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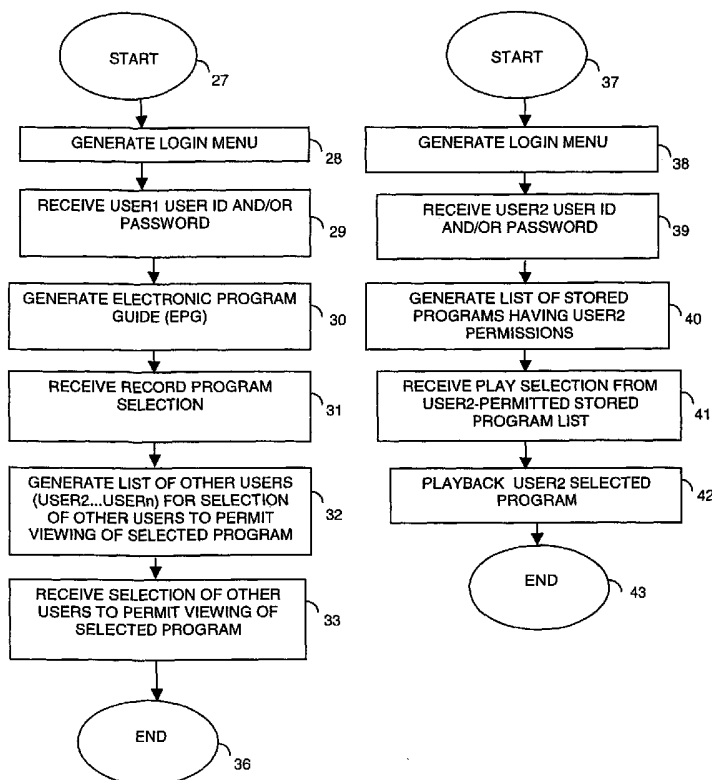
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(54) Title: VIDEO RECORDING SYSTEM AND METHOD FOR A PLURALITY OF INDIVIDUAL USERS AND CATEGORIES OF USERS



(57) Abstract: A system and method for a television program recording and playback system such as a Personal Video Recorder (PVR) or Digital Video Recorder (DVR) wherein the individual users and, optionally, categories of users, are established, an individual user logs in and selects a television program to be recorded. Later, after the program has been recorded, when a user logs in, a menu listing only those programs for which that user has selected for recording may be displayed in the graphical user interface (GUI). A user may also designate other users for a selected program and after that program is recorded and a designated user logs in, the list of programs includes those for which the logged in user has been designated. When there is insufficient storage space to record a program selected to be recorded, the system and method automatically delete from storage previously recorded programs according to a protocol which may consider how many of the permitted users have viewed the program, the thumbs up or thumbs down ratings assigned to the program by those users which have viewed the program, the group to which users which have not yet viewed the program belong, or how recently the stored program was viewed by a user. Passwords may be required for a user to log in.

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## VIDEO RECORDING SYSTEM AND METHOD FOR A PLURALITY OF INDIVIDUAL USERS AND CATEGORIES OF USERS

This invention relates to an apparatus and methods for recording video content  
5 and controlling access to recorded video content, and in particular, to an apparatus  
and methods for recording video content and controlling access to recorded video  
content for a plurality of users and categories of users.

Personal video recorders (PVR) are devices that allow a user to select, by  
means of a graphical user interface (GUI) displayed on an associated television set,  
10 monitor, or other display, a television program to be broadcast at a future time or  
which is currently being broadcast, digitally "record" the selected program onto a  
storage module, such as a hard disk, and upon user command "playback" the stored  
program by retrieving it from storage, decompressing or decoding the program and  
outputting it to an associated television set or other display device. Devices having  
15 such capability are currently sold under the trademarks "TiVo," "RePlayTV," "Sky +,"  
and "Showstopper."

Parental control systems and methods available on certain television sets use  
ratings information, contained in the video blanking interval (VBI) of broadcast  
television programs, or transmitted in the program guide, to prevent certain users,  
20 especially children, from viewing programs with ratings not permitted by the parent or  
supervisor who controls the system. For example, the parent may want to block his  
or her children from viewing programs that have certain sexual content ratings and/or  
violence content ratings. In that case, a child who is logged into the television set is  
blocked from viewing such programs. In other television systems, the parent may  
25 block viewing of all programs with certain ratings categories unless a password is  
provided to unlock the display of such programs.

While a typical personal video recorder may record the ratings information  
along with the programs being recorded so that television sets with parental control  
systems can be used to prevent an program having sexual or violent content from  
30 being viewed by unauthorized viewers, some parents do not agree with the ratings  
information supplied by the broadcaster. In other households, parents may wish to  
control the viewing of their children on a program by program basis, which may be  
difficult to manage with existing systems in which only one level of parental control is  
allowed, i.e., either all programs can be watched, or only those which fall into a  
35 certain ratings category. Under parental control systems used in conventional

television sets, a child may be blocked from viewing a program due to its rating information but a parent may override the blocking of a particular program to allow the child to watch on a program by program basis.

Another problem with existing systems is there is no way to associate selected recording with selected users. For example, a user may want to record a certain program for viewing by selected number of users, rather than all other users. For example, the mother may want to record a fashion show for viewing by her daughters, but not her sons or her husband. In view of the above, a need has arisen for a system that allows one user to select a television program for recording and at the same time select which other users may view the recorded program.

A still further problem with current PVR systems is that programs may be automatically deleted according to a default order when space is required for additional recording. For example, recorded programs may be automatically deleted in the order that they were recorded, i.e., the oldest recordings are deleted first. A user can override the default order by identifying a particular program and designating it to be saved until a particular date. In cases where more than one user wishes to view a recorded program, present systems do not distinguish whether certain interested viewers have completed viewing the program, and as such, there is no way to delete the program based on whether all interested users have completed the viewing. Therefore, some programs are deleted according to the default order before all users who are interested in them have had a chance to view them.

An additional problem with current PVRs is that since the entire list of recorded programs appears on a single list, each viewer must scroll through all of the programs currently stored on the list rather than only those in which that user is interested.

These problems, and others as will become apparent from the present description, are addressed by the present invention, which comprises, in one aspect, an improved video recording apparatus, which establishes a plurality of user identities, or names, and allows the users to customize the recording of programs to designated user identities, uniquely associates a specific recorded programs list for each user identity, and presents the associated recorded list to each one of the respective user identities. In an exemplary embodiment, the present apparatus allows a first user to log in and select a television program for recording, wherein after the selected program is recorded a list of available programs can be displayed which includes only the programs selected for recording by the logged in user and excludes

programs selected for recording by other users. In another embodiment, the first user can designate one or more other users or group names, which include a subset of all of the users, for viewing a selected program, wherein when one of the designated other users, or member of a designated group, logs in, a list of programs designated for that user, or group, as well as the programs recorded by the logged in user is displayed and can be played back by that user. In the case of parental controls based on rating systems wherein ratings are contained in a portion of the broadcast such as the video blanking interval (VBI), or in a program guide, when a supervisor such as a parent designates another user, the program is listed in the designated user's list of available programs after logging in, and that designated user has permission to view the program, superceding limitations imposed by the parental control system.

The PVR system according to the present invention comprises a storage space, such as a hard disk, where the video programs can be recorded and identifications of a plurality of users can also be stored. The PVR system generates a graphical user interface (GUI) that can be displayed on a television set, a monitor, or the like, and allows each potential user of the PVR recording or playback system to be identified, characteristics of each or certain users such as age to be entered, and passwords for some or all users to be established. A first user who has logged in using the GUI can select a television program to be recorded in any of the conventional ways, and according to the invention and in the aforementioned preferred embodiment can also designate one or more other users to watch the selected program. After the television program has been recorded, when another user logs in and requests a display of recorded programs using the GUI, that selected program is included in or excluded from that other user's list, depending on whether the first user selected that other user to view the selected program. Alternatively all of the stored programs, including the selected program, can be included when the subsequent user displays the list, but viewing of that program can be blocked if the first user did not give viewing permission to that subsequent user. Other schemes for permitting or denying a subsequent user from viewing a program recorded by a prior user are possible. A password scheme may be used in some embodiments, but may not be used in other embodiments. In some households where there are no children and parental control is not used, for example, a user identification scheme without passwords, e.g., just the users' nicknames, can be used.

The inventive PVR preferably also stores data regarding which of the permitted users have viewed the selected television program, and the portion of the program viewed by a permitted viewer if the program has been partially viewed. When all the permitted users of the selected television program have completely  
5 viewed the program, the PVR can be set to automatically delete it, which some users will find more convenient than being prompted to ask for permission to delete. When there is not enough storage space to record a new program which has been scheduled for recording, there are several possible deletion protocols which can be programmed as defaults or selected by the users. For example, the system may  
10 request user instructions to delete any program or it may use an automatic deletion order based on the number of permitted users which have viewed a stored program, or based on how recently the recorded program was viewed by any permitted user. Ratings system categories of stored programs can be used so that children's programs can be deleted first, or last, depending on preset user preferences for  
15 deletion order. Deletion order can even be based on a combined rating generated by whether the program received a positive review or negative review, known in the art as "thumbs up" or "thumbs down" selections, from the users who viewed the program.

The term PVR as used herein refers to any video recording apparatus that is  
20 capable of receiving a video signal, recording the signal to a storage device in digital format, retrieving the signal from the storage device in a random access manner, formatting the retrieved signal for display, and providing the formatted signal to a display device. Although a hard disk is used in the exemplary embodiments described below, it is to be understood that any storage device for storing digital  
25 video data may be used in the present PVR, including, but not limited to, optical media and solid state memories.

The invention is described herein with reference to the following drawings, wherein:

**FIG. 1** is a schematic of a video recording apparatus according to the invention;  
30 **FIG. 2** is a flow chart of an embodiment of a method according to the invention; and  
**FIG. 3** illustrates graphic user interfaces for implementing an embodiment of the invention.

Many households have multiple family members who use the same Personal Video Recoder (PVR), for recording television programs, such as those made by  
35 TiVo, and computer based PVRs. In some cases, multiple people want to watch the

same recorded programs, but have different schedules and watch the same programs at different times. Also in some cases, viewers want to watch different programs, and want to more easily select only those programs that are of interest to that individual viewer. This invention provides means to easily manage PVR viewing of programs by more than one viewer.

Referring to FIG. 1, an exemplary embodiment of a personal video recorder (PVR) 26 according to the present invention is illustrated wherein an outside broadcast source 11 such as terrestrial TV, digital terrestrial TV, analog cable TV, digital satellite, digital cable, DSL, cable modem, MMDS, or the like is connected to the PVR 26 which tunes the signal from the source with tuner control 17 and receiver 15. The received signal is processed and formatted for display on display 25 by video processor 22. A television program is received at a certain time on a certain channel for a certain time period as controlled by PVR CPU 21 based on program selection data, which was received from one of the users, and may be stored in a memory within CPU 21 or in memory 20. Memory 20 is in the form of a hard disk, however, any storage media suitable for storing a large amount of digital video data, such as optical disks, may be used.

An image generator 13 generates graphic user interface GUI screens under the control of PVR CPU 21 to display various operating modes of PVR 26, and to allow the user to enter various commands to control PVR 26. The images generated by image generator 13 is combined with the video images in video processor 22 and output to display device 25 such as a television display, computer monitor, etc. Image generator 13 may be incorporated into PVR CPU 21.

The user uses the remote control device 12 to transmit commands to control the various operating modes of PVR 26, such as: logging in to a particular user identity, selecting television programs to be recorded from an electronic program guide (EPG) for display on the TV monitor 25, and selecting a future television program to be "recorded," which is computed by the CPU 21 for a time period and channel at which the tuner control 17 will control the receiver 15 to receive a program from a broadcast source 11. The user also uses the remote control 12 in response to GUI screens, as will be discussed in more detail below, to designate other users for viewing the program. The CPU 21 processes the user's selection of programs to be recorded and designations of other users to view the selected program. The user can designate additional other users to allow the additional other user to view the recorded programs at any time, even after that user has viewed the stored program.

The structure of the various elements mentioned above are known to those skilled in the art and will not be discussed in further detail. The operation and control of the inventive PVR for implementing the present invention are now described.

Referring now to FIG. 2, a flow chart showing an embodiment of the process is illustrated as starting at 27, wherein the PVR 26 generates 28 a login menu in which a user, USER<sub>1</sub> in this example, uses the remote controller 12 (Fig. 1) to either select his user name, his password or both user name and password, which are received 29 and accepted by the PVR 26 to login USER<sub>1</sub>. The user identities are processed and managed by PVR CPU 21 and stored in a memory device within CPU 21 or in memory 20. USER<sub>1</sub> may wish to see the electronic program guide, in which case USER<sub>1</sub> selects the EPG and the PVR 26 generates 30 the EPG so that USER<sub>1</sub> can select a program to be recorded, which is received 31 and processed by the PVR 26. Following selection of a particular program for recording, in this embodiment the PVR 26 automatically generates a list of all the registered users, USER<sub>2</sub> . . . USER<sub>n</sub>, and provides USER<sub>1</sub> an option to select 33 any number of other users designated to view the selected program.

In the case of parental control applications of the invention, USER<sub>1</sub> is typically the parent or other supervisor, and the other users are the supervised users, and the designation functions as a permission from the parent, or supervisor, for the child to view the particular program. In other applications of the invention, USER<sub>1</sub> may wish to suggest, rather than permit, other users to watch the program, for example a husband may wish his son to see a sports program on the list of recorded programs when he logs in, but does not want to suggest such programs to other users. In the application where parental permission is not needed, the designation functions as a suggestion rather than a permission. In either case, the selected program appears in a listing of recorded programs available to the designated user.

The PVR 26 of the invention can have a group identification for each user, for example Sam and Aviva may be grouped under Parents and under Adults, Margalita, Noah, Natalie and Racheli may be grouped as teenagers, and Shoshana may be grouped under Child. Sam may be designated as supervisor, in which case Sam is the only one who can make group assignments. When the list of other users is generated 32, the list preferably contains the populated groups, i. e., parents, adults, teenagers, children, and/or whole family in this example, in which case USER<sub>1</sub> can select a group instead of each individual in that group.

After the program selection for recording and designated users are received by the PVR 26 and recorded, USER<sub>1</sub> logs out 36 or is automatically logged out by the PVR 26 after a timeout period. After a period of time 37, another user turns on the television, USER<sub>2</sub> in this example, logs in under that user identity at the login menu 38, and upon receipt 39 and processing of the correct password, a list of stored programs which includes programs recorded by USER<sub>2</sub> as well as all stored programs having USER<sub>2</sub> designations entered by other users is generated 40 and presented on display 26. Using the remote control 12, USER<sub>2</sub> may then select 41 one of the programs from the USER<sub>2</sub> list to view or play, and the PVR 26 then 10 accepts the selection and plays back 42 the permitted selection, completing the process 43.

Referring now to FIG. 3, an embodiment of a user login screen 14 generated by the PVR GUI generation system is illustrated. At this screen USER<sub>1</sub> in this example either selects an existing user name from the list or selects NEW USER to 15 start the New User Setup routine. Selecting a New User Setup routine results in the display of illustrated GUI screen 15. After successful login, a conventional EPG selection routine may be presented to allow the user to select programs to record. A user-customized Programs to Record GUI screen 16 may be selected by the user, wherein such a screen may say, for example, "Programs to Record for Bob" and list 20 the currently selected programs that are scheduled to be recorded for this user identity. PVR 26 also provides, either automatically or by user selection, a GUI screen 17 that allows the user to designate other users for viewing the selected program. A GUI screen for such a function is shown in GUI 17, which indicates 25 SAVE FOR OTHERS TO WATCH? followed by a list of user identities recognized by PVR 26, and allows USER<sub>1</sub> (Bob) to designate one or more other users, or groups of users such as Whole Family or Adults.

In accordance with the present invention, each user is also able to call up a screen that shows the programs recorded for his or her user identity, as well as programs that have been recommended for his or her user identity by other users. 30 For example, screen 19, shows that the identity Dad has recorded a certain Golf program and a program entitled A man, a Plan, a Canal, Panama, which was recorded by Bob and designated Dad.

A status symbol (not shown) may also be displayed next to each program in list 19 indicating whether the program is not watched, partially watched, or watched. 35 If the user has designated a particular program to be watched by others, a viewed

status symbol may also indicate whether the designated viewers have viewed the program, or the extent to which the program has been viewed. Ratings of the program by viewers that have already watched the program can also be displayed. The order of presentation of the stored programs can be customized at setup time, for example to first list the programs that have already been watched by other household viewers. The PVR 26 also can provide a master list of all stored programs. If a program being watched is not completely watched, the PVR 26 stores the current position in the program, and marks the status as partially watched. After a program is completely watched, the PVR 26 automatically marks that program as having been watched by the current viewer. (However, this can be manually overridden.) The viewer can also be prompted to rate the program (thumbs up/thumbs down, or a numerical rating). When the last of the intended viewers has completely watched a program, the PVR 26 will prompt the viewer to delete the program, or to mark it for archiving.

When the PVR 26 is scheduled to record new programs, but not enough storage space exists, currently stored programs are deleted to free the space to record the new programs. The order in which programs are chosen for deleting can be based on more information than the recording date, such as is done by currently available PVRs. Deletion order can be based on the number of intended viewers who have not watched a program, for example a program that has 3 viewers remaining to watch it would be deleted after a program with only 2 viewers remaining to watch. Deletion order can also be based on how recently a program was watched by any viewers, for example a program that was last watched a month ago is deleted before one watched yesterday. Deletion order can also be based on priority of the intended viewers, for example the kids' programs are deleted before the parents'. Deletion order can also be based on the rating's assigned to a program by some of the viewers. In general a hierarchical decision tree on deletion order is possible based on the time of the recording, most recent viewing of a program, number of remaining viewers for the program, ratings or the program, and viewer priority.

Thus, in accordance with the present invention, a Deletion Order screen may be generated to allow customized deletion order when the storage system is full and there is insufficient storage space to record a new program. The present invention allows the user to designate a hierarchy for deciding which programs are to be deleted, wherein the illustrated possible selections are: 1. number of designated users who have not viewed the program; 2. the thumbs up or thumbs down ratings

assigned by those who have viewed the program; 3. how recently the program was viewed; and 4. Deleting programs in certain programming categories first, for example, children's programs last in the deletion order, or deleting adult programs last. The order of the hierarchy may be selected by the user (not shown) such that in  
5 the event that the first item is the same, i.e., the number of designated viewers who have viewed the program are the same, the next factor is considered.

Parental controls can be supported by optionally requiring each user to enter a password in order to login as a specific viewer, in order to be allowed to watch programs intended for that viewer. This allows different levels of control for different  
10 family members, i.e. teenagers are allowed to watch programs that younger children are not allowed to watch, but there are some programs stored on the PVR that the teenagers are not allowed to watch.

The steps described above may be implemented using software and programming techniques known to those skilled in the art.

15 Numerous modifications to and alternative embodiments of the present invention will be apparent to those skilled in the art in view of the foregoing description. Accordingly, this description is to be construed as illustrative only and is for the purpose of teaching those skilled in the art the best mode of carrying out the invention. Details of the structure may be varied substantially without departing from  
20 the spirit of the invention and the exclusive use of all modifications, which come within the scope of the appended claims, is reserved.

**CLAIMS**

What is claimed is:

1. A video recording system comprising:
  - a) a storage space;
  - 5 b) means for storing the identifications of a plurality of users;
  - c) means for logging in a user;
  - d) means for generating an on screen display (OSD) for allowing the logged in user to select a television program for recording in the storage space;
  - e) means for recording the selected television program in the storage space;
  - 10 and
  - f) means for generating a list of recorded programs available for viewing that is uniquely associated with the logged in user.
2. The system of claim 1, further including means to designate the selected television program for viewing by a different user so that after the selected and designated television program has been recorded, wherein the list generating means generates a list of television programs including those selected by the logged in user and any programs designated for the logged in user by any other user.
- 15 3. The system of claim 1, wherein the means for storing the identifications comprises means to store user names and passwords.
4. The system of claim 1, further comprising means to store data indicative of the users that have viewed a recorded television program, and the portion of the recorded television program viewed by a user if the program has been partially viewed.
- 25 5. The system of claim 1, further comprising means to delete recorded programs from the storage space according to a default deletion order or a user selected deletion order when the storage space is insufficient to record a scheduled program.
6. The system of claim 5, wherein the default or user selected deletion order is based a selected hierarchy based on
  - 30 a) the number of users which have not viewed the stored program;
  - b) how recently the recorded program was viewed by any user;
  - c) a category of user selected from children, teenagers, parents, and/or owner; or

- d) a thumbs up or thumbs down rating assigned to a program after viewing by a user.
7. The system of claim 1 wherein the storage space is one of a hard disk, optical media, and solid state memory.
- 5 8. The system of claim 1, further comprising
- g) means for a logged in user to view a television program or to view a portion of a television program stored in the storage space; and
- h) means to store data regarding each user which has viewed or partially viewed each stored television program, and the portion of the program
- 10 viewed by a user in the event of a partially viewed the program.
9. The system of claim 8, further comprising presenting information in the GUI as to which users have viewed or partially viewed each stored program.
10. The system of claim 9, wherein the means for storing the identifications comprises means to store user names and passwords.
- 15 11. A method of controlling the operation of a television recording and playback system used by a plurality of users comprising the steps of:
- a) logging in a first user of a plurality of users;
- b) receiving from the first user a selection of a television program to be recorded;
- 20 c) recording the television program selected by the first user; and
- d) displaying a list of recorded programs which includes programs selected for recording by the first user, which list is uniquely associated with the first user.
12. The method of claim 11, further including the step of identifying a plurality of
- 25 individual users and groups to which each identified individual user belongs.
13. The method of claim 11 further comprising the step of requiring a password when logging in a user.
14. The method of claim 11 further comprising the step of deleting recorded programs when storage space is required to record scheduled programs according to either a default protocol or a user selected protocol.
- 30 15. The method of claim 11 further comprising the step of, when storage space is required to record scheduled programs, deleting recorded programs according to a default or a user selected deletion protocol based on one or more of
- a) the number of permitted users which have not viewed the stored program;
- 35 b) how recently the recorded program was viewed by any permitted user;

- c) the category of permitted user(s) which have not completed watching the recorded program; and
  - d) any thumbs up or thumbs down ratings assigned to a stored program after viewing by permitted users.
- 5 16. The method of claim 11, further comprising the step of assigning a user to a group and accepting permissions according to groups and/or individuals.
17. A method of controlling the operation of a television recording and playback system used by a plurality of users comprising the steps of:
- a) logging in a first user of a plurality of users;
  - 10 b) receiving from the first user a designation of at least a second user for viewing a selected television program;
  - c) logging out the first user;
  - d) recording the selected television program;
  - e) logging in the second user; and
  - 15 f) displaying a list of recorded programs for the second user which includes the television program selected by the first user for viewing by the second user.
18. The method of claim 17, further including the step of identifying a plurality of individual users and groups to which each identified individual user belongs.
- 20 19. The method of claim 17, further comprising the step of requiring a password when logging in a user.
20. The method of claim 17, further comprising the step of deleting recorded programs when storage space is required to record scheduled programs according to either a default protocol or a user selected protocol.
- 25 21. The method of claim 17, further comprising the step of, when storage space is required to record scheduled programs, deleting recorded programs according to a default or a user selected deletion protocol based on one or more of
- e) the number of permitted users which have not viewed the stored program;
  - f) how recently the recorded program was viewed by any permitted user;
  - 30 g) the category of permitted user(s) which have not completed watching the recorded program; and
  - h) any thumbs up or thumbs down ratings assigned to a stored program after viewing by permitted users.
22. The method of claim 17, further comprising the step of assigning a user to a group and accepting permissions according to groups and/or individuals.
- 35

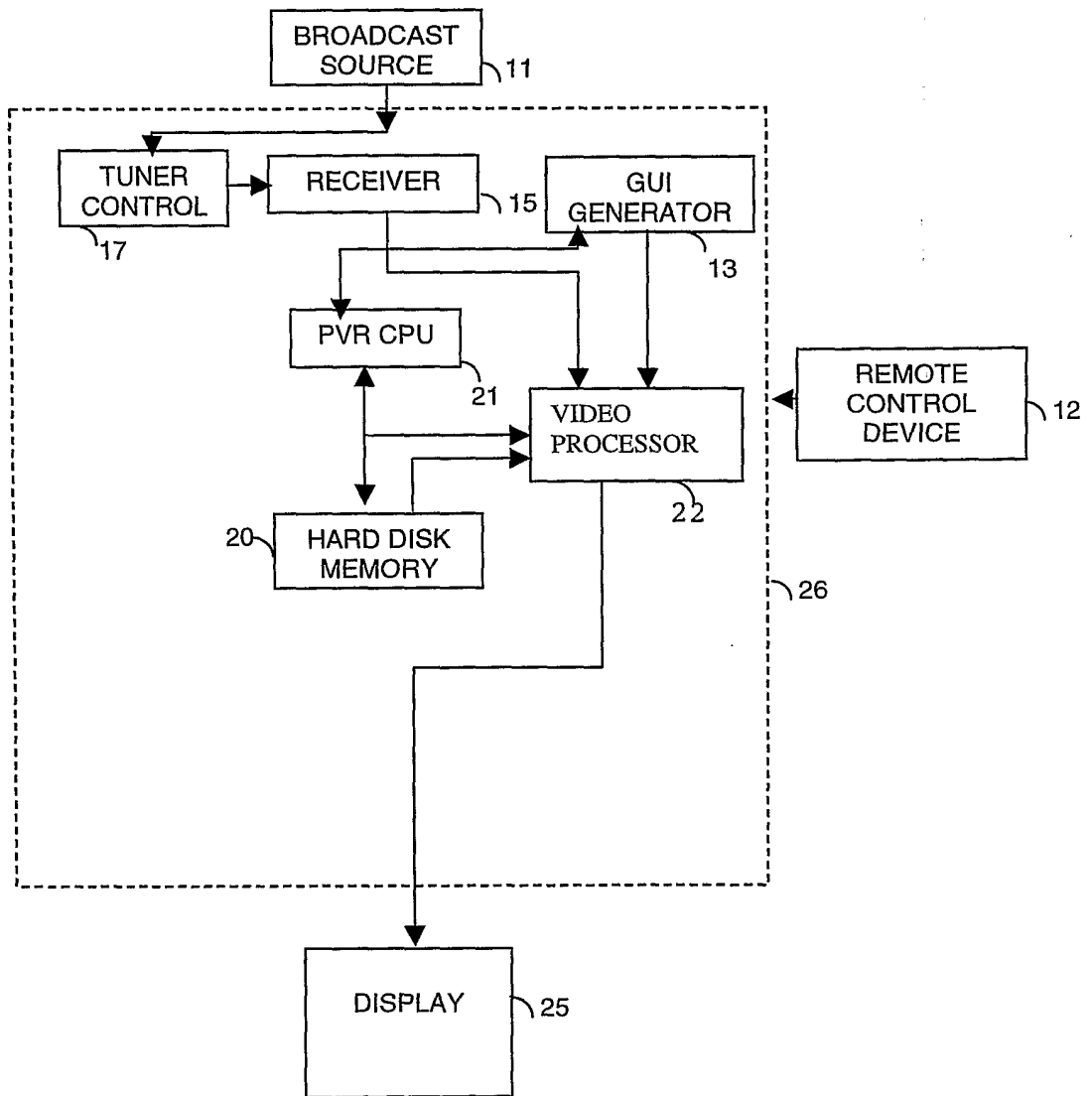


Fig. 1

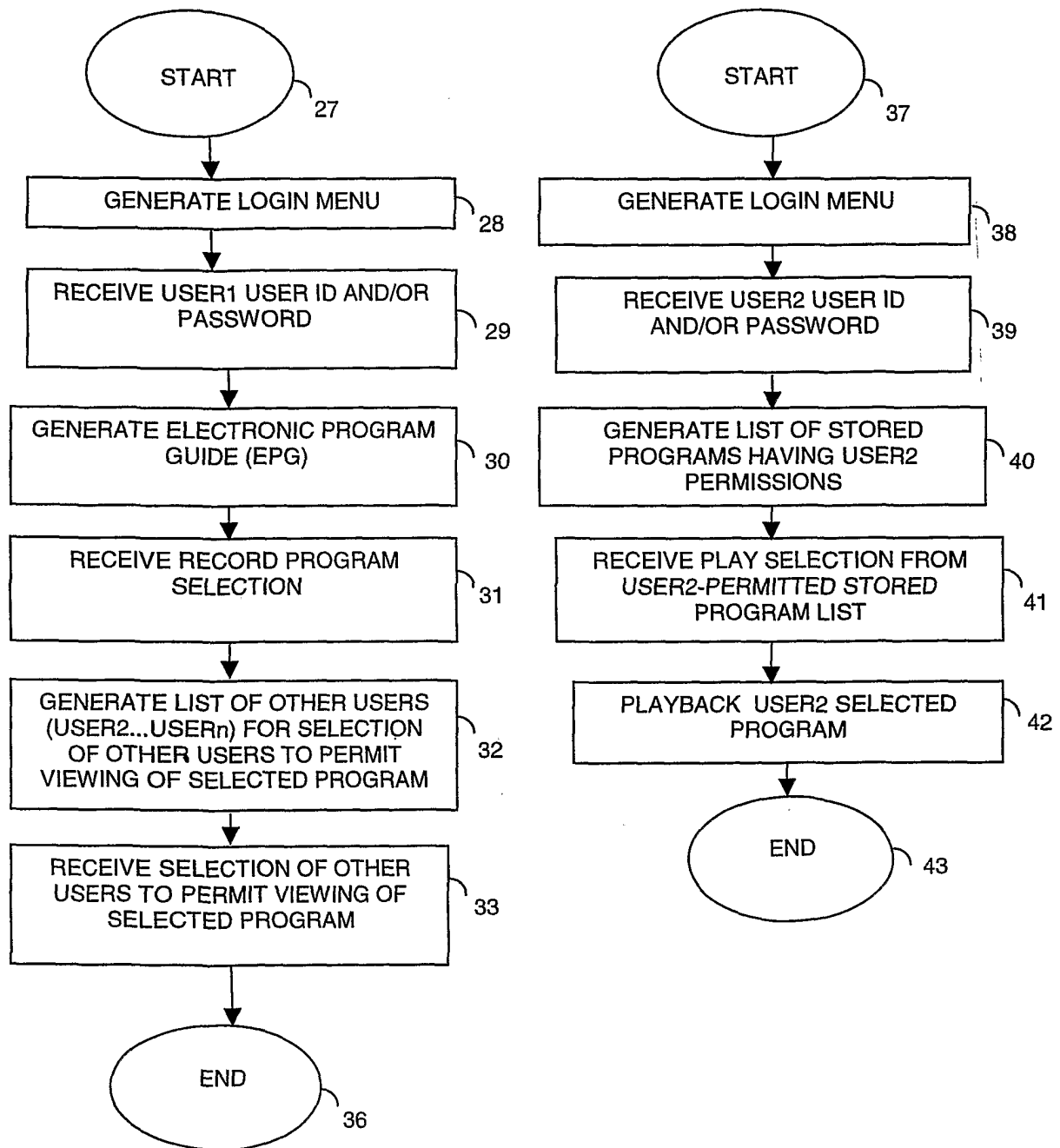


Fig. 2

**USER LOGIN**

Using the remote controller, highlight your user name or New User

Ana	Anna	Bob	Mom	Dad
Popop	Aviva	Momom	Sam	MargalitShoshana
Noah	Racheli	Natalie Paul		
		<b>NEW USER</b>		

14

**New User Setup**

Name: Mike  
 Password: ●●●●●  
 Reenter Password: ●●●●●  
 Age: 13  
 Group: Teen

15

**Programs to Record for Bob**

**Bob**, you have selected for recording: **A man, a plan, a canal, Panama**  
 Start time: 11:30 PM, Saturday January 1, 2000 Channel 10  
 Running time: 1:30 hours

16

**SAVE FOR OTHERS TO WATCH?**

Select one or more other viewers for this program using the Select button and then select Done:

Ana	Anna	<b>Bob</b>	Mom	Dad	Popop
<b>Aviva</b>	Momom	Sam	MargalitShoshana	Noah	
Racheli	Natalie Paul	Mike			
<b>Done</b>					

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**Deletion order**

If space is necessary, how should programs be deleted?  
 Select one or more:

1. Number of designated users who have not viewed the program
2. Based on thumbs up or thumbs down ratings assigned
- 3. How recently the program was viewed**
4. Delete children's programs last
5. Delete adult programs last

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**Recorded Programs for Dad:**

1) *A Man, A Plan, A canal: Panama*  
 (Learn about the fascinating story of the building of the Panama Canal recorded from the History Channel) -Recorded by Bob

2 *Golf* (Golf Lessons recorded from the Golf Channel)

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Fig. 3

# INTERNATIONAL SEARCH REPORT

Intern:      Application No  
PCT/US 02/35958

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7    H04N5/76

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)  
IPC 7    H04N    G11B

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 practical, search terms used)

EPO-Internal, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X  A	GB 2 346 251 A (IBM) 2 August 2000 (2000-08-02) abstract; figures 2-12 page 8, line 14 -page 14, line 24  -----	1, 3-5, 7, 11-14, 16  2, 6, 8-10, 15, 17-22

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Date of the actual completion of the international search

15 January 2003

Date of mailing of the international search report

24/01/2003

Name and mailing address of the ISA

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INTERNATIONAL SEARCH REPORT

Internat Application No  
PCT/us 02/35958

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2346251	A	02-08-2000	11-08-2000
		JP 2000224533 A	25-08-2000
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