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(54) **Title:** METHOD AND APPARATUS FOR FLOOR CONTROL IN MULTI-MEDIA PUSH-TO-TALK NETWORK

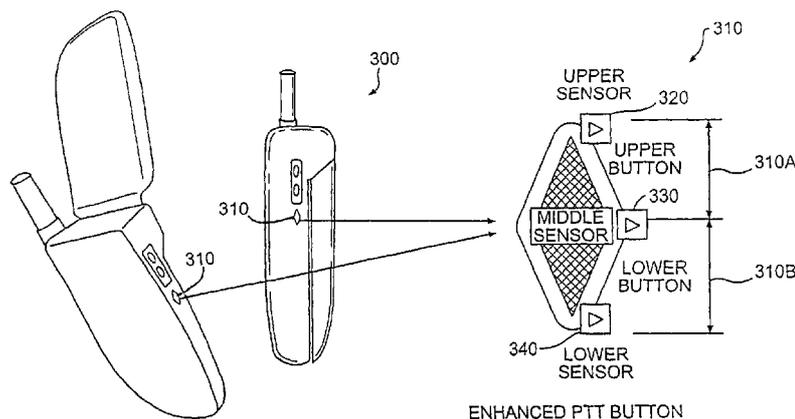


FIG. 3

(57) **Abstract:** A method and apparatus for floor control in a multi-media dispatch network is disclosed. An embodiment of the method includes receiving a floor request message related to a first media type at a dispatch network controller from a first user and receiving a floor grant request message related to a second media type at the controller from the first user. Another embodiment of the method includes sending the floor grant request message and the floor request message by a floor request sensor of a communications device. An embodiment of the apparatus includes the controller where the controller receives the floor request message and receives the floor grant request message. Another embodiment of the apparatus includes a device that includes the floor request sensor. The floor request sensor includes a first sensor and a second sensor.

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METHOD AND APPARATUS FOR FLOOR CONTROL IN MULTI-MEDIA PUSH-TO-TALK NETWORK

FIELD OF THE INVENTION

[0001] The present invention relates generally to the field of
5 telecommunications, and in particular to multi-media push-to-talk
wireless communications networks.

BACKGROUND OF THE INVENTION

[0002] Today, push-to-talk (PTT) communication networks
primarily support voice communications. However, as the use of multi-
10 media communications and information increases, e.g., video, gaming,
etc., it is desirable to incorporate these additional forms of
communications and information into PTT networks. These networks
may be referred to as push-to-X networks.

[0003] Currently, floor control processes, and the hardware for
15 implementing these processes, in PTT networks and PTT enabled devices
are directed to supporting voice communications. However, with these
additional forms of communications and information becoming available
over the wireless networks, and in order to efficiently utilize these
additional forms of communications and information, known floor control
20 processes and apparatuses have deficiencies.

[0004] Therefore, there is a need for an improved method and
apparatus for floor control in a multi-media push-to-talk communications
network.

SUMMARY OF THE INVENTION

25 [0005] In accordance with an embodiment of a method of the
present invention, a method for floor control in a multi-media dispatch
network is provided. The method includes receiving a floor request
message related to a first media type at a dispatch network controller
from a first user and receiving a floor grant request message related to a
30 second media type at the dispatch network controller from the first user.

[0006] In accordance with another embodiment of a method of the present invention, the method includes sending a floor grant request message for a first media type in a multi-media dispatch communication session and a floor request message for a second media type in the multi-media dispatch communication session by a floor request sensor of a communications device to a dispatch network controller.

[0007] In accordance with an embodiment of an apparatus of the present invention, an apparatus for floor control in a multi-media dispatch network is provided. The apparatus includes a dispatch network controller where the dispatch network controller receives a floor request message related to a first media type from a first user and receives a floor grant request message related to a second media type from the first user.

[0008] In accordance with another embodiment of an apparatus of the present invention, a device for communication in a multi-media dispatch network includes a floor request sensor. The floor request sensor includes a first sensor and a second sensor.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Figure 1 illustrates an embodiment of a method and apparatus in accordance with the principles of the present invention for floor control in a multi-media push-to-talk network in accordance with the principles of the present invention.

[0010] Figure 2 illustrates an alternative embodiment of a method and apparatus in accordance with the principles of the present invention for floor control in a multi-media push-to-talk network in accordance with the principles of the present invention.

[0011] Figure 3 illustrates an embodiment of a mobile communications device in accordance with the principles of the present invention.

[0012] Figure 4 illustrates an embodiment of types of floor control messages that are associated with the sensors of the enhanced PTT button of the mobile communications device of Figure 3.

[0013] Figure 5 illustrates an alternative embodiment of types of floor control messages that are associated with the sensors of the enhanced PTT button of the mobile communications device of Figure 3.

DETAILED DESCRIPTION OF THE EXEMPLARY

5 EMBODIMENTS

[0014] Figure 1 illustrates an embodiment of a method and apparatus in accordance with the principles of the present invention for floor control in a multi-media push-to-talk network in accordance with the principles of the present invention. As can be seen, a message flow
10 diagram 10 is provided for establishing a multi-media communication session between a first user A and a second user B by a PTT signaling controller and floor arbitrator 100 (hereinafter "PTT controller").

Whereas the illustrated multi-media communication session includes voice and video media, the present invention is not limited to only these
15 two types of media. The present invention may be practiced with any of a variety of media types, including voice, video, gaming, data, etc.

[0015] In this embodiment, in the PTT session setup 110, user A sends a floor request message 112 that requests the floor in the multi-media communication session for both media types, i.e., voice and video,
20 for use by user A. The floor request message 112 is received at the PTT controller 100. As is known, PTT systems by nature and design allow only one participant to gain the floor. The person who has the floor then has the ability to send a communication to other participants in the communication session. The other participants must wait for the floor to
25 be released before they can then request the floor. This type of communication system is a dispatch system, also known as a half-duplex system, where only one person at a time can send a communication to other participants. Thus, in step 112, user A is requesting the floor in the multi-media communication session for both voice and video
30 communications for user A's own use.

[0016] In response to the floor request message 112, PTT controller 100 grants the floor to user A for both media types in the multi-media

communication session, i.e., voice and video. PTT controller 100 may determine whether to grant the floor based on any of a variety of parameters, however, the present invention is not limited to any particular decision process by the PTT controller 100 for determining
5 whether any particular floor request should be granted. In granting the floor to user A in response to the floor request message 112, PTT controller 100 sends a floor grant message 114 to user A and a floor taken message 114A to user B. Floor grant message 114 notifies user A of the floor grant and enables user A's communication device to send both
10 voice and video communications to other participants, e.g., user B, in the multi-media communication session. Floor taken message 114A notifies user B of the grant of the floor to user A for both voice and video.

[0017] After the floor is granted to user A for both voice and video, voice and video communications may occur in the PTT multi-media
15 session 120. In the session, if user A no longer requires the floor, user A sends a floor release message 122 to the PTT controller 100 that releases the floor for use by other participants in the session. The floor release message 122 releases the floor for both voice and video communications, which was previously granted to user A as discussed above. In response
20 to receiving the floor release message 122, the PTT controller 100 sends a floor idle message 124 to user B, and any other participants. This message notifies the other users that the floor is now open and that it may be requested by the other users. With the floor now open, as illustrated, user B sends a floor request message 126 to PTT controller
25 100 to request the floor for both voice and video communications.

[0018] As illustrated, in this exemplary message flow diagram, PTT controller 100 only grants the floor to user B for voice
communications in response to floor request message 126, which requested the floor for both voice and video communications for user B.
30 Again, as discussed above, PTT controller 100 may determine whether to grant the floor in response to a request based on any of a variety of parameters. This exemplary message flow diagram, where the PTT

controller granted the floor to user A for both requested media types and only granted the floor to user B for one of the two requested media types, should not be construed as a limitation in any way on the capabilities of the communications devices of user A or user B, or the PTT controller

5 100. This flow diagram is provided as an exemplary call flow for a multi-media communication session between participants and how the various media types in the multi-media session can be independently controlled within the session.

[0019] Therefore, in this exemplary message flow diagram, where
10 PTT controller 100 only grants the floor to user B for voice communications in response to a request by user B for the floor for both voice and video communications, the floor for video communications can be requested by any other participant in the session since the floor is idle with respect to video communications. Thus, the different types of
15 communications in the multi-media session can be jointly and independently requested, controlled, and granted in the session.

[0020] Continuing with the exemplary message flow diagram 10 of Figure 1, in granting the floor to user B for voice communications in response to the floor request message 126, PTT controller 100 sends a
20 floor grant message 128 to user B and a floor taken message 128A to user A. In the same manner as discussed above, floor grant message 128 notifies user B of the floor grant and enables user B's communication device to send voice communications to other participants, e.g., user A, in the communication session. Floor taken message 128A notifies user A of
25 the grant of the floor to user B for voice. After the floor is granted to user B for voice communications, voice communications may occur in the PTT media session 130. As was also discussed above, in the session, if user B no longer requires the floor, user B sends a floor release message to the PTT controller 100 that releases the floor for voice for use by other
30 participants in the session. The PTT controller 100 then sends a floor idle message to the other participants regarding the floor for voice communications .

[0021] Figure 2 illustrates an alternative embodiment of a method and apparatus in accordance with the principles of the present invention for floor control in a multi-media push-to-talk network in accordance with the principles of the present invention. As can be seen, a message flow diagram 20 is provided for establishing a multi-media communication session between the first user A and the second user B by the PTT controller 200. Again, whereas this illustrated multi-media communication session also includes voice and video media, the present invention is not limited to only these two types of media.

10 [0022] In this embodiment, in the PTT session setup 210, user A sends a floor request message 212 that contains a floor request for voice communications in the multi-media communication session for use by user A. User A also sends a floor grant request message 214 that contains a floor request for video communications in the multi-media communication session for use by a user other than user A, e.g., user B. Thus, in this embodiment, a single user, e.g., user A, is able to request the floor for one media type, e.g., voice, for its use and also to request that the floor be granted for another media type, e.g., video, for use by another participant. In this embodiment, a user is able to simultaneously request the floor for one media type for its use and request that the floor be granted to another participant for another media type for use by that other user.

[0023] This feature has particular utility where each of multiple participants in a multi-media communication session may only require the floor for one of the different media types in the multi-media session. A single participant may both request the floor for the media type that it requires and request that the floor be granted for the media type required by the other participant. This provides for greater efficiency in the call set-up process for a multi-media communication session. An example of a multi-media communication session where each of two participants may only require the floor for one of the different media types in the multi-media session is where user B is using the mobile

communications device to send to user A a video of a construction site, real estate property, objects in a shop, etc. User B only requires the floor for video. However, user A, who is receiving the video from user B, may need to use its mobile communications device for a voice communication
5 to user B in order to direct the camera movements of user B such that the desired video is received by user A. Thus, user A only requires the floor for voice.

[0024] Therefore, in accordance with the principles of the present invention, the floor for each of the different media types in the multi-
10 media communication session may be granted to different participants. Further, any one of the participants may both request the floor for one media type for its use and grant the floor for another media type to another of the participants. Whereas the actual "grant" of the floor may be performed by the PTT controller, as discussed above, the PTT
15 controller may be programmed in any of a variety of ways such that a received grant request is automatically approved if the respective floor is idle, such that, in effect, a user is granting the floor to another user by making the grant request.

[0025] Continuing with the discussion of this embodiment of the invention in Figure 2, as can be seen, both the floor request message 212
20 and the floor grant request message 214 are received at the PTT controller 200. In response to messages 212 and 214, PTT controller 200 grants the floor to user A for voice and grants the floor to user B for video. In granting the respective floors to users A and B in response to
25 user A's floor request message 212 and floor grant request message 214, PTT controller 200 sends floor grant messages 216 and 216A to users A and B, respectively. Floor grant message 216 notifies user A of the floor grant for voice to user A and the floor grant for video to user B and enables user A's communication device to send voice communications to
30 other participants, e.g., user B, in the multi-media communication session. Likewise, floor grant message 216A notifies user B of the floor grant for voice to user A and the floor grant for video to user B and

enables user B's communication device to send video communications to other participants, e.g., user A, in the multi-media communication session. Since user B may not be aware that the floor has been granted to it since the grant was initiated by user A, in accordance with the principles of the present invention, the PTT controller may send a prompt to user B to notify user B of the granting of the floor for the respective media type. The prompt may be received by user B's communications device and displayed on a user interface of the device.

[0026] In an alternative embodiment, instead of sending a single message 216A to user B, two messages may be sent to user B. A first message may indicate that the floor has been taken by user A for the voice media type and a second message, called an unsolicited floor grant, may indicate that the floor has been granted to user B for the video media type. This may be desirable because the first message is within general interface definitions of a PTT network, e.g., floor taken message 114A of Figure 1, and the second message is an extension message that alerts user B of an unsolicited grant of the floor for the respective media type. Thus, this extension message does not violate what may be a general interface rule of not sending a floor "grant" message to someone who did not request the floor.

[0027] After the respective floors are granted to users A and B, user A may send a voice communication 222 to PTT controller 200, which in-turn sends the voice communication, as illustrated by message flow 222A, to user B in the split bi-directional voice and video PTT multi-media session 220. Similarly, user B may send a video communication 224 to PTT controller 200, which in-turn sends the video communication, as illustrated by message flow 224A, to user A.

[0028] In the session, if user A no longer requires the floor, user A sends a floor release message 226 to the PTT controller 200 that releases the floor for voice for use by other participants in the session. In this embodiment, when the PTT controller receives the floor release message 226 related to voice communications, not only does the PTT controller

release the floor for voice, but additionally, responsive to this floor
release message 226, the PTT controller sends a floor revoke message
226A to user B which revokes the floor for video communications from
user B. Thus, user B no longer has the floor for video. As discussed
5 above, since user B may not be aware that the floor has been revoked
from it, since the revocation was initiated by user A's floor release for
voice, the PTT controller may send a prompt to user B to notify user B of
the revocation of the floor for video communications, and thus prompt
user B to stop video communications. This prompt may also be received
10 by user B's communications device and displayed on the user interface of
the device. Alternatively, a separate prompt from the PTT controller is
not required. User B's communications device, in response to the floor
revoke message 226A will notify the user interface which in-turn will
notify user B and, possibly additionally, the media source to stop the
15 streaming, e.g., in this case the video camera. A similar process can also
be used for the UI prompt to start the video session, as discussed above.

[0029] This feature of the invention, where a single participant
may both release the floor for its media type and revoke the floor for the
media type of another participant, which was requested during the floor
20 request, may additionally provide for greater efficiency in the call tear-
down process for a multi-media communication session. It may be likely
that in such a multi-media communication session, if one participant no
longer requires the floor for one media type, then another participant(s)
will no longer require the floor for the other media types(s), and thus,
25 allowing a single user to control the release of the floors for the multiple
media types will provide for greater efficiency in the communications
system. After the respective floors have been released and revoked, PTT
controller 200 sends floor idle messages 228 and 228A to user A and B,
respectively. As discussed above, these messages notify the users that
30 the floor is now open and that it may be requested by the other users.

[0030] In further implementing the request messages for the multi-
media communication session of the present invention discussed above,

as illustrated in an embodiment in Figure 3, the present invention also provides a communications device with an enhanced PTT button. As can be seen, communications device 300 includes an enhanced PTT button 310. The PTT button 310 includes an upper sensor 320, a middle sensor 330, and a lower sensor 340. Thus, the PTT button 310 contains three different touch-sensitive areas that are disposed across an upper button area 310A and a lower button area 310B, which are capable of implementing the request messages discussed above. Thus, with the enhanced PTT button 310 of the present invention, a button is provided that can implement multiple variations of a floor request message in a multi-media communication session. Thus, with the present invention, a single button does not provide a single function.

[0031] The present invention is not limited to any particular embodiment for how the button is configured to implement the various request messages. For example, the button 310 can include separate physical buttons for each of the sensors or can include a touch-sensitive pad where different geometric areas of the pad are each associated with a respective possible floor request message. Additionally, the various sensors may be hard-wired to perform specified functions or may be configured by software such that any particular sensor may be programmed to perform any particular function.

[0032] Figures 4 and 5 provide illustrations of the various types of floor control messages that may be individually implemented by the multiple sensors of the enhanced PTT button of the present invention.

[0033] The floor control messages of Figure 4 generally correspond to the message flow diagram 10 that is provided in Figure 1 for establishing a multi-media communication session between the first user A and the second user B. In the flow diagram of Figure 1, users A and B request the floor for their own use. Thus, in accordance with the principles of the present invention, a user is able to request the floor for either one media type for its own use, e.g., voice or video, and/or request the floor for both media types, e.g., voice and video, for its own use. In

this embodiment of a multi-media communication session, the multiple sensors of the enhanced PTT button could be configured as shown in Figure 4. Thus, the upper sensor 320 could be utilized to send a floor request message to the PTT controller where the user requests the floor for only the voice media type in the multi-media communication session. The middle sensor 330 could be utilized if the user desired to send a floor request message to the PTT controller where the user requests the floor for both the voice and video media types in the multi-media communication session. Lastly, the lower sensor 340 could be utilized if the user desired to send a floor request message to the PTT controller where the user requests the floor for only the video media type in the multi-media communication session. Thus, in accordance with the principles of the present invention, a single button can be utilized to send various floor request messages in a multi-media communication session.

15 [0034] The floor control messages of Figure 5 generally correspond to the message flow diagram 20 that is provided in Figure 2 for establishing a multi-media communication session between the first user A and the second user B. In the flow diagram of Figure 2, user A can request the floor for one media type, e.g., voice or video, for its own use and grant the floor for another media type for another participant's use. In this embodiment of a multi-media communication session, the multiple sensors of the enhanced PTT button could be configured as shown in Figure 5. Thus, the upper sensor 320 could be utilized to send a floor request message to the PTT controller where the user requests the floor for the voice media type in the multi-media communication session for its own use and grants the floor for the video media type to another party(s). The middle sensor 330 could be utilized if the user desired to send a floor request message to the PTT controller where the user requests the floor for both the voice and video media types in the multi-media communication session, as discussed above with respect to the embodiment of Figure 4. Lastly, the lower sensor 340 could be utilized if the user desired to send a floor request message to the PTT controller

where the user requests the floor for the video media type in the multi-media communication session for its own use and grants the floor for the voice media type to another party (s). Thus, again, in accordance with the principles of the present invention, a single button can be utilized to send
5 various floor request messages in a multi-media communication session.

[0035] Whereas the disclosed embodiments principally describes a private PTT call between two users A and B, the principles of the present invention can also be applied to group calls where one party is able to request the floor for one media type for himself/herself and request that
10 the floor be granted to another member, or members, of the group call for another media type(s).

[0036] The disclosed embodiments are illustrative of the various ways in which the present invention may be practiced. Other embodiments can be implemented by those skilled in the art without
15 departing from the spirit and scope of the present invention.

What is claimed is:

1. A method for floor control in a multi-media dispatch network, comprising the steps of:
 - receiving a floor request message related to a first media type at a
5 dispatch network controller from a first user; and
 - receiving a floor grant request message related to a second media type at the dispatch network controller from the first user.
2. The method according to claim 1, further comprising the steps of:
 - granting a floor to the first user for the first media type by the
10 dispatch network controller in response to the floor request message; and
 - granting a floor to a second user for the second media type by the dispatch network controller in response to the floor grant request message.
3. The method according to claim 1, wherein the first media type is a
15 voice communication and wherein the second media type is video.
4. The method according to claim 2, wherein the first media type is a voice communication and further comprising the step of receiving a first voice communication in a voice communication session established between the first user and the second user from the first user at the
20 dispatch network controller for forwarding to the second user, and wherein the second media type is video and further comprising the step of receiving a first video in a video communication session established between the first user and the second user from the second user at the dispatch network controller for forwarding to the first user.
- 25 5. The method according to claim 2, further comprising the step of sending a prompt to the second user by the dispatch network controller to notify the second user of the granting of the floor to the second user for the second media type.
6. The method according to claim 2, further comprising the steps of:

receiving a floor release message related to the first media type at the dispatch network controller from the first user; and

5 sending a floor revoke message related to the second media type from the dispatch network controller to the second user in response to receiving the floor release message related to the first media type at the dispatch network controller from the first user.

7. The method according to claim 2, further comprising the step of:
sending a floor grant message to the first user, wherein the floor grant message notifies the first user of the steps of granting the floor to
10 the first user for the first media type and granting the floor to the second user for the second media type.

8. An apparatus for floor control in a multi-media dispatch network, comprising:

a dispatch network controller:
15 wherein the dispatch network controller receives a floor request message related to a first media type from a first user; and
wherein the dispatch network controller receives a floor grant request message related to a second media type from the first user.

9. The apparatus according to claim 8, further wherein:
20 the dispatch network controller grants a floor to the first user for the first media type in response to the floor request message; and
the dispatch network controller grants a floor to a second user for the second media type in response to the floor grant request message.

10. The apparatus according to claim 9, wherein the dispatch network
25 controller sends a prompt to the second user to notify the second user of the granting of the floor to the second user for the second media type.

11. A device for communication in a multi-media dispatch network, comprising:

a Communications device, wherein the communications device includes a floor request sensor and wherein the floor request sensor includes:

- 5 a first sensor; and
 a second sensor.

12. The device according to claim 11:
 wherein the first sensor is associated with a floor grant request message related to a first media type in the multi-media dispatch network and a floor request message related to a second media type in
10 the multi-media dispatch network; and

 wherein the second sensor is associated with a floor request message related to both the first and second media types in the multi-media dispatch network.

13. The device according to claim 12:
15 wherein the first media type is a voice communication and the second media type is video.

14. The device according to claim 12, wherein the floor grant request message related to the first media type requests that a floor be granted to a second communications device for the first media type and wherein
20 the floor request message related to the second media type requests that a floor be granted to the communications device for the second media type.

15. The device according to claim 11, wherein the floor request sensor is a touch-sensitive pad and wherein the first sensor is an upper portion
25 of the touch-sensitive pad and the second sensor is a lower portion of the touch-sensitive pad.

16. The device according to claim 11, wherein the first sensor is a first physical button and wherein the second sensor is a second physical button.

17. The device according to claim 12, wherein the floor request sensor includes a third sensor and wherein the third sensor is associated with a floor grant request message related to the second media type in the multi-media dispatch network and a floor request message related to the
5 first media type in the multi-media dispatch network.

18. A method for floor control in a multi-media dispatch communication session, comprising the steps of:

10 sending a floor grant request message for a first media type in the multi-media dispatch communication session and a floor request message for a second media type in the multi-media dispatch communication session by a floor request sensor of a communications device to a dispatch network controller.

19. The method according to claim 18, further comprising the steps of:

15 granting a floor to a second communications device for the first media type in response to the floor grant request message by the dispatch network controller; and

granting a floor to the communications device for the second media type in response to the floor request message by the dispatch network controller.

20 20. The method according to claim 19, further comprising the step of sending a prompt to the second communications device by the dispatch network controller to notify the second communications device of the granting of the floor to the second communications device for the first media type.

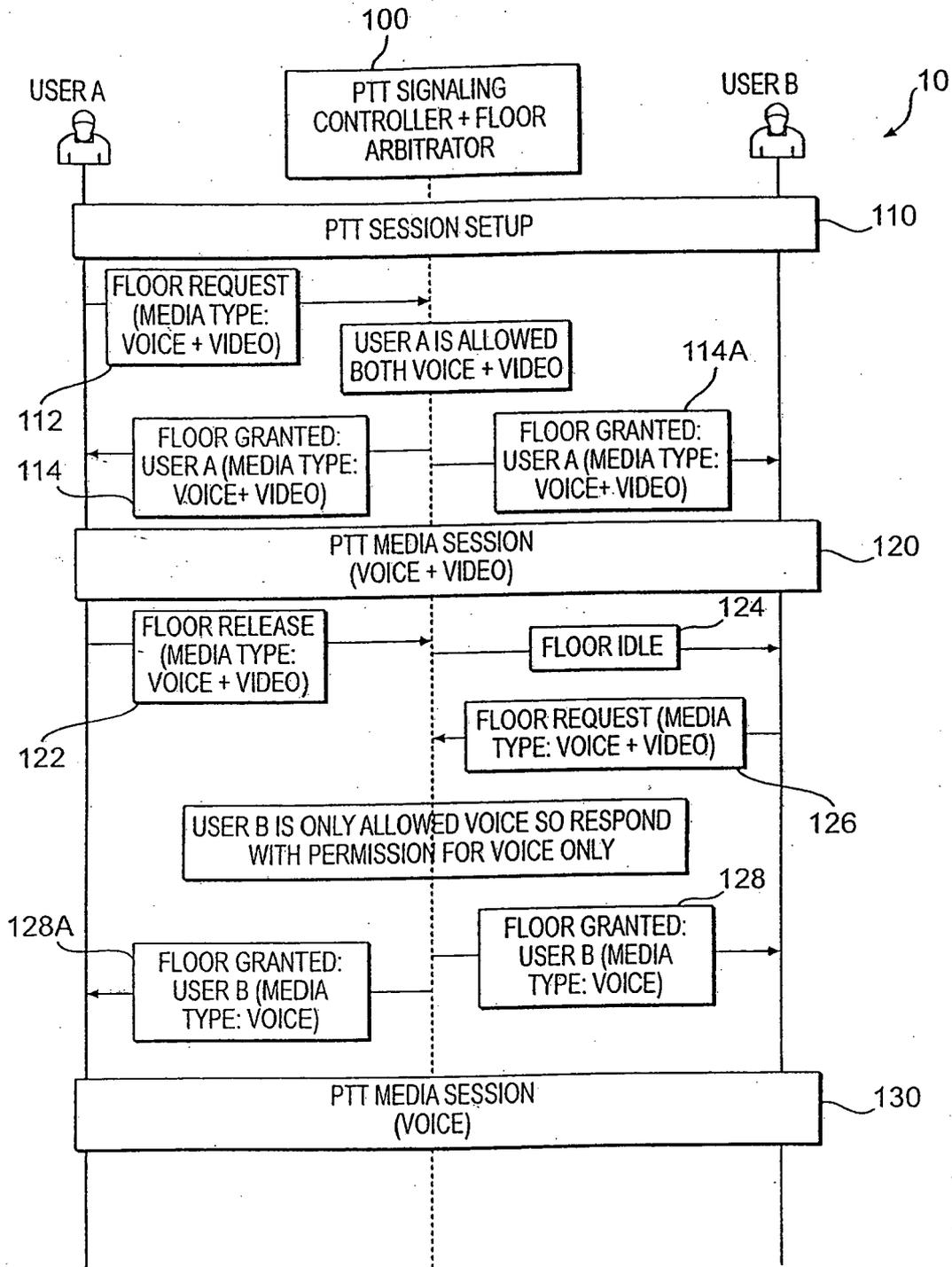


FIG. 1

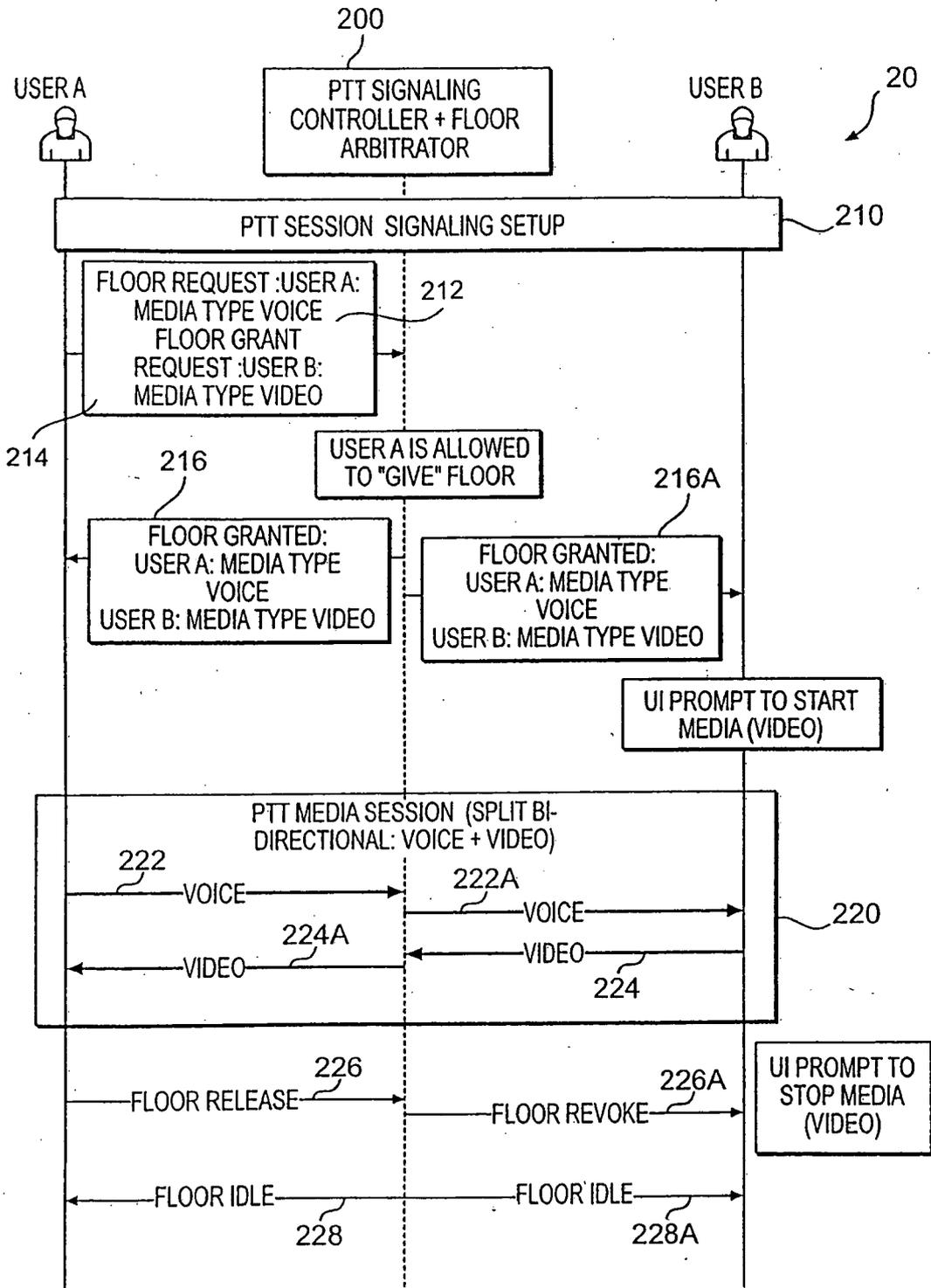


FIG. 2

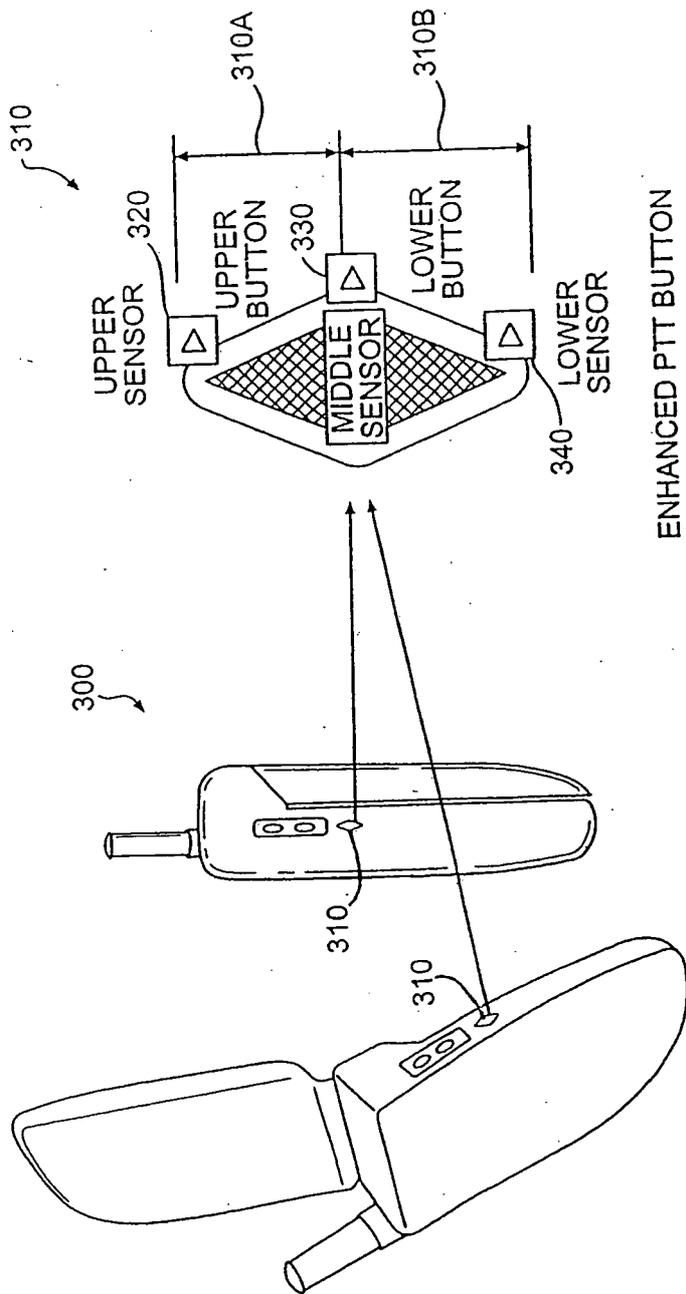


FIG. 3

	SENSOR	FLOOR REQUEST MESSAGE
320	UPPER SENSOR (BUTTON)	REQUEST MEDIA TYPE VOICE FOR SELF
330	MIDDLE SENSOR (BUTTON)	REQUEST BOTH MEDIA TYPES (VOICE + VIDEO) FOR SELF
340	LOWER SENSOR (BUTTON)	REQUEST MEDIA TYPE VIDEO FOR SELF

FIG. 4

	SENSOR	FLOOR REQUEST MESSAGE
320	UPPER SENSOR (BUTTON)	REQUEST MEDIA TYPE VOICE FOR SELF; GRANT MEDIA TYPE VIDEO TO OTHER PARTY (PARTIES)
330	MIDDLE SENSOR (BUTTON)	REQUEST BOTH MEDIA TYPES (VOICE + VIDEO) FOR SELF
340	LOWER SENSOR (BUTTON)	REQUEST MEDIA TYPE VIDEO FOR SELF; GRANT MEDIA TYPE VOICE TO OTHER PARTY (PARTIES)

FIG. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 09/01033

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - H04L 12/28 (2009.01)

USPC - 370/395.2

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

B FIELDS SEARCHEDMinimum documentation searched (classification system followed by classification symbols)
USPC: 370/395.2Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC: 370/351, 395.2; 455/39, 519 (keyword limited - see search terms below)Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PubWEST (PGPB, USPT, USOC, EPAB, JPAB); GOOGLE
Terms: push, talk, wireless, floor, request, grant, media, type, touch, sensitive, pad, video, display, prompt, audio.**C DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 2007/0021 133 A 1 (Coulas) 25 January 2007 (25.01.2007), entire document especially abstract, figure 5, para [0020], [0023], [0024], [0030], [0031], [0032], [0035], [0038], [0039], [0041].	1-14, 17-20 --- 15-16
Y	US 2006/0087982 A 1 (Kuure et al.) 27 April 2006 (27.04.2006), entire document especially, abstract, para [0044], [0050].	15-16

D Further documents are listed in the continuation of Box C

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

Date of the actual completion of the international search

28 March 2009 (28.03.2009)

Date of mailing of the international search report

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