(12) UK Patent Application (19) GB (11) 2 370 947 (13) A

(43) Date of A Publication 10.07.2002

(21) Application No 0109369.9

(22) Date of Filing 17.04.2001

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(51) INT CL[7]
H04L 29/06 // G06F 17/30

(52) UK CL (Edition T)
H4L LEUF L205 L207

(56) Documents Cited
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EP 0838932 A1 **EP 0717346 A2**
DE 019528911 A1 **JP 20001117809 A**

(58) Field of Search
UK CL (Edition S) **H4L LED LEP LEUF LEUG**
INT CL[7] **G05B 15/02 , G06F 3/00 3/16 9/44 12/00 13/00 17/30 , H04L 13/00 29/06 , H04N 1/00**
Online: WPI EPODOC JAPIO

(54) Abstract Title
A display system that is capable of enhancing the capability of a display of a limited size to convey information to a user

(57) A system is disclosed for generating a page for display for example on a WAP-enabled device (10) or a web browser. The system comprises a database 38 a selection stage 34 for receiving a user request and selecting references from the database, a ranking stage 40 for ordering the references selected from the database, and a page generation stage 42 for generating data to define a page. The page is generated based upon the references ordered by the ranking stage 40. The ranking stage 40 orders the data in a non-constant manner in accordance with predetermined rules. For example, the data may be ordered randomly, pseudo-randomly, weighted randomly, in rotation, or in accordance with a prioritisation set on a commercial basis. An aim of the system is to reduce the effect of the limited capacity for display of data that is inherent in display devices such as WAP-enabled mobile telephones.

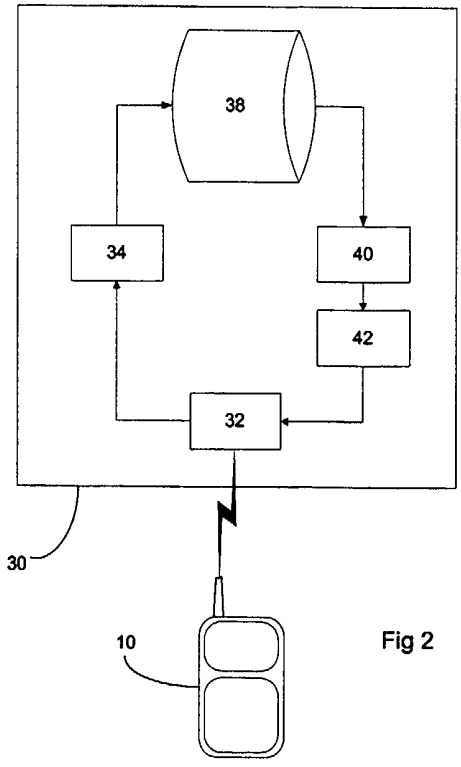

Fig 2

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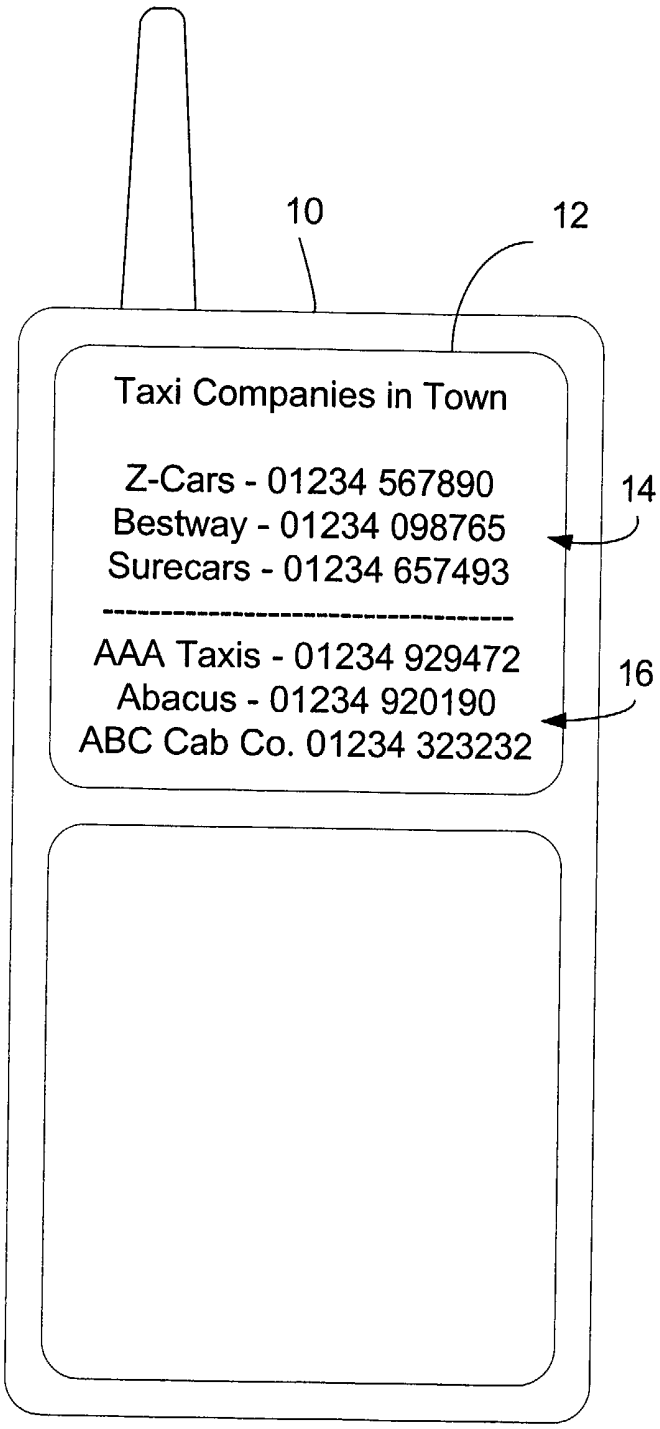
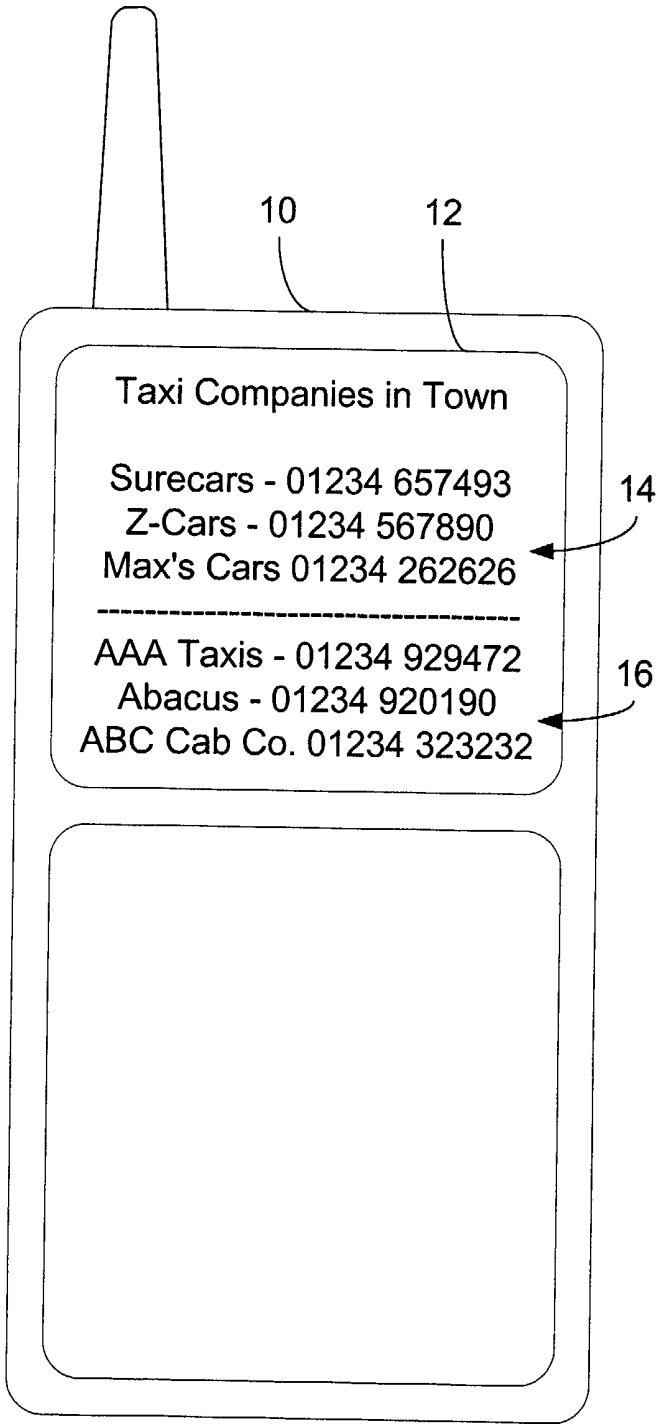

10
12
Taxi Companies in Town
Z-Cars - 01234 567890
Bestway - 01234 098765
Surecars - 01234 657493
AAA Taxis - 01234 929472
Abacus - 01234 920190
ABC Cab Co. 01234 323232
14
16

Fig 1a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12
Taxi Companies in Town
Surecars - 01234 657493
Z-Cars - 01234 567890
Max's Cars 01234 262626
AAA Taxis - 01234 929472
Abacus - 01234 920190
ABC Cab Co. 01234 323232
14
16

Fig 1b

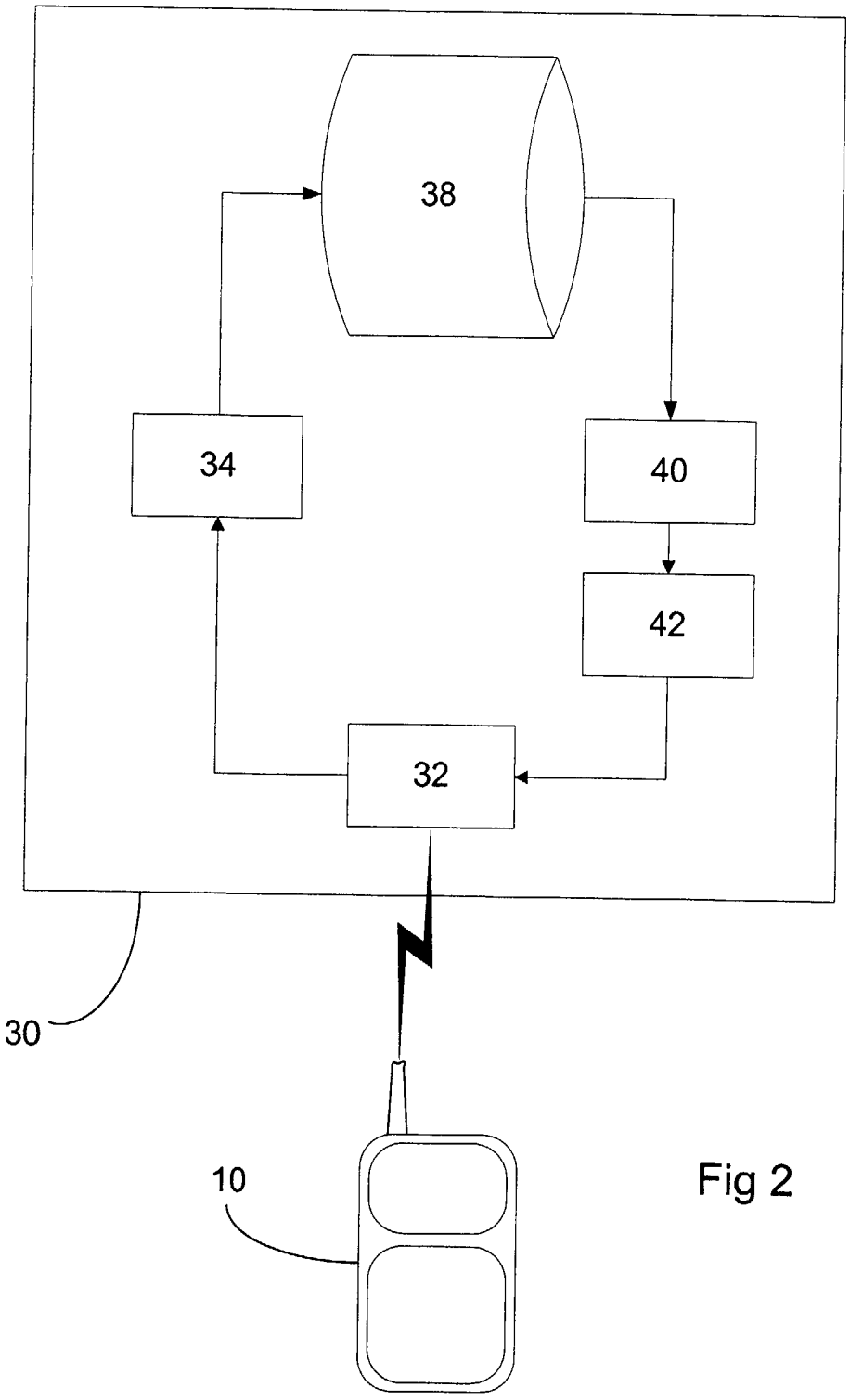

Fig 2

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Display system

This invention relates to a display system. In particular, it relates to a display system that is capable of enhancing the capability of a display of the limited size to convey information to a user.

Of late, there has been a sharp rise in the popularity of mobile communications devices enabled to render pages encoded in Wireless Application Protocol (WAP). A characteristic feature of many of these devices is that they have a display that is a very limited in size. This means that only a limited amount of information can be displayed at any one time. This is of particular disadvantage where a user is to be presented with a range of options from which to select. For instance, this might occur when a user carries out a search, for example, to obtain contact details for a service provider. Given the limited nature of the display, it may be possible to present no more than a very small number of alternatives to the user at any one time without scrolling down through a page.

This is inconvenient from the point of view of the user. It also limits the ability of a search service provider to offer a satisfactory service to their advertisers, since only the details of a very few advertisers can be presented to the user at any given time.

An aim of this invention is to improve the performance of displays of limited size, such as may be found on a mobile communications device.

This invention provides, from a first aspect, a system for generating a page for display comprising a database, a selection stage for receiving a user request and selecting references from the database, a ranking stage for ordering the references selected from the database, and a page generation stage for generating data to define a page based upon the references ordered by the ranking stage, wherein the ranking stage orders the data in a non-constant manner in accordance with predetermined rules.

When a page generated by a system embodying the invention is displayed on a screen of limited size, it may be that only a small number of references can be displayed. By ensuring that the order in which they appear in the page is not constant, the system ensures that the user sees the same small number of references. Therefore, a service provider can assure that a larger number of references will be presented to a user than would be the case if the order were constant, thereby overcoming, or at least ameliorating, the restrictions imposed by a display of limited size.

The ranking stage may use a number of alternative rules to order the references. As a simplest example, the order may be entirely random, ensuring that all references have an equal chance of being displayed. However, in many embodiments, the rules will specify that some references will be displayed more often than others. This enables the operator of the system to give preference to one reference over another, whether because of the relative importance of one reference as compared with another, or for commercial reasons. For example, the order in which the references are displayed may be selected at random, with the probabilities of different references being selected being unequal. In such cases, each reference may be provided with a weighting that indicates the likelihood of that reference being selected. Alternatively, the order in which the references are displayed may be varied in a predetermined order. For example, the

order may be varied in a cycle, with the order being skewed in favour of one or more references over others.

The invention has particular application to a database query service, the effectiveness of which might be compromised by output of its results on a display of limited size.

Of preference, not all of the references retrieved from the database are processed by the ranking stage. The rest of the references may be ordered in a conventional manner, for example, in alphabetical order, or in any other (typically fixed) order.

In preferred embodiments, the page generation stage generates pages for display encoded in a mark-up language such as wireless application mark-up language (WML) or hypertext mark-up language (HTML). Such pages may then be transmitted for display on a remote device such as a WAP-enabled communications device (for example, a cellular telephone) or a computer.

Typically, a system embodying the invention may execute on a server such as a web server or a WAP-page server. However, the invention is equally applicable to other technologies and protocols, both already proposed and yet to be developed.

From a second aspect, this invention provides a server including a system according to the first aspect of the invention. Such a server may, for example, be a WAP server or a web server.

From a third aspect, the invention provides a method for generating a display page in a system according to the first aspect of the invention.

This invention also provides a computer program product for implementing a system according to the first aspect of the invention. Such a computer program product may, for example, be a program for operating a server according to the second aspect of the invention.

An embodiment of the invention will now be described in detail, by way of example, and with reference to the accompanying drawings, in which:

Figures 1a and 1b are examples of a display on a WAP-enabled cellular telephone generated by a system embodying the invention; and

Figure 2 is a block diagram of a server system that includes an embodiment of the invention.

With reference to the drawings, a system embodying the invention provides a directory service that enables a user to access contact information relating to local services (for example, taxi companies) from a WAP-enabled cellular telephone.

In this embodiment, a user contacts a WAP site from a WAP-enabled cellular telephone 10. The user is asked to enter details of the type of services they require and to specify their location. There are then returned a list of providers of such services and contact telephone numbers.

Figure 1a represents a typical display 12 appearing on a user's cellular telephone 10 after a first request for a list of taxi companies. The display comprises a ranked group of items 14 and an alphabetical group of items 16. As will be seen, the display is capable of showing only a small number of companies. In such circumstances, it is known that a user will tend to pick one of the companies that was shown in the first

display, rather than scrolling or requesting a further page in order to obtain a full list of available service providers. This gives rise to the well-known tendency of companies such as taxi companies to pick a name that will place them at or near the head of alphabetical listings.

Figure 1b a represents a typical display generated by a system embodying the invention if the same request for information is made a second time. As will be seen, the second request may provide alternative contact details within the ranked items 14 are and may present details in a different order. The alphabetical group of items 16 is unchanged. This can ensure that, after several requests, all of the information contained within the database that is eligible for inclusion in the ranked group of items will be presented to a user in the first page of a response appearing on their display.

Turning now to Figure 2, a system embodying the invention is incorporated into a WAP server 30.

The WAP server 30 includes a front-end 32. The front-end 32 operates to exchange information with remote clients, in this case, a WAP enabled telephone using the Wireless Application Protocol. Alternative or additional front-ends might be provided to exchange information with other clients. For example, an HTTP front-end might be provided for communication with a web browser.

A request received by the front-end is passed to a parser 34 that extracts the data from the request necessary to identify the data required by the user. For example, in the case described above, this data may include the nature of the services required (for example, taxi services) and the location in which the services are required (example, the name of

the town). The parser 34 uses this data to generate a query, and passes to query to a database 38.

From the query, the database generates an output set. Each item in the output set has a flag to indicate whether or not it is eligible for ranking. The output set his passed to a ranking stage 40. The ranking stage of 40 operates to order the data items within the output set that are eligible for ranking in accordance with predetermined rules. In this embodiment, those items not eligible for ranking are passed through the output stage 40 in the order in which they were retrieved from the database.

Once the data has been ordered by the ranking stage 40 it is passed to a page generation stage 42. The page generation stage 42 takes the output set and from it generates a page encoded in a language appropriate to the client. The encoded page is then passed to the front end 32, from which it is transmitted to the client 10.

Operation of the ranking stage 40 will now be described further.

In this embodiment, the ranking stage 40 principally sorts the eligible items in the output set in to a random order. That is to say, for the most part no preference is given to the order in which those items are represented on the page presented to the user. However, the ranking stage 40 also implements additional rules that can override this basic principle.

As a first example of such an additional rule, the ranking stage 40 maybe instructed always to place one particular data item as the first item on the page, if that item is included in the output set.

As a second example, each item within the database 38 may be stored with an associated ranking value. This ranking value is used to skew the ordering process whereby an item with a higher-ranking value is more likely to appear at the beginning of the list. However, when such a rule is applied, the ranking value is not the sole determinant of the position of any item within the list. If this were the case, items within the list would always be in a fixed order. For example, in order to apply such a rule, for each item in the output set, there is a ranking value r obtained from the database where r is in the range $0 < r < 1$. Then, for each item in the output set, the ranking stage generates a random value v, where v is in the range $0 < v < 1$, and then calculates the product pv. Items in the output set and then ordered with increasing values of pv. If two items have an identical value of pv then their order is chosen at random. In extreme case, where an item has a ranking value of 1, it will always be placed at the beginning of the output set, as proposed in the last preceding paragraph, subject, of course, to its contending with another item having the same ranking value.

Clearly, many other types of rule might be implemented by the ranking stage 40. The particular rule implemented in any given embodiment will be dependent upon the nature of the data and on the aim that is being sought by carrying out the actions of the invention. One envisaged commercial application of the invention would allow customers to pay a fee in order that their entry in the database can become eligible for ranking. Then the invention may also allow a customer to obtain a ranking value in accordance with the amount they pay. A higher payment entitles a customer or to a higher ranking value. This means that a customer can pay to have their services positioned more prominently in the list provided to the user.

In any case, it will be seen that embodiments of this invention allow a greater range of information to be displayed on a display of restricted size than would be the case with conventional systems.

Claims

1. A system for generating a page for display comprising a database, a selection stage for receiving a user request and selecting references from the database, a ranking stage for ordering the references selected from the database, and a page generation stage for generating data to define a page based upon the references ordered by the ranking stage, wherein the ranking stage orders the data in a non-constant manner in accordance with predetermined rules.

2. A system according to claim 1 in which the ranking stage uses a number of alternative rules to order the references.

3. A system according to claim 1 or claim 2 in which the order is random

4. A system according to claim 1 or claim 2 in which the rules specify that some references will be displayed more often than others.

5. A system according to claim 4 in which the order in that the references are displayed may be selected at random, with the probabilities of different references being selected being unequal.

6. A system according to claim 4 or claim 5 in which each reference are provided with a weighting that indicates the likelihood of that reference being selected.

7. A system according to claim 4 or claim 5 in which the order in which the references are displayed is varied in a predetermined order.

8. A system according to claim 7 in which the order is varied in a cycle, with the order being skewed in favour of one or more references over others.

9. A system according to any preceding claim that provides a database query service.

10. A system according to any preceding claim in which not all of the references retrieved from the database are processed by the ranking stage.

11. A system according to claim 10 in which the references not processed by the ranking stage are ordered in a conventional manner.

12. A system according to claim 11 in which the references not processed by the ranking stage are in alphabetical order.

13. A system according to any preceding claim in which the page generation stage generates pages for display encoded in a mark-up language.

14. A system according to claim 13 in which the mark-up language is wireless application mark-up language (WML) or hypertext mark-up language (HTML).

15. A system according to any preceding claim operative to transmit generated pages for display on a remote device such.

16. A system according to any preceding claim executable on a server such as a web server or a WAP-page server.

17. A system for generating a page for display substantially as herein described with reference to the accompanying drawings.

18. A server including a system according to any preceding claim.

19. A server according to claim 18 in which the server is a WAP server or a web server.

20. A method for generating a display page in a system according to any one of claims 1 to 16.

Application No:	GB 0109369.9 12	**Examiner:**	Hannah Sylvester
Claims searched:	1-16	**Date of search:**	8 December 2001

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.S): H4L (LEP, LED, LEUG, LEUF)

Int Cl (Ed.7): H04L 29/06, 13/00, G06F 17/30, 13/00, 12/00, 3/00, 3/16, 9/44, G05B 15/02, H04N 1/00

Other: Online: WPI EPODOC JAPIO

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
A	EP0969389A2	(IBM)	
A	EP0898404A2	(NEC)	
A	EP0838932A1	(SUN MICROSYSTEMS)	
A	EP0717346A2	(CANON)	
A	DE19528911A1	(FRIDLEY TECHNOLOGIES)	
A	JP20001117809A	(FUJITSU)	

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&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.