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(71) Applicant (for all designated States except US): **RIGHT-INNOVATION AB** [SE/SE]; Box 6717, S-113 85 Stockholm (SE).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **SMEDSHAMMAR, Christer** [SE/SE]; Frejgatan 23, S-113 49 Stockholm (SE).

(74) Agents: **LINDÉN, Stefan** et al.; Bergenstråhle & Lindvall AB, Box 17704, S-118 93 Stockholm (SE).

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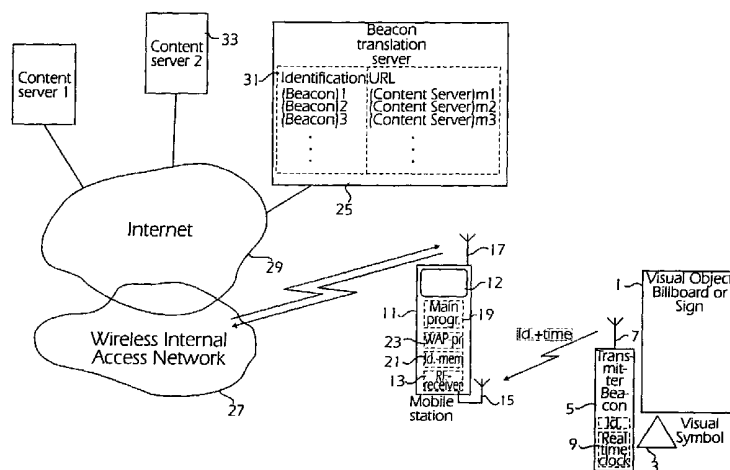
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(54) Title: AN INFORMATION RETRIEVAL SYSTEM



(57) **Abstract:** An information retrieving system for a mobile terminal (11) comprises a general service network like the Internet (29) accessed e.g. through a wireless access network (27). In order to permit direct information on visual objects (1) such as billboards or signs, beacons (59) are placed at the objects constantly transmitting information in regard of the identity of the beacon and thereby of the object. The mobile terminals have local-range receivers (13) for detecting and receiving the beacon information. They will, when receiving such information, forward it to the Internet, to a site comprising a beacon translation server (31) which translates the identity information to an associated predetermined page in a content server (33). The content server contains additional information on the visual object in a format suitable to be shown on the display (12) of the mobile terminal and is by the translation server directly connected to the mobile terminal or the relevant information is accessed by the translation server and retransmitted to the mobile terminal. Beacons constructed only for simple repeated transmission of the same message can be built to have small dimensions and at very low costs and can easily be placed at any desired place.



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AN INFORMATION RETRIEVAL SYSTEM

TECHNICAL FIELD

The present invention relates to an information retrieving system for a mobile unit or terminal using a general service network like the Internet and to a method of retrieving
5 information.

BACKGROUND

The World Wide Web or the Internet is ever growing to be available to more and more people. More and more persons and companies have own pages in the Internet and thus also the amount of information in the Internet is constantly increasing. Thus, to find
10 wanted information on the Internet is an increasing problem. The cause of this problem is probably the same as the cause of the explosive growth of the Internet, i.e. the distributed topology. This gives any subscriber the possibility to add information and functionality to the Internet but at the same time it has resulted in a lack of structure of the information carried by Internet. This has in turn resulted in various new research areas such as search
15 engines and also new terms such as "portals" and "browsing". To "browse for content" is in most cases the same as searching around for information in a random way until something interesting appears. Such a user behaviour of browsing cannot be comfortably made on mobile stations such palm size terminals or mobile telephones due to smaller screens, limited input options and the fact that the user of the device is probably moving
20 and thereby can only give a limited amount of attention to the device.

As a consequence of the difficulty to find services and information on the Internet the "portal" industry is rapidly growing. The portals collect on a single web site lists of contents of other web sites so that a user can find valuable information faster. The business idea of the portals is to collect as many user hits as possible and then sell
25 advertisement space on the portal front page. To get as many hits as possible the portals have to collect information and services of interest, but they also spend a lot of money on advertising in traditional media.

There is a trend today among the portals to let the users personalize or individualize the information that they want on the portal. This will probably be even more important
30 for the wireless Internet since the wireless devices will initially not allow convenient browsing.

The mobility of devices connected to the Internet also opens up for a new set of possible value added services that are related to the position of the user. One example comprises mobile telephony systems that are currently carrying voice. Also, in mobile
35 telephone networks such as GSM, AMPS/D-AMPS and IS-95, major efforts have been made to find solutions to the problem of geographically locating mobile users or mobile stations in the systems since the FCC has stated that all emergency calls placed over a mobile network in the USA shall be localised with an accuracy of 125 m in 67% of the cases. Examples of solutions are the methods based on TOA (Time Of Arrival), OTD

(Observed Time Difference), AOA (Angle Of Arrival), GPS and the SIM-toolkit. The principle of the Time Of Arrival method comprises measuring the time when a known signal is received in several base stations and thereafter calculating a geographic position related to the known geographic positions of the base stations. The OTD method uses the same general principle but instead the mobile terminal measures the times when a specific signal arrives from different base stations. Another solution is to simply have a GPS receiver built into the mobile terminal. There is also a GSM solution in which a SIM-toolkit is used. The program on the SIM-card is modified in such a way that it also reads the strengths of the signals that the mobile unit has received from base stations of the neighbouring cells when doing the normal scan to see if there is another better cell to camp on. These measured signal strengths are transmitted in an SMS (Short Message Service) message to a server in which an estimated geographic position is calculated.

All these technologies except GPS have difficulties in fulfilling the requirement of an accuracy of 125 meters. However, GPS has poor coverage in built-up areas and inside houses.

A wide range of services can be implemented by using these technologies since there are services that do not require a higher accuracy than a few hundred meters, one such important service being fleet management.

It can be easily anticipated that the wireless portals will use location technologies for adding the position of the user together with the personal profile to customize the content for a particular user at a particular place.

SUMMARY

It is an object of the present invention to provide a communication system including information retrieval, in which a mobile terminal can obtain extended or additional information on predetermined objects.

Thus generally, the physical surroundings of a mobile unit is used as a portal for information. There is an association between the visual impressions that a user of the mobile Internet receives in a public or non-public area and the content that is then presented on the user's mobile Internet terminal.

Public visual items such as billboards and signs are thus proposed to be equipped with a transmitter or beacon transmitting information wirelessly, such as a radio transmitter or an IR-transmitter, and a significant eye-catching symbol. When the user then gets close to the visual item, a short range receiver adapted to wirelessly receive information on wavelengths used by the beacon, such as a radio receiver or and an IR-detector, carried by the user will discover the beacon signal and receive an identity of the visual item. This identity will be transmitted over the mobile Internet by a mobile browser in the user equipment to a server that will deliver content and functionality matching the visual information on the visual sign or billboard. The same significant symbol as can be seen on the visual item can also be presented by the mobile browser on

the display of the user equipment. The identity of the beacon can be implemented as a cookie to the mobile browser which is stored in the mobile device cookie memory. This will then automatically be transmitted to the server when the local web or WAP page is requested for downloading.

5 By only transmitting an identity from the local transmitter instead of the entire information content, the beacon can be made at a much smaller cost than would be the case if it would have to be connected to the Internet. By only transmitting an identity that is converted to a web address (URL) by a server, the associated information can be easily changed when for instance the billboards are changed.

10 To protect the investment that is needed for installing the transmitter the ID code of the transmitter can be changed with time, e.g. periodically such as each day.

The server can also allow that the identity of the user is hidden in relation to a content server so that the company that owns the sign or billboard through the content server associated with the sign or billboard cannot see when and how often a user passes
15 the sign or billboard.

Thus, the user of a mobile terminal device that is used mainly for accessing the Internet will by a system as described herein get an efficient way of finding information of interest.

The Internet is herein taken as an example of a general service network in which
20 the communication as described above can be used.

Additional objects and advantages of the invention will be set forth in the description which follows, and in part will be obvious from the description, or may be learned by practice of the invention. The objects and advantages of the invention may be realized and obtained by means of the methods, processes, instrumentalities and
25 combinations particularly pointed out in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

While the novel features of the invention are set forth with particularly in the appended claims, a complete understanding of the invention, both as to organization and content, and of the above and other features thereof may be gained from and the
30 invention will be better appreciated from a consideration of the following detailed description of non-limiting embodiments presented hereinbelow with reference to the accompanying drawings, in which:

- Fig. 1 is a schematic view of a system for retrieving information, and
- Fig. 2 is a schematic view of an alternative embodiment of a system for retrieving
35 information.

DETAILED DESCRIPTION

A visual, physical object 1 such as a sign, billboard or boarding or advertisement pillar carries a significant visual symbol 3 that indicates that it is also equipped with a transmitter beacon 5. The beacon 5 periodically, all the time, transmits through an

antenna 7 a signal having a limited geographical coverage. The signal comprises information on the identity of the transmitting beacon. The information sent can be encrypted and it can in addition to the identity of the beacon comprise information on the current time obtained from a real time clock 9. The information sent from the beacon 5
5 can e.g. be coded as a web-browser cookie. Alternatively it can be coded as an Internet address string or URL containing a variable that is the identity of the transmitting beacon. Another alternative is to code the information as an SMS message containing the identity. The beacon 5 can wirelessly transmit the information in any suitable way, such as using electromagnetic waves within a suitable radio frequency band or IR-waves.

10 A mobile Internet terminal 11 for wireless communication such as a mobile telephone having the conventional circuits necessary for the mobile communication, a display 12 and some installed wireless Internet protocol like a WAP-protocol is carried by a user. The terminal 11 is equipped with an additional local-range receiver or detector 13 adapted to receive the wireless information sent by the beacon 5. The receiver 13 has
15 an own antenna or similar receiving element 15 that is separate from the ordinary mobile unit antenna 17 used by the mobile communication circuits. The receiver or detector 13 constantly listens whether signals issued by a beacon 5 are received or detected. It can thus for example listen to radio signals within a predetermined wavelength band in which the beacon 5 is transmitting. Then the receiver 13 will receive, when the terminal 11 is
20 sufficiently close to the transmitter beacon 5, the signals transmitted by the beacon 5 carrying information on the identity of the beacon. Then it is determined whether the received signals have a predetermined format indicating that they carry the special type of information issued by beacons 5 associated with visual objects 1. In the case where it is decided that the received signal has the predetermined format, the receiver 13 decodes the
25 signal to find the possibly encrypted information containing the identification and transfers the information to a main program 19 which operates the mobile terminal 11 and stores the information in an internal memory 21 in the terminal. The information can be stored in a suitable format and/or in a proper place such as in the standard directory holding cookies so that it can be later transferred to a server in the Internet or be later
30 accessed by such a server.

Instead of having the beacon 5 transmitting the information directly in the shape of a cookie or URL-variable etc, the received information can by the main program 19 be encoded or transformed to a shape suitable to transmit information from a terminal connected to Internet such as a cookie, an Internet address string or URL containing a
35 variable comprising the identity of the transmitting beacon or an SMS message containing the identity.

The main program 21 then sets up a session, using a WAP or other wireless protocol 23 for accessing the Internet, with a distant beacon translator server 25 which is a Web server in the Internet. The server is accessed over some suitable wireless, access

network such as a Wireless Internet Access Network 27 and the Internet 29 by transmitting suitable signals from the main antenna 17 of the mobile terminal 11. The beacon translator server 25 accesses in some predetermined way, such as accessing a cookie in the mobile terminal 11, the information carrying the identification and if
5 necessary, decrypts the information to find the identification of the beacon. Then it searches an internal list 31 to find a server 33 called a content server with which this identity information is associated and which holds information associated with the visual object 1 at which the beacon 5 is placed. The beacon translator server 31 thereafter redirects the browser of the calling mobile terminal 11 to the associated content server 33
10 so that the information of the visual object 1 can be seen on the display 12 of the mobile terminal to be read and evaluated by the user of the terminal.

Alternatively the beacon translator server 31 can directly fetch the information associated with the object 1 from the content server 33 and then it operates as a proxy server so that the user of the mobile terminal 11 can see the relevant information on the
15 display 12. In the latter case where the beacon translator server 31 acts as a proxy server it can also provide the mobile terminal 11 and thus the user of the terminal with anonymity in relation to the called content server 33.

In Fig. 2 a somewhat modified embodiment is illustrated. The local-range receiver 13 in the mobile unit 11 is there replaced by a local-range transmitter-receiver or
20 transponder 13'. The transponder 13' is also in this embodiment all the time listening to signals and detecting whether the received signals have a predetermined format indicating that they carry the special type of information issued by beacons 5 associated with visual objects 1. When it detects this special type of wirelessly received signals it starts transmitting, on the antenna or emitting element 15, information on the identity of the
25 mobile terminal 11, this information being directly coded in the transmitter portion of the transponder 13' or in a separate, fixed memory 35.

The beacon 5' is also modified and has in this embodiment in addition to the transmitter 37 a receiver portion 39 which is adapted to receive the identity information issued by the mobile station 11. The identity information issued by the mobile station can
30 e.g. have a special format or be issued on a wavelength different from that used by the transmitter portion 37 of the beacon 5'. After receiving the signals from the mobile station 11, the identity information is decoded and temporarily stored in the beacon, e.g. in a memory cell 41. Then the transmitter portion 37 of the beacon 5' for a while, say for a few seconds, changes its continuously issued information to comprise in addition the
35 received information in regard of the identity of the mobile station 11 located in the vicinity of the beacon. This information is issued, e.g. it can have a special format, so that the transponder 13' of the mobile station 11 now recognizes that a complete message is received by the transponder 13'. Alternatively, at least part of the received information can be decoded to find the particular information of the identity of the mobile unit in the

received message and to compare it to the identity of the mobile station 11. In the case where the received information of the identity of the mobile station 11 agrees with the identity of the considered mobile station, the received message is transferred to the main program 19 of the mobile unit 11. Then the process will continue in the same way as
5 described above.

For the signalling between the mobile station 11 and the beacon 5' in this case other more or less complicated protocols can be used. For example, when first receiving a message continuously broadcast from an approached beacon 5', the message must not contain any identity information but just some indication that there is a beacon nearby. If
10 there is identity information in the first received messages, such a message can be decoded to find the identity of the transmitting beacon. This identity information is then temporarily stored in some memory cell of the mobile station. When later receiving a complete message from the beacon, the received identity information of the identities of both the beacon 5 and the mobile unit 11 are compared to the temporarily stored identity
15 of the beacon and to the identity of the considered mobile unit and if they both agree, the latest received message is decided to be issued by the first approached beacon 5 and is thus transferred to the main program 19 of the mobile unit 11.

While specific embodiments of the invention have been illustrated and described herein, it is realized that numerous additional advantages, modifications and changes will
20 readily occur to those skilled in the art. Therefore, the invention in its broader aspects is not limited to the specific details, representative devices and illustrated examples shown and described herein. Accordingly, various modifications may be made without departing from the spirit or scope of the general inventive concept as defined by the appended claims and their equivalents. It is therefore to be understood that the appended claims are
25 intended to cover all such modifications and changes as fall within a true spirit and scope of the invention.

CLAIMS

1. An information retrieving system comprising a general service network and at least one mobile terminal connected to the network through wireless or radio communication, **characterized by** at least one transmitter beacon placed at a visual
5 object, which is provided with first information, and constantly wirelessly transmitting first signals which include information indicating the existence of the beacon, the mobile terminal comprising a local-range receiver or detector for wirelessly receiving or detecting signals including the first signals from the beacon, a content server and a translator server connected to the general service network, the content server carrying
10 second information related to the first information, the mobile terminal being arranged to access, when located to receive the first signals from the beacon through the local-range receiver, information including identity information of the beacon and to access the translator server through the general service network and the translator server being arranged to access, when accessed or after having accessed by the mobile terminal, the
15 information including identity information of the beacon and to translate the identity information of the beacon to an address of the content server and to make one of:

- connecting the mobile terminal to the content server to make the second information available to the mobile terminal, and
- connecting itself to the content server and communicating the second information from
20 the content server to the mobile user whereby anonymity of the mobile terminal in relation to the content server is achieved.

2. An information retrieving system according to claim 1, **characterized in** that the beacon is arranged to make, in transmitting the first signals indicating the beacon, the first signals carry the identity information of the beacon.

25 3. An information retrieving system according to claim 1, **characterized in** that the mobile terminal comprises a local-range transmitter for wirelessly transmitting signals from the mobile terminal to the beacon and that the beacon comprises a receiver or detector for wirelessly receiving or detecting signals from the mobile terminal, the mobile terminal being arranged to transmit through the local-range transmitter, when or after
30 receiving the first signals from the beacon, signals comprising identity information of the mobile terminal, and the beacon being arranged to transmit, when or after receiving the signals comprising identity information of the mobile terminal, for a relatively short time period, second signals comprising information including identity information of the beacon and the received identity information of the mobile terminal, the mobile terminal
35 being arranged to access, when or after receiving the second signals including the information of the identities, the translator server through the general service network and the translator server being arranged to access, when accessed or after having been accessed by the mobile terminal, the information of the identities and to translate the identity information of the beacon to an address of the content server.

4. An information retrieving system according to claim 1, **characterized by** a wireless secondary network connected to the general service network, the mobile terminal being connected to the general service network through the wireless secondary network.

5. An information retrieving system according to claim 1, **characterized in** that the
5 general service network comprises the Internet and that the mobile terminal, when or after receiving the identity information, is arranged to stored it as a cookie.

6. An information retrieving system according to claim 1, **characterized in** that the general service network comprises the Internet and that the mobile terminal, when or after receiving the identity information, is arranged to stored it as a variable in a URL-
10 string.

7. An information retrieving system according to claim 1, **characterized in** that the general service network comprises the Internet and that the mobile terminal, after connecting to the translator server, is arranged to transmit the identity information as an SMS-message.

15 8. A method of retrieving information in a system comprising a general service network and at least one mobile terminal connected to the network through wireless or radio communication, **characterized by** the steps of:

- placing at least one transmitter beacon at a visual object, which is provided with first information,
- 20 - constantly wirelessly transmitting from the beacon first signals which include information indicating the existence of the beacon,
- wirelessly receiving or detecting in the mobile terminal, by a local-range receiver or detector, signals including the first signals transmitted by the beacon,
- connecting a content server and a translator server to the general service network,
- 25 - making the content server carry second information related to the first information,
- the mobile terminal accessing, when located to receive the first signals from the beacon through the local-range receiver or detector, information including identity information of the beacon,
- the mobile terminal accessing, after having accessed the information including identity
30 information of the beacon, the translator server through the general service network,
- the translator server accessing, after having been accessed by the mobile terminal, the information including identity information of the beacon and translating the identity information of the beacon to an address of the content server and making one of:
- connecting the mobile terminal to the content server to make the second information
35 available to the mobile terminal, and
- connecting itself to the content server and communicating the second information from the content server to the mobile user whereby anonymity of the mobile terminal in relation to the content server is achieved.

9. A method according to claim 8, **characterized in** that, in the step of the beacon

transmitting the first signals indicating the beacon, the first signals carry the identity information of the beacon.

10. A method according to claim 8, **characterized by** that the additional steps of:

- 5 - the mobile terminal transmitting through a local-range transmitter, when or after receiving the first signals from the beacon, signals comprising identity information of the mobile terminal,
- the beacon transmitting, when or after receiving the signals comprising identity information of the mobile terminal, for a relatively short time period, second signals comprising information including identity information of the beacon and the received
10 identity information of the mobile terminal,
- the mobile terminal accessing, when or after receiving the second signals including the information of the identities, the translator server through the general service network, and
- the translator server accessing, when accessed or after having been accessed by the
15 mobile terminal, the information of the identities and translating the identity information of the beacon to an address of the content server.

Fig. 1

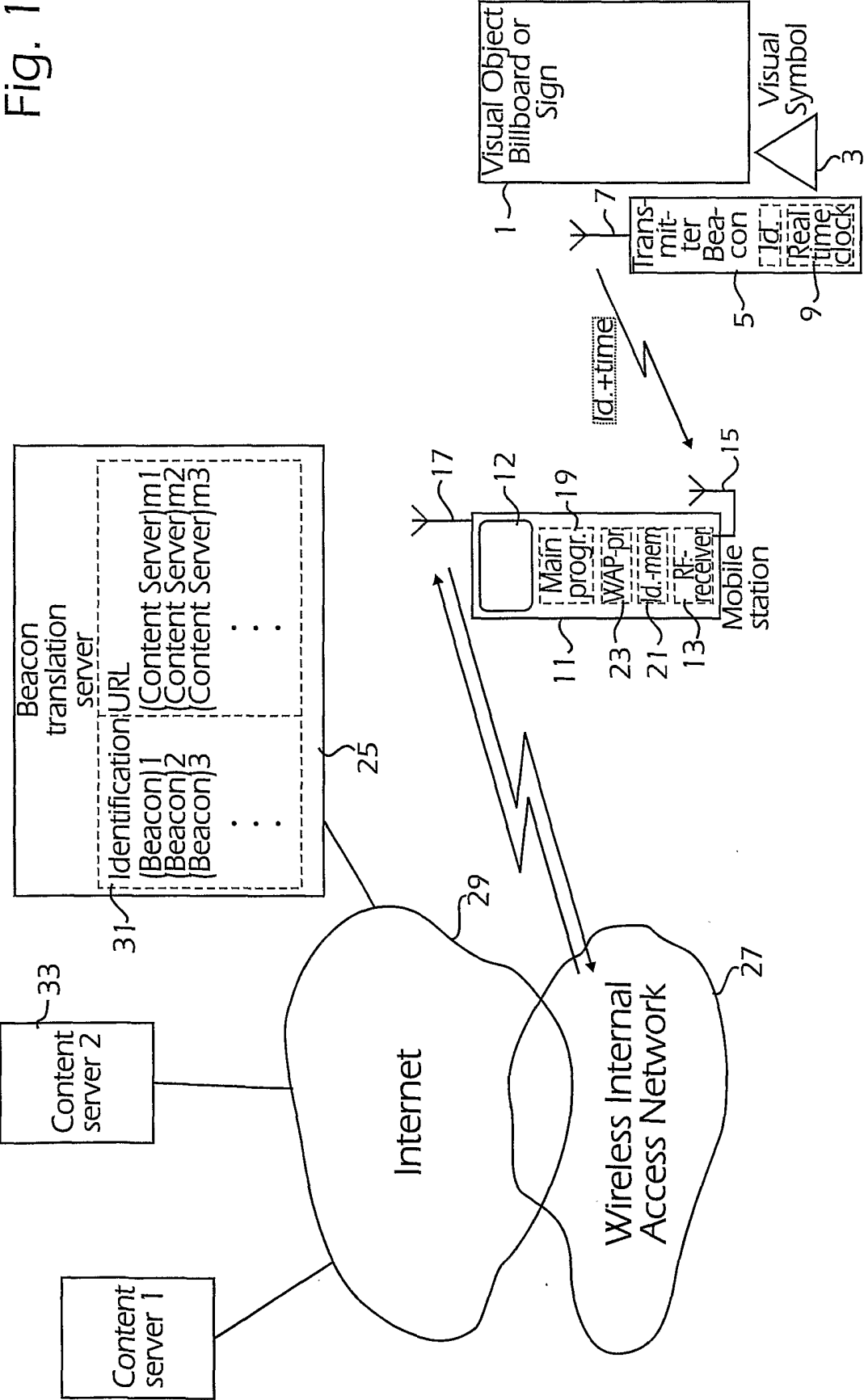
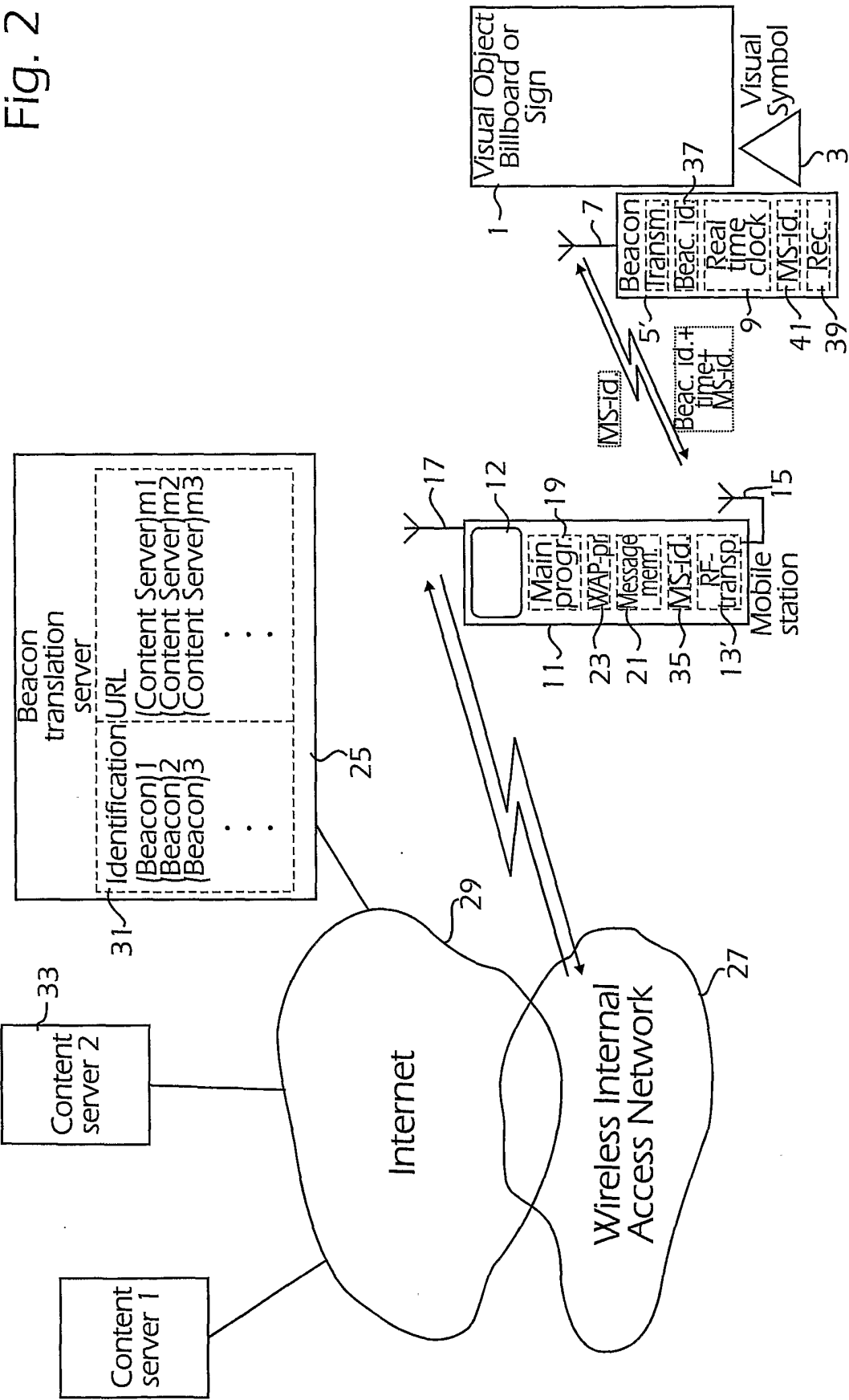


Fig. 2



INTERNATIONAL SEARCH REPORT

International application No.

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A. CLASSIFICATION OF SUBJECT MATTER

IPC7: G06F 17/60, G06F 17/30, H04Q 7/20

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)

IPC7: G06F, H04Q

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

SE,DK,FI,NO classes as above

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	WO 0035216 A1 (SPOTCAST COMMUNICATIONS, INC), 15 June 2000 (15.06.00) ---	1-10
A	WO 9827778 A2 (TELEFONAKTIEBOLAGET LM ERICSSON), 25 June 1998 (25.06.98) ---	1-10
A	WO 0023864 A2 (LANG, BROOK), 27 April 2000 (27.04.00) ---	1-10

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

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Box 5055, S-102 42 STOCKHOLM

Facsimile No. +46 8 666 02 86

Authorized officer

Oskar Pihlgren/LR

Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

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