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(54) SWITCH DEVICE

(57) Timed switch device applicable to an electrical user apparatus, which can be activated by a consent signal generated by a safety circuit, wherein there are a plurality of electrical safety switches arranged in series with each other. This consent signal is generated only when all such switches cause electrical continuity in the circuit. Said device comprises a pair of electrical connection leads (P) which are positioned in said safety circuit one upstream and one downstream of said series of safety switches, short-circuiting it when a short-circuit breaker (2) is activated which places such two leads P in electrical contact, the switch (2) being controlled by a special control circuit (3), a signaling circuit (4) for a plurality of acoustic and/or visual indicators of the status of the user apparatus, a power supply circuit (5) for the short circuit breaker (2) and for the control (3) and signaling (4) circuits.

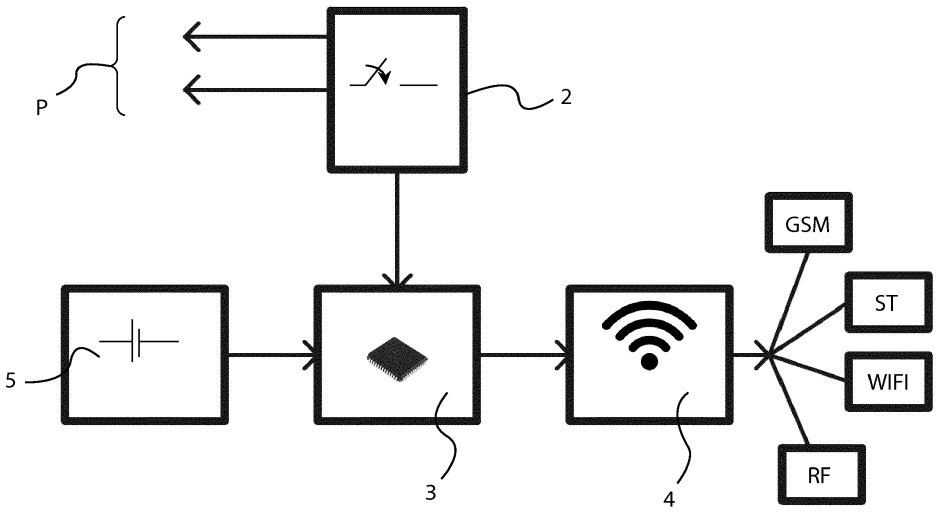

Fig. 1

EP 3 518 265 A1

Description

[0001] The present invention relates to a timed switch device adapted to restore an interrupted part of the circuit in which said circuit supplied the power supply to a user apparatus, to allow the verification and/or repair of a control circuit which feeds or controls such user apparatus.

[0002] In particular, the present invention applies for example to the elevator sector; in fact, such a user apparatus may be an elevator while the control circuit is the electrical panel that controls the operation of the elevator itself.

[0003] A user apparatus like an elevator is controlled by a consent signal which allows the movement of the cabin when a plurality of electrical safety switches arranged in series with each other cause the electrical continuity, thus generating said signal. For example, such switches open an electrical circuit when there are no normal operating conditions of the user apparatus, due to a fault or an anomaly. If the user apparatus is an elevator, the switches may be associated with sensors for detecting the correct closing of the doors, sensors adapted to detect the misalignment of the cabin floor with the floor, or limit switch sensors. In any case, all these safety switches when there is an anomaly block the consent signal, thereby blocking the apparatus.

[0004] The technician responsible for checking and repairing the system must first restore this consent signal to reactivate the system temporarily and then check which of the safety switches has blocked the apparatus.

[0005] To do this, it must bypass all the safety switches placed in series, through a so-called jumper, which is an electric cable that "jumps" the series of switches.

[0006] Once the apparatus is reactivated, the technician will check the switches one by one to check which of them has tripped and what the reason is, and then carry out the repair.

[0007] A first problem of this working method is the inherent danger of reactivating an apparatus in failure, through a jumper that excludes safeties. In fact, at the end of the repair operations, a possible failure to remove the jumper could have disastrous effects, reactivating an apparatus without safety devices freely usable by users.

[0008] In addition, the search for the fault or malfunction is totally entrusted to the case, as the technician will check the switches one by one to verify those of them that has tripped and what the reason is, without having any indication or specific information from the apparatus.

[0009] The present invention aims to solve such problems by providing a timed by-pass switch device with verification of the restoration of the by-passed circuit having the features of claim 1.

[0010] Further features of the switch according to the present invention are the subject matter of the dependent claims.

[0011] The features and advantages of the device according to the present invention will be apparent and evident from the following illustrative and non-limiting description, of an embodiment, made with reference to the accompanying figure 1 illustrating a block diagram of the device according to the present invention.

[0012] The device according to the present invention is applicable to an electrical user apparatus, that can be activated by a consent signal generated by a safety circuit, where there is a plurality of electrical safety switches arranged in series with each other, this consent signal being generated only when all such switches cause electrical continuity in the circuit.

[0013] The device comprises a pair of electrical connection leads P which are positioned in this safety circuit one upstream and one downstream of this series of safety switches, short-circuiting it when a short circuit breaker 2 is activated which puts such two leads P in electrical contact.

[0014] The switch 2 is controlled by a special control circuit 3 and also comprises a signaling circuit 4 for a plurality of acoustic and/or visual indicators of the status of the apparatus.

[0015] Finally, the device comprises a power supply circuit 5 for the short circuit breaker 2 and for the control 3 and signaling 4 circuits.

[0016] When the switch device is connected to the user apparatus, the switch 2 is activated for a predetermined time interval, for example established by the operator, after which the switch opens.

[0017] Moreover, the device sends the two leads P an electrical voltage which crosses the safety circuit of the apparatus, checking the continuity and the status of the safety switches.

[0018] The control circuit comprises an electronic processing unit, for example a micro processor, capable of activating and subsequently deactivating said switch 2 after a predetermined time which can be set by the operator through a user interface, for example by means of a keypad.

[0019] Such continuity checks can be carried out continuously throughout the period during which the device is activated and connected to the user apparatus, or they can be cyclically carried out at predetermined time intervals.

[0020] The signaling circuit 4 comprises a display on the device, or a plurality of signaling LEDs and/or acoustic indicators, such as electric buzzers, or it may comprise wireless communication circuits with external devices, such as smartphones or tablets. Such wireless communication can be of the Bluetooth or Wi-Fi type, or via GSM or via radio-frequency signals. The signals which are advantageously in real time may concern timing, for example they can alert the operator of how much time remains before the switch 2 opens and blocks the user apparatus. Or the signals may concern the restoration of the electrical continuity of the safety circuit being monitored, signaling that the fault has been repaired.

[0021] Moreover, through said wireless communication it is possible to program the switch 2 from the outside, for example by means of such tablet or smartphone.

[0022] The power supply circuit is powered by a battery rechargeable from the outside of the device advantageously via a USB socket.

[0023] The device according to the present invention allows the search of the fault with the safety circuit of the user apparatus powered and allows being notified by the instrument when the repair has been carried out.

[0024] Advantageously, the electric leads P are provided with kits for connection in different modes.

Claims

1. Timed switch device applicable to an electrical user apparatus that can be activated by a consent signal generated by a safety circuit, in this safety circuit there being a plurality of electrical safety switches arranged in series with each other and this consent signal being generated only when all such switches cause electrical continuity in the safety circuit,
said device comprising

   • a pair of electrical connection leads (P) which are positioned in this safety circuit one upstream and one downstream of this series of safety switches, short-circuiting it when a short circuit breaker (2) is activated which puts such two leads P in electrical contact,
   • the switch (2) being controlled by a dedicated control circuit (3)
   • a signaling circuit (4) for a plurality of acoustic and/or visual indicators of the status of the user apparatus,
   • a power supply circuit (5) for the short circuit breaker (2) and for the control (3) and signaling (4) circuits,

   characterized in that

   • when the switch device is connected to the user apparatus, the switch (2) is activated for a predetermined time interval established by the operator, after which the switch opens,
   • the device sends the two leads (P) an electrical voltage which crosses the safety circuit of the apparatus, checking the continuity and the status of the safety switches.

2. Device according to claim 1, wherein said continuity checks can be carried out continuously throughout the period during which the device is activated and connected to the user apparatus, or they can be cyclically carried out at predetermined time intervals.

3. Device according to claim 1, wherein the control circuit (3) comprises an electronic processing unit, capable of activating and subsequently deactivating this switch (2) after a predetermined time which can be set by the operator through a user interface.

4. Device according to claim 1, wherein the signaling device (4) comprises a display provided on the device, and/or a plurality of signaling LEDs and/or sound alarms such as electric buzzers.

5. Device according to claim 1, wherein the signaling device (4) comprises wireless communication circuits with external devices, such as smartphones or tablets.

6. Device according to claim 5, wherein said wireless communication can be of the Bluetooth or Wi-Fi type, or via GSM, or via radio-frequency signals.

7. Device according to claim 5, wherein through said wireless communication it is possible to program the switch (2) from the outside, for example by means of such tablet or smartphone.

8. Device according to claim 1, wherein the power supply circuit (5) is powered by a battery rechargeable from the outside of the device, advantageously via a USB socket.

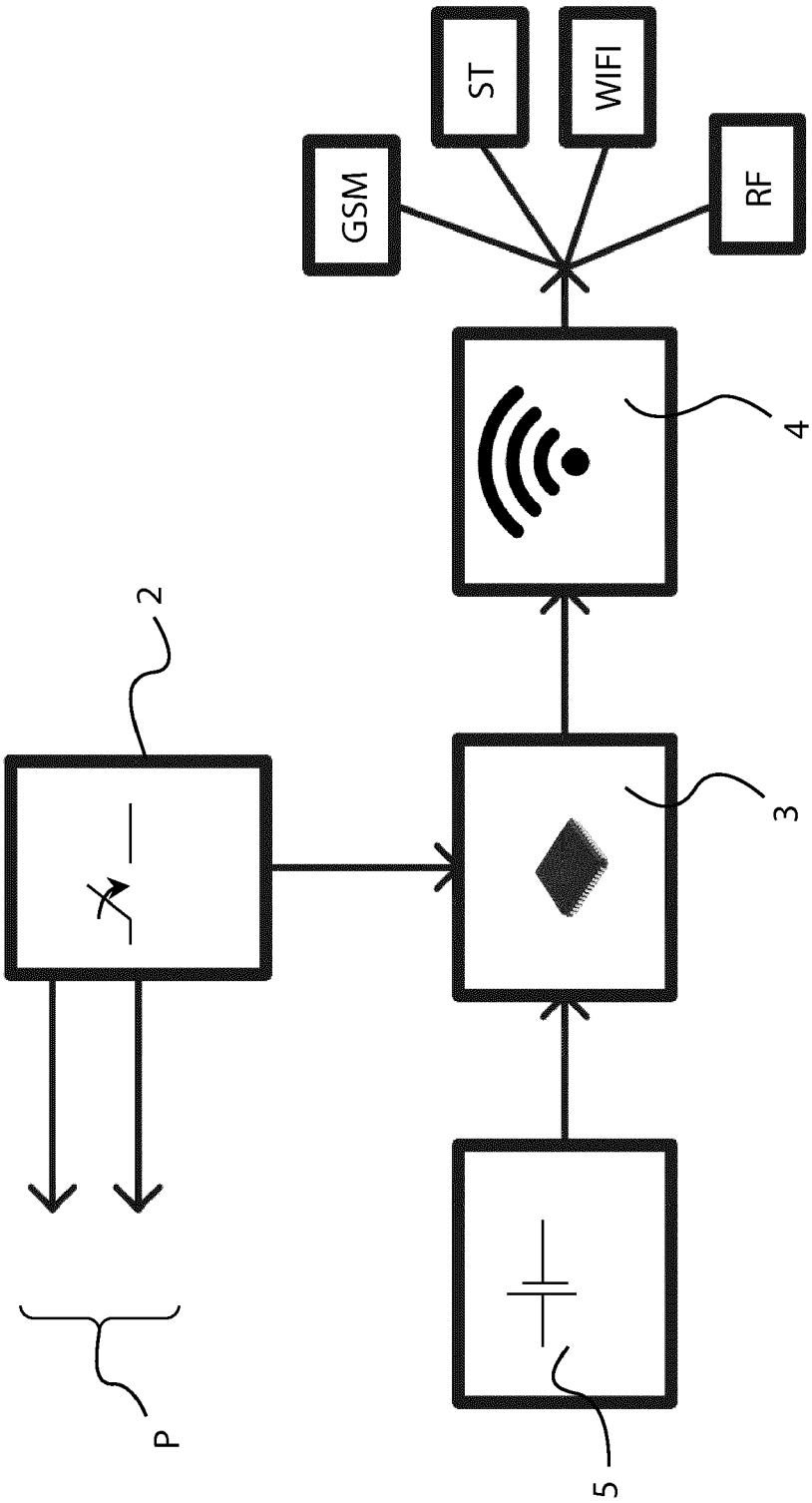

Fig. 1

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EUROPEAN SEARCH REPORT

Application Number
EP 19 15 3137

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	WO 2015/090809 A1 (INVENTIO AG [CH]) 25 June 2015 (2015-06-25) * page 7, line 12 - page 10, line 21; figures 1,2 *	1-8	INV. H01H47/00 H01H3/16
Y	US 2004/094366 A1 (WEINBERGER KARL [CH] ET AL) 20 May 2004 (2004-05-20) * paragraphs [0037], [0038], [0046], [0050], [0051] *	1-8	

TECHNICAL FIELDS SEARCHED (IPC)
H01H
B66B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	17 June 2019	Arenz, Rainer

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 19 15 3137

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82