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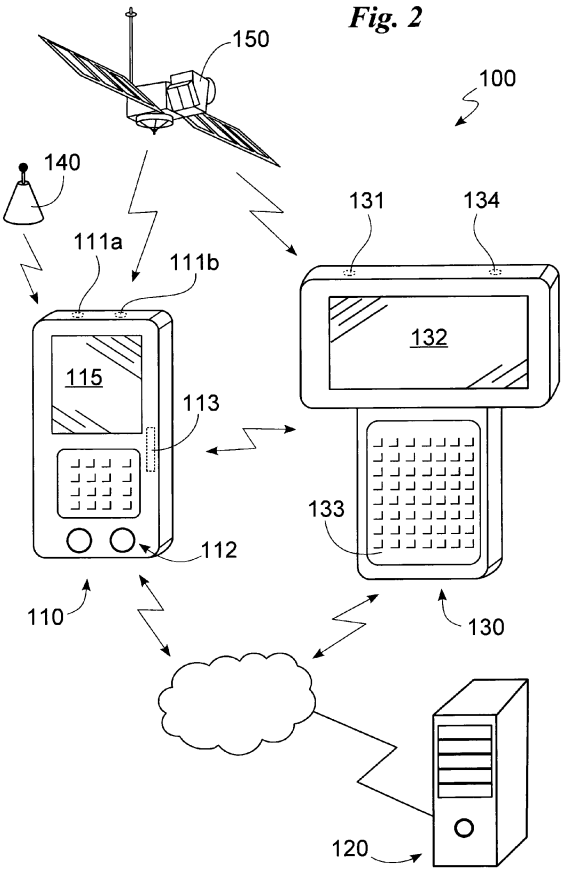
(54) Process for checking and certifying parking times and the like

(57) It is provided a process for checking and certifying parking times and the like through a control apparatus (100) comprising: a signalling device (110) adapted to identify its position and a central processing unit (120) suitable to be connected, for data passage, with the signalling device (110); the process (1) comprising a location step (3) in which the signalling device (110) identifies the parking place, a first-signalling step (2) in which the signalling device (110) sends a parking-start signal to said central processing unit (120), a second-signalling step (5) in which the signalling device (110) sends an end-of-parking signal to the central processing unit (120), a computing step (6) in which the central processing unit (120) establishes the true parking duration and a detection step (7) in which the central processing unit (120) carries out identification of said parking place based on co-ordinates.

Fig. 2



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Description

[0001] The present invention relates to a process for checking and certifying parking times and the like, of the type pointed out in the preamble of the first claim.

[0002] In particular, the process is adapted to be used in paying parking spaces or car parks. It is also usable for verifying a correct accomplishment of a service to which it is not possible to be personally present and for directly controlling carrying out of same. For instance, the process can be used for checking whether a control is carried out during a night supervision or whether a responsible person is really present at the place of his/her competence.

[0003] It is known that a paying parking space is made up of a plurality of parking places for motor-vehicles or the like, each of which is subject to payment of a duty that can have a different value depending on the time duration and the place where parking takes place.

[0004] Presently, there are two types of parking spaces: those that are open or outdoors, i.e. obtained for example in places at the side of a road, and those that are closed or indoors, i.e. obtained within a building. The last-mentioned parking spaces are distinguishable from the others not only due to their location but also for the system of payment.

[0005] Outdoor parking spaces use systems for payment in advance of the stopping time and among them there is the parking meter, the pay and display system or the parking coupon.

[0006] The parking meter is a device placed beside a parking place and into which a money amount is inserted which corresponds to the equivalent amount for the expected stopping time. In particular, once the amount corresponding to the expected stopping time has been inserted, the parking meter carries out a reverse counting of said time.

[0007] The pay and display system utilises a device that, against an advance payment directly proportional to the expected parking duration, emits payment receipts, bills or tickets for example, indicating the hour of the parking end which receipts are to be shown in a visible manner on the car's dashboard.

[0008] In the last-mentioned system of payment the motorist buys a plurality of coupons in advance, each of said coupons corresponding to a given parking time. At the parking moment the motorist, based on the expected parking duration, exposes a given number of coupons,.

[0009] In indoor car parks, there are systems contemplating both a payment in advance for the parking time and a deferred payment in which parking is only paid at the parking end.

[0010] In case of a deferred payment the motorist picks up an entry coupon at the moment he/she accesses the car park and keeps it during the whole parking time. When the motorist is leaving the parking, he/she introduces said coupon into suitable apparatuses that will calculate the amount to be paid based on the parking duration. The motorist therefore pays the due amount and the apparatus issues an exit coupon that will be subsequently introduced into a device adapted to enable the motorist to leave the parking space.

[0011] The above mentioned known art has some important drawbacks.

[0012] In outdoor parking spaces the parking amount is paid in advance and therefore the motorist must quantify the parking duration at the moment he/she parks the car.

[0013] The parking duration is frequently different from the expected one due to hitches or other unforeseen events. In particular, if the true duration exceeds the estimated one, the motorist may incur sanctions or fines; so he/she is obliged to come back to the parking space before the end of the parking time and pay again for extending the parking duration.

[0014] Often, in order to avoid occurrence of the above problem, the car driver overestimates the parking duration and therefore pays for a longer time than the necessary one.

[0015] A further problem is represented by the fact that most of known devices only accept coins, i.e. small-denomination metal money and if the user is devoid of this type of money, he/she is unable to pay.

[0016] Another problem typical of the systems contemplating a deferred payment, is represented by the necessity to keep the entry ticket. In fact, if the user has lost this ticked, he/she is obliged to pay a high fine for getting out of the car park.

[0017] Under this situation, the technical task underlying the present invention is to devise a process for checking and certifying parking times and the like enabling the mentioned drawbacks to be substantially eliminated.

[0018] Within the scope of this technical task it is an important aim of the invention to devise a process allowing the parking time to be quantified in a practical and quick manner.

[0019] A further aim of the process is to enable the payment for parking to be effected in a quick and practical manner.

[0020] Another important aim of the invention is to make available a process that does not require an estimate of the parking duration to be made.

[0021] A further aim of the invention is to devise a process in which the driver is not obliged to have coins at his/her disposal.

[0022] The technical task mentioned and the aims specified are achieved by a process for checking and certifying parking times and the like, as claimed in the appended claim 1.

[0023] Preferred embodiments are highlighted in the sub-claims.

[0024] The features and advantages of the invention are hereinafter clarified by the detailed description of a preferred embodiment of the invention, with reference to the accompanying drawings, in which:

Fig. 1 shows a diagram of the process for checking and certifying parking times and the like, according to the invention; and

Fig. 2 shows an apparatus adapted to be used in the process.

[0025] With reference to the mentioned figures, the process for checking and certifying parking times and the like according to the invention is generally identified by reference numeral 1.

[0026] The invention therefore comprises a new process that, through a suitable control apparatus 100 is adapted to estimate both the parking duration and parking location, i.e. enables identification of the parking place where stopping occurs and how long parking is going to be.

[0027] The checking and certifying process 1 is then adapted to verify the correct execution of a service which the applying person is unable to attend.

[0028] For instance, process 1 allows for checking whether a control is carried out during a night supervision service or whether a worker is really present in the work place. Alternatively, process 1 is used for management and use of paying car parks of both the indoor and outdoor type.

[0029] The control apparatus 100, as shown in Fig. 2, comprises a signalling device 110 adapted to be operated by a user and to identify the position thereof, a central processing unit 120 adapted to be connected for data passage to said signalling device 110 and a checking member 130 adapted to verify the correct execution and the observance of the control and certifying process 1.

[0030] The signalling device 110 has communication tools adapted to identify the position of the device itself and to allow a data exchange with the central processing unit 120 and a push-button panel 112 adapted to allow operation of device 110. In particular, the communication tools comprise at least one antenna 111a adapted to identify the position of device 110, and a second antenna 111b suitable to exchange data with the central processing unit 120. The first antenna 111 a is suitably of the satellite type and detects the device 110 through a satellite-controlled positioning system, i.e. a system adapted to be connected to satellites 150 for identifying its position. In particular, the signalling device 110 identifies its position through a satellite system of the GPS (Global Positioning System) type. In more detail, the satellite connection is of the DGPS (Differential Global Positioning System) type which identifies the position of the signalling device 110 with an error of less than 6 m.

[0031] The DGPS satellite system increases the GPS accuracy due to use of a plurality of differential stations 140 placed in a parking space for example, in places having known co-ordinates, i.e. of which latitude and longitude are known. The signalling device 110, after identifying its position via a GPS system, amends it by comparing it with the position of the closest differential station 140 and the distance between its position and that of said station 110. Alternatively, if the satellite signal does not allow device 110 to detect the parking place, a code identifying the parking place can be inputted through the push-button panel 112.

[0032] The second antenna 111b, belonging to the communication tools, brings the signalling device 110 into communication for data passage with the central processing unit 120 through the ether. By the expression "through the ether" it is intended any communication system adapted to enable a data exchange between two components, device 110 and unit 120, without using cables or physical carriers, but only by means of the radio or the ether. In particular, the expression through the ether in the form of a non-exhaustive example, means a connection of the wireless, GSM, GPRS or UMTS type.

[0033] The device, in order to facilitate the identification operations, can be provided with a recognition means 113 enabling the checking member 130 and the central processing unit 120 to uniquely identify the device. In particular, the recognition means 113 allows identification through an identifying code.

[0034] The recognition means 113 is a device containing the identifying code. Remote access to this device is allowed and the same is able to reply and communicate said identifying code. In detail, the recognition means 113 is a radio frequency instrument. More particularly, it is an RFID and preferably a passive RFID.

[0035] Device 110 containing an identifying code, is adapted to communicate said code to the central processing unit 120 through the communication tools. In addition, the code is adapted to enable payment of the used service, for instance stopping in a parking space. It is therefore connected to a bank current account to enable said account to be directly credited with the due amount. Alternatively, the device can contemplate use of a card and, in particular, a rechargeable card, i.e. a card adapted to enable the central processing unit 120 to instantaneously charge the amount to be paid for the used service.

[0036] In the last-mentioned case the signalling device and in particular the communication tools can comprise a third antenna, not shown in the figures, allowing a first identification of a second card adapted to increase the credit of the aforesaid card. Said third antenna is preferably adapted to emit and receive a radio frequency and the second card is provided with an RFID or other device adapted to interact with said signal.

[0037] This reloading operation can therefore contemplate recognition of the second card owing to the presence of the third antenna and admission of an identifying code of the second card through the push-button panel 112.

[0038] In order to avoid an incorrect availability of the service, the signalling device is adapted to prevent any displacement until it has received a confirmation signal of the correct conclusion of the process. For instance, it is adapted to inhibit a vehicle from moving away from a parking space until a confirmation of payment for parking

has been received. The signalling device 110 is therefore adapted to carry out a detection of a modification of its position through said satellite-based positioning system or, as an alternative, a suitable accelerometer adapted to carry out said detection.

[0039] Finally, the signalling device 110 can be advantageously provided with a screen 115 suitable to allow easy reading of information.

[0040] The central processing unit 120 is adapted to quantify the parking duration and identify the parking place where stopping occurs. It is therefore suitable to process data received from the signalling device 110 through a geographic-placement database in which the co-ordinates of all parking places where stopping can take place are inputted.

[0041] In a preferred embodiment, the geographic-placement database can contain the co-ordinates of all buildings that have to be checked in a night supervision service. In a second preferred example, the geographic-placement database can contain the co-ordinates of the car parks managed through process 1. In the last-mentioned example, the database can advantageously contain other information such as the parking cost per hour and/or the possible time bands during which parking is free.

[0042] The central processing unit 120 therefore consists of a computer or other similar element adapted to transmit and receive data through the ether to and from the signalling device 110 and the checking member 130.

[0043] The checking member 130 adapted to enable the observance of process 1 to be verified, comprises a receiving and transmitting apparatus 131 suitable for connection with the central processing unit 120 and device 110 for data passage, and a screen 132 enabling the controller to quickly control data concerning device 110.

[0044] In particular, the receiving and transmitting apparatus 131 consisting of an antenna for example, is adapted to carry out connection of member 130 for data passage both with the central processing unit 120 and the device 110 through the ether. In particular, if the signalling device 110 is provided with a recognition means 113, the receiving and transmitting apparatus 131 is suitable to communicate with said means 113 in order to identify device 110. This communication takes place due to emission by the receiving and transmitting apparatus 131, of a radio frequency activating the recognition means, the RFID that, in turn, sends a reply signal containing the identifying code of the device.

[0045] Alternatively, this recognition can take place through a suitable keyboard 133 with which the control member 130 can be advantageously provided, said keyboard being adapted to enable manual input of an alphanumeric code such as the vehicle's registration number.

[0046] The checking member 130 can be adapted to identify its position through a satellite-controlled positioning system and therefore is provided with a satellite antenna 134 enabling said identification. In particular, the satellite system used by member 130 is of the GPS type, and more specifically the DGPS type. The checking and certifying process for parking times and the like 1 diagrammatically shown in Fig. 1, comprises a plurality of steps that, for easy understanding, are described hereinafter with reference to the instance of stopping in a paying car park.

[0047] In this particular case, once the vehicle has been parked, a user by operating the signalling device 110 starts the checking and certifying process 1.

[0048] In the first-signalling step 2 a signal of parking start is sent through the signalling device 110 to the central processing unit 120. In particular, through the push-button panel the signalling device 110 receives the command of getting into communication with the central processing unit for sending said start signal.

[0049] In addition, the signalling device 110 is connected with one or more satellites for identifying the co-ordinates of the parking place, i.e. the latitude and longitude of the place where the vehicle is parked.

[0050] Said start signal contains information concerning the activation time of device 110 corresponding to the parking start time, and a code identifying the signalling device 110 enabling the central processing unit 120 to carry out identification thereof.

[0051] At the moment device 110 comes into possession of these co-ordinates, the location step 3 starts during which the signalling device 110 identifies the parking place and preferably sends the central processing unit 120 the co-ordinates identifying the location of the parking place. In particular these co-ordinates are advantageously obtained through the suitably positioned differential stations 140.

[0052] If the signalling device 110 is unable to detect the parking place through the first antenna 111a, a code identifying the parking place is entered through the push-button panel 112 and this code is sent during this step 3.

[0053] The first-signalling step 2 and the location step 3 can be carried out both in series and at least partly in parallel. Preferably, the first-signalling step 2 and location step 3 are performed substantially in parallel, i.e. device 110 sends these data using a single signal.

[0054] When said data have been sent, the central processing unit 120 confirms signal receipt to the signalling device 110 that will emit a confirmation through an audible and/or visual signal.

[0055] During parking a checking step 4 can take place in which an operator, by virtue of the checking member 130, verifies the observance of process 1, i.e. recognises whether a correct use of the service is being done.

[0056] The operator, provided with member 130, identifies device 110 through the recognition means 113. In detail, the checking member 130 sends a signal to said means 113 that, through a radio frequency, transmits a response signal containing the identifying code belonging to the signalling device 110. Alternatively, the operator inputs the identifying code to the checking member 130 that, through connection with the central processing

unit 120, verifies whether the service is being used in a correct manner, i.e. if payment of the parking amount is taking place. Said input of the identifying code can be done through the keyboard 130, by typing in the vehicle's registration number, for example.

[0057] Once the parking period has finished, the second-signalling step 5 begins during which the signalling device 110 sends the central processing unit 120 an end-of-parking signal through the ether, in which signal the end-of-parking time is specified as well as the code identifying the device itself and the location.

[0058] Steps 2, 3 and 5 can be carried out in parallel and device 110 can send all information almost simultaneously, i.e. it can send it in a single signal.

[0059] Upon receipt of the end-of-parking signal, the computing step 6 begins during which the control apparatus 100 states the true parking duration. In particular, the central processing unit 120 searches for the start signal having the same identifying code and, by comparing it with the end-of-parking code establishes the true duration.

[0060] The central processing unit 120 carries out the detection step 7 in which the stopping place is identified, in this case the car park, through a comparison between the co-ordinates sent and those contained in the geographic-placement database. This identification is done by looking up in the database those co-ordinates that are at a lower distance from the co-ordinates sent by the signalling device 110 or including the co-ordinates sent.

[0061] Once the stopping place has been identified, i.e. the car park, the charging step 8 begins in which the central processing unit 120 determines the parking cost based on said identification and true duration.

[0062] In fact, once the stopping place has been identified, the central processing unit 120, due to the previously described data inputted to the database, draws the parking cost per hour belonging to the stopping place where parking has occurred and thus can easily estimate the cost of said parking.

[0063] The checking and certifying process for parking times and the like 1 is completed with a crediting step 9 during which the central processing unit takes the parking cost off a pre-existing credit. For instance, this cost can be taken off a suitable current account or, alternatively, the previously mentioned card. This crediting step 9 comes to an end when the central processing unit 120 sends the device 110 an audible and/or visual signal indicating that the process has been successful.

[0064] Upon receipt of said signal, the signalling device 110 allows the vehicle to be moved from the parking space.

[0065] In another preferred example the process can be used for checking the correct execution of a night supervision service.

[0066] In this case the user, i.e. the caretaker or supervisor, uses the signalling device 110 advantageously keeping it always active. In particular, in order to speed up the search for the parking co-ordinates, the satellite-controlled positioning system is maintained always active.

[0067] On coming close to the building to be controlled, the first-signalling step 2 and the location step 3 are carried out substantially in parallel, i.e. device 110 sends the central processing unit 120 the start signal and, simultaneously, the parking co-ordinates.

[0068] At the end of supervision the second-signalling step 5 is carried out and the signalling device 110 sends the end signal indicating the hour of end of the control.

[0069] The central processing unit 120 after receiving the above communications identifies which was the supervised place among those to be controlled, as well as the supervision duration.

[0070] When the supervision service has been completed, unit 120 stores all controlled places and the control duration at each place.

[0071] The invention enables important advantages to be achieved.

[0072] In fact, the device allows an exact quantification of a parking duration and the parking place to be automatically identified.

[0073] Another advantage is represented by the highly practical use of the device. In particular, this practical use is ensured by the very simple operations required and the mode of payment. In fact, payment is carried out in an automatic manner by withdrawal of the amount from a preloaded current account and crediting of same on the current account of the person offering the service.

[0074] A further advantage resides in that in process 1 a quantification in advance of the parking duration or the provision of coins for payment is not required.

[0075] Another important advantage is represented by the possibility of checking the correct execution of a service, such as that of a night supervision or the presence of a responsible person at a given place, without being required to be physically present therein.

[0076] In addition, the process can ensure an easy management. In fact the checking member 130 allows the correct application of the process to be verified in a simple and quick manner.

[0077] The invention is susceptible of variations all falling within the scope of the inventive idea. All of the details can be replaced by equivalent elements and the materials, shapes and sizes can be of any nature and magnitude.

Claims

1. A process for checking and certifying parking times and the like through a control apparatus (100) comprising a signalling device (110) adapted to identify its position; a central processing unit (120) suitable to be in connection, for data passage, with said signalling device (110); said process (1) being **characterised in that** it comprises a locating step (3) in which said signalling device (110) identifies said

parking place, a first-signalling step (2) in which said signalling device (110) sends a parking-start signal to said central processing unit (120), a second-signalling step (5) in which said signalling device (110) sends an end-of-parking signal to said central processing unit (120), a computing step (6) in which said central processing unit (120) establishes the true duration of said parking and a detection step (7) in which said central processing unit (120) carries out identification of said working place based on coordinates.

2. A process (1) as claimed in claim 1, wherein said first-signalling step (2) and location step (3) are performed substantially in parallel.

3. A process (1) as claimed in one or more of the preceding claims, wherein said start signal and end signal include a code identifying said signalling device (110).

4. A process (1) as claimed in one or more of the preceding claims, wherein said process (1) comprises a charging step (8) in which said central processing unit (120) determines the cost of said parking based on said identification and true duration.

5. A process as claimed in one or more of the preceding claims, comprising a checking step (4) adapted to verify the correct execution of said process (1) and wherein in said checking step (4) a checking member (130) is used which is adapted to carry out an identification of said signalling device (110) and communicate with said central processing unit (120) and said device (110).

6. A process (1) as claimed in claim 5, wherein said signalling device (110) comprises a recognition means (113) adapted to enable said checking member (130) to carry out said identification.

7. A process (1) as claimed in claim 6, wherein said recognition means (113) is an RFID.

8. A process (1) as claimed in one or more of the preceding claims, wherein said signalling device (110) operates through a satellite-controlled positioning system.

9. A process (1) as claimed in the preceding claim, wherein said satellite-controlled positioning system is selectively selected from a GPS system and a DGPS system.

10. A process (1) as claimed in one or more of the preceding claims, wherein said connection for data passage between said signalling device (110) and central processing unit (120) takes place through the ether.

11. A process (1) as claimed in claim 10, wherein said connection for data passage selectively takes place through a GSM network, GPRS network and UMTS network.

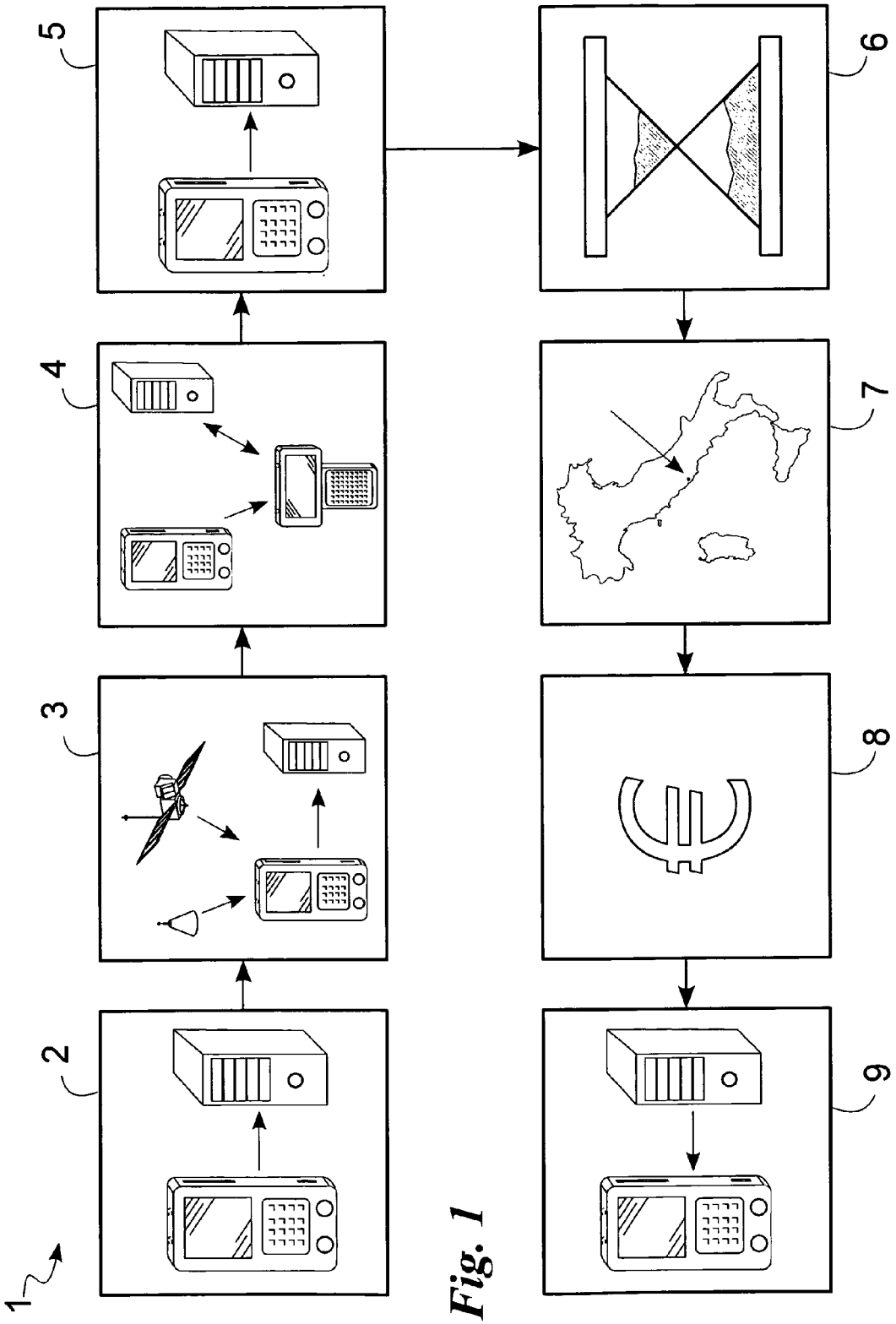
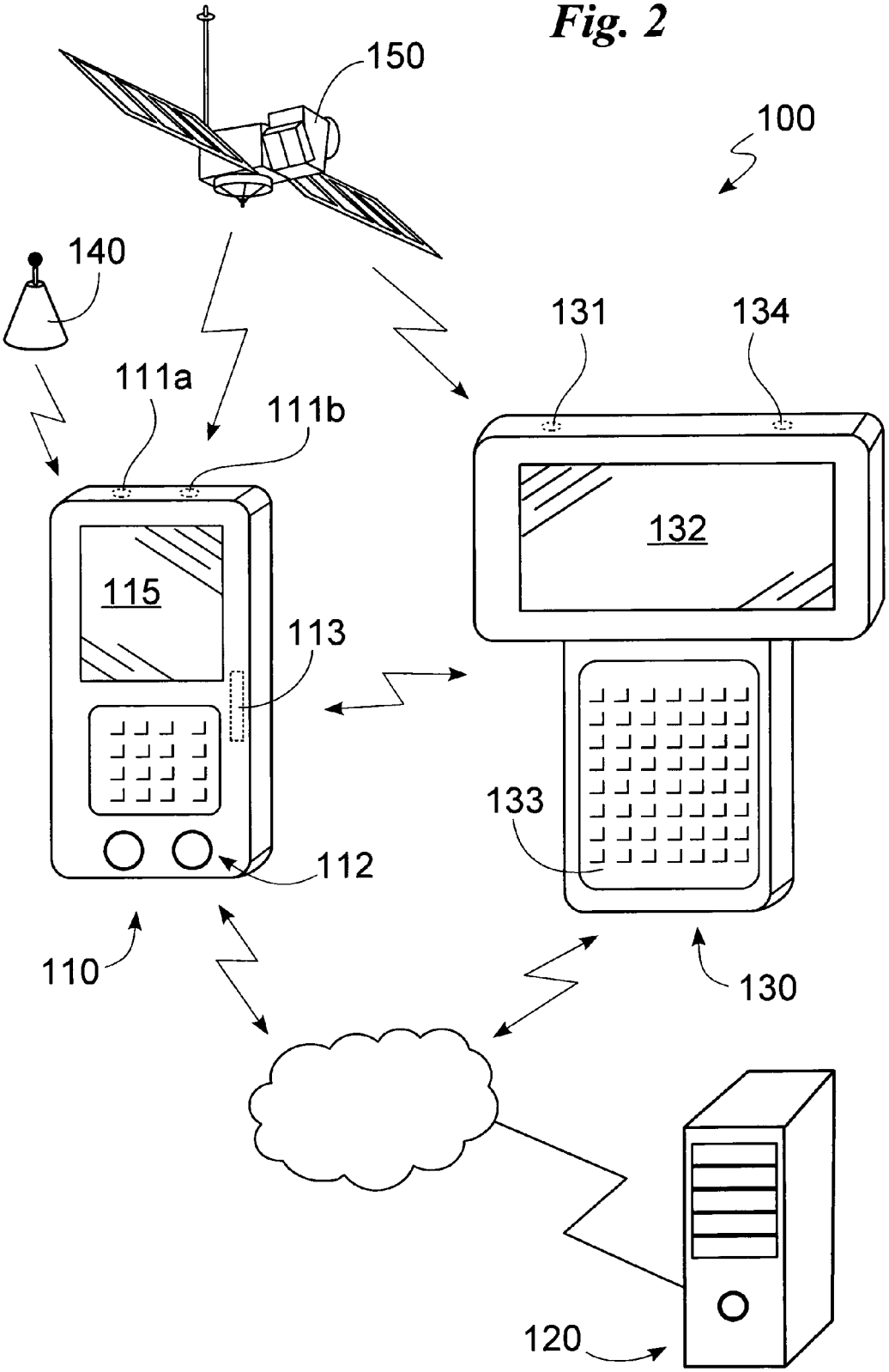


Fig. 1

Fig. 2



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EUROPEAN SEARCH REPORT

Application Number
EP 10 42 5177

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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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	11 October 2010	Pañeda Fernández, J

CATEGORY OF CITED DOCUMENTS

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