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(54) **PEER-TO-PEER MOBILE INSTANT MESSAGING METHOD AND DEVICE**

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This patent is subject to a terminal disclaimer.

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(52) **U.S. Cl.** **370/313**; 370/395.3; 455/466; 709/206

(58) **Field of Classification Search** 455/466; 370/313, 395.3

See application file for complete search history.

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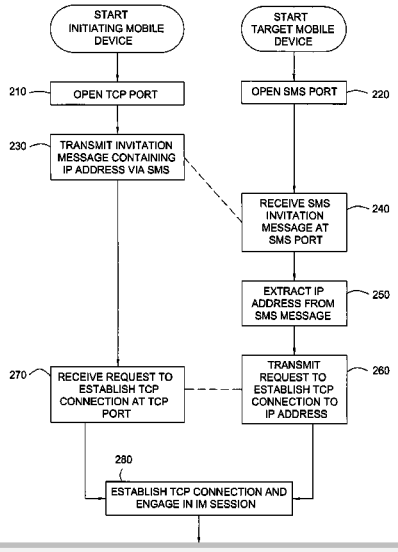
(57) **ABSTRACT**

A technique is provided for establishing peer-to-peer session-based instant messaging between mobile devices without the need for using an instant messaging registration or log-in server to provide presence information. Session-based instant messaging communications between mobile devices are established by transmitting necessary address information through page-based messaging services that utilize the underlying digital mobile network databases and services to resolve the identification and location of the mobile devices.

20 Claims, 2 Drawing Sheets



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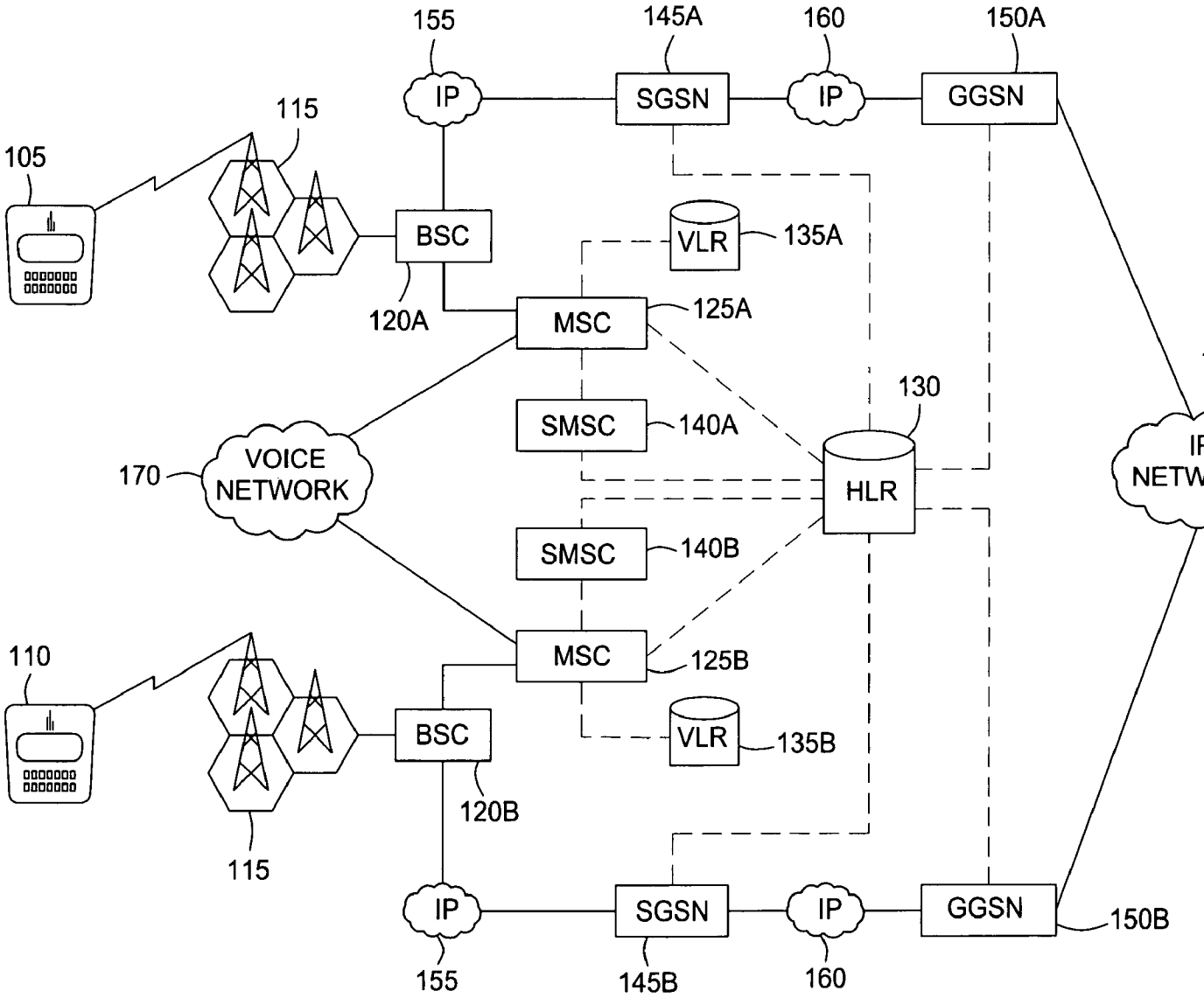

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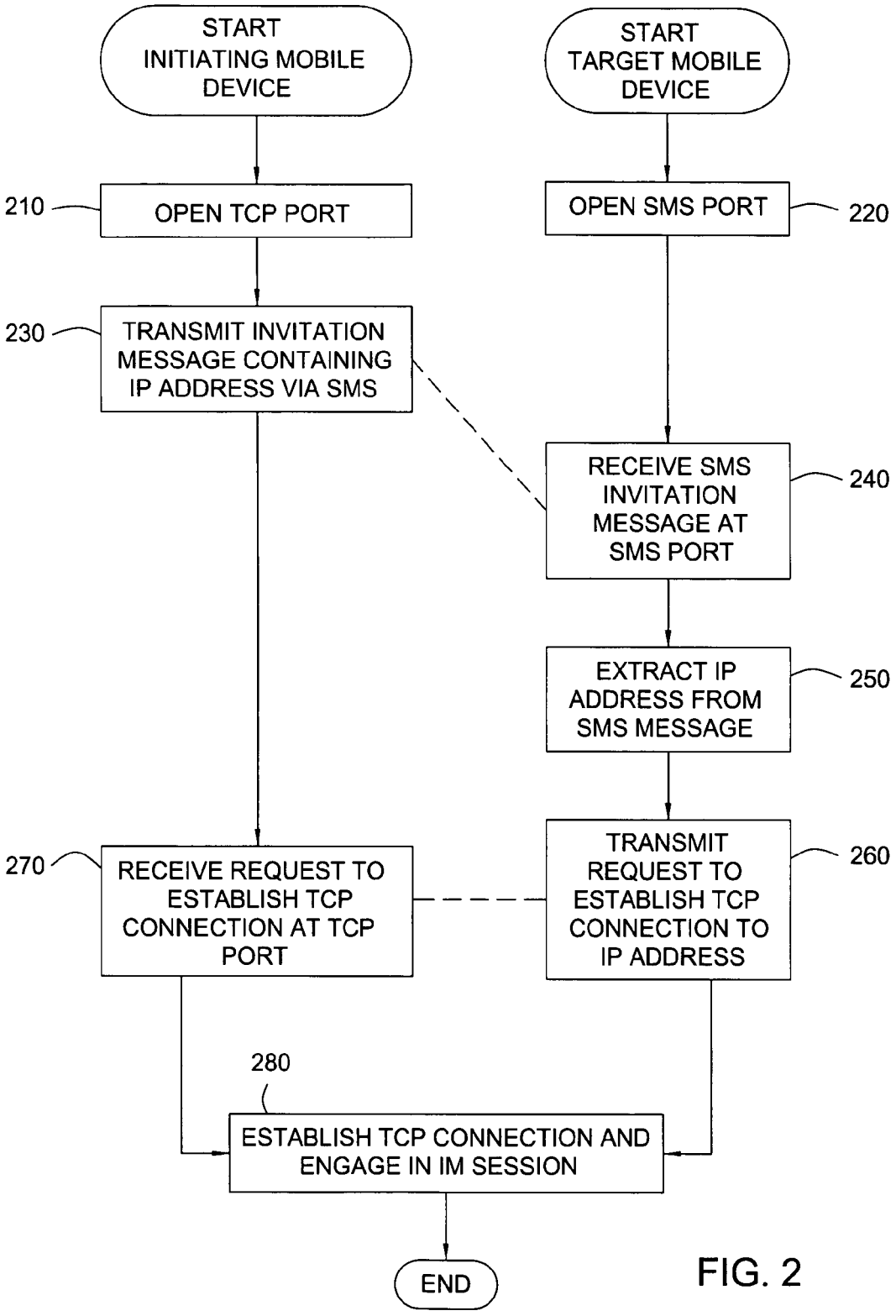

FIG. 2

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PEER-TO-PEER MOBILE INSTANT MESSAGING METHOD AND DEVICE

FIELD OF THE INVENTION

The present invention relates generally to messaging techniques for mobile devices, and more specifically, a technique to establish peer-to-peer session-based instant messaging ("IM") communications among mobile devices without the need for IM registration.

BACKGROUND OF THE INVENTION

Current instant messaging ("IM") technologies depend upon a registration system to enable end users to communicate with one another. For example, to establish an IM session on AOL's Instant Messenger ("AIM"), each participating end user must have registered with AOL and must log into an AIM server in order to use the service. This registration system creates a virtual network of registered users and the value to a new user in joining an IM service is directly related to the number of existing users already registered on the service. As more users register to use an IM service, the value of the IM service to registered users increases since registered users will be able establish IM sessions with an increasing number of users. Known as a "network effect," this phenomenon causes a further tipping effect, which is the natural tendency for few (or even a single) IM services to pull away from their competitors once they have gained an initial edge by registering a critical mass of users. This tipping effect tends to occur rapidly and stems, in part, from users' inclination to gravitate towards the IM services that they expect will be become dominant. This tipping effect gives proprietary IM services such as AIM, Microsoft's .NET Messenger Service, and Yahoo! Messenger, that have achieved a large network of registered users, a strong barrier to entry into the IM market. As such, proprietary IM services may be reluctant to provide interoperability to other less established IM services since providing such access could cannibalize their competitive network advantage.

From a technical perspective, the registration system used in IM services is necessary to provide presence capabilities. In order to establish an IM session, an end user must be registered with the IM service so that the end user can log into the service's IM server, which broadcasts the end user's availability to engage in IM sessions to an authorized group of the end user's peers that have also registered and logged into the IM server. The IM server also similarly provides the end user with a list of registered peers that are available to engage in an IM session. When end users engage in IM sessions over a traditional connected network environment, presence capabilities are a critical characteristic of an IM service because such capabilities are needed to provide an end user's peers with sufficient presence information (i.e., IP address and port number) in order to locate the end user within the network and establish a connection between the end user and a peer for an IM session. Furthermore, logging into an IM server also enables an end user to indicate whether or not he or she is physically present (e.g., sitting in front of a networked workstation or in front of a laptop that is connected the network) and willing to engage in an IM session.

However, IM services for mobile devices, such as smartphones, appear to have less a need for presence capabilities. Unlike establishing an IM session on a laptop, desktop or workstation, where the end user must broadcast his or her

workstation, establishing an IM session on a mobile device does not suffer from the same presence issues because the end user is presumed to be carrying the mobile device at all times. So long as the mobile device has enough contact information (e.g., cellular telephone number, PIN number, etc.) to directly communicate with other mobile devices through the underlying wireless network technology (e.g., cellular technology, etc.), an IM session could be initiated and established in a manner similar to making and answering mobile phone calls without the need for registering with or logging into an IM server in order to broadcast presence information to other end users for IM purposes.

Furthermore, unlike IM services in a traditional connected network environment, successful end user adoption of an IM service between mobile devices would not suffer from reliance upon establishing a critical mass of end users through a registration system. In contrast, such an IM service would be instantly usable to any and all end users of mobile devices so long as such mobile devices are already capable of directly communicating with other mobile devices through the underlying wireless mobile technology without needing further presence information (e.g., cellular phones directly communicating with other cellular phones through cellular telephone numbers). As such, what is needed is a method to establish IM sessions directly between mobile devices, where such mobile devices are capable of directly communicating with other mobile devices through the underlying wireless technology, such that no IM registration or log-in server is needed to provide presence information to other mobile devices for IM purposes.

SUMMARY OF THE INVENTION

The present invention provides a method for establishing a peer-to-peer session-based IM communications between mobile devices over a digital mobile network system that supports data packet-based communications. Under the present invention, no IM registration or IM log-in server need be used to provide presence information. Instead, a mobile device initiating an IM session opens a listening port defined by an underlying data packet based network protocol. The initiating mobile device sends an invitation message containing the network address, including the listening port, of the initiating device to a target mobile device through a page-mode messaging service supported by the digital mobile network system. The initiating mobile device further utilizes and incorporates a unique identification number (e.g., telephone number, PIN number, etc.) associated with the target mobile device into the invitation message to locate and contact the target mobile device within the wireless mobile network. Once the initiating mobile device receives a response from the target mobile device at the listening port, the two mobile devices are able to establish a reliable virtual connection through the underlying data packet-based network protocol in order to exchange text messages directly between the two mobile devices through a session-based communication.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** depicts a diagram of an environment for establishing an IM session in accordance with the present invention between a first mobile device and a second mobile device in a GSM mobile network system supporting GPRS as a data packet-based communications service, SMS as a text mes-

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