 is a diagram describing a screen of a recording and playback program 81;

FIG. 10 is a diagram describing a screen of a recording and playback program 81;

FIG. 11 is a diagram for describing the change in recording time by clicking the recording time change button 151;

FIG. 12 is a diagram for describing a recording time setting window;

FIG. 13 is a diagram for describing a recording time setting window;

FIG. 14 is a diagram describing a screen of a recording and playback program 81;

FIG. 15 is a diagram describing a screen of a recording and playback program 81;

FIG. 16 is a diagram describing a screen of a recording and playback program 81;

FIG. 17 is a diagram for describing a screen of an AV content editing program 83;

FIG. 18 is a flowchart for describing a process of switching between recording and playback screens;

FIG. 19 is a flowchart for describing a process for determining recording time;

FIG. 20 is a flowchart for describing details of the recording process;

FIG. 21 is a flowchart for describing a playback process;

FIG. 22 is a flowchart for describing a process for displaying a still image;

FIG. 23 is a diagram for describing the screen of the AV content management search program 82;

FIG. 24 is a diagram for describing the screen of the AV content management search program 82;

FIG. 25 is a diagram for describing icons;

FIG. 26 is a diagram for describing icons;

FIG. 27 is a diagram for describing another screen of the AV content management search program 82;

FIG. 28 is a diagram for describing yet another screen of the AV content management search program 82;

FIG. 29 is a flowchart for describing the display switching process of the AV content management search program 82.
FIG. 30 is a flowchart for describing a process for displaying an icon;

FIG. 31 is a flowchart for describing a process for deleting AV content with an expiration date;

FIG. 32 is a flowchart for describing a process for deleting AV content;

FIG. 33 is a diagram for describing the operation of searching a video tape cassette 301, or the operation of searching the AV contents 101;

FIG. 34 is a diagram for describing a two-dimensional barcode;

FIG. 35 is a diagram for describing a window for determining whether or not a two-dimensional barcode is registered in the AV content management search program 82;

FIG. 36 is a diagram for describing a window for determining whether or not a two-dimensional barcode is registered in the AV content management search program 82;

FIG. 37 is a diagram for describing a window for determining whether or not a two-dimensional barcode is registered in the AV content management search program 82;

FIG. 38 is a diagram for describing a window for searching for a two-dimensional barcode registered in the AV content management search program 82;

FIG. 39 is a diagram for describing a window for searching for a two-dimensional barcode registered in the AV content management search program 82;

FIG. 40 is a diagram for describing a window for searching for AV content corresponding to a two-dimensional barcode registered in the AV content management search program 82;

FIG. 41 is a flowchart for describing a process of associating AV content with a two-dimensional barcode;

FIG. 42 is a flowchart for describing the process of determining whether or not a two-dimensional barcode is associated with AV content;

FIG. 43 is a flowchart for describing a process of searching for a two-dimensional barcode associated with AV content;

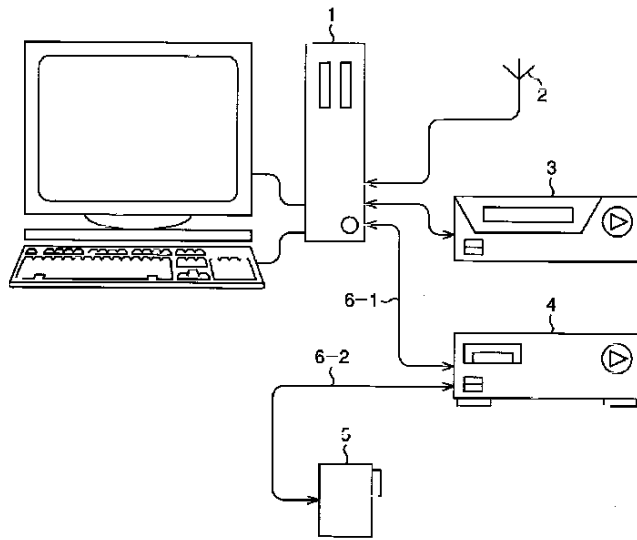
FIG. 44 is a flowchart for describing a process of searching for AV content associated with a two-dimensional barcode; and

FIG. 45 is a diagram for describing a medium.

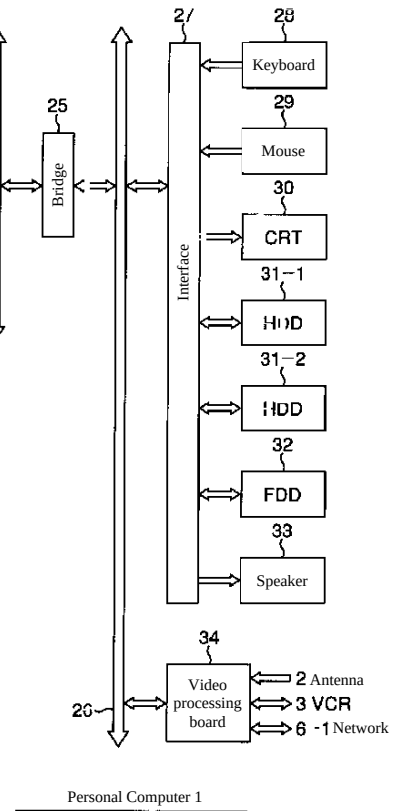
DESCRIPTION OF REFERENTIAL NUMERALS

1. Personal computer, 3. VCR, 4. DVCR, 5. DVCR, 6, 6-1, 6-1. Network, 21. CPU, 23. RAM, 34. Video processing board, 58. MPEG encoder, 60. MPEG decoder, 81. Recording and playback program, 82. AV content management search program, 83. AV content editing program, 92. Content database, 101. AV content, 102. AV content attribute record, 111. Moving image data file, 112. Still image data file, 121. AV content, 131. Edit data file, 132. AV content attribute record, 141. Recording window, 142. Record button, 143. Stop button, 144. Play button, 145. Pause button, 151. Recording time change button, 161. Playback window, 171. Still image display window, 172. Current position indication gauge, 183. Edit start video display window, 184. Edit end video display window, 201. AV content information display window, 202. Recording time display window, 203. AV content classification display window, 204. AV content icon display window, 251. AV content list display window, 261. AV content calendar display window, 301. Video tape cassette, 302. Label, 502. Hard disk, 503. Semiconductor memory, 511. Floppy disk, 512. CD-ROM, 513. MO disk, 514. DVD, 515. Magnetic disk, 516. Semiconductor memory, 521. Download site, 522. Satellite, 531. Network

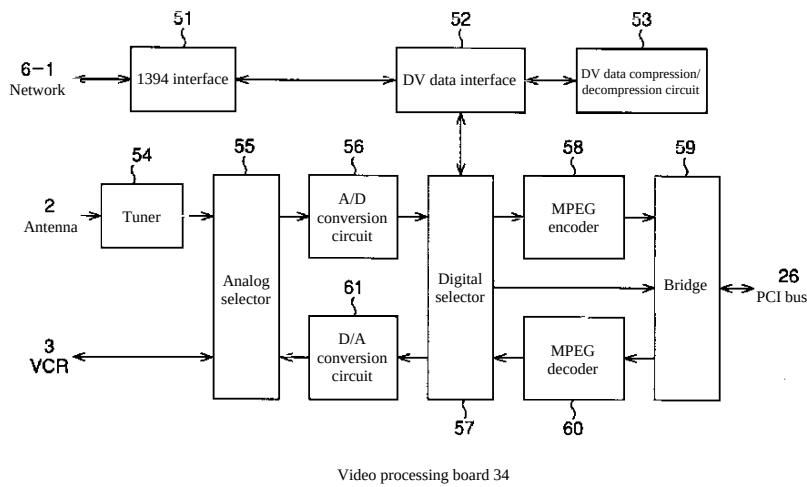
[FIG. 1]



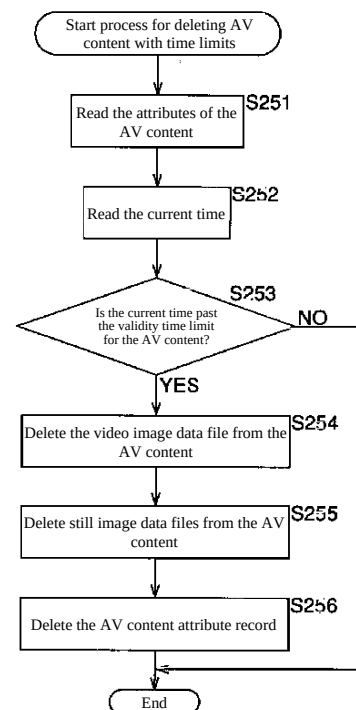
[FIG. 2]



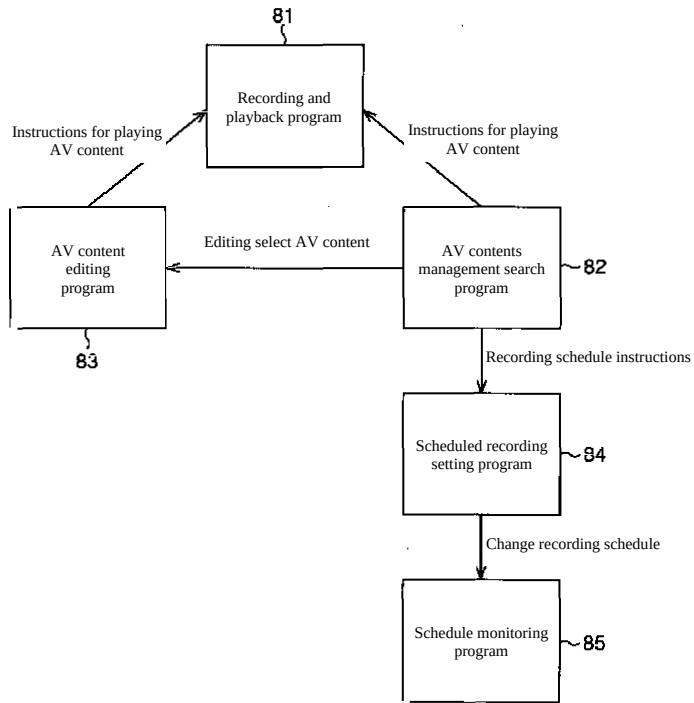
[FIG. 3]



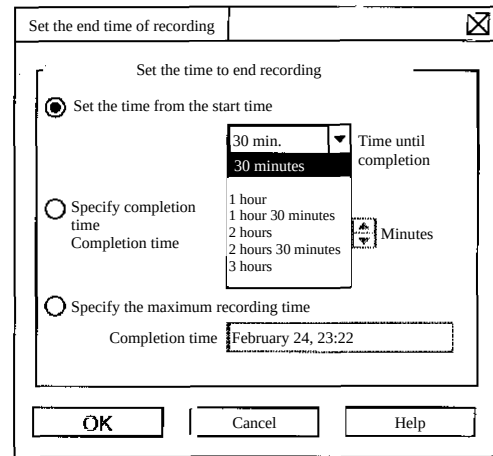
[FIG. 31]



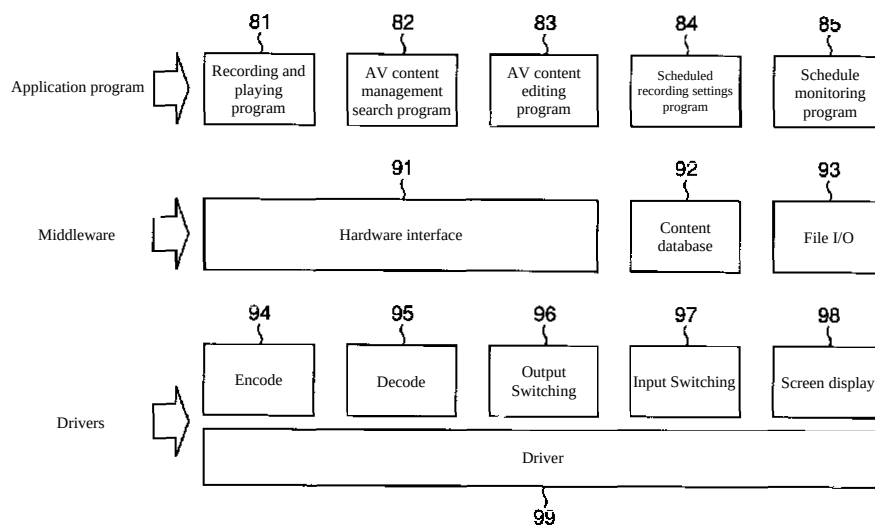
[FIG. 4]



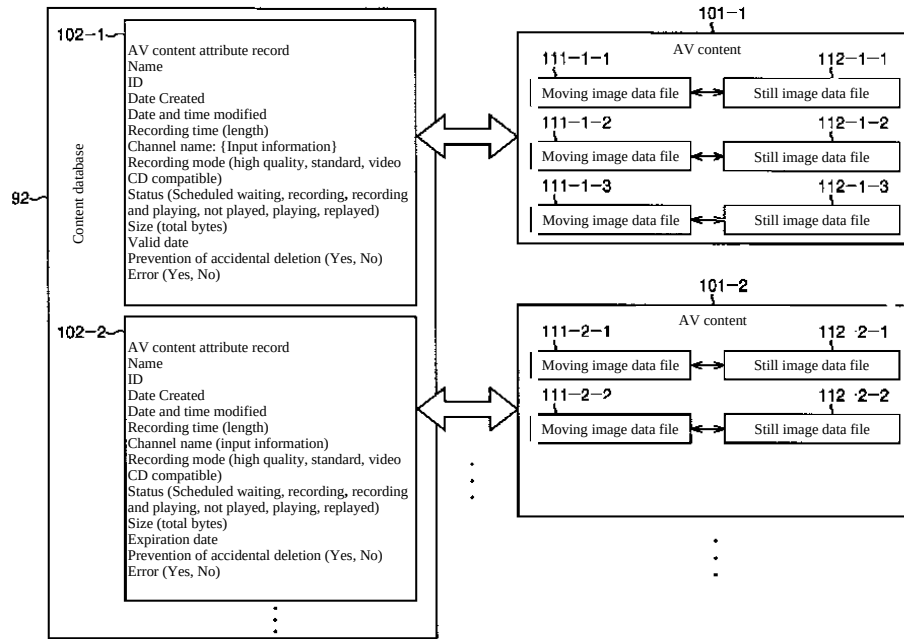
[FIG. 12]



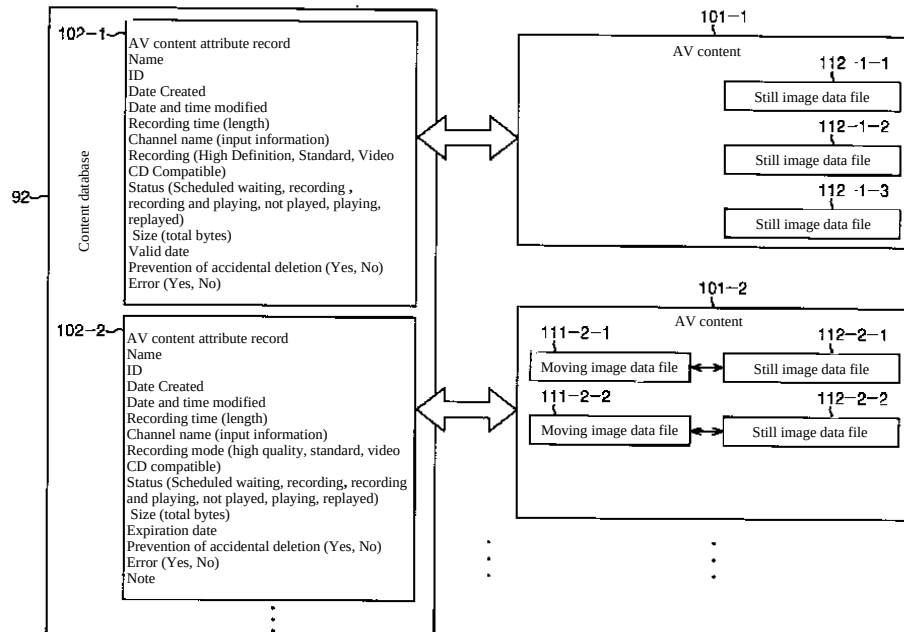
[FIG. 5]



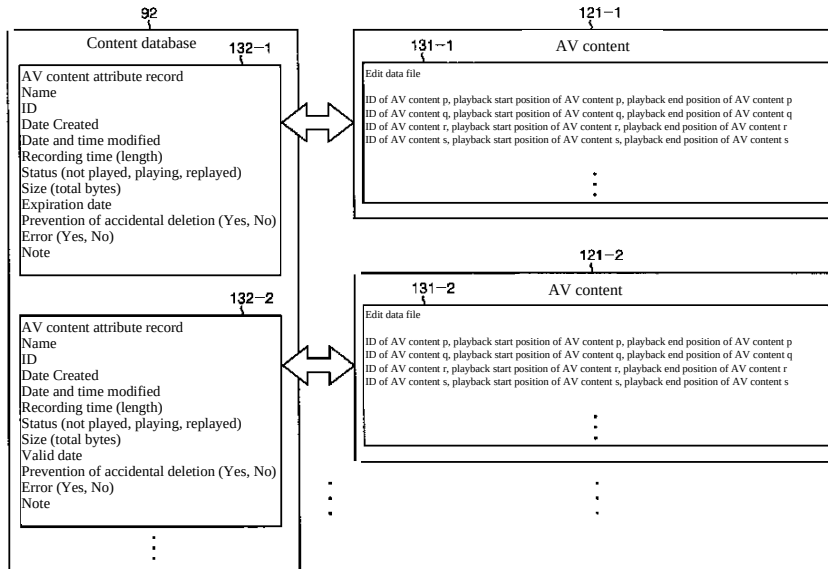
[FIG. 6]



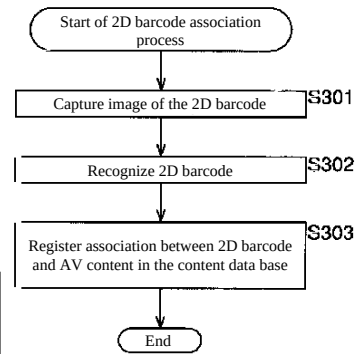
[FIG. 7]



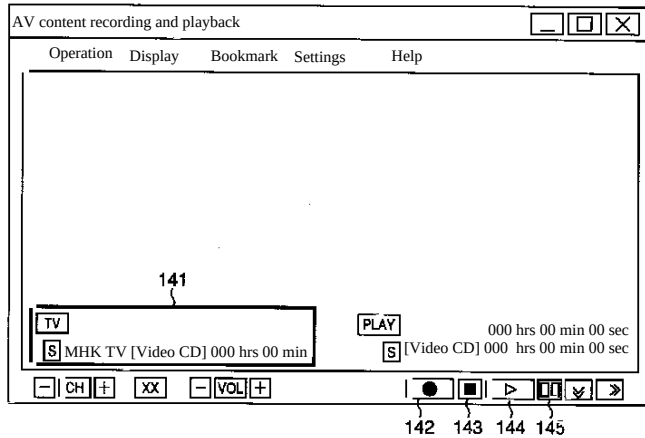
[FIG. 8]



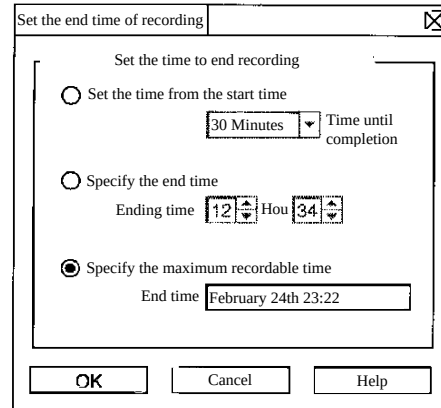
[FIG. 41]



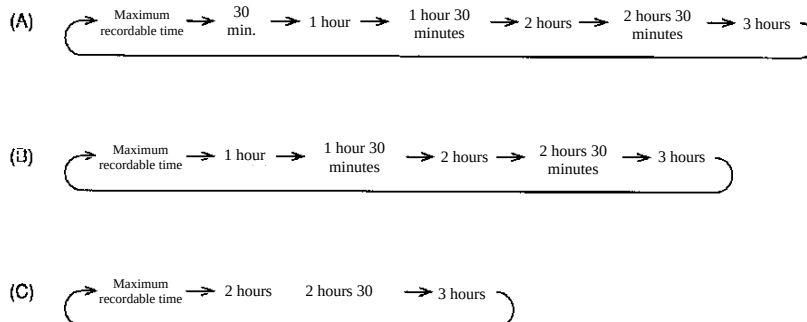
[FIG. 9]



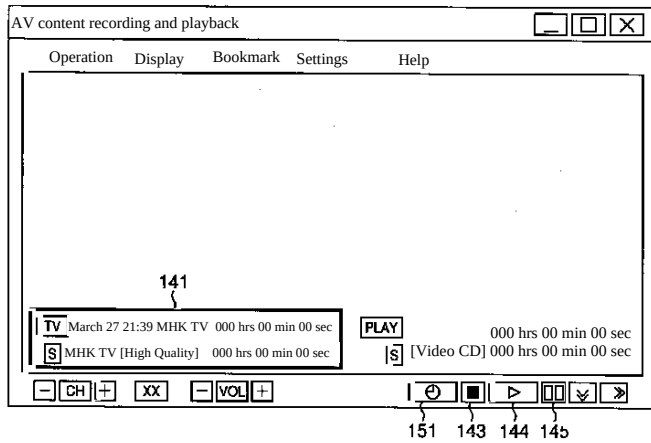
[FIG. 13]



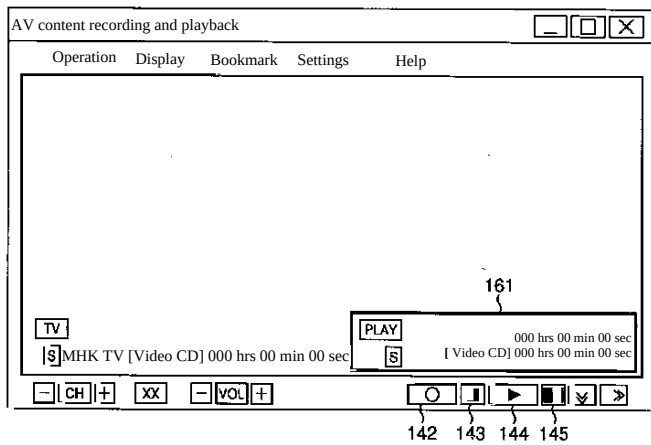
[FIG. 11]



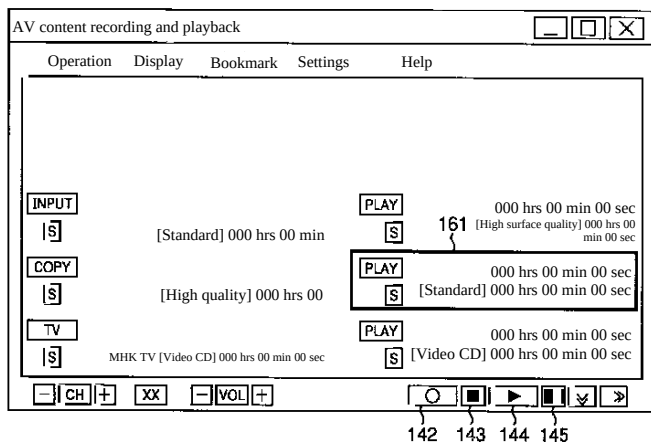
[FIG. 10]



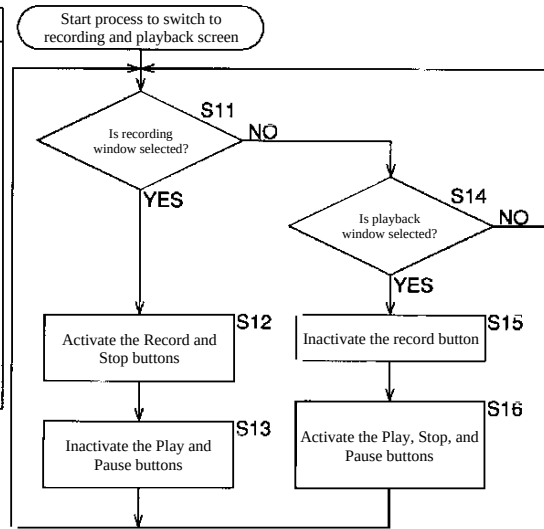
[FIG. 14]



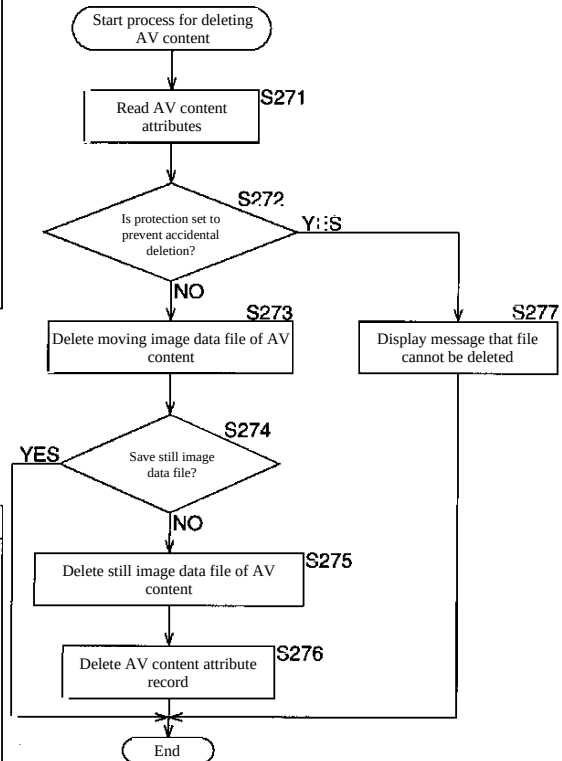
[FIG. 15]



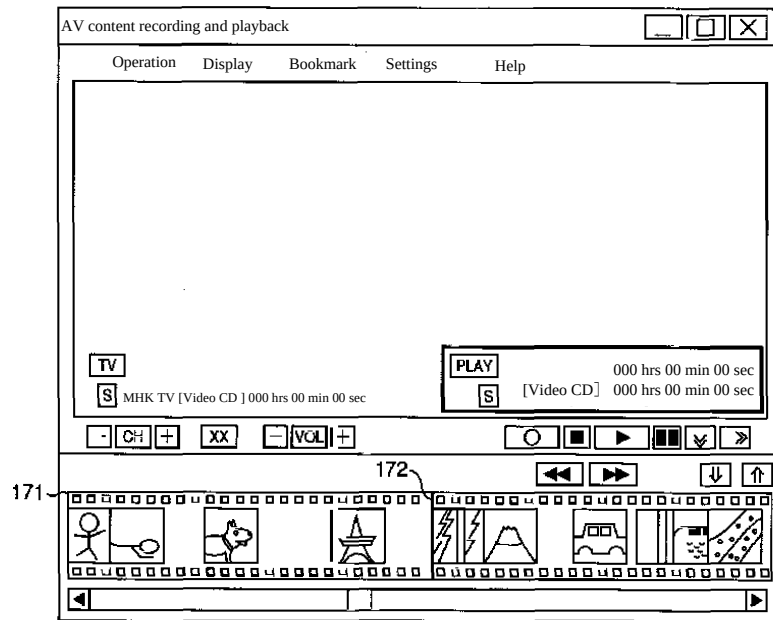
[FIG. 18]



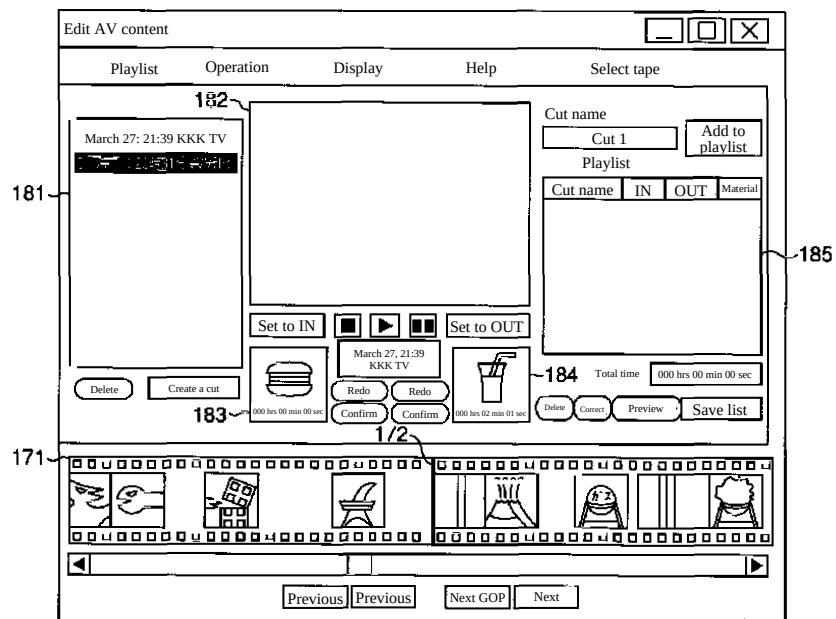
[FIG. 32]



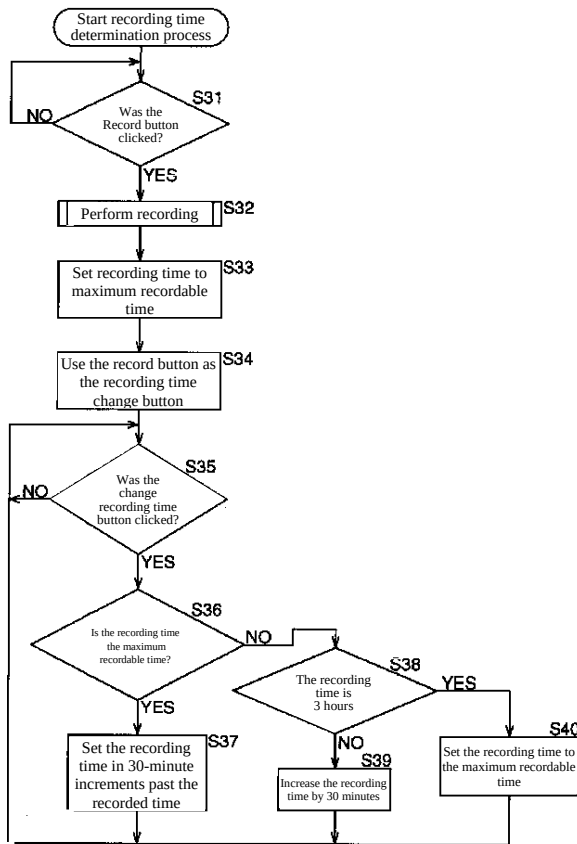
[FIG. 16]



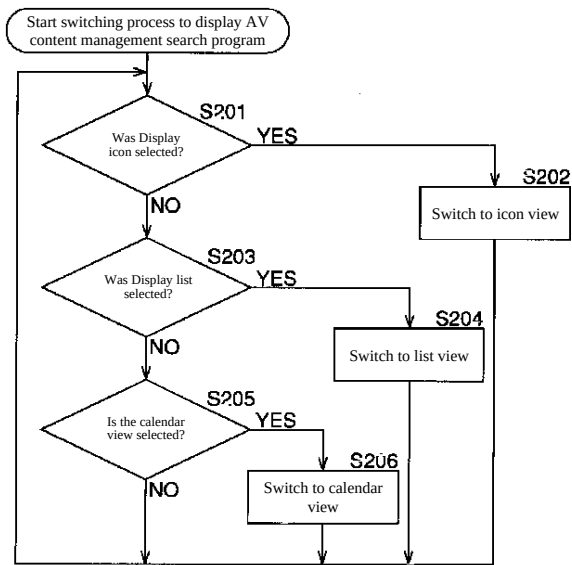
[FIG. 17]



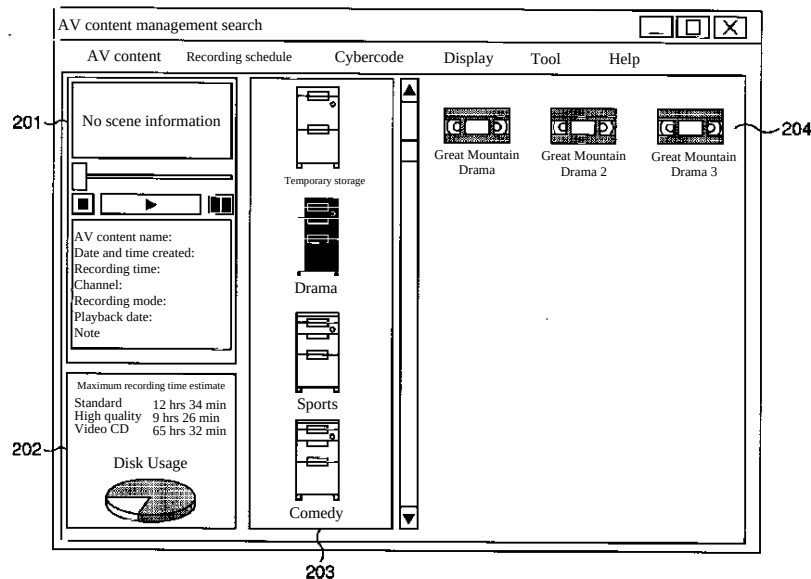
[FIG. 19]



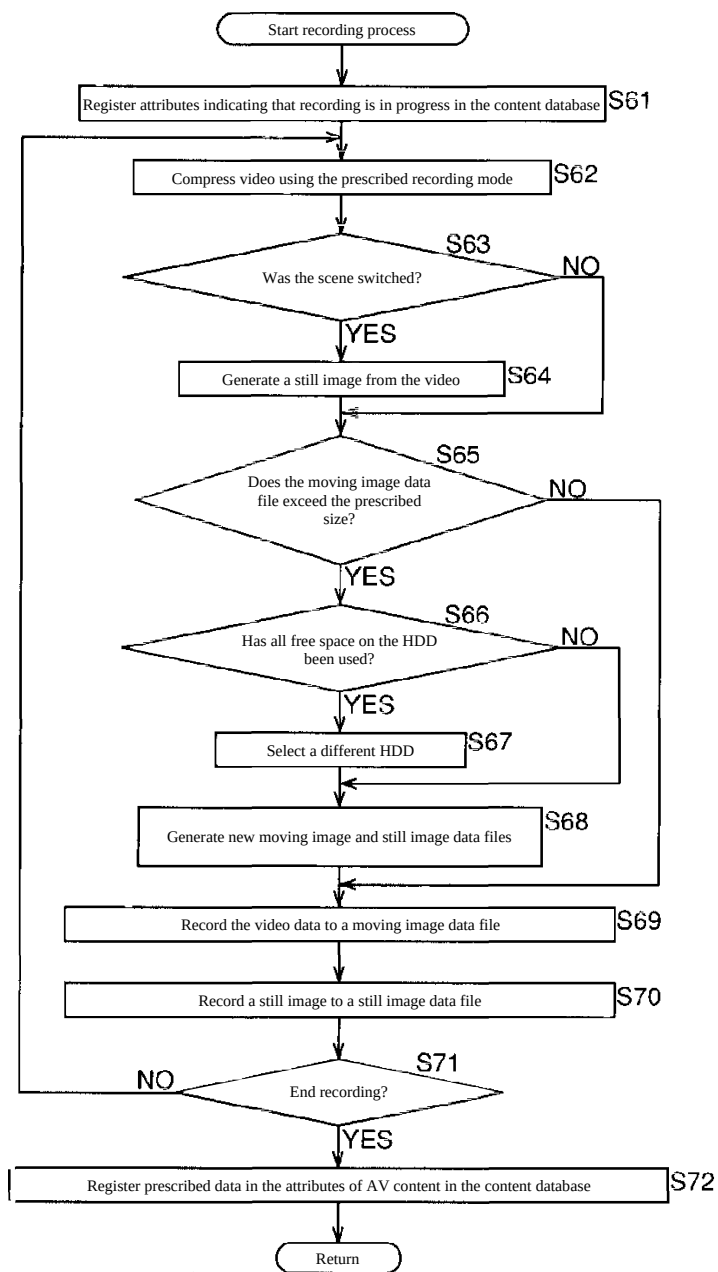
[FIG. 29]



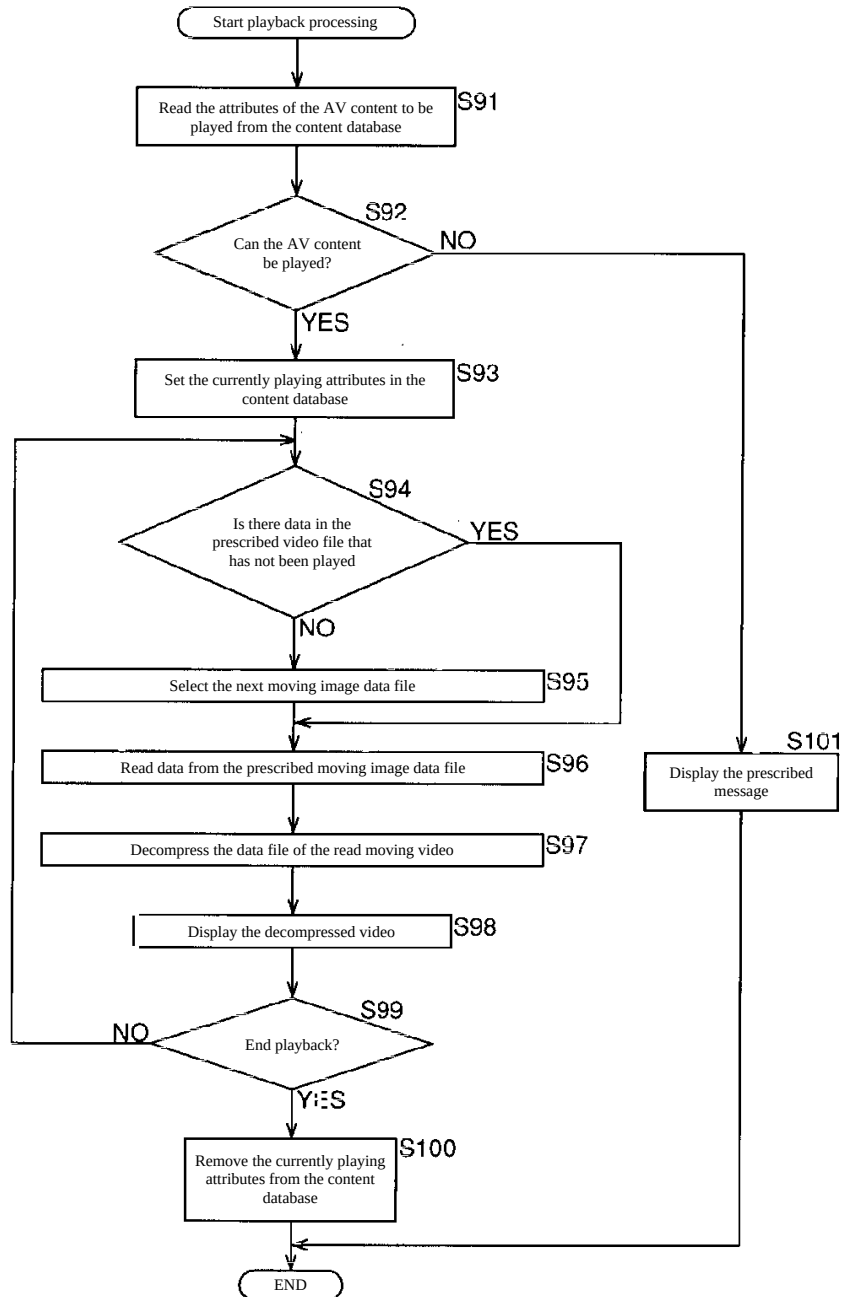
[FIG. 23]



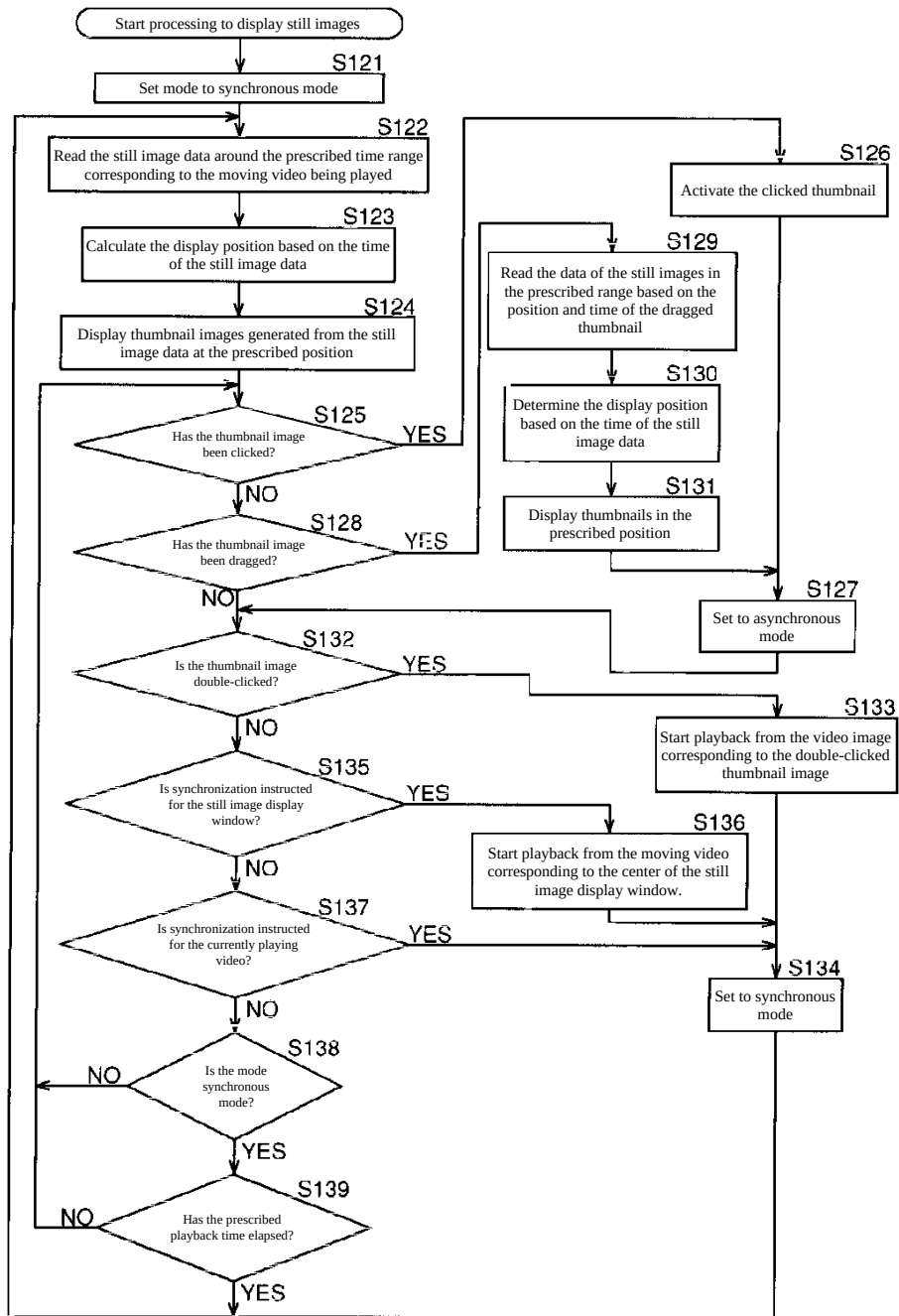
[FIG. 20]



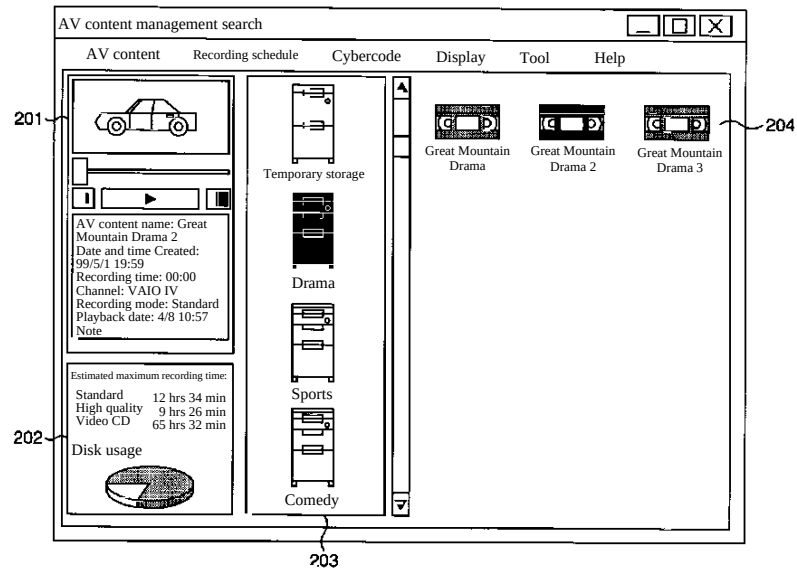
[FIG. 21]



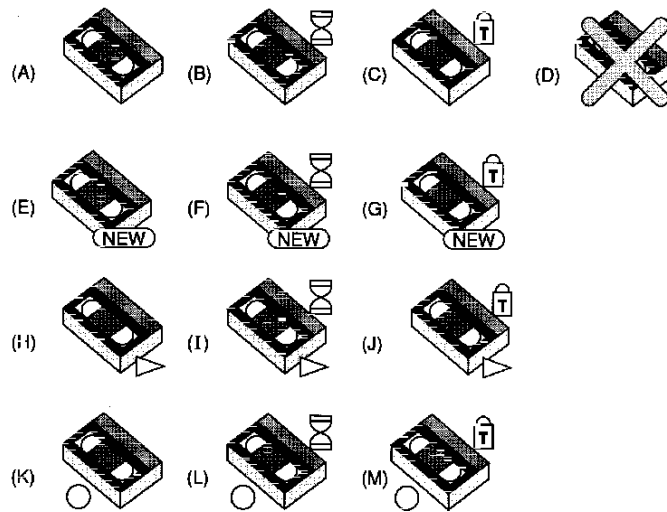
[FIG. 22]



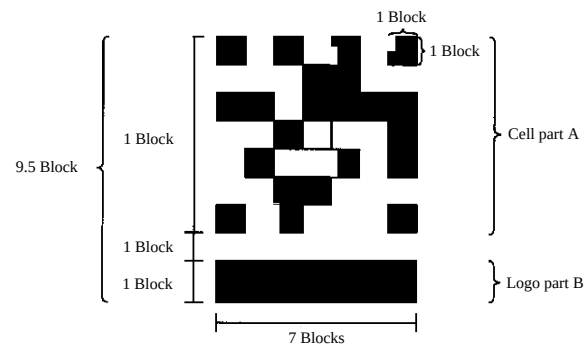
[FIG. 24]



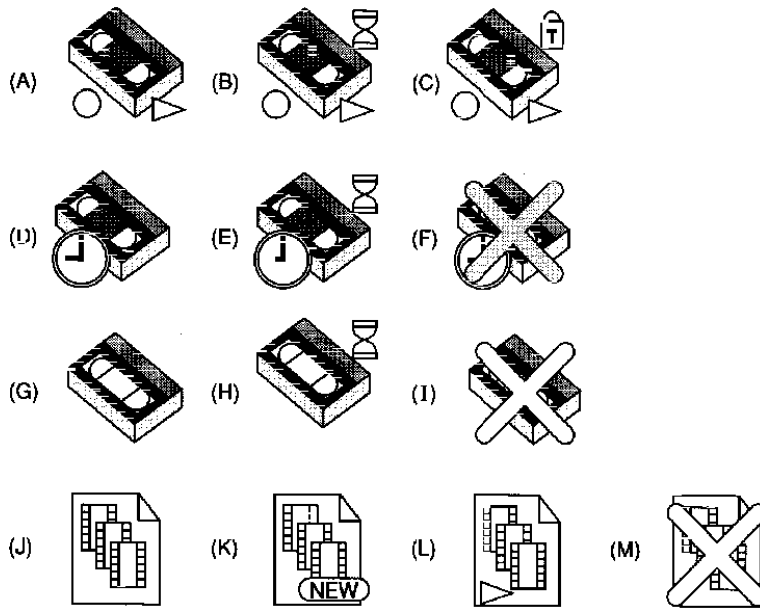
[FIG. 25]



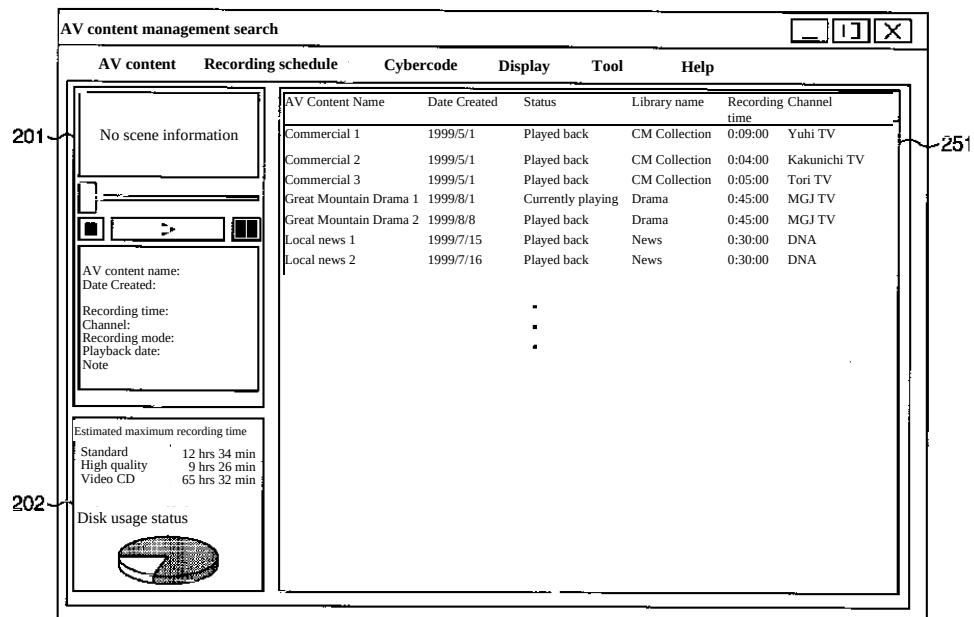
[FIG. 34]



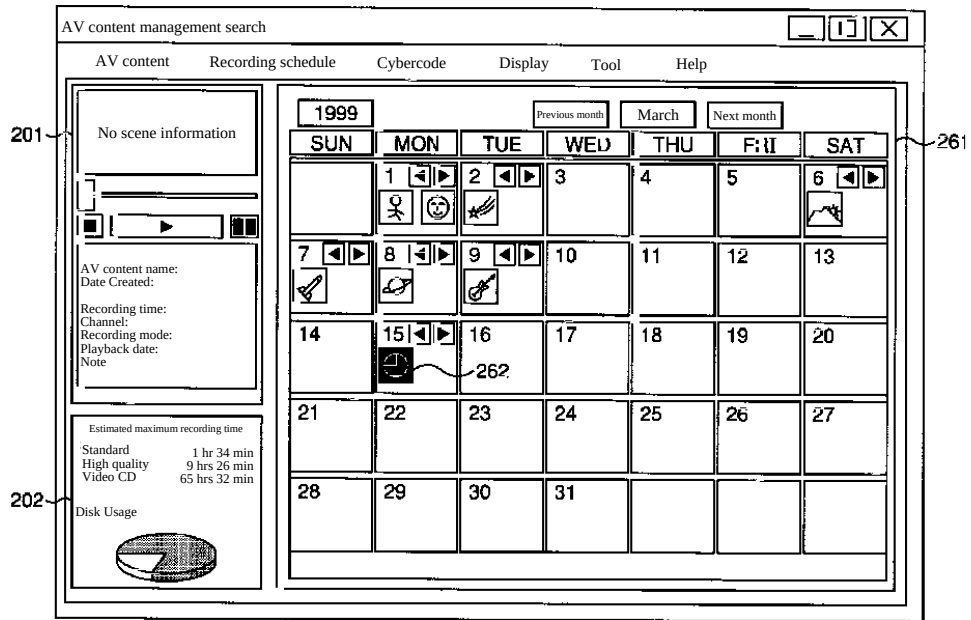
[FIG. 26]



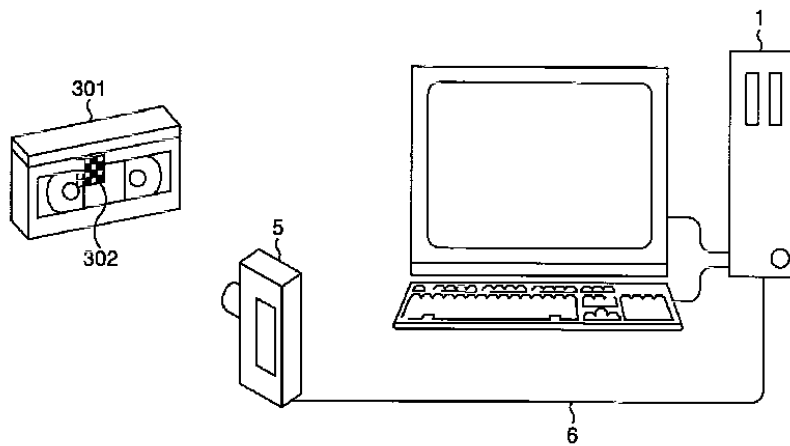
[FIG. 27]



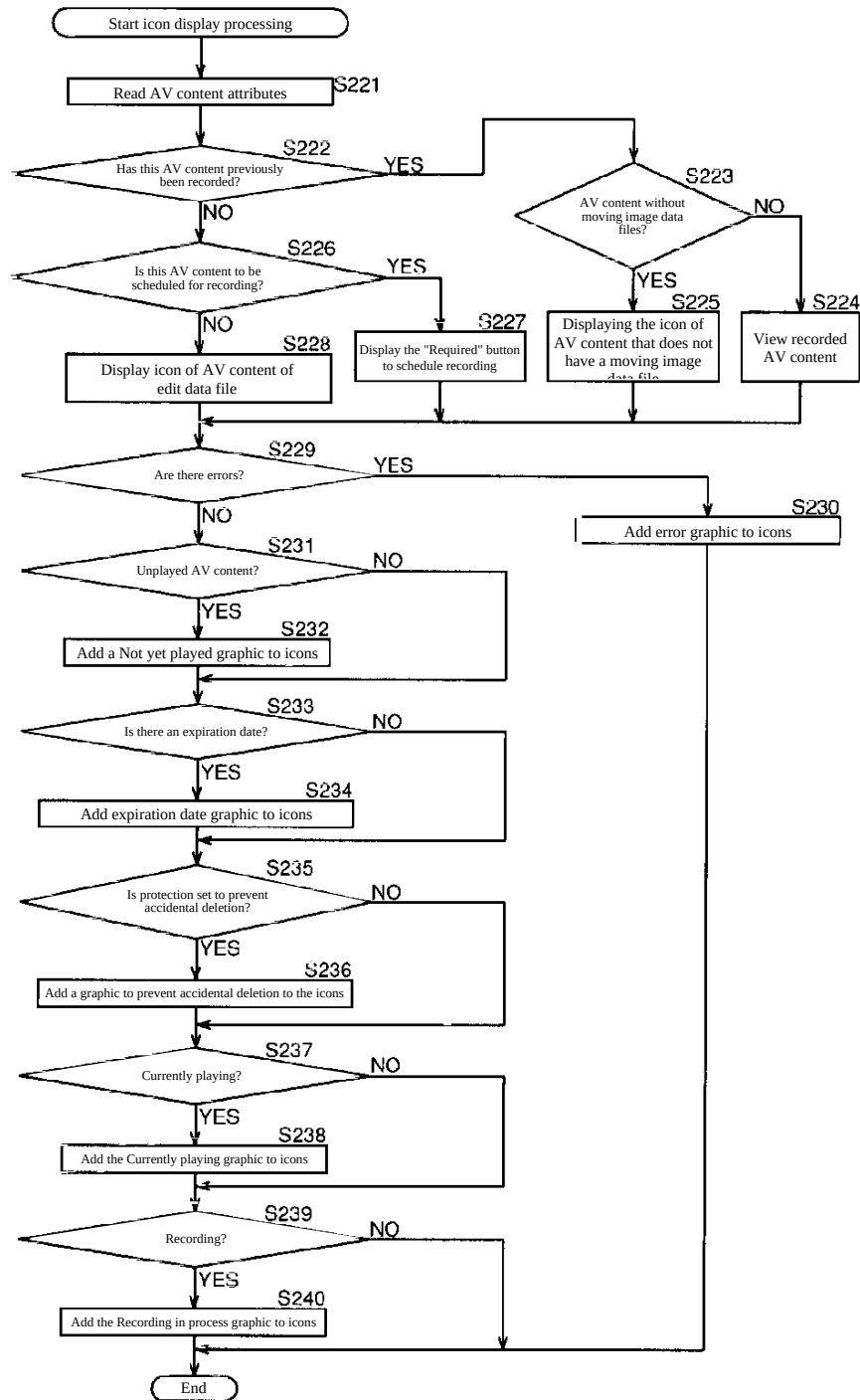
[FIG. 28]



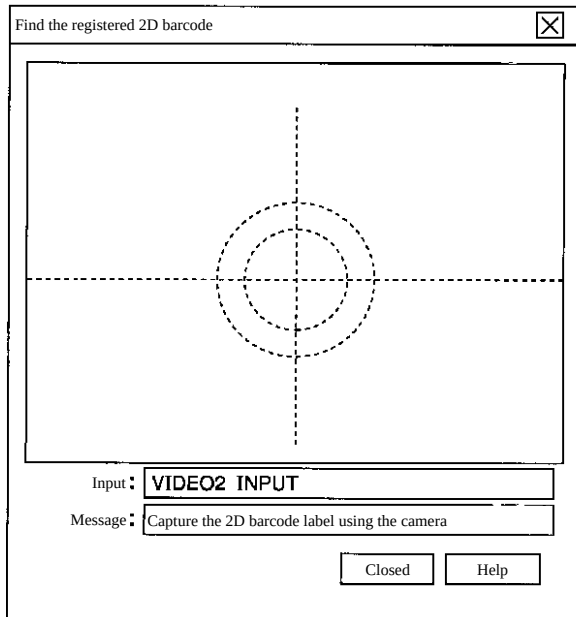
[FIG. 33]



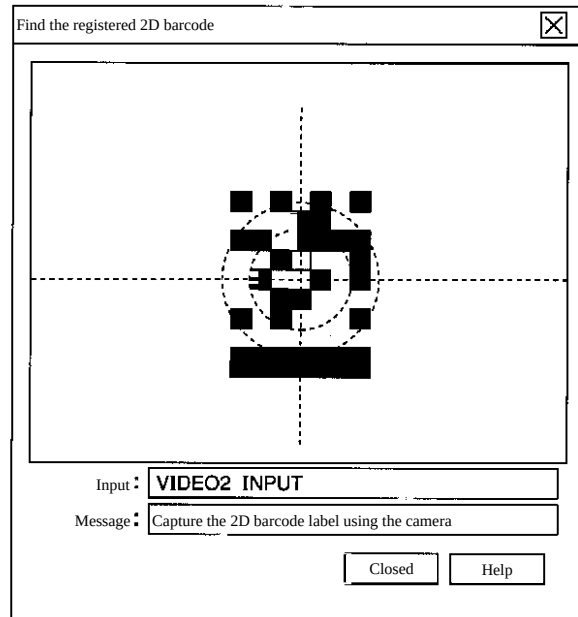
[FIG. 30]



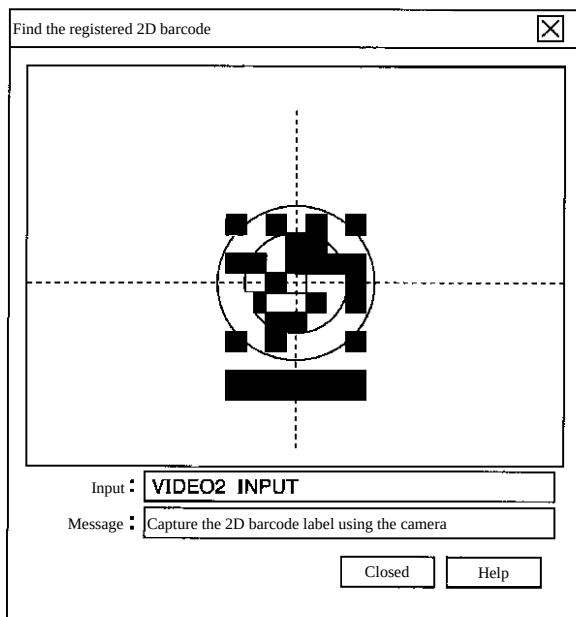
[FIG. 35]



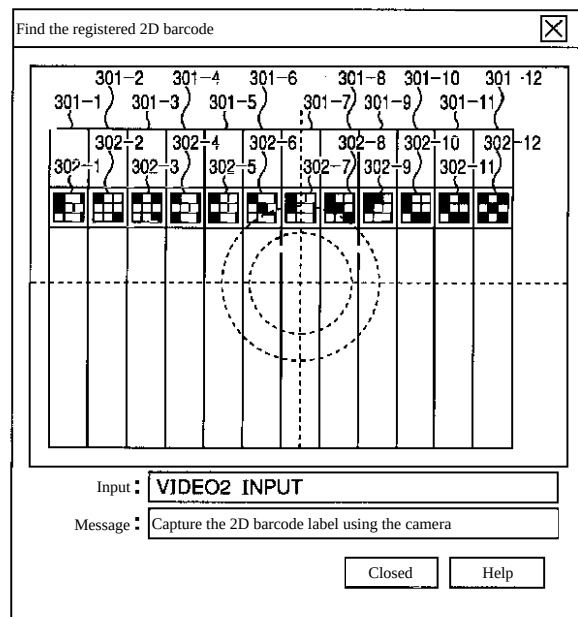
[FIG. 36]



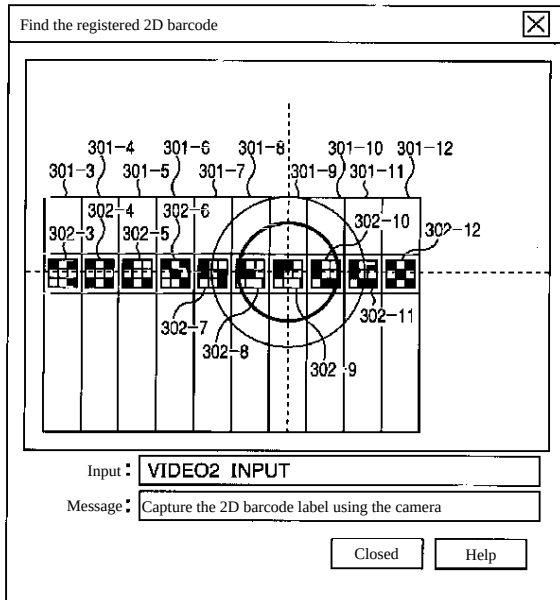
[FIG. 37]



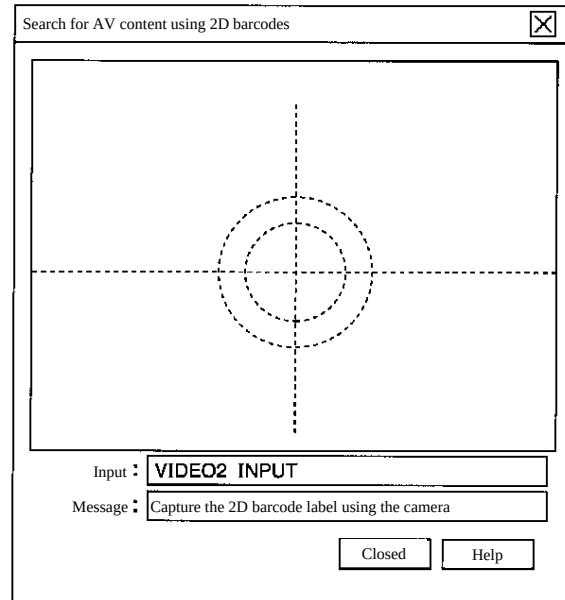
[FIG. 38]



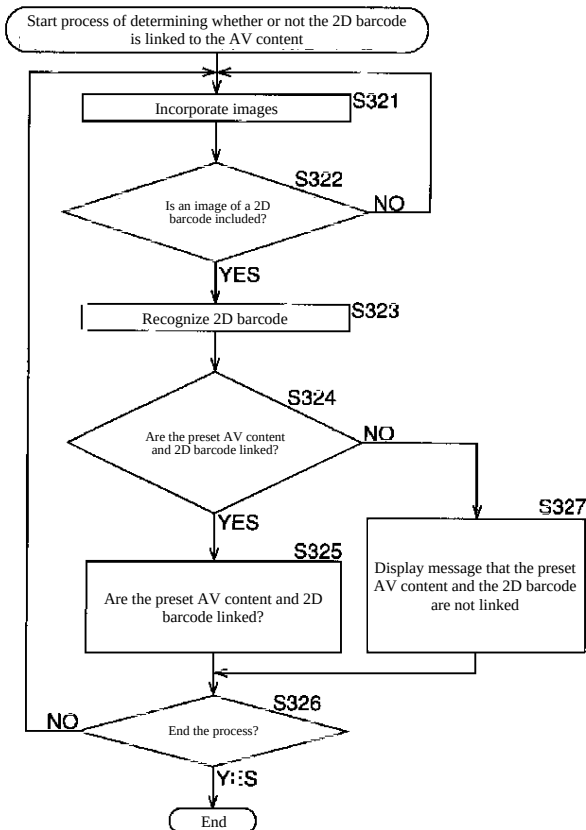
[FIG. 39]



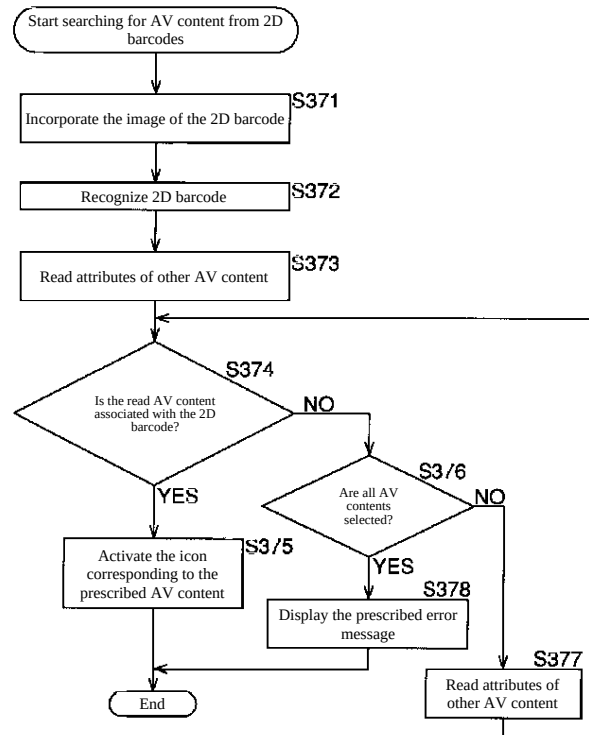
[FIG. 40]



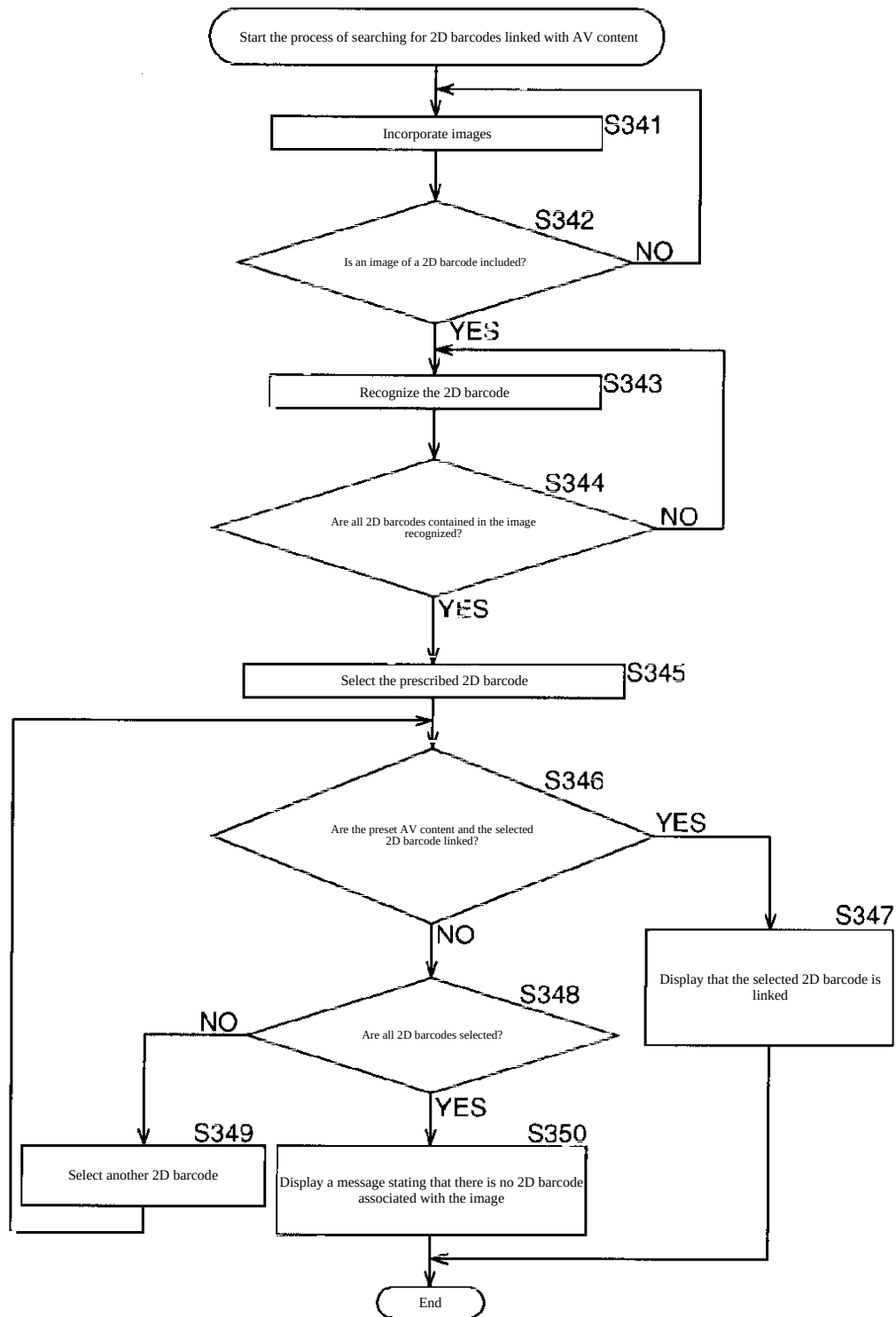
[FIG. 42]



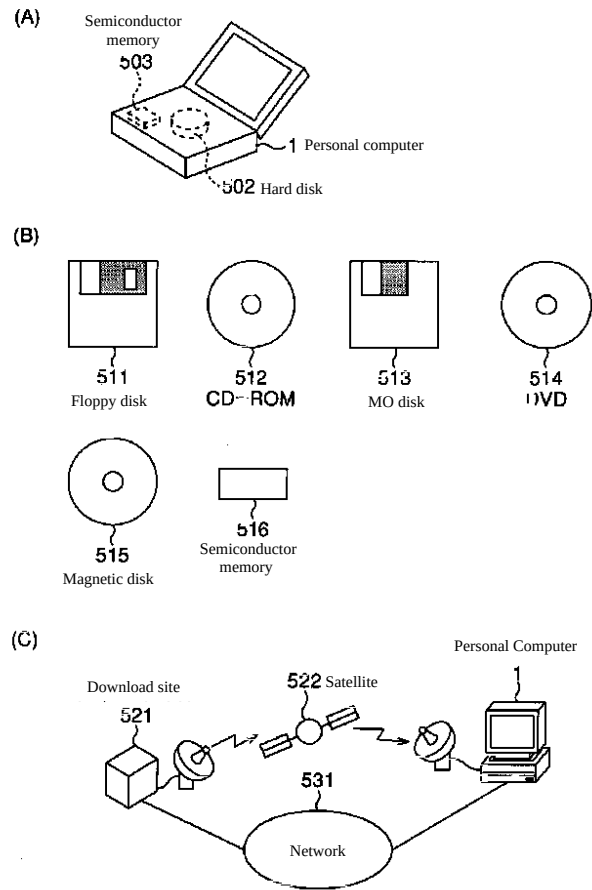
[FIG. 44]



[FIG. 43]



[FIG. 45]



Continued from front page

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LA07 LA11
5E501 AA02 BA03 CA02 CA08 CB02
CB09