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(54) **Title**: A CONTROL SYSTEM FOR A LOCAL TELEPRESENCE VIDEOCONFERENCING SYSTEM AND A METHOD FOR ESTABLISHING A VIDEO CONFERENCE CALL

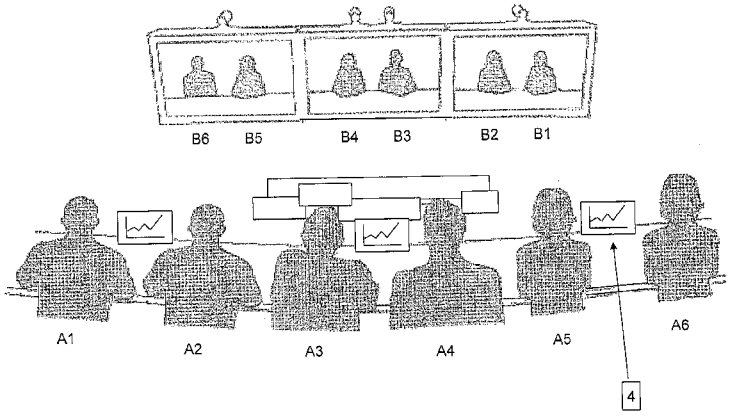

Figure 1

(57) **Abstract**: The invention relates to a control system for a local telepresence videoconferencing system, wherein the telepresence system comprises cameras and display screens, comprising: a graphical user interface comprising a left display icon, a center display icon, a right display icon, and contact field icons 8, wherein each of said contact field icons 8 is associated with a remote videoconference system, touch screen control display for displaying and manipulating the graphical user interface, and where said graphical user interface permits a user to pre-arrange respective assignments of display screens to one or more remote videoconference systems prior to establishing a connection with the one or more remote video conference systems and present an image on said touch screen control display of said respective assignments on said display screens prior to establishing said connection. The invention also relates to a method for establishing a video conference call between a local telepresence videoconferencing system and one or more remote video conferencing system.

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A CONTROL SYSTEM FOR A LOCAL TELEPRESENCE VIDEOCONFERENCING SYSTEM AND A METHOD FOR ESTABLISHING A VIDEO CONFERENCE CALL

CROSS-REFERENCE TO RELATED APPLICATIONS

The present provisional application contains related subject matter to U.S. provisional application filed March 16, 2007 and having Application Serial No. 60/895,331, Norwegian patent application No. 20071401, filed on March 16, 2007, and U.S. Patent Application 12/050,004 the entire contents of all these documents being incorporated herein by reference.

BACKGROUND

FIELD OF THE INVENTION

The present invention relates to a computer-processor based method and system for creating a dynamic interactive graphical user interface (GUI) for a videoconferencing system, method, and a computer system having telepresence features that visualizes how a video layout of a final call setup will be experienced for the users prior to the initiation of the videoconference.

DESCRIPTION OF THE RELATED ART

Conventional videoconferencing systems include a number of end-points that communicate real-time video, audio and/or data (often referred to as "duo video") streams over and between various networks such as WAN, LAN and circuit switched networks.

A number of videoconference systems residing at different sites may participate in a same conference, most often, through one or more MCU's (Multipoint Control Unit) performing, among other things, switching rate conversion, and transcoding functions to allow the audiovisual terminals to intercommunicate properly. The MCU also allows for aggregate presentation on one display of several end users located at different endpoints.

A compression of multimedia data to be transmitted, as well as a decompression of the multimedia data to be received, takes place in a processor unit conventionally referred to as a "codec" (coder/decoder).

As videoconferencing involves various resources and equipment simultaneously interoperating at different places with varying capabilities, there is also a need as recognized by the present inventor for the possibility to manage the resources involved both for

scheduled and ad hoc videoconferences through a video conference graphical user interface (GUI).

Video conferencing systems presently provide communication between at least two locations for allowing a video conference among participants situated at each endpoint. Conventionally, the video conferencing arrangements are provided with one or more cameras. The outputs of those cameras are transmitted along with audio signals to a corresponding plurality of displays at a second location such that the participants at the first location are perceived to be present, or face-to-face, with participants at the second location.

Telepresence systems are enhanced video conference systems. Typically, terminals in telepresence systems have a plurality of large scaled displays for life-sized video, often installed in rooms with interior dedicated and tailored for video conferencing, all to create a conference as close to personal face-to-face meetings as possible. The images captured by the plurality of high-definition cameras are usually arranged and displayed so that they generate a non-overlapping and/or contiguous field of view, as shown by example in Figure 19. This is in contrast to traditional so-called "Continuous presence" where several video streams are mixed (e.g. a mosaic) in an MCU from source images at endpoints and displayed together on one display in a screen split (N*M array).

Video cameras are arranged on top of the upper display screens in order to capture images of the local participants, which are transmitted to corresponding remote video conference sites.

A purpose of the setup shown in Figure 1 is to give the local participants (A1 to A6) a feeling of actually being present in the same meeting-room as the remote participants (B1 to B6) that are shown on the respective display screens.

Key factors in achieving a feeling of presence are the ability to see at whom the remote participants are looking, that all the participants are displayed in real life size and that all displayed participants appear equally sized relative to each other. Another provision for achieving high quality telepresence is that the images of the remote participants are presented to each local participant as undistorted as possible.

In order to obtain this feeling of presence, a set of rules, or a proprietary protocol, is used by the telepresence systems such as that described in U.S. Patent Application No. 12/050,004. That set of rules (or protocol) defines e.g. camera positions (pan, tilt zoom), codec connection scheme (which local codec should call which remote codec), etc. In known telepresence systems, the user dials (or selects from a phonebook) the remote telepresence sites (and/or other video endpoints) he/she wishes to join in the conference.

When the call is launched, the system decides how and where the different remote sites are displayed on the local displays. This may, for example, depend on call sequence (e.g. in a four-site multi-site call the first called site is displayed on the left screen, second called on center screen, and third called on right screen), or it may appear to be totally random.

This automatic call launch may not result in a layout as desired by the user. Suppose that one of the remote sites in a four-site multi-site call is the Board of Directors of a company. The other two remote sites are of ancillary status. The caller would most likely wish have the Board of Directors displayed on the centre display, undisturbed and unobstructed. This is almost impossible to control in current systems in an easy and user friendly way.

The eye-contact issue, and the feeling of participants from different sites being present in the same room is not fully resolved in conventional systems, as they capture the same picture and send the same to all the sites, thus making the movements of the participants look unnatural when they face a certain display (and associated camera) to talk to the participants displayed therein. Furthermore, with these telepresence systems, there is no conventional mechanism for interconnecting different telepresence sites that are located on different networks. Moreover, firewall traversal limits the ability to seamlessly establish connections between different telepresence sites. Thus conventional telepresence systems have been restricted to dedicated, high-bandwidth communication lines. Conventional "telepresence" systems are usually standalone systems that are not well integrated with other computer resources and video conference resources within a particular company's facilities. Users of these telepresence systems are handicapped by having relatively limited amount of flexibility in adding other non-telepresence systems endpoints, and establishing calls between telepresence endpoints and other non-telepresence endpoints.

A further problem is that conventional systems have a user operate/ configure the videoconference system via a non-graphical remote control as the connections are being made. This makes for a frustrating experience for users not familiar with the telepresence system at hand, particularly when an urgent meeting is about to begin.

SUMMARY

One aspect of the present invention is to address and resolve the above limitations with conventional systems, methods and computer program products.

The present invention relates to a control system for a local telepresence videoconferencing system, wherein the telepresence system comprises cameras and display screens, comprising:

a graphical user interface comprising a left display icon, a center display icon, a right display icon, and contact field icons, wherein each of said contact field icons is associated with a remote videoconference system,

touch screen control display for displaying and manipulating the graphical user interface, and where

said graphical user interface permits a user to pre-arrange respective assignments of display screens to one or more remote videoconference systems prior to establishing a connection with the one or more remote video conference systems and present an image on said touch screen control display of said respective assignments on said display screens prior to establishing said connection.

The present invention also relates to a method for establishing a video conference call between a local telepresence videoconferencing system and one or more remote video conferencing system, wherein the telepresence system includes cameras and display screens, said method comprises the steps of:

providing on a touch screen control display a graphical user interface comprising a left display icon, a center display icon, a right display icon, and available contact field icons 8, wherein each of said available contact field icons is associated with a remote videoconference system,

adding one or more remote video conference systems to the conference call prior to establishing a connection by selecting one or more of said available contact field icons;

pre-arrange respective assignments of display screens to one or more remote videoconference systems prior to establishing a connection with the one or more remote video conference systems;

present an image of said respective assignments on said touch screen control panel. Aspects of the control system and the method above are defined in the enclosed dependent claims.

In a first aspect, the present invention includes a computer-based video conference graphical user interface (GUI) adapted to communicate with other corresponding video conference arrangements, terminals and endpoints, the video conference arrangement including one or more displays, a computer processor with memory running software to create a GUI, hardware or wireless components to establish GUI access to the network and

thereby acquire remote teleconference end point contact information, hardware or wireless network access to the codec components that control the content of display screens and hardware of remote videoconferencing end points.

In another aspect, the GUI is resident on a mobile computer, personal data assistant (PDA), cell phone, or the like that may be taken out of the videoconference room to configure a videoconference.

In yet another aspect, the GUI is a graphics-based controller for configuring the conference before the first connection is made. This allows unsophisticated users an easy and non-stressful way to establish the teleconference system configuration by having a visual display of how the users will be displayed in a simulated telepresence room before the conference takes place, allowing a relatively unsophisticated user to feel confident that they have properly prepared for the telepresence session before it starts.

As should be apparent, the invention can provide a number of advantageous features and benefits. It is to be understood that, in practicing the invention, an embodiment can be constructed to include one or more features or benefits of embodiments disclosed herein, but not others. Accordingly, it is to be understood that the preferred embodiments discussed herein are provided as examples and are not to be construed as limiting, particularly since embodiments can be formed to practice the invention that do not include each of the features of the disclosed examples.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be better understood from reading the description which follows and from examining the accompanying figures. These are provided solely as nonlimiting examples of the invention. In the drawings:

Figure 1 is an illustration of a telepresence videoconferencing setup according to an embodiment of the invention;

Figure 2 illustrates the graphical user interface (GUI) of the control system according to the present invention;

Figure 3 illustrates the GUI of the control system selecting a contact candidate according to a further example of the present invention;

Figure 4 illustrates the GUI of the control system according to the present invention when has a selected two end point locations (a T3 telepresence system and a briefer) to participate in a call;

Figure 5 illustrates the user interface of the control system according to the present invention when a user has selected four end point locations to participate in the call (three T3 telepresence systems and one briefer);

Figure 6 illustrates the user dragging and dropping icons according to one embodiment of the present invention as shown in Figure 5;

Figure 7 is a graphical representation of sending call setup instruction set information from the control system to the codec(s);

Figure 8 is a logical flow chart of the steps required to set up a meeting using the graphical user interface (GUI) according to one embodiment of the present invention;

Figure 9 shows various screen shots of the GUI according to the present invention,

Figure 10 is an illustration of an enterprise WAN/ LAN where the GUI would have access to videoconferencing contact information;

Figure 11 is an illustration of a monitor and camera arrangement for a telepresence videoconference system;

Figure 12 is an illustration of the codec arrangement supporting a telepresence videoconference system;

Figure 13 is an illustration of a GUI showing speed dial 5, contact fields 8, and phone book icons 7 according to one embodiment of the present invention,

Figure 14 is an illustration of a telepresence videoconferencing meeting with six local participants (A1 to A6) and a briefer according to one embodiment of the present invention;

Figure 15 is an illustration of a telepresence videoconferencing meeting with four local T3 participants (A2 to A5) and three briefers according to one embodiment of the present invention;

Figure 16 is an illustration of the GUI keypad 6 according to one embodiment of the present invention;

Figure 17 is an illustration of a T3 telepresence videoconferencing meeting with four telepresence participants (one local and three remote);

Figure 18; is a photo image of a T3 telepresence videoconference in session with combo displays on the desk according to one embodiment of the present invention;

Figure 19; is a photo image of a T3 telepresence videoconference in session with combo displays on the desk from the vantage point of a user according to one embodiment of the present invention;

Figure 20; is a photo image of a T3 telepresence videoconference in session with combo displays that configured multiple-sized picture-in-picture screens in multiple displays according to one embodiment of the present invention;

Figure 21; is a diagram of codec connections according to one embodiment of the present invention; and

Figure 22; is a diagram of point-to-point telepresence relationships with H323 endpoint connected according to one embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference will now be made in detail to the present preferred embodiments of the invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference characters will be used throughout the drawings to refer to the same or like parts.

Figure 11 shows the monitor and camera arrangement for a novel system for providing realistic presence of participants in a videoconference by way of standards-based communication. An endpoint compliant with this system is disclosed in Figures 11, 18, 19, and 20. At least one codec (Figures 12, 21, and 22) and one camera (10-13) are associated with each display. The displays 1-3 (or 1-n) are preferably large-scaled flat high-definition screens or projections placed side by side with the high definition cameras respectively placed on top of the displays or within the projections. As recognized by the present inventors, the distance between the left edge of display 1 and the right edge of display 3 can be a fairly far distance such as 10 feet or more. Consequently, as recognized by the present inventors, when a participant is looking toward remote participants displayed in the display 1, the user's head will be turned towards those users. As such, if one of the cameras 11, 12 or 13 were to capture the image of the user, that image would appear as though the users head is turned towards a different direction. In contrast, an image captured by camera 10 would give the appearance to the participants displayed in display 1 that that participant is looking at them. Therefore, the distribution of the cameras 10-13 is preferable distributed across the three displays 1, 2 and 3 as shown. This effect will give the "turn-to" feel towards participants at remote sites. This "turn-to" perception, gives the impression to the remote participants that the user is either looking towards them when communicating with them or turned to one of the other remote participants when the user is speaking with them directly.

Figure 1 is a schematic view illustrating a telepresence videoconferencing system with a "combo display" 4.

A display device of a videoconferencing device, in particular a videoconferencing terminal of the telepresence type, is arranged in front of one or more local conference participants. The local participants are located along a table, facing the display device which includes one or more display screens. In the illustrated example, three display screens are included in the display device. Left, center, and right display screens are arranged adjacent to each other. These screens are used for displaying images captured at one or more remote conference sites of a corresponding telepresence type. In a point to point call between two telepresence systems, a typical setup has a maximum of six participants at each local site and where two participants are displayed at each screen from the respective remote site. In a multisite call between (3-4 telepresence sites), a typical setup has a maximum of four participants at each local site and where four participants (or one remote site) is displayed at each screen from the respective remote sites (not shown). This reduces the telepresence feeling because the displayed participants appear smaller on the display, but allows for the inclusion of a third T3 telepresence-capable endpoint while maintaining a telepresence experience for the participants.

A different display device that is small enough to fit on a videoconference table is referred to as a combo display. One or several combo displays may be arranged at the table where the participants are seated. In a typical use, the combo screen may be used for computer-generated presentations, to provide access to the GUI, or to access other secondary conference information. The combo display may be a touch screen activated to enable users to efficiently manipulate the icons and other information on the display.

There is also a combo display 4 located at the meeting participant's table being reserved for the GUI to set-up and initiate the conference, allow data input, and allow the viewing of presentations and shared applications (such as computer graphics) or for communicating with regular (e.g., H. 323) videoconferencing endpoints usually having only one camera and capable of displaying several sites in the same display.

Figure 23 illustrates a computer system 1201 upon which an embodiment of the present invention may be implemented. The computer system 1201 includes a bus 1202 or other communication mechanism for communicating information, and a processor 1203 coupled with the bus 1202 for processing the information. The computer system 1201 also includes a main memory 1204, such as a random access memory (RAM) or other dynamic storage device (e.g., dynamic RAM (DRAM), static RAM (SRAM), and synchronous DRAM

(SDRAM)), coupled to the bus 1202 for storing information and instructions to be executed by processor 1203. In addition, the main memory 1204 may be used for storing temporary variables or other intermediate information during the execution of instructions by the processor 1203. The computer system 1201 further includes a read only memory (ROM) 1205 or other static storage device (e.g., programmable ROM (PROM), erasable PROM (EPROM), and electrically erasable PROM (EEPROM)) coupled to the bus 1202 for storing static information and instructions for the processor 1203.

The computer system 1201 also includes a disk controller 1206 coupled to the bus 1202 to control one or more storage devices for storing information and instructions, such as a magnetic hard disk 1207, and a removable media drive 1208 (e.g., floppy disk drive, read-only compact disc drive, read/write compact disc drive, compact disc jukebox, tape drive, and removable magneto-optical drive). The storage devices may be added to the computer system 1201 using an appropriate device interface (e.g., small computer system interface (SCSI), integrated device electronics (IDE), enhanced-IDE (E-IDE), direct memory access (DMA), or ultra-DMA).

The computer system 1201 may also include special purpose logic devices (e.g., application specific integrated circuits (ASICs)) or configurable logic devices (e.g., simple programmable logic devices (SPLDs), complex programmable logic devices (CPLDs), and field programmable gate arrays (FPGAs)).

The computer system 1201 may also include a display controller 1209 coupled to the bus 1202 to control a display 1210, such as a cathode ray tube (CRT), for displaying information to a computer user. The computer system includes input devices, such as a keyboard 1211 and a pointing device 1212, for interacting with a computer user and providing information to the processor 1203. The pointing device 1212, for example, may be a mouse, a trackball, or a pointing stick for communicating direction information and command selections to the processor 1203 and for controlling cursor movement on the display 1210. In addition, a printer may provide printed listings of data stored and/or generated by the computer system 1201.

The computer system 1201 performs a portion or all of the processing steps of the invention in response to the processor 1203 executing one or more sequences of one or more instructions contained in a memory, such as the main memory 1204. Such instructions may be read into the main memory 1204 from another computer readable medium, such as a hard disk 1207 or a removable media drive 1208. One or more processors in a multi-processing arrangement may also be employed to execute the sequences of instructions contained in

main memory 1204. In alternative embodiments, hard-wired circuitry may be used in place of or in combination with software instructions. Thus, embodiments are not limited to any specific combination of hardware circuitry and software.

As stated above, the computer system 1201 includes at least one computer readable medium or memory for holding instructions programmed according to the teachings of the invention and for containing data structures, tables, records, or other data described herein. Examples of computer readable media are compact discs, hard disks, floppy disks, tape, magneto-optical disks, PROMs (EPROM, EEPROM, flash EPROM), DRAM, SRAM, SDRAM, or any other magnetic medium, compact discs (e.g., CD-ROM), or any other optical medium, punch cards, paper tape, or other physical medium with patterns of holes, a carrier wave (described below), or any other medium from which a computer can read.

Stored on any one or on a combination of computer readable media, the present invention includes software for controlling the computer system 1201, for driving a device or devices for implementing the invention, and for enabling the computer system 1201 to interact with a human user (e.g., print production personnel). Such software may include, but is not limited to, device drivers, operating systems, development tools, and applications software. Such computer readable media further includes the computer program product of the present invention for performing all or a portion (if processing is distributed) of the processing performed in implementing the invention.

The computer code devices of the present invention may be any interpretable or executable code mechanism, including but not limited to scripts, interpretable programs, dynamic link libraries (DLLs), Java classes, and complete executable programs. Moreover, parts of the processing of the present invention may be distributed for better performance, reliability, and/or cost.

The term "computer readable medium" as used herein refers to any medium that participates in providing instructions to the processor 1203 for execution. A computer readable medium may take many forms, including but not limited to, non-volatile media, volatile media, and transmission media. Non-volatile media includes, for example, optical, magnetic disks, and magneto-optical disks, such as the hard disk 1207 or the removable media drive 1208. Volatile media includes dynamic memory, such as the main memory 1204. Transmission media includes coaxial cables, copper wire and fiber optics, including the wires that make up the bus 1202. Transmission media also may also take the form of acoustic or light waves, such as those generated during radio wave and infrared data communications.

Various forms of computer readable media may be involved in carrying out one or more sequences of one or more instructions to processor 1203 for execution. For example, the instructions may initially be carried on a magnetic disk of a remote computer. The remote computer can load the instructions for implementing all or a portion of the present invention remotely into a dynamic memory and send the instructions over a telephone line using a modem. A modem local to the computer system 1201 may receive the data on the telephone line and use an infrared transmitter to convert the data to an infrared signal. An infrared detector coupled to the bus 1202 can receive the data carried in the infrared signal and place the data on the bus 1202. The bus 1202 carries the data to the main memory 1204, from which the processor 1203 retrieves and executes the instructions. The instructions received by the main memory 1204 may optionally be stored on storage device 1207 or 1208 either before or after execution by processor 1203.

The computer system 1201 also includes a communication interface 1213 coupled to the bus 1202. The communication interface 1213 provides a two-way data communication coupling to a network link 1214 that is connected to, for example, a local area network (LAN) 1215, or to another communications network 1216 such as the Internet. For example, the communication interface 1213 may be a network interface card to attach to any packet switched LAN. As another example, the communication interface 1213 may be an asymmetrical digital subscriber line (ADSL) card, an integrated services digital network (ISDN) card or a modem to provide a data communication connection to a corresponding type of communications line. Wireless links may also be implemented. In any such implementation, the communication interface 1213 sends and receives electrical, electromagnetic or optical signals that carry digital data streams representing various types of information.

The network link 1214 typically provides data communication through one or more networks to other data devices. For example, the network link 1214 may provide a connection to another computer through a local network 1215 (e.g., a LAN) or through equipment operated by a service provider, which provides communication services through a communications network 1216. The local network 1214 and the communications network 1216 use, for example, electrical, electromagnetic, or optical signals that carry digital data streams, and the associated physical layer (e.g., CAT 5 cable, coaxial cable, optical fiber, etc). The signals through the various networks and the signals on the network link 1214 and through the communication interface 1213, which carry the digital data to and from the computer system 1201 maybe implemented in baseband signals, or carrier wave based

signals. The baseband signals convey the digital data as unmodulated electrical pulses that are descriptive of a stream of digital data bits, where the term "bits" is to be construed broadly to mean symbol, where each symbol conveys at least one or more information bits. The digital data may also be used to modulate a carrier wave, such as with amplitude, phase and/or frequency shift keyed signals that are propagated over a conductive media, or transmitted as electromagnetic waves through a propagation medium. Thus, the digital data may be sent as unmodulated baseband data through a "wired" communication channel and/or sent within a predetermined frequency band, different than baseband, by modulating a carrier wave. The computer system 1201 can transmit and receive data, including program code, through the network(s) 1215 and 1216, the network link 1214 and the communication interface 1213. Moreover, the network link 1214 may provide a connection through a LAN 1215 to a mobile device 1217 such as a personal digital assistant (PDA) laptop computer, or cellular telephone

A telepresence compliant endpoint as described above will from now on be described as a telepresence system. One aspect of "telepresence" is that, generally, the display size of an individual at the remote site is generally life size. As such, the division of a particular screen in the telepresence system does not reduce the size of the display of a person at a remote endpoint. Moreover, a six-foot person would be displayed having generally the same size as if seen in real life. This is in contrast to a traditional continuous presence layout in a traditional MCU-based video conference call, where when additional parties are included in the telepresence system, the screen is further divided and the size of the participant is displayed in a smaller area. The addition of a non-telepresence participant in the system shown in Figure 11 would be displayed in either the left, center, or right displays 1,2,3 in a smaller "picture-in-picture" image as represented in the GUI shown in Figure 4.

According to an aspect of the present invention, a conference between telepresence systems is arranged by setting up site-to-site connections between respective codecs of the endpoints, even if the conference is a multi-site conference. Which codecs in which endpoints (because there are multiple endpoints as will be discussed) to connect to each other, are selected to optimize the feeling of presence for the participants in the conference. As an example, when the codec associated with the right camera and the right screen of site A in a conference is directly connected in a video conference link to the codec associated with the left camera and the left screen of site B, the participants of site A will experience that the participants of site B turn to them when the participants of site B look at the left screen where

the participants of site A are displayed. Examples on how this will effect the selection of connections paths in different conference constellations are discussed further below.

According to one aspect of the present invention, when a conference is established, the telepresence system initiating the conference is the master site. The master site controls the other telepresence systems in the conference keeping track of at least the status, identifying addresses of codecs, controlling the establishment of the conference, and rearranging the communication links when a telepresence systems joins or leaves during the conference.

At the master site there is a touch screen control panel ("combo panel" or "combo screen") 4 having a user interface. The purpose of the user interface is to efficiently enable the user to readily access the contact information for other sites, establish the contact links and configure the participants and cameras to optimize the telepresence experience. A combo display panel enables either the presentation materials to be shown on the display as well as the graphical user interface (GUI) as needed for operation and system set-up. The combo panel(s) may be available in one or more locations on the desk where meeting participants are seated during a videoconference as shown in Figure 1. The combo panel may be detachably attached to a docking station or port so as to communicate with the master codec and other components. The combo panel may also "connect" wirelessly with the master codec or an intermediate radio frequency (RF) or infra-red (IR) sensor configured to send and receive data.

The graphical user interface (GUI) 100 available to be viewed on the combo control panel is shown in Figure 2 in its nominal state when no meeting has yet been set up. The various icons shown in the GUI in its nominal state are the: left display 1, center display 2, right display 3, speed dial 5, keypad 6, phone book 7, and available contact field icons 8. See Figures 13 and 16.

The speed dial 5 selector is located at the center of the GUI and contains a selectable field for each contact that the user intends to call frequently. See Figure 13. The design of the speed dial 5 organizes these names alphabetically, but other embodiments include having the speed dial organize the contacts in a customized order specified by the user as to importance to the user or alternatively by the frequency of use. The user may select a contact to participate in a call by either clicking the corresponding contact field or by dragging and dropping a contact to a desired left, center, or right display icon.

The left, center, and right display icons represent the content of the actual left, center, and right displays at the master site. The content of these display icons will depend on the

videoconference status and the configuration selected. In the nominal state and when a configuration has been selected so that there are no participants designated to be viewed in a given display, then the respective display icon will be empty as shown in Figure 13 for the left, center, and right displays 1, 2, 3. In the active state when a remote participant is designated to be viewed in a display icon, then one or more avatars 20 will appear in a display icon to indicate that the maximum number of participants available to be viewed in the corresponding display within the site. See Figure 5. Further a status bar will appear above the window to designate the location of the participants who will be viewed in that display, as well as a direct telephone icon 9 illustrated in Figure 3. If activated by the user, the direct telephone icon would initiate a videoconference with the specific location designated on the status bar. The videoconference could be initiated and include all participant end points by activating the start meeting icon 21 at any time after meeting participants are selected using the GUI 100. Some display icons may contain avatars 20, but may not have status bars 9 above them such as in Figure 3. When only one status bar 9 appears above only one display icon 41, 42, 43 although multiple display icons are occupied by avatars in the GUI it merely indicates avatars in the display icons are all from the same remote location and only one status bar has been provided to reduce redundancy. Other embodiments of the GUI may include status bars that provide other functions, such as deactivating a display 1, 2, 3 in the conference corresponding to that display icon 41, 42, 43. Instead of a generic avatar, images of certain users will appear if those users are identified as participants in the conference, and an image of their likeness can be saved in memory.

Sometimes meeting participants from multiple remote sites may be represented in a single display icon 41, 42, 43. In this case multiple status bars 9 may be exhibited on the GUI to identify the each possible meeting participant. For example, in the center display icon in Figure 4, two avatars 20 represent two available meeting participants from Barcelona and one smaller avatar in the same display icon represents a different meeting participant.

As described earlier, a user selects contacts to be included in a call by either clicking contact field in the speed dial 5 or dragging or dropping a contact field 8 to a desired left, center, or right display icon where the contact may ideally be viewed during a conference. The GUI responds to the user selecting a contact field by populating the left, center, and right display icons 41, 42, 43 with avatars depending on the configuration of the equipment at the remote end point, the quantity of remote end points to be included in the call and the preferred location of each of these remote end points on the screen.

In an exemplary embodiment, the GUI is ideally designed to configure conferences with other three camera (T3) telepresence systems; however, it also enables the user to set up video conferences with: single screen (T1) telepresence systems, personal non-telepresence video conferences, a non-telepresence meeting teleconference, and/ or other videoconferencing units.

In the point-to-point call to another T3 teleconference system, the avatars can be displayed in the GUI as shown in Figure 9(a). For example, each T3 site has three displays 1, 2, 3 and each corresponding display icon 41, 42, 43 is populated by two avatars 20 meaning that that up to two meeting participants may appear in each of the displays nominally resulting in a total of up to six people to participate from each side. The GUI 100 can also configure the telepresence system to operate in directional audio stereo and the cameras will capture each group of up to two participants with predefined pan, tilt, and zoom capability.

An alternative configuration is provided for when additional end points are added to a point-to-point call with another T3 teleconference system. Using the GUI, the user has the ability to designate a single non-telepresence system to be added to the conference. A single non-telepresence end point is also known as a "briefer." The user may place a briefer in either the left, center, or right displays 1, 2, 3 by using the GUI. This results in a picture-in-picture image within a display. When this configuration is arranged within the GUI, it appears as shown in the example of Figure 4. In this case, the two T3 telepresence systems can still provide directional audio stereo. The cameras can each be able to capture a group of two participants with the capability for predefined pan, tilt, and zoom. However, a picture of the briefer will appear as a smaller picture within either the left, center, or right displays and their respective icons in the GUI. The smaller picture is also known as a "picture-in-picture." In this case the briefer can receive a voice-switched picture of either of the T3 telepresence systems also on the call. The voice-switched picture received by the briefer's videoconferencing system can depend on which T3 end point is talking louder into the videoconferencing system. The voice-switched picture received by the briefer will be a video image from all three cameras stitched together to show only participants from the single remote T3 telepresence end point. The briefer can also receive mono audio corresponding to the voice switched picture.

Alternatively, instead of a point-to-point call with another T3 telepresence system, the user may configure a videoconference with up to three briefers, each may occupy their own display as represented by avatars in each left, center, and right display icons 41, 42, 43. See Figure 9(d). In this meeting configuration, the GUI enables the user's T3 telepresence system

to receive only mono audio from each briefer participating in the call. The image that the briefer receives is dependent upon whether there is one or multiple briefers on the call. If there is a call with one briefer, then the briefer will view all possible six participants at the T3 telepresence end point where each camera captures up to two participants at the user's T3 telepresence end point and each camera has a predefined pan, tilt, and zoom. The corresponding GUI is shown in Figure 9(c) and the resulting meeting is shown in Figure 14. In the case where there are more than one briefer on the call then briefers may see four participants from the user's T3 room and each briefer may see the other briefers, but not themselves. Figure 15 shows the resulting meeting and Figure 9(d) shows the GUI that creates the meeting. Figure 15 shows hatch mark outlined white images (only A1 and A6) who are not in the videoconference because they are outside the active camera angle required for telepresence.

The GUI also can enable the user to configure a call setup with multiple telepresence systems. A set up with multiple telepresence systems can be called a "roundtable", "continuous presence", or "OneTable." In the roundtable setup only four participants may be viewed from any telepresence system available on the call. The participants are shown in Figure 17 and the corresponding GUI is shown in Figure 9(e). The telepresence system in this example is limited to showing four participants instead of the six participants available in other configurations due to the camera angle needed to maintain the telepresence experience. However, briefers can also be added to the roundtable conference call and are exhibited as a picture-in-picture as shown in Figure 5.

Moreover, the GUI may configure a call setup with multiple telepresence showing all six participants from each site except the user's endpoint can only be able to see one telepresence endpoint at a time. The GUI allows the user to switch between each telepresence endpoint on the call using icons on the GUI. See Figure 9(f).

The Keypad icon 6 is used to add endpoints to the conference when they are not available in the Speed Dial 5. The keypad has icon buttons to enter the phone number of desired conference participants and the GUI 100 can enable the number to be called when the conference is to begin. When participants are added to the conference via the Keypad 6, the GUI and its associated logic assume these added participants are briefers.

The Phone Book icon 7 is used in a similar manner as the Speed Dial as to selecting meeting participants and adding their names to the display icons. The difference between the phone book icon 7 and speed dial icon 5 is that the Phone Book is provided to be an extensive listing of possible videoconferencing participants that is not as customizable by the user as

the Speed Dial. The GUI can access Phone Book entry fields via the network for example. One embodiment is to populate Phone Book using the Tandberg Management Suite (TMS), or similar Management and Scheduling Software for Videoconferencing Networks, which is based on a LAN/ WAN enterprise network as shown in Figure 10. Other options are to add information manually, or to automatically populate attributes based on a previous call to particular sites. An example attribute is the type of system, e.g., 3-screen telepresence (T3); 2-screen telepresence (T2); one-screen telepresence (T1); personal video endpoint; and meeting room system. A Multipoint Control Unit (MCU) may be used to allow for providing compatible communications between Tandberg-made telepresence systems and non-Tandberg-made telepresence systems such as Cisco, Polycom, and others.

The GUI of one or more embodiments enables the user, as desired, to place important persons in more prominent positions in the left, center, or right displays within the restriction of the equipment capabilities. Figure 6 shows a situation where the meeting participants from the right display icon have been moved to the left display icon by dragging and dropping the avatar icons in the GUI. The image on a telepresence videoconference display 1, 2, 3 is dependent upon codec hardware. The control system can send updated instructions to the codec hardware responsible for the corresponding displays so that the images appear in the desired displays and that cameras with appropriate camera angles are used to record the meeting participants making eye contact with the correspondingly updated display contents, and that other video conferencing recourses (such as MCU's) are incorporated if needed, see Figure 7.

Figure 8 shows a flow chart describing the process steps for identifying meeting participants, configuring a meeting, and sending the instructions to the various codecs according to an example. The process begins in step S1 where a user generates an "empty" GUI. The user may access the GUI from any combo display which is located in the conference room containing the user's endpoint. The GUI is usually empty when the user's end point is not in use, but if the GUI is not empty then the user may drag and drop any contents of a display icon out of the display icon until all display icons are empty. The combo screen is a touch sensitive screen and the user may drag and drop with the touch of her finger to the screen. Alternative embodiments may allow dragging and dropping with the use of a mouse and cursor or via voice commands. The process then proceeds to step S2 where the user adds parties to the conference being setup. The user adds each party by clicking the contact field icon for every party to participate in the conference. The contact fields may be in the Speed Dial 5 or the Phone Book 7. When a contact field icon is selected by the user,

then the GUI can use the information about the videoconferencing system to determine which display screens can be used to display the participants associated with that contact field. The process then moves to step S3 where the GUI can indicate the displays that it might use for displaying these conference participants by populating those selected displays with avatars to enable the user to "visualize" the call. See Figures 5 and 8. Once the GUI reflects the current setup with avatars then the process moves back to step S2 where the user has the opportunity to add, remove, or move a party in a display. The user may move participants from one display screen to another by dragging and dropping avatars into different display icons. Figure 6 depicts four avatars from the right display icon being moved to the left display icon. Sometimes the teleconference equipment does not allow participants to be associated with different displays because of camera angles that prevent telepresence characteristics or other data bandwidth limitations. In these cases when the user attempts to move the avatar to a display where the system cannot accommodate the move, then the GUI will not allow the avatars to be moved. Lastly, a user may remove a participant by dragging and dropping outside of the display icon. See Figure 6.

The user may begin process step S4 when no additional parties need to be moved, removed, or added. In step S4 the user presses the "call setup" icon to start the meeting. The "call setup" icon is depicted in Figure 5. Once the icon is pressed then a series of process steps follow to begin the call. In the next step, the computerized control system automatically collects all information relative to the parties that are to participate in the meeting. See Figure 7. The control system transfers this information to a Scenario Manager to generate instruction sets for the local telepresence equipment to set up the call and for the remote equipment at the other end points. The scenario manager can be hardware and software that converts the information configured in the GUI to information needed by the codecs to initiate the videoconference and operate during the videoconference. The process automatically moves to step S6 where the instructions generated in the control system are sent to the local and remote end points to set up the call. The instructions, consistent with standards-based communications, are incorporated in an open field in the message flow specifying the control protocol of establishing video conference call, such as ITU H.241, H.242 or H.243. A controller, processor for a master codec, or remote control of the present invention may be implemented consistent with the corresponding description contained in commonly owned US Patent No. 7,295,613 and U.S. patent application 60/895,331, the entire contents of which being incorporated herein by reference.

Another embodiment of the invention stores remote teleconference contact information in the GUI for conference calls that were made previously. This information would be made accessible automatically to the user in the GUI the next time the GUI is used to set up a future meeting.

Another embodiment of the invention allows a user to configure a videoconference meeting real-time during a telepresence videoconference session. This GUI ability would allow the user to change the position of various participants on the display screens 1, 2, 3 as needed.

Another embodiment of the invention stores future meeting configurations in a scheduling program such as Microsoft® Office Outlook® or a scheduling program resident in the GUI so that the future teleconferences may be associated with specific meeting dates and times.

Another embodiment of the invention provides the ability to shut down the meeting in progress by providing a shutdown icon in the GUI.

Another embodiment of the invention allows the user to enter into the GUI information about the specific upcoming conference (e.g., distance from the cameras to the participants, number of participants, or layout of the participants' seating locations within the videoconference room) to enable the videoconference system to properly adjust the system to accommodate that meeting.

Another embodiment of the invention allows users to enter into the GUI the names and seating locations of various participants and this information will be used by the videoconference system to place "virtual name tags" on the display screens showing the participants' images during the videoconference.

Further, it should be appreciated that the exemplary embodiments of the invention are not limited to the exemplary embodiments shown and described above. While this invention has been described in conjunction with exemplary embodiments outlined above, various alternatives, modifications, variations and/or improvements, whether known or that are, or may be, presently unforeseen, may become apparent. Accordingly, the exemplary embodiments of the invention, as set forth above are intended to be illustrative, not limiting. The various changes may be made without departing from the spirit and scope of the invention. Therefore, the systems and methods according to exemplary embodiments of this invention are intended to embrace all now known or later-developed alternatives, modifications, variations and/or improvements.

CLAIMS:

1. A control system for a local telepresence videoconferencing system, wherein the telepresence system comprises cameras and display screens, comprising:

a graphical user interface comprising a left display icon, a center display icon, a right display icon, and contact field icons 8, wherein each of said contact field icons 8 is associated with a remote videoconference system,

touch screen control display for displaying and manipulating the graphical user interface, and where

said graphical user interface permits a user to pre-arrange respective assignments of display screens to one or more remote videoconference systems prior to establishing a connection with the one or more remote video conference systems and present an image on said touch screen control display of said respective assignments on said display screens prior to establishing said connection.

2. A control system according to claim 1, where said touch screen control display is available in one or more locations on a desk where local meeting participants are seated during a videoconference.

3. A control system according to one of the preceding claims, where said local telepresence systems includes three display screens, and where the left, center, and right display icons represent the content of an actual left, center, and right display screen at the local telepresence system.

4. A control system according to claim 1, where said graphical user interface is configured to, in response to a user selecting a contact field, to populate the left and/or center and/or right display icons 41, 42, 43 with avatars based on the configuration of the remote video conference system associated with the selected contact field, the quantity of remote video conference systems to be included in the call and/or the preferred location of each of these remote video conference systems on the screen.

5. A control system according to claim 4, where said graphical user interface is further configured to allow a user to move participants from one display screen to another by dragging and dropping avatars into different display icons.

6. A control system according to claim 4, where said graphical user interface is further configured to allow a user to remove participants from the conference by dragging avatars from a display icon and dropping said avatars on any location not occupied by a display icon.

7. A control system according to claim 4, where selecting a contact field comprises:
touching a contact field icon 8 in a speed dial 5 or a phone book 8, or
dragging and dropping a contact field icon 8 to a desired left, center, or right display icon.

8. A control system according to claim 1, where said graphical user interface is configured to pre-arrange perspective assignments of display screens to one or more remote videoconference systems prior to establishing a connection with the one or more remote video conference systems based on the following set of rules:

if only one remote telepresence system is selected to participate in a conference, each of said left, center, and right display icons are populated with two avatars 20,

if two or more remote telepresence systems are selected to participate in a conference, two or more of said left, center, and right display icons are each populated with four avatars,

if only one or more remote non-telepresence systems are selected to participate in a conference, one or more of said left, center, and right display icons are each populated with one avatar,

if a remote non-telepresence systems is selected to participate in a conference together with one or more telepresence systems, one of said left, center, and right display icons are populated with a small avatar on top of already present avatars, or if one of the display icons are not already populated by avatars representing a telepresence or a non-telepresence system the empty display icons are populated with one avatar.

9. A control system according to one of the preceding claims, further comprising a scenario manager configured to, in response to a user instructing the local video conference to establish said connection via said graphical user interface,

generate instruction sets for the local telepresence system based at least on said respective assignments.

10. A method for establishing a video conference call between a local telepresence videoconferencing system and one or more remote video conferencing system, wherein the telepresence system includes cameras and display screens, said method comprises the steps of:

providing on a touch screen control display a graphical user interface comprising a left display icon, a center display icon, a right display icon, and available contact field icons 8, wherein each of said available contact field icons 8 is associated with a remote videoconference system,

adding one or more remote video conference systems to the conference call prior to establishing a connection by selecting one or more of said available contact field icons 8;

pre-arrange respective assignments of display screens to one or more remote videoconference systems prior to establishing a connection with the one or more remote video conference systems;

present an image of said respective assignments on said touch screen control panel.

11. A method according to claim 10, where said touch screen control display is available in one or more locations on a desk where local meeting participants are seated during a videoconference.

12. A method according to one of the claims 10-11, where said local telepresence systems includes three display screens, and where the left, center, and right display icons represent the content of an actual left, center, and right display screen at the local telepresence system.

13. A method according to claim 10, where a contact field is selected to

populate the left and/or center and/or right display icons 41, 42, 43 with avatars based on the configuration of the remote video conference system associated with the selected contact field, the quantity of remote video conference systems to be included in the call and/or the preferred location of each of these remote video conference systems on the screen.

14. A method according to claim 13, further comprising the step to allow a user to move participants from one display screen to another by dragging and dropping avatars into different display icons.

15. A method according to claim 13, where said graphical user interface is further configured to allow a user to remove participants from the conference by dragging avatars from a display icon and dropping said avatars on any location not occupied by a display icon.

16. A method according to claim 13, where the step of selecting a contact field comprises:

touching a contact field icon 8 in a speed dial 5 or a phone book 8, or

dragging and dropping a contact field icon 8 to a desired left, center, or right display icon.

17. A method according to claim 10, where said graphical user interface is configured to pre-arrange perspective assignments of display screens to one or more remote videoconference systems prior to establishing a connection with the one or more remote video conference systems based on the following set of rules:

if only one remote telepresence system is selected to participate in a conference, each of said left, center, and right display icons are populated with two avatars 20 representing two available meeting participants, and

if two or more remote telepresence systems are selected to participate in a conference, two or more of said left, center, and right display icons are each populated with four avatars representing four available meeting participants, and/or

if a remote non-telepresence systems is selected to participate in a conference together with one or more telepresence systems, one of said left, center, and right display icons are populated with a small avatar representing one available non-telepresense system.

18. A method according to one of claims 10-17, further comprising the step to:

generate instruction sets for the local telepresence system based at least on said respective assignments in response to a user instructing the local video conference to establish said connection via said graphical user interface.

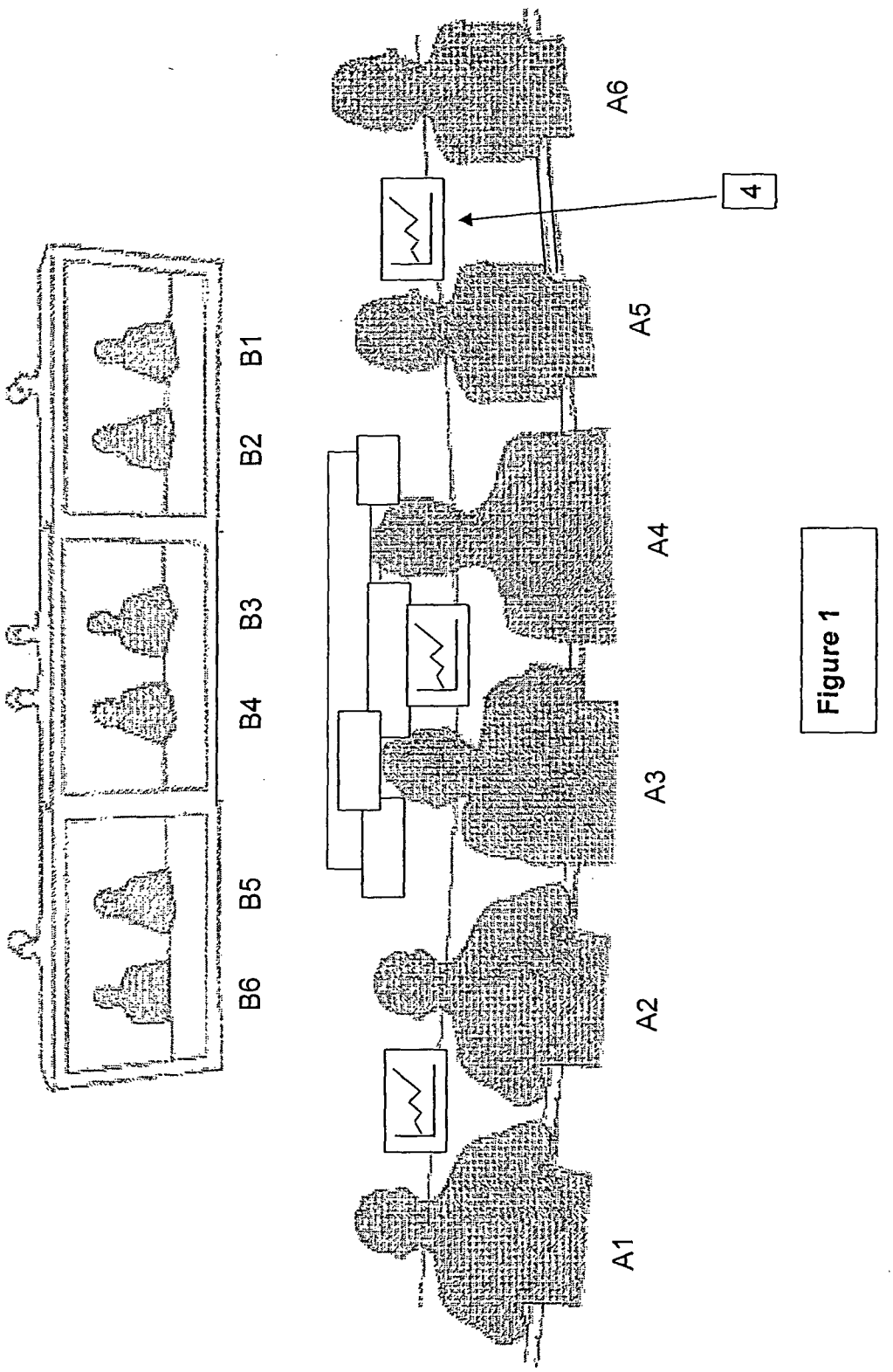

Figure 1

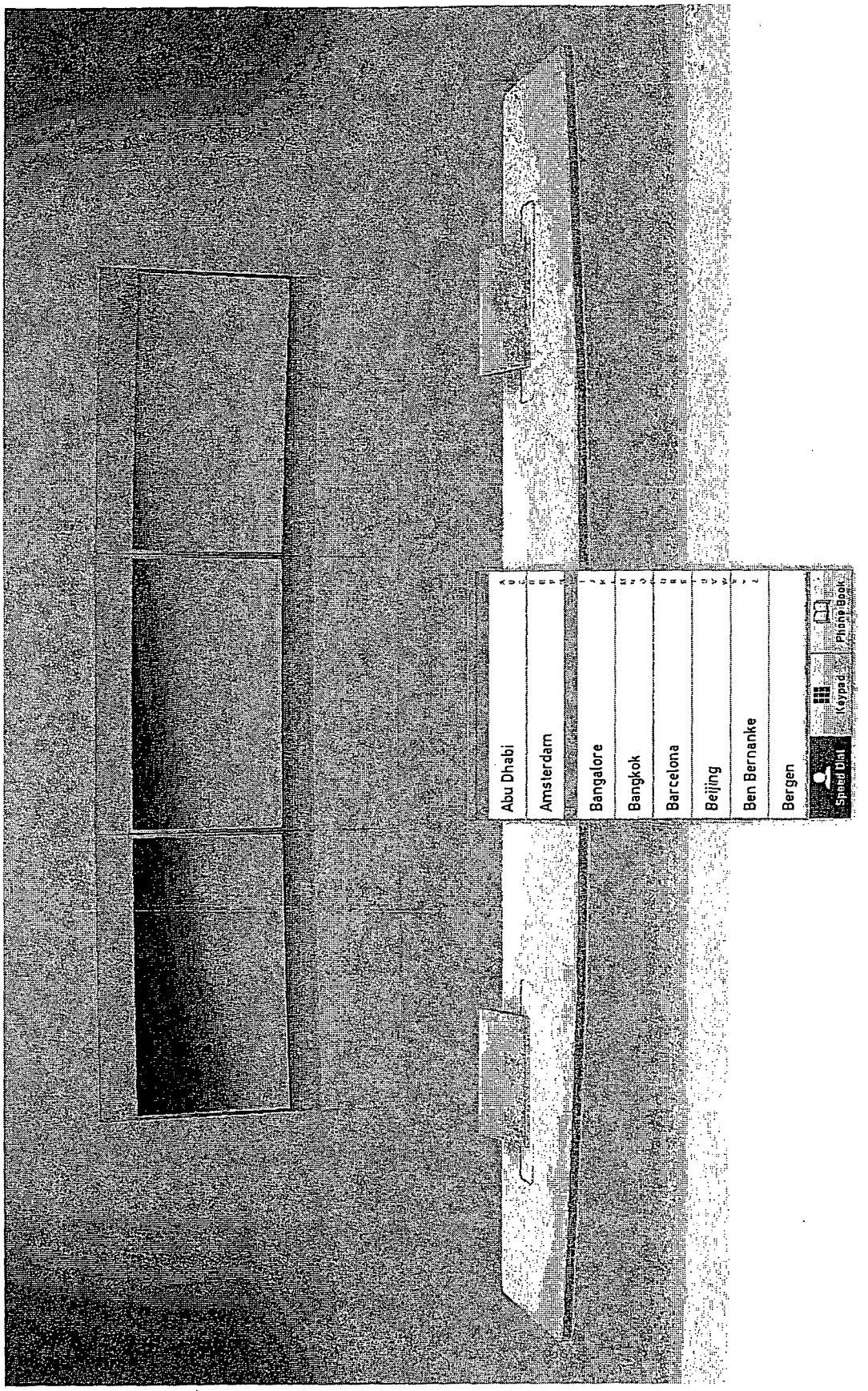
Abu Dhabi
Amsterdam
Bangalore
Bangkok
Barcelona
Beijing
Ben Bernanke
Bergen
Speed Dial
Keypad
Phone Book
100

Figure 2

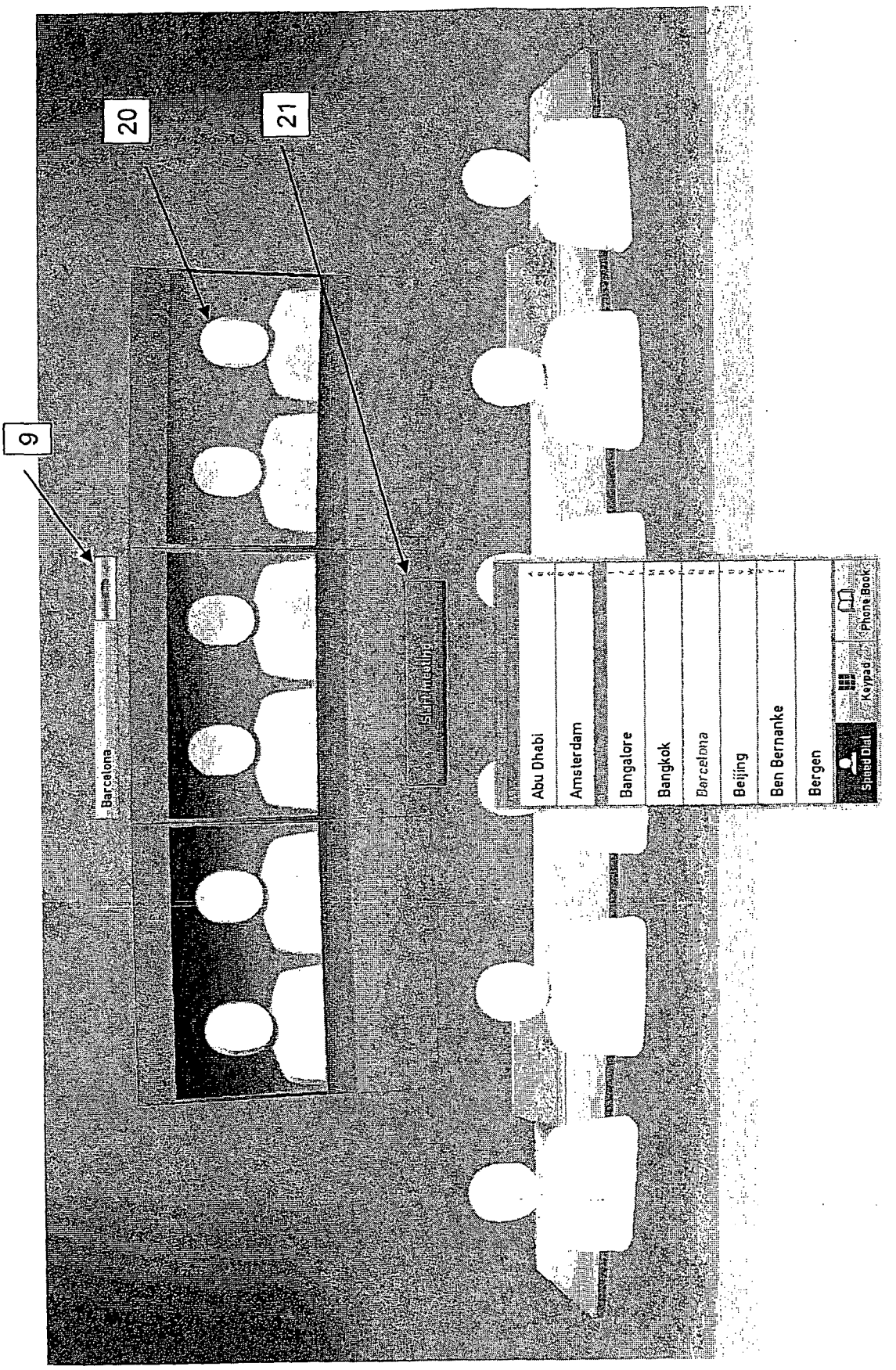
9
20
21
Barcelona
Start meeting
Abu Dhabi
Amsterdam
Bangalore
Bangkok
Barcelona
Beijing
Ben Bernanke
Bergen
Speed Dial
Keypad
Phone Book

Figure 3

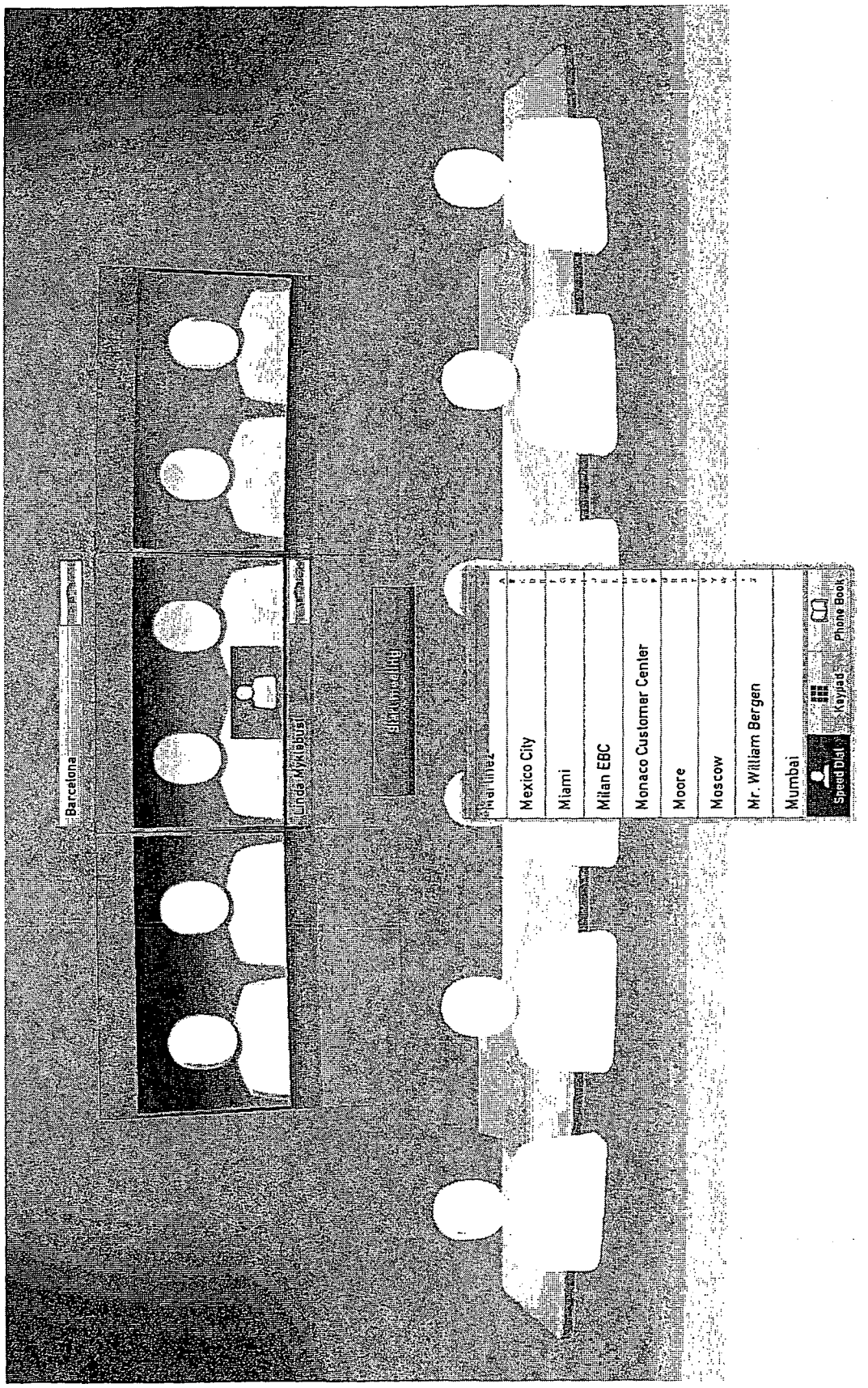
Barcelona
Linda Myklebust
Mexico City
Miami
Milan EBC
Monaco Customer Center
Moore
Moscow
Mr. William Bergen
Mumbai
Speed Dial
Keypad
Phone Book

Figure 4

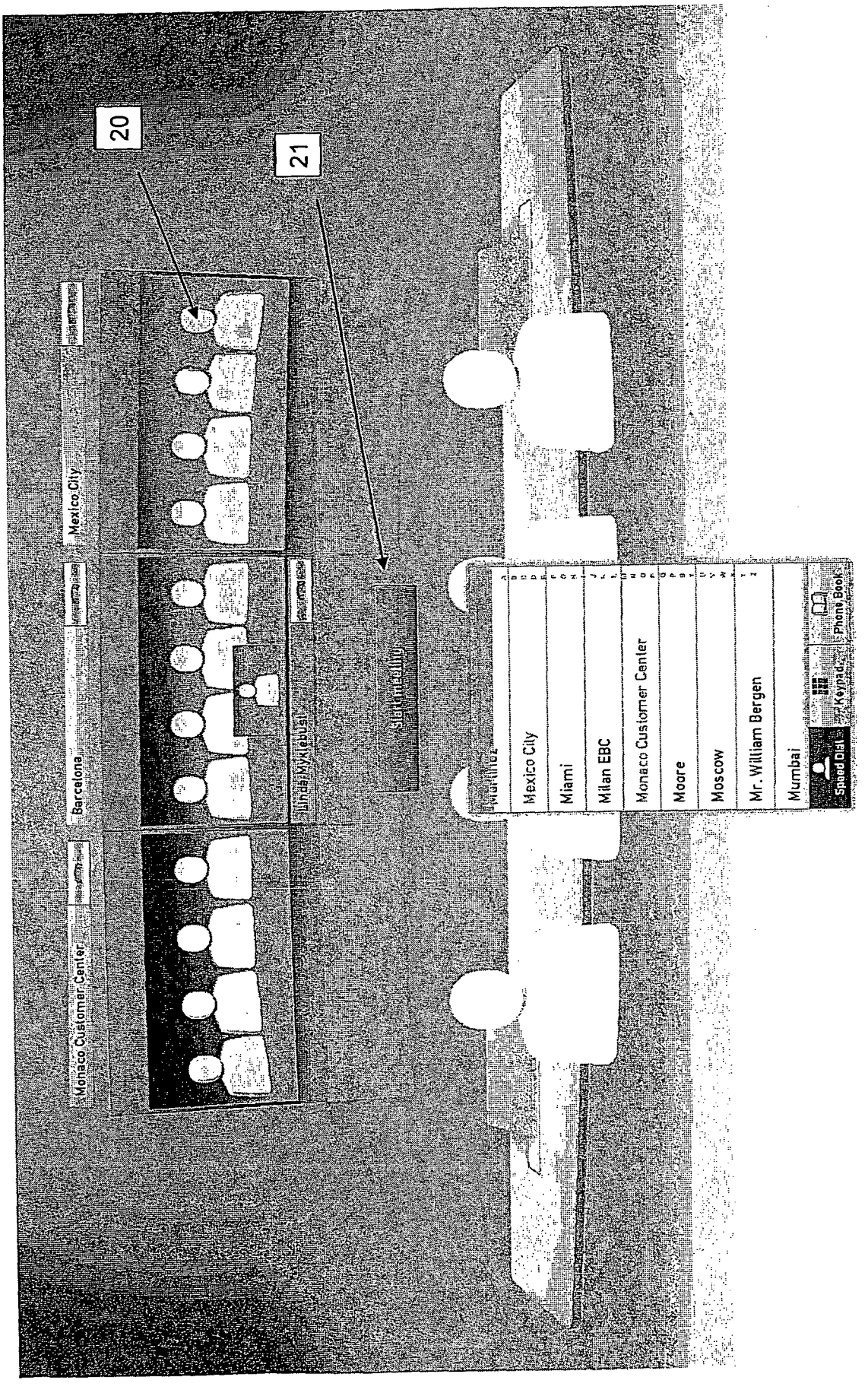
20
21
Mexico City
Barcelona
Monaco Customer Center
Linda Myklebust
Mexico City
Miami
Milan EBC
Monaco Customer Center
Moore
Moscow
Mr. William Bergen
Mumbai
Speed Dial
Keypad
Phone Book

Figure 5

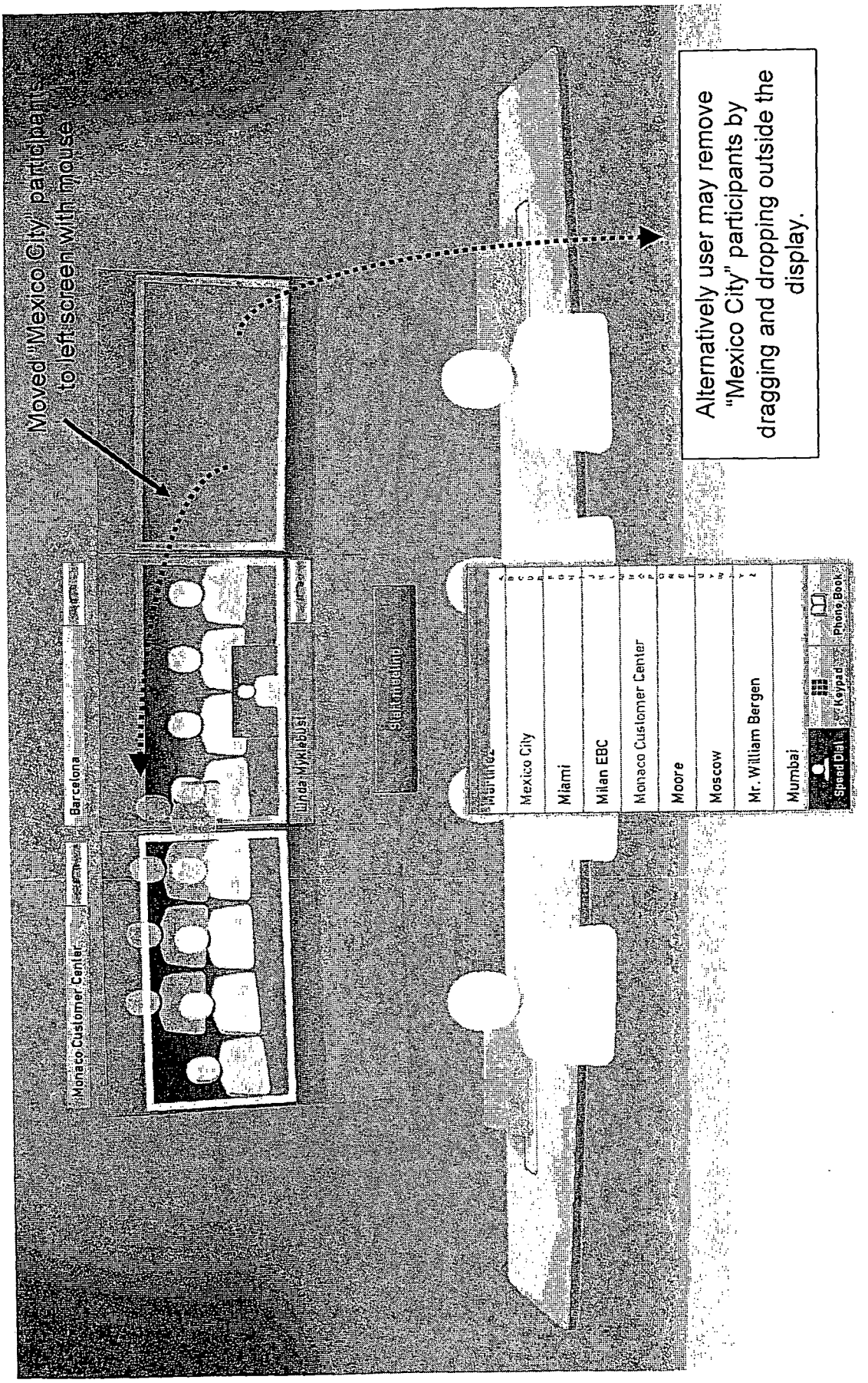
Moved "Mexico City" participant to left screen with mouse
Alternatively user may remove "Mexico City" participants by dragging and dropping outside the display.
Monaco Customer Center
Barcelona
Linda Myklebust
Mexico City
Miami
Milan EBC
Monaco Customer Center
Moore
Moscow
Mr. William Bergen
Mumbai
Speed Dial
Keypad
Phone Book

Figure 6

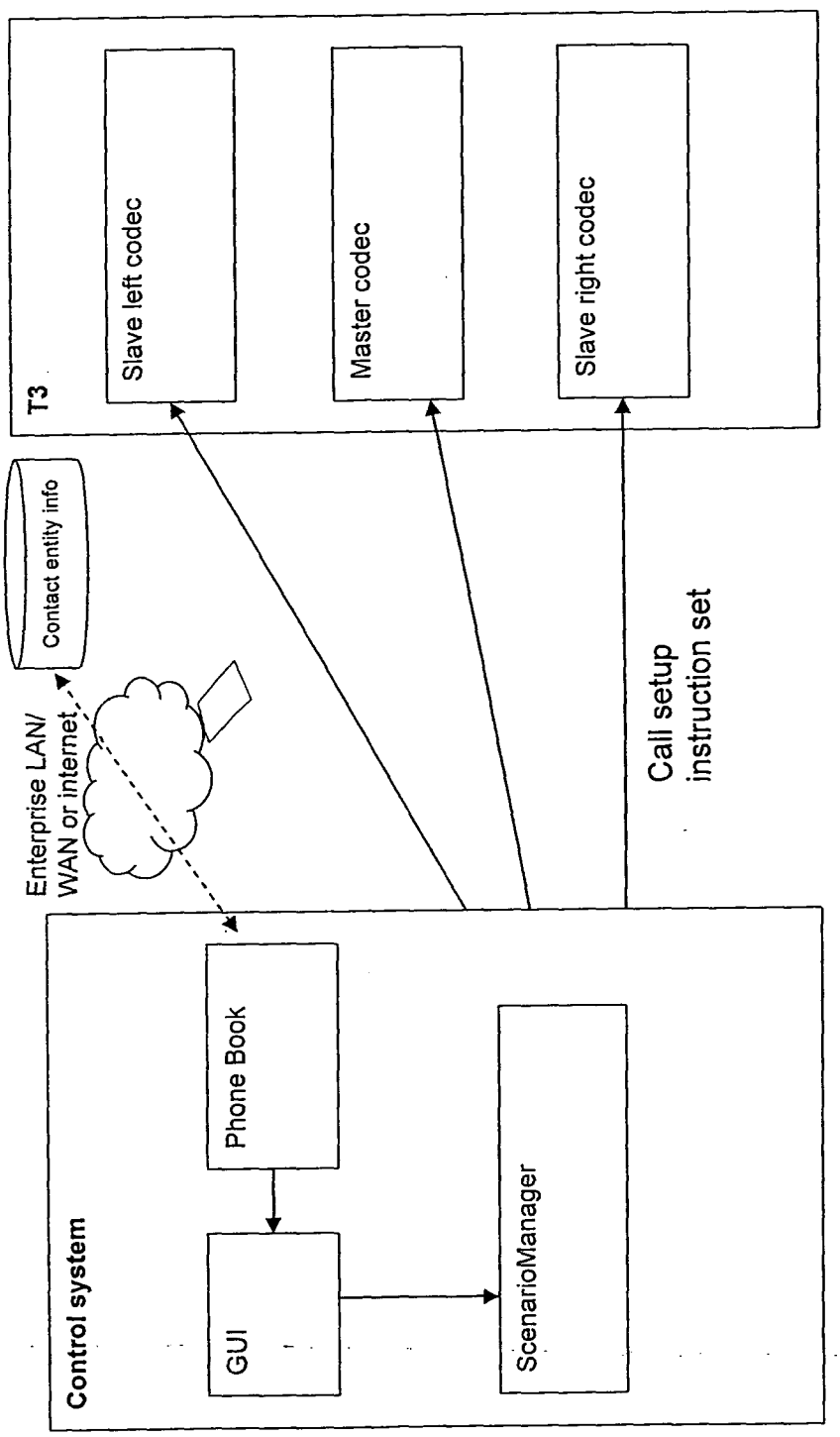
T3
Slave left codec
Master codec
Slave right codec
Contact entity info
Enterprise LAN/
WAN or internet
Call setup
instruction set
Control system
Phone Book
GUI
ScenarioManager

Figure 7

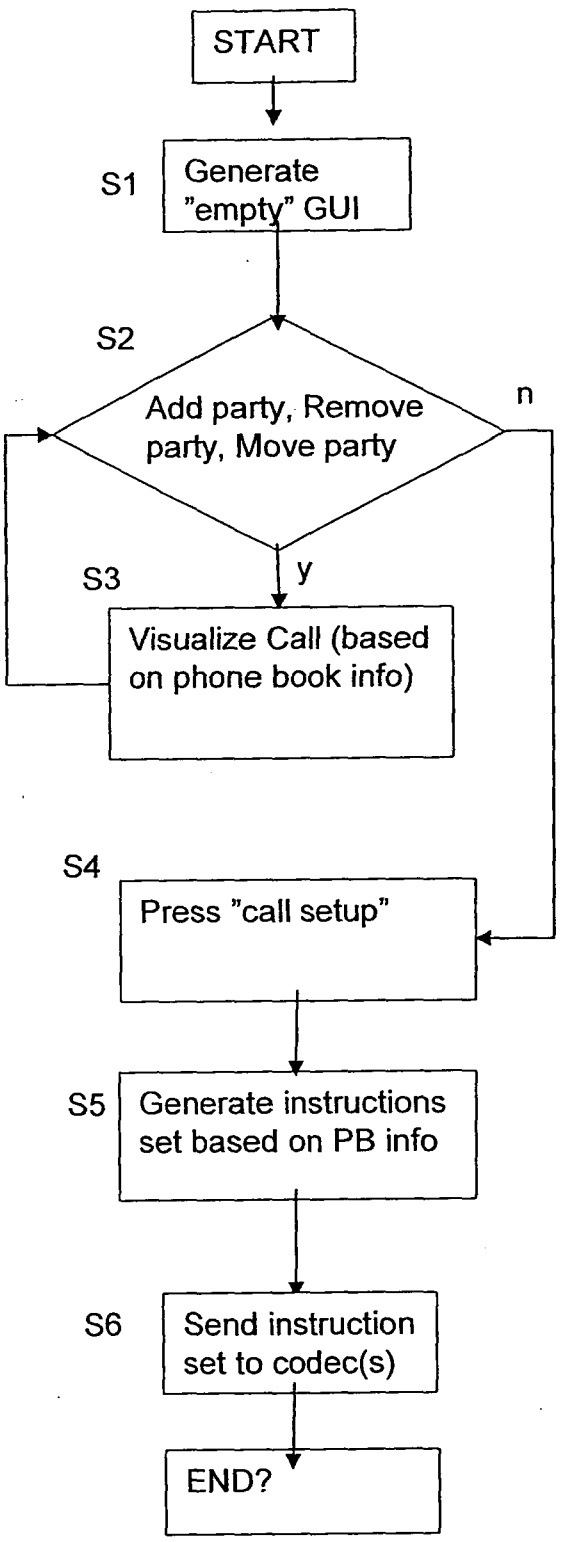
START
S1
Generate "empty" GUI
S2
Add party, Remove party, Move party
n
y
S3
Visualize Call (based on phone book info)
S4
Press "call setup"
S5
Generate instructions set based on PB info
S6
Send instruction set to codec(s)
END?

Figure 8

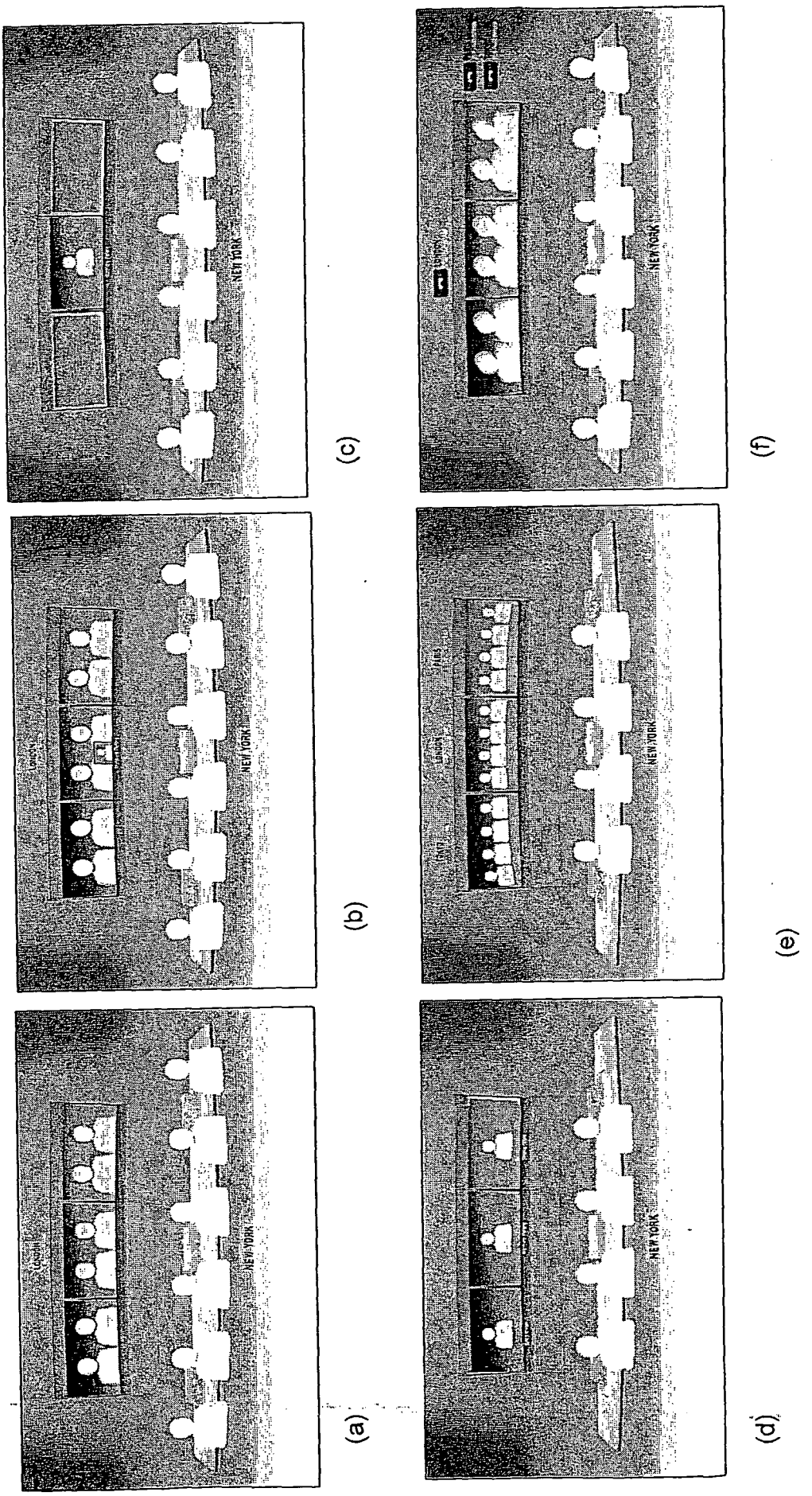

Figure 9

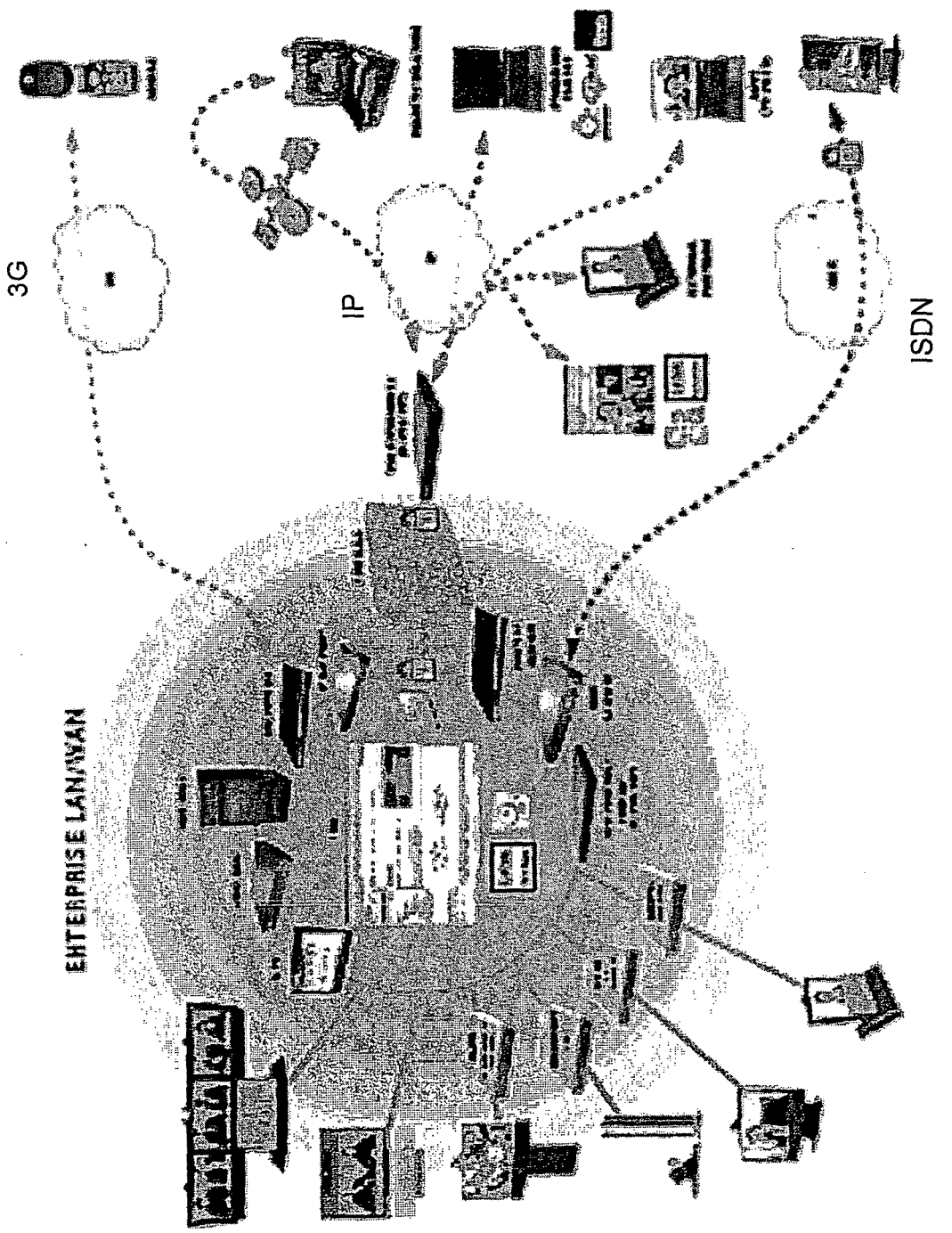

Figure 10

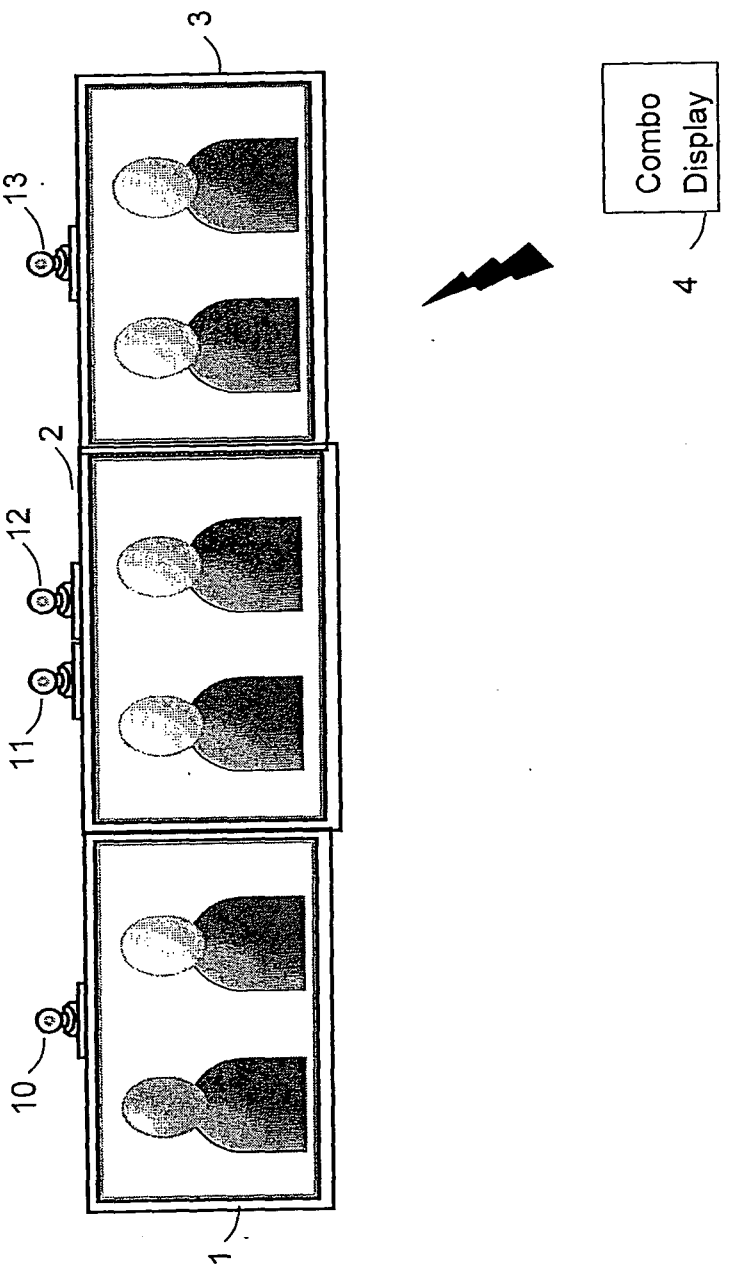

Figure 11

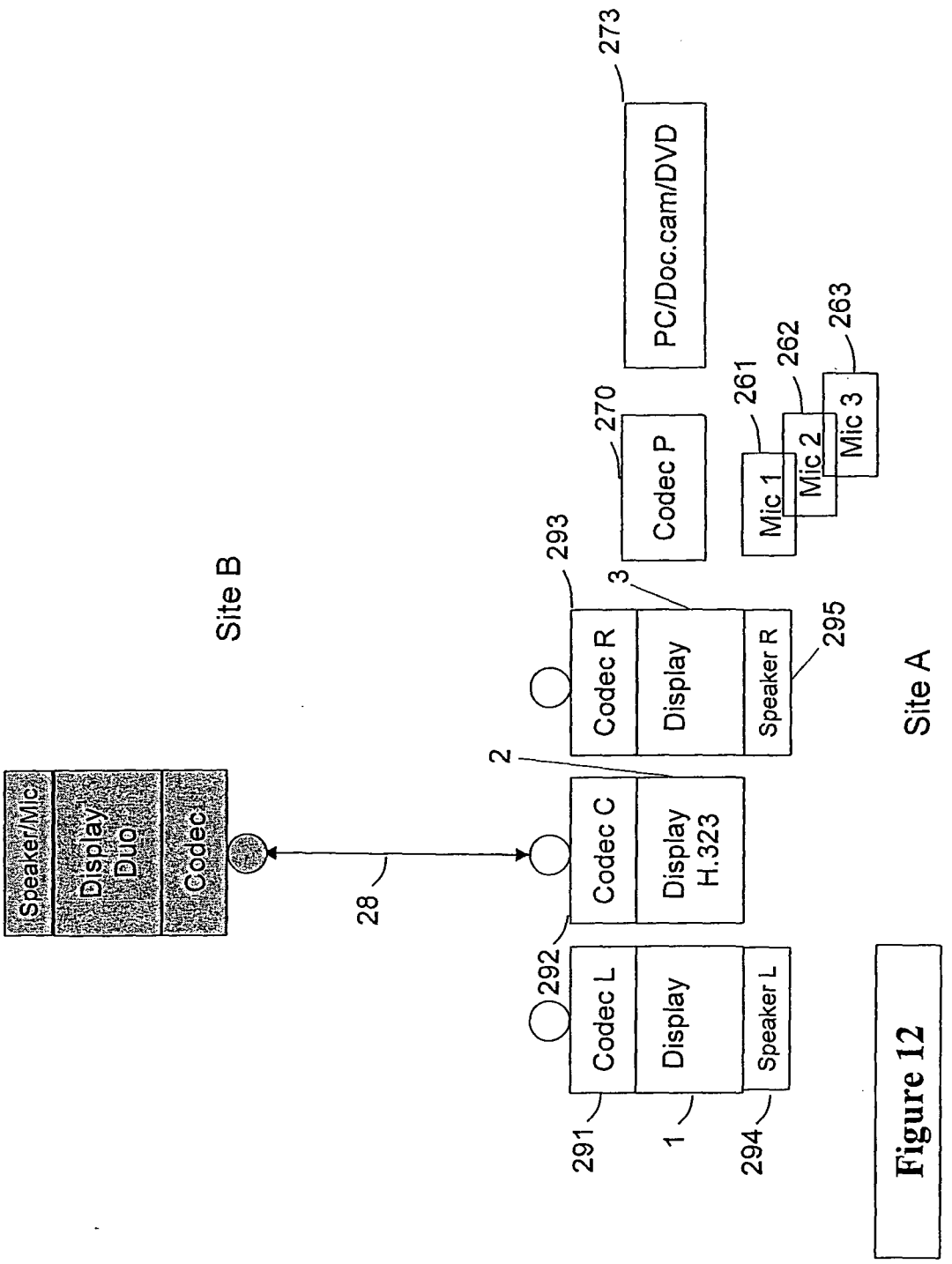
Site B
Speaker/Mic.
Display
Duo
Codec
28
Site A
Codec C
Display H.323
2
Codec R
Display
Speaker R
293
3
295
Codec L
Display
Speaker L
292
291
1
294
Codec P
270
PC/Doc.cam/DVD
273
Mic 1
Mic 2
Mic 3
261
262
263

Figure 12

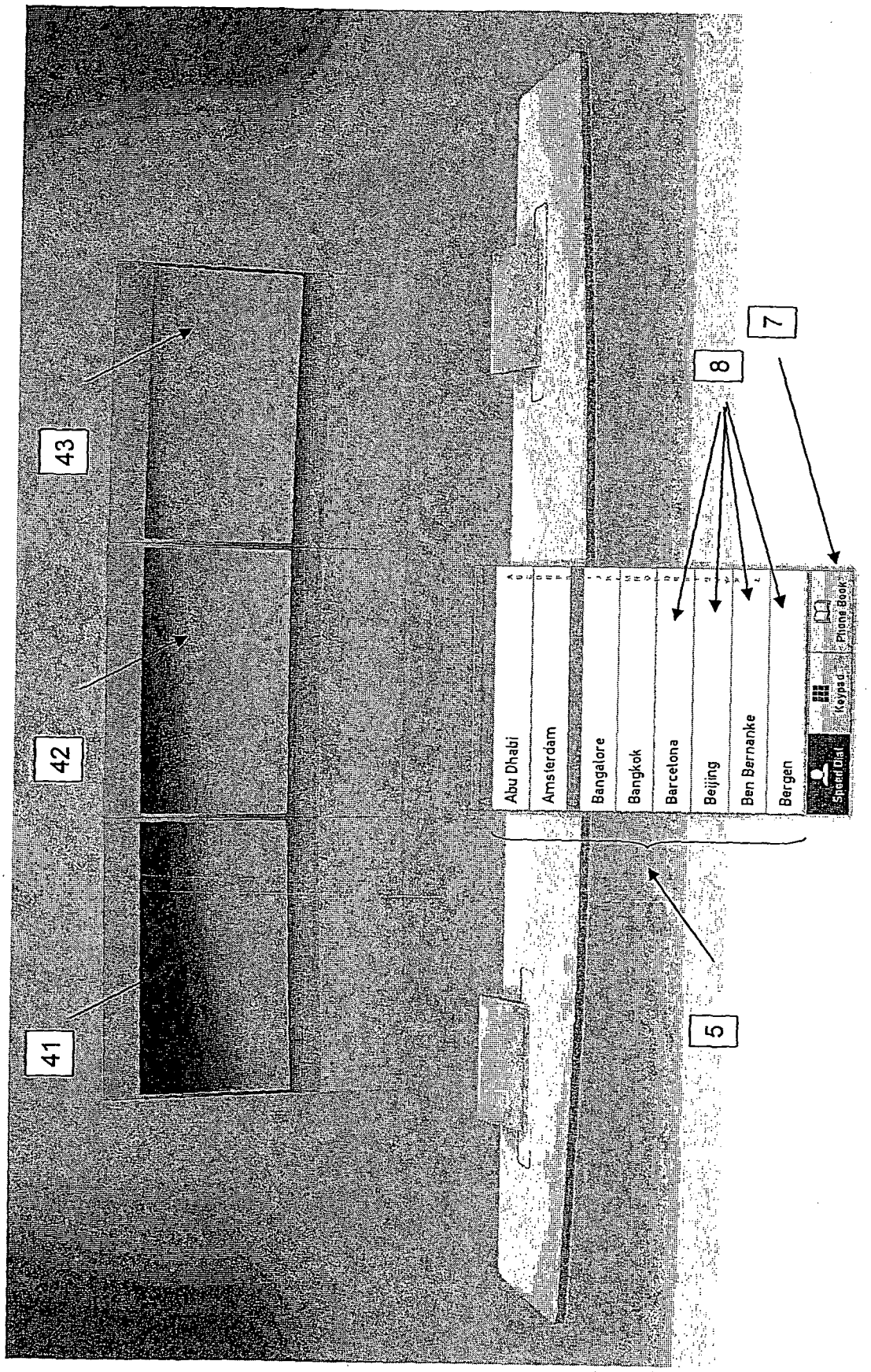
43
42
41
5
8
7
Abu Dhabi
Amsterdam
Bangalore
Bangkok
Barcelona
Beijing
Ben Bernanke
Bergen
Speed Dial
Keypad
Phone Book

Figure 13

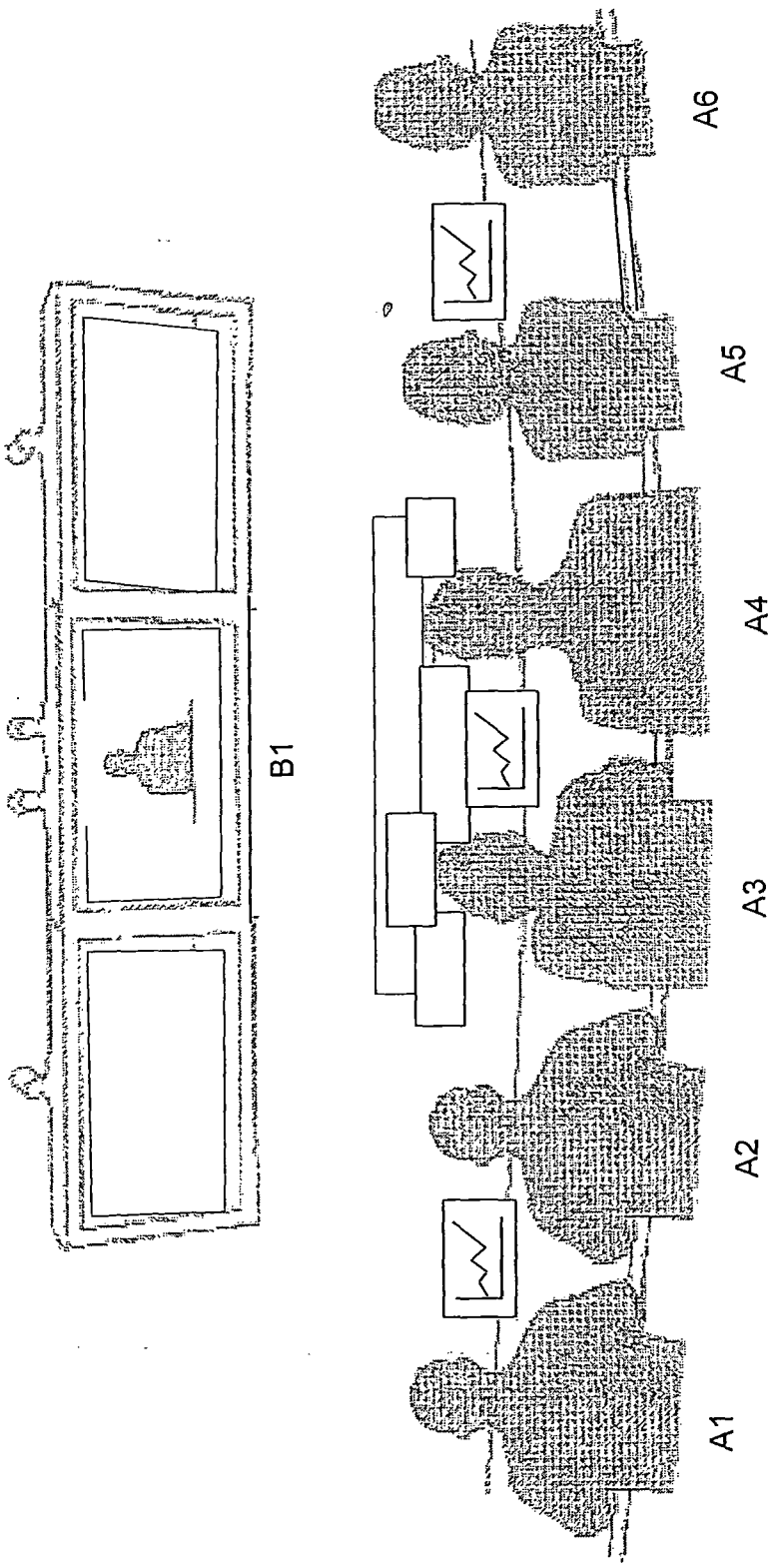

Figure 14

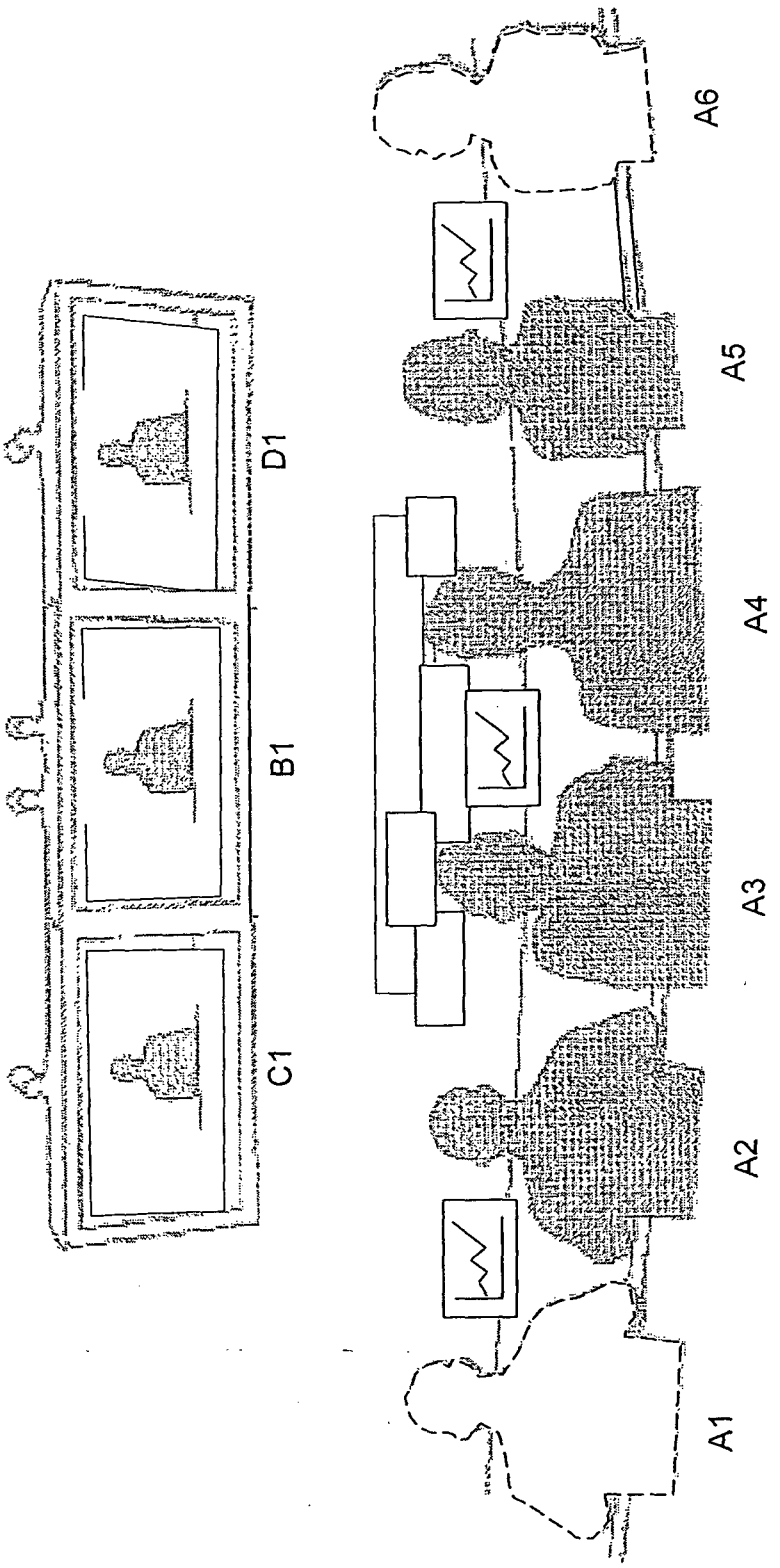

Figure 15

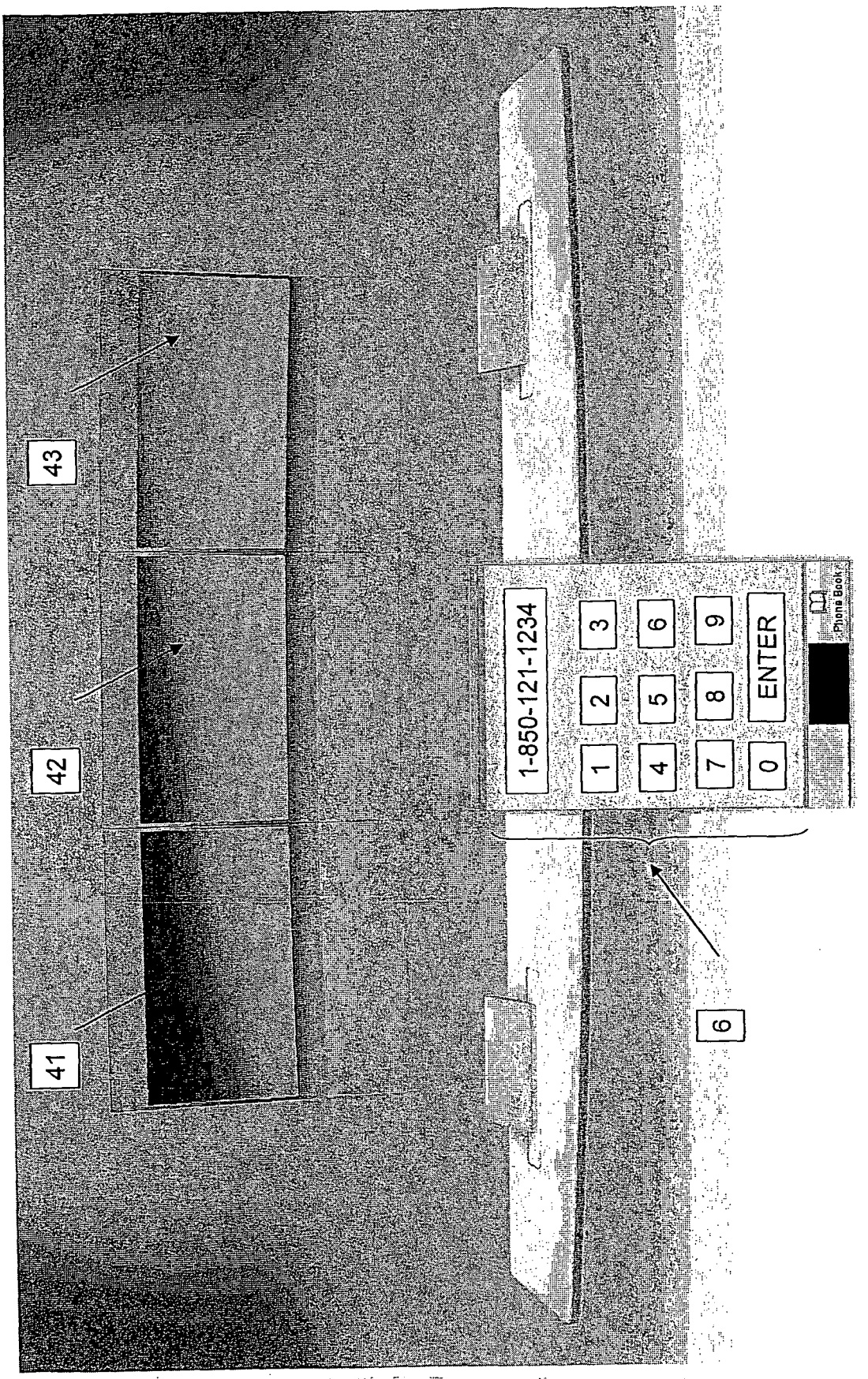

Figure 16

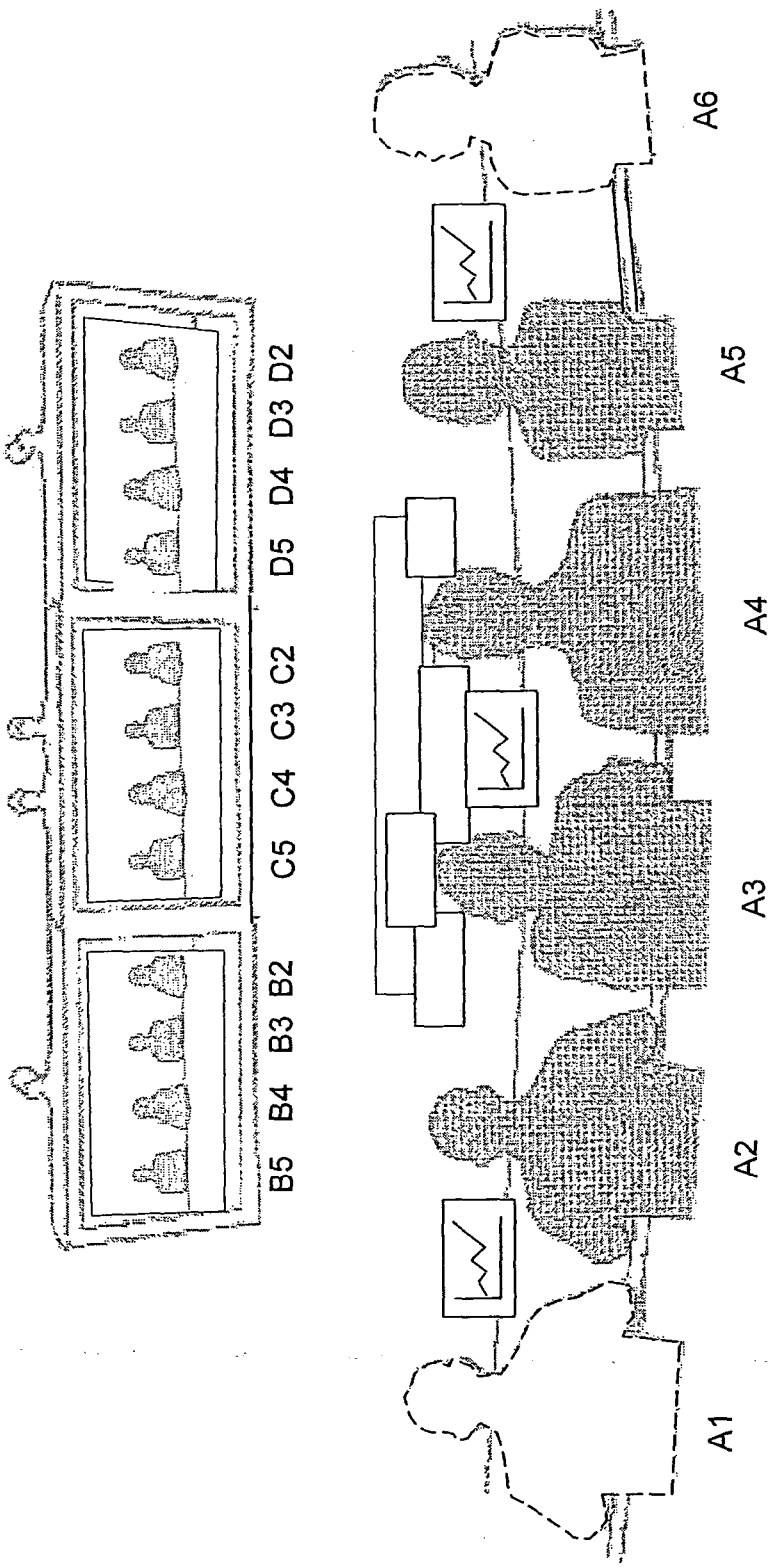

Figure 17

Figure 18

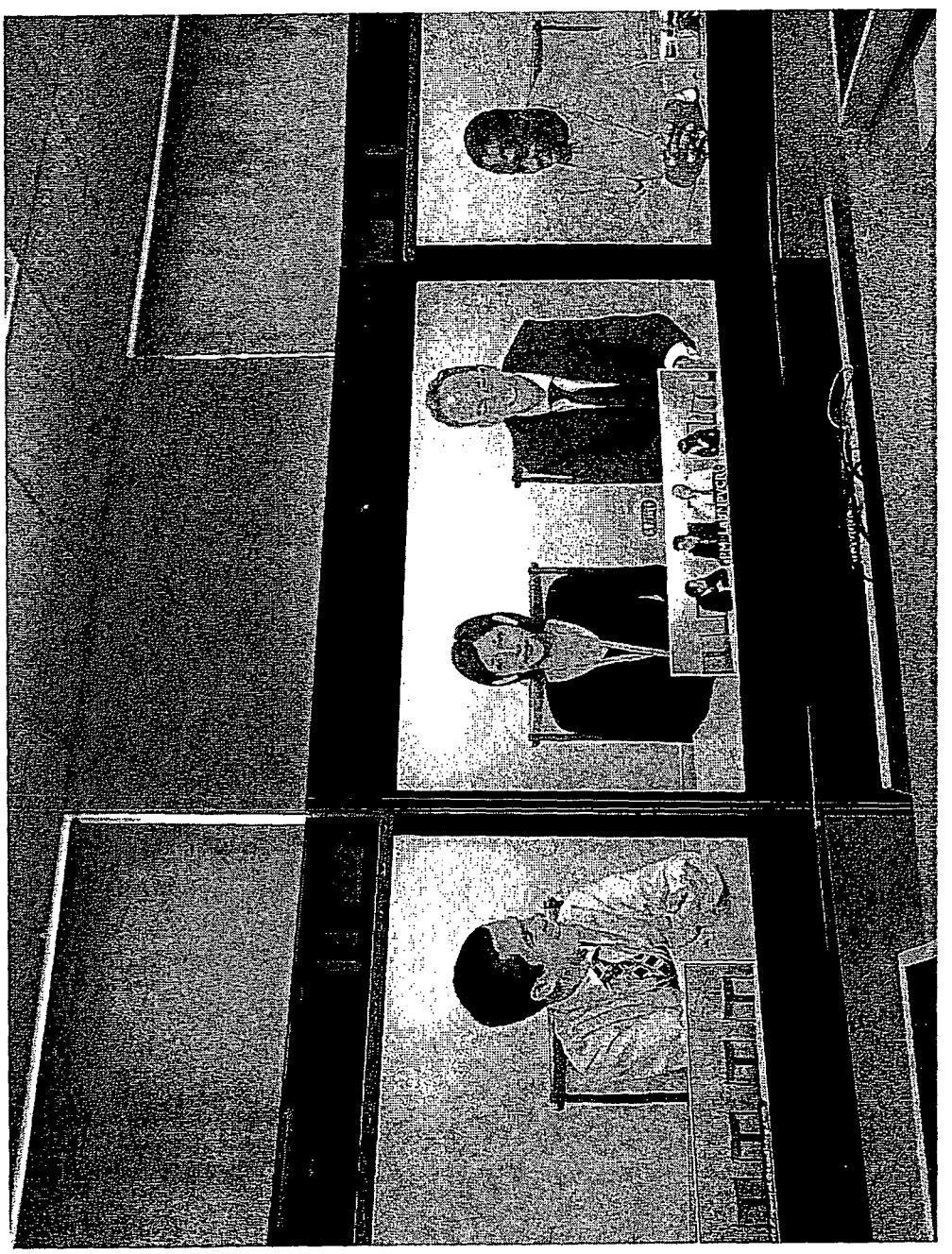

Figure 19

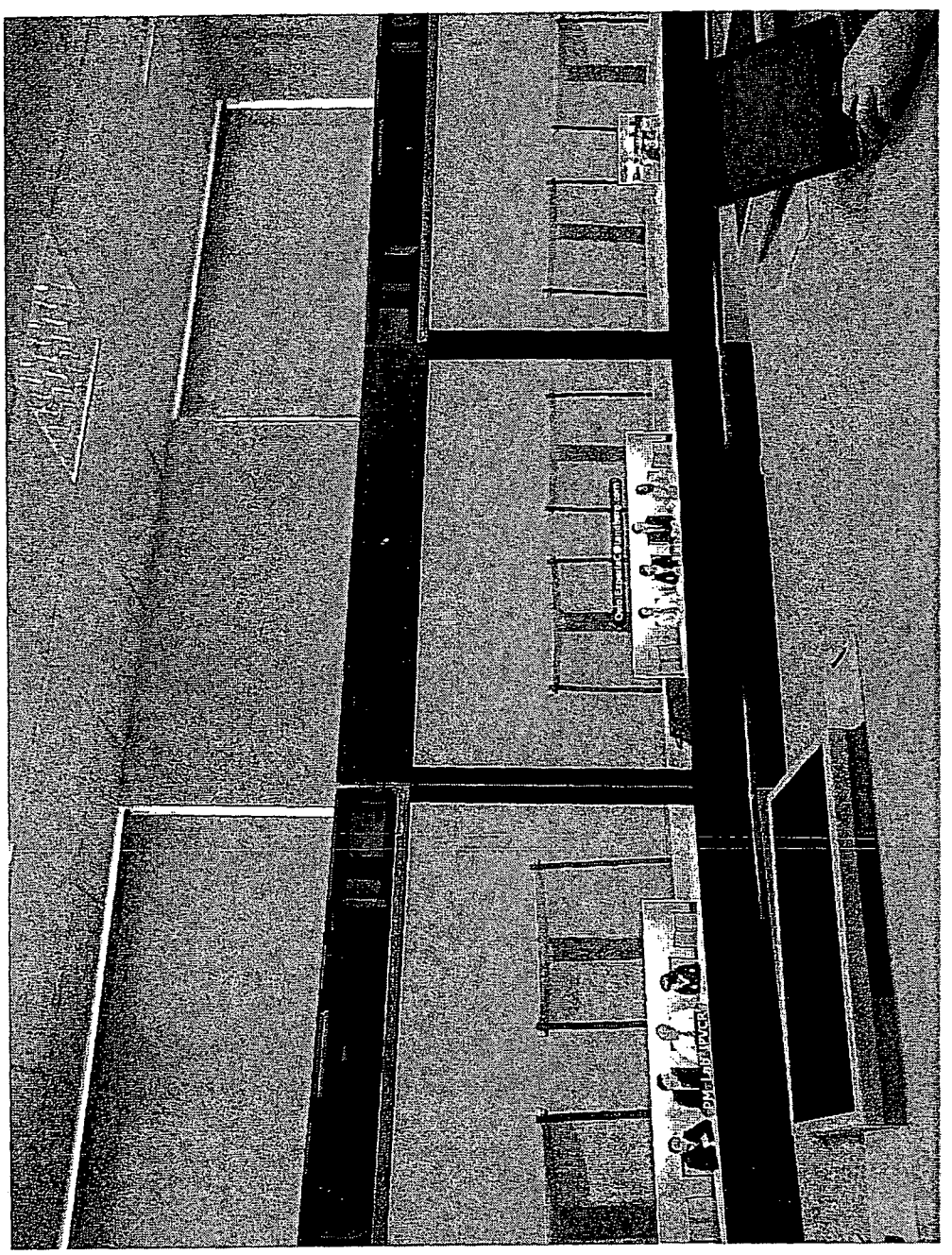

Figure 20

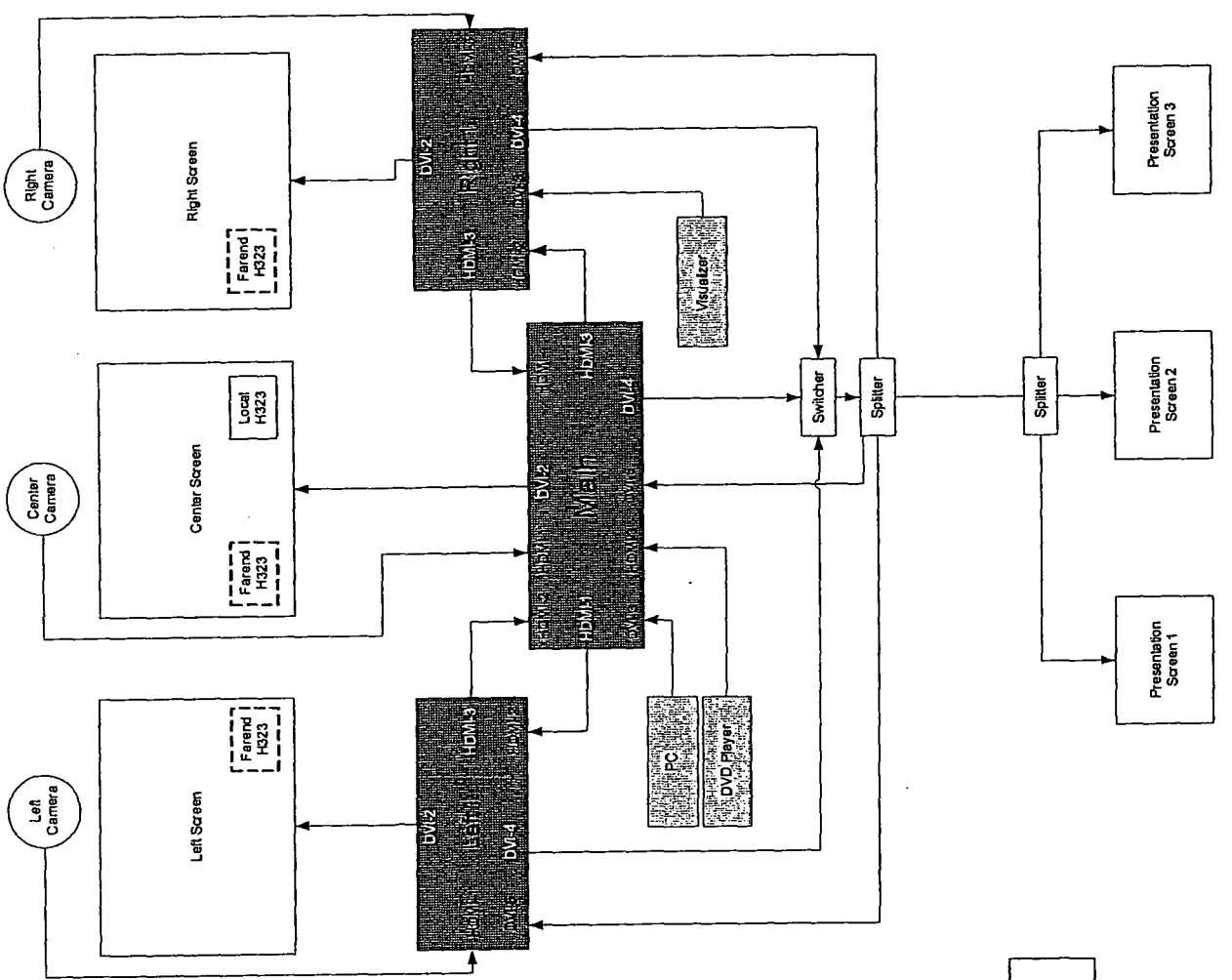
Eagle AV connections 3 codecs
Will make pres. in three breiefers sc. possible
Left Camera
Center Camera
Right Camera
Left Screen
Center Screen
Right Screen
Farend H323
Local H323
DVI-2
DVI-4
HDMI-3
HDMI-1
Main
PC
DVD Player
Visualizer
Switcher
Splitter
Splitter
Presentation Screen 1
Presentation Screen 2
Presentation Screen 3

Figure 21

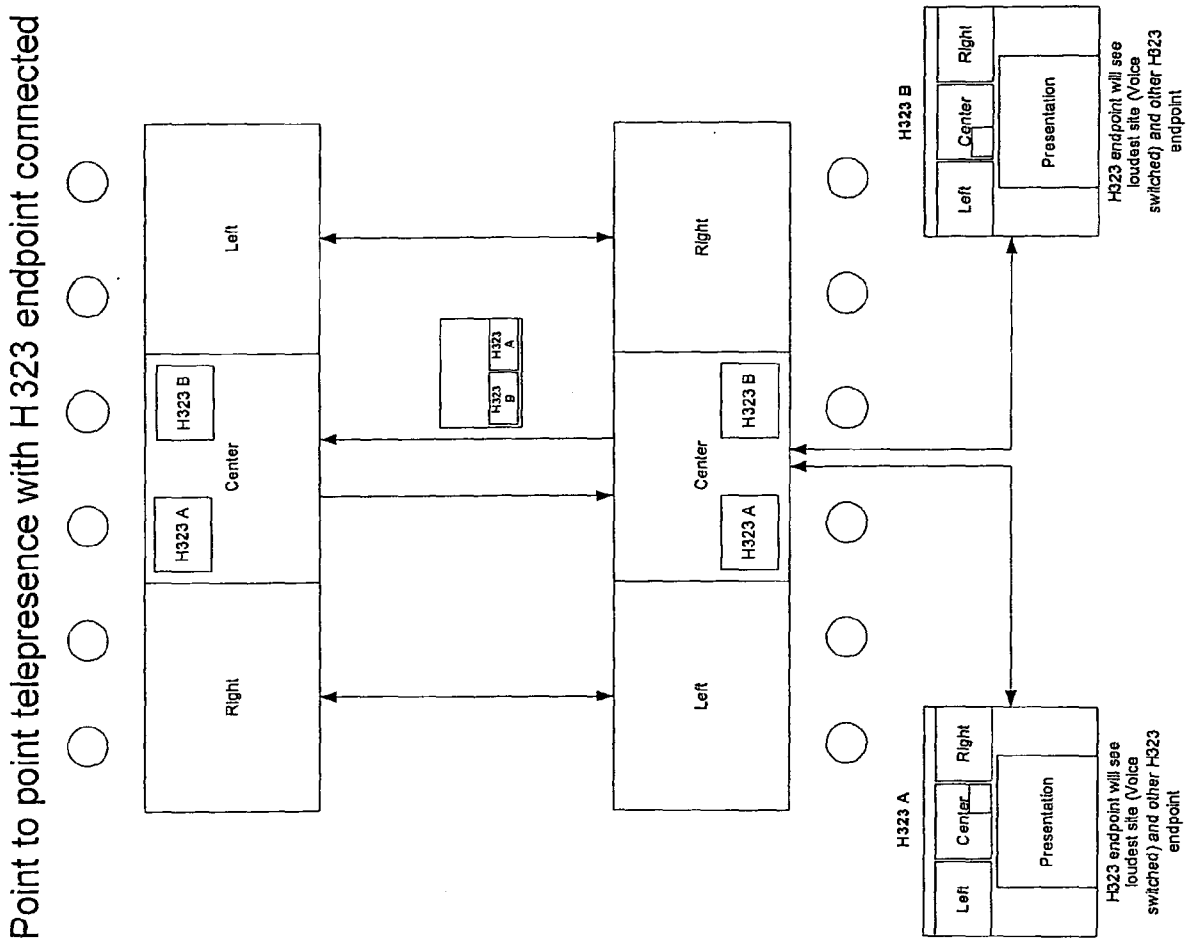
Point to point telepresence with H323 endpoint connected
Left
H323 B
Center
H323 A
Right
H323 A
H323 B
Right
H323 B
Center
H323 A
Left
H323 B
Left
Center
Right
Presentation
H323 endpoint will see loudest site (Voice switched) and other H323 endpoint
H323 A
Left
Center
Right
Presentation
H323 endpoint will see loudest site (Voice switched) and other H323 endpoint

Figure 22

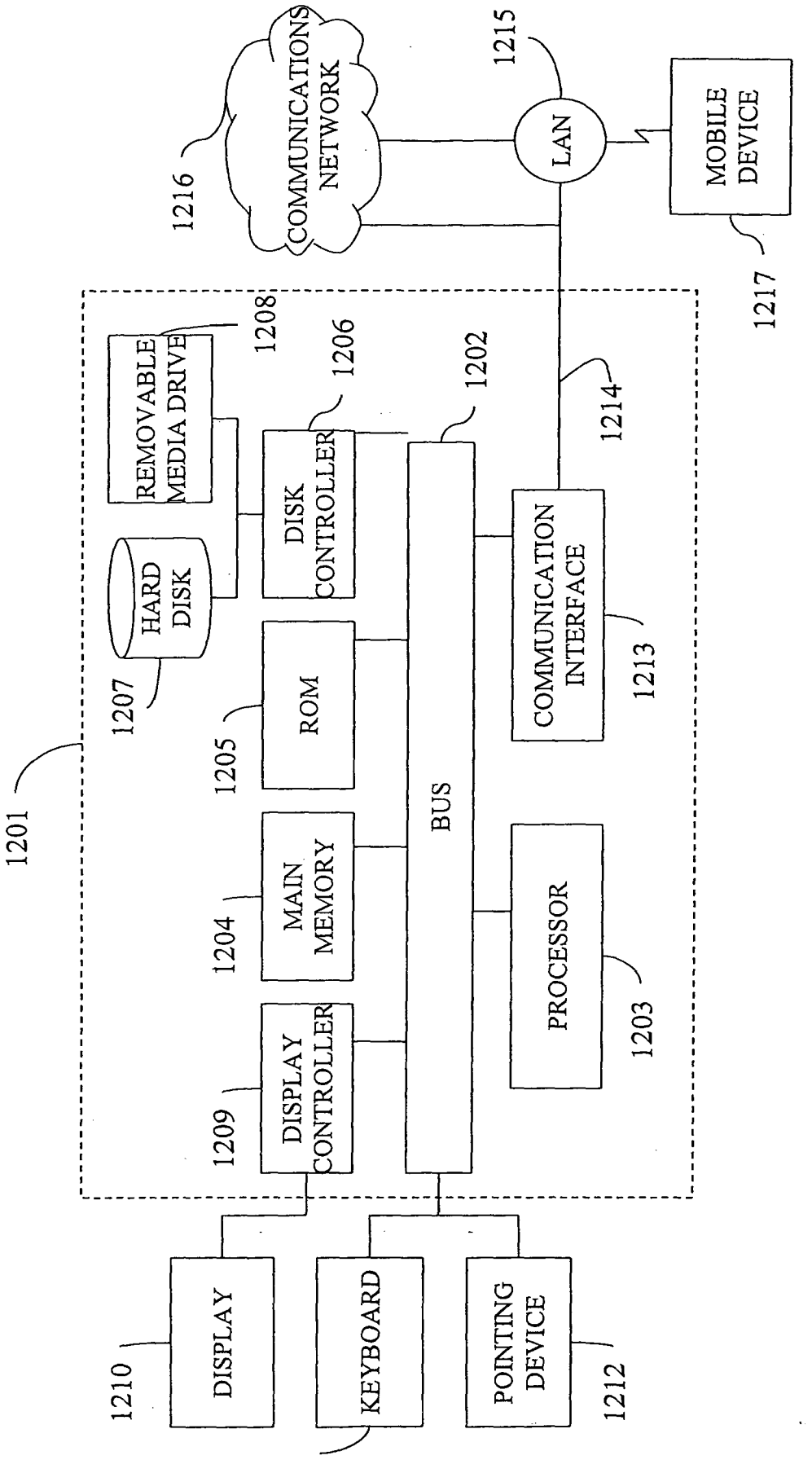
1216
COMMUNICATIONS NETWORK
1215
LAN
MOBILE DEVICE
1217
1201
1208
REMOVABLE MEDIA DRIVE
1206
DISK CONTROLLER
1202
1214
HARD DISK
1207
1205
ROM
COMMUNICATION INTERFACE
1213
BUS
1204
MAIN MEMORY
PROCESSOR
1203
1209
DISPLAY CONTROLLER
1210
DISPLAY
KEYBOARD
POINTING DEVICE
1212

Figure 23

INTERNATIONAL SEARCH REPORT

International application No.
PCT/NO2009/000323

A. CLASSIFICATION OF SUBJECT MATTER
H04N 7/14, H04N 7/15, G06F 3/048, G06T 5/00

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, G06T

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
SE, FI, DK, No

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6724403 B (SANTORO O. ET AL.) 2004-04-20 Abstract, col. 2 line 44, col. 7 line 18 - 33, Col. 11 line 63 - col. 12 line 35, fig. 2, 8 - 12	1-3, 9 - 12, 18
Y	WO 2008/101117 A (TELIRIS INC) 21 August 2008 (2008-08-21) Abstract, page 11, line 10 - 14, page 11 line 22 - page 12 line 2 page 24 line 30 - page 25 line 2, all figures	1-3, 9 - 12, 18
Y	JP 2007-096974 A (TOSHIBA CORP) 2007.04.12 Abstract	1-3, 9 - 12, 18
A	JP 06-274596 A (INTERNATIONAL BUISNESS MACHINE CORP) 1994-09-30 Abstract, paragraphs [0004], [0005], fig. 4 - 6	4-7, 9, 13 - 16, 18

☒ 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
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"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
11/12/2009	15/12/2009
Name and mailing address of the ISA/ Nordic Patent Institute Helgeshoj Allé 81, 2639 Taastrup, Denmark Facsimile No. (45) 53 50 80 08	Authorized officer Jan Frode Næss Telephone No. (47) 22 38 75 81

INTERNATIONAL SEARCH REPORT

International application No.
PCT/NO2009/000323

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2005/0188321 A (ADAMS S. S.) 2005-08-25 Claim 1	1-3, 8, 10 - 12, 17
A	US 2003/0074672 A (DANIELS J.) 2003-04-17 Paragraphs [0029], [0052], [0118], [0138], fig. 20	1, 9

- - -

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/NO2009/000323

US 6724403 A	2004-04-20	AU 2573301 A	2001-05-08
		CA 2387933 A	2001-05-30
		EP 1242856 A2	2002-09-25
		EP 1242856 A4	2008-06-04
		JP 2003513350 A	2003-04-08
		US 2003020671 A	2003-01-30
		US 7028264 B	2006-04-11
		US 2005283734 A	2005-12-22
		US 2009132942 A	2009-05-21
		WO 0131416 A2	2001-05-03
		WO 0131416 A3	2002-01-31
WO 2008101117 A	2008-08-21	US 2009051756 A	2009.-02-26
JP 2007-096974 A	2007-04-12	NONE	
JP 6274596 A	1994-09-30	JP 2539153 B	1996-10-02
US 20050188321 A	2005-08-25	NONE	
US 20030074672 A	2003-04-17	AU 4744299 A	2000-03-23
		AU 6257899 A	2000-04-10
		WO 0018054 A2	2000-03-30
		WO 0018054 A3	2000-07-27