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(54) **WARDROBE RAIL WITH LED LIGHT AND INTEGRATED MOTION SENSOR**

(57) Wardrobe bar with LED light and integrated motion sensor designed to be used in any type of wardrobe that needs or wants to be equipped with a light source to better show the inside of the wardrobe, comprising an aluminium profile (1) that houses a strip of LEDs (2) associated with a heat sink (3) that acts as a visual protector; and where said profile (1) incorporates at its ends lateral supports (4) compatible with the supports of the cabinet rail; and where on its front part, the profile (1) has a small hole (1a) through which the electronic movement detection system (5) emerges; all of this, powered by a plug (6) connected to the conventional mains supply.

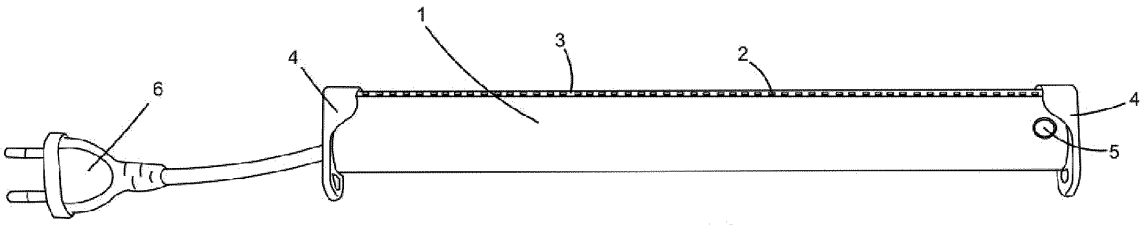

FIG.1

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Description

Object of the invention

[0001] The object of the present invention is a wardrobe bar with LED light and integrated movement sensor, designed to be used both at domestic and professional level (e.g. in the hotel sector), specifically in any type of wardrobe that needs or wants to be equipped with a light source to better show the inside of the wardrobe; simplifying the known solutions in an efficient way.

Background to the invention

[0002] Nowadays, cabinets or cabinet rails that incorporate a light source are well known. This type of solution requires, on the one hand, the installation of a presence sensor or detector that detects when the cabinet door is opened and manages to activate the activation circuit, and on the other hand, a transformer that should preferably be placed in a non-visible position so as not to break the aesthetics of the cabinet.

[0003] All of this will involve a greater complexity in the electrical installation to supply all the elements that make it up.

[0004] Consequently, the installer of the solution that provides light inside the enclosure needs to make a false register (e.g., at the top of the enclosure) or hidden somewhere outside the enclosure, which is likely to leave the installation or the presence of the constituent elements visible to the user.

[0005] This type of installation is usually costly both in terms of material and installation time, as the installer has to make the registers or run the wiring manually, trying to minimize the damage to the structure of the cabinet, while avoiding those traces of it can be easily seen afterwards, as the visual impact of the elements on the user would be high, breaking the aesthetics of the cabinet.

[0006] Another problem with this type of solution lies in the maintenance of the elements, given that the greater the number of elements present in the installation, the greater the probability that some of these elements will suffer over time and, therefore, end up causing a breakdown that would have to be solved. Consequently, this means that a qualified operator must go to the installation, check each component and replace the faulty element, which implies a higher maintenance cost than the solution provided by the present invention.

[0007] As already mentioned, the above mentioned solutions require a 12/24V transformer for the LED strip of this voltage (which works in direct current) and can have a sensor, switch or direct current.

[0008] The main difference compared to the solution described here is that it does not incorporate all its elements integrated in the bar, as the present invention does, which benefits the user, given that all the elements required to provide light in the cabinet are integrated in a single element that must be present in the cabinet.

[0009] Another known solution is to implement a lighting system in the wardrobe, using a USB charger and internal battery, but it requires an external transformer to charge the battery that supplies the voltage to the LED strip, making it a more inefficient solution than the one proposed here and practically limiting it to solutions within the home. Given that, in a hotel environment, it would be economically unviable to charge the strip in each hotel room where there is a wardrobe.

[0010] The present invention differs from all the proposals present in the state of the art mainly in that it manages to implement all the elements necessary for its correct operation (i.e., the lighting of the cabinet), i.e., both the strip of LEDs and, above all, the movement sensor, in the cabinet rod itself.

[0011] Another aspect of special importance is the fact that it works at 220-230 V, i.e., at the nominal voltage of the electrical network, which means that it does not require transformers, as most equivalent solutions work at 12/24 V voltages.

[0012] This results in a lower economic cost for the user and less possibility of breakdowns or defects in its operation, because of a greater presence of electronic elements.

[0013] The applicant is aware of the existence of various prior art documents that could affect its patentability, thus, document KR 101 820 859 relates to a clothes hanger rod installed on a clothes hanger or inside a closet. More specifically, the clothes hanger rod with an LED lighting device is configured to use a battery that is easily replaceable as a power source, thereby preventing the risk of a fire and being automatically operated by a sensor. The clothes hanger rod comprises: a frame formed by compressing aluminum; a removable member detachably coupled to the inner side of the frame; an LED module emitting light downward; and a translucent expansion cover diffusing the light of the LED module downward.

[0014] The fact that it is powered exclusively by batteries implies several problems, first and foremost, the amount of light emitted will be less than in the case of the invention recommended here, so that, in the event of requiring greater illumination inside the cabinet, the Korean solution will not solve this technical problem.

[0015] Another aspect, as mentioned above, is that the power supply has to be continuously maintained at an optimum level, i.e. the batteries have to be replaced continuously, which makes it unsuitable for use in business environments such as tourist accommodation.

[0016] In addition, the wear and tear of the battery can cause, in an extreme case, the battery acid to fall on clothing, damaging it.

[0017] The document KR 200 453 308 describes a solution where the lighting can be used refers to a built-in integrated hanger, hangers hangers, allowing you to make the outer peripheral surface is provided with an opening size to prepare a hollow rod after creating requires a light source such as a fluorescent lamp or LED

light source to be installed in the hollow part of the main body and the circuit board for the light source, and the installation of the main body to adjust the distance between one end of the threaded rotation of furniture, and other pendant lights when an external power supply to receive a power to rotate by the output of the adjustment protrusion slot, creating a hanger to prevent separation after supporting centre binding with the load due to prevent deformation by minimizing the reduction of electricity in accordance with the safety and achieve a robust and easy to use.

[0018] The present document has the dual functionality of being able to incorporate a fluorescent or LED tube, so that it is really a low-power lighting element on which hangers can be placed, i.e. the weight of the clothes themselves would end up destroying the lighting tube and so it does not serve the main purpose of a wardrobe rod, which is to hold the clothes correctly arranged inside the wardrobe.

[0019] At the same time, this invention lacks presence detection associated with the rod, which is done externally, and therefore requires a larger wiring element than the solution presented here (greater economic expense in installation and maintenance); and a greater possibility of failure in the same.

[0020] Document KR 2019 0002779 defines an LED lighting hanger useful for sterilising and deodorizing clothes in a wardrobe and a wardrobe sterilization device using the same. In this design, the LED lighting sterilizing and deodorizing hanger comprises a heat sink, a diffusion PC cover, a mounting bracket and an open/close switch, wherein the red LED is attached and installed in PCB form inside the hanger rod. The present design is a cabinet sterilisation device that uses LED sterilization and deodorization lighting of hangers, and is configured to operate continuously inside the cabinet when the door is closed with a fixed switch that turns on/off depending on the opening/closing of the cabinet door.

[0021] The main difference with respect to the present invention is that in that document, it is stated that the function of the lighting is to sterilize and deodorize the contents of the cabinet, which is totally different from the invention described here, whose main function is to illuminate the inside of the cabinet in order to be able to observe the contents of the cabinet.

[0022] Furthermore, the Korean document does not integrate any type of presence and/or movement detection, as it is associated with a mechanical switch that activates and/or deactivates the lighting by pressing the cabinet door. This is of vital importance, because it is only activated in this way, which implies more electromechanical elements susceptible to failure and/or damage through its use. In addition, this solution implies the presence of exposed wiring that can be damaged if the user is not careful. Therefore, any failure in either of these two elements (wiring and switch) will disable the presence of light inside the cabinet.

[0023] Therefore, when the door of the cabinet is open, the light in the cabinet remains on, regardless of whether there is a person using it or whether it has been left open due to carelessness. This means that the battery wear is accelerated and must be replaced on a regular basis.

[0024] US 7 301 287 describes a high-power light string device comprising a plug with a plug set, a tail receptacle and at least one LED string, wherein a first power adaptor in the plug converts an AC voltage across the plug set to a high DC voltage, and a second power adaptor in the tail receptacle converts the AC voltage across the plug set to a low DC voltage. The two ends of the LED string are connected respectively to the first and second current adapters to receive the high and low DC voltages, so that the LED string is switched on to emit light. The current adapters are arranged directly on the plug and the tail receptacle, respectively, to simplify the whole light chain device and improve the decorative effect of the light chain device.

[0025] The described invention does not fall within the technical field of the present invention and only relates to it, as it defines a basic led type lighting circuit; it does not feature or resemble a cabinet bar that illuminates and integrates a motion circuit that activates it.

[0026] And finally, DE 20 2010 017009 describes a lamp with at least one light source, wherein a stretched profile rail is provided as a supporting element for the light source and other lamp components, which has an approximately semi-cylindrical cross-sectional shape that fits into a cylindrical protective tube made of glass or similar translucent material and which is provided with an intermediate wall that lies in a plane parallel to the extreme edges of the profile in the manner of the chord of a circle and which serves as a fixing surface for the lamp components, wherein the intermediate wall has longitudinal grooves and/or longitudinal grooves for the safe reception of fixing means, such as screws and/or rivets, characterised in that the profile rail (1) is designed as a replacement support for alternative lighting means, in particular for LED lights (16, 17, 18 or 30, 31 or 38, 39), and for the fixing thereof, instead of or in addition to a rope-like intermediate wall, at least one LED carrier strip (13, 14, 15) is provided close to the circumference. For the attachment thereof, instead of or in addition to a chord-like intermediate wall, at least one LED carrier strip (13, 14, 15) is provided close to the circumference, instead of or in addition to a chord-like intermediate wall.

[0027] Said document, as in the previous case, is not related to the present invention nor in object, it is a lamp with a metallic bse for placing a lighting tube inside it, which does not incorporate any type of associated detection element, and which, would not be capable (due to its structure) of serving as a means of attachment for a hanger or similar, which is associated with a garment. Therefore, in case of weight bearing, the invention would most likely be structurally damaged.

[0028] None of the documents described here, either together or separately, would solve the described problem in a way that would be obvious to a person skilled in

the art.

Description of the invention

[0029] The technical problem solved by the present invention is to obtain a wardrobe rod with an integrated LED light source, capable of illuminating the inside of a wardrobe in a simple way for its user, and which does not entail major installation or maintenance operations inside the wardrobe, whether for private or professional use, e.g. integrated in hotel wardrobes or similar. To this end, the wardrobe rod with LED light and integrated movement sensor, the object of this utility model, comprises an aluminium profile characterized by the fact that said profile houses a strip of LEDs associated with a dissipator that acts as a visual protector; and where said profile incorporates at its ends lateral supports compatible with the supports of the wardrobe rod; and where on its front part, the profile has a small hole through which the electronic movement detection system emerges; all this, powered by a plug connected to the conventional mains power supply.

[0030] Thanks to its design, the bar presented here will become a means of easy installation in premises or locations that have a large number of cabinets (for example, hotels or similar) that want to provide a light source within the aforementioned location in a simple and easy way, since they simply have to install the bar recommended here in their location and connect it to a conventional mains socket for immediate use.

[0031] The simplicity of its design, apart from solving the technical problem of providing a stable light source inside the cabinet, means that no adaptation of the cabinet is required for its installation, so that, once it has been supplied, any type of user will only have to position the bar in its place (cabinet supports for this purpose) and connect it to the light.

[0032] This means that, if the bar stops working, there is no need for any kind of qualified operator to look for the fault, but any maintenance personnel or the user himself will only have to replace one bar with another to get it working again.

[0033] This fact is of vital importance in, for example, hotel rooms or similar, given that in this way the guest will not do without the service offered by the cabinet (the presence of light) for more than a few brief minutes, which will not disrupt the dynamics of the hotel itself, the maintenance being carried out quickly and easily by the hotel's own staff, with minimal disruption to the hotel's dynamics.

[0034] The operating mode of the bar presented here is very simple, given that when the wardrobe door is opened or if it is open when it detects the presence of someone; once the sensor detects the presence, the electrical circuit that supplies the 220V power supply to the LED strip opens and switches on (without the need for a transformer); it remains on for between 30 and 60 seconds; once this time has elapsed it will switch off and will remain on waiting for a new movement signal (with a detection range of between 50 and 100 cm and an angle of 90°). Throughout the description and the claims, the word "comprises" and its variants are not intended to exclude other technical features, additives, components or steps. To those skilled in the art, other objects, advantages, and features of the invention will be apparent in part from the description and in part from the practice of the invention. The following examples and drawings are provided by way of illustration and are not intended to restrict the present invention. Furthermore, the present invention covers all possible combinations of particular and preferred embodiments indicated herein.

Brief description of the figures

[0035] The following is a very brief description of a series of drawings which help to better understand the invention, and which relate expressly to an embodiment of the invention which is presented as a non-limiting example of the invention.

FIG 1. It shows a view of the cabinet rod with led light and integrated motion sensor, object of the present invention.

FIG 2. It shows a view of a second practical realization of the cabinet rail with LED light and integrated motion sensor, which is the subject of this report.

Detailed description of an embodiment of the invention

[0036] The attached figures show a preferred embodiment of the invention. More specifically, the cabinet rail with LED light and integrated motion sensor, the subject of the present report, is characterized in that it comprises a profile (1) made of aluminium or other material with equivalent characteristics, which houses a strip of LEDs (2) associated with a heat sink (3) that acts as a visual protector; and where said profile (1) incorporates at its ends lateral supports (4) compatible with the supports of the cabinet rail, for its insertion and fixing.

[0037] The profile (1) has a small hole (1a) in the front part of the profile (1) through which the electronic movement detection system (5) will emerge, with a detection capacity of between fifty and one hundred centimeters and a detection angle of up to 90°.

[0038] All elements are powered by a plug (6) connected to the conventional mains power supply.

[0039] In a preferred embodiment, the hole (1a) will have a diameter of between 6 and 10 millimeters and may be located either in the center of the profile (1) or at one end.

[0040] In the same practical implementation, the LED strip (2) and the heat sink (3) are located at the upper end of the profile (1).

[0041] In a second practical implementation, the profile

(1) will incorporate a second strip of LEDs (7) and a second heat sink (8) that acts as a visual protector, with both strips (2,7) and the associated heatsinks (3, 8) located at their upper and lower ends, respectively, as shown in figure 2.

Claims

1. Wardrobe rail with LED light and integrated motion sensor comprising an aluminium profile (1) **characterized in that** said profile (1) houses a strip of LEDs (2) associated with a heat sink (3) that acts as a visual protector; and where said profile (1) incorporates lateral supports (4) at its ends that are compatible with the supports of the wardrobe rail; and where on its front part, the profile (1) has a small hole (1a) through which the electronic movement detection system (5) emerges; all of which is powered by a plug (6) connected to the conventional mains power supply

2. Wardrobe rail with led light and integrated motion sensor according to claim 1 wherein the hole (1a) has a diameter of between 6 and 10 millimetres.

3. Wardrobe rail with led light and integrated motion sensor according to any of claims 1 and 2, wherein the movement detection system (5) has a detection capacity of between fifty and one hundred centimetres and a detection angle of up to 90°.

4. Wardrobe rail with integrated light and motion sensor according to any of claims 1 to 3, wherein the LED strip (2) and the heat sink (3) are located at the upper end of the profile (1).

5. Wardrobe rail with light and integrated motion sensor according to any of claims 1 to 4, where the profile (1) incorporates a second strip of LEDs (7) and a second heat sink (8) that acts as a visual protector, both strips (2,7) being located together with the associated heat sinks (3, 8) located at their upper and lower ends, respectively

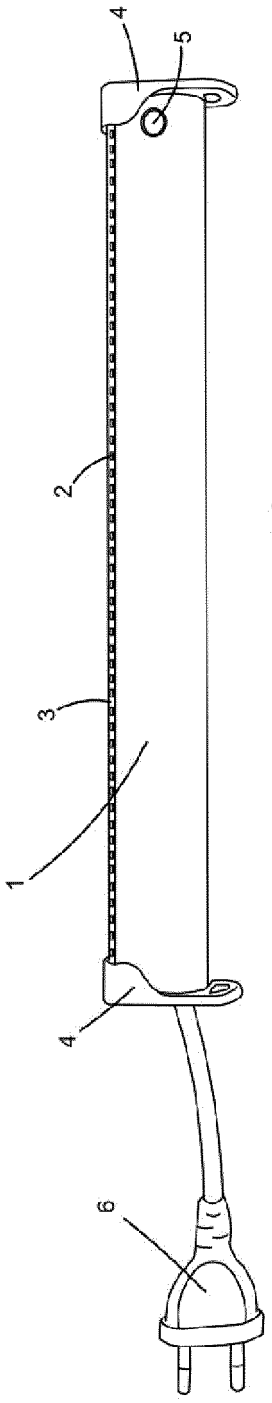

FIG.1

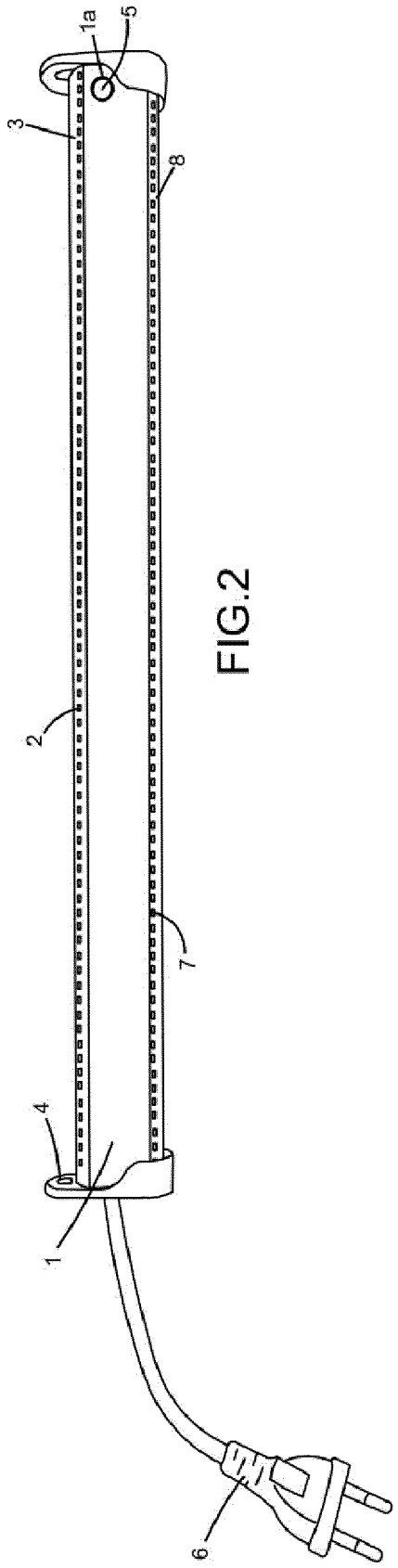

FIG.2

INTERNATIONAL SEARCH REPORT

International application No
PCT/ES2022/070522

A. CLASSIFICATION OF SUBJECT MATTER
INV. F21V23/04 A47B61/00 A47F11/10 A47G25/06 F21V29/89
F21V33/00
ADD. F21W131/301 F21Y103/10 F21Y107/90 F21Y115/10
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
F21V A47G A47B A47F F21W F21Y

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR 101 820 859 B1 (BANG YEOUNG JUN [KR]) 22 January 2018 (2018-01-22) the whole document	1-5
Y	KR 200 453 308 Y1 (LEEHYUNKI [KR]) 20 April 2011 (2011-04-20) the whole document	1-5
Y	KR 2019 0002779 U (CHUL C Y [KR]) 6 November 2019 (2019-11-06) the whole document	1-5
Y	US 7 301 287 B1 (LU CHONG YING [TW]) 27 November 2007 (2007-11-27) column 2, lines 8-50; figures 2-3	1-5
Y	DE 20 2010 017009 U1 (FKB GMBH [DE]) 24 February 2011 (2011-02-24) paragraphs [0024] - [0040]; figures 1-6	5

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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Date of the actual completion of the international search	Date of mailing of the international search report
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Name and mailing address of the ISA/	Authorized officer
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/ES2022/070522

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 101820859 B1	22-01-2018	NONE	
KR 200453308 Y1	20-04-2011	NONE	
KR 20190002779 U	06-11-2019	NONE	
US 7301287 B1	27-11-2007	NONE	
DE 202010017009 U1	24-02-2011	NONE	

Form PCT/ISA/210 (patent family annex) (April 2005)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- KR 101820859 **[0013]**
- KR 200453308 **[0017]**
- KR 20190002779 **[0020]**
- US 7301287 B **[0024]**
- DE 202010017009 **[0026]**