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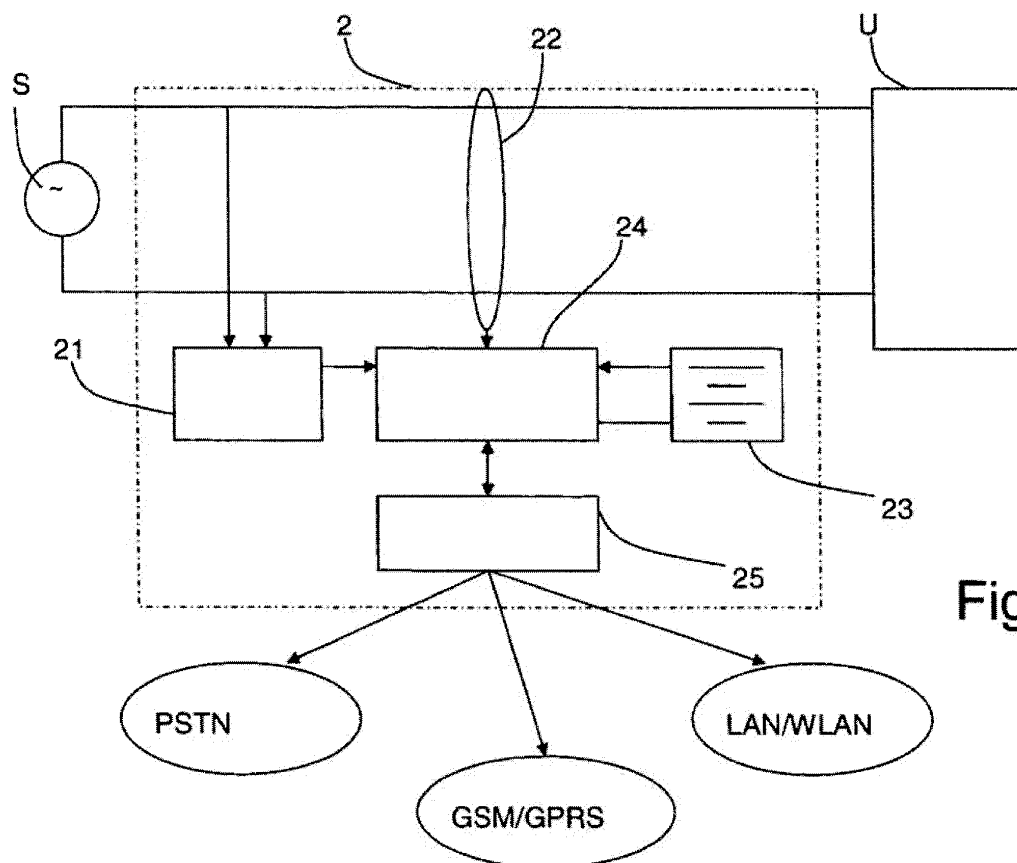
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(54) **Electronic apparatus for remote signalling of anomalies in an electrical device**

(57) Electronic apparatus (2) for signalling anomalies in an electrical user device (U) able to be fed with power by an electric power source (S), electrically connected between said source and said user device. The apparatus comprises a current sensor (22) suitable for detecting

the current emitted by such a source and a transmission interface (25) suitable for communicating the presence of an anomaly of the user device to a user remotely and in real time through a predetermined communication protocol.



**Fig. 1**

## Description

**[0001]** The present invention refers to an electronic apparatus for signalling anomalies in an electrical device. In particular, the present invention concerns an electronic apparatus for signalling anomalies in electrical user devices connected to alternating voltage supply.

**[0002]** Devices for signalling anomalies in the operation or state of electrical apparatuses are known, like for example warning lights or sound alarms associated with refrigerators, ovens, boilers, etc...

**[0003]** Theft-prevention devices are also known that are able to communicate through a telephone line that an infraction has occurred or in general that the alarm procedure has been activated, to a predetermined telephone user. Moreover, in some cases the theft-prevention device allows a more specific indication of the infraction taking place to be sent to such a user, through such a telephone line.

**[0004]** The Applicant has observed that apparatuses for signalling anomalies in electrical devices supplied with power by the network are effective locally, i.e. they work if the user who receives the alarm signal is close to the device. For example, if the signalling apparatus foresees a sound alarm, the user must be situated a short distance away so as to be able to hear it. Similarly, optical alarms, such as lights, must be directly visible by the user.

**[0005]** The Applicant has made an apparatus for signalling anomalies in electrical devices that is able to communicate remotely and in real time information about the anomaly itself to a user connected with such an apparatus through a communication line.

**[0006]** An aspect of the present invention concerns an electronic apparatus for signalling anomalies in an electrical user device that can be fed with power by an electrical power source, characterised in that it is electrically connected between said source and said user device and in that it comprises at least one current sensor suitable for detecting the current emitted by such a source and a transmission interface suitable for communicating the presence of an anomaly of the user device to a user remotely and in real time through a predetermined communication protocol.

**[0007]** Further purposes and advantages of the present invention shall become clearer from the following description and from the attached drawing, provided purely as a non-limiting example, in which:

- figure 1 is a block diagram of the apparatus according to the present invention applied to an electric device power by the alternating voltage supply.

**[0008]** With reference to the quoted figure, the electronic apparatus 2 for signalling anomalies in electrical devices according to the present invention is preferably inserted between an electrical power source S, for example the conventional source of the alternating voltage supply, and an electrical user device U.

**[0009]** The apparatus preferably comprises a direct voltage power supply 21 that takes the alternating voltage of the supply and transforms it into a direct electric voltage in order to feed the apparatus as a whole and at least one current sensor 22 suitable for detecting the current emitted by such a source. The apparatus can be equipped with an auxiliary power supply battery 23 that can be kept charged during the normal operation of the power supply of the source, whilst it can feed the apparatus in the case in which the power supply of the source is lacking.

**[0010]** An electronic processing unit 24, able to be fed with power either by the power supply 21 or by the battery 23 communicates with such a current sensor 22 and controls a transmission interface 25 according to a management programme of the apparatus that has been suitably stored.

**[0011]** Such a processing unit takes care of continuously checking the flow of current towards the user, signalling to the end user, preferably automatically, predetermined anomaly situations through the sending of messages through such a transmission interface 25.

**[0012]** Examples of anomalies are defined as the occurrence of one or more of the following conditions:

- user switched off or not working;
- absence of power supply to the apparatus;
- error detected by a self-diagnostic system of the apparatus.

**[0013]** Such a transmission interface is able to communicate with the user information about such an anomaly remotely and in real time through a predetermined communication protocol.

**[0014]** Such a transmission interface is able to communicate with the user through a communication protocol of the PSTN (Public Switched Telephone Network) type, which represents the conventional landline telephone connection, which we all use to contact the most varied interlocutors and where just the number of the receiver has to be known to be able to reach them with a phone call, with a call via modem, or else with an SMS message so that the user is able to receive information about the anomaly through a fixed telephone.

**[0015]** Moreover, such an interface can communicate with the user through a GPRS (General Packet Radio Service) transmission protocol for mobile telephone communication, so that the user is able to receive information about the anomaly through a mobile telephone. Moreover, such an interface allows the apparatus to communicate with the internet for example through connection with a local LAN or WLAN network, so as to be able to send messages to the user for example through the INTERNET.

**[0016]** In brief, the messages to notify the anomaly are sent to one or more known receivers, identified in the configuration process of the apparatus, through one of the aforementioned telecommunications technologies or

equivalent ones.

**[0017]** Moreover, the apparatus is able to signal the resetting of one or more conditions considered anomalies (voltage dips of the source S that do not mean immediate alarm but just temporary handicap).

the apparatus.

10. Apparatus according to claim 1 in which the resetting of one or more conditions considered anomalies (voltage dips of the source S that do not mean immediate alarm but just temporary handicap) is also signalled.

## Claims

1. Electronic apparatus (2) for signalling anomalies in an electrical user device (U) able to be fed by an electrical power source (S), **characterised in that** it is electrically connected between said source and said user device and **in that** it comprises at least one current sensor (22) suitable for detecting the current emitted by such a source and a transmission interface (25) suitable for communicating the presence of an anomaly of the user device to a user remotely and in real time through a predetermined communication protocol.
2. Apparatus according to claim 1, also comprising an electronic processing unit (24) that communicates with such a current sensor and controls such a transmission interface.
3. Apparatus according to claim 1, also comprising a power supply (21) that takes the voltage from the source and transforms it into a direct electric voltage in order to supply the apparatus as a whole.
4. Apparatus according to claim 3, also comprising an auxiliary power supply battery (23), which can be kept charged during the normal operation of the source, whilst it can feed the apparatus in the case in which the supply of the source itself is lacking.
5. Apparatus according to claim 1, in which such a communication protocol is of the PSTN type.
6. Apparatus according to claim 1, in which such a communication protocol is of the GSM/GPRS type.
7. Apparatus according to claims 5 and 6, in which the user is able to receive information on the anomaly through a fixed telephone or a mobile phone.
8. Apparatus according to claim 1, in which such a communication protocol allows the apparatus to communicate with the Internet.
9. Apparatus according to claim 1, in which anomalies are defined as the occurrence of one or more of the following conditions:
  - user switched off or not working;
  - absence of power supply to the apparatus;
  - error detected by a self-diagnostic system of

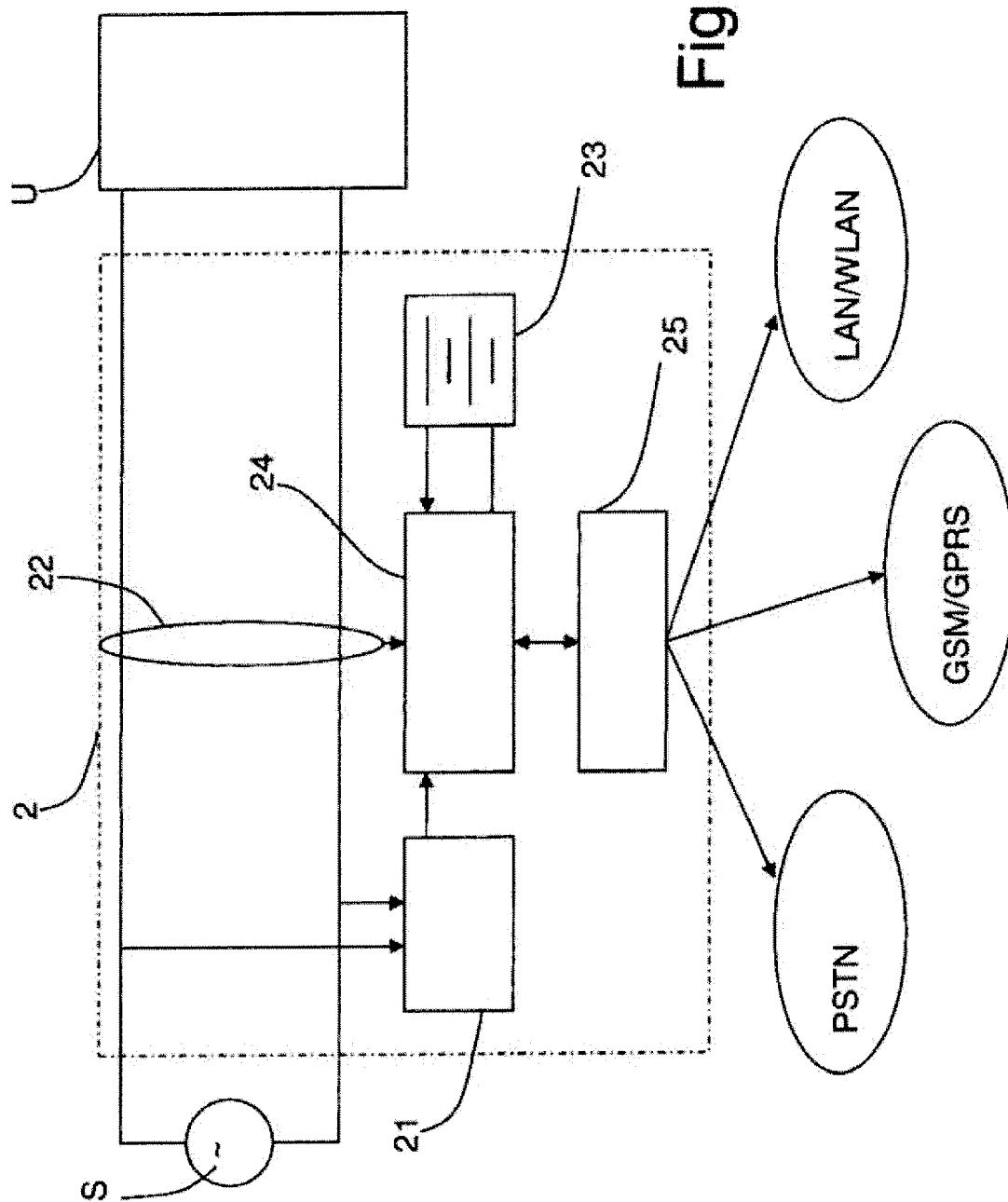


Fig. 1



European Patent  
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# EUROPEAN SEARCH REPORT

Application Number  
EP 07 10 1560

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	FR 2 768 227 A1 (GOURLAOUEN JEAN MARIE [FR]) 12 March 1999 (1999-03-12) * page 4, line 6 - line 31 * * page 5, line 18 - line 31 * * page 8, line 1 - page 11, line 17 * * figures 1-7 *	1-9	INV. G08B29/06
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			G08B
Place of search Munich		Date of completion of the search 5 July 2007	Examiner Dascaľu, Aureľ
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... &amp; : member of the same patent family, corresponding document</p>			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 07 10 1560

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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05-07-2007

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