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(54) **Procedure and device for the power supply of fluorescent discharge lamps**

Verfahren und Anordnung zum Betreiben von Leuchtstofflampen

Procédé et dispositif pour alimenter des lampes fluorescentes

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(56) References cited:
DE-A- 2 612 343
DE-A- 3 116 933
US-A- 4 862 038
US-A- 5 089 943

- **PATENT ABSTRACTS OF JAPAN vol. 015, no. 412 (E-1124), 21 October 1991 (1991-10-21) & JP 03 171605 A (TOKYO ELECTRIC CO LTD), 25 July 1991 (1991-07-25)**
- **PATENT ABSTRACTS OF JAPAN vol. 018, no. 355 (E-1573), 5 July 1994 (1994-07-05) & JP 06 096893 A (TOSHIBA LIGHTING & TECHNOL CORP), 8 April 1994 (1994-04-08)**

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Description

[0001] The present invention refers to a device for the power supply of fluorescent discharge lamps, by means of which a new and profitable effect is achieved for the power supply of fluorescent lamps.

[0002] In particular, the device of the present invention is destined to solve a problem that presently occurs in fluorescent lamp illumination systems, namely the relatively frequent failure of the fluorescent lamps due to the extinguishment of its active life or due to other causes. When this occurs the lamp fails, many times quite suddenly, ceasing to fulfil its function. Given that fluorescent lamps are relatively complex in their handling and are installed in high locations of the areas to be illuminated, their replacement cannot be performed in an easy and practical manner as is the case with a light bulb, so that when a fluorescent lamp stops working it causes problems and inconvenience until it is replaced, a task that in most cases requires trained staff and a ladder, etc. The present invention is destined to solve these inconveniences allowing lighting installations in which, for each fluorescent tube, another reserved tube or several others are available, being the system of the following invention arranged in a way that only the normal lighting of one lamp takes place, but in case of its failure, automatically, another one of the reserve lamps will light up until the total extinguishment of all the reserve lamps installed takes place. This allows to achieve lighting installations that offer noticeably regular illumination and which rarely stop performing as desired since when a reserve tube begins to operate there will be time enough to replace it, which allows proper maintenance of the light conditions of the particular area illuminated by fluorescent lamps. The present invention will be applicable domestically as well as in offices, warehouses etc., given that in all cases the same advantage will be obtained, namely that of achieving a more reliable illumination of the desired area and allowing the replacement of lamps when desired, for example during periodic inspections of the light installation which will no longer be direct consequence as it occurs nowadays, of the partial or total lack of illumination of the area due to the failure of one or several lamps.

[0003] U.S. Patent no.4 862 037 discloses and automatic relamping system for lamps with different starting voltages with an starting circuit including an oscilator, an output capacitor, a step-up transformer with the output capacity connected in parallel and a second capacitor coupled in series between the output capacitor and the lamps.

[0004] JP-A-03171605 discloses a stabilizer for discharge lamp composed of a core and a coil wound around the core and arranged in the center of a case, with two capacitor units and an insulating resin filled up in the closed space.

[0005] To achieve its objectives, the present invention foresees the arrangement of a single balast supplying power in parallel to several identical fluorescent lamps of the same lighting system, being the power characteristics of the balast those required for a single lamp , which means that in activating the system only a single tube will illuminate, and when this tube ceases to function for whatever reason, in a very short period of time, which could be less than 0.2 seconds, another one of the reserve lamps will light up and so on. Therefore the device of the invention will allow the sequential power supply of fluorescent lamps in the same lighting installation without the absence of light ever being noticeable due to the failure of one lamp.

[0006] The single balast used in the device of this invention possesses a specific characteristic by which the exit of the conducting cables from the inside of the balast takes place through a single body of insulating resin in which the components of the balast and the wire connections are monolithically embedded without any exposed connection devices, which confers the balast more solidity, simplifies its manufacturing process and provides it with a much higher resistance to any kind of external agents.

[0007] For a better understanding a number of drawings are included, as means of illustrating but not limiting a preferred embodiment of the present invention.

Figures 1 and 2 represent side and top views of a balast used for carrying out the present invention.
Figure 3 shows a front view of the balast displaying the set of conducting cables.
Figure 4 shows schematically an installation with two lamps and one single balast.
Figure 5 shows a block diagram of a balast feeding a set of two fluorescent lamps.

[0008] The device object of the present invention is based fundamentally in the disposition of a single balast 1, Figure 4, with appropriate characteristics to feed only one tube of one array of various identical tubes, as shown with reference numerals 2 and 3, being the total number of lights in a set absolutely variable. These fluorescent lamps are connected in parallel with respect to the single balast 1. As illustrated in figure 4, the balast will remain connected by means of wires 4 and 5 to one polarity and the neutral of the AC current source, showing as well the proper grounding 6. The fluorescent lamps 2 and 3 will be connected in parallel with the conductor pairs 7 and 8 for lamp 2 , and 9 and 10 for lamp 3.

[0009] The balast will contain the components shown in figure 5, in which elements 11, 12, 13, 14, 15 and 16 have been represented as blocks integrated inside a monolithic block of insulating resins 17, inside which remain the connections of the various conducting cables, so that the outside wall 18 of the monolithic block 17 is perforated directly by the conductors, not exposing to the exterior a single connection. Through the wall itself 18 will come out all of the power supply cables and the wires to the multiple lamps such as 19 and 20 or a var-

iable number of them, connected in parallel with the single balast, having the above mentioned construction. Blocks 11 to 16 contain the following elements: Block 11: filters and suppressors; block 12 : rectifier and protections; block 13: corrector of power factor and potential difference elevator; block 14 : commutation and high frequency control; block 15 : lamp control and power manoeuvre; block 16 : absence detectors, potential and current.

[0010] Figure 3 shows the front wall 18 of the monolithic block of resins through which conductors 21, 22, 23, 24 pass to feed the two fluorescent lamps in parallel as well as conductor 25 which holds the wires to supply power and for the grounding connection.

[0011] It will be understood therefore the present invention allows the control of the power supply to several identical fluorescent lamps by means of a single balast suitable for one individual tube, making a connection in parallel of the various tubes with the single balast, resulting in the lighting of a single or main lamp and continuing to light one of the other tubes as they cease to be operative for whatever cause.

[0012] The proper device to perform the present procedure consists of a completely monolithic balast which will contain its components inside of a block of insulating resin, and in this block the connections to the wires for the connection in parallel of several identical tubes, which wires go through the wall of the monolithic block with no external connections exposed.

Claims

1. Device for the power supply of fluorescent discharge lamps, of the type which comprises a single balast (1) suitable for one individual tube which feeds an array of multiple fluorescent lamps, **characterized in that** the lamps (2, 3) are of identical nature, and are connected in parallel with the terminals (7, 8; 9, 10) of the balast (1), lighting a single one of the lamps in the set of the fluorescent lamps and going on to light from one lamp to another automatically when the illuminated lamp stops working, the balast (1) containing embedded monolithically in a single block of insulating resin (17) successively one block 11 with filters and suppressors; one block 12 with rectifier and protections; one block 13 with corrector of power factor and potential difference elevator; one block 14 with commutation and high frequency control; one block 15 with lamp and power manoeuvre control; one block 16 with absence, potential and current detectors, remaining in the block of insulating resin connections to the power wires and the wires which feed the lamps in parallel, which come out through a wall of the resin block without exposing any connections at all.

Patentansprüche

1. Gerät für die Energieversorgung fluoreszierender Entladungslampen in der Bauart, die ein einzelnes Gehäuse (1) geeignet für einen einzelnen Kanal umfasst, welcher eine Anordnung von mehreren Fluoreszenzlampen speist,
   dadurch gekennzeichnet, dass die Lampen (2, 3) identischer Art sind und mit den Anschlüssen (7, 8; 9, 10) des Gehäuses (1) parallel geschaltet sind, wobei eine einzelne der Lampen in dem Satz der Fluoreszenzlampen zum Leuchten gebracht wird und wobei sich das zum Leuchten bringen von einer Lampe zu einer anderen automatisch fortsetzt, wenn die erleuchtete Lampe aufhört zu arbeiten, wobei das Gehäuse (1) monolitisch in einem einzelnen Block isolierenden Harzes (17) nacheinander eingebaut enthält: einen Block (11) mit Filtern und Entstörern; einen Block (12) mit Gleichrichter und Sicherungen; einen Block (13) mit Leistungsfaktorkorrektor und Potentialdifferenzelevator; einen Block (14) mit Kommutierung und Hochfrequenzsteuerung; einen Block (15) mit Lampe und Leistungsänderungssteuerung; einen Block (16) mit Fehl-, Potential- und Stromdetektoren, wobei in dem Block isolierenden Harzes Verbindungen zu den-Stromleitungen und den Leitungen verbleiben, welche die Lampen parallel speisen, wobei die Verbindungen aus einer Wand des Harzblocks austreten, ohne dass irgendwelche Verbindungen exponiert sind.

Revendications

1. Dispositif d'alimentation en puissance de lampes fluorescentes à décharge, du type comprenant un unique ballast (1) convenant à un unique tube individuel qui alimente une rangée de multiples lampes fluorescentes, **caractérisé par le fait que** les lampes (2, 3) sont de type identique et sont connectées en parallèle aux bornes (7, 8 ; 9, 10) du ballast (1), illuminant une seule desdites lampes, au sein du jeu des lampes fluorescentes, et continuant d'illuminer automatiquement d'une lampe à l'autre lorsque la lampe éclairée cesse de fonctionner, le ballast (1) renfermant en succession, avec intégration monolithique dans un unique bloc (17) de résine isolante, un bloc (11) comportant des filtres et des antiparasites ; un bloc (12) comportant un redresseur et des protections ; un bloc (13) à correcteur de facteur de puissance et augmentateur de différence de potentiel ; un bloc (14) à commande de commutation et de haute fréquence ; un bloc (15) à commande de lampe et d'actionnement de puissance ; un bloc (16) à détecteurs d'absence, de potentiel et de courant, demeurant dans le bloc de connexions à résine isolante gagnant les conduc-

teurs de puissance et les conducteurs qui alimentent les lampes en parallèle, qui sortent en traversant une paroi du bloc de résine sans exposer une quelconque connexion.

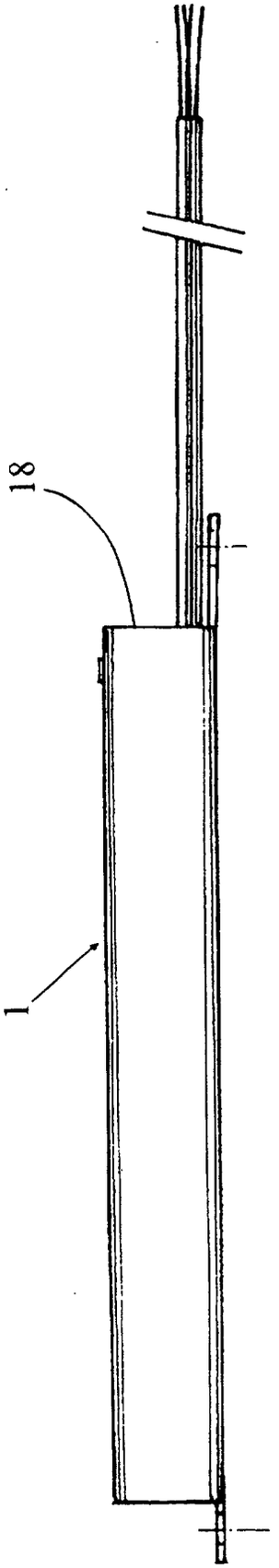


FIG. 1

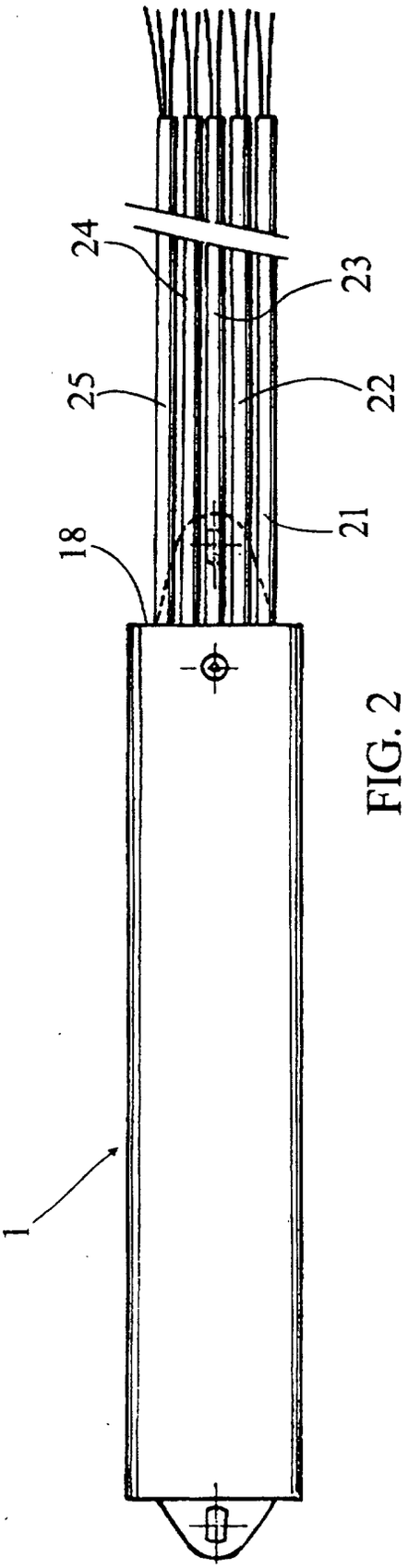


FIG. 2

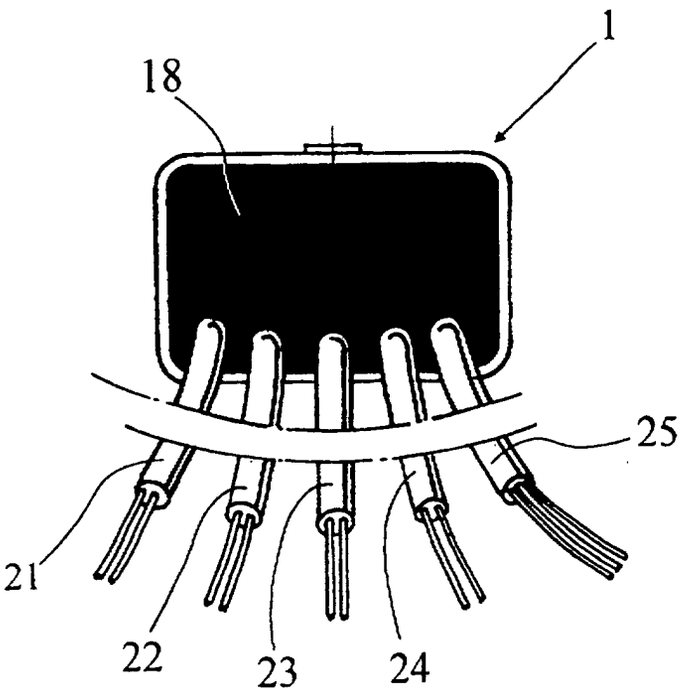


FIG. 3

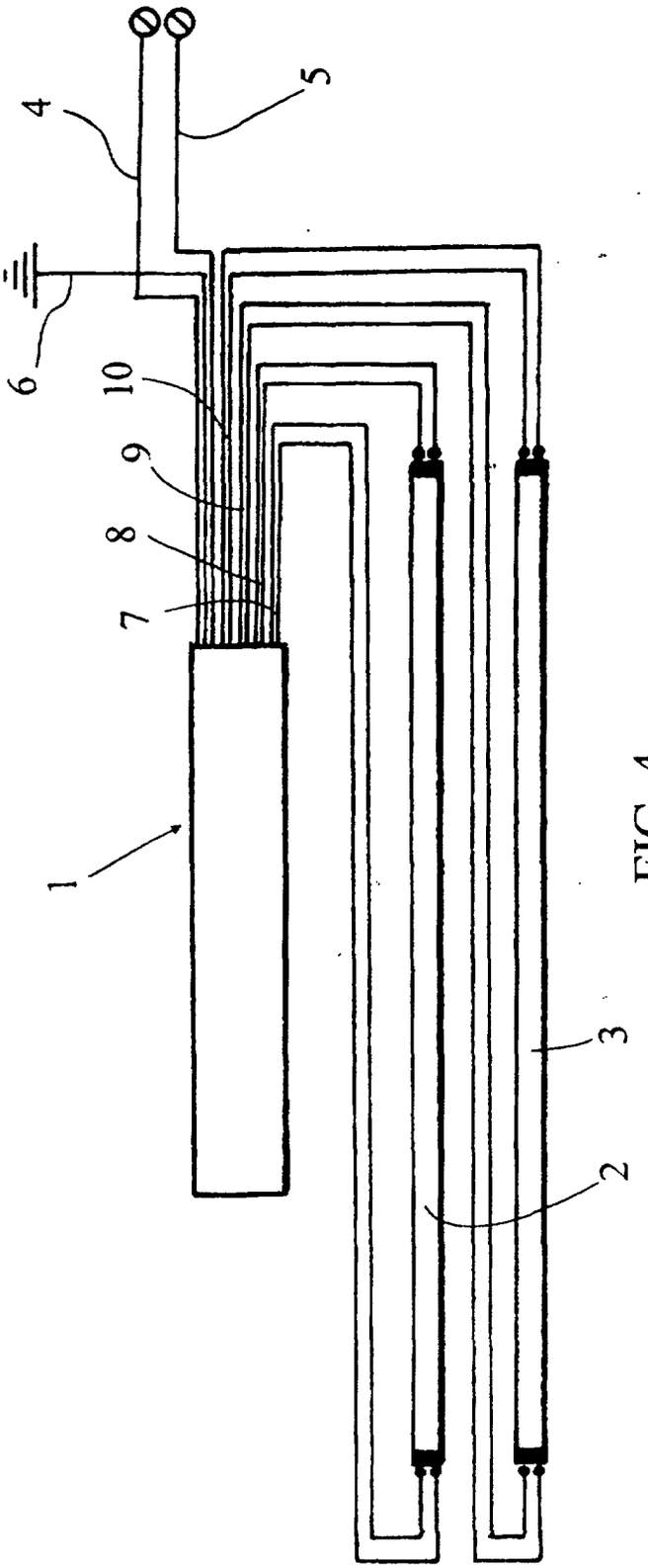


FIG. 4

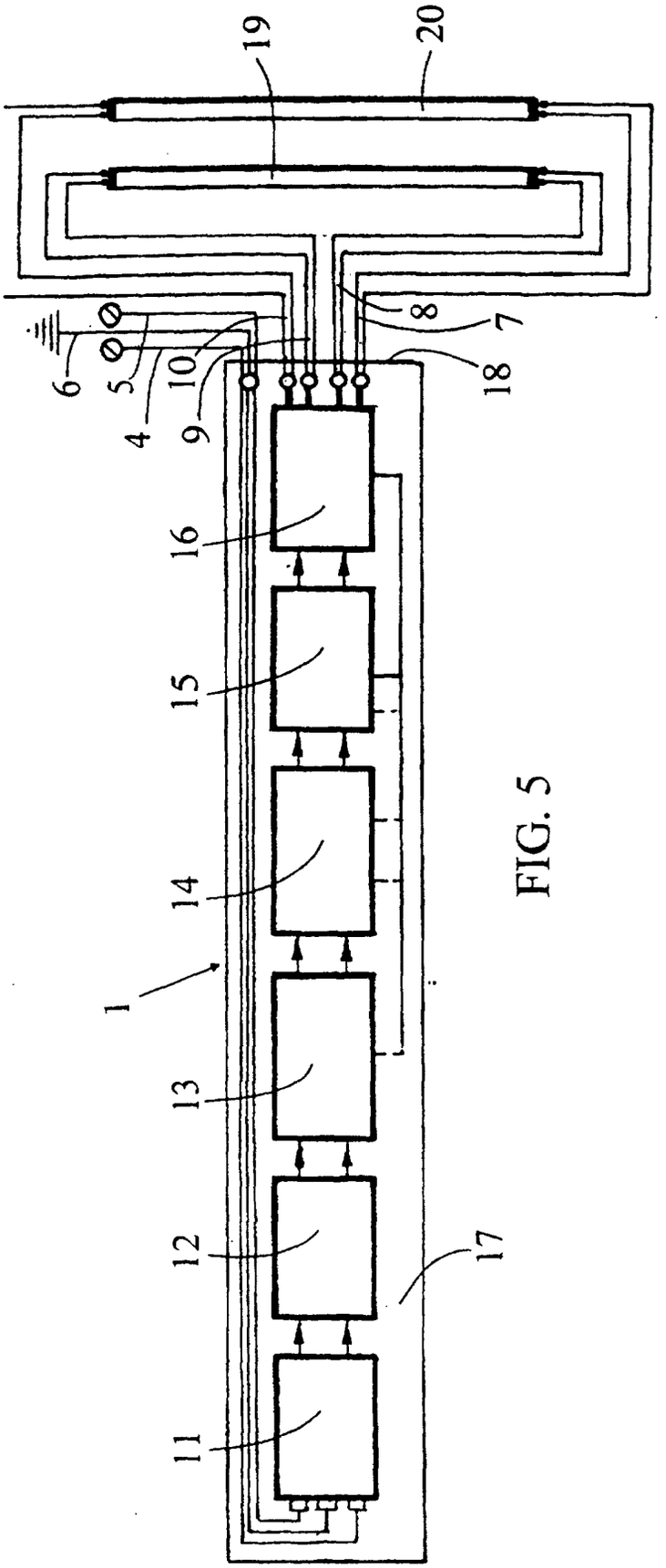


FIG. 5