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(54) **A system for the display, by a user, of multimedia content items**

System, welches einem Benutzer die Visualisierung von Multimediainhalten gestattet

Systeme pour permettre a un utilisateur de visualiser des contenus media

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**FR-A1- 2 864 738 JP-A- 2005 257 378**  
**US-A1- 2008 302 867**

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## Description

**[0001]** The present invention relates to a system for the display, by a user, of multimedia content items, of the type comprising a network for the transmission of data and at least one multimedia device associated with the network.

**[0002]** A preferred use of the invention is in a museum context, for the management of guided tours for individuals and groups of users, in an exhibition context and in general when it is desired to provide a user with selectively chosen information based on preselected parameters.

**[0003]** Devices and systems are known that are capable of guiding a user while he/she moves inside an environment, typically during a visit to a museum. An example of such devices is described in US2009/0175499A1 of Apple Inc. In this case, a multimedia device is used such as an iPhone or iPad capable of being connected through a wireless Internet network with a server to download from that server information that is useful for identifying one or more of the exhibited works and for obtaining information about the work, about its creator or about other content. These devices are potentially subject to drawbacks in that, by handling information downloaded from the Internet, they can even replace a tour of the museum leading the user to abandon it in favour of a purely virtual tour. In addition, they do not liven up the tour by interactively stimulating the users and do not have specific options to facilitate and monitor tours by groups following guides.

**[0004]** US 2008/0302867 discloses a system and method for tracking individuals via remote transmitters attached to personal items, particularly for verifying presence at a vendor location.

**[0005]** The technical problem underlying the invention is that of making available a system for the display, by a user, of multimedia content items, a network for implementing the system and a multimedia device associated with the network, the aforementioned items being structurally and functionally designed to enable all the drawbacks complained about with reference to the cited prior art to be overcome.

**[0006]** This problem is tackled and solved by the present invention by means of a network and a device produced in accordance with the claims that follow.

**[0007]** The features and advantages of the invention will become clear from the detailed description of one of its preferred but not exclusive example applications, illustrated, by way of indication and in a non-limiting manner, with reference to the appended drawings in which:

Figure 1 is a diagram that illustrates the system for the display, by a user, of multimedia content items according to the present invention and the network for implementing the system;

Figure 2 is a schematic illustration of a museum environment in which the system of the present inven-

tion is applied;

Figure 3 is a schematic illustration of a room in the museum environment of Figure 2;

Figure 4 is a schematic illustration of another room in the museum environment of Figure 2;

Figures 5 and 6 are flow diagrams that illustrate the information flow from the server end and from the client end, respectively, of the system according to the present invention.

**[0008]** In the drawings, the reference 1 indicates in an overall manner a network for the display, by a user, of multimedia content items stored in a memory 3 of a network server 2.

**[0009]** The network 1 comprises, in addition to the server 2, a plurality of devices for the selective display of multimedia content items, such as smartphones or tablet PCs 4 that are conventional per se, an RFID tag 5, of the active or passive type, coupled unambiguously to each of these multimedia devices 4, and a plurality of tag readers 6 distributed in an environment 7, for example the set of rooms in a museum, according to a mapping known to the server 2.

**[0010]** The network 1 may be implemented as a wireless or wired network, according to techniques that are conventional per se and well known to the person skilled in the art and which will not be discussed further.

**[0011]** Each RFID tag is programmed with a user identification code such that the multimedia device associated with it can be identified by the network server, via the user code associated with the tag, as a node of the network 1. In other words, in this way the multimedia device is given the option of intervening, according to the methods explained below, with the network server and/or with other network users. Thus, the network is used to interconnect the mobile devices tracked by means of the RFID tag readers.

**[0012]** As a priority, the interaction between the tags and the tag readers is used to locate the multimedia devices and to authorise the exchange of data with the server in a manner limited to the exchange authorisations related to the user code and to the location of the position of the tag in the environment.

**[0013]** The system is envisaged for situations in which the information flow is highly dependent on the spatial locations of the person who requires that information, as exactly happens in museums, but as similarly happens at conventions, exhibitions, tours of relatively vast places and other circumstances in which multiple users follow one or more routes along which various images or items of information come together.

**[0014]** The authorisation will be limited to works close to the user and to specific functions to which the user can have access, according to user level definitions previously set in the server.

**[0015]** Typically, if there is assumed a museum environment (Figure 2) made up of an entrance room (L1), four exhibition rooms (L2 - L5) and an exit room (L6), as

well as a toilet facilities room (WC), the rooms being interconnected by means of passages (P1-P6), and if it is assumed that in each room there is placed at least one tag reader 6, having stored the location of the readers on the server 1 it will be possible to know the distribution of the users by locating them in the environment considered and consequently authorising the respective multimedia device 4 to receive from the server 1 a subset of the multimedia content items available at the server and correlated with the room in which each user is located: the said subset of multimedia content items is therefore a function of the user code of each RFID tag and of the location of the tag in the environment considered.

**[0016]** Thus, if there are five exhibited works contained in a room, for example L2, marked O1, O2, O3, O4 and O5 as highlighted in Figure 3, it is possible to restrict the exchange of data between the user who is passing through and the server 1 to only the works present there.

**[0017]** Provision is also made (Figure 4) in that there can be provided in each room two or more tag readers so as to enable the server 1 to triangulate the position of the user (by means of their TAG) and determine the position relative to the exhibited works. Thus, it will be possible to further limit the interaction between server and multimedia device to an exchange of data related to the work or works that match the user from the position in which he or she is located.

**[0018]** Therefore, once the identity and location of the user are recognised, the network will be capable of offering a personalised service based on the instantaneous situation of that user. That user will access a series of content items correlated with him/her (and with his/her state) authorising, if the relevant circumstances and level authorisations recur, the possibility of data exchange between server and user and/or between several users, through the server and the network 1. It follows that the applications provided for this invention include contexts in which one or more users have a need to access and/or share content items that are dependent on their spatial position when accessing the service.

**[0019]** In the example proposed (museum context): The museum wishes to make available to its users (visitors, guides, groups) information and multimedia content items pertaining to the objects present in the exhibition rooms, and make available information for example on routes recommended according to the interests of the user, on the maximum tour time, and on contingent requirements (bars, toilet facilities). Furthermore, it is desired to allow touring users to exchange information and opinions on the exhibited objects.

**[0020]** There is arranged for the service a database of information related to the topic covered, which information can be displayed only within the specialist area in the museum and stored in a memory accessible to the server. The museum, if lacking, is equipped with network infrastructure so as to allow the touring users access to the local network (intranet) and to the content items present therein.

**[0021]** A user equipped with a multimedia device compatible with the system, once they have entered the area of coverage of the service, is provided with an RFID tag which allows both their unambiguous identification as a network node and their spatial location within the museum rooms. If the visitor lacks one, the museum makes arrangements to equip the user with a device, of the smartphone or tablet PC type, for the selective display of multimedia content items, the usability of which device will be limited solely to functions admitted by the service.

**[0022]** The user is therefore authenticated for access to the network (by manual authentication, by the user him-/herself, or carried out by the network itself) making the network capable of unambiguously identifying the user and locating him/her in the environment of the museum. Thus, there is authorised a service targeted to and personalised for the user based on their location (among other possible parameters). For example, there can be proposed on a user's multimedia device a list of works very close to the user's position, with a possible option of checking which of those have been discovered more by other users, or allowing the user access to a chat facility in which a conversation between the other users present in the room is taking place in real time.

**[0023]** Provision is made for the possibility of managing various types of users, for example a "master" and a "slave". Referring to the museum example, the guide of a group will for example be master, while the individual user or the user belonging to a given group associated with a master user will be slave.

**[0024]** The master user will be authorised through the recognition of his/her RFID tag code to receive from and transmit to the slave users connected to him/her via a linking phase defined by the system. He/she can impose a defined behaviour on the slave terminals, for example duplicating his/her monitor on the monitors of the slave terminals. Every action, such as the highlighting of a detail, the change of a mask, or any other variation in the elements displayed by the monitor will be reproposed on all the slave terminals connected to him/her.

**[0025]** The slave user can be linked or not linked to the master user and therefore can decide whether or not to be influenced by the actions of the master user. At any moment, he/she will in any case be able to be released from the actions undertaken by the master user in order to follow an independent route.

**[0026]** Finally, provision is made such that one or more sensors can be associated with the RFID tags, which sensors are capable of detecting environmental data, events or other information inputted in the network by means of the tag readers in order to be stored in a network database. Thus, there can be detected events that are harmful for the exhibited works, flagged in real time by the visitors, variations in environmental parameters, or simple information useful for statistical purposes. Figures 5 and 6 present information flows from the server end and from the user end respectively.

**[0027]** The server-end information flow starts with the

storing of multimedia content items and of other sensitive information in the server 3 (step S101).

**[0028]** Next, the server queries the RFID readers in order to check whether they are actually active (step S102).

**[0029]** If the response is negative, a check on the actual connection of the readers is carried out (step S103).

**[0030]** Once the activation of the readers is verified (step S104), the server establishes a connection with all the readers, so as to start searching for tags within the field of detection of the readers (step S105).

**[0031]** If no tags are detected as being present, the server remains on standby (step S106) until a tag is identified and, following detection, there is stored in the database of the server a data item relating to an identification code of the detected tag and, additionally, to the position of the reader and to the read time (step S107). The information flow from the server end is concluded with this last step. As regards the client end, the information flow starts (step S201) with an authentication request to the server by the client, carried out on the basis of an identification code ID, or ID tag, which is inputted as a login to the system. Following the request (step S202), the system checks whether the identification code ID of the tag from which the request is initiated is present in the system, entering it in the system (step S203) if it is not present.

**[0032]** When the ID code is present, the client is connected to the system (step S204).

**[0033]** Once the connection is made, the system checks whether it is in single, master or slave configuration (step S205). If the system is in master or single configuration, the system requests from the server the position code of the last reader which stored the ID tag in question (S206).

**[0034]** In the case of a slave configuration, the system requests from the server the position code of the last reader which stored the ID tag of the appropriate master (S207).

**[0035]** Once one of these two requests to the server has been carried out, content items corresponding to the detected position are received from the server (S208).

**[0036]** Lastly, the client-end flow is concluded by the requesting from/sending to the server personal content items relating to the ID tag in question, for example content items transmitted by the master or received by slaves, chat messages, or even data on the route followed by a user.

**[0037]** The system provides for the use of RFID technology for the purpose of implementing intercommunicability and sharing of multimedia content items in which:

- an RFID tag is associated with every user of the system for the purposes of identifying them spatially and as a network node;
- a system of RFID readers is used, the spatial positioning of which provides for defining a mapping of the physical place of installation;

- a network infrastructure is used to offer users a service of intercommunicability and display of content items according to a spatial identification and as network node;

- 5 - through the abovementioned infrastructure, a communication is performed through connected mobile devices according to their positioning and to the preferences expressed by the user;
- 10 - the communication between the terminals also allows approval ratings to be cast on the topics/content items taken into consideration.

**[0038]** By means of the server inside, the following data-processing can also be performed:

- 15 - the data of the read RFID tags is crossed with the data picked up from the users to obtain their unambiguous identification;
- 20 - the data obtained from the RFID tag reader is used to propose targeted information services to the users;
- the data entered by the users is used for statistical purposes, to analyse content items proposed by the system.

**[0039]** Among the main advantages offered by the present invention, there is the fact that:

- 30 - The information transmitted to the user can be viewed only while the user is in the area of coverage of the service. All the content items that are subject to restrictions, for example for reasons of security, confidentiality, rights of third parties, will therefore not be able to be exported outside the area of coverage, laying down an obligation to be able to clear the system cache from the device used or to provide a device which remains under the control of the museum or other provider of the service.
- 35 - Multimedia devices that temporarily take advantage of the service can communicate dynamically with each other through the possibility of audio and video transmission in real time provided by the network server. They can also access an integrated chat system.
- 40 - The network itself is enriched by the exchange of user information, such as, by way of example, preferences and notes added to the content. The museum body (or provider of the service) thus increases its information offering with the contribution provided by the users.
- 45 - It is not necessary to apply tags to the works (an operation that is sometimes completely inadmissible), these works being identified and located in the respective rooms by means of the data inputted in the database of the server.
- 50 - The user can take advantage of additional services such as suggestions on the most suitable route for their requirements or on the remaining tour time.
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## Claims

1. A system for displaying, by a user, multimedia content items, the system comprising a network:

- a server with a memory in which the multimedia content items are saved;  
 - at least one multimedia device, of the smart-phone or tablet PC type, with which each user is equipped, for selective displaying of multimedia content items, which multimedia device is able to receive and make available to the respective user one or more of the multimedia content items that can be obtained from the server;  
 - a radio-frequency identification, RFID, tag provided with a user identification code such that the RFID tag is unambiguously coupled to the specific multimedia device carried by the user;  
 - a plurality of tag readers connected to the server, each of the tag readers being able to identify the RFID tag in order to authorize the sending of one or more of the multimedia content items to the device, the tag readers being distributed in an environment according to a mapping known to the server; the plurality of tag readers being able to locate the multimedia device in the environment in order to authorise the respective multimedia device carried by the user to receive from the server a targeted to and personalized subset of the multimedia content items, the subset being a function of the user identification code and of the location of the RFID tag; and the multimedia device being able to receive and make available to the user that is equipped with it the personalized subset of the multimedia content items, **characterized in that** the RFID tags are configured to identify a user of a master-type and one or more users of a slave-type, wherein the multimedia device of the user of the master-type is configured to selectively impose a defined behaviour on the multimedia device of the user of the slave-type.

2. A system according to Claim 1, in which the network is wireless.

3. A system according to Claim 1 or 2, in which there are provided, in one or more rooms of the environment, two or more tag readers arranged so as to allow the triangulation of the RFID tags distributed in the one or more rooms.

4. A system according to any claim hereinbefore, in which the targeted to and personalized subset of the multimedia content items comprises information on the route of transit through the environment.

5. A system according to any claim hereinbefore, in

which the targeted to and personalized subset of the multimedia content items comprises a chat service between users identified and located in the environment.

6. A system according to any claim hereinbefore, in which there are associated with the tags detection sensors capable of signalling to the tag readers events or environment-related data and/or inputting into the network data that can be stored in a database of the network.

## Patentansprüche

1. System zur Anzeige, seitens eines Benutzers, von Multimediainhaltelementen, wobei das System ein Netzwerk umfasst;

- einen Server mit einem Speicher, in dem die Multimediainhaltelemente gespeichert sind;  
 - mindestens ein Multimediagerät, des Typs eines Smartphones oder eines Tablet-PCs, mit welchem jeder Benutzer ausgestattet ist, zur selektiven Anzeige von Multimediainhaltelementen, wobei das Multimediagerät imstande ist, ein oder mehrere Multimediainhaltelemente, die vom Server erhalten werden können, zu empfangen und dem jeweiligen Benutzer zur Verfügung zu stellen;  
 - ein Radiofrequenzidentifizierungs- bzw. RFID-Etikett, das mit einem Benutzeridentifizierungscode versehen ist, so dass das RFID-Etikett mit dem spezifischen Multimediagerät unzweideutig gekoppelt ist, das vom Benutzer getragen wird;  
 - eine Vielzahl von Etikett-Lesegeräten, die mit dem Server verbunden sind, wobei jedes Etikett-Lesegerät imstande ist, das RFID-Etikett zu identifizieren, um den Versand des einen oder der mehreren Multimediainhaltelemente an das Gerät zu erlauben, wobei die Etikett-Lesegeräte in einer Umgebung gemäß einem Mapping, das dem Server bekannt ist, verteilt sind;

wobei die Vielzahl von Etikett-Lesegeräten imstande ist, das Multimediagerät in der Umgebung zu lokalisieren, um zu erlauben, dass das jeweilige Multimediagerät, das vom Benutzer getragen wird, vom Server eine gezielte und personenbezogene Untermenge der Multimediainhaltelemente empfängt, wobei die Untermenge eine Funktion des Benutzeridentifizierungs-codes und der Lokalisierung des RFID-Etiketts ist; und

das Multimediagerät imstande ist, die personenbezogene Untermenge der Multimediainhaltelemente zu empfangen und dem Benutzer, der damit ausgestattet ist, zur Verfügung zu stellen, **dadurch ge-**

- kennzeichnet, dass** die RFID-Etikette so konfiguriert sind, um einen Benutzer eines Master-Typs und einen oder mehrere Benutzer eines Slave-Typs zu identifizieren, worin das Multimediagerät des Benutzers des Master-Typs so konfiguriert ist, um dem Multimediagerät des Benutzers des Slave-Typs ein bestimmtes Verhalten selektiv aufzuerlegen. 5
2. System nach Anspruch 1, worin das Netzwerk drahtlos ist. 10
3. System nach Anspruch 1 oder 2, worin in einem oder mehreren Räumen der Umgebung zwei oder mehrere Etikett-Lesegeräte vorgesehen sind, die so angeordnet sind, um die Triangulation der RFID-Etikette, die in dem einen oder in den mehreren Räumen verteilt sind, zu ermöglichen. 15
4. System nach einem der vorhergehenden Ansprüche, worin die gezielte und personenbezogene Untermenge der Multimediainhaltselemente Informationen über die Transitstrecke durch die Umgebung umfasst. 20
5. System nach einem der vorhergehenden Ansprüche, worin die gezielte und personenbezogene Untermenge der Multimediainhaltselemente einen Chat-Dienst zwischen Benutzern umfasst, die in der Umgebung identifiziert und lokalisiert sind. 25
6. System nach einem der vorhergehenden Ansprüche, worin den Etiketten Erfassungssensoren zugeordnet sind, die imstande sind, den Etikett-Lesegeräten Ereignisse oder umgebungsbezogene Daten zu signalisieren und/oder in das Netzwerk Daten einzugeben, die in einer Datenbank des Netzwerks gespeichert werden können. 30 35

## Revendications

1. Système pour afficher, par un utilisateur, des éléments de contenu multimédia, le système comprenant 40
- un réseau ;
  - un serveur ayant une mémoire dans laquelle les éléments de contenu multimédia sont sauvegardés ;
  - au moins un dispositif multimédia, du type téléphone intelligent ou tablette électronique, dont chaque utilisateur est équipé, pour un affichage sélectif d'éléments de contenu multimédia, lequel dispositif multimédia est apte à recevoir et à rendre disponibles pour l'utilisateur respectif un ou plusieurs des éléments de contenu multimédia qui peuvent être obtenus à partir du serveur ; 50 55

- une étiquette d'identification par radiofréquence, RFID, comportant un code d'identification d'utilisateur de telle sorte que l'étiquette RFID est couplée de manière non ambiguë au dispositif multimédia spécifique transporté par l'utilisateur ;
- une pluralité de lecteurs d'étiquette connectés au serveur, chacun des lecteurs d'étiquette étant apte à identifier l'étiquette RFID de façon à autoriser l'envoi d'un ou plusieurs des éléments de contenu multimédia au dispositif, les lecteurs d'étiquette étant répartis dans un environnement selon un mappage connu par le serveur ;

la pluralité de lecteurs d'étiquette étant aptes à localiser le dispositif multimédia dans l'environnement de façon à autoriser le dispositif multimédia respectif transporté par l'utilisateur à recevoir, à partir du serveur, un sous-ensemble ciblé et personnalisé des éléments de contenu multimédia, le sous-ensemble étant une fonction du code d'identification d'utilisateur et de l'emplacement de l'étiquette RFID ; et le dispositif multimédia étant apte à recevoir et à rendre disponible pour l'utilisateur qui est équipé de celui-ci le sous-ensemble personnalisé des éléments de contenu multimédia, **caractérisé par le fait que** les étiquettes RFID sont configurées pour identifier un utilisateur d'un type maître et un ou plusieurs utilisateurs d'un type esclave, le dispositif multimédia de l'utilisateur du type maître étant configuré pour imposer de manière sélective un comportement défini au dispositif multimédia de l'utilisateur du type esclave.

2. Système selon la revendication 1, dans lequel le réseau est sans fil.
3. Système selon la revendication 1 ou 2, dans lequel sont disposés, dans une ou plusieurs pièces de l'environnement, au moins deux lecteurs d'étiquette agencés de façon à permettre la triangulation des étiquettes RFID réparties dans la ou les pièces. 40
4. Système selon l'une quelconque des revendications précédentes, dans lequel le sous-ensemble ciblé et personnalisé des éléments de contenu multimédia comprend des informations sur l'itinéraire de transport à travers l'environnement. 45 50
5. Système selon l'une quelconque des revendications précédentes, dans lequel le sous-ensemble ciblé et personnalisé des éléments de contenu multimédia comprend un service de dialogue en ligne entre des utilisateurs identifiés et localisés dans l'environnement. 55
6. Système selon l'une quelconque des revendications

précédentes, dans lequel sont associés aux étiquettes des capteurs de détection capables de signaler aux lecteurs d'étiquette des événements ou des données associées à l'environnement et/ou d'entrer dans le réseau des données qui peuvent être stockées dans une base de données du réseau.

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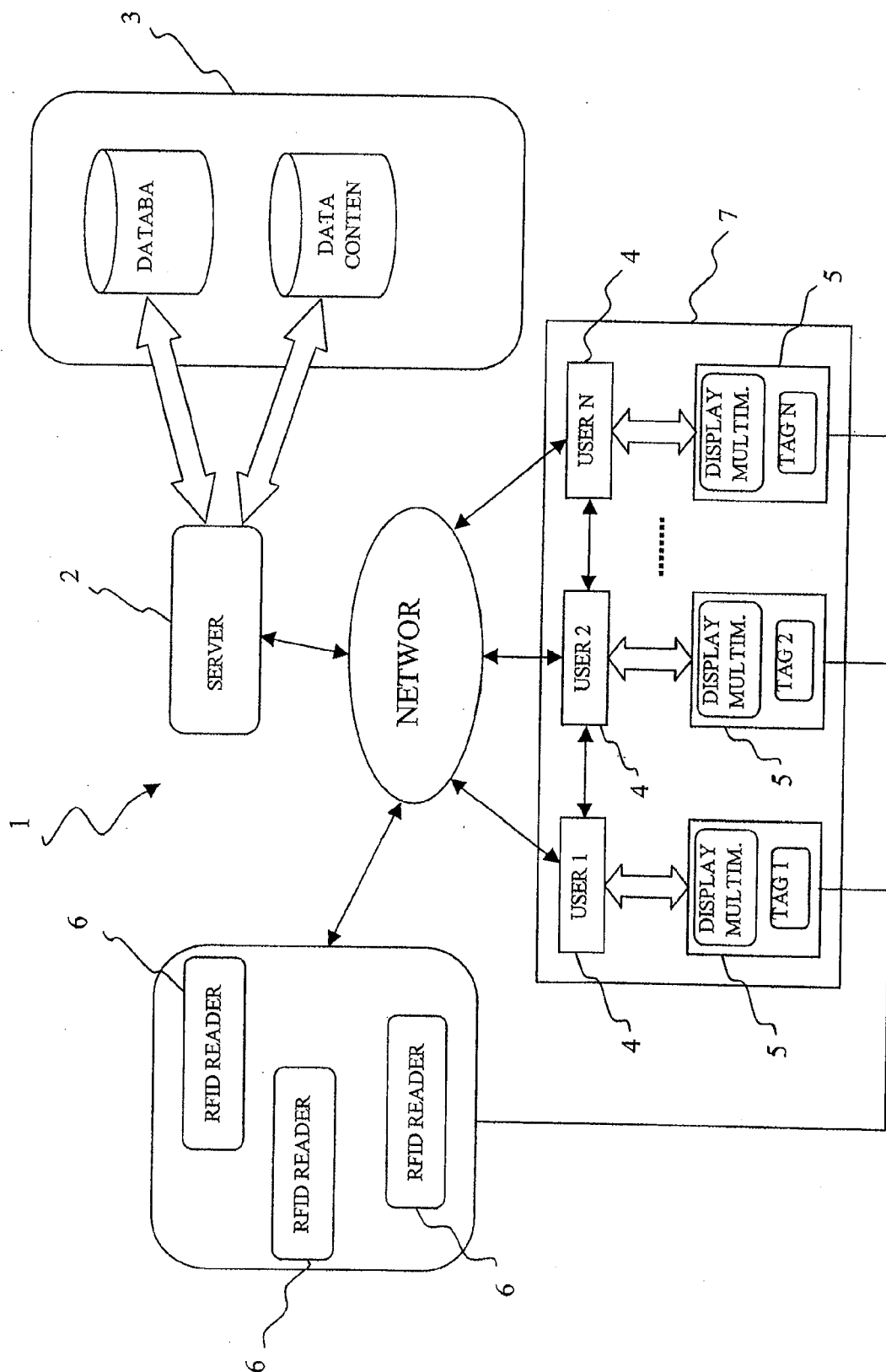


FIG. 1



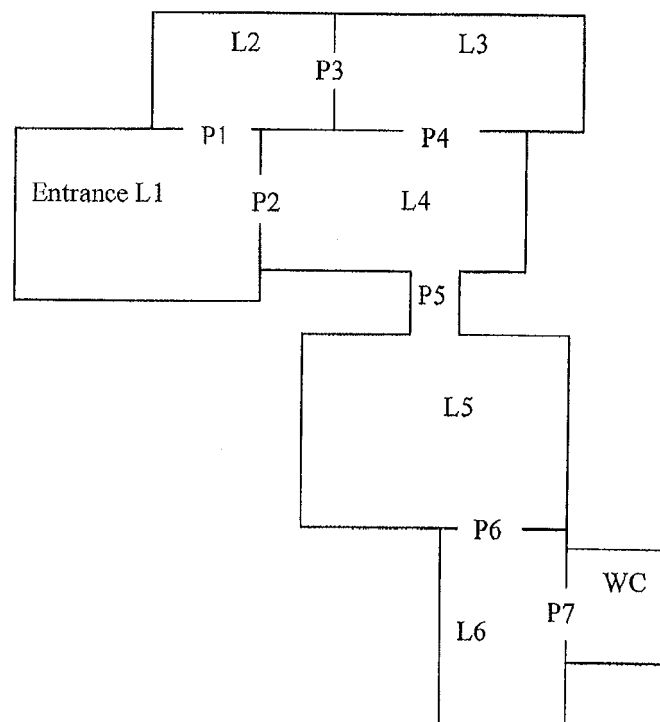


FIG. 2

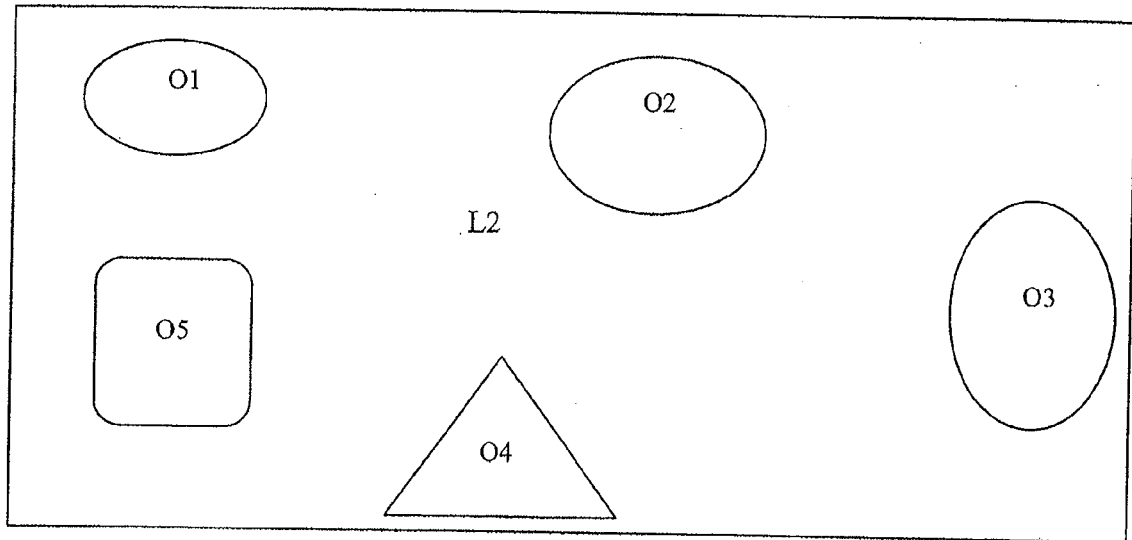


FIG. 3

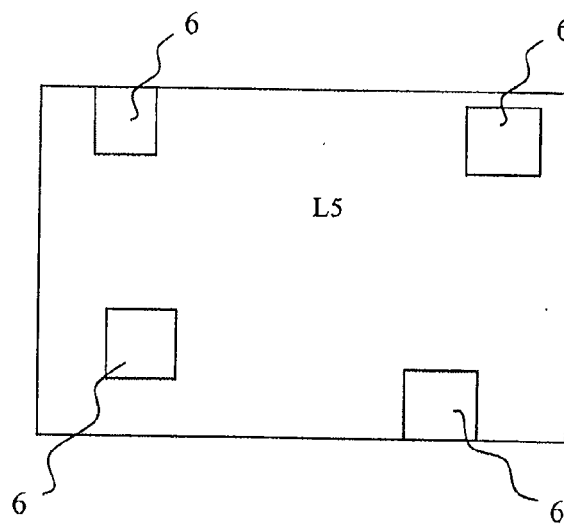


FIG. 4

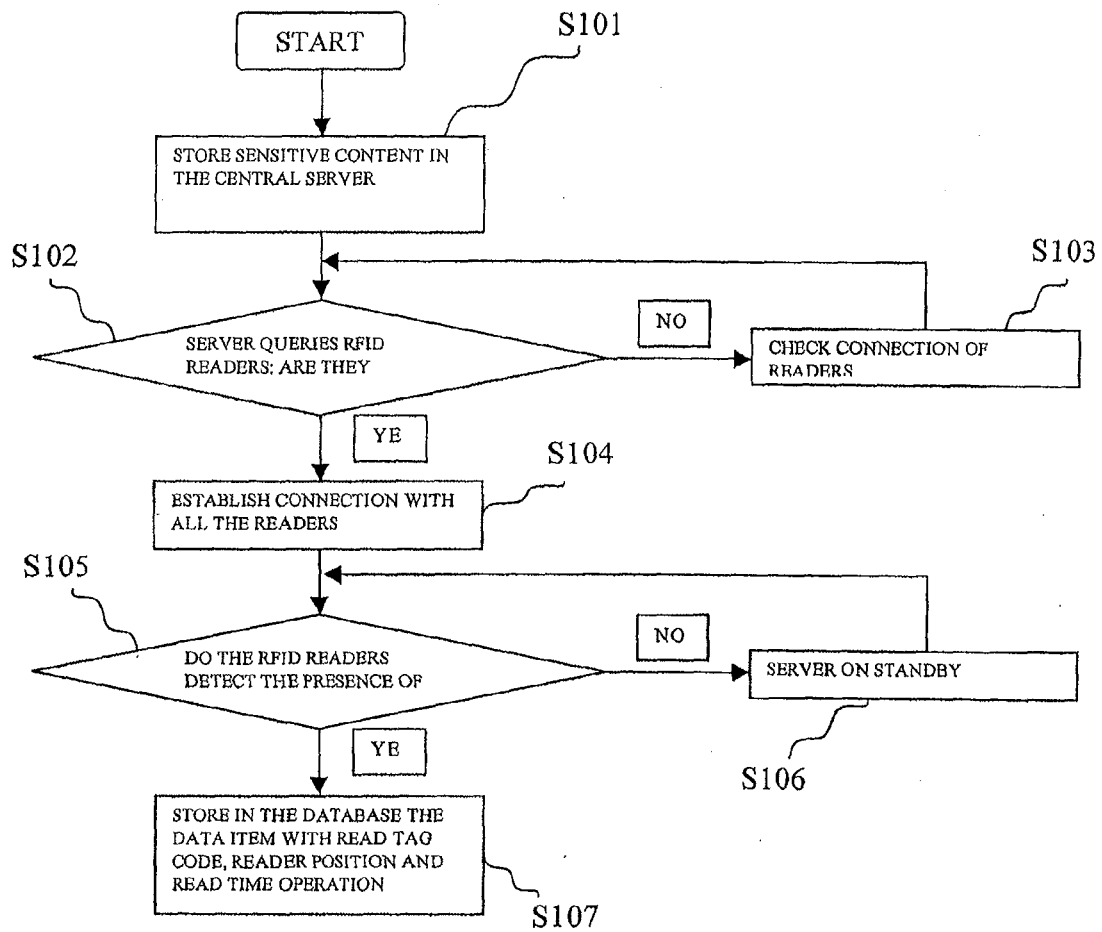


FIG. 5

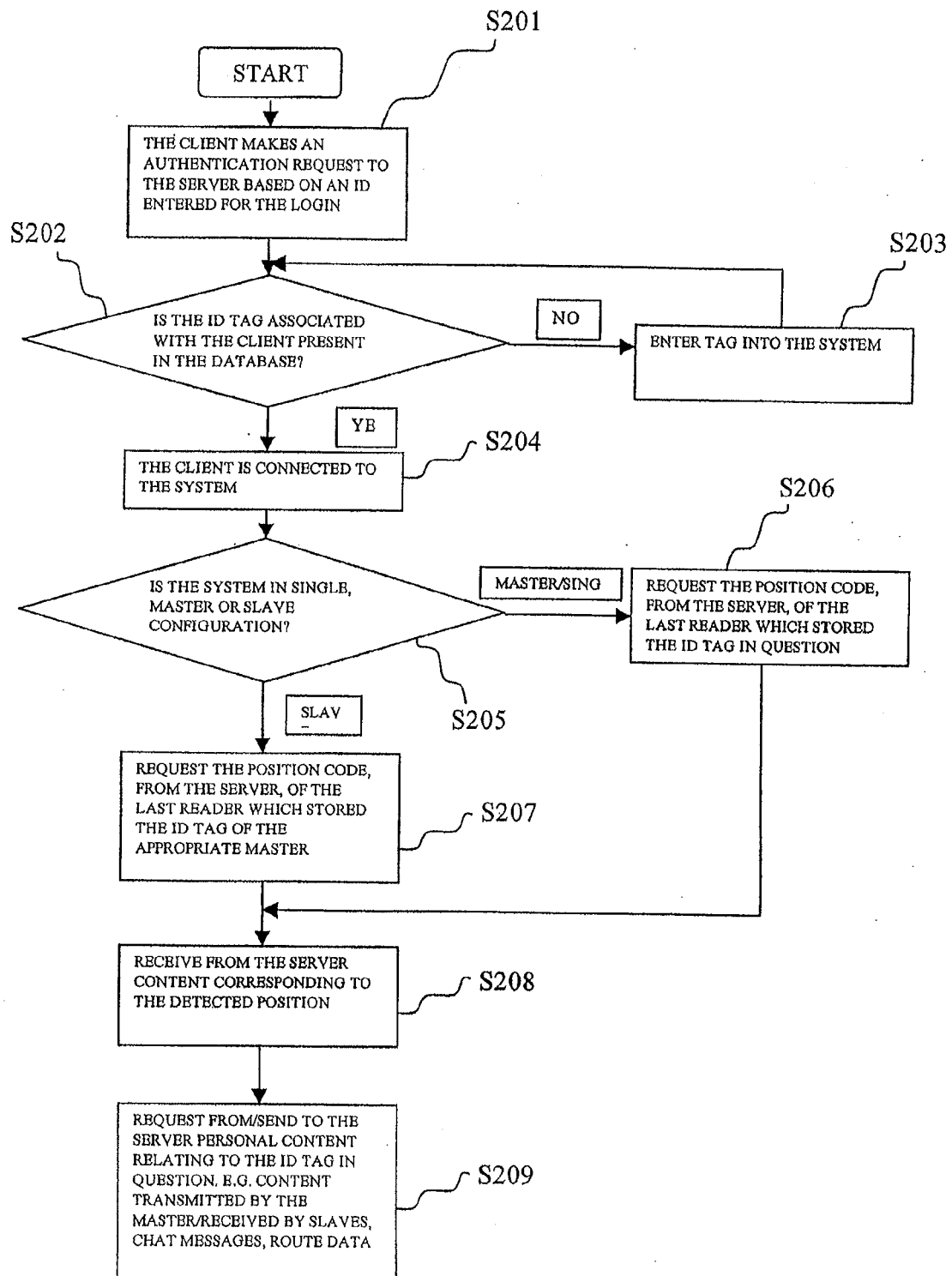


FIG. 6

**REFERENCES CITED IN THE DESCRIPTION**

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