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Description

The present invention relates to an arrangement for indication of the need of cleaning of an air filter for instance in a stove hood. After some time of working the cleaning ability of the filter is reduced because of pollution of the filter and the arrangement shall then indicate the need of cleaning of the filter.

It is priorly known to use a timer for measuring the working time and, after a predetermined period, to make the timer give a signal. As a ventilator can work with different degrees of capacity and pollution of the filter is dependent thereon, it is impossible to determine a proper time of working of the filter between the cleaning procedures. In order to have an equivalent of the time passing from one cleaning to another it is necessary to consider the capacity of the ventilator on each occasion. As a measure of the capacity of the ventilator the current of the motor can be used, the arrangement then constituting a time circuit which is programmed by the current of the ventilator motor, in other words, when the ventilator motor is working at the highest capacity an indication is received after for instance 30 hours, when the ventilator motor is working at half the capacity the indication occurs after for instance 50 hours, and when the ventilator is adjusted to the lowest rpm no time counting at all takes place owing to the fact that in this position no pollution will fasten to the filter as the flow speed of air is then so low that the pollution will follow the air through the filter without the time limit for cleaning getting nearer.

By the present invention it is presented a circuit arrangement with a time circuit where the main component is constituted of a time summing galvanic cell comprising an anode and a cathode and an electrolyte there between. By charging the cell a certain current passes during a time period in the direction anode — cathode whereby a certain quantity of anode material, in this case silver, is transferred to the cathode which e. g. is made of gold. If the current is reversed through the cell the silver is transferred back to the anode, but when no more silver remains and gold will not be dissolved, the cell ceases conducting. The voltage over the cell during the electrolysis is about 1 V but increases when the cell is discharged. The transient voltage then occurring can in an arrangement with components be used for emitting a signal. A realization of this principle is featured as the arrangement according to the characterizing clause of claim 1.

An embodiment of the invention is described in the following with reference to the accompanying drawing which shows a wiring diagram of the arrangement of the invention.

When the arrangement is connected to the mains an AC-voltage is supplied on an input 10, 11 and applied via a series resistor 12, a control 13 and a switch 14 to a ventilator motor 15. From the voltage input 11 current is supplied to a time

meter, the substantial part of the arrangement. The voltage is rectified by a rectifier 16 and limited by a series resistor 17 and a Zener diode 18 which via a return wire 19 is connected to the connector 10 of the input. A capacitor 20 keeps a DC-voltage nearly constant at 10 V on a wire 21.

In the circuits shown in the Figure a current passes between the wires 21 and 19 through i. a. a resistor 22 and a transistor 23 which has a control current via a resistor 24 and diode 25. A thyristor 26 is then connected between a lamp or LED 27 and a connection 28 between the components 22 and 23. The LED lights when the thyristor is switched on by a current to its control electrode 29.

When the switch 14 is closed a voltage is supplied to the resistor 12 and applied via a rectifier 30 and a resistor 31 to the base of a transistor 32 and via a rectifier 33 and an electrolytic cell or so called E-cell 34 to the connection 28. When the cell is discharged it has a high resistance which causes a control current to the transistor 32 which is switched on and causes a voltage drop in a resistor 35. In this way a control voltage will arise on a transistor 36 which then switches on and makes a voltage drop in a resistor 37, whereby a control voltage is put on the electrode 29, so that the thyristor switches on and the LED lights owing to a current in the circuit 21, 27, 26, 28, 23, 19.

Another current circuit can be established through a resistor 38, a pulse switch 39 and a capacitor 40 when a push button 41 on the pulse switch is actuated. The current circuit is created from 21 to 38, 39, 40, 25, 23 and 19 making the capacitor 40 be charged in less than one second. After this the push button is disengaged and the pulse switch is reset into the shown position. The transistor 23 will have a negative control voltage and breaks the circuits 22, 28, 23, 19 and 27, 26, 28, 23, 19. The LED 27 stops lighting. At breaking the first one of said circuits a voltage will arise in the E-cell from 28 to the base of 32. An engaging current will pass from 21 to 22, 28, 34, 32, 19 during a period when the transistor 23 is off, i. e. while the capacitor 40 is discharged through a circuit comprising the resistor 24, capacitor 40, the pulse switch 39 and a Zener diode 42. Said period is some minutes, after which the transistor 23 is switched on and the activation (charging) of the E-cell ceases. When the transistor 23 switches on and half-wave pulses corresponding to the current of the motor 15 are supplied to the E-cell via the rectifier 30, a current passes in the opposite direction through the cell which starts discharging. A certain base voltage appears on the transistor 32 which still does not conduct at this low base voltage. A condition for making the cell work is a voltage in it, exceeding a step of some 1 V. This step is not reached when the ventilator works at its minimum rpm, whereby a cancellation of time summing at such rpm, as said in the introduction, will automatically occur. The

discharging of the E-cell proceeds at a speed proportional to the rpm, and when the cell is totally discharged the current through it ceases and the voltage on the base of the transistor 32 increases so that the transistor starts conducting in the circuit 21, 35, 32, 19. A voltage drop occurs in 35 and makes the transistor 36 switch on and, as described before, supplies a starting pulse to the thyristor 26, whereby the LED lights. This is a signal for the need for cleaning the filter, and when this is done, the push button 41 is re-activated, whereby the E-cell is re-charged, the LED put out and another working period starts.

In a real embodiment of the invention applied in a stove hood the push button 41 and the LED 27 are positioned in a control panel where also other control members are gathered, however, the push button is separated so that it is not actuated during a working period by mistake.

Claims

1. An indicator in an air filter with a ventilator driven by an electric motor and requiring from time to time cleaning and during the period between the cleanings working with a varying capacity which causes a pollution proportional to said capacity, characterized in that in the circuit of the electric motor a resistor (12) forms a voltage which is a power input in a circuit of an electrolytic cell (34) having a higher voltage drop when discharged than when charged and in that a detecting circuit sensing said voltage drop is disposed to supply a signal when the cell is discharged.

2. An indicator according to Claim 1, characterized in that a second circuit is connected in parallel with the circuit of said cell by a change-over switch (23, 32) and constituting a second power input to the cell with an inversed polarity in relation to the said voltage drop.

3. An indicator according to Claim 2, characterized in that the detecting circuit is an amplifying circuit of a thyristor (26) connected in series with a lamp (27) and with one branch of the change-over switch.

4. An indicator according to Claim 3, characterized in that the electrolytic cell (34) is connected to the input of the amplifying circuit.

5. An indicator according to Claim 2, characterized in that the said change-over switch is provided with a holding current circuit controlled by a manually operated pulse switch (39) and a time circuit (40, 24, 42).

Patentansprüche

1. Anzeigeeinrichtung in einem Luftfilter mit einem von einem Elektromotor angetriebenen Ventilator, welches von Zeit zu Zeit gereinigt werden muß und während des Zeitraumes zwischen den Reinigungen mit unterschiedlicher Kapazität arbeitet, was eine dieser Kapazität

proportionale Verschmutzung verursacht, dadurch gekennzeichnet, daß im Stromkreis des Elektromotors ein Widerstand (12) eine Spannung liefert, die eine Stromzufuhr in einem Stromkreis einer Elektrolysezelle (34) mit einem höheren Spannungsabfall beim Entladen als beim Laden ist, und daß ein Detektorkreis, der den Spannungsabfall abfühlt, angeordnet ist, um ein Signal zu liefern, wenn die Zelle entladen wird.

2. Anzeigeeinrichtung nach Anspruch 1, dadurch gekennzeichnet, daß ein zweiter Kreis parallel mit dem Kreis der Zelle mittels eines Umschalters (23, 32) angeordnet ist, der eine zweite Stromzufuhr zur Zelle mit umgekehrter Polarität in bezug auf den Spannungsabfall bildet.

3. Anzeigeeinrichtung nach Anspruch 2, dadurch gekennzeichnet, daß der Detektorkreis ein Verstärkerkreis eines Thyristors (26) ist, der in Serie mit einer Lampe (27) und mit einer Zweigleitung des Umschalters verbunden ist.

4. Anzeigeeinrichtung nach Anspruch 3, dadurch gekennzeichnet, daß die Elektrolysezelle (34) mit dem Eingang des Verstärkerkreises verbunden ist.

5. Anzeigeeinrichtung nach Anspruch 2, dadurch gekennzeichnet, daß der Umschalter mit einem Haltestromkreis versehen ist, der durch einen manuell bedienten Impulsschalter (39) und einen Zeitkreis (40, 24, 42) gesteuert wird.

Revendications

1. Indicateur pour un filtre à air comprenant un ventilateur entraîné par un moteur électrique et exigeant un nettoyage périodique et, pendant la période entre les nettoyages, travaillant avec une capacité variable qui entraîne un encrassement proportionnel à ladite capacité, caractérisé en ce que dans le circuit du moteur électrique, une résistance (12) réalise une tension qui est une entrée de puissance dans un circuit d'une pile électrolytique (34) ayant une chute de tension plus élevée lorsque'elle est déchargée que lorsque elle est chargée, et en ce qu'un circuit de détection détectant ladite chute de tension est disposé pour fournir un signal lorsque la pile est déchargée.

2. Indicateur selon la revendication 1, caractérisé en ce qu'un second circuit est connecté en parallèle avec le circuit de ladite pile par l'intermédiaire d'un commutateur (23, 32) et constitue une deuxième entrée de puissance pour la pile avec une polarité inversée, en relation avec ladite chute de tension.

3. Indicateur selon la revendication 2, caractérisé en ce que le circuit de détection est un circuit d'amplification d'un thyristor (26) connecté en série avec une lampe (27) et avec une branche du commutateur.

4. Indicateur selon la revendication 3, caractérisé en ce que la pile électrolytique (34) est connectée à l'entrée du circuit d'amplification.

5. Indicateur selon la revendication 2, caractérisé en ce que ledit commutateur est muni d'un circuit de maintien de courant commandé par un commutateur à impulsions (39) actionné manuellement et un circuit de temporisation (40, 24, 42).

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