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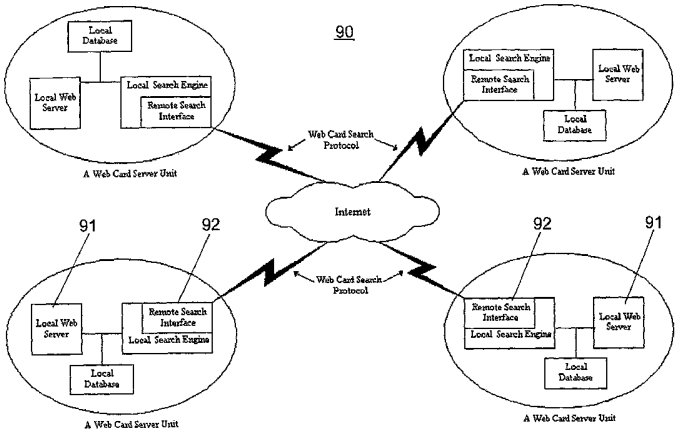

(57) Abstract: A global network and privacy control of personal and business information management comprises a plurality of servers, each server having at least a local database and a local search engine, and a plurality of users' equipment that are accessible to the Internet and thus connectable with at least one of the servers. The servers have at least one uniform search interface. One of the servers functions as a master server, and the web card servers communicate with each other through predetermined protocols to connect with the other servers. In a web card system, a method of controlling privacy comprises the steps of storing a set of web card information of each individual user in the database; determining privacy control levels of the information of the individual user; transmitting, at the registration user's initiation, selected web card information of a particular privacy control level with an authorization code to other users; storing a table of authorized names of the other users for each level of privacy control; looking through the table of authorized users' names when any of the other users conducts a search; and generating a corresponding web card of the individual user to the other user once the authorization is confirmed.

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GLOBAL NETWORK AND PRIVACY CONTROL OF WEB CARD SYSTEMS AND METHOD THEREOF

FIELD OF THE INVENTION:

The present invention relates to a network of online personal information management systems and privacy control thereof. More particularly, it relates to a global network and privacy control of personal and business web cards, and a method of managing and controlling the systems of personal and business web cards.

BACKGROUND OF THE INVENTION:

Up to now, most all of electronic personal information management (PIM) systems are localized personal information management systems, in which individuals or users of the systems enter the personal data of their own and of their friends or contacts. Such systems are provided in individual electronic apparatus, such as personal computers, palm top computers, or any other kinds of electronic organizers, most using Microsoft Outlook, Lotus, or other address books. However, some of those electronic apparatus may not be easily carried around, some may not be kept handy, and some may not be updated often although certain synchronization software are available. Thus, it indeed causes inconsistency of data stored in various personal electronic apparatus a person may have.

Therefore, several web-based personal information management systems have been established to provide the remote storage and database of personal information, that are accessible through a network, such as addresses, calendars, and contacts. Such systems are, for instance, www.ecode.com, www.planetall.com, and www.backup.com. The eCode provides the personal information in electronic card format. Further, there are many existing online telephone directory services in various formats, such as "yellow pages" or "white pages." With the establishment of remote storage and databases of personal information management, the accompanying technology of accessing such databases has been gradually developed. For

instance, the Contact Networks, Inc. has several pending patent applications, e.g., WO 00/67105, WO 00/67106, WO 00/67108, WO 00/67416.

WO 00/67105 discloses a method and apparatus for publishing and synchronizing selected user information over a network. It describes a kind of virtual personal information cards that may be communicated to various receiving users under the control of the publishing user. When the publishing user changes the personal information, such changes will be propagated to all holders of the publishing user's card. However, it dose not teach how the card search is conducted more efficiently, and how such a system can be adopted for various users of different languages. Nor it teaches a concept of global network and privacy control of personal and business web card systems. Although some aspect of privacy control is mentioned in WO/67416, it does not teach how the privacy issue of the web cards can be more efficiently executed, and how such a system can be adopted for various users of different languages.

In almost all of such remote PIM database systems, each entry of such names, telephones, and sometimes addresses can be searched using exact matching words, such as names and telephone numbers, etc. If the entered inquiry cannot exactly match the entry of information, several closest possible entries may be provided for selection. However, quite often the search may end up with a result of "no matching entry." Thus, the searcher may have to modify the inquiry again and again. Finally, the searcher might give up because of frustration of repeatedly modification of inquiries when no result can be generated through several attempts. This is because most of the time the searcher lacks accurate description of the person being searched, for instance, lacking of correct spelling of the words or exact matching characters to get the correct result, not just some phonetic equivalent words or characters. The problem for such search is the requirement of completely or exact "matching" of the search words with the words of entry or entries. No matching, no result.

In case of searching somebody with whom you do not have any contact for quite a while or someone you just ran into once or twice, you probably do not have much information about him or her. You could hardly remember his or her name. Or sometimes, you lost your collection of business cards or databank or simply you do not have such information handy. Nonetheless, you do know something about him or her, such as where he or she studied, lived or worked before, his or her nickname, or what his or her hobby was etc. In any event, you do have a desire or necessity to find him or her for whatever reason is, but do not have accurate contact information. Using the aforesaid traditional search method searching a particular network or website, you will probably get nothing, or may have to try tens or hundreds of times before you finally get the information you want. In the real life, no-body would like to try too many times to get a simple search result. Therefore, how we could intelligently find someone's information without too much trouble has become a problem waiting to be solved.

Nowadays, Internet accessible electronic information management apparatus are widely used and becoming more and more popular, such as mobile phones, pagers, notebook computers, palm top computers, or any kind of personal computers or data apparatus. You may find an access to such instruments anywhere, such as offices, schools, homes, stores, libraries, or other public facilities. If you are traveling or just away from your own home or office where you usually keep your personal information files or cards, you might think of using the Internet to get what you want. If there were a reliable service on the Internet providing a readily available and accurately accessible database for all of individuals, anyone could then get the contact information of someone wanted from anywhere.

At present, the world is getting closer and closer. Perhaps, someone you want to find may be located or relocated in a different geographic location from yours. Maybe the person, whom you ran into, is in a different country, and speaks a different language. Therefore, there is a necessity to create a network or a global network of systems of personal and business information

management, such that anyone may search through the global network of web cards to find the desired information, while the private information will not be disclosed.

Accordingly, it is an object of the present invention to create a network of systems on the Internet that provides a service of personal information search, through which any Internet user may obtain a piece of desired information of someone from anywhere.

It is another object of the present invention to provide a global network of personal and business web card systems that contain necessary information of individuals of different geographic locations and different cultural backgrounds in different languages.

It is still another object of the present invention to provide a network of database systems that can be quickly and effectively searched using native languages.

It is a further object of the present invention to provide a privacy control system for any search done through the system of personal information web cards, through which any Internet user may obtain a piece of desired information of someone based on a minimum description of that person, but may be subject to the privacy control as set up by that person.

It is still a further object of the present invention to provide an information web card system, that contains all necessary information of individuals to assist the search, but any private and intimate personal information will not necessarily be disclosed.

SUMMARY OF THE INVENTION:

According to the present invention, a network of systems of personal and business information management comprises a plurality of servers, each server having at least a local database and a local search engine, and a

plurality of users' equipment that are accessible to the Internet and thus connectable with at least one of the servers. Each of the databases contains at least some of personal data and information of individuals who are located within a particular geographic area or sign on with a particular server of the aforesaid plurality of servers, as an Internet Service Provider (ISP). The database may contain a plurality of sub-databases for a variety of categories of individuals or businesses. Anyone who has access to one of the aforesaid servers may search any such personal or business information from the database.

Such electronic equipment may include individual Internet users' computers, data apparatus, and cellular phones. Thus, the individual Internet users may have an instant access to one of the aforesaid servers to search and exchange any desired information from the database of the aforesaid server. And certainly the individual users may also update their information files through synchronizing with the server.

There may be a master server or central control server, that monitors and controls the data and search traffic among the servers, and transmits the updates in any of the servers to other servers or public users. Therefore, any update of personal or business information can be simultaneously updated in all equipment.

The present invention further discloses a privacy control system for personal and business web cards system including at least a server having at least a database and a search engine. The privacy control system comprises means for storing a set of web card information of each individual user of the web card system; means for determining privacy control levels of the web card information of the individual user as selected by the individual user; means for transmitting, at the registration user's initiation, selected web card information of a particular privacy control level with an authorization code to other users; means for storing a table of authorized names of the other users for each level of privacy control; means for looking through the table of authorized

users' names when any of the other users conducts a search; means for generating a corresponding web card of the individual user to the other user once the authorization is confirmed.

The server is equipped with the aforesaid control means and the web card information is stored in the database of the server. The search engine of the server receives the search inquiry of the other users, and performs the search and issuance of the corresponding cards. The privacy control levels of the personal web card information are divided normally into three levels corresponding to three versions of web cards, that is, simplified version, regular version, and detailed version. The authorized users or selected groups of users are predetermined and set up by the particular web card user or owner.

The present invention can be better understood through the following detailed description in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS:

Fig. 1A is illustrative of the system of the present invention;

Fig. 1B illustrates a network system of the web card according to the present invention;

Fig. 2A-C show the appearance of the interactive screen of the present invention;

Fig. 3A shows a conventional arrangement of the data structure for the exact matching search;

Fig. 3B shows an arrangement of the data structure of the present invention;

Fig. 4A is a flow chart of the conventional exact matching search;

Fig. 4B is a flow chart illustrative of the fuzzy search of the personal and business web cards according to the present invention;

Fig. 5 is an illustration of a global network of systems of personal and business web cards according to the present invention;

Fig. 6A and 6B illustrate the centrally controlled global network of systems of personal and business web cards according to the present invention;

Fig. 7 is a diagram showing that a set of personal information web cards is divided into three versions corresponding to three privacy control levels, for receipt and search of such web cards by the other users; and

Fig. 8A and Fig. 8B are flow charts of the method of the present invention, respectively illustrative of how a personal web card is being dispatched through the Internet to other selected users, and how other users may search the web card information and get a corresponding web card under the privacy control.

DETAILED DESCRIPTION OF THE INVENTION:

With reference to Fig. 1A, a server **11**, as marked 3721™ server, contains a master database **12**, and sub-databases **13,** such as company A and company B's databases. The various electronic equipment are the public Internet users' tools to access the Internet and then search the 3721™ server **11**, such as lap top computers, personal computers, cell phones, and other data apparatus. No matter where they are located, they may conduct a search at the 3721™ server when they log on the Internet. Fig. 1 shows that the public individual users are linked directly to the 3721™ server **11**. However, the individual users may also be linked to a portal ISP **14** or ASP **15,** and in turn the ISP **14** or ASP **15** is in connection with the 3721™ server **11**. The ISP **14** or ASP **15** contains its own database that may include their own personal or business information or telephone directories.

Further, as seen in Fig. 1A, the various electronic equipment may also be an intranet of a company, which contains an internal database of its own. Such an intranet database is normally used for intranet users only. When the intranet users need to search others' information, they may need to access the Internet or outside databases, such as the 3721™ server **11**. On the other hand, the personal or business information of others may also be stored therein for use by the intranet users. Such personal or business information of others or publicly known information of the company needs to be updated from time to time. In this situation, a firewall is necessary to protect the confidential information in the intranet database.

Fig. 1B illustrates the networking of the personal and business web card system of the present invention. Each block illustrates a web card server or a system unit. Each of such system or unit includes its own card database and card search engine. In consideration of the performance and load balance, each system may comprise one or more physical servers, for instance, one for the master or local web server **16**, one for the master or local search engine, and one or more for the master or local database. A service vendor (ISP/ICP, etc.) may operate a web card unit independently, while the most important is that these web card units, although independent, can communicate with each other through specific built-in interfaces. Hence, such connected and communicated web card systems or units construct a global distributed web card system. Within such a global system **20**, a user may search anyone's web card regardless with which vendor the desired person's web card is registered. Certainly, the users can communicate with each other through their web cards, such as, writing emails, notes, or exchanging web cards.

The global card search may be coordinated by the master card server, such as 3721™ server **11**. The master server may coordinate the propagation of data synchronization of any updates between the slave servers. The master server may contain a global card exchange center, and all of the updates or data of the slave servers may be transmitted to the master server for passing on to another or other desired slave services for synchronization of these updates therewith. When a user conducts a search at a slave server, the search will not only performed by the local search engine of the particular slave server, but also be passed onto the master card search engine as described hereinafter with respect to Figs. 5 and 6.

Fig. 2A shows the printout of real web card of the present invention. It can be seen that the personal information stored in the server **11** will appear in a card format **31**, in analogy to a business card but much fancier. On the card, one can choose any available decoration **36**, such as pet or flowers etc., a logo **37**

and any background and color **38**. As seen in Fig. 2B, the personal information contains a person's name, telephone number, and correspondence address (either street address or postal box). However, it may contain more information, such as name, address, website of the company where the person works, and telephone and facsimile numbers of the company, the person's cell phone number and email addresses and so on. When a searcher wants to find out a particular person, the search may reveal all of the necessary contact information.

However, none of such information is necessarily to show up on the card if the person chooses not to. Sometimes there is only a name shown up on the card to confirm the search result, while the interactive surface screen provides the searcher with options of communicating with the person being searched, who then may decide whether to contact the searcher. These options may include, but not limited to, personal message box (voice or written), public bulletin board, email box, box for exchanging cards, and even language selection. Assuming that the searcher left message or contact information to the person found through the search, he or she may then call or write back to the searcher if the person found is the right person and would like to communicate with the searcher. In any event, any personal information is sensitive and needs to be protected by all means. This aspect of privacy protection of the present invention is further disclosed in another co-pending patent application of the same assignee.

As shown in Fig. 2C, the features of the web cards of the present invention include my card folder **40**, design card **46**, search the net **41**, and check message **44**, etc. In "Design My Card" section **46**, there are not just options of card appearances, but also entries of personal information and setting the level of privacy protection. As seen in Fig. 2B, the information about a person's work may include the person's name, company's name and address, the person's job title, telephone number, facsimile number, email, personal web page, mobile phone number, and pager, while the personal information may include the person's gender, age, residential address, home telephone

number, etc. The most important feature is that the information entry may also contain more intimate data, such as marriage status, blood type, family physician or attorney, family history, health condition, educational status, location of past residence, date and place of birth, hobby, favorite books, movies, and even photos.

To most of people, they do not intend to disclose the aforesaid information to everybody, but almost always want to disclose such information to different groups of people. For instance, the people may be roughly classified into three groups. The first group includes social or business contacts, the second group is friends and relatives, and the third is family members. However, sometimes, one does not want anyone to know certain "intimate dada" except the ones who must know of the data. Therefore, some or most of the aforesaid "more intimate data" will not be disclosed without specific authorization of the person. Nonetheless, such data may provide a basis for a search. If someone by chance only knows or remembers a few pieces of such information, he or she may still conduct a meaningful search if the person being searched is indeed registered with a local web card system or the global web card system. The search result, however, may not necessarily display the whole lot of information to the searcher, but will at least let the searcher know whether such a person is there, for instance, identified at least by person's name being searched.

Fig. 2C also shows that the interactive screen contains my favorite card folder **42**, synchronization **43**, modification of web card information **47**, distribution of web cards **48**, and privacy control **49**, card exchange record **50**, and selection of background and design area **51**. These features are just designed for the users convenience. This will give users more freedom of exercising control of sending and receiving the web cards, such that the personal and business card can be distributed to and synchronized with attempted recipients of the registered user's choice, and the card may be searched by any others with the limitation of the registered user's choice.

Fig. 3A illustrates the data structure adopted by the card search engine **23** to carry out the conventional search of exact or accurate matching. Fig. 3B illustrates the data structure adopted by the card search engine **23** to carry out a fuzzy or approximate search method in accordance with the present invention. The web card search engine **23** of the present invention performs both of the exact or accurate matching search as well as fuzzy or approximate search. The web card search engine **23** does not use the database of conventional relationship (RDBMS) to carry out the search. To ensure the search speed and efficiency, the specific data structure and indexing structure are established completely in the memory **58**.

As seen in Fig. 3A, the key is to set up highly efficient fast indexing in addition to the establishment of the memory structure of the stored web card data therein (e.g., adoption of array and link lists, etc.). The web card search engine **23** utilizes a Hash table **55** and hierarchical structure index **56** to carry out the accurate search of name, and pin-yin (phonetic spelling) and homophony. In the search engine **23**, the card data and the index data are all in the form of Unicode. Take the Hash table **55** and hierarchical index tree **56** for accurate or exact matching search as an example. The Hash table **55** is a table containing entries of all 64K characters of the Unicode. Under each entry, there is a branch of the hierarchical tree; each node **57**, as shown in dot, contains a pointer **59**. Each of such pointers **59** leads to a position of the actual card data stored in the memory. And the names of these cards are the same as the name constructed by all of the characters along the route from the entries of the Hash table to the nodes. Therefore, the accurate search based on names is a process of locating nodes and pointers in the hierarchical tree as illustrated in Fig. 3A. The structure of Hash table plus hierarchical index tree for pinyin or homophony search is similar to that of the search based on characters. The only difference is that the phonetic alphabetic letters, instead of characters, appear at the nodes of the hierarchical tree and the entries of the Hash table.

Fig. 3B illustrates an index structure established for carrying out the fuzzy

search at the web card search engine **23**. The index structure of Fig. 3B is similar to that of Fig. 3A. However, the characters form Chinese words or a phrase, as they are constructed at nodes **57** from the Hash table **55** to the hierarchical tree **56**. Each node **57** contains a card pointer **59**. Each pointer **59** leads to the name of the name card or other additional information containing such a word. Fig. 3B is in fact a reversed index based on searching words.

The index structure in Figs. 3A and 3B are dynamically maintained. That is to say when the user applies for or modifies a web card, the information of this web card will be transmitted to the web card search engine, including the additional searchable information of all characteristics of the card. The search engine **23** will add such information to the two branches of the hierarchical index tree in Fig. 3A in accordance with the name of the card and its Chinese phonetic spelling. At the same time, the additional information and the name of the card will be divided into several words, and these divided words are added into the index pointers **59** corresponding to the nodes **57** of the index tree in Fig. 3B.

At present, almost all of the countries have their specified sets of characters, for instance, the specified set of Chinese characters GB2312. These sets of characters may have correspondence with the set of characters of Unicode. Therefore, the web card search engine uses Unicode characters as the encoding format to store the web card data, such that the search mode of the web card search engine of the present invention may be adopted easily for other languages, such as Japanese and Korean, etc.

For the detailed description of the web card search of the present invention, Fig. 4A illustrates the flowchart of the search process using the accurate or exact matching search. Under the accurate or exact matching search, the search for a name is carried out by inputting **61** inquiry string A, treating the character stream A of the inquiry as the exact matching words for the name. Based on the first character of the character stream A, it will be easy to locate

an entry in the Hash table **55** of Fig. 3A. Then, the following process is to find **62** a node **Na** within the hierarchical tree connected to this entry, to have the character corresponding to **Na** being equal to the last character of the character stream A of the inquiry. When the characters from the Hash table entry to the node **Na** are combined together, they should form the characters stream A of the inquiry. This is a traditional computing method, and its time complexity is O(N), wherein N is the length of the character stream of the inquiry. When the node **Na** is found, the content directed by the index pointer **63** contained in the node **Na** will be the desired web cards **Ra** with all cards matching the inquiry. If such a node is not found, it means that all of the web cards as stored in the memory **58** do not have anything matching the character stream A of the inquiry.

For the same accurate search mode, but based on phonetic spelling or homophony search, it will be substantially the same with such search for characters of the web card as described above. First, it will determine at **65** whether the entered inquiry A is a pure stream of ASCII characters. If yes, treat the inquiry A as the pin-ying string **67**. Then, the pin-ying string may be divided into several phonetic units in accordance with the Chinese phonetic spelling rules. Such phonetic units constitute a stream of phonetic spelling A' **68**. If the inquiry A contains not only the phonetic spelling alphabetic letters, but also Chinese characters as seen in the step **66**, the Chinese characters can be converted into equivalent phonetic units through the conversion table stored in the memory **58**. Thus, the stream A' **68** of phonetic spelling can be obtained easily from the stream A of the initial inquiry. Then, the pertinent nodes **Nb** may be found **69** for the stream A' through the index structure as shown in Fig. 3A. Subsequently, the pointer may be found to indicate the result **Rb** at the step **70** and **71**. This process is the same as the process for searching the characters, i.e., the accurate or exact matching search. When combining the results **Ra** and **Rb** at the step **72**, the final result **R** may be obtained at the step of **73**.

Fig. 4B is the flowchart of the fuzzy or approximate search in accordance with

the present invention. As shown in Fig. 3B, the index structure of the fuzzy or approximate search is the same as the structure of the accurate or exact matching search. For an inquiry character stream A inputted at the step **81**, such as "I would like to find XYZ who works in Beijing for an IT company" in Chinese "我想找在北京做IT工作的XYZ" the search engine **23** will break down, at the step **82** the inquiry into several words through a dictionary having self-study ability. Such words constitute a collection W. At the step **83**, each word Wx is being dealt with in accordance with the way of computing same as the one for the accurate or exact matching search so as to locate a node **Nx** among the index structure of Fig. 3B. From each node **Nx**, a result collection **Rx** is generated at the step **84**. The result collection **Rx** contains the web cards that have the name or additional information including the word Wx. All of the result collections **Rx** are consolidated to constitute a big result collection **R** at the step **85**. During the consolidation, the similarity of each card may be evaluated by weight at the step **86**. Such similarity may follow certain specific rules. Finally, all of web cards in the big result collection **R** are sorted out at the step **87** and arranged in accordance with the similarity, and the number of selected search results of web cards is restricted under certain rules so as to obtain the final search result collection **R** of the fuzzy or approximate search at the step **88**.

With respect to Fig. 5, it can be understood that due to the different cultural backgrounds and languages, there is a necessity that an interface may be provided between the servers for transmitting a search inquiry from one local web server to a remote web server, and also a necessity that each web card search equipment may have a screen interface that assists all kinds of users to communicate with a local web server as well as remote web servers.

In the distributed network **90** without a central control server, as shown in Fig. 5, the network of systems of personal and business information or web cards enables a searcher to search anyone of the web card server units, that provide services of web card search of personal information. For instance, each web card server **91** has a particular group of people signing up with the

server. Each person signing up with the server may only remember the website of this particular server, but the person may want to search from other remote web card servers as well. Thus, each of the web card servers **91** has established protocols with other web card servers in the distributed network **90**, and is equipped with an interface **92** which operates such protocols such that a search inquiry placed at one particular web card server may be passed simultaneously, through the interface of the protocols, to all remote web card servers that have the established protocols with the particular web card server. The search can then be done simultaneously at all remote web card servers.

However, the user or searcher may have an option as to whether or not a full search is desired. Otherwise, the searcher can choose only one or more specific web card servers for the possible search. Such a selection can be based on any geographic regions, countries, states, provinces, counties, cities, and so on. It is the protocols that should work in a uniform language, and have ability to process the search inquiry placed in one language with this specific uniform language and to pass it on to other web card servers that may operate in different languages. Likewise, any search result may be sent back to the original web card server to inform the searcher who places the search inquiry.

It can be understood that almost everyone has his or her name spelled in native language as well as at least in alphabetic letters. Searches can be classified as a search of someone completely unknown to the searcher or a search of someone who somehow became known to the searcher before. For the former, a full search may have to be done, but for the latter a description of such person is possible for the search. The description can be either in a particular native language or in English, such as "so and so was in where, in what year, and/or doing what." Therefore, it is very likely that the uniform language operating the protocols may be English or a specific set of Unicode that translates the various sets of Unicode for different languages.

Nonetheless, the network of Fig. 5 may not be easily synchronized to keep the updates of all web card servers. It would require that one web card server be in connection with all other web card servers so that an update of a piece of personal information or data in a local web card server can be simultaneously updated at other web card servers. It would require the server unit having the update keep its update alert as long as possible so as to permit other web card server to keep up with the change. Thus, anyone signs up with the other web card servers may update his or her own records or organizers.

Fig. 6A and 6B illustrate, respectively, a network of systems of personal and business web cards, which comprises a central master server unit **100**, and a plurality of local web card server units **101**. The local web card server units **101** are in connection with the central master server unit **100**. In this architecture of network, the personal information stored in the local web card server **101** may always have an update alert indication at the central master server unit to let any searcher know of where an update occurs and even send out a notice to others who had prior search inquiry to a particular person of the update. The update indicator alerts only the persons who had previous contact with the person of the update and who are allowed to get the information being updated.

Normally, the web card personal information contains a person's name, telephone number, and correspondence address (either street address or postal box), and may also include the information of name, address, website of the company where the person works, and telephone and facsimile numbers of the company, the person's cellular phone number and email addresses and so on. Further, the personal information may also include more intimate information, such as the person's gender, age, residential address, and home telephone number, and even marriage status, blood type, family physician or attorney, family history, health condition, educational status, location of past residence, date and place of birth, hobby, favorite books, movies, and even photos. The more private and intimate information

may assist the search, but is not necessarily displayed on the web cards.

Therefore, to each searcher who does not have previous contact, the searcher may not get all the details of the person registered at the web card server, but may still find the person at the web card server with a limited indication of search result. The searcher will then be given options of leaving a message at personal message box (voice or written), public bulletin board, email box, and card exchange box etc. Similarly, the updates will be sent to the persons who are entitled to know the information. This aspect of privacy protection of the present invention is further disclosed in a co-pending patent application of the same assignee. Therefore, when an update occurs, the master server unit will deliver the updated information only to certain people based on the privacy protection level.

In the centrally controlled network of systems of web cards, the master web card server **100** is in charge of transmitting all search inquiries, and passing the updates. Thus, each of other web card servers **101** may establish only one protocol with the master web card sever **100**. As shown in Fig. 6A, each of the web card servers **101** may be located in a country, while the master web card server **100** may be in any country so long as the other web card servers can be connected to it.

As shown in Fig. 6B, there could be a master web card server for each country, such as one in the United States, one in China, one in Japan, and one in Korea. In this network, only those master web card servers are equipped with an interface with operational protocols for connection among the master web card servers. This is like a distributed global network of master web card servers, while each master server establishes a centrally controlled network of systems of personal web cards.

Some of personal information are sensitive and need to be protected by all means. Therefore, a privacy control and protection is adopted in the present invention to ensure that the private and intimate data, such as the person's

gender, age, marriage status, blood type, family physician or attorney, family history, health condition, educational status, location of past residence, date and place of birth, hobby, favorite books, movies, and even photos will not be published or posted unless there is specific authorization of the person being searched.

As shown in Fig. 7, the set **110** of web card information of a particular person is stored in the database **22**. The information in the data set **110** may be selected to compose, respectively, into three versions of web cards. These versions of web cards are simplified version **111**, regular version **112**, and detailed version **113**. Thus, when someone only knows or remembers a few pieces of such information, he or she may still conduct a search of the particular person who signs up the web card service and has recorded contact information at such a web card system. If the searcher is one who has never contact the particular registered person before or has given limited authorization by the registered person before. Such a searcher is classified in the first group **114** of people, i.e., public contacts. The result may not display a whole lot of information, but only the first simplified version of web card. It will display just enough information to let the searcher know whether such a person being searched is there, at least by name or a specific indicator.

However, for the second group **115** of people, i.e., social contacts and working contacts, the second version **112** of web cards is displayed provided that anyone of such contacts conducts a search of this particular registered person. Likewise, the third version **114** of web cards is designed for the third group **116** of people who are either family members or very close friends. However, except those who do not have any previous contact or, for a long time, have not contacted with the registered person, the three groups of people are indeed authorized by the registered user when the personal information is entered into the database. Such authorization can be changed from time to time. All of these are carried out by the privacy control system of the present invention.

To fulfill the aforesaid privacy control and protection, the personal and business information web card system includes memory units in the database **22** for storing sets of the personal information web cards, a privacy control memory unit containing a table of corresponding authorization passwords or security codes in association with a list of persons' names having or not having such authorization. The security codes are used to prevent any unwanted persons from getting any personal information. A privacy control unit is normally in connection with the search engine **23** to look through the authorization table, and to determine the levels of the privacy control. The privacy control unit also has a portion to transmit selected web card versions of person information to selected groups of people. Upon the issuance of a search result, the web card server **21** generates a corresponding web card to the searcher.

With respect to the flow chart of Fig. 8A, the registered user **X** has entered, at step **121**, all authorizations to possible users or searchers of the personal information web card system, and assigned authorization passwords or security codes to each levels of privacy control at step **122**. Then, the registered user **X** send out or the web card system sends out for the registered user **X** to selected or designated groups of people, at step **123**, such as the user **Y**, the corresponding contact information along with the passwords or codes. The user **Y** may then keeps the contact information at his or her own data apparatus or organizers together with the authorization password or code.

With respect to the flow chart of Fig. 8B, the search is carried out with assigned security code or an authorization password. When a person first conducts a search of the registered user, at step **130**, the search engine **23** will determine the status of the searcher and the web card system automatically gives a security code to that person. This rule is applied to any of persons who have not been listed in the authorization table, and thus such a person is treated as the first contacting person. If the person is given a limited access to the personal information, he or she may only enter the

security code and the system assigns the security code to the searcher at step **131**.

Otherwise, the searcher will enter an authorization password such that the system will receive such an authorization code at step **132** to determine whether the authorization is anyone of the privacy control levels. At step **133**, the privacy control unit will look through the authorization table based on the entered authorization password or code to verify the code. Once the authorization is verified, the web card system will generate, at step **134**, a corresponding version of information web card to the searcher.

It can be understood that the privacy control may include a fourth level of emergency version web card, designated respectively to family doctors, insurance agents, and family lawyers, etc. This will assure that the most intimate information will be available to those who are concerned.

The scope of protection of the present invention is set out in the following claims. However, any obvious modification without excess of the essence of the present invention should also be within the scope of the present invention.

CLAIMS

1. A network of systems of personal and business web cards, comprising a plurality of servers with which users may sign up to keep their contact information and through which the users may search others' contact information, each of said servers having at least a database and a search engine, and having at least one uniform search interface.

2. A network of systems according to claim 1, wherein one of said servers functions as a master server that is equipped with at least one interface having protocols established to connect with said other servers, and wherein said master server communicates, through said protocols operated by said interface, with said other servers to transmit any search inquiry to one or more designated servers, and to pass on any updates that a user placed at one of the other servers to designated servers.

3. A network of systems according to claim 2, wherein said master server has synchronization function to pass on any update to any of designated other servers through said interface.

4. A network of systems according to claim 1, wherein said servers communicate with each other through the reciprocal uniform search interface with predetermined protocols between said servers, and wherein said predetermined protocols are of a uniform operative language.

5. A network of systems according to claim 4, wherein each of said predetermined protocols is operative at least between two of said servers in consideration of the operative languages of said two servers, and wherein said predetermined protocols of said servers are operated in Unicode that has correspondence with other Unicode of different languages.

6. A network of systems according to claim 2, wherein said protocols of the

interface are capable of transforming a search inquiry placed in a language into other operative languages and thus transmitting the search inquiry to other servers.

7. A network of systems according to claim 6, wherein said protocols of the interface are capable of transforming a search result into the language corresponding to the language of the search inquiry, and thus transmitting the result back to the server placing the search inquiry.

8. A network of system according to claim 2, wherein said master server has automatic synchronization function to transmit an update to all designated servers whenever an update occurs.

9. A method of managing and controlling a network of systems of personal and business web cards, each of said systems including at least a web card server having at least a search engine and a database, said method comprising connecting a plurality of web card servers through the Internet; establishing at least a protocol between two of said servers to enable communication between them including transmission of search inquiries therebetween; installing said protocols, respectively, in at least two of said servers that communicate with each other; identifying said protocol between the servers to establish connection and communication therebetween; and transmitting any of said search inquires and web card information between at least two of said connected servers.

10. A method of claim 9, further comprising designating at least one of said web card servers as master server, and installing said protocols in said master server such that the master server is capable of communicating with all of said servers and transmitting any of said search inquires and web card information among the servers, including any update of said web card information, and wherein said protocol is operative in a uniform Unicode corresponding to Unicode of different languages.

11. A method of claim 9, further comprising one master server for a particular region, and having all of designated master servers installed with pertinent protocols that enable communication between said master servers and transmission of web card information and search inquires among said master servers.

12. A method of claim 11, wherein each of said master servers are capable of flashing an update that occurs within a corresponding system of personal information web card, and transmitting such an update to other master servers having designated users, that in turn transmits the update to the designated user so as to synchronize all personal information data files of all designated users.

13. In a personal and business information web card system including at least a server having at least a database and a search engine, a privacy control system comprising:

a) means for storing a set of web card information of each individual user of the web card system;

b) means for determining privacy control levels of the web card information of the individual user as selected by the individual user;

c) means for transmitting, at the registration user's initiation, selected web card information of a particular privacy control level with an authorization code to other users;

d) means for storing a table of authorized names of the other users for each level of privacy control;

e) means for looking through the table of authorized users' names when any of the other users conducts a search; and

f) means for generating a corresponding web card of the individual user to the other user once the authorization is confirmed.

14. A privacy control system of claim 13, wherein said means for storing the web card information and said means for storing a table of authorized names are parts of said database.

15. A privacy control system of claim 13, wherein said means for determining privacy control levels and means for looking through the table of authorized users' names form portions of a privacy control unit.

16. A privacy control system of claim 13, wherein said means for transmitting selected web card information and means for generating a corresponding web card are part of said search engine.

17. A method of controlling privacy in a personal web card system including at least a web card server having at least a database and a search engine, comprising the steps of:

a) storing a set of web card information of each individual user of the web card system in said database;

b) determining privacy control levels of the web card information of the individual user as selected by the individual user;

c) transmitting, at registered user 担 initiation, selected web card information of a particular privacy control level with an authorization code to other users;

d) storing a table of authorized names of the other users for each level of privacy control;

e) looking through the table of authorized users' names when any of other users conducts a search; and

f) generating a corresponding web card of the individual user to the other user once the authorization is confirmed.

18. A method of controlling privacy of claim 6, wherein said search server includes a privacy control unit, that determines the status of a searcher who submits a search inquiry, and automatically gives the searcher a security code if the searcher is determined as a first time searching a predetermined registered user.

19. A method of controlling privacy of claim 18, wherein said privacy control

unit will looks through the table of authorized users' names to decide which level of privacy control is given to the searcher, and then the server will generate a corresponding web card to the searcher.

20. A method of controlling privacy of claim 17, wherein there are at least three versions of web cards corresponding to at least three levels of privacy control of issuance of the web cards, and the three version cards are a simplified version card for unknown searchers or searchers given limited authorization, and a regular version card for regular social and working contacts, and a detailed version card for family and close friends.

21. A method of controlling privacy of claim 18, wherein there is a fourth version web card for emergency information including at least health, medical, insurance, and legal matters.

22. A method of controlling privacy of claim 17, wherein the web card system will transmit from time to time all personal information to other selected and designated users of such information, respectively, in accordance with the authorization given to these users.

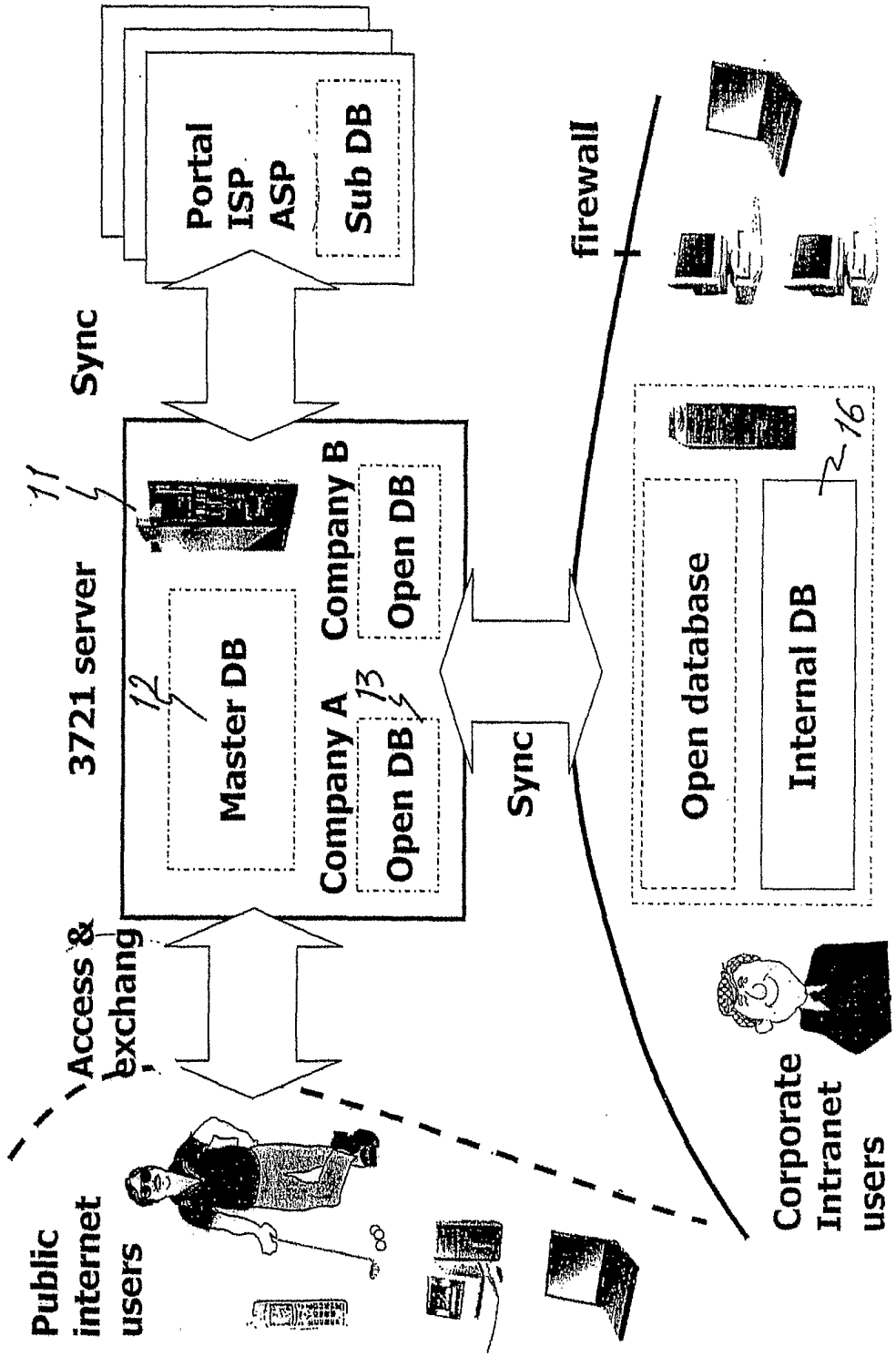

Portal
ISP
ASP
Sub DB
Sync
firewall
11
3721 server
Company B
Open DB
Master DB
12
13
Company A
Open DB
Sync
Open database
Internal DB
16
Access &
exchang
Public
internet
users
Corporate
Intranet
users

FIG. 1A

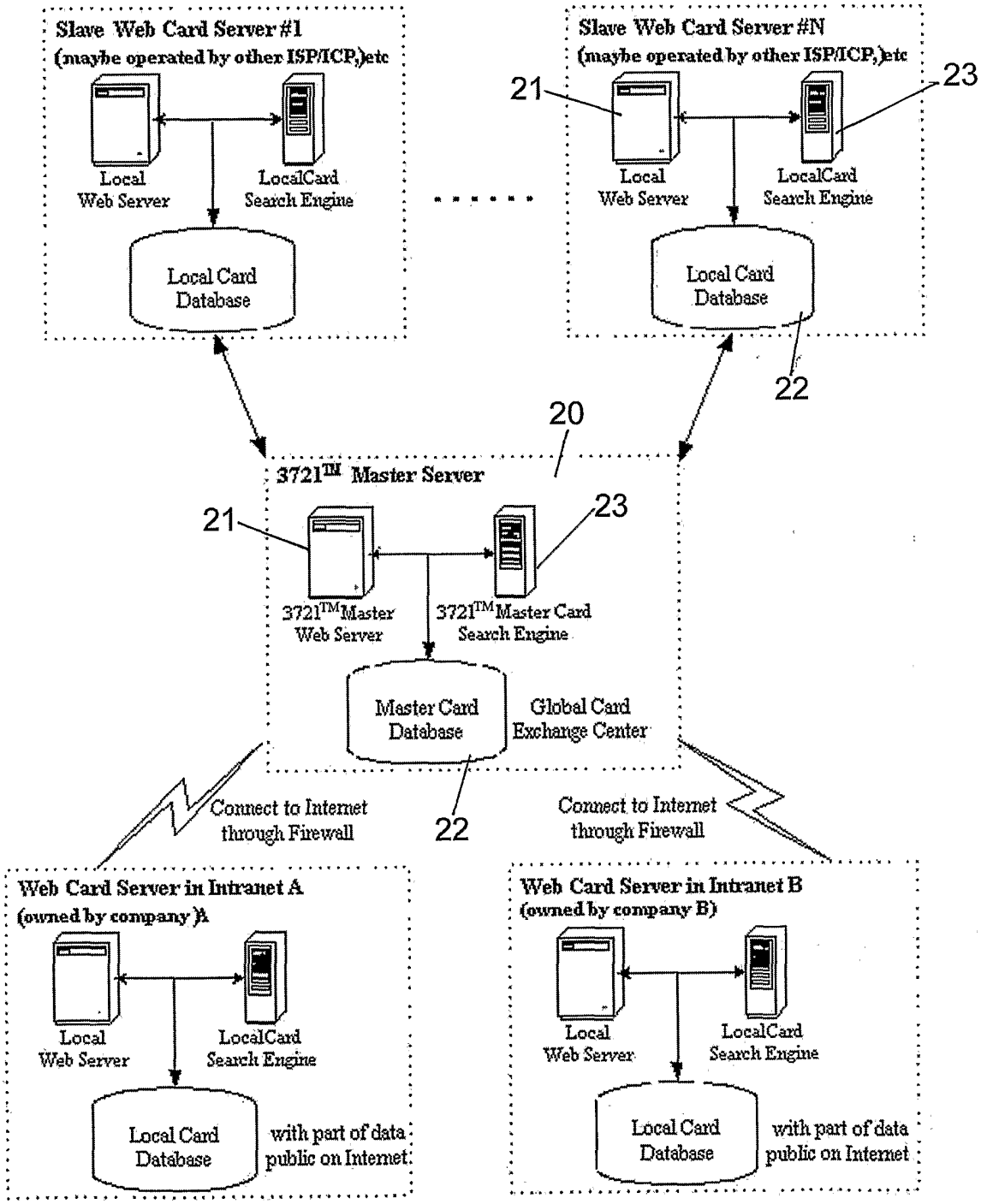

Slave Web Card Server #1
(maybe operated by other ISP/ICP,)etc
Local Web Server
LocalCard Search Engine
Local Card Database
Slave Web Card Server #N
(maybe operated by other ISP/ICP,)etc
21
23
Local Web Server
LocalCard Search Engine
Local Card Database
22
20
3721™ Master Server
21
23
3721™Master Web Server
3721™Master Card Search Engine
Master Card Database
Global Card Exchange Center
Connect to Internet through Firewall
22
Connect to Internet through Firewall
Web Card Server in Intranet A
(owned by company A)
Local Web Server
LocalCard Search Engine
Local Card Database
with part of data public on Internet
Web Card Server in Intranet B
(owned by company B)
Local Web Server
LocalCard Search Engine
Local Card Database
with part of data public on Internet

FIG. 1B

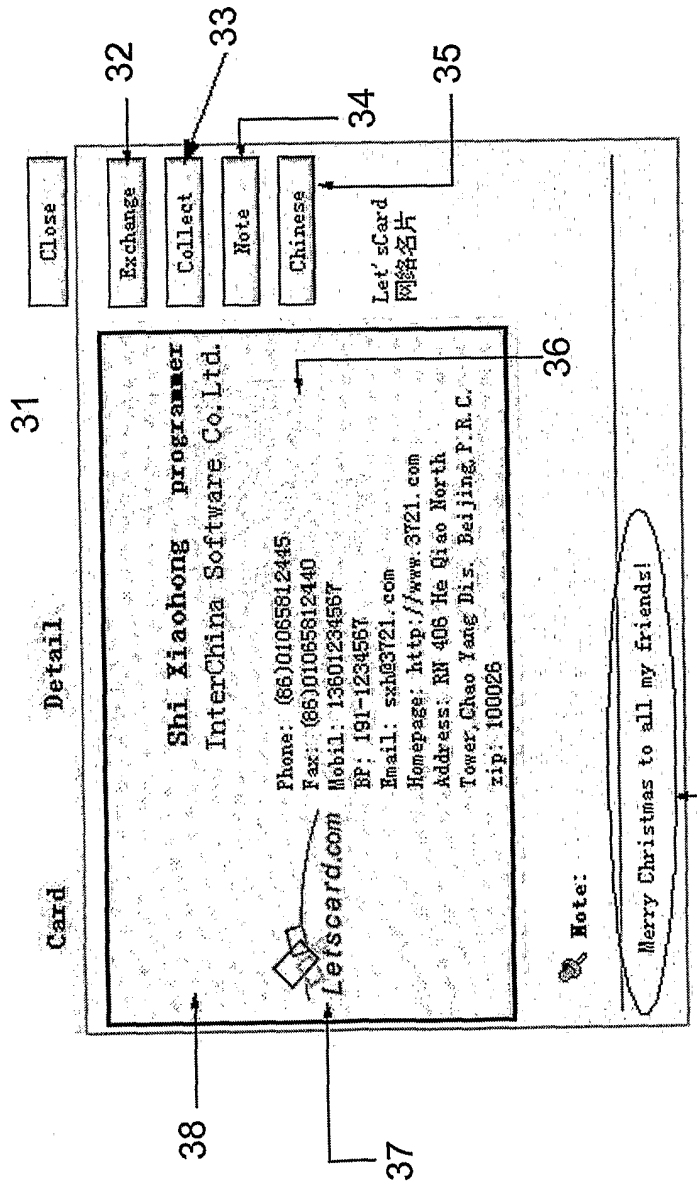
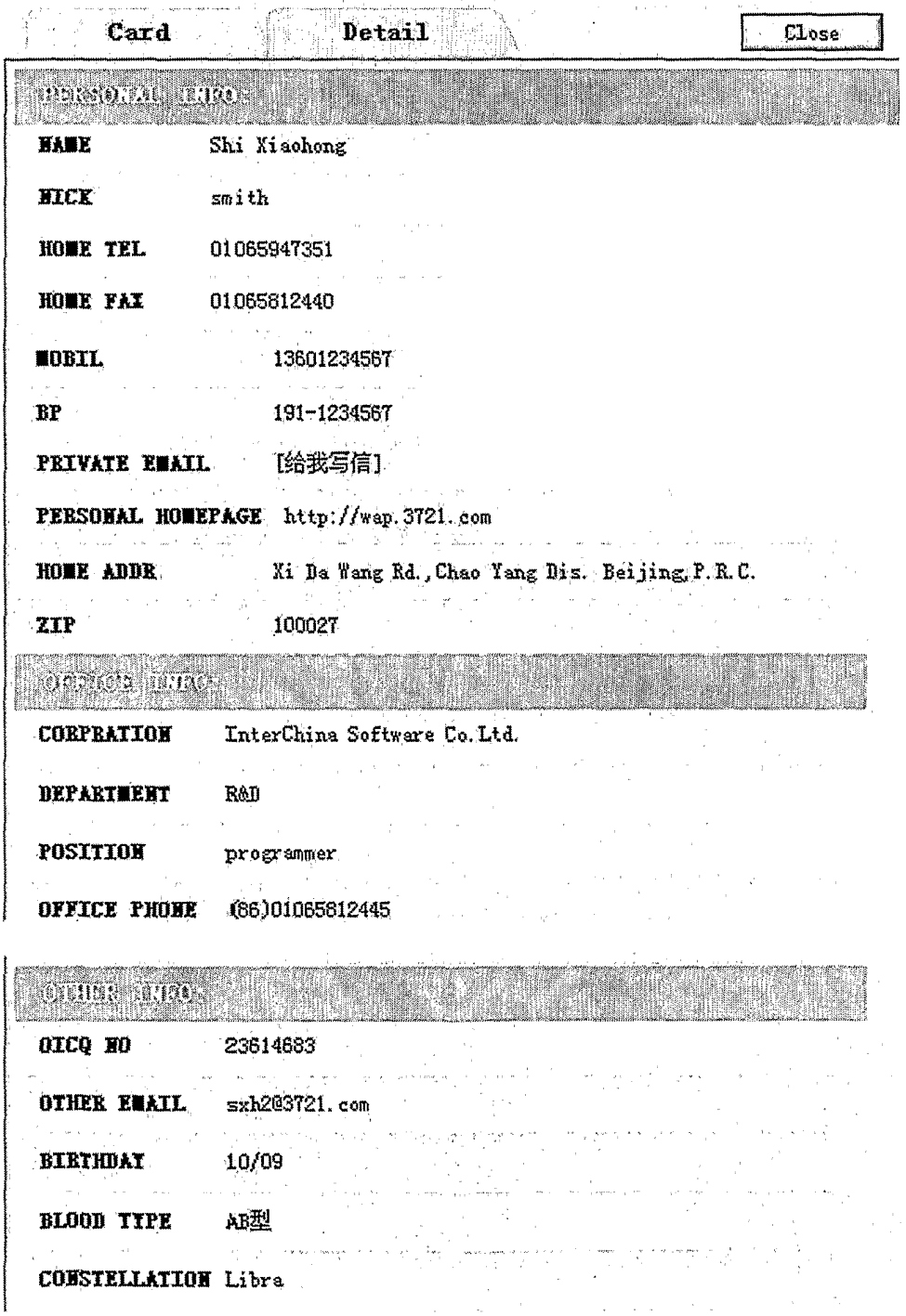

Close
Exchange
Collect
Note
Chinese
Let' sCard
网络名片
Card
Detail
Shi Xiaohong programmer
InterChina Software Co.Ltd.
Phone: (86)01065812445
Fax: (86)01065812440
Mobil: 13601234567
BP: 191-1234567
Email: sxh@3721.com
Homepage: http://www.3721.com
Address: RM 406 He Qiao North
Tower,Chao Yang Dis. Beijing,P.R.C.
zip: 100026
Letscard.com
Note:
Merry Christmas to all my friends!
31
32
33
34
35
36
37
38
39

FIG. 2A


Card
Detail
Close
PERSONAL INFO
NAME Shi Xiaohong
NICK smith
HOME TEL 01065947351
HOME FAX 01065812440
MOBIL 13601234567
BP 191-1234567
PRIVATE EMAIL [给我写信]
PERSONAL HOMEPAGE http://wap.3721.com
HOME ADDR Xi Da Wang Rd.,Chao Yang Dis. Beijing,P.R.C.
ZIP 100027
OFFICE INFO
CORPRATION InterChina Software Co.Ltd.
DEPARTMENT R&D
POSITION programmer
OFFICE PHONE (86)01065812445
OTHER INFO
OICQ NO 23614683
OTHER EMAIL sxh2@3721.com
BIRTHDAY 10/09
BLOOD TYPE AB型
CONSTELLATION Libra

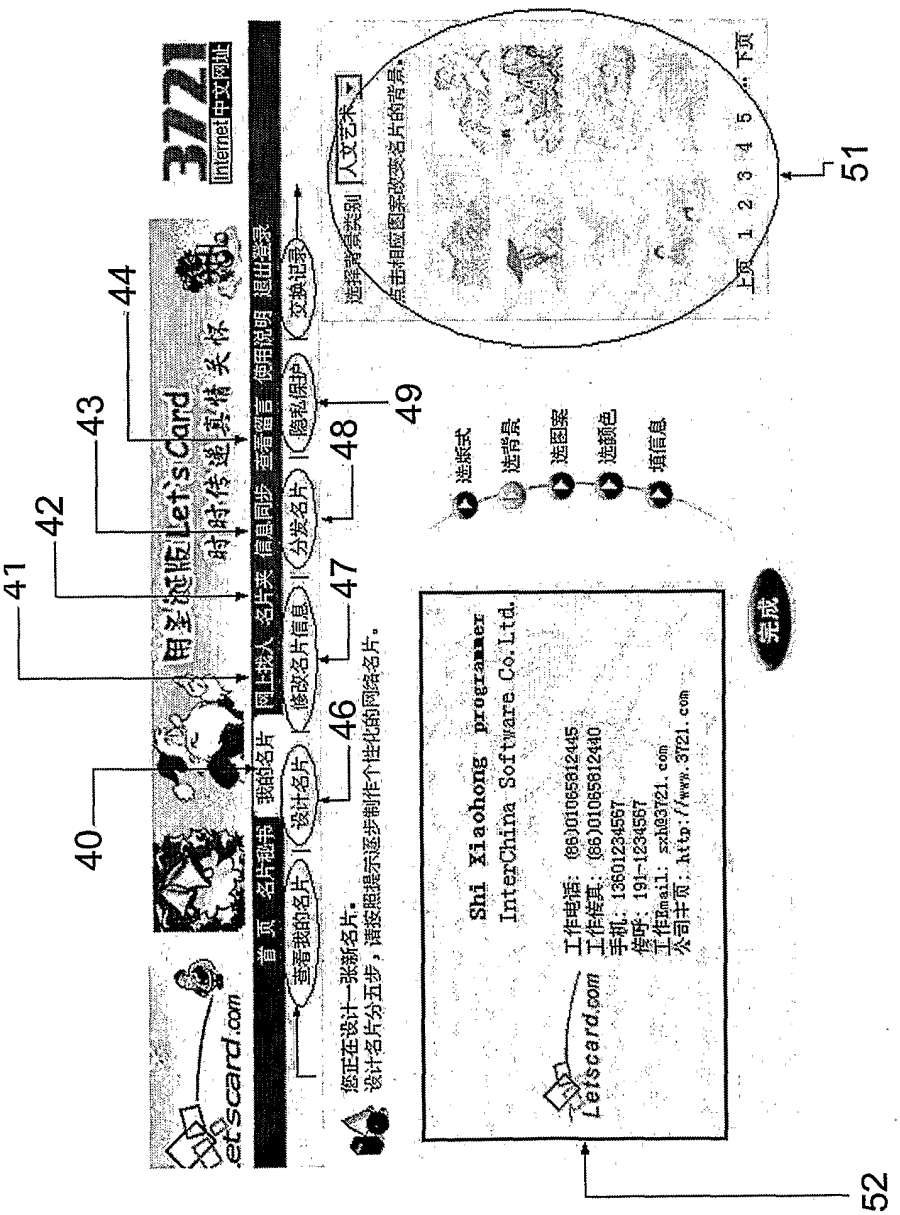

40
41
42
43
44
46
47
48
49
51
52
首 页
名片秘书
我的名片
网上找人
名片夹
信息同步
查看留言
使用说明
退出登录
设计名片
修改名片信息
分发名片
隐私保护
交换记录
查看我的名片
您正在设计一张新名片。
设计名片分五步，请按照提示逐步制作个性化的网络名片。
选择背景类别
人文艺术
点击相应图案改变名片的背景。
上页 1 2 3 4 5 ... 下页
选版式
选背景
选图案
选颜色
填信息
完成
Shi Xiaohong programmer
InterChina Software Co.Ltd.
工作电话：(86)01065812445
工作传真：(86)01065812440
手机：13601234567
传呼：191-1234567
工作Email：sxh@3721.com
公司主页：http://www.3721.com
letscard.com

FIG. 2C

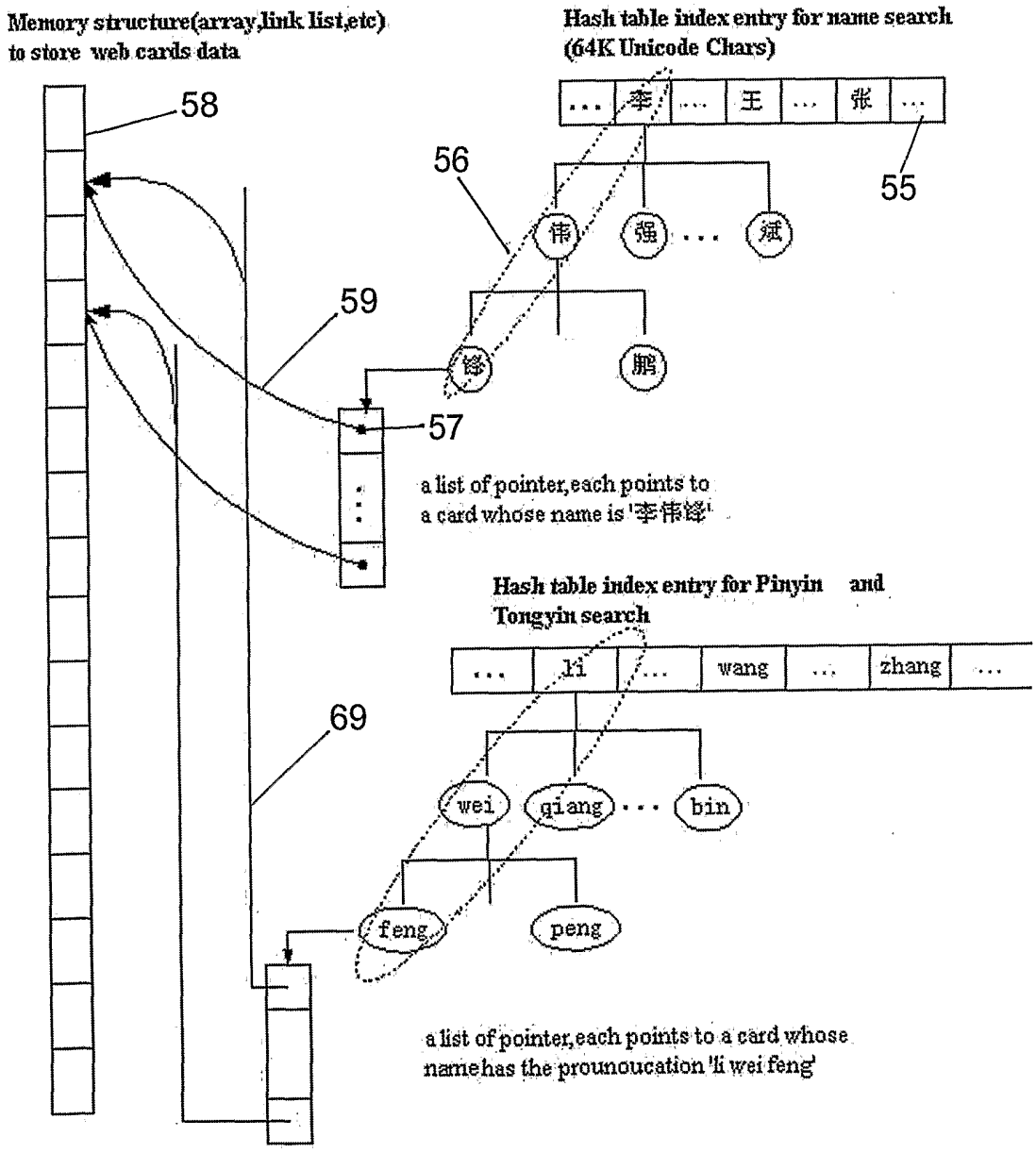

Memory structure(array,link list,etc) to store web cards data
Hash table index entry for name search (64K Unicode Chars)
58
56
55
59
57
a list of pointer,each points to a card whose name is '李伟锋'
Hash table index entry for Pinyin and Tongyin search
69
wei
qiang
bin
feng
peng
a list of pointer,each points to a card whose name has the prounoucation 'li wei feng'

FIG. 3A

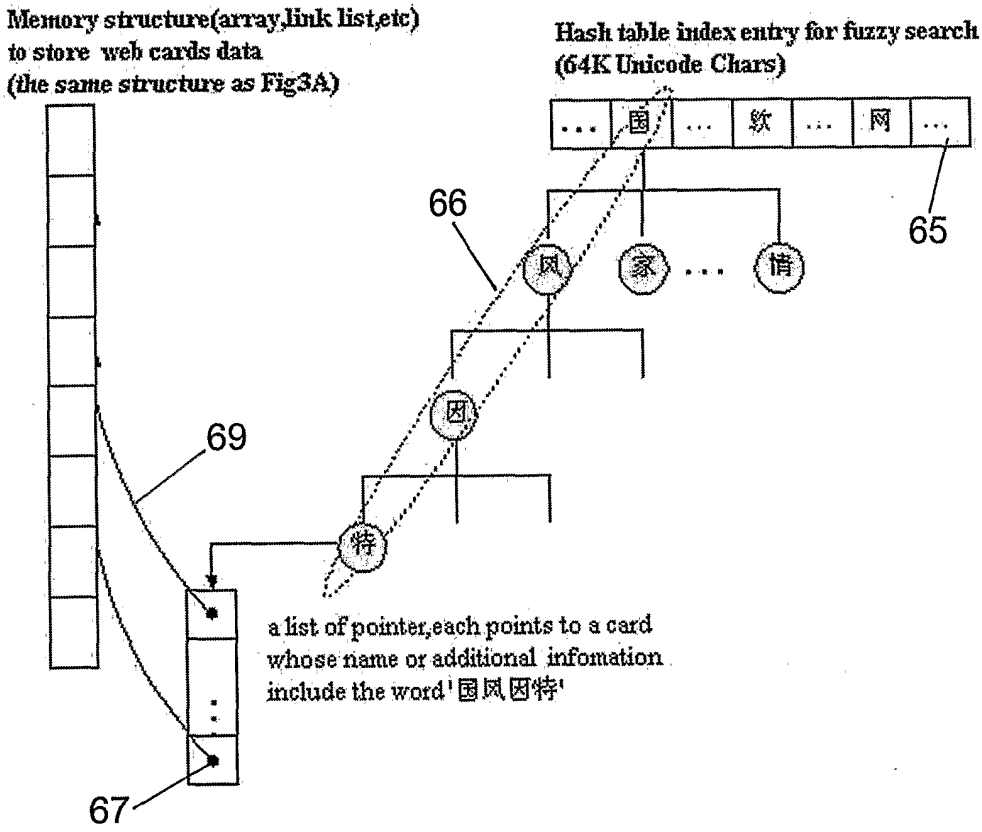

Memory structure(array,link list,etc)
to store web cards data
(the same structure as Fig3A)
Hash table index entry for fuzzy search
(64K Unicode Chars)
国
软
网
65
66
风
家
俏
因
69
特
a list of pointer,each points to a card
whose name or additional infomation
include the word'国风因特'
67

FIG. 3B

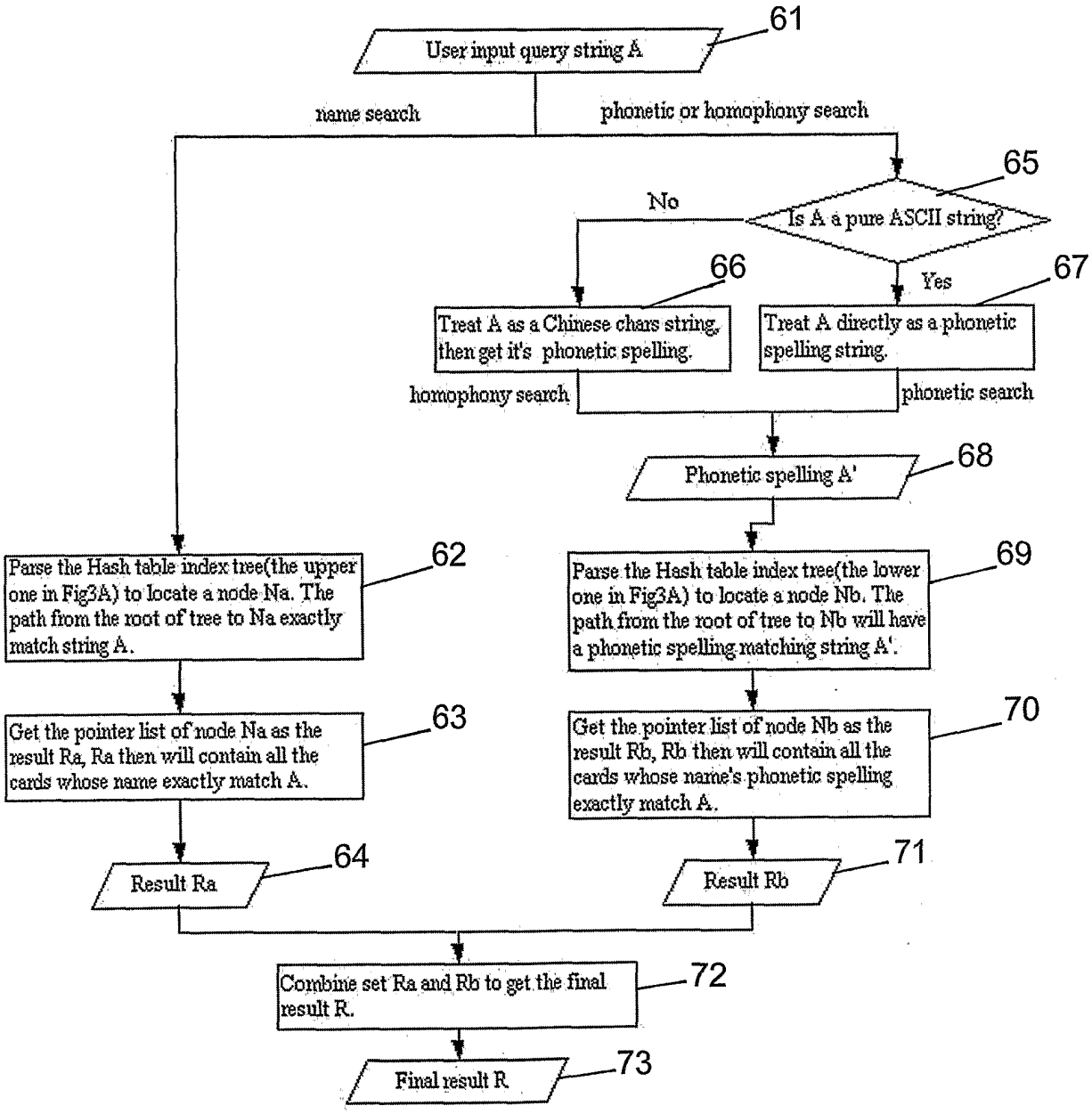

User input query string A
61
name search
phonetic or homophony search
65
Is A a pure ASCII string?
No
Yes
66
67
Treat A as a Chinese chars string, then get it's phonetic spelling.
Treat A directly as a phonetic spelling string.
homophony search
phonetic search
Phonetic spelling A'
68
Parse the Hash table index tree(the upper one in Fig3A) to locate a node Na. The path from the root of tree to Na exactly match string A.
62
Parse the Hash table index tree(the lower one in Fig3A) to locate a node Nb. The path from the root of tree to Nb will have a phonetic spelling matching string A'.
69
Get the pointer list of node Na as the result Ra, Ra then will contain all the cards whose name exactly match A.
63
Get the pointer list of node Nb as the result Rb, Rb then will contain all the cards whose name's phonetic spelling exactly match A.
70
Result Ra
64
Result Rb
71
Combine set Ra and Rb to get the final result R.
72
Final result R
73

FIG. 4A

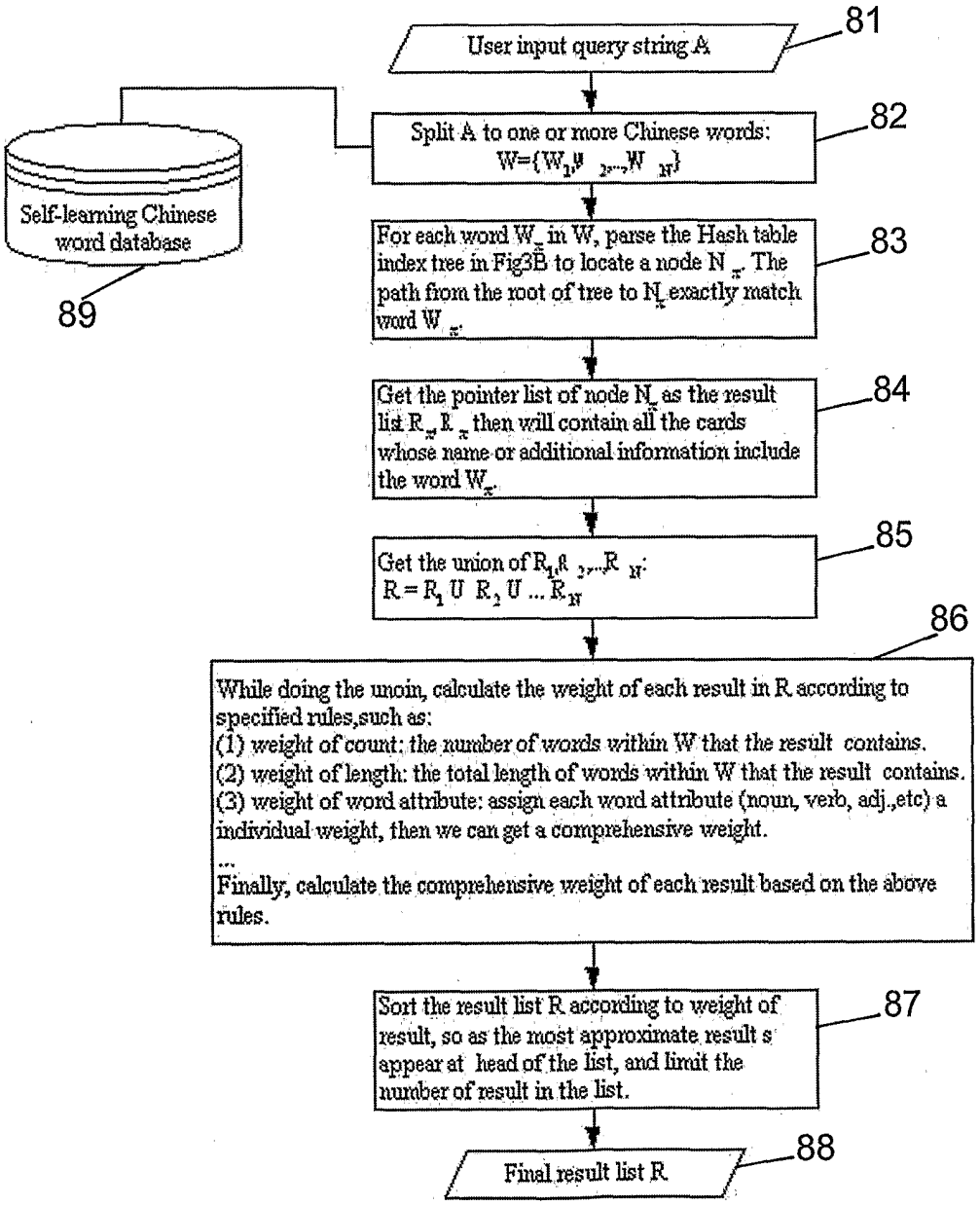

User input query string A
81
Split A to one or more Chinese words:
W={W1,W2,...,WN}
82
Self-learning Chinese word database
89
For each word Wi in W, parse the Hash table index tree in Fig3B to locate a node Ni. The path from the root of tree to Ni exactly match word Wi.
83
Get the pointer list of node Ni as the result list Ri. Ri then will contain all the cards whose name or additional information include the word Wi.
84
Get the union of R1,R2,...RN:
R=R1 U R2 U ... RN
85
86
While doing the unoin, calculate the weight of each result in R according to specified rules,such as:
(1) weight of count: the number of words within W that the result contains.
(2) weight of length: the total length of words within W that the result contains.
(3) weight of word attribute: assign each word attribute (noun, verb, adj.,etc) a individual weight, then we can get a comprehensive weight.
...
Finally, calculate the comprehensive weight of each result based on the above rules.
Sort the result list R according to weight of result, so as the most approximate result s appear at head of the list, and limit the number of result in the list.
87
Final result list R
88

FIG. 4B

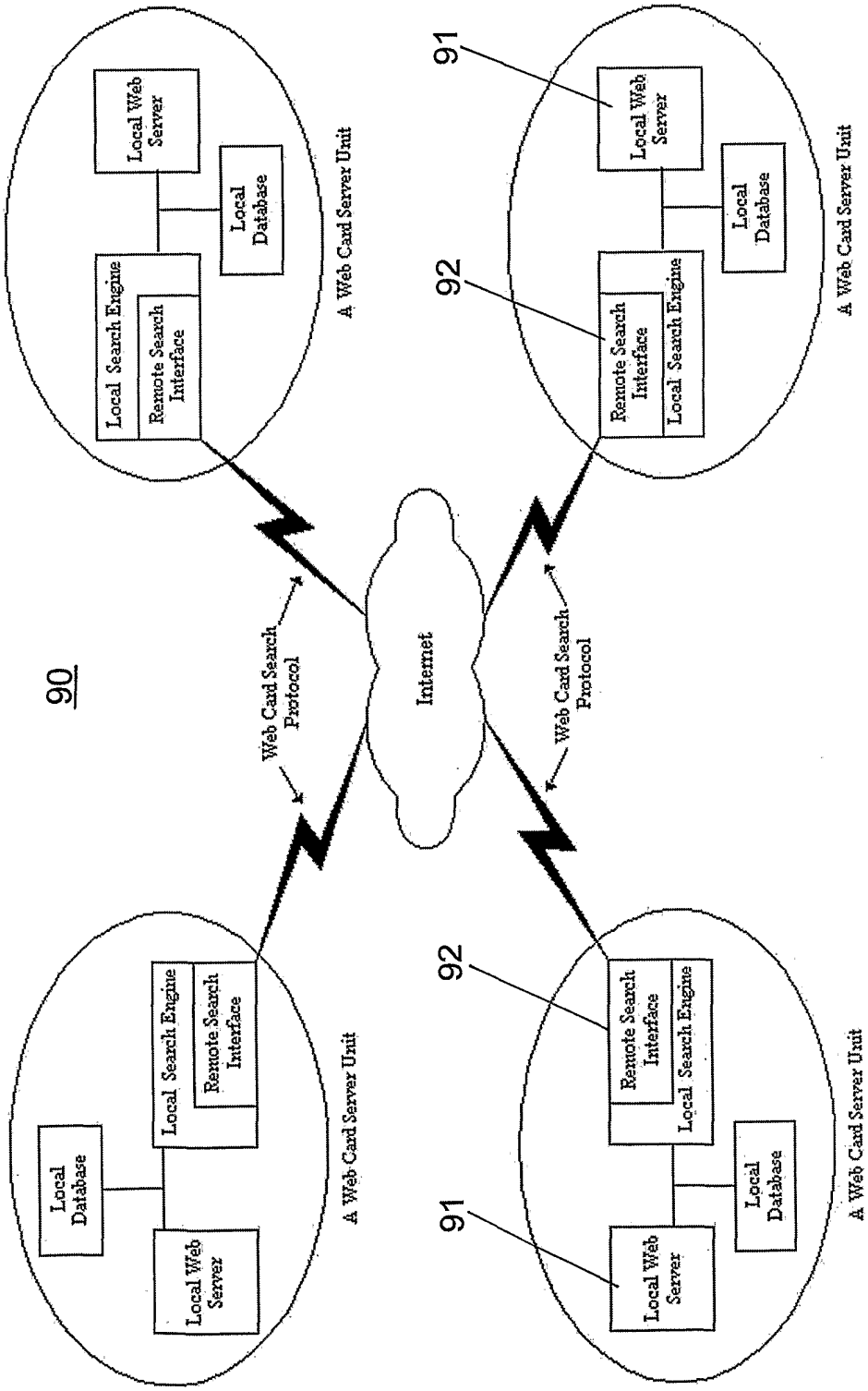

90
Internet
Web Card Search Protocol
Web Card Search Protocol
A Web Card Server Unit
Local Web Server
Local Database
Local Search Engine
Remote Search Interface
91
92

FIG. 5

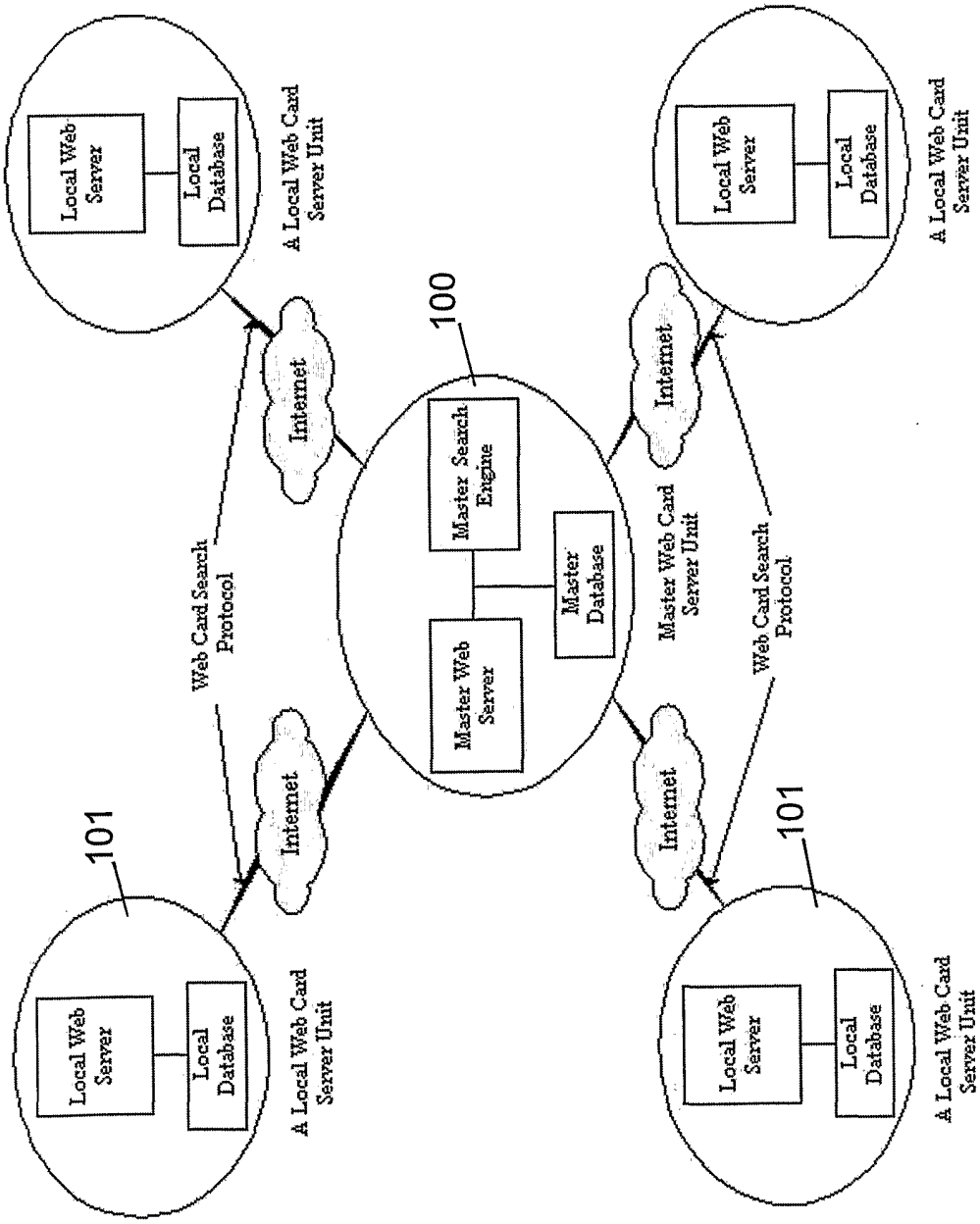

Local Web Server
Local Database
A Local Web Card Server Unit
Internet
Web Card Search Protocol
100
Master Search Engine
Master Database
Master Web Server
Master Web Card Server Unit
101

FIG. 6A

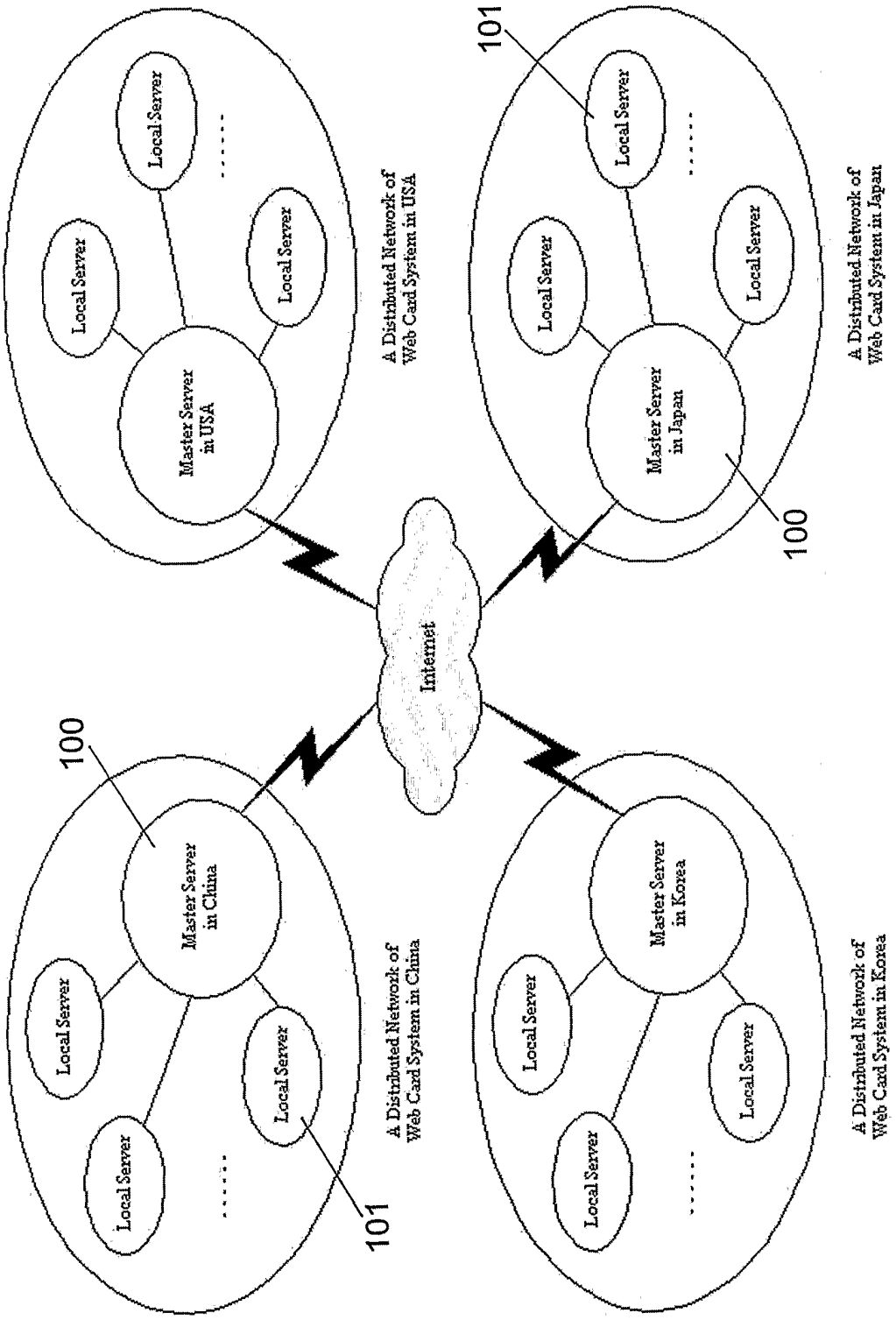

Internet
Master Server in USA
Local Server
Local Server
Local Server
Local Server
A Distributed Network of Web Card System in USA
Master Server in Japan
Local Server
Local Server
Local Server
Local Server
A Distributed Network of Web Card System in Japan
Master Server in China
Local Server
Local Server
Local Server
Local Server
A Distributed Network of Web Card System in China
Master Server in Korea
Local Server
Local Server
Local Server
Local Server
A Distributed Network of Web Card System in Korea
100
101
100
101

FIG. 6B

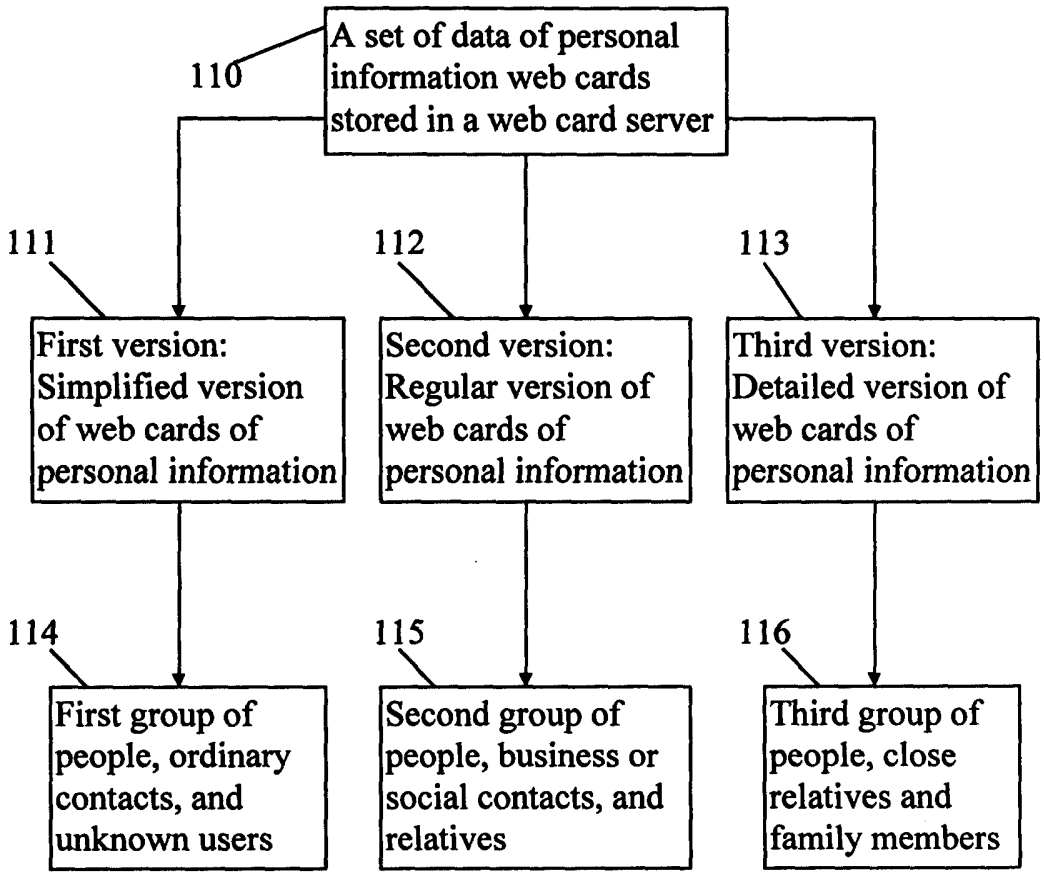

110
A set of data of personal information web cards stored in a web card server
111
112
113
First version: Simplified version of web cards of personal information
Second version: Regular version of web cards of personal information
Third version: Detailed version of web cards of personal information
114
115
116
First group of people, ordinary contacts, and unknown users
Second group of people, business or social contacts, and relatives
Third group of people, close relatives and family members

FIG. 7

FIG. 8A

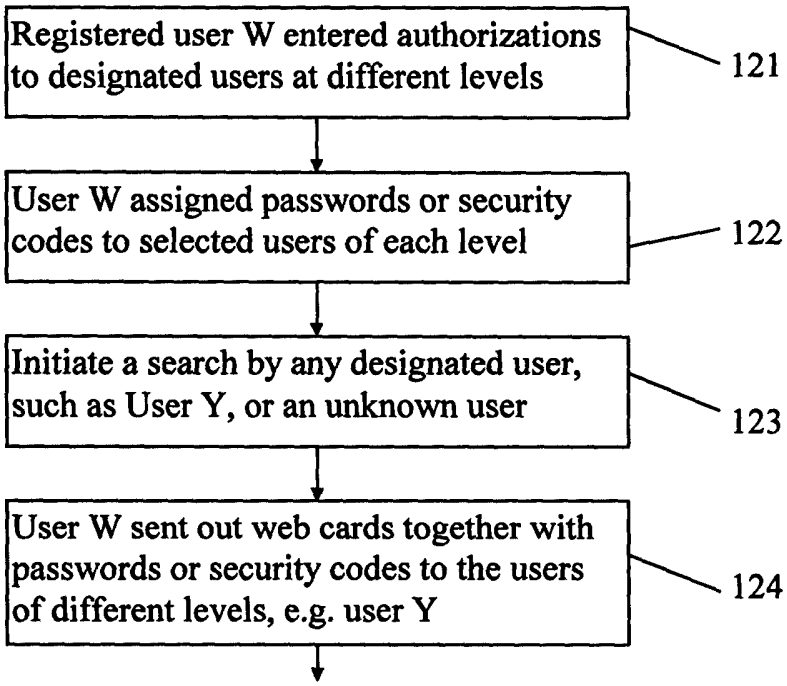
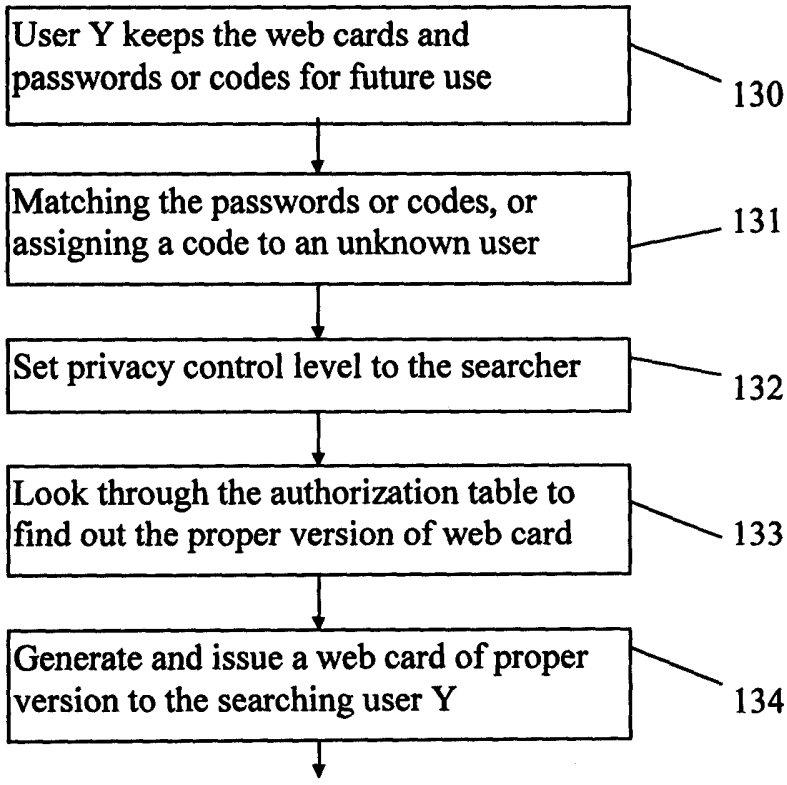

Registered user W entered authorizations to designated users at different levels
121
User W assigned passwords or security codes to selected users of each level
122
Initiate a search by any designated user, such as User Y, or an unknown user
123
User W sent out web cards together with passwords or security codes to the users of different levels, e.g. user Y
124

FIG. 8B


User Y keeps the web cards and passwords or codes for future use
130
Matching the passwords or codes, or assigning a code to an unknown user
131
Set privacy control level to the searcher
132
Look through the authorization table to find out the proper version of web card
133
Generate and issue a web card of proper version to the searching user Y
134

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN02/00267

A. CLASSIFICATION OF SUBJECT MATTER

G06F 17/30

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)

G06F 1/34 17/30 17/00

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

G06F 1/34 17/30 , H04M 1/64 11/00

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

WPI, EPODOC: personal information, PIM, web card, server, search, match, protocol, interface, database, privacy, authorization,

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO0067105A1 09.Nov 2000, (whole document)	1-22
A	CN1277396A 20.Dec 2000, (whole document)	1-22

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

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"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)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search
22.Aug 2002 (22.08.02)

Date of mailing of the international search report
05 SEP 2002

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Form PCT/ISA/210 (second sheet) (July 1998)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN02/00267

Box I Observations where certain claims were found unsearch able (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

Group1 (Claim 1-12, and indepentent claims: 1, 9) relates to a network of system of personal and business web cards, and a method of managing and controlling such a network.

Group2 (Claim 13-22, and indepentent claims: 13, 17) relates to a privacy control system and a method of controlling privacy in a personal web card system.

Obviously, Group1 and Group 2 are not linked by a common inventive concept, and don't contain same or corresponding technical features. Thus, there are 2 inventions claimed in the international application covered by the claims, so the international application does not comply with the requirements of unity of invention.

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant,this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant.Consequently ,this international search report is restricted to the invention first mentioned in the claims;it is covered by claims Nos.:

Remark on protest

☐ The acditional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN02/00267

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0067105A1	2000-11-09	WO0067416A1	2000-11-09
		WO0067108A1	2000-11-09
		WO0067106A1	2000-11-09
		AU4990800A	2000-11-17
		AU4990600A	2000-11-17
		AU4825500A	2000-11-17
		AU4821000A	2000-11-17
		WO0133430A1	2001-05-10
		AU1104501A	2001-05-14
CN1277396A	2000-12-20	WO0203772A2	2002-01-17