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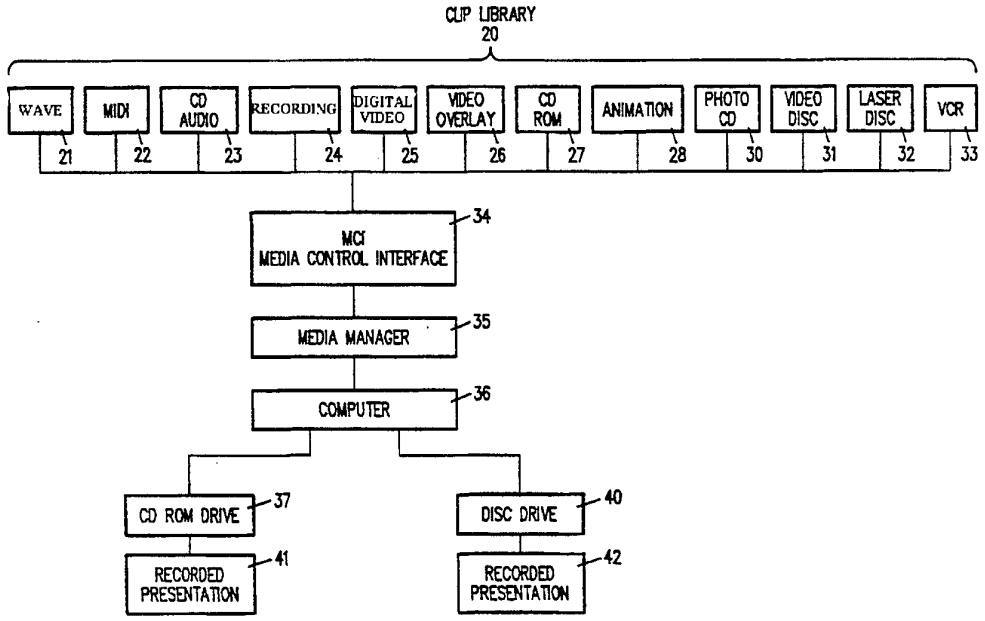
(54) Title: CHECK MULTIMEDIA LINKING



(57) Abstract

The Check Multimedia Linking functionality provides a mechanism for users to verify that all media links to media elements (20) in the current multimedia presentation (41, 42) are still valid. A media link is valid if the media element (21 to 33) (media file or external data as in CD data) can be located. If a media element (20) cannot be located, the check media links feature of the present invention allows users to remedy invalid media links by either locating one or more specific media elements (21 to 33), or by changing (adding) a path to the current search path that the media manager (35) uses to locate media elements (21 to 33). Additionally, the user has the option of disabling a media element (21 to 33) if the link cannot be found. A disabled media element (21 to 33) will not show up in the check links list in the next verification search.

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PATENT APPLICATION

CHECK MULTIMEDIA LINKING

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TECHNICAL FIELD

The present invention relates to the verification of links between objects and multimedia and, more particularly, to a computer system for determining that all media links to media elements in a multimedia presentation are still valid, and if not, to provide options for the correction thereof.

BACKGROUND ART

By using a computer as a slide projector, a number of special effects are employed in multimedia presentations. The special effects are produced by what is known as multimedia files in which are stored sound effects, video, animation, and the like. Typically, a multimedia presentation comprises a sequence of computer screens organized in slide format. Each slide has on it what are termed objects. Anything may be an object. The objects are linked to multimedia files that contain audio or visual information. Typically, the multimedia files are stored in digital form, although they may be stored in analog form if the appropriate interface

equipment and drivers are provided. Typically, the presentation includes only a reference to a segment of any media source or file. These are called clips. Only the reference may be stored in the presentation file. The multimedia files are usually vendor-supplied and are accessed by way of a Media Manager. Clips are start and end position references to a multimedia file. Defining a clip determines the starting and ending points in a multimedia file or device. The term "linking" is analogous to message sending. An object is said to be "linked" to another object when it sends a message to it. An example of linking could be, "When Button 1 Mousedown, Play Animation of Circle 1." Button 1 is linked to Circle 2.

Occasionally, when a presentation is taken to the field, the presenter will discover during the presentation that a particular link can not be found. For example, when a button is clicked on a certain slide, music is supposed to be played from a particular MIDI (Musical Instrument Digital Interface) file. The presenter clicks the button, and the presenter is embarrassed to find that no music plays. Either the MIDI file has been lost, the multimedia link has been broken, or the file is hidden in a directory not currently being searched by the Media Manager when it goes through the directories in the drive path.

DISCLOSURE OF THE INVENTION

Accordingly, it is a feature of the present invention to provide a mechanism for users to verify that all media links to media elements in a given presentation are still valid. A media link is valid if a media element such as a media file or external data as in CD (compact disc) data can be located. If a media element cannot be located, the present invention allows users to remedy invalid media links by either locating one or more specific media elements or by changing (adding) a path for the Media Manager to search for media elements to the current search path that the Media Manager uses to locate media elements. Additionally, the user has the option of disabling a media element if the link cannot be found. A disabled media element will not show up in the check links list the next time the search is invoked. All changes made to either the media element or the Media Manager search path are persistent - that is, they are stored with the presentation data. For example, if the file c:\compel\src\exe\song.wav cannot be found and the user locates the media element using the present invention to point to d:\music\song.wav. The media

element stored in the presentation now points to d:\music\song.wav and not the previous location (e.g. c:\compel\src\exe\song.wav).

BRIEF DESCRIPTION OF DRAWINGS

For a fuller understanding of the present invention, reference is made to the accompanying drawing taken in conjunction with the following detailed description of the Best Mode For Carrying Out the Invention. In the drawing:

Figure 1 is a perspective view of a location in which a computerized multimedia presentation may be given.

Figure 2 is a block diagram illustrating the elements used in preparation of a multimedia presentation with the appropriate sound or visual clips employing a Vendor-Supported Clip Library and a Media Manager.

Figure 3 is a diagram illustrating the functional relationship between a Media Manager, an exemplary embodiment of a presentation program, and a check media links screen.

Figure 4 is a tool menu screen from which the check media links screen may be invoked.

Figure 5 is a check media links screen.

Figure 6 is a locate file screen.

Figure 7 is a set directory screen.

Reference numbers refer to the same or equivalent elements of the present invention throughout the several figures of the drawing.

BEST MODE FOR CARRYING OUT THE INVENTION

Figure 1 is a perspective view of a location in which a multimedia presentation may be given. This location may be a customer's conference room or a hotel meeting room, for example. Figure 1 illustrates a number of individual elements connected together for the presentation. A computer 10 is the primary element, and is provided with a viewing screen 11, a keyboard 12, a pointing device such as a mouse 13, a disk drive 14 for a floppy disk or a computer diskette, and a drive 15 for a CD ROM. The computer 10 may be a conventional personal computer such as an IBM PC having MS DOS 3.1, a 20 MHz 80386 SX processor, a hard disk with at least 4 MB of disk space, and at least 2 MB of RAM. All of the foregoing elements are easily carried to the presentation site. The presentation itself may be

brought to the meeting recorded on floppy disks for use in the disk drive 14 or recorded on CD ROMs for use in the drive 15.

Although it is not a necessity, it may be desirable to have a large screen 16 disposed in the room where the presentation is to be given. The large screen 16 may have a driver unit 17 coupled to the computer 10 and to the screen 16. In other situations, projection means (not shown) may be available for projecting images from the screen 11 of the computer 10 onto a larger screen.

A multimedia presentation delivers its message with music, voice-overs, vivid images, and motion in addition to text and graphics. Sound may be produced in a Wave Audio File, a MIDI (Musical Instrument Digital Interface) file, and CD Audio formats. Video may be provided in digital file format or in video disk overlay. If Windows 3.1 is used, animation may be provided in file formats that are compatible with a standard known as the Media Control Interface (MCI) standard, since Windows 3.1 provides the MCI and, in addition, provides three MCI drivers: one controls the MIDI sequencer, one controls sound for Wave Audio Files, and one controls sound for CD Audio devices. The Windows instruction manual is hereby incorporated by reference as if fully set forth herein. The document is entitled: "The User's Guide for the Windows Graphical Environment, MS DOS Operating System", copyright 1990-92, by Microsoft Corporation.

Referring now to Figure 2, the presentation may be prepared ahead of time with the appropriate sound or visual clips in conjunction with a Vendor-Supported Clip Library 20. It should be understood that the Vendor-Supported Clip Library 20 is a standard commercial item, and is readily available. It is not typically transported to the presentation site. It may be available on a network, such as an E-Mail Network. The Clip Library 20 is a part of a CDB (Central Data Base). The segments of clips necessary to a presentation may be copied onto the presentation disk. For example, 3 seconds of a 10-second video clip may be copied.

Figure 2 illustrates a typical Vendor-Supported Clip Library 20. The Clip Library 20 involves interface equipment that stores, plays or supports Wave 21, MIDI 22, CD Audio 23, Audio Recording Equipment 24 that digitizes an audio waveform and stores it for use in voiceovers and the like, Digital Video 25, Video Overlay 26, CD ROM 27, Animation 28, Photo CD 30, Video Disk 31, Laser Disk

32, and VCR 33. Bit Map Graphics may be employed to provide visual images. A Media Control Interface (MCI) 34 may be present as well as a Media Manager 35. The Media Manager 35 provides the information needed for triggering the playing of the clips by a computer 36. Again, the computer 36 may be a conventional personal computer such an IBM PC, for example. The computer 36 organizes the information from the Clip Library 20 and integrates it with the triggers that call up the playing of the clips at the appropriate time, and records the information in a compressed format on a CD ROM by way of a CD ROM drive 37, or on a floppy disk by way of a disk drive 40. The complete computerized presentation of a slide show, including multimedia linking, is provided on a CD ROM recorded presentation 41, or on a floppy disk recorded presentation 42. These disk-format presentations 41, 42 are used with the system of Figure 1 to make the presentation at the presentation site.

In accordance with the present invention, prior to making a demonstration, the presentation is checked to verify that all multimedia links are in order. A media link is valid if a media element such as a media file or external data can be located. If a media element cannot be located, the present invention allows users to remedy invalid media links. Referring now to Figure 3, an exemplary presentation system known as Compel is illustrated in a functional diagram. It will be understood that reference to Compel software is made by way of example only for purposes of illustrating the operation of the present invention. The block at the upper part of the diagram shown in Figure 3 indicates that the presentation program is identified as Compel.exe. The block at the lower right of Figure 3 indicates that the Media Manager is known as CPLMM.DLL. This identifies Compel Media Manager, Dynamic Link Library. When the screen entitled "Check Media Links" is invoked, the screen is as shown in the center of the upper rectangle. As shown to the right, it provides a menu comprising three selections: (a) append to the search directory; (b) fix-up this media element; and (c) disable (ignore) this link.

Figure 4 is a screen showing the Compel "tools" menu. A screen called the check media links screen, shown in Figure 5, is invoked via the Compel tools menu of Figure 4. Check Media Links is available from both edit and playback mode. In Edit mode the check media links option is available from the Tools Menu. When

invoked from playback mode the check media links options is located on the systems menu.

Additionally, Check Media Links is available in the runtime version of Compel, known as CplShow. In CplShow, the check media links option is only available from the system menu. Since no presentation file saving occurs when running the playback only version (cplshow), any media link fixups applied by the user are transient. That is, they only effect the presentation to which they were applied while the presentation is loaded. Check Media links changes are not stored with the presentation in this case.

In the example shown in Figure 5, two media files cannot be found. The first is identified as C:\Compel\sac\exe\test.mid, and the second is identified as C:\Compel\sac\exe\junk.wav. The screen of Figure 5 indicates that the Media Manager looked for a particular MIDI file and was not able to find it and also looked for a particular Wave Audio file and was not able to find it. The Media Manager looks in different directories in the drive path. The possibilities are that the files are not present, or that they are hidden in a directory that is not in the path that the Media Manager is examining.

Ordinarily, media files are searched for by the Media Manager in the following order:

1. The path where the media file was last found during this presentation.
2. The explicit path for the file as defined in the media link.
3. The default directory for media files as set in the check media links dialog box.
4. The current working directory.
5. The directory in which the Windows software is installed.
6. The directory in which the Windows system files are installed.
7. The directory in which the Compel.exe file or cplshow.exe file is installed.
8. All directories in the PATH statement of the systems AUTOEXEC.BAT file.
9. Any CD-ROM drive using the explicit path.

It should be apparent that during an on-screen presentation, if the Media Manager cannot find a media file or device, the media clip will not play. A media link is valid if the media file or device can be located. If the media file or device cannot be located, the check media links feature of the present invention allows the presenter to remedy invalid media links by disabling the link, locating one or more specific media elements, or by adding a directory or path to the current search path that the Media Manager uses to locate media elements. Thus, the immediate options presented to the user is to: a) disable the link, b) locate the file, or c) set the directory which will be included in the search path for the Media Manager.

If option b) is chosen, then the user is presented with a locate file screen as shown in Figure 6. Figure 6 shows that the file named test.mid is located in goodvib6.mid and in pickin3.mid. It also indicates that those files may be found in drive c. Thus, the user can use the locate file screen of Figure 6 to point to the missing media element. If c) is selected, the user is presented with the option of adding a directory or path to the current search path where the Media Manager searches for files. The user does this by selecting a path in the set directory screen of Figure 7.

If it is desired to temporarily disable a broken media link, the following steps are followed:

1. From the tools menu, choose check media links, or in slide show view or Compel show, press Alt + space bar to display the control menu, then choose check media links.
2. Under media link status, select the broken link.
3. Click disable link. The disable link button leaves the media link intact, but prevents Compel from playing the clip in slide show view or Compel show.
4. Click OK. The media link remains disabled until you both restore the media file referenced by the clip and display the check media links dialog box again, which re-enables the media link.

To reconnect a broken media link, the following steps are followed:

1. From the tools menu, choose check media links. Or in slide show view or Compel show, press Alt + space bar to display the control menu, then choose check media links.
2. Under media link status, select the broken link.
3. Click locate file. The locate file dialog box appears, in which you can search your directories for the media file referenced by the clip. The locate file box is the screen shown in Figure 6.
4. When you have found the file, click OK. The check media links dialog box reappears where the media links status now displays the message "all media elements found".
5. Click OK.

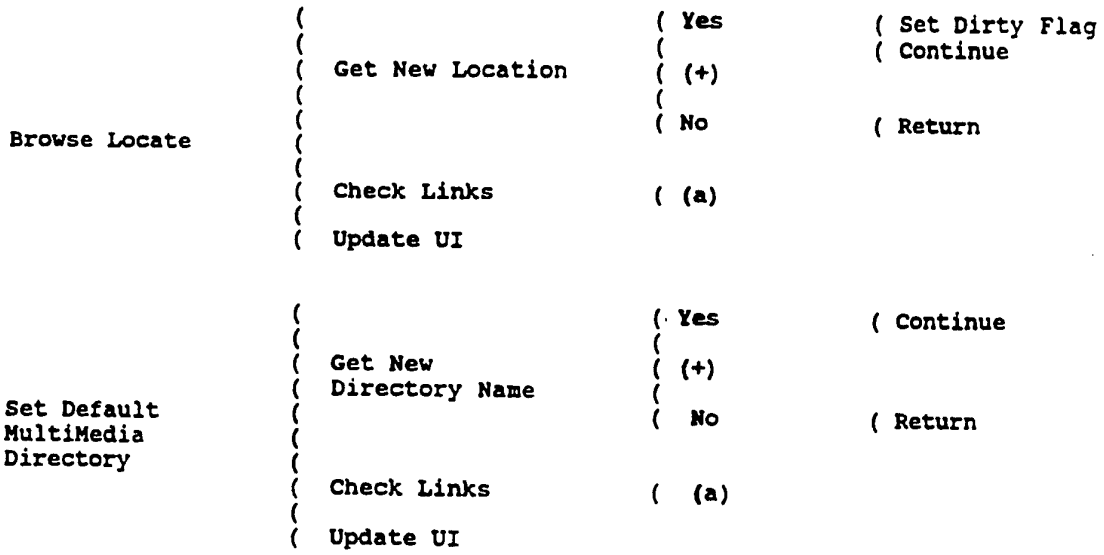
The present invention has been particularly shown and described with respect to certain preferred embodiments of features thereof. However, it should be readily apparent to those of ordinary skill in the art that various changes and modifications in form and detail may be made without departing from the spirit and scope of the invention as set forth in the appended claims. The invention illustratively disclosed herein may be practiced without any element which is not specifically disclosed herein.

The following is a Warnier/Orr diagram for the check media link portion of the Compel software used herein as an example. This is a functional diagram conventionally employed in the computer industry to indicate computer programming in much the same way that pseudo code is employed.

CHECK MEDIA LINKS
WARNIER/ORR DIAGRAM
Init
Allocate Resources
Initialize Local Data
Check Links
Update UI
Get current default Multimedia Directory
Enumerate all media elements in stream associated with current presentation
(a)
(a)
Check Links
0 - Num Media Elements
Locate File ?
NO
(+)
Yes
Dirty ?
Multimedia Element Open Name
Disabled ?
Yes
No
(+)
(+)
store old name
set new name
skip
(b)
enable
do nothing

WARNIER/ORR DIAGRAM (Concluded)

CHECK MEDIA LINKS



CLAIMS

We claim:

1. Apparatus for verifying multimedia linking for a multimedia presentation, said apparatus comprising

means for searching an existing multimedia presentation to verify that links to media files and to media files are intact;

means for listing file names corresponding to missing media elements;

means for offering an option of disabling a missing media element;

means for offering an option of locating in a previously unsearched location a missing media element; and

means for offering an option of establishing a new search path identifier corresponding to a missing media element.

2. The method of checking multimedia linking comprising the following steps:

searching an existing multimedia presentation to verify that links to media files and to media files are intact;

listing file names corresponding to missing media elements;

offering an option of disabling a missing media element;

offering an option of locating in a previously unsearched location a missing media element; and

offering an option of establishing a new search path identifier corresponding to a missing media element.

3. In a programmed computer with memory having at least one media drive and storage medium therein, a multimedia presentation system comprising:

a plurality of media elements for the multimedia presentation;

a plurality of media links for operating associated ones of the media elements;

a media manager for selectively triggering the media links for operating associated ones of the media elements, the media manager including means for determining which of the plurality of media elements are used in the multimedia presentation, the media manager further including means for determining which ones

of the media links for the multimedia presentation are presently unavailable media links;

means providing an option of disabling determined ones of the unavailable media links associated with ones of the media elements;

means providing an option of adding new search path identifiers for the media manager to search for determined ones of the unavailable media links; and

means providing an option of searching previously unsearched locations of the programmed computer by the media manager.

4. A system as in claim 3 wherein the media elements include audio and visual media files and data.

5. A system as in claim 4 wherein the media links include driver files.

6. A system as in claim 5 wherein the media manager is a set of computer program instructions.

7. A system as in claim 6 wherein the media manager is operable from an edit mode and a playback mode.

8. A system as in claim 6 wherein the media manager is operable within another computer program for multimedia presentation operating within a graphic user interface operating system of the programmed computer.

9. A system as in claim 8 wherein ones of the driver files are written for a Media Control Interface Standard.

10. For a programmed computer having memory, means for storing and retrieving files and data, a multimedia directory and media links corresponding to media elements, a computer program for providing conditions and means for altering the conditions of the media links for a multimedia presentation, the program comprising:

means for obtaining the multimedia directory;

means for enumeration of all the media elements in the multimedia presentation to provide enumerated media elements;

means for locating the media links in the multimedia directory corresponding to the enumerated media elements and for determining ones of the media links corresponding to the enumerated media elements which are presently unavailable;

means for determining the conditions of the unavailable media links, the conditions including disabled and open name;

means for enabling selected ones of the unavailable media links having the disabled condition;

means for storing an old name of selected ones of the unavailable media links having the open name condition;

means for setting a new name to selected ones of the unavailable media links having the open name condition; and

means for searching the programmed computer for selected ones of the unavailable media links having the open name condition.

11. A program, as in claim 10, further comprising means for browsing through the programmed computer for the unavailable media links.

12. A program, as in claim 11, further comprising means for setting flags after finding ones of the unavailable media links with the open name condition.

13. A program, as in claim 12, further comprising means for setting a default multimedia directory.

14. For a programmed computer with memory, at least one media drive and storage medium therein, a method for a multimedia presentation comprising the steps of:

providing a plurality of media elements for the multimedia presentation;

operating associated ones of the media elements with a plurality of media links;

selectively triggering the media links for operating associated ones of the media elements with a media manager;

determining which of the plurality of the media elements are used in the multimedia presentation;

determining which ones of the media links for the multimedia presentation are presently unavailable media links;

providing an option of disabling determined ones of the unavailable media links associated with ones of the media elements;

providing an option of adding new search path identifiers for the media manager to search for determined ones of the unavailable media links; and

providing an option of searching previously unsearched locations of the programmed computer by the media manager.

15. A method, as in claim 14, wherein the media elements include audio and visual media files and data.

16. A method, as in claim 15, wherein the media links include driver files.

17. A method, as in claim 16, wherein the media manager is a set of computer program instructions.

18. A method, as in claim 17, wherein the media manager is operable from an edit mode and a playback mode.

19. A method, as in claim 17, wherein the media manager is operable within another computer program for multimedia presentation operating within a graphic user interface operating system of the programmed computer.

20. A method, as in claim 19, wherein ones of the driver files are written for a Media Control Interface Standard.

21. For a programmed computer having memory, means for storing and retrieving files and data, a multimedia directory and media links corresponding to media elements, a process for providing conditions and altering the conditions of the media links for a multimedia presentation, the process comprising the steps of:

obtaining the multimedia directory;

enumerating all of the media elements in the multimedia presentation to provide enumerated media elements;

locating the media links in the multimedia directory corresponding to the enumerated media elements and for determining ones of the media links corresponding to the enumerated media elements which are presently unavailable;

determining the conditions of the unavailable media links, the conditions including disabled and open name;

enabling selected ones of the unavailable media links having the disabled condition;

storing an old name of selected ones of the unavailable media links having the open name condition;

setting a new name to selected ones of the unavailable media links having the open name condition; and

searching the programmed computer for selected ones of the unavailable media links having the open name condition.

22. A process, as in claim 21, further comprising the step of browsing through the programmed computer for the unavailable media links.

23. A process, as in claim 22, further comprising the step of setting flags after finding ones of the unavailable media links with the open name condition.

24. A process, as in claim 23, further comprising the step of setting a default multimedia directory.

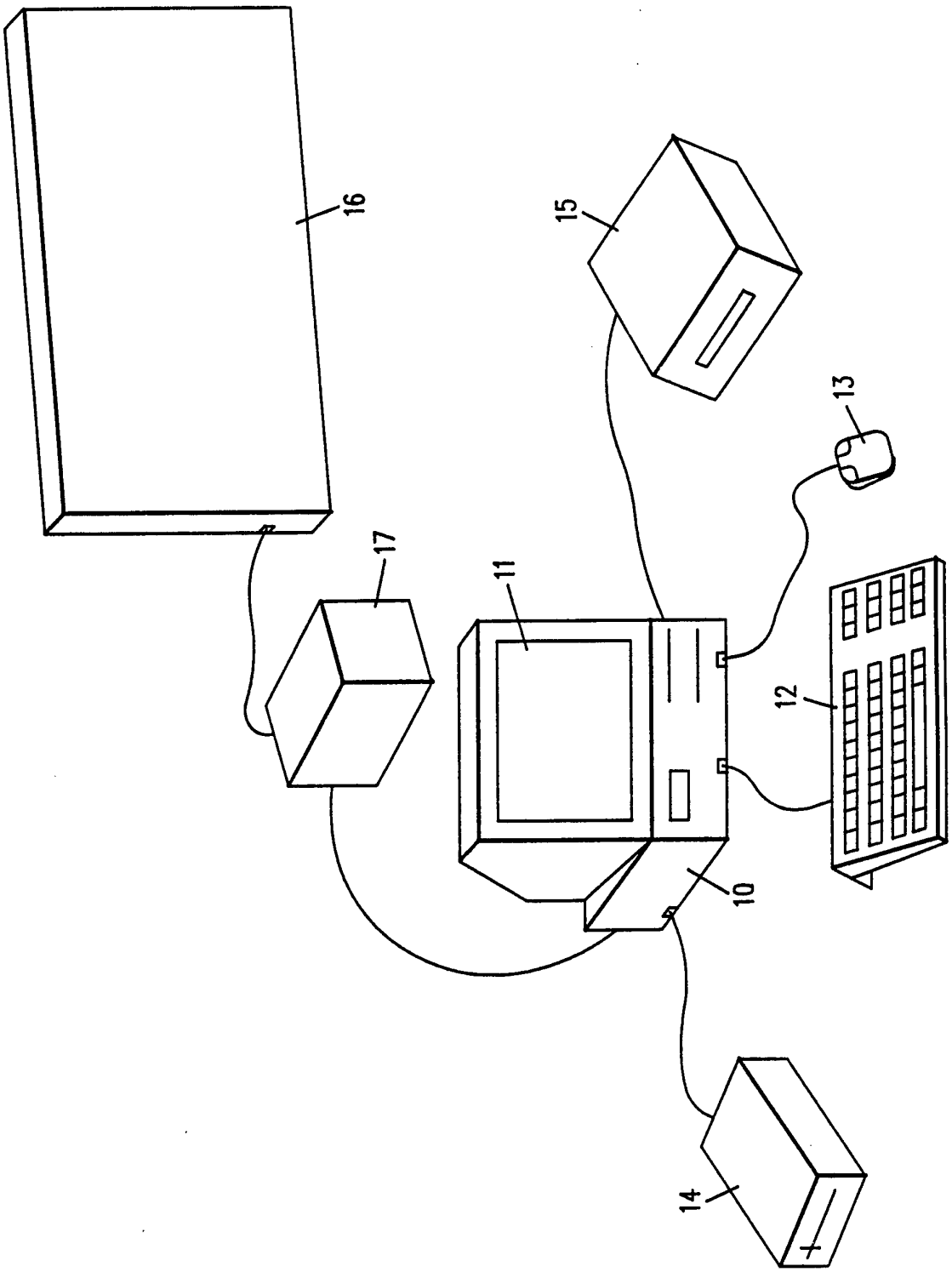


FIG. 1

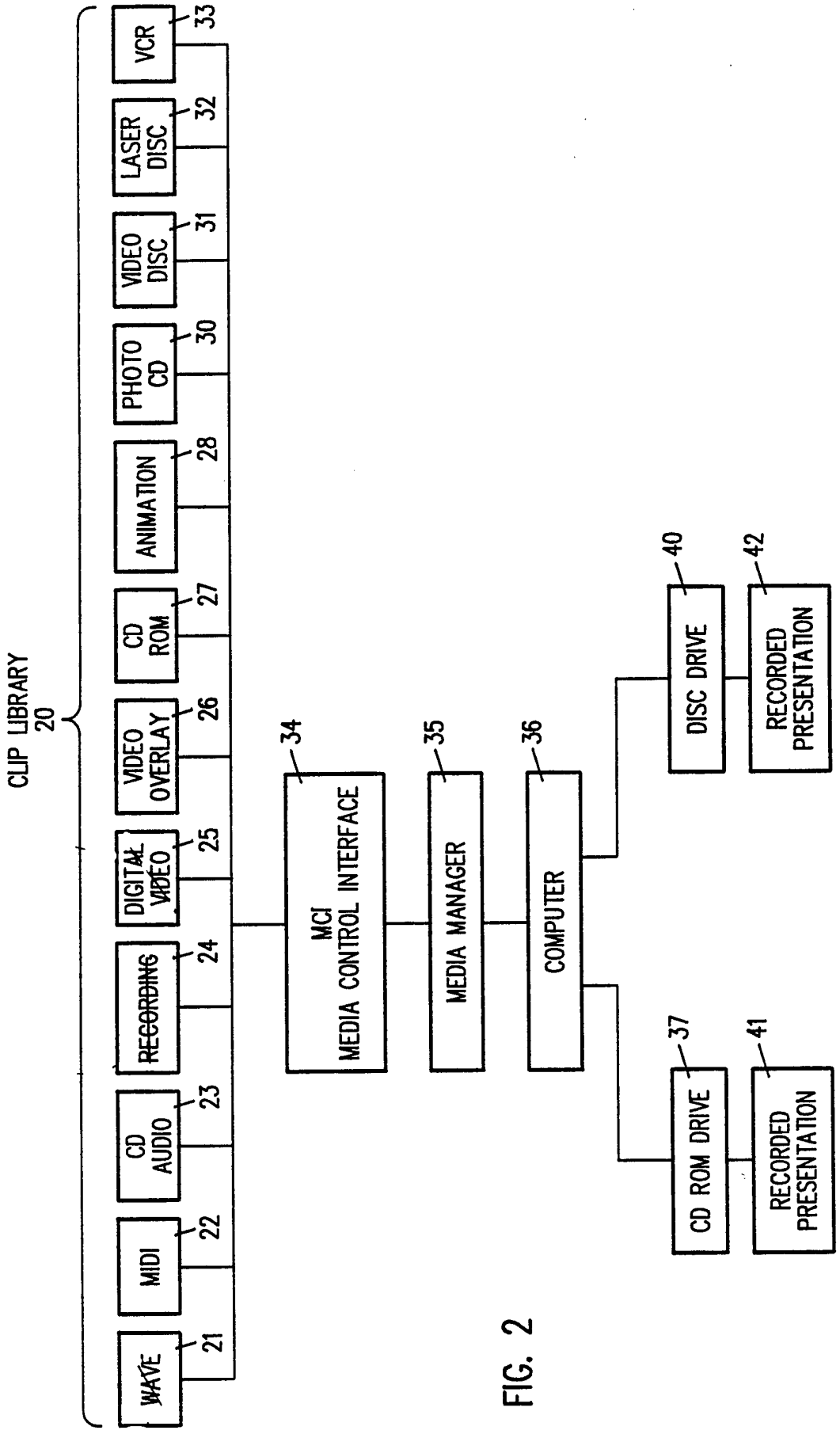

CLIP LIBRARY
20
WAVE
21
MIDI
22
CD AUDIO
23
RECORDING
24
DIGITAL VIDEO
25
VIDEO OVERLAY
26
CD ROM
27
ANIMATION
28
PHOTO CD
30
VIDEO DISC
31
LASER DISC
32
VCR
33
MCI
MEDIA CONTROL INTERFACE
34
MEDIA MANAGER
35
COMPUTER
36
CD ROM DRIVE
37
DISC DRIVE
40
RECORDED PRESENTATION
41
RECORDED PRESENTATION
42

FIG. 2

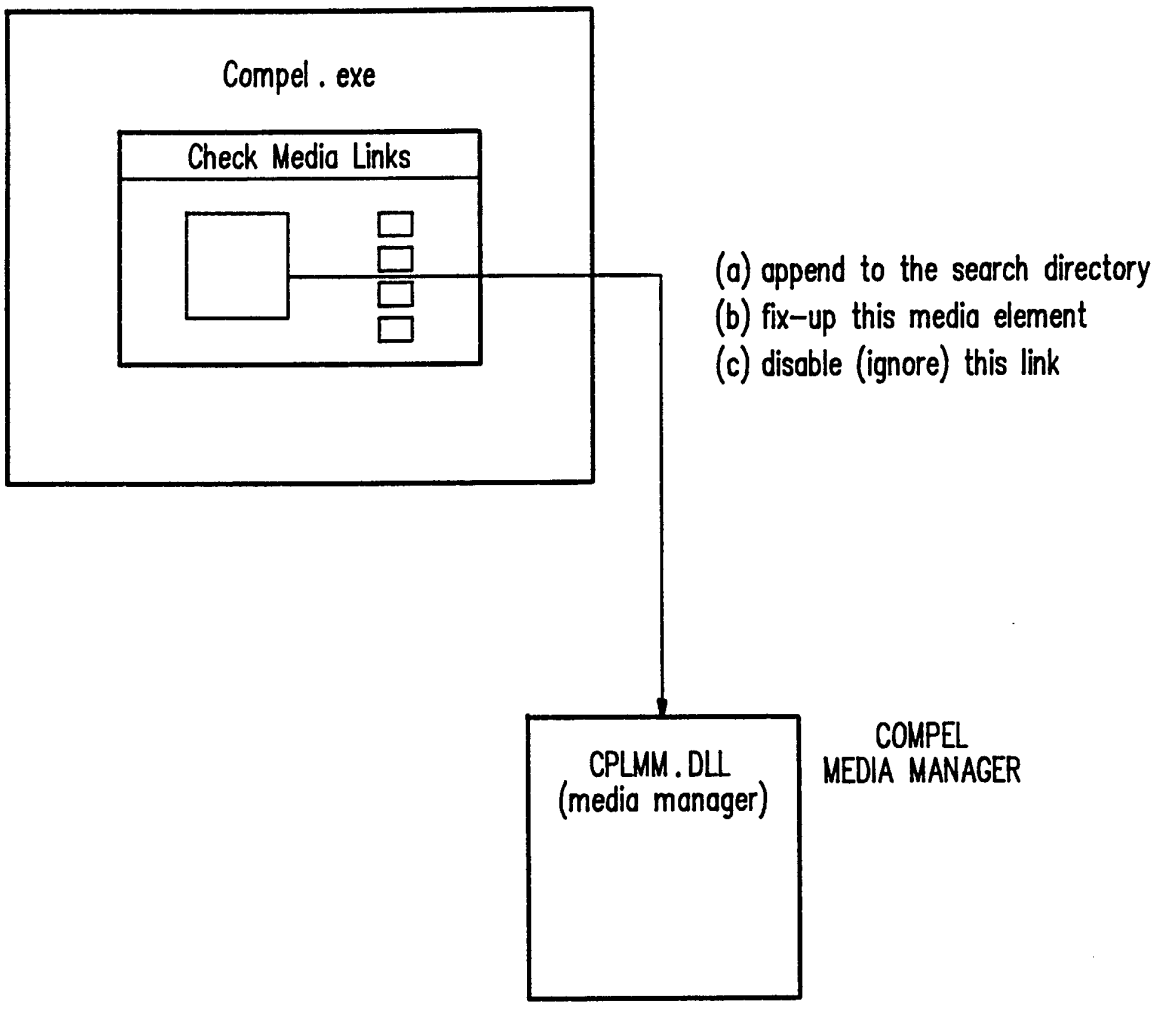

Compel . exe
Check Media Links
(a) append to the search directory
(b) fix-up this media element
(c) disable (ignore) this link
CPLMM . DLL
(media manager)
COMPEL
MEDIA MANAGER

FIG. 3

Tools:

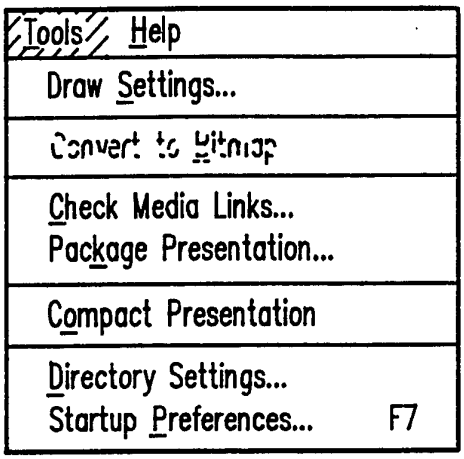


FIG. 4

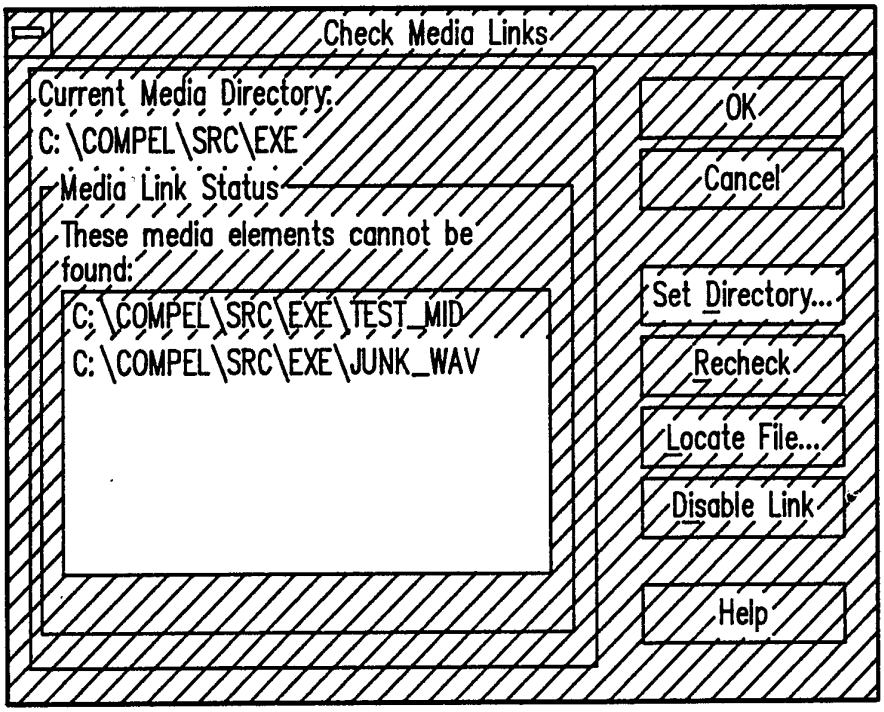


FIG. 5

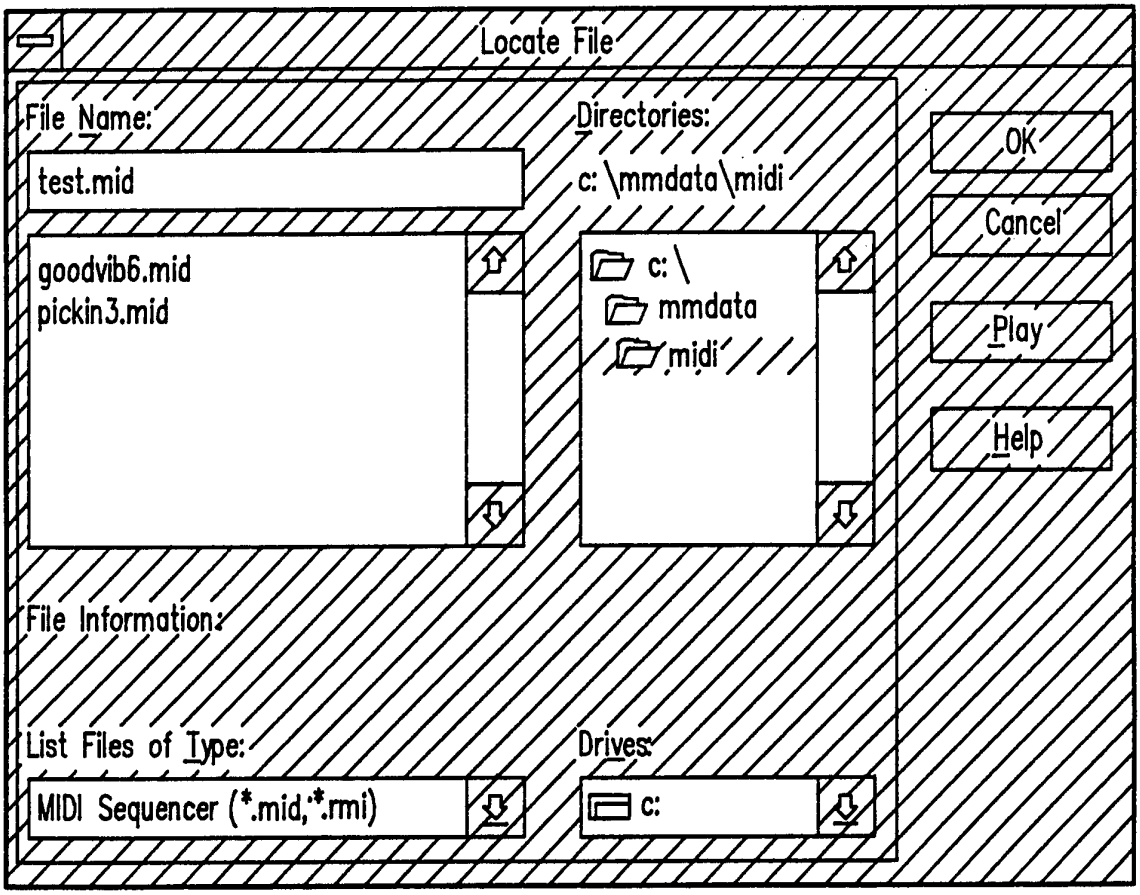

Locate File
File Name:
test.mid
goodvib6.mid
pickin3.mid
Directories:
c:\mmdata\midi
c:\
mmdata
midi
OK
Cancel
Play
Help
File Information:
List Files of Type:
MIDI Sequencer (*.mid,*.rmi)
Drives:
c:

FIG. 6

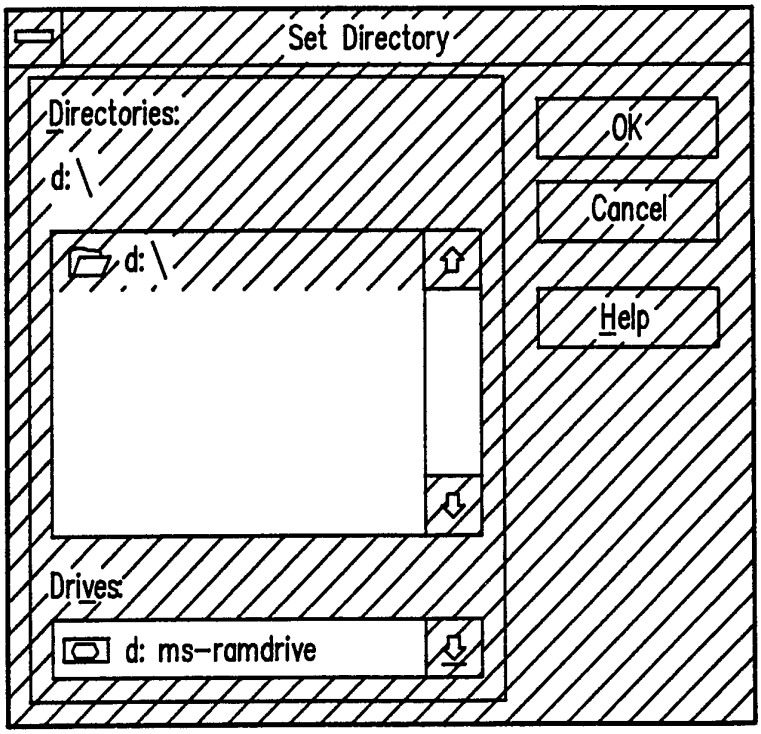

Set Directory
Directories:
d:\
d:\
OK
Cancel
Help
Drives:
d: ms-ramdrive

FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US94/02617

A. CLASSIFICATION OF SUBJECT MATTER

IPC(5) :G06F 15/40
US CL :395/12,154,156,600

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)

U.S. : 395/12,154,156,600,700

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

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

Please See Extra Sheet.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A,E	US, A, 5,317,732 (GERLACH, JR. et al.) 31 MAY 1994, see whole document.	1-24
A,E	US, A, 5,303,379 (KHOYI et al.) 12 APRIL 1994, see whole document.	1-24
Y,E	US, A, 5,297,249 (BERNSTEIN et al.) 22 MARCH 1994, see columns 1-6, 9-10, 12-13 and 18-19.	1-24

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents:	"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
"A"	document defining the general state of the art which is not considered to be part of particular relevance	"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
"E"	earlier document published on or after the international filing date	"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
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"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		

Date of the actual completion of the international search 09 June 1994	Date of mailing of the international search report JUL 21 1994
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer B. Hardis for MARIA N. VON BUHR Telephone No. (703) 305-9600

Form PCT/ISA/210 (second sheet)(July 1992)*

B. FIELDS SEARCHED
Electronic data bases consulted (Name of data base and where practicable terms used):

APS-FILE USPAT AND FILE JPOABS, DIALOG- ONESEARCH FILE COMPSCI
search terms: multimedia, linking, resources, checking, validating, verifying, presentations, (un)available, missing, disabled, interactive, searching