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(54) AUTOMATIC DISPENSING DEVICE FOR RECHARGEABLE BATTERIES FOR ELECTRIC CARS

(57) A vending machine (1) for rechargeable batteries (3, 5) for electric cars is described, comprising: a control means (9) of the vending machine (1); a plurality of housings (7) designed to contain at least one charged battery (3) and/or at least one discharged battery (5); a charging system designed to recharge the discharged battery (5); and a distributor element of the charged battery (3).

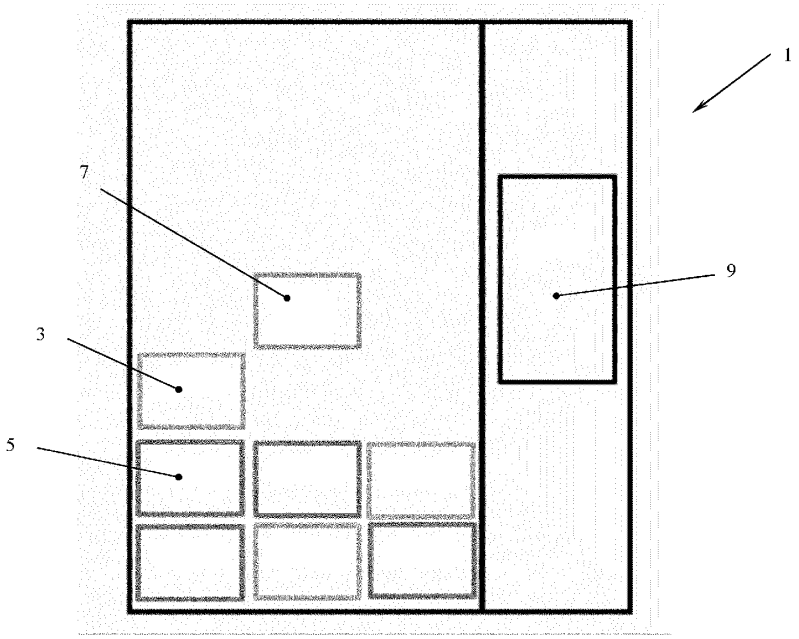

FIG. 1

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Description

[0001] The present invention relates to an automatic dispenser device for rechargeable batteries for electric cars.

[0002] As is known, current recharging systems for electric cars are distributors, similar to those for petrol, installed by creating special parking areas for electric cars.

[0003] These known recharging systems, in addition to the space occupied by the single column and by the adjacent parking spaces reserved for the electric cars which need to be recharged, require time for recharging the batteries.

[0004] Furthermore, electric cars must be constantly connected to charging systems during the process.

[0005] Object of the present invention is solving the aforementioned prior art problems, providing an automatic distributor device for rechargeable batteries for electric cars which can eliminate the waiting times for charging the batteries of the electric car, for all those journeys where the electric autonomy is insufficient, for long distance journeys or in all those cases where it is necessary to have an additional electric autonomy.

[0006] Another object of the present invention is providing an automatic dispenser device for rechargeable batteries for electric cars which takes up little space on the road, eliminating parking spaces reserved for electric cars.

[0007] If we consider that all petrol stations will disappear due to the change from fuel to electric motor, the present idea will allow them to be reconverted, so that they "supply" batteries instead of petrol.

[0008] Furthermore, a vending machine will be able to dispense the batteries during the closing period as is the case today with self-service devices.

[0009] The above and other objects and advantages of the invention, as will appear from the following description, are achieved with an automatic vending device such as the one described in claim 1. Preferred embodiments and non-trivial variants of the present invention form the subject matter of the dependent claims.

[0010] It is understood that all attached claims form an integral part of the present description.

[0011] It will be immediately obvious that innumerable variations and modifications may be made to what is described (for example relating to shape, dimensions, arrangements and parts with equivalent functionality) without departing from the scope of the invention as appears from the attached claims.

[0012] The present invention will be better described by some preferred embodiments thereof, provided by way of non-limiting example, with reference to the attached drawings, in which the only Figure 1 shows a schematic view of an embodiment of the automatic dispenser device for recharging batteries for electric cars according to the present invention.

[0013] With reference to Figure 1, it can be seen that the vending machine 1 for rechargeable batteries 3, 5 for electric cars of the invention comprises:

- at least one control means 9 of the vending machine 1;
- a plurality of housings 7 designed to contain at least one charged battery 3 and/or at least one discharged battery 5;
- at least one recharging system (not shown) designed to recharge the discharged battery 5; and
- at least one dispensing element (not shown) of a charged battery 3.

[0014] In particular, the batteries 3, 5 must be of the "plug and play" type which is easy to remove and insert into the electric car.

[0015] The replacement of flat batteries 5 in the electric car with others that are already charged 3 can be carried out using a vending machine 1, or a manual device, with or without supervision by an operator, with the function of checking the functionality of the flat battery 5 returned, and delivery for payment or free of charge of a charged battery 3.

[0016] Advantageously, the vending machine 1 according to the present invention then recharges the discharged battery 5 that is returned, to then make it available for the next customer.

[0017] In this way, the batteries 3, 5 no longer become parts of the absolute property of the users of the electric car, but objects made to be replaced, of the delivery and collection type.

[0018] Furthermore, the vending machine 1 is equipped with a system for taking charge of the batteries 3, 5, even of different sizes, with an autonomous recharging system and with a distribution system for the charged batteries 3.

[0019] In particular, the control means 9 can be a system with a display which allows the user to be guided step by step in all the distribution operating steps, and precisely:

- request for the card with the credentials and choice of battery format;
- insertion position of the discharged battery 5 in the acceptance compartment of the vending machine 1;
- check of the life status of the discharged battery 5 and of the residual charge quantity to be deducted;
- payment for picking up a charged battery 3;
- dispensing or position from where to take the charged battery 3.

[0020] Furthermore, in the event that the discharged battery 5 returned is no longer suitable for a subsequent recharge, a new security deposit may be required for a new charged battery 3; the machine will not give the possibility to another user to take the exhausted battery 5.

[0021] Advantageously, the vending machine 1 may have a different format and recharging capacity accord-

ing to the type of electric car for which it will be intended.

[0022] In particular, the vending machine 1 can be connected to Internet and be located by means of a specific application by the user, in order to more quickly find the vending machine 1 closest to one's position.

[0023] The vending machine 1 according to the present invention can be placed in any station, not necessarily supervised, and thus act as a self-service vending machine 1.

[0024] Advantageously, the method for dispensing a battery with the automatic vending machine 1 described above comprises the steps of:

- request for the card with the user's credentials by the vending machine 1;
- choice of battery format by the user;
- insertion of the discharged battery 5 into the slot 7 of the vending machine 1;
- check of the life status of the discharged battery 5 and of the residual charge quantity to be deducted;
- payment for taking a charged battery 3;
- supply of the charged battery 3.

Claims

1. Automatic dispenser device or vending machine (1) for rechargeable batteries (3, 5) for electric car, comprising:

    - at least one control means (9) of said vending machine (1);
    - a plurality of housings (7) designed to contain at least one charged battery (3) and/or at least one discharged battery (5);
    - at least one recharging system designed to recharge said discharged battery (5); and
    - at least one dispensing element of said charged battery (3);

    wherein:

    - said batteries (3, 5) are of the "plug and play" type in order to be easily removed and inserted into said electric cars;
    - a replacement of flat batteries (5) in the electric car with batteries (3) that are already charged is carried out using said vending machine (1), with the function of checking the functionality of the flat battery (5) returned, and delivery for payment or free of charge of a charged battery (3);
    - said control means (9) is a system with display designed to operatively cooperate with said vending machine (1) and at least one user; and
    - said vending machine (1) is operatively connected to Internet and is located by means of a suitable application by at least one user.

2. Process for dispensing a battery (3, 5) using the vending machine (1) according to claim 1, the process comprising the steps of:

    - request for the card with the user's credentials by the vending machine (1);
    - choice of a battery format by the user;
    - insertion of the discharged battery (5) in the housing (7) of the vending machine device (1) ;
    - check of the life of the discharged battery (5) and of the residual charge quantity to be deducted;
    - payment for taking a charged battery (3);
    - delivery of the charged battery (3).

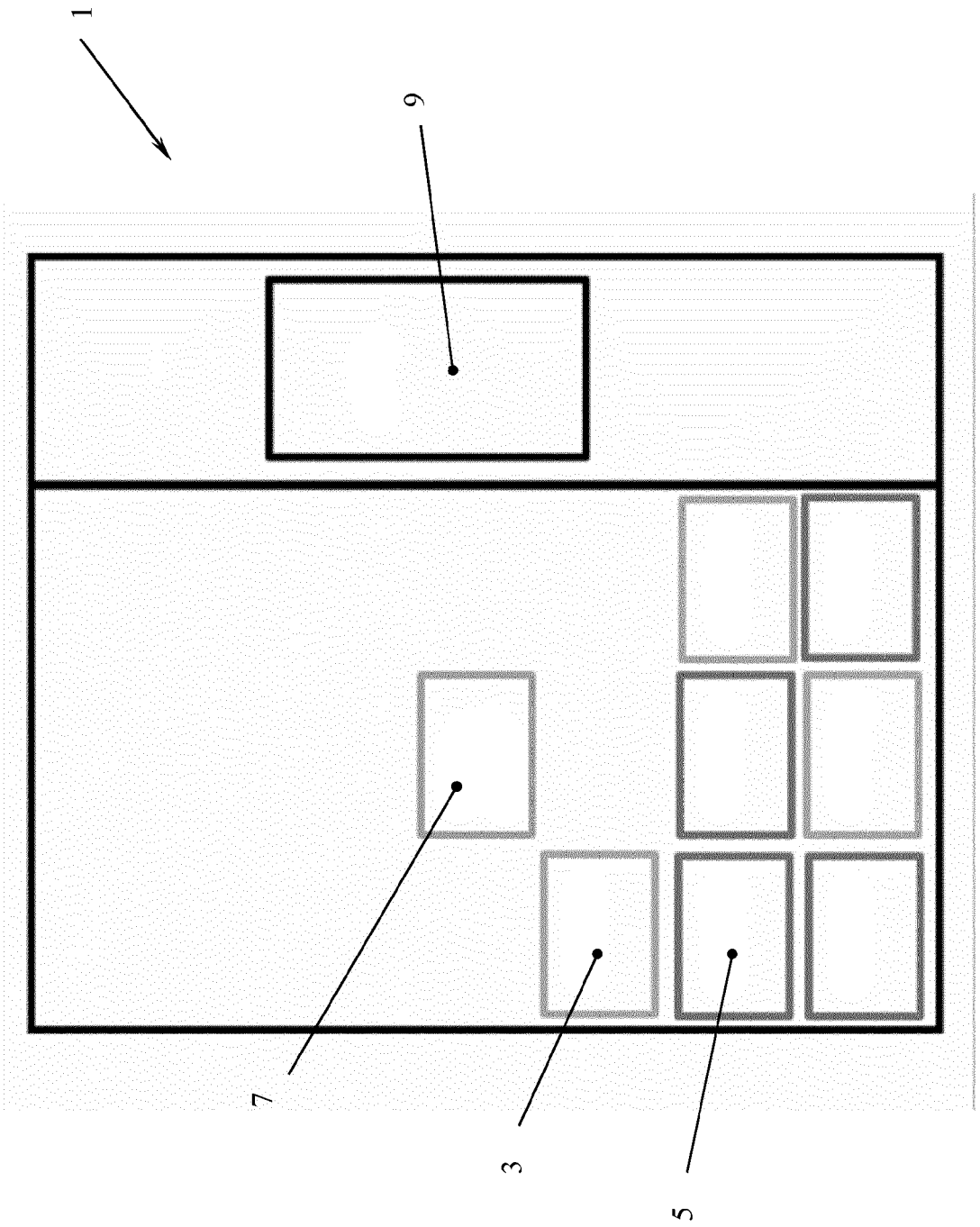

FIG. 1

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EUROPEAN SEARCH REPORT

Application Number
EP 23 19 0248

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2014/279576 A1 (LUKE HOK-SUM HORACE [US]) 18 September 2014 (2014-09-18) * abstract * * figures 1, 2 * * paragraphs [0039] - [0079] *	1,2	INV. G07F7/06 G07F15/00 G07F11/62
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TECHNICAL FIELDS SEARCHED (IPC)

G07F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	30 August 2023	Diepstraten, Marc

CATEGORY OF CITED DOCUMENTS

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