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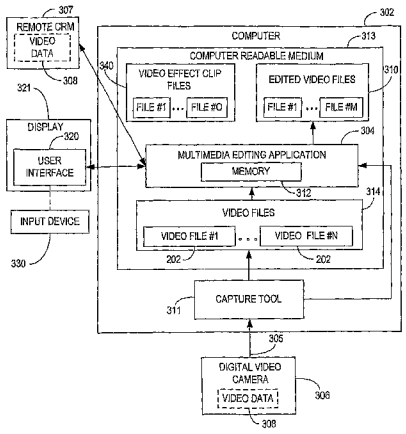

(57) Abstract: A media editing application for creating and displaying video effect clips. A detection component detects video files stored in a memory of a computer. A user interface displays the detected video files and various video effects that can be applied to video files. The user interface is responsive to a user selecting one or more of the detected video files to apply a selected video effect to the selected video files to create the video effect clip. The user interface is further responsive to user input to display the video effect clip.

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PHOTO AND VIDEO COLLAGE EFFECTS

BACKGROUND

[0001] An increasing number of people use cameras to take photographs and/or camcorders to make videos to capture their experiences and document events in their lives. Known video playback, browsing and editing applications, such as multivideo editing applications (MEAs), allow a user to bring versatility to such video recordings and photographs via a personal computer by allowing the user to capture or transfer the video or photograph onto the computer as a video file and to manually segment the digital video file into a recording or clip that displays events of the user's choosing. Some MEAs make this easier for the user by attempting to automatically detect shot boundaries within a particular video file. Thereafter, the MEA may segment the video file into shots that are displayed in a library or menu to allow the user to manually select shots and combine them to form a desired recording. The MEA may also allow the user to add animation or special effects (video effects) to selected shots or clips included in the recording. For example, the user may want to include a photo or video collage effect in the recording to displays multiple photos and/or video clips on the display at a given time.

[0002] Conventional MEAs use video tracks to enable the user to create such video effects. For example, a conventional MEA allows the user to create a photo or video collage effect by adding one or more video clips on a timeline that corresponds to a specific period of time, and by manually adjusting the size and locations of each video clips on the timeline. For example, FIG. 1 shows five video tracks 102, 104, 106, 108, and 110 used to create a photo collage for ten photos, labeled A-J. In this example, the photos are added to the video tracks by a user (e.g., via a drag- and-drop operation) and are staggered with respect to a timeline 112 such that only one or two of the photos are displayed at any given time. As can be seen, photo A is positioned on video track 102 and photo B is positioned on video track 104 such that photo A is displayed first and photo B is displayed next. After photo B is displayed, photo C, which is positioned on video track 106, is displayed. This pattern continues for the remaining photos. Thus, by staggering photos on the timeline 112 and adjusting the size and location of the photos,

multiple photos can be shown at the same time to create a photo collage effect. This same technique can also be applied to video files and video clips. That is, by staggering video clips on the timeline 112 and adjusting the size and location of the video clips, multiple video clips can be shown at the same time to create video collage effect. Nevertheless, this technique is tedious and difficult for most users to master. For example, in order to display five photos on the screen at a given time, the user is required to add the five video tracks, add a resize effect to each video clip, add fade-in and fade-out effects, add key frames to each video to determine positioning and motion, stagger photos on timeline to create collage effect, and manually adjust the duration of each photo and video clip. Moreover, adding additional photos, rearranging photos, changing photo durations, determining each photos position is extremely task intensive. For example, to adjust the duration of each photo from five (5) seconds to seven (7) seconds would require the user to manually adjust the duration and location of each photo on the time. To create a three photo animated collage would require the user to rearranging the photos on the timeline so that three photos are aligned vertically at given points on the timeline.

SUMMARY

[0003] Aspects of the invention not only add video effects to video clips included in a recording, but provide a video effects tool that enables the user to select a video effect to apply to videos clips and/or photos to create a video effect clip. Accordingly, users can create complicated video effects quickly and easily.

[0004] Computer-readable media having computer-executable instructions for segmenting videos embody further aspects of the invention. Alternatively, embodiments of the invention may comprise various other methods and apparatuses.

[0005] Other features will be in part apparent and in part pointed out hereinafter.

[0006] This Summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This Summary is not intended to identify key features or essential features of the

claimed subject matter, nor is it intended to be used as an aid in determining the scope of the claimed subject matter.

[0007] Other features will be in part apparent and in part pointed out hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. 1 illustrates video tracks used to construct video effects in a conventional video editing application.

[0009] FIG. 2 is an exemplary block diagram illustrating three fundamental levels of a digital video file or a digital video.

[0010] FIG. 3A is a block diagram illustrating an exemplary computer-readable medium on which aspects of the invention may be stored.

[0011] FIG. 3B is an exemplary screen shot of a photo collage effect clip.

[0012] FIG. 4 is a block diagram illustrating basic components of an MEA for implementing aspects of the invention.

[0013] FIGS. 5A and 5C illustrate an exemplary graphical user interface for creating a video effect clip according to one aspect of the invention.

[0014] FIG. 5B illustrates an exemplary properties menu for modifying properties of a video effect clip according to one aspect of the invention.

[0015] FIGS 6A, 6B, and 6C illustrate various video effects.

[0016] FIG. 7 is an exemplary flow chart illustrating a method for creating a video effect clip according to one aspect of the invention.

[0017] Corresponding reference characters indicate corresponding parts throughout the drawings.

DETAILED DESCRIPTION

[0018] Referring now to FIG. 2, an exemplary block diagram illustrates three levels of a digital video file 202 or a digital video. At a fundamental or base level, digital video 202 comprises multiple video frames 204, each video frame 204 typically having a fixed duration D and a known date and time at which the recording began. As known to those skilled in the art, the duration of a video frame 204 is typically a small fraction of one second (e.g., 1/30, 1/25 or 1/24) but may be any other value or may vary from frame to frame within a single video 202.

[0019] At the next higher level, digital video 202 comprises multiple video shots, or clips 206 including one or more video frames 204. As shown by timeline 208, each video clip 206 represents a continuously recorded portion of the digital video 202 between a record operation R and a stop operation S of the recording device. Within video clip 206, each subsequent video frame 204 after the first video frame 204 in the clip has a start date and time equal to the start date and time of the previous video frame 204 plus the duration D, as indicated by reference character 210, of the previous video frame 204. As known to those skilled in the art, the difference between the last frame of one clip and the first frame of the next clip is always greater than the duration of a single video frame 204. The time difference may be a few seconds or it may be several minutes, hours or even days or months away, and typically corresponds to the time between the user pressing stop on a video recording device (e.g., camcorder) and the next time the user starts recording. For still images generated, for example, by a digital still camera (DSC), the start and end times for a still image are set to the same value. In other words, a still image or photograph is treated as a video clip 206 with a duration of zero seconds.

[0020] Referring now to FIG. 3A, an exemplary block diagram illustrates a suitable operating environment in which aspects of the invention may be implemented. A computer 302 comprises a multivideo editing application (MEA) 304 for performing various video editing functions including identifying video clips 206 or segment boundaries between video clips 206 within a digital video data stream (video stream) 305 captured or transferred from a video source 306. For example, a video source 306 such as a digital video camera provides, via the video data stream 305, digital video data 308 including video clips 206 and/or other video elements (e.g., still shots) to the computer 302 executing the MEA 304. Notably the video data stream 305 may transfer video data 308 from the video source 306 as the video data 308 is recorded (e.g., live feed or streaming video), or may transfer video data 308 from a video file 202 stored (e.g., previously recorded) on the video source 306. The MEA 304 organizes video frames 204 and video clips 206 and/or other video elements dynamically or statically into an edited video file 310 for the

purposes of viewing the video and/or interacting with the video via a user interface 320 on a display 321, or for subsequent output onto another CRM (e.g., remote CRM 307) such as a Digital Video (DV) tape linked to the computer 302. For example, the DV tape may be an optical video disc with chapters such as a Digital Video Disk (DVD).

[0021] In one embodiment, the digital video camera 306 records a visual image or series of visual images and generates the video stream 305 representative of the visual image or series of visual images. The video stream 305 includes video data 308 specifying the start time and date of the individual video images or "video frames" included in the video stream 305.

[0022] The remote CRM 307 may be any CRM storing video data 308 that may be linked to the computer 302 for the purpose of transferring or storing video data 308. For example, the remote CRM 307 may be an optical disc in a DVD-drive, another computer, a personal video recorder (PVR), or any other video-capable device that may be linked to the computer 302 via a network (e.g. Ethernet) or direct connection (e.g. Universal Serial Bus) such that video data 308 stored on the remote CRM 307 may be transferred to the computer 302 or received from the computer 302 via electronic means such as file transfer or electronic mail.

[0023] A capture tool 311 is linked to the computer 302 and the digital video camera 306 for capturing the video stream 305. The capture tool 311 transfers the digital data directly to a memory 312 of the MEA 304 or directly to the CRM 313 (e.g., hard drive or random access memory (RAM) of the computer 302 for storage as a video file 314 containing, for example, DV data. Alternatively, the capture tool 311 may convert the format of digital video stream 305 from one digital video format to another during capture. For example, the capture tool 311 may convert the format of the video stream 305 from DV data to Windows Media Video (WMV) while preserving the date and time information about each of the series of video frame 204 included in the video data 308. The capture tool 311 may change the timing or the number of frames present within the video stream 305. For example, the capture tool 311 may convert the frame rate of the video steam 305 to a different frame rate while preserving the start time for each new video frame 204

created and calculating a new duration for each video frame 204. The capture tool 311 may be implemented using software that writes DV/ Audio Video Interleave (AVI) files together with a direct connection such as an Institute of Electrical and Electronic Engineers (IEEE) 1394 interface. The IEEE-1394 interface may be connected to an IEEE-1394 connection port on a digital camcorder and connected to an IEEE-1394 connection port on the computer 302 to facilitate the transfer of the video stream 305, generated by digital video camera 306, to the computer 302 for storage. Although the capture tool 311 is described as capturing a video stream 305, it is contemplated that audio information (i.e., audio stream) that corresponds to a particular video file 202 may also be captured. Thus, as used herein, the discussion relating to video is applicable to both video and audio information.

[0024] The MEA 304 allows a user to archive captured videos and photographs in a digital format, and allows a user to add animation or special effects to selected video and/or photograph files. More specifically, the MEA 304 in the illustrated embodiment provides a graphical user interface (UI) 320 that allows the user to apply a selected video effect to selected video shots, video frames, and/or still photographs to create a video effect clip file (video effect clip) 340. For example, the user uses the UI 320 to designate a video effect such as photo collage effect to apply to selected video files 202 to create a photo collage clip 350 such as shown in FIG. 3B. In this example, the three rectangles 352, 354, and 356 could each display a different photo or video. In other words, rather than manually adding video files 202 to various video tracks as described above in reference to FIG. 1, embodiments of the MEA 304 of the invention provide a user interface that allows the user to select photos and/or videos and to designate a video effect (e.g., a collage) to apply to selected video and/or photograph files. As a result, creating such video effect clips is easier, less time consuming, and, thus more enjoyable to the user.

[0025] The exemplary operating environment illustrated in FIG. 3A includes a general purpose computing device (e.g., computing device 302) such as a computer executing computer-executable instructions. The computing device typically has at least some form of computer readable media (e.g., computer-readable medium 313). Computer readable media, which include both volatile and nonvolatile video,

removable and non-removable video, may be any available medium that may be accessed by the general purpose computing device. By way of example and not limitation, computer readable medias comprise computer storage video and communication video. Computer storage video include volatile and nonvolatile, removable and non-removable video implemented in any method or technology for storage of information such as computer readable instructions, data structures, program modules or other data. Communication video typically embody computer readable instructions, data structures, program modules, or other data in a modulated data signal such as a carrier wave or other transport mechanism and include any information delivery video. Those skilled in the art are familiar with the modulated data signal, which has one or more of its characteristics set or changed in such a manner as to encode information in the signal. Wired video, such as a wired network or direct-wired connection, and wireless video, such as acoustic, RF, infrared, and other wireless video, are examples of communication video. Combinations of any of the above are also included within the scope of computer readable media. The computing device includes or has access to computer storage video in the form of removable and/or non-removable, volatile and/or nonvolatile memory. A user may enter commands and information into the computing device through an input device 330 or user interface selection devices such as a keyboard (e.g., wired or wireless) and a pointing device (e.g., a mouse, trackball, pen, or touch pad). Other input devices (not shown) may be connected to the computing device. The computing device may operate in a networked environment using logical connections to one or more remote computers.

[0026] Although described in connection with an exemplary computing system environment, aspects of the invention are operational with numerous other general purpose or special purpose computing system environments or configurations. The computing system environment is not intended to suggest any limitation as to the scope of use or functionality of aspects of the invention. Moreover, the computing system environment should not be interpreted as having any dependency or requirement relating to any one or combination of components illustrated in the exemplary operating environment. Examples of well known computing systems,

environments, and/or configurations that may be suitable for use in embodiments of the invention include, but are not limited to, personal computers, server computers, hand-held or laptop devices, multiprocessor systems, microprocessor-based systems, set top boxes, programmable consumer electronics, mobile telephones, network PCs, minicomputers, mainframe computers, distributed computing environments that include any of the above systems or devices, and the like.

[0027] Embodiments of the invention may be described in the general context of computer-executable instructions, such as program modules, executed by one or more computers or other devices. Generally, program modules include, but are not limited to, routines, programs, objects, components, and data structures that perform particular tasks or implement particular abstract data types. Aspects of the invention may also be practiced in distributed computing environments where tasks are performed by remote processing devices that are linked through a communications network. In a distributed computing environment, program modules may be located in both local and remote computer storage video including memory storage devices.

[0028] Referring now to FIG. 4, an exemplary block diagram illustrates basic components of a MEA 400 (e.g., MEA 304) for implementing aspects of the invention. Although it is contemplated that aspects of the invention can be used to create video effect clips 340 for at least each of the three fundamental levels of the video file 202 and or still images, as described above in reference to FIG. 2, for purposes of illustration aspects of the invention are described herein as being used to create video effect clips 340 that include one or more video files 202.

[0029] A detection component 402 searches a memory (e.g., 312) associated with the computer 302 to detect video files supported by the MEA 400. For example, the detection component 402 searches video files 202 stored in memory 312 to detect video files 202 that have a file extension that corresponds to a video file type that can be processed by the MEA 400. The detection component 402 assigns a display position to each of the detected video files 202. As explained in more detail in reference to FIGS. 6A-6C below, the assigned display position determines, in part, the position and/or the sequence a particular video file 202 will

be displayed to the user during playback of the video effect clip 340. The display position may be determined based on the order in which the video file 202 is detected or based on metadata included in the video file (e.g., date, size, etc.). For example, consider the detection component 402 detects two video files 202 during the search of the memory 312. In one aspect of the invention, the detection component 402 parses metadata included in each of the two video files 202 to identify time data such as a start time of the record operation for each video file 202. Thereafter, the detection component 402 assigns a display position to each of the detected video files 202 as a function of their identified start time.

[0030] A user interface (UI) component 404 is responsive to the detection component 402 to display the detected video files 202 and a menu displaying various video effects. More specifically, the UI component 404 displays a graphical user interface to the user via a display (e.g., display 221) that allows the user to view and select compatible video files 202 and to view and select a desired a video effect from the menu to apply to the selected video files 202 to create an video effect clip 340. The user interface component 404 is responsive to user input to display and/or modify the properties of a created video effect clip 340. For example, as explained in more detail below in reference to FIG. 5B, the user can interact with the graphical user interface to view and/or modify various properties of video effect clip (e.g., number video files, display position, background type, and border color).

[0031] A generation component 406 is responsive to the user selecting one or more of the detected video files 202 and a desired video effect, being displayed by the user interface component 404, to apply the selected desired video effect to the selected video files 202 to create the video effect clip 340. The generation component 406 is further responsive to the user modifying one or more properties of the video effect clip 340 to modify the video effect accordingly. Thereafter, the UI component 404 is responsive to input from the user (e.g., user selects a play option) to play the video effect clip 340 where each of the selected video files 202 in the video effect clip 340 are displayed based on their assigned display position via the graphical user interface 320.

[0032] Referring now to FIG. 5A, a screen shot illustrates an exemplary graphical user interface 500 for allowing the user to view and select compatible video files 202 and to select a desired video effect to apply to the one or more selected video files 202. In this particular embodiment, the graphical user interface 500 provides a video effects menu 502 and a storyboard window 504 for creating the video effect clip 340. The video effects menu 502 displays various video effects that can be applied to the one or more selected video files 202 to create the video effect clip 340. A user uses the storyboard window 504 to create the video effect clip 340 by adding one or more video effects from the menu 502 to a timeline 506 within the storyboard window 504. For example, the user performs a drag and drop operation to add a particular video effect 507 from the menu 502 to the timeline 506. As known to those skilled in the art, a drag and drop operation refers to a user's ability to perform operations in a graphical user interface by dragging objects on a screen with a mouse from a first location to a second location. In this example, the user selects a photo collage effect 507 from the menu 502 to add to the timeline 506 and drags the selected photo collage effect 507 to a particular location on the timeline 506 where the user would like to incorporate the photo collage effect 507 into the video effect clip 340. Notably, more than one video effect can be added to a particular a particular location on the timeline 506. A video effect icon 508 is responsive to user input (e.g., mouse click) to display a video effect properties menu 510 that allows the user to view and/or modify video effects applied to the video clip 340, video files included in the video effect clip 340, and other video effect clip properties.

[0033] Referring now to FIG. 5B, a block diagram illustrates components of an exemplary video effect properties menu 510 for viewing and/or modifying properties of a video effect clip 340 according to one aspect of the invention. A list box 512 displays a list of video files 202 detected by the detection component 402 (see FIG. 4). As described above in reference to FIG. 4, the detection component 402 assigns the display position to each of the detected video files 202 based on the order in which the video file 202 is detected or based on metadata included in the video file 202 (e.g., date, size, etc.). The following Table 1 illustrates a list of

video files 202 selected to include in a video effect clip 340, and there assigned display positions.

DISPLAY POSITION	FILE NAME
1	VIDEO FILE B
2	VIDEO FILE C
3	VIDEO FILE D
4	VIDEO FILE A
5	VIDEO FILE E
6	VIDEO FILE F
7	VIDEO FILE G
8	VIDEO FILE H

TABLE 1

[0034] An add control 514 is responsive to user input to add one or more selected video files listed in the list box 512 to the video effect clip 340. For example, the user uses the input device 330 (e.g., mouse or keyboard) to select a video file 202 displayed in the list box 512, and then uses the mouse or keyboard to select the add control 514 to add the selected video file 202 to the video effect clip 340. According to one aspect of the invention, the order in which the video files 202 are added to the video effect clip 340 also determines the order each of the video files 202 will be displayed when viewing the video effect clip 340 during playback. For example, video file B corresponds to the first video file added to video effect clip 340 and is assigned position one (1) in Table 1, and will be the first video file 202 displayed when viewing the video effect clip 340. Video file C corresponds to the second video file 202 added to video effect clip 340 and is assigned position two (2), and will be the second video file 202 displayed when viewing the video effect clip 340. In contrast, video file H will be the last video file 202 (e.g., assigned position 8) displayed when viewing the video effect clip 340.

[0035] An import control 516 is responsive to user input to include video files 202 in a video effect clip 340 that are not displayed in the list box 512. That is, the import control 516 allows a user to import video files 202 stored on a remote CRM 307 or removable CRM, such as a DVD, and to display the file name of the

additional file in the list box 512. Thereafter, imported video files 202 can be selected as described above to include in the video effect clip 340.

[0036] Up and down position controls 518, 520 are responsive user input to change the assigned position of the files so that the order video files 202 are displayed when viewing the video effect clip 340 can be controlled. For example, the user selects a particular video file 202 from the list of video files 202 displayed in the list box 512 by positioning the mouse cursor over that particular video file 202 and right clicking the mouse. The selected video file 202 is highlighted, and the user can move the video file 202 upward in list by selecting the up position control 518 or downward in the list by selecting the down position control 520. The video effect properties menu 510 includes a remove control 522 for removing one or more video files from inclusion in the video effect clip. For example, the user uses the mouse or keyboard to select a video file displayed in the list box 502 and then uses the mouse or keyboard for selecting the remove control 522 to remove the selected video file from the video effect clip 340.

[0037] An apply control 524 is responsive to user input to apply the selected video effect to the one or more selected video files 202 to create the video effect clip 340. Thereafter, the user can select a storage control (not shown) to burn a created animated clip to a DVD, or to store the created video effect clip in a local CRM (e.g., CRM 313) or a remote CRM (e.g., 307). The properties menu 510 may also include a splitting control (not shown) that can be used to split an video effect clip into two animated clips of equal duration, and each effect would retain the full set of clips. For example, if a 30 second effect had 10 clips, splitting the clip would result in two effects 15 second effects with 10 clips each.

[0038] A background control 526 allows the user to specify a background for the video effect clip. For example, the background can be a specific color, no color (i.e., transparent or none), or a video file. A border control 528 allows the user to specify the size and color a border to apply around the video effect clip 340. A cancel control 530 is responsive to user input to remove the properties menu 510 from the display. Notably, the properties menu 510 being displayed may contain

unique properties for the selected video effect clip 340. For example, a cube effect may only allow a maximum of six (6) video files to be added.

[0039] Referring now to FIG. 5C, a screen shot illustrates the exemplary graphical user interface 500 being used to add a video effect to an existing video clip or photo on a timeline 506, rather than adding the video effect directly to the storyboard 504 as described above in reference to FIG. 5A. In this case, the existing video file 202 on the storyboard 504 will be displayed as the background of the video effect clip 340. For example, if the user selects the photo collage effect 507 from the video effects menu 502, and adds the photo collage effect to an existing video file 202 showing a birthday cake, as indicated by 534, the video of the birthday cake appears in the background of the photos an/or videos added to the photo collage effect 507. As described above, clicking the effects icon 703 allows the user to view the various video effects applied to the video effect clip 340 and the properties menu 510.

[0040] Referring now to FIGS 5A and 5C, the exemplary graphical user interface 500 further includes a playback window 538 for playing the video effect clip 340. A playback control 532 controls the playback of the video effect clip 340. More specifically, the playback control 532 allows a user to stop, play/pause, rewind, or fast forward a video effect clip 510 in the playback window 530. By default, the duration of the playback the video effect clip 340 is based on the duration of the content (e.g., video files, photo) within the video effect clip 340. Notably, some video effect clips 340 may have a custom duration property that can be adjusted by the user via the properties menu, and, thus, allowing the user to specify a specific duration value. In the absence of such a property, or the user adjusting such a property, the duration of the video effect clip 340 will be intelligently and automatically adjusted based on the type of video effects added and the number of elements (e.g., photos and video files) added to the video effect clip 340. For example, if the user adds a photo stack video effect (see FIG. 3B) and adds three photos to the video effect, by default the duration the video effect will total fifteen (15) seconds, five (5) seconds per photo added to the effect. If the user were to modify the properties of video effect clip 340 by, for example, adding

three (3) additional photos, the duration of the video effect clip 340 would then be thirty (30) seconds. As a result, the user is not required to modify elements on the storyboard or timeline when adding or removing elements to the video effect clip 340. For example, without this support, if the video effect clip 340 includes six photos, each having a playback duration of five (5) seconds, and three of the photos are removed, the remaining three photos would still playback over a duration of thirty (30) seconds. As a result, each photo is shown for longer period of time, which could adversely impact how the user visualizes the video effect clip 340. However, the present invention allows the user to automatically adjust the duration without impacting the speed of the video effect clip 340. If a video effect is added to a video file 202 as described above in reference to FIG. 5C, the duration of the video effect clip 340 will be based on the duration of the video to which it is added. However, the video effect clip 340 will continue to be intelligent and ensure that the video is displayed correctly. For example, if the background video is only 30 seconds long, and the user adds 10 photos, the photos will be arranged so they will be displayed for 5 seconds each. Notably, it is contemplated that video effect clips 340 can be configured to allow the user to determine the duration of the effect or the speed of the effect.

[0041] FIGS. 6A, 6B, and 6C illustrate various video effect that can be applied to the selected video files 202 shown in Table 1 to create a video effect clip 340. FIG. 6A illustrates a moving collage effect 602. As shown in FIG. 6A, video file B, which is assigned position 1, is displayed in a larger animation window 604, and the remaining video files C, D, A, E, F, G, and H are displayed via a plurality of smaller animation windows 606 that each move from right to left, as indicated by arrow 608, across the larger animation window 604 according to their assigned position. FIG. 6B illustrates a rotating cube effect 607. In this example, the video file B is displayed in the larger animation window 604, and the remaining video files are displayed via a three dimensional rotating cube 609 within the larger animation window 604. FIG. 6C illustrates a picture in picture effect 610. In this case, only two video files 202 are displayed on the screen at the same time. For example, the video file B is displayed in the larger window 604, and video file C

(assigned position 2) is displayed in the smaller animation window 606 within the larger animation window 604. Similarly, video file D (assigned position 3) will be displayed in the larger window 604, and the video file A (assigned position 4) will be displayed in the smaller window 606 within the larger window 604. This process continues until all the video files have been displayed.

[0042] Referring now to FIG. 7, an exemplary flow chart illustrates a method for creating a video effect clip 340 according to one aspect of the invention. The MEA displays a video effects menu 502 that includes various video effects and displays a storyboard window at 702. At 704, the MEA creates a video effect clip in response to the user adding a video effect from the menu 502 to the storyboard window 504. For example, as described above in reference to FIG. 4, the user can add the video effect to the storyboard window 504 by dragging and dropping the video effect on a timeline 506 in the storyboard window 504. After one or more the video effects have been added to the storyboard window 504, the MEA is responsive to user input to display a properties menu 510 that displays properties associated with each video effect clip 340 at 706. For example, the MEA is responsive to the user clicking on the video effects icon 508 associated with a particular video effect clip 340 to display a properties menu 510 that allows the user selectively modify properties of that particular video effect clip 340. The user selectively modifies properties of the video effect clip at 708. For example, the user uses the properties menu 510 to add video files 202 to the video effect clip 340, remove video files 202 from the video effect clip 340, re-assign display positions of video files included in the video effect clip, select the background of the video effect clip 340, and select the border color of the video effect clip 340. The MEA is responsive to the user modifications, to apply any property changes (e.g., add photos or video files, background, border) to the video effect clip at 710. At 712, the MEA plays the video effect clip 340 in the preview window 538 in response to input from the user.

[0043] The order of execution or performance of the operations in embodiments of the invention illustrated and described herein is not essential, unless otherwise specified. That is, the operations may be performed in any order, unless otherwise specified, and embodiments of the invention may include additional or fewer

operations than those disclosed herein. For example, it is contemplated that executing or performing a particular operation before, contemporaneously with, or after another operation is within the scope of aspects of the invention.

[0044] Embodiments of the invention may be implemented with computer-executable instructions. The computer-executable instructions may be organized into one or more computer-executable components or modules. Aspects of the invention may be implemented with any number and organization of such components or modules. For example, aspects of the invention are not limited to the specific computer-executable instructions or the specific components or modules illustrated in the figures and described herein. Other embodiments of the invention may include different computer-executable instructions or components having more or less functionality than illustrated and described herein.

[0045] When introducing elements of aspects of the invention or the embodiments thereof, the articles "a," "an," "the," and "said" are intended to mean that there are one or more of the elements. The terms "comprising," "including," and "having" are intended to be inclusive and mean that there may be additional elements other than the listed elements.

[0046] As various changes could be made in the above constructions, products, and methods without departing from the scope of aspects of the invention, it is intended that all matter contained in the above description and shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

CLAIMS

What is claimed is:

1. One or more computer-readable media having computer executable components executed by a computing device (302) for displaying a plurality of video files 202, said computer-readable media comprising:

a detection component (402) for detecting video files (202) stored in a memory 312;

a user interface (UI) component (404) for displaying a plurality of video effects and detected video files (202); and

a generation component (406) responsive to user input selecting a desired video effect from the plurality of video effects and selecting one or more of video files (202) from the detected video files (202) to which the selected video effect is applied to create a video effect clip (340), and wherein the UI component (404) displays the created video effect clip (340) via a graphical display (321).

2. The computer-readable media of claim 1, wherein the UI component (404) displays the detected video files (202) via a properties menu (510) and displays the plurality of video effects via a video effects menu (502) , and wherein the generation component (406) is responsive to user input selecting the desired video effect from the video effect menu (502) and selecting one or more video files (202) from the properties menu (510) to apply the desired video effect to the selected one or more video files (202) to create the video effect clip (340).

3. The computer-readable media of claim 2, wherein the UI component (404) displays a video effect icon (508) corresponding to the created video effect clip (340), and wherein said video effect icon (508) is responsive to user input to display the video effect applied to the video effect clip (340) and to display the properties menu (510).

4. The computer-readable media of claim 1, wherein UI component (404) further displays:

a background control (526) responsive to user input specifying a desired background to apply the desired background to the video effect clip (340), wherein

specifying a desired background includes specifying a color, no color, or a video file (202) to display in a background of the video effect clip (340); and

a border control (528) responsive to user input specifying a desired border to apply the desired border to the video effect clip (340), wherein specifying a desired border includes specifying a desired border color, a desired border size, or both to apply to the video effect clip (340).

5. The computer-readable media of claim 1, wherein the detection component (402) assigns a display position to each of the detected video files (202), and wherein the UI component (404) displays each of the detected video files (202) in a list of detected video files (202) according to their assigned display position and displays each of the selected video files (202) in the video effect clip (340) according to their assigned display position.

6. The computer-readable media of claim 5, wherein the detection component (402) assigns the display position to each of the detected video files (202) based on the order in which the video file is detected in the memory (312).

7. The computer-readable media of claim 5, wherein the detection component (402) assigns the display position to each of the detected video files (202) based on recording time information included in metadata associated with the detected video file (202).

8. The computer-readable media of claim 5, wherein the UI component (404) displays a position control (518, 520) responsive to user input for re-assigning display positions to selected video files (202) in the list of detected video files (202), and wherein the UI component (404) displays each of the detected video files (202) in a list of detected video files (202) according to their re-assigned display position and displays each of the selected video files (202) in the according to their re-assigned display position.

9. The computer-readable media of claim 5, wherein the UI component (404) displays an add control (514) responsive to user input to add the selected video file (202) to the video effect clip (340), and wherein the detection component (402) assigns the display position to each of the selected video files (202) based on the order the selected video file (202) is added to the video effect clip (340).

10. The computer-readable media of claim 9, wherein the UI component (404) displays an import control (516) responsive to user input to add an additional video file (202) from a remote memory (312) to the list of detected video files (202), and wherein add control (514) responsive to user input selecting the additional video file (202) to add the selected additional video file (202) to the video effect clip (340), and wherein the UI component (404) assigns a display position to the additional video file (202) based on the order in which the additional video file (202) is added to the video effect clip (340).

11. A computerized method for displaying a plurality of video files, said computerized method comprising:

detecting video files (202) stored in a memory (312);

displaying a plurality of video effects and the detected video files (202) via a graphical display (321);

identifying, in response to user input, a desired video effect from the plurality of video effects;

applying the desired video effect to one or more of the detected video files (202), selected by a user, to create the video effect clip (340); and

displaying the video effect clip (340) via the graphical display (321).

12. The computerized method of claim 11 further including assigning a display position to each of the detected video files (202), and wherein displaying the detected video files (202) includes displaying the detected video files (202) according to their assigned display position, and wherein displaying the video effect clip (340) includes displaying each of the selected one or more vide files in the video effect clip (340) according to their assigned display position.

13. The computerized method of claim 12, wherein the display position is assigned based on metadata included in each video file (202), or based on an order in which the video file (202) is detected.

14. The computerized method of claim 12 further including selectively re-assigning display positions for each of the selected video files (202) in response to user input, and wherein displaying the detected video files (202) includes displaying the detected video files (202) according to their re-assigned display

position, and wherein displaying the video effect clip (340) includes displaying each of the selected one or more video files (202) in the video effect clip (340) according to their re-assigned display position.

15. The computerized method of claim 12 further including generating a list of detected video files (202), wherein each of the detected video files (202) in the generated list are organized according to their assigned display position, and wherein displaying detected video files (202) includes displaying the generated list of detected video files (202) via the graphical display (321).

16. The computerized method of claim 15 further includes selectively importing additional video files (202) from a remote memory to add to the generated list of detected video files, and wherein each of the additional video files (202) are assigned a display position, and wherein each of the additional video files (202) in the generated list are organized according to their assigned display position.

17. The computerized method of claim 11 further includes:

displaying a background control (526) responsive to user input specifying a desired background to apply the desired background to the video effect clip (340), wherein specifying a desired background includes specifying a color, no color, or a video file (202) to display in a background of the video effect clip (340); and

displaying a border control (528) responsive to user input specifying a desired border to apply the desired border to the video effect clip (340), wherein specifying a desired border includes specifying a desired border color, a desired border size, or both to apply to the video effect clip (340).

18. A system for creating a video clip (206), said video clip (206) displaying a plurality of animated video files, said system comprising:

a processor (302) configured to execute computer-executable instructions to:

detect video files (202) stored in a memory (312);

display a list of detected video files (202) via a graphical display (321);

display a plurality of video effects via the graphical display (321);

identifying, in response to user input, a desired video effect from the plurality of video effects and one or more desired video files (202) from the list of detected video files (202); and

apply the desired video effect to the one or more desired video files (202) to create a video effect clip (340); and

an interface (320) configured to display the video effect clip (340).

19. The system of claim 18, wherein the processor (302) is further configured to execute computer-executable instructions to assign a display position to each of the detected video files (202), and wherein the interface (320) is further configured to display each of the selected video files (202) in the video effect clip (340) as a function of their assigned display position.

20. The system of claim 19, wherein the processor (302) is further configured to execute computer-executable instructions to import additional video files (202) from a remote memory to add to the list of detected video files (202), and wherein processor (302) assigns a display position to each of the additional video files (202) based on the order in which the additional video file (202) is added to the list of detected video files (202).

FIG. 1

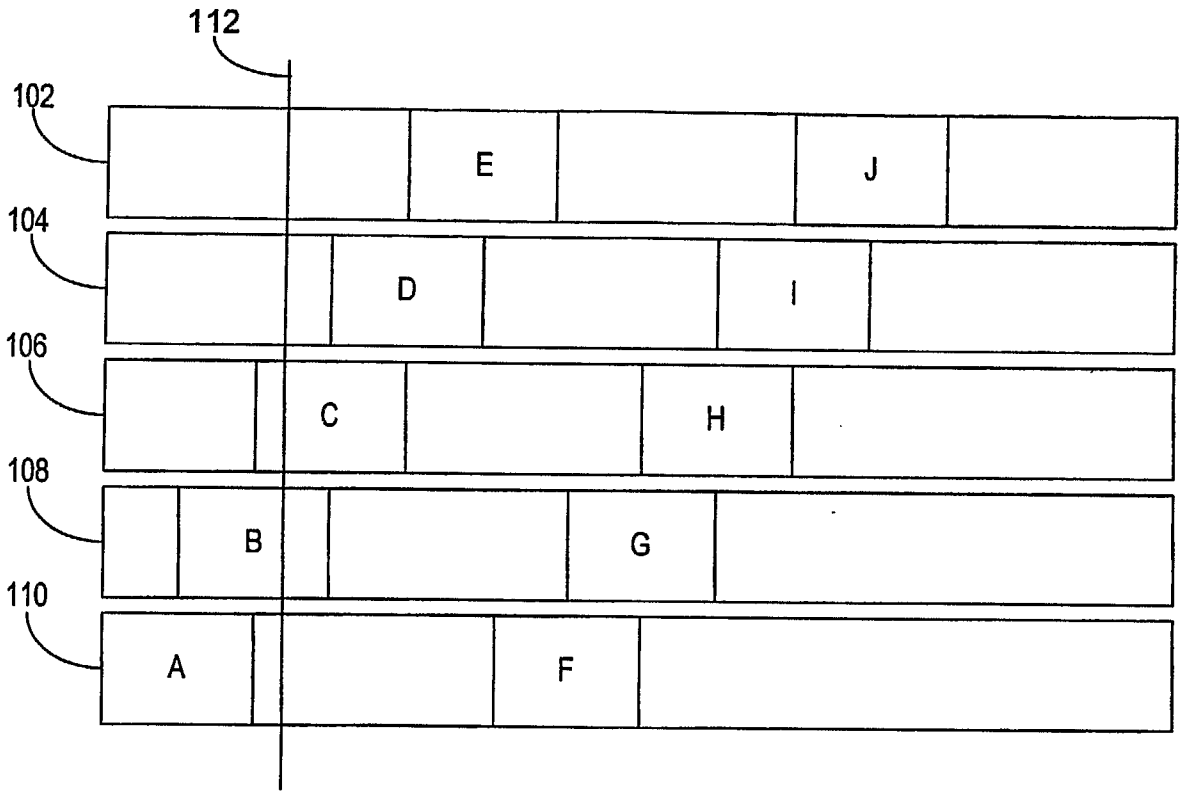


FIG. 2

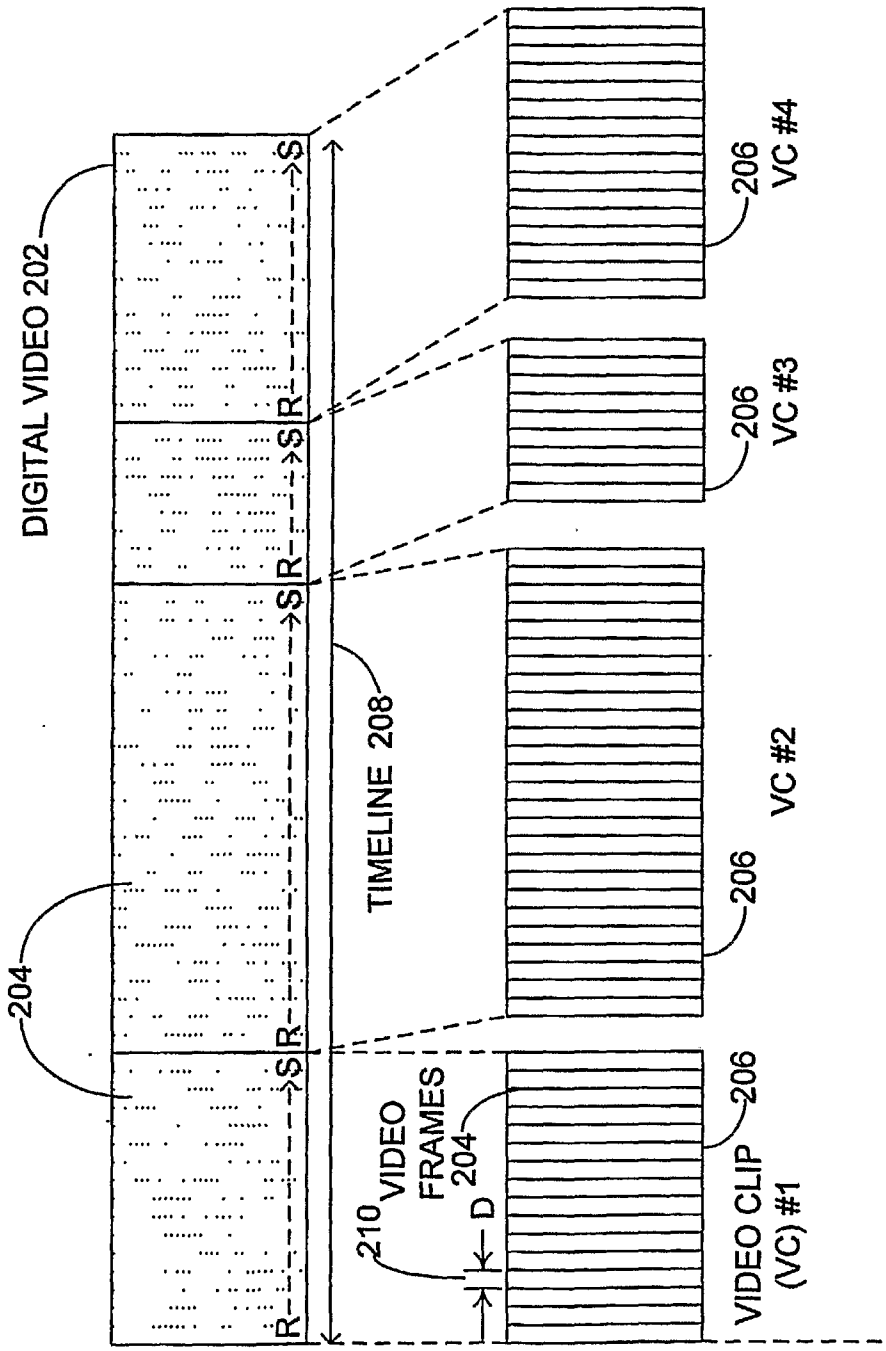

DIGITAL VIDEO 202
204
S
R
TIMELINE 208
VIDEO FRAMES 204
210
D
206
VC #4
VC #3
VC #2
VIDEO CLIP (VC) #1

FIG. 3A

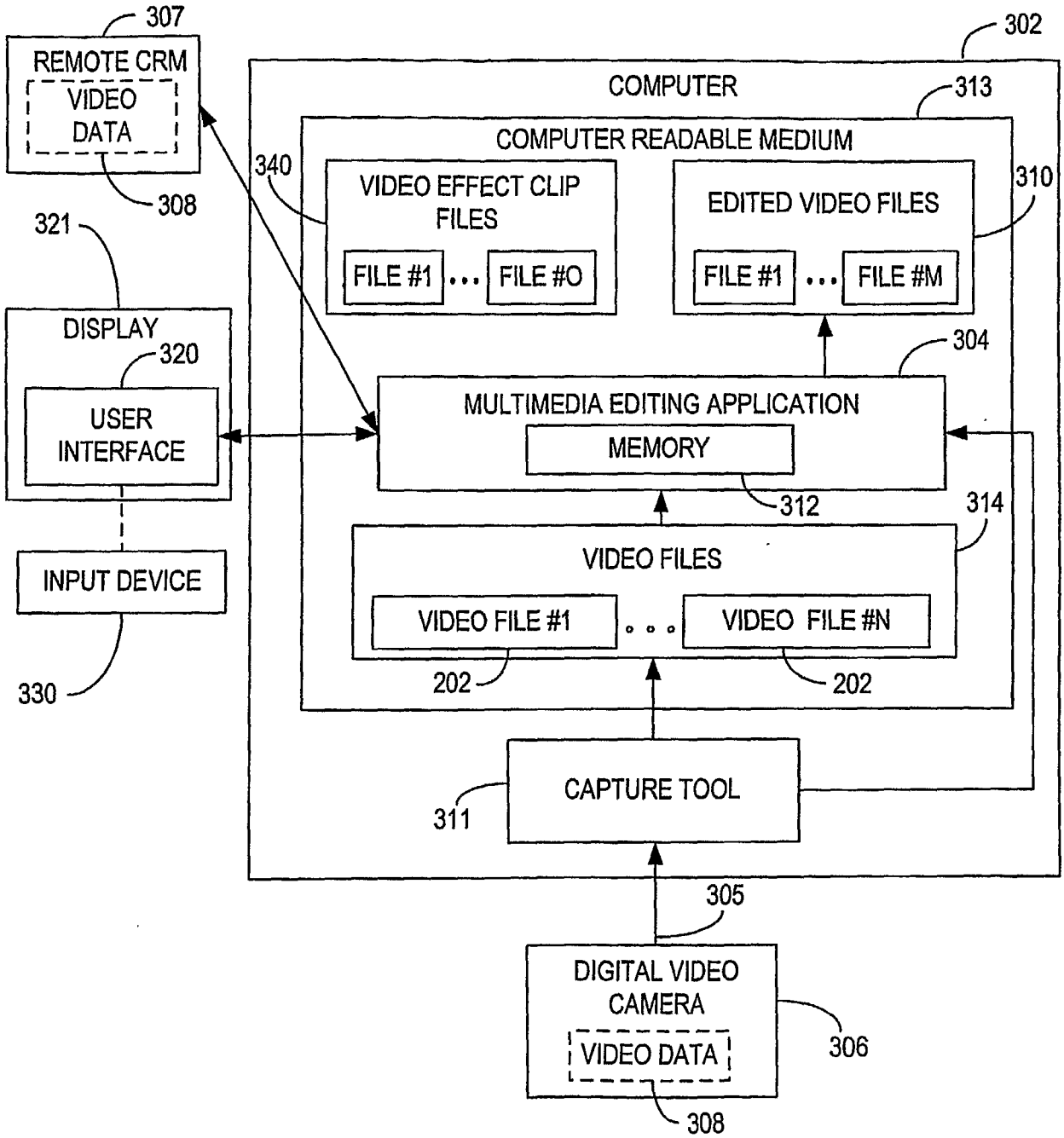

307
REMOTE CRM
VIDEO DATA
308
302
COMPUTER
313
COMPUTER READABLE MEDIUM
340
VIDEO EFFECT CLIP FILES
FILE #1 ... FILE #O
EDITED VIDEO FILES
310
FILE #1 ... FILE #M
321
DISPLAY
320
USER INTERFACE
304
MULTIMEDIA EDITING APPLICATION
MEMORY
312
314
VIDEO FILES
VIDEO FILE #1 . . . VIDEO FILE #N
202
202
INPUT DEVICE
330
CAPTURE TOOL
311
305
DIGITAL VIDEO CAMERA
VIDEO DATA
306
308

FIG. 3B

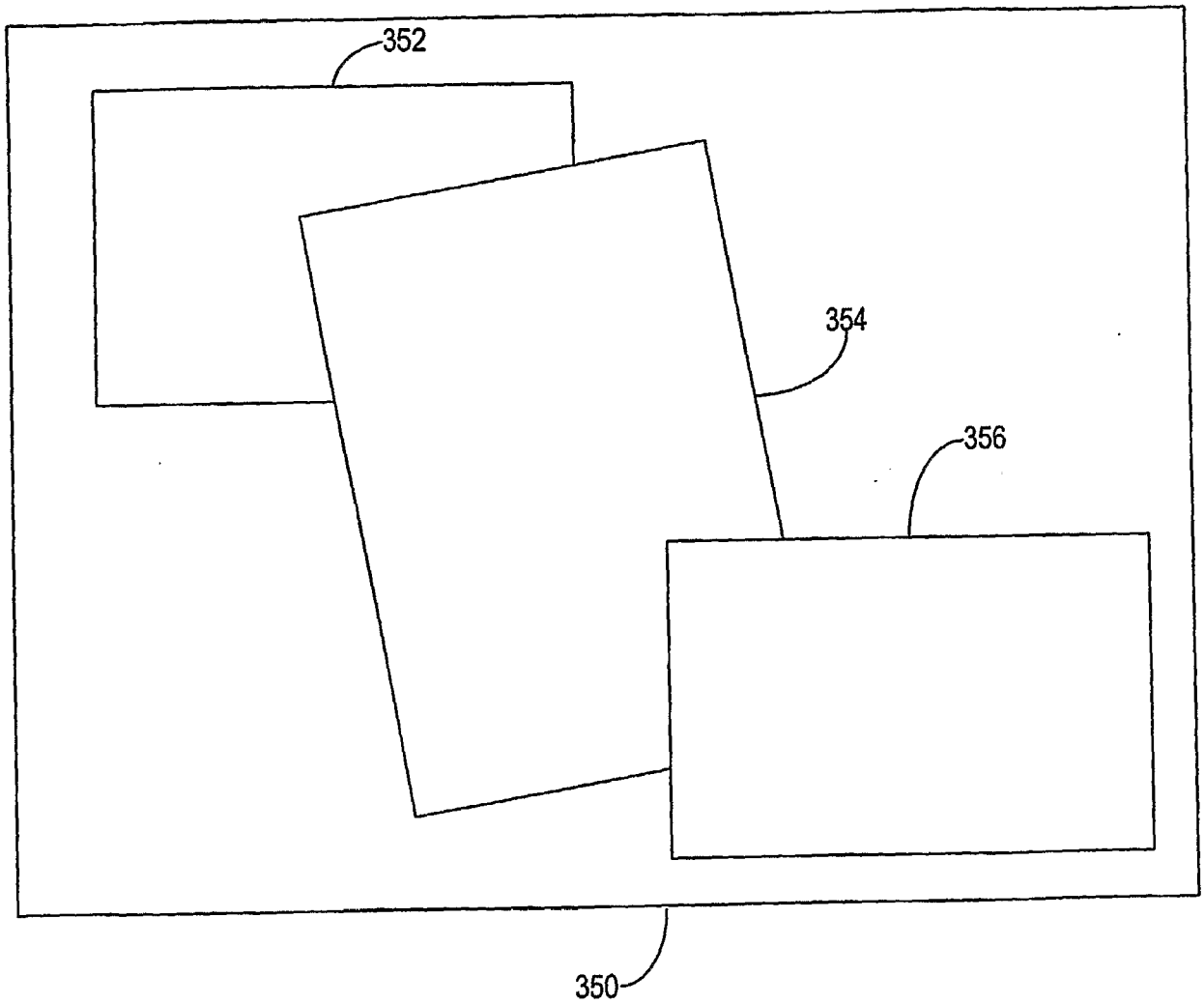


FIG. 4

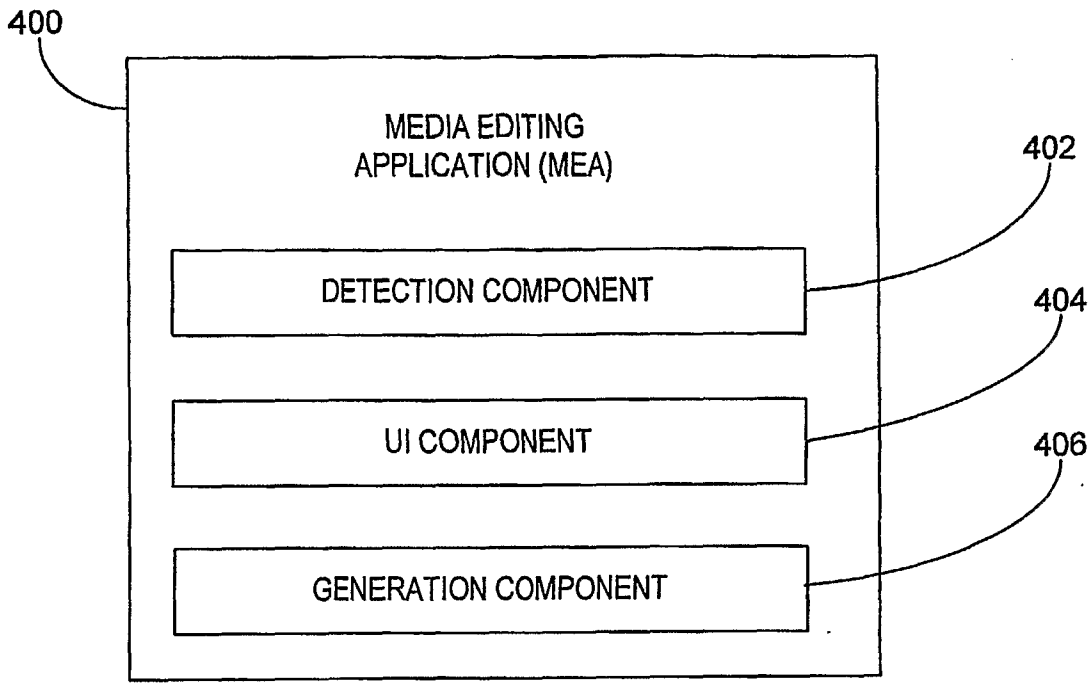

400
MEDIA EDITING
APPLICATION (MEA)
402
DETECTION COMPONENT
404
UI COMPONENT
406
GENERATION COMPONENT

FIG. 5A

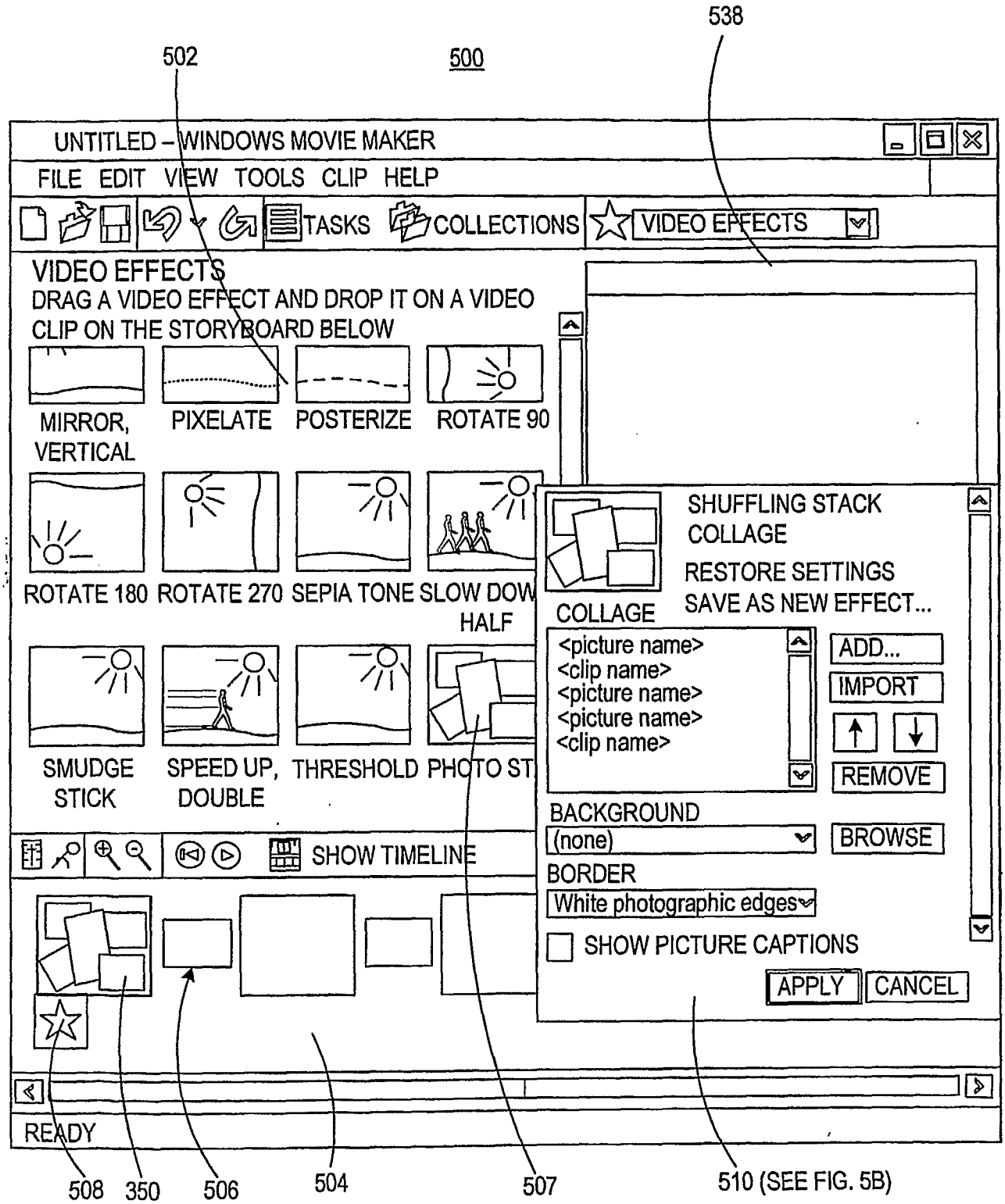

538
502
500
UNTITLED – WINDOWS MOVIE MAKER
FILE EDIT VIEW TOOLS CLIP HELP
TASKS
COLLECTIONS
VIDEO EFFECTS
VIDEO EFFECTS
DRAG A VIDEO EFFECT AND DROP IT ON A VIDEO CLIP ON THE STORYBOARD BELOW
MIRROR, VERTICAL
PIXELATE
POSTERIZE
ROTATE 90
ROTATE 180
ROTATE 270
SEPIA TONE
SLOW DOW HALF
SMUDGE STICK
SPEED UP, DOUBLE
THRESHOLD
PHOTO ST
SHOW TIMELINE
SHUFFLING STACK COLLAGE
RESTORE SETTINGS
SAVE AS NEW EFFECT...
COLLAGE
<picture name>
<clip name>
<picture name>
<picture name>
<clip name>
ADD...
IMPORT
REMOVE
BACKGROUND
(none)
BROWSE
BORDER
White photographic edges
SHOW PICTURE CAPTIONS
APPLY
CANCEL
READY
508
350
506
504
507
510 (SEE FIG. 5B)

FIG. 5B

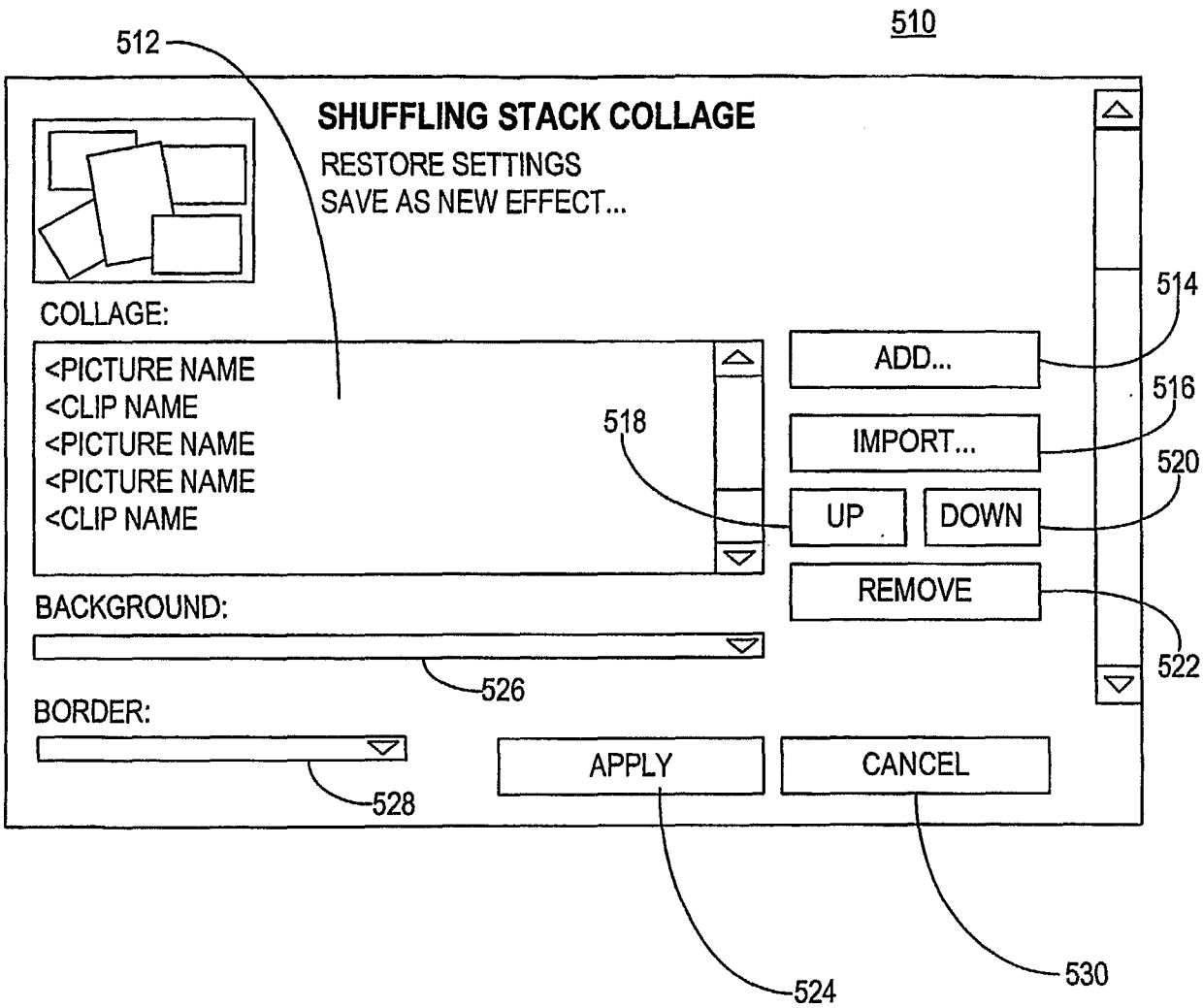

510
512
SHUFFLING STACK COLLAGE
RESTORE SETTINGS
SAVE AS NEW EFFECT...
COLLAGE:
<PICTURE NAME
<CLIP NAME
<PICTURE NAME
<PICTURE NAME
<CLIP NAME
518
ADD...
IMPORT...
UP
DOWN
REMOVE
514
516
520
522
BACKGROUND:
526
BORDER:
528
APPLY
CANCEL
524
530

FIG. 5C

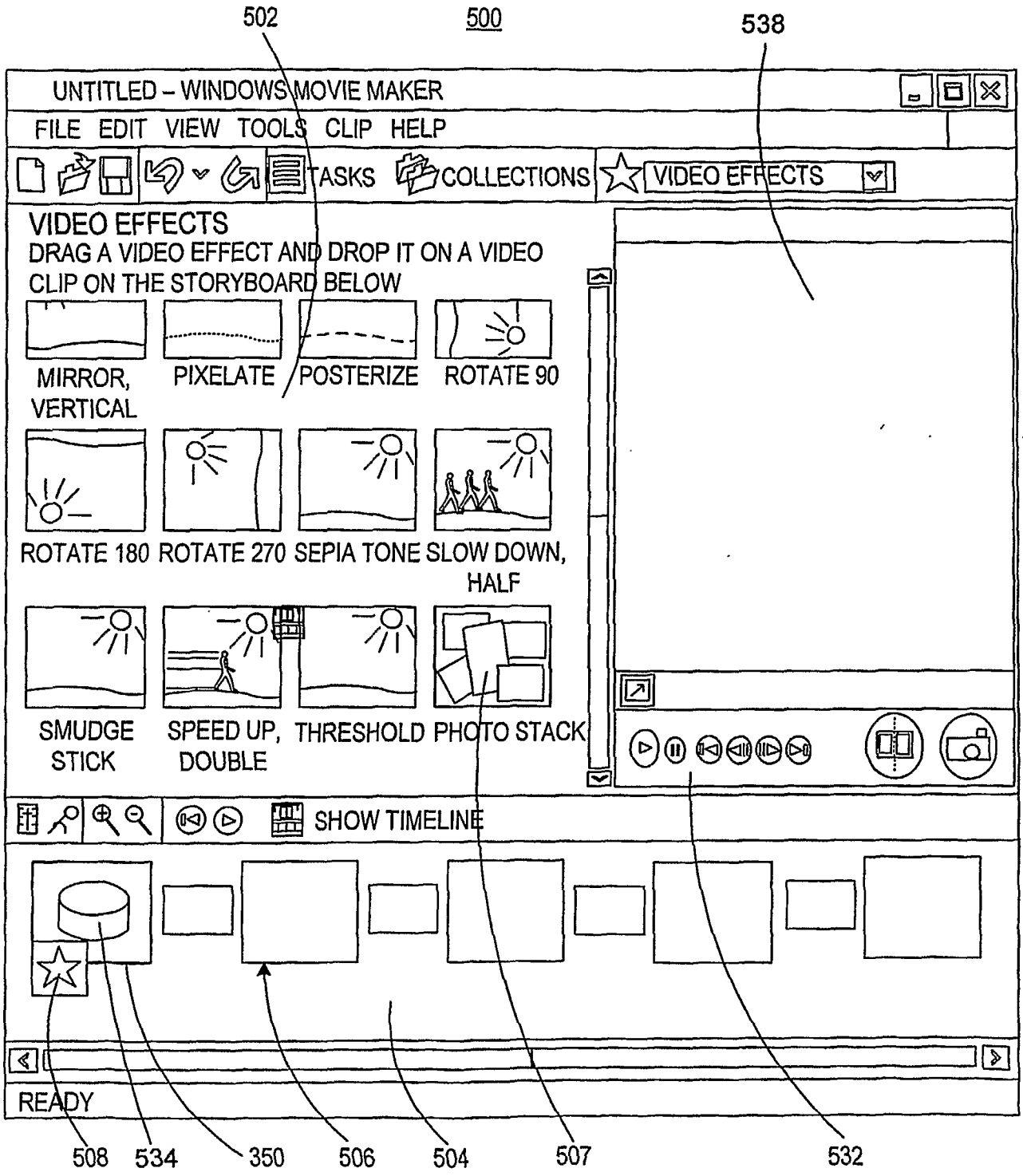

502
500
538
UNTITLED – WINDOWS MOVIE MAKER
FILE EDIT VIEW TOOLS CLIP HELP
TASKS
COLLECTIONS
VIDEO EFFECTS
VIDEO EFFECTS
DRAG A VIDEO EFFECT AND DROP IT ON A VIDEO CLIP ON THE STORYBOARD BELOW
MIRROR, VERTICAL
PIXELATE
POSTERIZE
ROTATE 90
ROTATE 180
ROTATE 270
SEPIA TONE
SLOW DOWN, HALF
SMUDGE STICK
SPEED UP, DOUBLE
THRESHOLD
PHOTO STACK
SHOW TIMELINE
READY
508
534
350
506
504
507
532

FIG. 6A

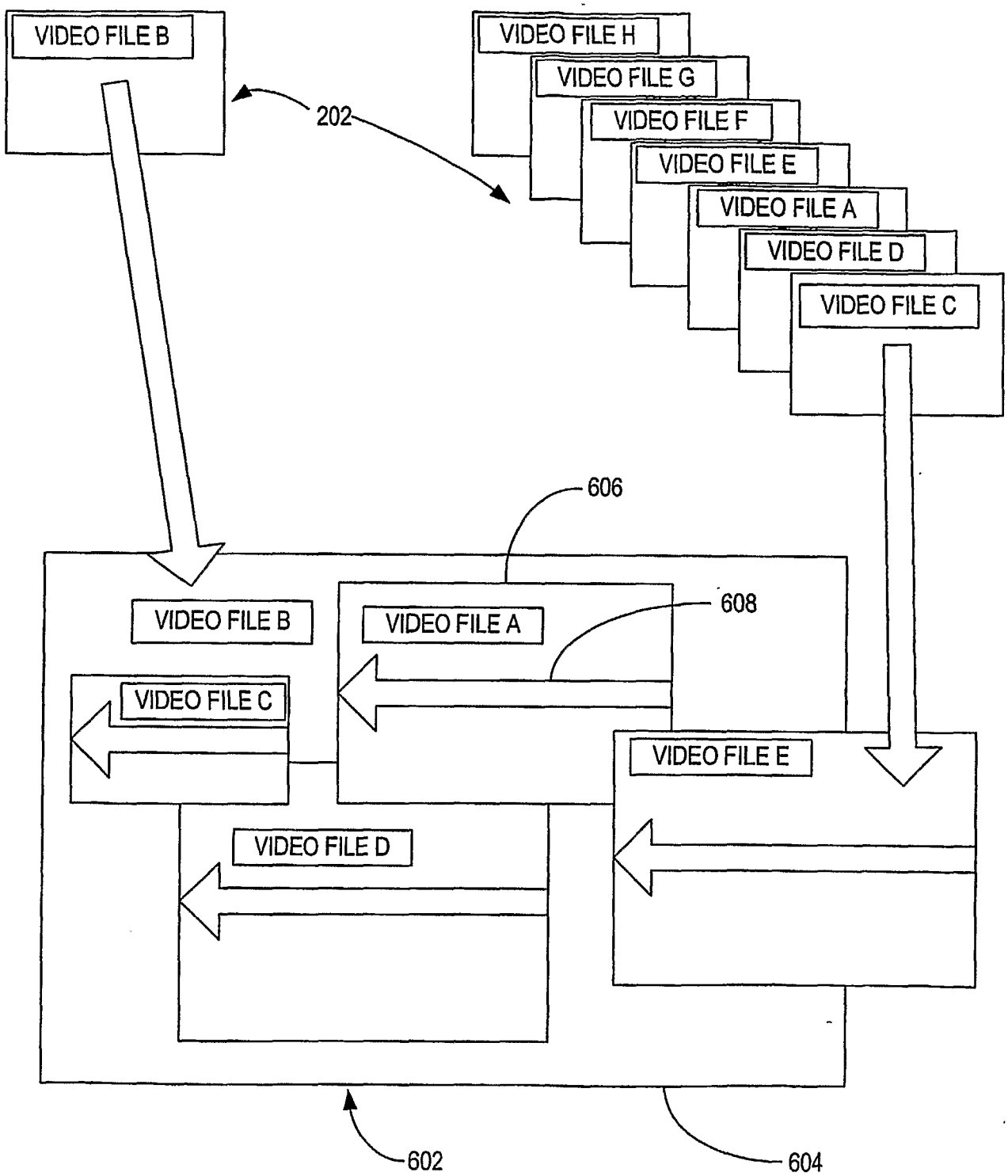

VIDEO FILE B
202
VIDEO FILE H
VIDEO FILE G
VIDEO FILE F
VIDEO FILE E
VIDEO FILE A
VIDEO FILE D
VIDEO FILE C
606
608
VIDEO FILE B
VIDEO FILE A
VIDEO FILE C
VIDEO FILE E
VIDEO FILE D
602
604

FIG. 6B

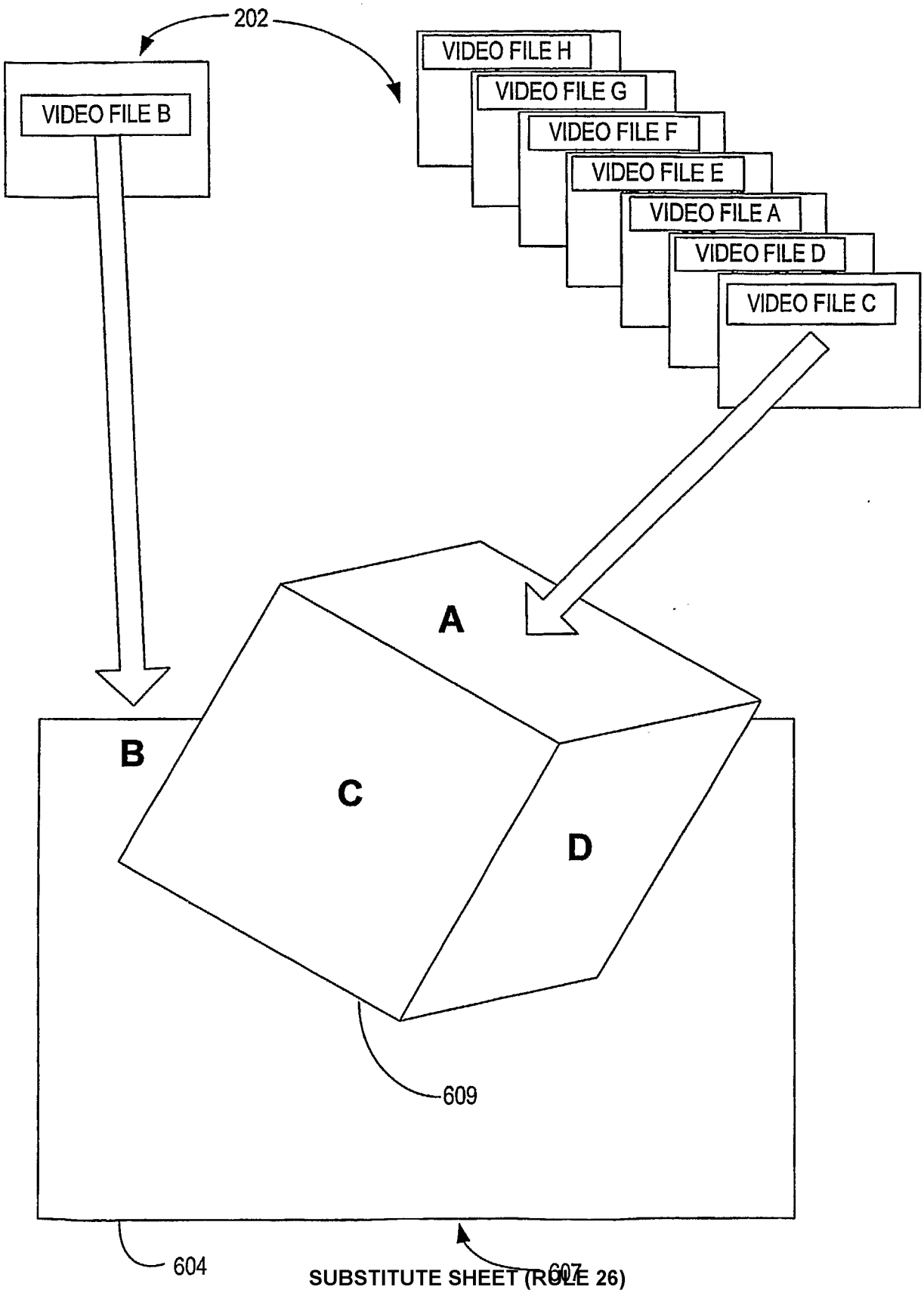

202
VIDEO FILE B
VIDEO FILE H
VIDEO FILE G
VIDEO FILE F
VIDEO FILE E
VIDEO FILE A
VIDEO FILE D
VIDEO FILE C
A
B
C
D
609
604
607

FIG. 6C

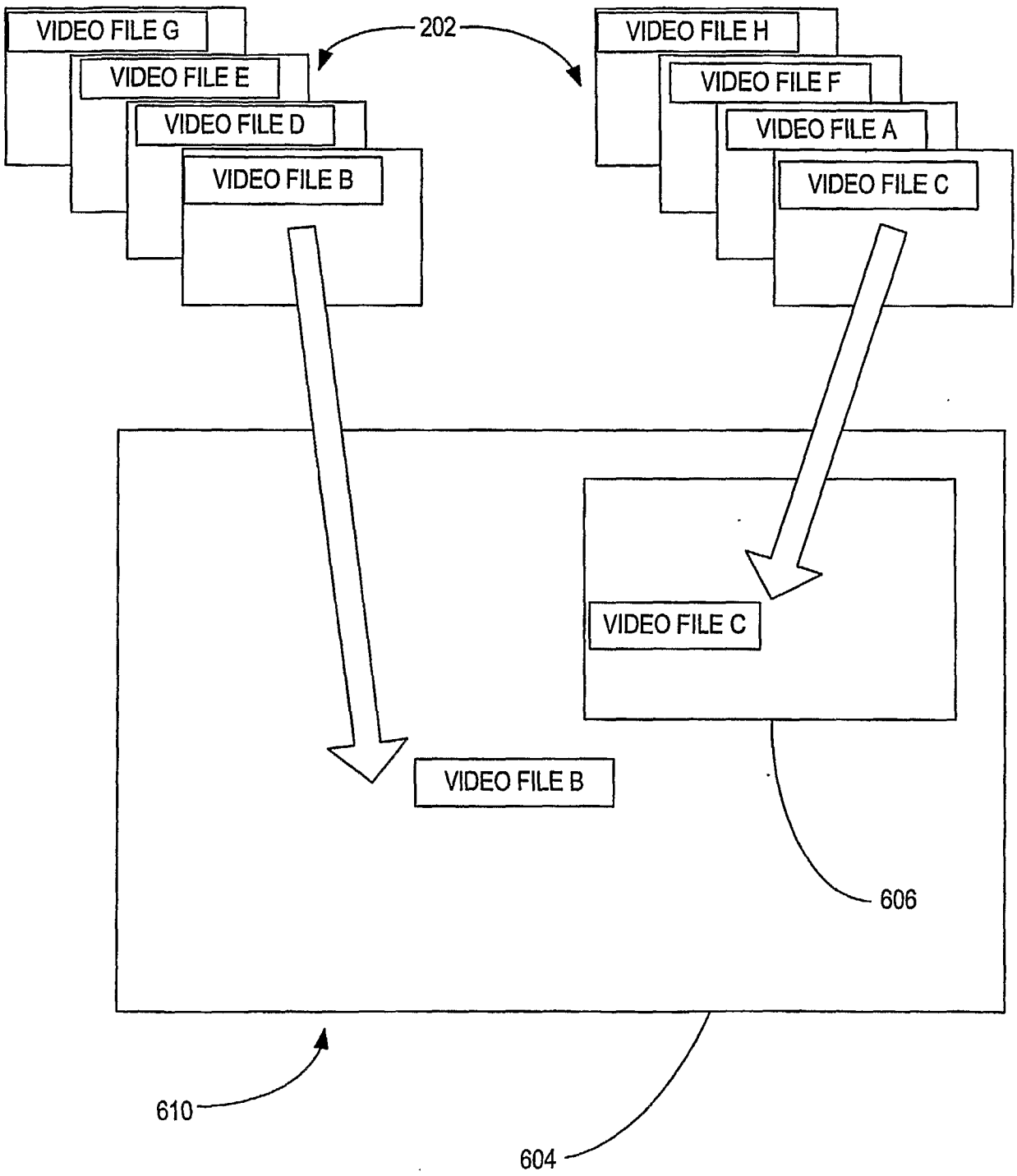
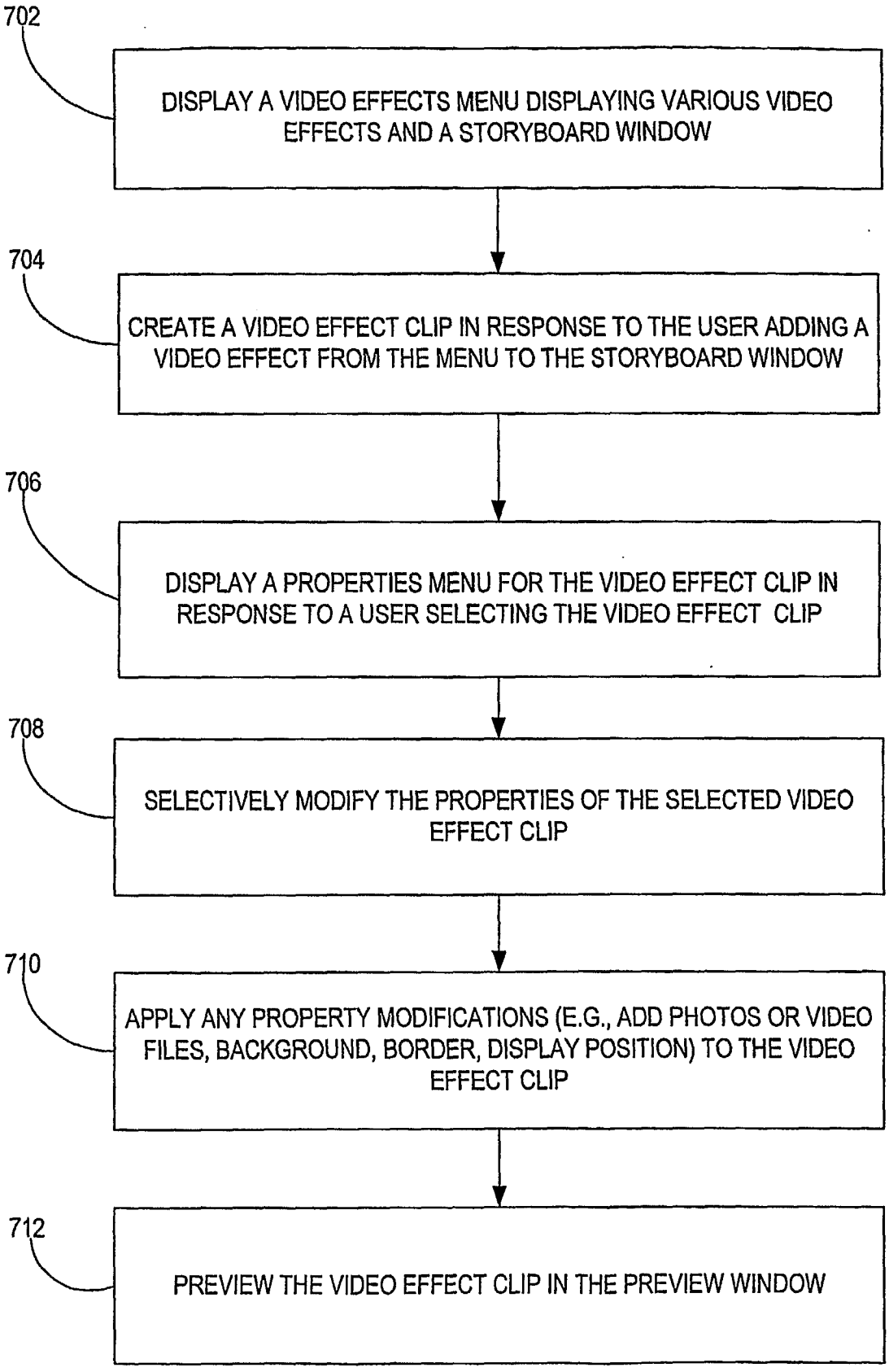

VIDEO FILE G
VIDEO FILE E
VIDEO FILE D
VIDEO FILE B
202
VIDEO FILE H
VIDEO FILE F
VIDEO FILE A
VIDEO FILE C
VIDEO FILE C
VIDEO FILE B
606
610
604

FIG. 7


702
DISPLAY A VIDEO EFFECTS MENU DISPLAYING VARIOUS VIDEO EFFECTS AND A STORYBOARD WINDOW
704
CREATE A VIDEO EFFECT CLIP IN RESPONSE TO THE USER ADDING A VIDEO EFFECT FROM THE MENU TO THE STORYBOARD WINDOW
706
DISPLAY A PROPERTIES MENU FOR THE VIDEO EFFECT CLIP IN RESPONSE TO A USER SELECTING THE VIDEO EFFECT CLIP
708
SELECTIVELY MODIFY THE PROPERTIES OF THE SELECTED VIDEO EFFECT CLIP
710
APPLY ANY PROPERTY MODIFICATIONS (E.G., ADD PHOTOS OR VIDEO FILES, BACKGROUND, BORDER, DISPLAY POSITION) TO THE VIDEO EFFECT CLIP
712
PREVIEW THE VIDEO EFFECT CLIP IN THE PREVIEW WINDOW

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2006/038465

A. CLASSIFICATION OF SUBJECT MATTER

H04N 5/445(2006.01)i, H04N 5/44(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H04N, G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Patents and applications for inventions since 1975
Korean Utility models and applications for Utility models since 1975
Japanese Utility models and application for Utility models since 1975

Electronic data base consulted during the intertnational search (name of data base and, where practicable, search terms used)

eKIPASS, SEARCH TERMS: VIDEO EFFECT, EDIT, and similar terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 20030237091 A1 (KENTARO TOYAMA et al.), 25 December 2003 See abstract, page1, right-hand column, line8-page5, right-hand column, line52	1-20
A	US 20010041020 A1 (STEPHEN L. SHAFFER et al.), 15 November 2001 See abstract, page1, right-hand column, line36-page2, left-hand column, line3	1-20
A	US 20010035875 A1 (KENJI SUZUKI et al.), 01 November 2001 See abstract	1-20
A	JP 05-290548 A (HITACHI CO., LTD.), 05 November 1993 See abstract	1-20

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
20 FEBRUARY 2007 (20.02.2007)	**20 FEBRUARY 2007 (20.02.2007)**

Name and mailing address of the ISA/KR
Korean Intellectual Property Office
920 Dunsan-dong, Seo-gu, Daejeon 302-701,
Republic of Korea
Facsimile No. 82-42-472-7140

Authorized officer
SHIN, Jae Chul
Telephone No. 82-42-481-8215

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/US2006/038465

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US20030237091A1	25.12.2003	EP01376582A2	02.01.2004
		EP01376582A3	13.10.2004
		EP1376582A2	02.01.2004
		EP1376582A3	13.10.2004
		JP16048735	12.02.2004
		JP2004048735A2	12.02.2004
		US2003237091AA	25.12.2003
US20010041020A1	15.11.2001	DE69915566C0	22.04.2004
		DE69915566T2	07.04.2005
		EP01004967A1	31.05.2000
		EP01004967B1	17.03.2004
		EP1004967A1	31.05.2000
		EP1004967B1	17.03.2004
		JP12215212	04.08.2000
		JP2000215212A2	04.08.2000
		US2001041020A1	15.11.2001
		US2001041020AA	15.11.2001
		US6389181BB	14.05.2002
US20010035875A1	01.11.2001	DE69712930C0	11.07.2002
		DE69712930T2	19.12.2002
		EP00784294A2	16.07.1997
		EP00784294B1	05.06.2002
		EP0784294A2	16.07.1997
		EP784294A2	16.07.1997
		EP784294A3	10.09.1997
		EP784294B1	05.06.2002
		HK1001531A1	13.12.2002
		JP09190546	22.07.1997
		JP9190546A2	22.07.1997
		US2001035875AA	01.11.2001
		US2006150091AA	06.07.2006
		US7124359BB	17.10.2006
JP05290548	05.11.1993	NONE	