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(71) Applicant: **Parking Partners Ltd.**
Blanchardstown, Dublin 15 (IE)

(72) Inventor: **DEN HOLLANDER, Kees**
Dublin 15 (IE)

(74) Representative: **Jorritsma, Ruurd et al**
Nederlandsch Octrooibureau
Scheveningseweg 82
P.O. Box 29720
2502 LS Den Haag (NL)

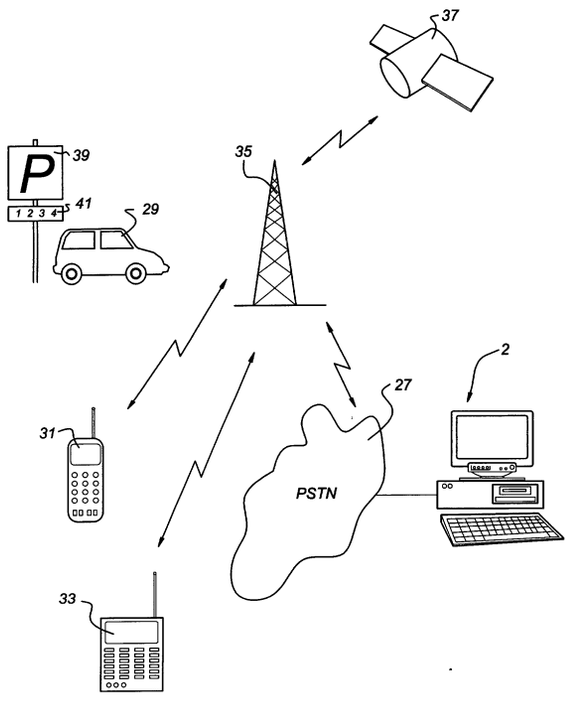
(54) Parking system with general parking permits in combination with parking payment

(57) A parking fee system with a computer arrangement (2) having a processor (1) connected to memory (5, 7, 9, 11) having stored therein a first database comprising:

- parking information related to a parking starting time of at least one vehicle (29);
- parking location information of said vehicle (29);

the processor being arranged to calculate from said parking information and said parking location information a parking fee to be charged to a driver of said vehicle (29) in accordance with predefined calculation rules; the computer arrangement (2) is also arranged to store information as to vehicles having a general parking permit for one or more specified parking zones in a second database, and to check both the first and second databases when an attendant contacts said computer arrangement (2) to check whether a vehicle as specified is allowed to park in a parking zone as specified.

Fig 1



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Description

Field of the invention

[0001] The present invention relates to a parking fee system allowing a driver to perform a wireless parking payment using a wireless device like a mobile telephone.

Prior art

[0002] In such systems known from the prior art, the parking system sends a warning signal to a control unit of an attendant, who checks whether or not a vehicle specified by the attendant has a valid parking permission, to inform him of the parking status of the vehicle.

Summary of the invention

[0003] There is a need to expand the functionality of such systems since prior art systems do not provide any possibility to store information relating to general parking permits issued to predetermined vehicles. Such general permits are, for instance, necessary for people living in a zone where other people have to pay for parking their vehicles, or for people working in an area where they do not have a reserved parking place and they would have to pay on a daily basis to park their vehicle when coming to work.

[0004] The object of the present invention is solve this problem.

[0005] To that end, the present invention provides a parking fee system comprising a computer arrangement provided with a processor connected to memory having stored therein a first database comprising:

- parking information related to a parking starting time of at least one vehicle;
- parking location information of said vehicle;

the processor being arranged to calculate from said parking information and said parking location information a parking fee to be charged to a driver of said vehicle in accordance with predefined calculation rules,
wherein the computer arrangement is also arranged to store information as to vehicles having a general parking permit for one or more specified parking zones in a second database, and to check both the first and second databases when an attendant contacts said computer arrangement to check whether a vehicle as specified is allowed to park in a parking zone as specified.

Brief description of the drawings

[0006] The invention will be illustrated with reference to some drawings which are only intended to illustrate the invention and not to limit its scope as defined by the accompanying claims.

[0007] Figure 1 shows a general overview of some components used in the present invention.

[0008] Figure 2 shows a more detailed overview of a computer arrangement used in a payment centre.

Description of the preferred embodiment

[0009] The present invention relates to the field of parking by using some kind of telecommunication device. In figure 1, such a device is shown to be a mobile telephone 31. However, as the case may be, any other kind of communication device may be used. E.g., it is sometimes possible to use a fixed telephone to provide necessary instructions.

[0010] Figure 1 shows a car 29 that a driver wishes to park on a desired location for which he has to pay a certain amount of money or for which he needs a parking permit.

[0011] Figure 1 also shows a telecommunication mast 35 provided with suitable antenna means to communicate with the mobile telephone 31 and a control unit 33 to be operated by a parking attendant. Through the mast 35 or via other suitable means the mobile telephone 31 and the control unit 33 can communicate with a computer arrangement 2 of a parking provider, that is connected to a telecommunication network like the Public Switched Telecommunication Network (PSTN) 27. The mobile telephone 31 and the control unit 33 may use a GSM or other similar network. Some communications may be routed through a satellite 37 if required.

[0012] Parking may be done on a location provided with a parking sign 39 with a parking zone number 41 expressly shown to the public.

[0013] The control unit 33 may be arranged such that the attendant when checking whether or a parked vehicle 29 has a permit or has been paid for parking by inputting the number plate value in his control unit 33, for instance, by means of suitable input keys. However, the control unit may, alternatively, be provided with automatic reading means for reading the number plate and then transmitting the number plate value to the computer 2. Instead of using the number plate use may be made of a number or other identification that is linked to the vehicle concerned and that is shown on a separate plate or sheet of paper, or the like, behind one of the car windows and that can be automatically read by the control unit 33. To that end, a bar code or other code can be used. However, such a number may also be in a form legible for the attendant. All this is prior art and not essential to the present invention.

[0014] In figure 2, an overview is given of a computer arrangement that can be used to implement the computer 2. The arrangement comprises a processor 1 for carrying out arithmetic operations.

[0015] The processor 1 is connected to a plurality of memory components, including a hard disk 5, Read Only Memory (ROM) 7, Electrically Erasable Programmable Read Only Memory (EEPROM) 9, and Random Ac-

cess Memory (RAM) 11. Not all of these memory types need necessarily be provided. Moreover, these memory components need not be located physically close to the processor 1 but may be located remote from the processor 1.

[0016] The processor 1 is also connected to means for inputting instructions, data etc. by a user, like a keyboard 13, and a mouse 15. Other input means, such as a touch screen, a track ball and/or a voice converter, known to persons skilled in the art may be provided too.

[0017] A reading unit 17 connected to the processor 1 is provided. The reading unit 17 is arranged to read data from and possibly write data on a data carrier like a floppy disk 19 or a CDROM 21. Other data carriers may be tapes, DVD, etc,. as is known to persons skilled in the art.

[0018] The processor 1 is also connected to a printer 23 for printing output data on paper, as well as to a display 3, for instance, a monitor or LCD (Liquid Crystal Display) screen, or any other type of display known to persons skilled in the art.

[0019] The processor 1 may be connected to a communication network 27, for instance, the Public Switched Telephone Network (PSTN), a Local Area Network (LAN), a Wide Area Network (WAN), etc. by means of I/O means 25. Connection to network 27 may be physical or wireless. The processor 1 may be arranged to communicate with other communication arrangements through the network 27.

[0020] The processor 1 may be implemented as stand alone system, or as a plurality of parallel operating processors each arranged to carry out subtasks of a larger computer program, or as one or more main processors with several subprocessors. Parts of the functionality of the invention may even be carried out by remote processors communicating with processor 1 through the network 27.

[0021] Now, a brief description of the functionality of the system shown in figures 1 and 2 is given.

[0022] A driver desiring to park his vehicle in a location where he has to pay calls the computer 2 by means of his mobile telephone 31. This call may be set up in any known way. The mobile telephone may e.g. have the telephone number of the computer 2 prestored in his memory (not shown). In one embodiment, he enters his own telephone number, the vehicle number (e.g. the number plate or a number shown on a separate plate behind a car window) and a parking zone number.

[0023] However, alternatively, the driver only enters the parking zone number. Then, the computer 2 is arranged to identify the calling driver automatically, e.g., by a Calling Line Identification method. The registration number of the vehicle is then already linked to the telephone number of the calling driver in the memory of the computer 2. Such an automatic system has the advantage of requiring less data to be sent by the driver, however, has the disadvantage of inflexibility since it cannot be used by the driver driving another vehicle than his own.

[0024] The time of calling by the driver is the starting time of the parking. When the driver wishes to end the parking time he simply calls the computer 2 again and parking will be terminated automatically. So, the computer can automatically calculate the parking fee in accordance with predetermined rules. For instance, the first hour may be much cheaper than later hours or vice-versa. The computer 2 is arranged to bill the driver for his parking through his telephone bill. To that end, the computer is arranged to, through network 27, automatically contact a computer system (not shown) of the telecommunication provider associated with the mobile telephone 31. Billing may also be done via a bank account after the computer 2 has contacted a bank computer (not shown) via a procedure known by persons skilled in the art.

[0025] When the attendant comes to check whether the vehicle 29 has a valid permission to be parked on the parking location he may read the vehicle's number plate (or other code related to the car) and key this, possibly with a parking zone number, into his control unit 33. As clarified above, he may also use an automatic way of reading the vehicle's information from the vehicle if his control unit 33 provides such functionality. The attendant then transmits this information together with the zone number, if any, to the computer 2 that automatically checks whether the vehicle is allowed to be parked on this parking location.

[0026] If the vehicle is not allowed to be parked there the parking attendant may issue a parking fine. Alternatively, the attendant may issue a parking ticket for a predetermined time period, the ticket being provided with information to the driver of how to pay the fee for this ticket.

[0027] The attendant may be warn of the valid or invalid vehicle's permission to park by means of indication means on the control unit 33, for instance, a red lamp showing that permission is invalid and a green lamp showing a valid permission.

[0028] Optionally, in order to protect the system either one or both the driver and the attendant may need a personal identification number to get access to the computer 2.

[0029] The telecommunication explained above may, if and where required, use the Internet, SMS messages, and other way of modern telecommunication like the Wireless Application Protocol (WAP) or other protocol with similar functionality.

[0030] Although in the system shown in figure 1 use is made of a mobile telephone 31, alternatively, a terminal fixed to the vehicle and having the same or similar functionality may be used.

[0031] Instead of using parking zones with zone numbers expressly indicated on signs at the location of parking, modern ways of locating the vehicle can be used. For instance, techniques to automatically locate a mobile telephone can be used, like using the Home Loca-

tion Register - HLR, Visitor Location Register - VLR, of the mobile telephone network. Alternatively, the vehicle may be provided with a GPS system for automatic traffic guidance. Then, the GPS system can also be used for the automatic parking method.

[0032] In accordance with the invention, the computer arrangement supports both parking permits and paid parking. Here, "parking permit" refers to a mechanism where the driver has a general permission to park his vehicle in one or more predetermined parking zones for which he has paid (or not paid) a predetermined amount of money in advance. He has, for instance, paid one year in advance and within that year he does not have to log in on the computer arrangement 2 to obtain a valid permission to park his vehicle. Such a general permission may, for instance, advantageously be used for drivers living in a city zone where people not living there have to pay for any parking. It can also be used for zones in the vicinity of working locations of people.

[0033] Parking permits may be obtained via a wireless connection between a driver's mobile telephone 31 and a parking permit system. Alternatively, the parking permits may have been granted upon a written request or a telephone request made with a standard fixed telephone. The parking permit is stored in a separate databank of the parking permit system. The parking permit system may be the same as the one shown in figure 1. However, the additional functionality may also be provided with another computer arrangement (not shown), e.g., also connected to the network 27.

[0034] Then, when an attendant wishes to verify if a vehicle has an associated valid parking payment by sending the vehicle's identification code to the computer arrangement 2, the computer arrangement 2 must not only search a central database stored in its memory for a valid payment, but also any other relevant parking databases, including the wireless parking permit system central database. The parking permit system central database may be stored in the memory of computer arrangement 2 but may, alternatively, be stored in the memory of another computer that can be contacted by computer arrangement 2, e.g., via network 27.

[0035] In an embodiment, a grace period for a parking permit may be provided or parking tickets may be retrospectively issued.

[0036] In such an embodiment, a motorist applies for a parking permit using the parking permit system. A temporary permit is automatically generated for this motorist for the duration of a pre-determined grace period, e.g., a month. Within this grace period, the motorist must supply the issuing authority with relevant proof or documentation pertaining to the issuance of this permit. If after this grace period the motorist has not provided sufficient proof or documentation, the temporary parking permit is retrospectively declared invalid. If the motorist's vehicle has been checked for validity of the parking permit by an attendant within this grace period, the motorist is retrospectively issued with parking tickets relevant to that infringement, inclusive of any fine due. This may be done by automatically generating parking debit notes addressed to the motorist, or billing the motorist through his telephone provider or his bank, or any other way known to persons skilled in the art.

Claims

1. A parking fee system comprising a computer arrangement (2) provided with a processor (1) connected to memory (5, 7, 9, 11) having stored therein a first database comprising:

   - parking information related to a parking starting time of at least one vehicle (29);
   - parking location information of said vehicle (29);

   the processor being arranged to calculate from said parking information and said parking location information a parking fee to be charged to a driver of said vehicle (29) in accordance with predefined calculation rules,
   wherein the computer arrangement (2) is also arranged to store information as to vehicles having a general parking permit for one or more specified parking zones in a second database, and to check both the first and second databases when an attendant contacts said computer arrangement (2) to check whether a vehicle as specified is allowed to park in a parking zone as specified.

2. A parking fee system according to claim 1, wherein the computer arrangement (2) is arranged to receive from a user a parking permit request, and to automatically generate a parking permit for a vehicle as specified by said user for a period of grace.

3. A parking fee system according to claim 2, wherein the computer arrangement (2) is arranged to calculate a period of grace of one month.

4. A parking fee system according to claim 2 or 3, wherein the computer arrangement (2) is arranged to retrospectively declare invalid any parking permit issued for a period of grace if it did not receive any validation from an authorized party.

5. A parking fee system according to claim 4, wherein the computer arrangement (2) is arranged to retrospectively issue parking tickets, inclusive of any fine due, to said user.

6. A method of operating of a parking fee system comprising a computer arrangement (2) provided with a processor (1) connected to memory (5, 7, 9, 11) having stored therein a first database comprising:

- parking information related to a parking starting time of at least one vehicle (29);
- parking location information of said vehicle (29);

the method including the step of calculating from said parking information and said parking location information a parking fee to be charged to a driver of said vehicle (29) in accordance with predefined calculation rules,
wherein the method also comprises the steps of storing information as to vehicles having a general parking permit for one or more specified parking zones in a second database, and checking both the first and second databases when an attendant contacts said computer arrangement (2) to check whether a vehicle as specified is allowed to park in a parking zone as specified.

Fig 1

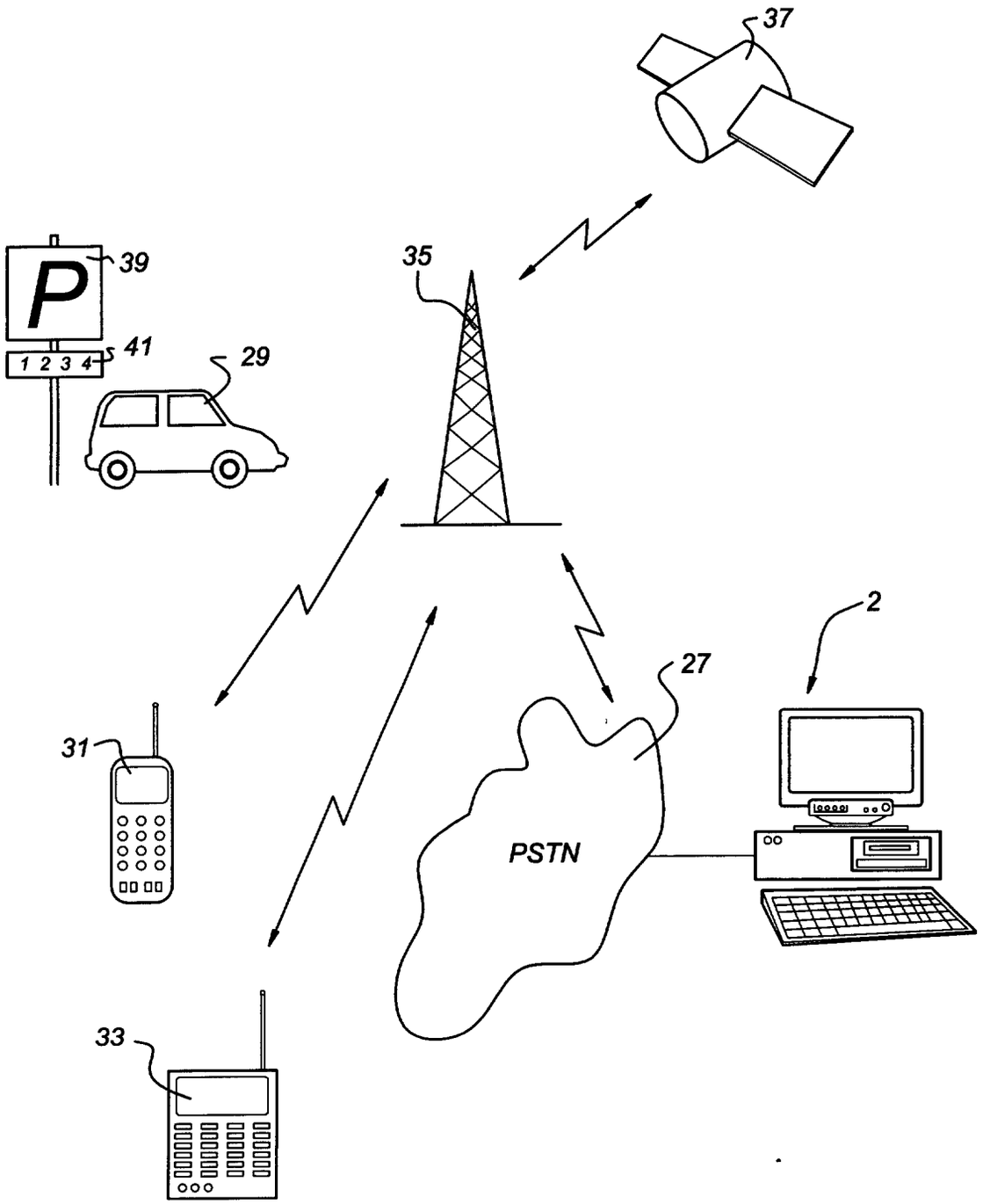
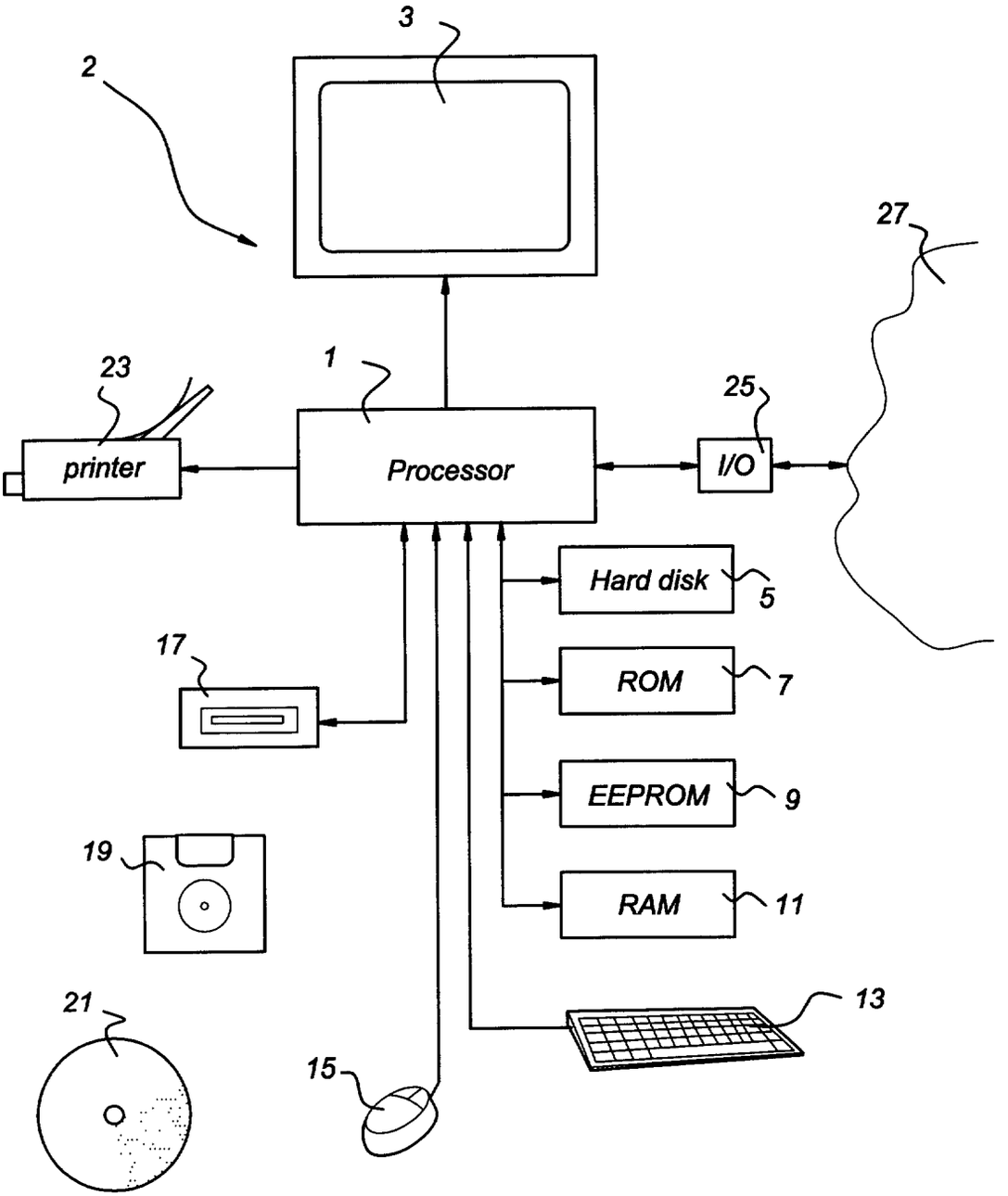


Fig 2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EUROPEAN SEARCH REPORT

Application Number
EP 01 20 0346

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	10 July 2001	Meyl, D

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 01 20 0346

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