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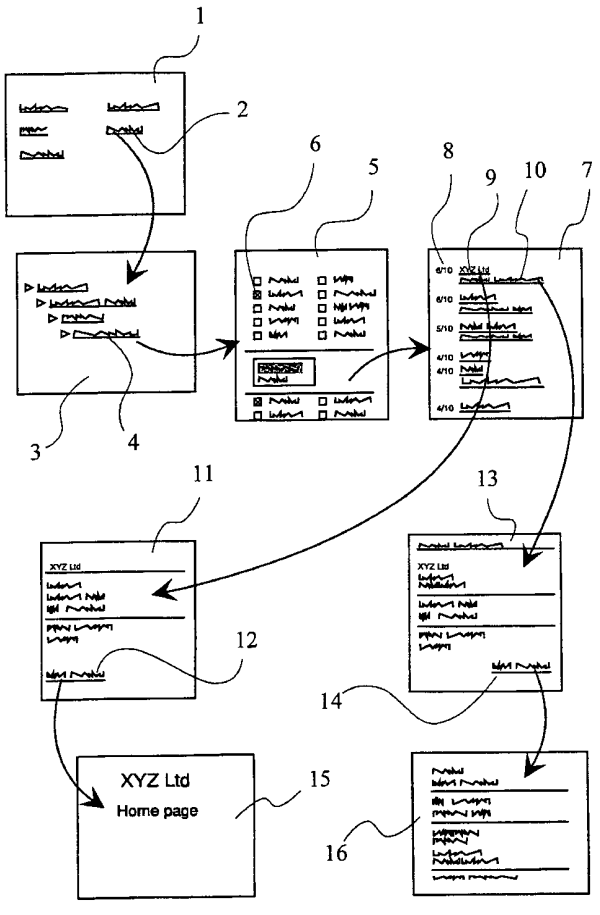
[Continued on next page]

(54) Title: SYSTEM FOR INTERNATIONALIZATION OF SEARCH INPUT INFORMATION



(57) Abstract: The invention concerns a system for the management and evaluation of geographically scattered, extensive and detailed inquiry and response information in the Internet or equivalent, in which system the input information to be processed consists of inquiry and response information, said information being supplied from terminal units in the network into the system, directly to the places on the users' own WWW pages which describe the subject concerned. The input information as well as the search results together with links for evaluation of candidates can be updated and read via terminals connected to the Internet. The input information has been arranged in a hierarchically modeled fashion so that equivalent pieces of input information given from the user interface correspond to a single code data item in the system.

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SYSTEM FOR INTERNATIONALIZATION OF SEARCH INPUT INFORMATION

The present invention relates to a system as defined in the preamble of claim 1 for the management of extensive and scattered information in a global data network.

The basic problem e.g. in finding a subcontractor or co-operation partner is, from the searcher's point of view, the apparent abundance of response information and its very poor applicability to the subject defined for the particular search. In addition, response information that may at first have seemed applicable too often turns out to be inapplicable, which means that an unreasonable amount of time is wasted on examining candidates that turn out to be undesirable. To solve this problem, use has been made of data networks, but this leads to further drawbacks. The problem with the use of public data networks, such as the Internet, is that they contain plenty of unorganized information consisting of both useful information and rubbish. Many enterprises have their own home pages in the network, but as there is too much unorganized information and the amount of information is rapidly increasing all the time, the search results produced by traditional search robots are increasingly out of keeping with the search criteria. Nobody has enough time to browse through the thousands and even millions of candidates given by the search robots, most of the candidates being additionally completely different from what the user is looking for.

Another problem is that, for small and able enterprises and for individual persons as well, competition on the international market means that it is necessary to adapt oneself to a new situation as required by the changes substantially faster than at present. In this respect, a

further drawback is that, due to lacking language skills and insufficient marketing skills and resources, many opportunities remain unutilized.

The object of the present invention is to eliminate the problems referred to above and to achieve a new type of system which is free of the drawbacks of existing systems and which is largely automated and also independent of the user's language skills. By using the system of the invention, it is possible to significantly reduce the time consumed e.g. in searching for cooperation partners and at the same time to improve the search results regardless of the line of business.

In the present invention, 'communication' refers to the processing and transmission of inquiry and response information mainly based on real-time needs of organizations, such as companies, in an internationally implemented system utilizing a global data network, such as the Internet, in such manner that the response information only includes the most appropriate candidates in the line of business in question, automatically pre-audited. Further, if the number of such candidates is still too large, additional criteria can be used to reduce the number of pre-audited candidates to the desired level. After an appropriate number of candidates has been defined, then, in each advertisement of each company, the system offers a link directly to the place in the organization's own home page which presents more detailed information relating to the subject at hand that the searcher may utilize. Thus, the searcher need not even search the candidates' home pages to find the desired information; instead, he can directly access specific information via the advertisements included in the system and maintained by the users themselves and via the links included in them.

The system of the invention is characterized by what is presented in the characterization part of claim 1. Other embodiments of the invention are characterized by what is presented in the other claims.

In the solution of the invention, both the finding of a cooperation partner for the purposes of management of matters relating to sales, technology, training and environment and the collation of companies' synergetic needs to provide a basis for new investments or development of business activities can be implemented significantly faster and better than at present and at a low cost by using a new type of intermediary service arrangement based on a stepwise progressing structural message processing system known in itself and especially on linkages between individual items of desired detailed information associated with each step in the system.

The structural message processing included in the system of the invention, which comprises automatic language conversion, is based on a structure modeled specifically for each line of business and each application, describing the structure in respect of both content and functions including detailed criteria. The content of different lines of business and their criteria have been established in the course of years and decades, in other words, e.g. lathe work with all its options is the same in all parts of the world regardless of what it is called in different countries. By using a modeled structure, it is easy to choose the desired working language in each country. The system takes care of automatic language conversion in conjunction with a search for a partner e.g. in another country.

As compared with the present practice feasible in data networks, such as the Internet, the system of the inven-

tion provides significant advantages, including e.g. the following:

- A significant improvement is that real alternatives can be found even from an ample supply and that the time needed for finding the right cooperation partner is reduced.

- Better profitability is achieved as the conditions for renewal of enterprises are improved (a larger number of right projects can be launched on a market-oriented basis in a shorter time than at present).

- Enterprises are able to focus their forces in a profitable manner on fewer methods than at present, including methods of modern technology, because the invention makes it possible to collate the dispersed needs of many client companies to form a basis for new activity, gathering information from a large area even on an international scale.

- Enterprises can advance from local markets to national and international markets significantly faster than before.

- A search for a cooperation partner can be performed using criteria significantly more precise than at present, and the responses generated by the system are based on information updated at any time by the service or product suppliers themselves, both on the pages (advertisements) comprised in the system and on the users' own home pages linked to them.

- Each user can use a desired language in the search for a cooperation partner and in making his own tender.

In the following, the system of the invention will be described in detail by the aid of an example taken from industry, in which a search is performed to find a new supplier of circuit boards, with reference to the attached drawings, wherein

Fig. 1 presents a diagram representing an arrangement according to the invention,
Fig. 2 presents a precision search form on a display screen,
Fig. 3 presents a form for the definition of areas of expertise,
Fig. 4 presents a form for the definition of search criteria,
Fig. 5 presents a form for the results of a precision search,
Fig. 6 presents a form giving company profile information, and
Fig. 7 presents an actual sales advertisement form.

The system of the invention is a system working in a geographically distributed manner and used globally by utilizing a public data network, such as the Internet or equivalent, as a coherent search process in which even a narrow inquiry produces response information that, from the user's point of view, is applicable in real time in an easy, fast and low-cost manner regardless of the working language and in which the response information contains links to evaluation information needed for the estimation of the quality of the candidates. Both the criteria and link data comprised in the system and the detailed evaluation information associated with the subject, connected to them via links on organizations' own home pages, can be updated by the users themselves without any intermediaries. Thus, the structural line-specific and/or application-specific user information can be provided with links giving the searcher access to de-

tailed evaluation information which is important in respect of response information and which is continuously changing with the growth of knowledge and know-how.

The input data processed in the system consists of inquiry and response information defined in respect of structure and content, and this data is supplied with predefined or open rights from one or more terminal units into the global system, in which the input data, representing demand and supply, can be read and updated via any terminal unit connected to the public data network. According to the invention, the input data representing supply and demand is organized in a hierarchical and modeled fashion so that equivalent pieces of input information given from the user interface correspond to a single code data item in the system and that the evaluation of the information obtained as a result of a search is performed in appropriate places in the organizations' own network pages, such as WWW pages, using subject-specific links, such as Web-links comprised in the system.

The essential point is that, using criteria 2, 4, 6 hierarchically defined by the searcher, the searcher receives for each business environment (industry, trade, training, services, etc.) only the most suitable candidates 9 in the field in question, automatically pre-audited in order according to quality, and the search result 7 does not contain any representatives of any other fields. Fig. 1-5 represent this stage of the process. The next step in the search process is evaluation of the most suitable candidates 9 on a detailed level, which is implemented in the system in the relevant context on the basis of links 12, 14 represented by the information suppliers themselves and included in the system. The supply forms used in the system have been provided with specific positions for the links, and the advertising party only fills in and tests these positions. This eliminates e.g. orthographic er-

rors. By clicking on the links 12, 14, the searcher can find the very places on the information suppliers' own home pages 15, 16 which present both supplementary information about the company in question and the expertise or business described in the advertisement, which the searcher is interested in. In this way, the searcher can easily and quickly find the best candidates in the field in question without wasting time on surfing. Typical links are e.g. circumstantial organization information from the company's or organization's standard WWW page 11 to the corresponding place on the company's or organization's own home page 15 and a link from a subject-specific data input page, such as a sales advertisement 13, to a place 16 in the company's own home page where the relevant expertise is described. Hereinafter, the standard WWW page included in the system is called company/organization profile. From the point of view of the party looking for information, the practice described allows a significantly more accurate search result to be obtained in a significantly shorter time than before. This is a new solution to the growing problem of data processing with an extensive data supply that is currently prevailing in the Internet.

Another essential thing is that the user does not have to browse any electronic notice boards but only needs to input via an easy-to-use graphical interface 1, 3, 5 his line-specific or application-specific criteria 2, 4, 6 defining the object being looked for or offered. For example, a company in the role of a main supplier defines what it wants to buy. A search operation together with the selection criteria 2, 4, 6 is prepared using an "intelligent" user interface 1, 3, 5 and fed into the network service system. After this, the system automatically carries out the search for companies, producing an output 7 giving both subcontracting companies perfectly matching the need and companies which, based on needs prioritized

in different ways, correspond to the needs as closely as possible, including companies not completely matching the search (ranking list). After this, the searcher can use the Web links 12, 14 included in the system and maintained by the supplier companies themselves to access the appropriate places on the companies' own home pages 15, 16 describing the expertise in question to decide which one or which ones of the companies found would be the best choice as cooperation partners. It is to be noted that the system is open and impartial to all users, like e.g. telephone networks.

The system of the invention, in which each user can communicate in the language he/she likes, is based on hierarchical levels 2, 4, 6 which the user can access via a user interface over a network. The hierarchical nature of the messages and the control of possible selections give the message a structured property, thus allowing language conversion as well. The language conversion functions so that the communication presented to the user of the system is in the language he has used. The system infers the language used by the user from the message according to the language selected by the user. Messages created in different languages are translated by the system into a so-called general coded form by using a conversion table, which it is possible to maintain and develop because of the hierarchical and structured nature of the messages/know-how.

Table 1 presents an example of a form hierarchy that makes the system of the invention possible, in a simplified form so that only the selected criteria are shown. The working language is Finnish. (For readability, an English translation is given in brackets. Translator's note.)

Sovellus (Application):	Koneenrakennus (Machine construction)
Hankintataso (Purchasing level):	Osien valmistus (Manufactured components)
Tuoteperhe (Product family):	Valut (Casts)
Tyyppi (Type):	Harmaa rautavalu (Grey castiron casts)
Työvaiheet (Manufacturing techniques):	Kuorimuotti (Shell mould)
Materiaalit (Materials):	Harmaa valurauta (Grey castiron)
Hakualue (Search area):	Etelä-Englanti (Southern England)

Table 1

Table 2 correspondingly presents a language conversion table according to the invention, applied to the example in Table 1. Certain fields, such as "Sovellus" (Application) can be assigned default values already during installation of the user interface. The leftmost column in the table gives the field, the next column an ID, i.e. a code assigned to each criterion and alternative, the third column presents the Finnish term corresponding to the code, next the corresponding English term, and so on.

FIELD	ID	FINNISH	ENGLISH	And so on
Sovellus (Application):	A1	Koneenrakennus	Machine construction	
	A2	Muoviteollisuus	Plastic industry	
	...			
Hankintataso (Purchasing level):	BI	Valmistustekniikat	Manufacturing technologies	
	B2	Osien valmistus	Manufactured components	
	...			
Tuoteperhe (Product family):	D4	Valut	Casts	
	F5	Polttoleikkeet	Oxygen cuttings	
	...			
Tyyppi (Type):	G2	Harmaa rautavalu	Gray castiron casts	
	...			
Työvaiheet (Manufacturing techn.):	G78	Kuorimuotti	Shell moulds	
	...			
Materiaalit (Materials):	J7	Harmaa valurauta	Castiron (gray)	

	J8	Rakenneteräs	Construction steel
	...		
Hakualue (Search area):	H13	Etelä-Englanti	Southern England
	...		
Pituus (Length):	K		
Leveys (Width):	L		
	...		
Laatujärjestelmä (Quality system):	P1	ISO 9001	ISO 9001
	P2	ISO 9002	ISO 9002
	...		
	...		
AND SO ON			

Table 2

A message consistent with Table 1, coded in accordance with Table 2, is sent from the user into an internationally operated network service. The coded message according to the examples is: A1, B2, D4, G2, G78, J7 and H13. These codes consist of indexed addresses of memory locations in an n-dimensional table, said memory locations containing the corresponding "plain" information as elements of the table. In different versions of the system in different languages, the table positions are the same but the elementary information having the same meaning is in different languages. Thus, for instance, memory location A1 in the table in the Finnish version contains the data "Koneenrakennus", whereas the same memory location in the English version contains the data "Machine construction", and so on. In this description, the table locations are referred to as codes. If users submit suggestions for the addition of a new piece of code-type information, a different hierarchical criterion, to the system, then this information is coded (added to a new memory location in the table and assigned an indexed address) and the service server of the system is updated with this information in a centralized manner, in other words, the code is updated at the same time for all us-

ers. When using the system, all users are communicating with the said service server via the Internet or a corresponding network connection.

Table 3 shows how the message used in the above example is seen by an English user.

MESSAGE INTO INTERNATIONAL NETWORK	MESSAGE PRESENTED TO THE ENGLISH USER	
A1	Application:	Machine construction
B2	Purchasing level:	Manufactured components
D4	Product family:	Casts
G2	Type:	Grey castiron casts
G78	Manufacturing Techniques:	Shell moulds
J7	Materials:	Castiron (grey)
H13	Search Area:	Southern England

Table 3

The system of the invention comprises functional means, such as various forms in different languages for the input of information into the system and retrieval of information from the system. One of the functional means is a precision search form 1, which can be used to define the operating environment together with the criteria. The precision search form contains links 2 to different operating environments, such as industry, trade, services, and so on. The operating environment is the highest hierarchical level. Once the operating environment has been defined by clicking the corresponding link, a form 3 concerning areas of know-how is opened, and this form again contains links 4 for the selection of functions defined on the next levels in the hierarchy. If the user has selected e.g. industry, then the form will show a list of links to different branches of industry. By then select-

ing the desired branch of industry, a link list for the next hierarchical level will be displayed. The search is continued in this stepwise manner until reaching the area of expertise which is actually sold and bought by the enterprises. In the example in Fig. 3, the search has been continued through four successive steps to the level of circuit boards. The number of steps to be gone through varies depending on the matter at hand and the number of steps required in each practical case. In the case illustrated in Fig. 3, the search has already advanced to the last step, so the figure does not show the actual link lists obtained in the intermediate steps, but only the links 4 of different hierarchical levels which have been selected from the lists. The form 3 additionally comprises a keyword search option, which can be used to advance directly to a desired area of expertise, e.g. circuit boards, by typing a keyword in the keyword search box.

Once the final situation in form 3 as shown in Fig. 3 has been reached, the next step is form 5, which contains criteria 6 of the area of expertise selected by the above-mentioned hierarchical procedure, pre-defined and presented in the language originally selected by the user. Having selected the criteria 6 in form 5, the user clicks the search button in the form, whereupon, based on the conditions defined, the system will find the optimal companies and organizations for the purpose in question. On a search result form 7 generated by the system, the companies best matching the search are presented in order of quality 8 according to a ranking list, depending on how many of the desired criteria each company meets. Each company is represented by a company link 9, and clicking this link opens a company/organization profile 11 describing the enterprise in question, which profile is included in the system and which has been stored by the respective candidate on the service server of the system

via his own Internet connection. The company/organization profile 11 further contains a link 12 to the company's own home page 15, which is located on the company's own server or on another server and which gives a more detailed description of the company.

The search result form 7 also contains subject-specific links 10 to sales advertisements 13 prepared and sent via an Internet connection to the service server by the companies themselves and containing more detailed information about the responses found on the basis of the inquiry criteria. Correspondingly, the sales advertisement form 13 contains a link 14 to a web page 16 on the company's own server or on another server which contains more information about the subject presented in the sales advertisement.

Both the company/organization profile 11 and the sales advertisements 13 are filled in during a real-time Internet connection to the service server, which contains the required means, such as technical solutions, for the information to be fed into the system, processed and stored.

It is obvious to the person skilled in the art that the invention is not restricted to the examples described above but that it may instead be varied in the scope of the claims presented below.

CLAIMS

1. System for the management of geographically scattered inquiry and response information of a large extent in respect of content in a globally operated search process utilizing a public or private data network, such as the Internet or equivalent, in which the input data to be processed consists of inquiry and response information (2, 4, 6) defined in respect of structure and content and expressed in the form of selected criteria, said information being supplied from one or more terminal units with pre-defined or free access rights into a globally operated system, from where the said input information representing demand and supply can be read and updated via any terminal unit in the public or private data network with limited or free access rights, **characterized** in that the said input information representing supply and demand is organized in a hierarchical and modeled manner so that input information in different languages with the same meaning only corresponds to a single code data item used in the system.

2. System according to claim 1, **characterized** in that the evaluation of the search result (7) obtained is performed using subject-specific links (9, 10, 12, 14) comprised in the system and related to each item of evaluation, said links being arranged to open the appropriate places on the home pages of the organizations maintaining the input information.

3. System according to claim 1 or 2, **characterized** in that the system comprises a memory location reserved for each input data item of inquiry and response information (2, 4, 6) and that the system has been equipped to function in such a way that, after the input information has been received from the user's terminal unit into a service server, it is converted into an element in an n-

dimensional table where the address of the memory location of the element is an unambiguous code data item independent of the working language, which code data item has been arranged to be visible in conjunction with searches on each user's terminal unit in a plain form in a language selected by the user.

4. System according to claim 1, 2 or 3, **characterized** in that, when a need for it appears, the service server of the system is updated with new evaluation criteria and input information (2, 4, 6) in a centralized manner on the basis of suggestions made by the users, adding to the system a code data item indicating the address.

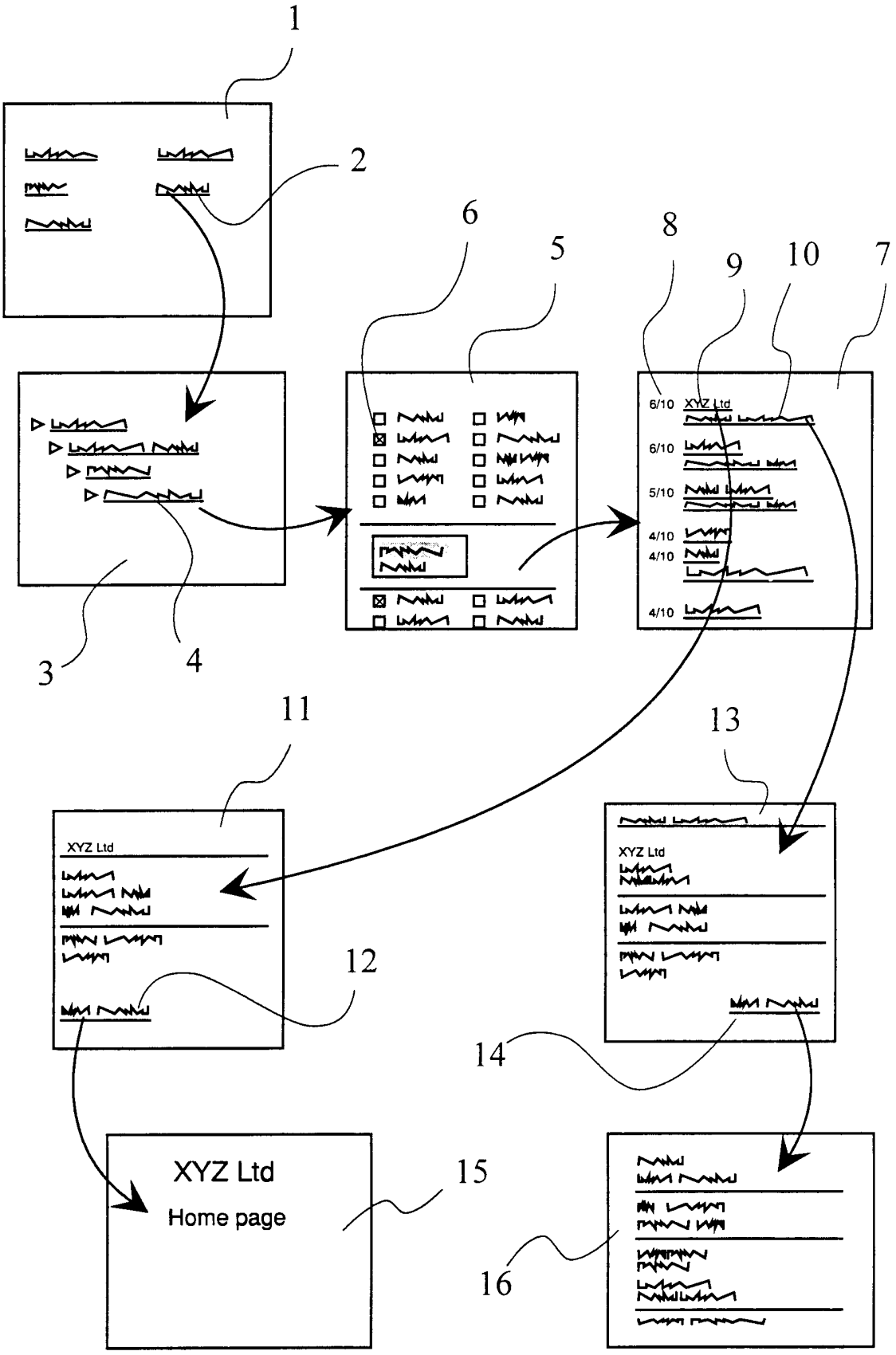

1
2
6
5
8
9
10
7
3
4
11
13
12
14
15
16
XYZ Ltd
Home page
6/10
6/10
5/10
4/10
4/10
4/10

Fig. 1

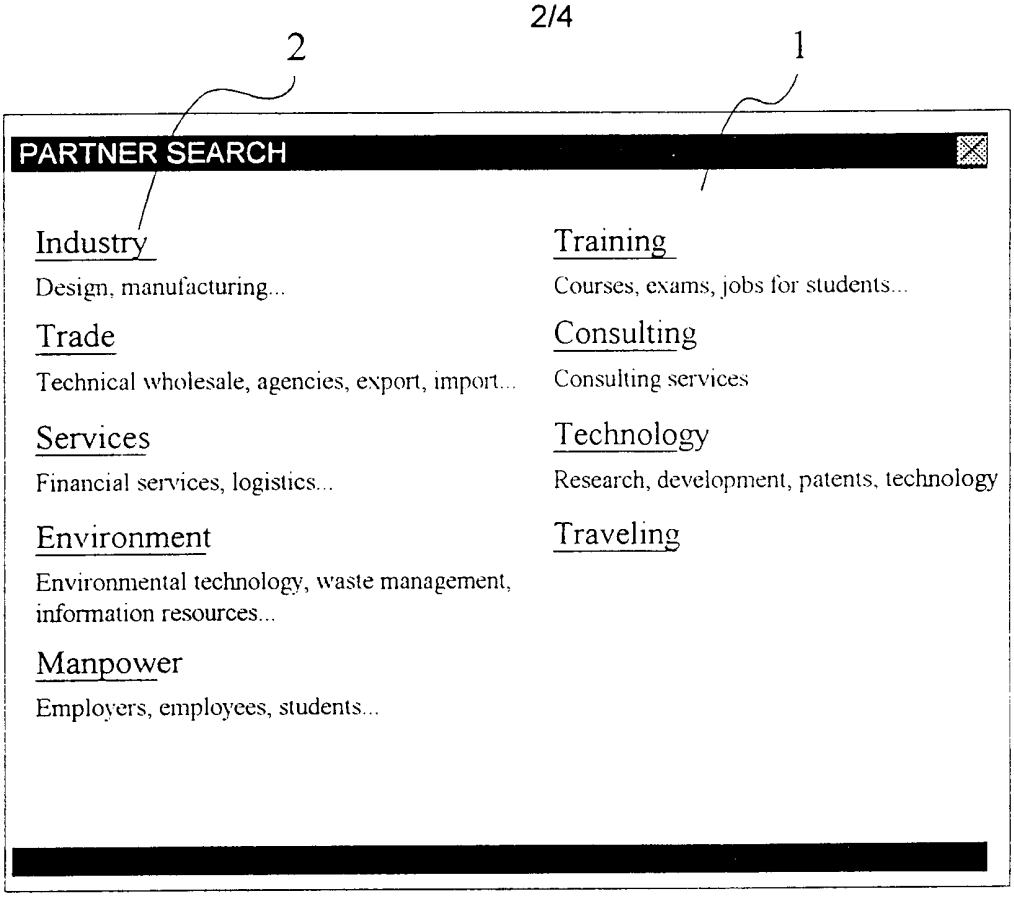

2
1
PARTNER SEARCH
Industry
Design, manufacturing...
Trade
Technical wholesale, agencies, export, import...
Services
Financial services, logistics...
Environment
Environmental technology, waste management, information resources...
Manpower
Employers, employees, students...
Training
Courses, exams, jobs for students...
Consulting
Consulting services
Technology
Research, development, patents, technology
Traveling

Fig. 2

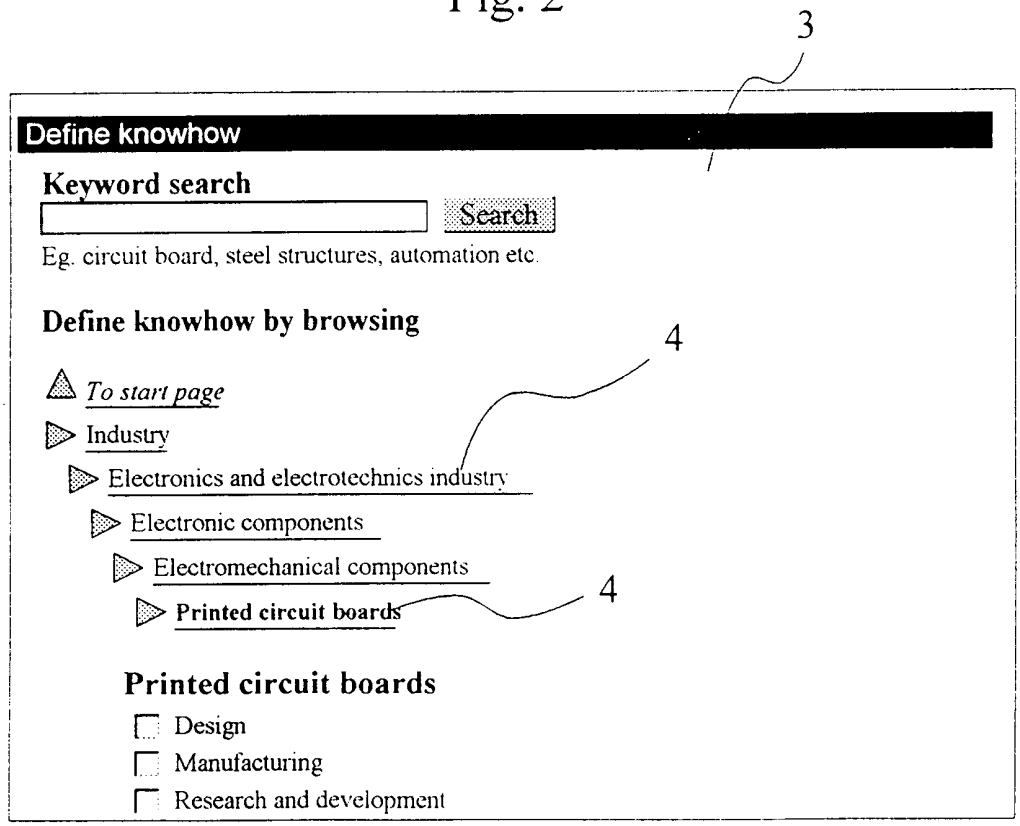

3
Define knowhow
Keyword search
Search
Eg. circuit board, steel structures, automation etc.
Define knowhow by browsing
4
To start page
Industry
Electronics and electrotechnics industry
Electronic components
Electromechanical components
Printed circuit boards
4
Printed circuit boards
Design
Manufacturing
Research and development

Fig. 3

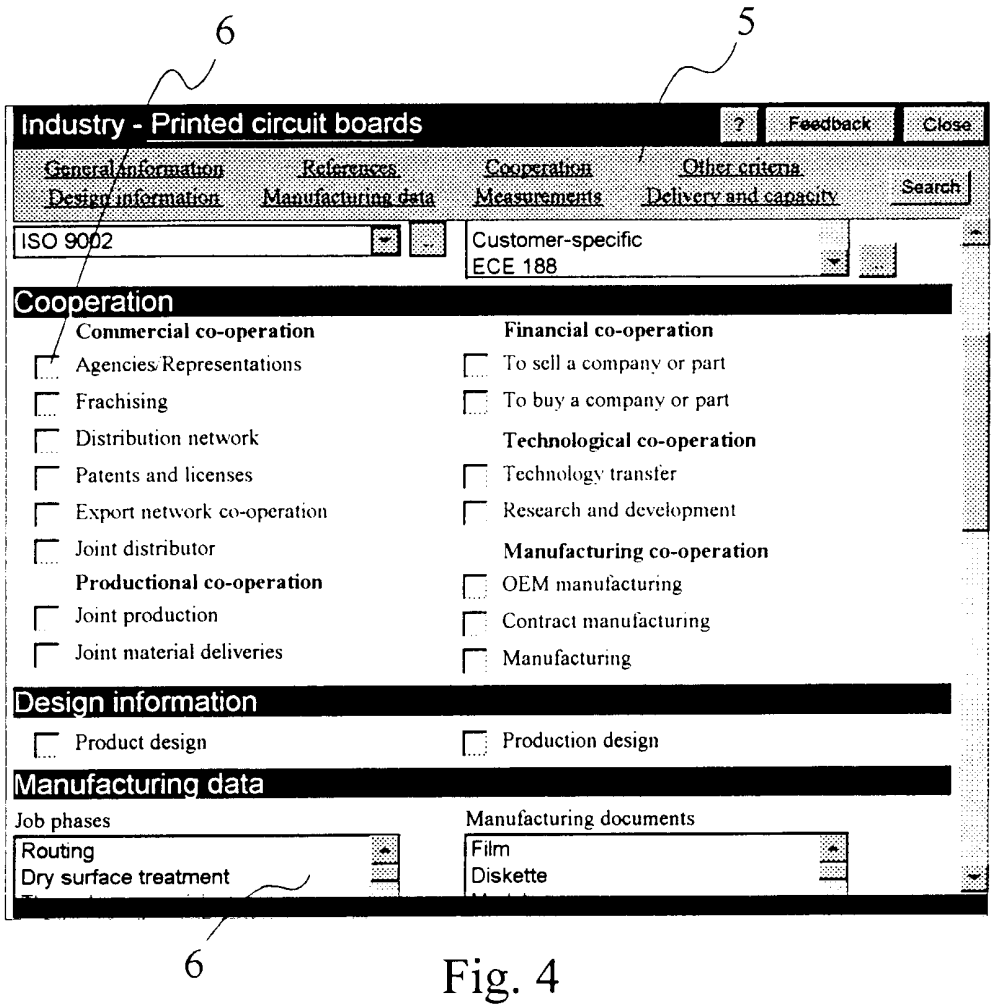

6
5
Industry - Printed circuit boards
?
Feedback
Close
General information
Design information
References
Manufacturing data
Cooperation
Measurements
Other criteria
Delivery and capacity
Search
ISO 9002
Customer-specific
ECE 188
Cooperation
Commercial co-operation
Agencies/Representations
Frachising
Distribution network
Patents and licenses
Export network co-operation
Joint distributor
Productional co-operation
Joint production
Joint material deliveries
Financial co-operation
To sell a company or part
To buy a company or part
Technological co-operation
Technology transfer
Research and development
Manufacturing co-operation
OEM manufacturing
Contract manufacturing
Manufacturing
Design information
Product design
Production design
Manufacturing data
Job phases
Routing
Dry surface treatment
Manufacturing documents
Film
Diskette
6

Fig. 4

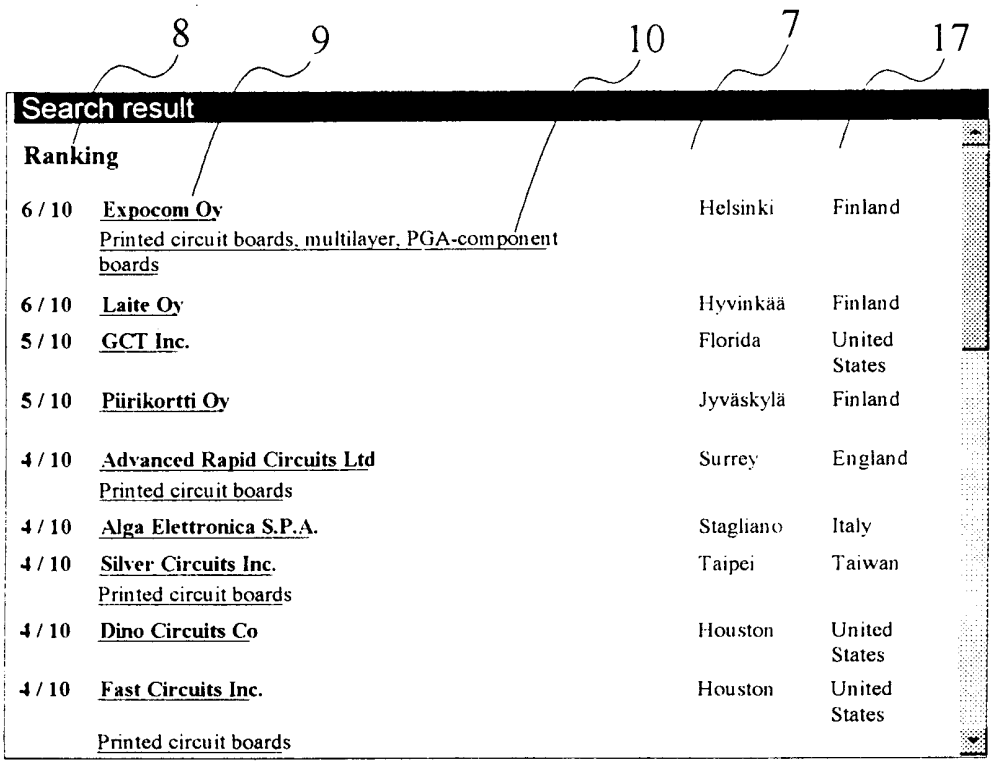
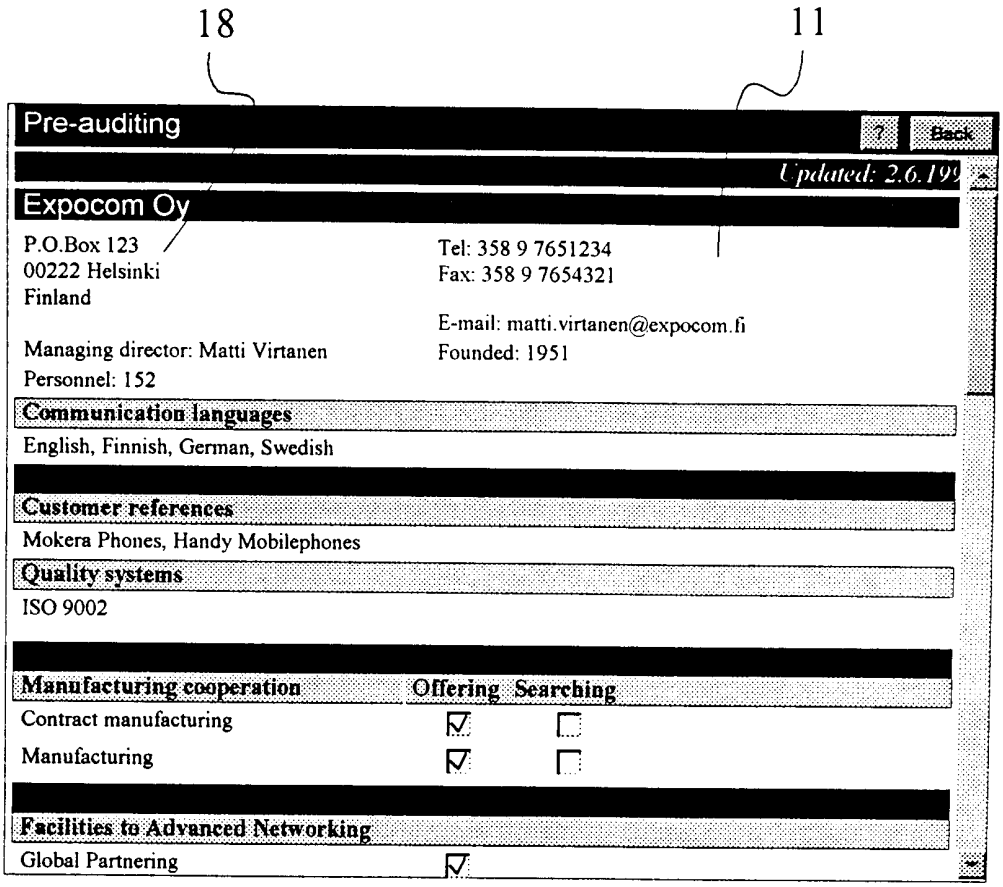

8
9
10
7
17
Search result
Ranking
6 / 10 Expocom Oy Helsinki Finland
Printed circuit boards, multilayer, PGA-component boards
6 / 10 Laite Oy Hyvinkää Finland
5 / 10 GCT Inc. Florida United States
5 / 10 Piirikortti Oy Jyväskylä Finland
4 / 10 Advanced Rapid Circuits Ltd Surrey England
Printed circuit boards
4 / 10 Alga Elettronica S.P.A. Stagliano Italy
4 / 10 Silver Circuits Inc. Taipei Taiwan
Printed circuit boards
4 / 10 Dino Circuits Co Houston United States
4 / 10 Fast Circuits Inc. Houston United States
Printed circuit boards

Fig. 5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11
Pre-auditing
?
Back
Updated: 2.6.199
Expocom Oy
P.O.Box 123
00222 Helsinki
Finland
Tel: 358 9 7651234
Fax: 358 9 7654321
E-mail: matti.virtanen@expocom.fi
Managing director: Matti Virtanen
Founded: 1951
Personnel: 152
Communication languages
English, Finnish, German, Swedish
Customer references
Mokera Phones, Handy Mobilephones
Quality systems
ISO 9002
Manufacturing cooperation
Offering
Searching
Contract manufacturing
Manufacturing
Facilities to Advanced Networking
Global Partnering

Fig. 6

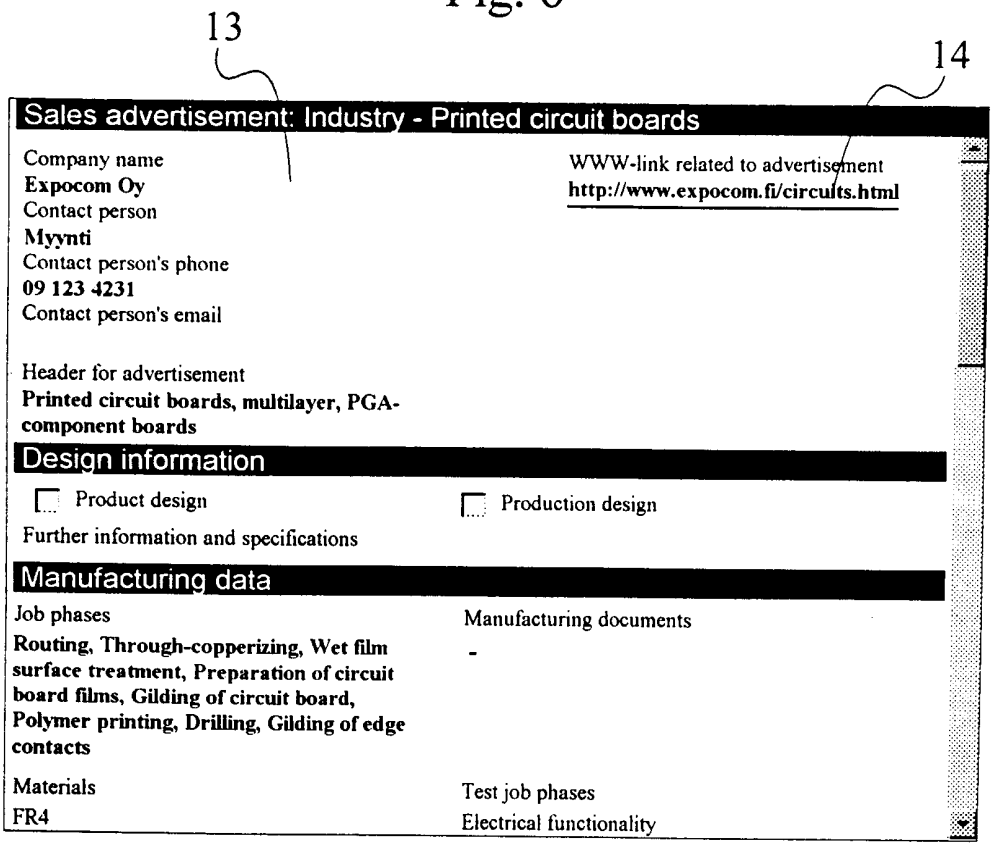
13
14
Sales advertisement: Industry - Printed circuit boards
Company name
Expocom Oy
Contact person
Myynti
Contact person's phone
09 123 4231
Contact person's email
WWW-link related to advertisement
http://www.expocom.fi/circuits.html
Header for advertisement
Printed circuit boards, multilayer, PGA-component boards
Design information
Product design
Production design
Further information and specifications
Manufacturing data
Job phases
Routing, Through-copperizing, Wet film surface treatment, Preparation of circuit board films, Gilding of circuit board, Polymer printing, Drilling, Gilding of edge contacts
Manufacturing documents
-
Materials
FR4
Test job phases
Electrical functionality

Fig. 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI 00/00588

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: G06F 17/30, G06F 17/22
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: G06F

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CA 2209265 A1 (THE COMPUTER GROUP, INC.), 27 August 1998 (27.08.98), page 2, line 31 - page 9, line 17; page 27, line 27 - page 29, line 10 --	1-4
Y	EP 0668558 A1 (SUN MICROSYSTEMS, INC.), 23 August 1995 (23.08.95), column 3, line 9 - column 4, line 28; column 9, line 18 - column 10, line 14; column 17, line 37 - line 55, figure 21 --	1-4

[X] Further documents are listed in the continuation of Box C. [X] 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
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Date of the actual completion of the international search	Date of mailing of the international search report
24 October 2000	24. 11. 2000
Name and mailing address of the ISA/ European Patent Office Facsimile No.	Authorized officer Erik Veillàs/LR Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI 00/00588

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 9612238 A1 (DANISH INTERNATIONAL, INC.), 25 April 1996 (25.04.96), page 5, line 1 - page 6, line 6; page 13, line 12 - page 15, line 11; page 21, line 18 - line 27, page 28, line 12 - page 29, line20; see figure 16	1-4
A	US 5857184 A (LYNCH, JO), 5 January 1999 (05.01.99), column 3, line 51 - column 4, line 13; column 4, line 50 - column 8, line 42; column 10, line 18 - column 13, line 51	1-4
A	WO 9708604 A2 (SYRACUSE UNIVERSITY), 6 March 1997 (06.03.97), column 2, line 10 - column 3, line 11, figure 5	1-4
A	US 5732274 A (O'NEILL, MAUREEN), 24 March 1998 (24.03.98), column 3, line 59 - line 67; column 4, line 56 - line 57; column 7, line 1 - column 8, line 47	1-4

INTERNATIONAL SEARCH REPORT

03/10/00

International application No.
PCT/FI 00/00588

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