

INTEGRATED LIGHTING DEVICE, WHICH CAN BE USED IN
PARTICULAR IN WORKING ENVIRONMENTS

5 The present invention relates to an integrated lighting
device, which can be used in particular in working
environments.

Protection of the health and safety of workers in their
working environment is the subject of recent National and
10 Community Standards.

In this context, both satisfactory lighting of the work
place, and general health measures, assume particular
significance.

At present, lighting devices are known, which can provide
15 satisfactory lighting of a work surface, in particular
where electronic processors or video terminals in general
are used.

It is also known that these devices additionally operate
satisfactorily as systems to supplement the ordinary
20 level of lighting of an entire working environment.

Furthermore, from the point of view of the requirements
planned for satisfactory health and adequate
salubriousness of working environments, it would be
desirable simultaneously to pursue the dual aim, firstly
25 of improving the lighting conditions of the environment,

and secondly of contributing significantly to the well-
being of the operators.

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In fact, it is known that nowadays, attention is paid to the growth of the ecological crisis, associated with excessive, and not always intelligent productive development by man; the existence of dust and sediment is increasing, the concentration of oxygen is decreasing, that of carbon dioxide, lead and other metals is increasing, and the ozone layer is disintegrating.

All of these factors are leading to the loss of the natural ecological balance, and partially to the imbalance of the content of ionising substances in the air, and thus have a serious negative effect on the state of health and behaviour of man. For these reasons, the attention of doctors and health specialists, as well as of the committees which are responsible for Community and International Standards, is being turned increasingly to the quality of the working environment, particularly in environments which are closed and where there is an element of risk, and more generally to the lives of people who come into contact with synthetic materials, clothing, lacquers, paints, building materials, coatings, insulating substances, irradiating bodies, electrostatic fields, electrical equipment, electronic devices, and household electrical appliances, which can cause phenomenon of de-ionisation of the air, and concentration of heavy negative ions, or light positive ions and aero-ions, with a consequent overall decrease of light negative ions, which are so important as far as the

protection of health is concerned.

The object of the present invention is thus to provide an integrated lighting device, which can be used in particular in a working environment, which can provide
5 satisfactory lighting of the environment, with which there is combined integrally a device which contributes towards satisfactory general healthiness of the environment itself.

Another object of the invention is to provide an
10 integrated lighting device, which can be used in particular in working environments, which also permits satisfactory functioning as a supplement to the ordinary lighting level.

A further object of the present invention is to provide
15 an integrated lighting device, which can be used in particular in a working environment, which, within a single container structure, and thus with obvious advantages of an economic type, makes it possible to pursue the objectives of improving the lighting of work
20 places, compared with the conventional devices, and simultaneously to contribute significantly to the well-being and health of the operators.

A further, but not final, object of the present invention is to provide an integrated lighting device, which can be
25 used in particular in working environments, which is easy to use, and simple and economic to produce, without the use of complex or costly technologies, using known

electrical and electronic components.

This object and others are achieved by an integrated lighting device, which can be used in particular in working environments, according to claim 1, to which
5 reference is made for the sake of brevity.

As well as providing satisfactory lighting both of work surfaces which are equipped with video terminals, and of the entire working environment, as specified in the Standards on the subject of health and safety of workers,
10 the device according to the invention advantageously contributes towards increasing the advantages derived from satisfactory healthiness and safety of the environment, by utilising the positive effects of ionisation on the health of people.

15 In fact, as can be demonstrated experimentally, it is known that prolonged exposure to bipolar ionisation in the air, for example in some types of factories, offices, stores or other work places, has a positive effect on the organism.

20 Experimental results have also shown that prolonged systematic exposure to bipolar ionisation in a stable aero-ionic situation, with slight prevalence of negative ions relative to the positive, leads to some physiological changes in the organism, in terms of
25 consumption of oxygen, in exchange of heat, in the blood indicators, and in the tonus of the vascular system.

Further objects and advantages of the present invention

will become apparent from the following description and the attached drawings, provided purely by way of non-limiting example, in which:

- figure 1 shows a perspective view of an integrated lighting device according to the present invention, which can be used in particular in working environments;
 - figure 2 shows an elevated front view of the integrated lighting device according to the present invention;
 - 10 - figure 3 shows an elevated lateral view of the integrated lighting device according to the present invention; and
 - figure 4 shows a view from above of the integrated lighting device according to the present invention.
- 15 With particular reference to the aforementioned figures, 10 indicates generally an integrated lighting device according to the invention, which can be used in particular in working environments which are equipped with video terminals, comprising a single container
- 20 structure or outer casing 14, a lighting body 13, consisting of a light source or lamp 12, which is accommodated inside a lamp-holder 17, and is disposed in the position of focussing of a reflective parabola 15, which deflects appropriately the radiation which is
- 25 emitted by the lamp 12, and emerges from the top of the parabola 15, and a support base 16, which contains a stabilising weight in order to maintain the device 10

vertical.

In particular, the physical and electrical characteristics of the light source 12 and of the parabola 15 are designed specifically and appropriately, 5 in order to obtain satisfactory lighting, with light which is indirect and diffused, and is thus particularly agreeable, of an environment of either work or rest (bedroom, kitchen, or place where one or more television sets are located), and/or of a work surface, if the 10 device 10 is positioned on an office desk, or in an environment which is equipped with video terminals.

On the top of the lighting body 13, protective glass 18 is also inserted, in the direction of the light beam which is emitted by the lamp 12, as well as grids 19 for 15 the output of ionised air, which are disposed on the top of the device 10.

Inside the structure 14, there is provided an ionising electronic circuit 20, of a known type, which, from a flow of air admitted through one or a plurality of front 20 grids 21 of the device 10, can generate ionised air, which is output from a rear grid 31, conveyed by a fan 30, and is diffused in the environment, after having followed a specific path inside the device 10 (the laminar flow of the air output from the grid 31 is marked 25 indicatively as a broken line in figure 3).

There are also provided two further grids 19, for output of non-ionised air, which rises upwards by means of

convection motion, as a result of the internal heat produced by the lamp 12. Finally, the fan 30 is disposed inside the device 10, immediately facing the grids 21 for intake of air from the exterior.

5 In fact, the well-being of a person who is in an enclosed space, such as a working environment, depends both on the conventional environmental parameters such as temperature, relative humidity, cleanliness of the air, noise and lighting, and on the quantity of ions present
10 in the air, as well as on the relative percentages of the concentrations of positive ions and negative ions diffused.

The ionising electronic circuit 20 thus makes it possible to combine the effectiveness, which has already been
15 proved experimentally, of negative ions on the state of health of people, with the advantages derived from correct lighting of the environment, which is obtained by means of appropriate design of the lighting body 13. The negative ions can be produced by the circuit 20 by means
20 of known techniques, similarly to the process which takes place in nature, i.e. using a method known as the "corona effect", which is similar to a light phenomenon. According to this method, a very high voltage, which for safety reasons has low current intensity, is applied to
25 one or a plurality of needles; the electrons are thus thrust from the base towards the tip of the needles, colliding with one another, and, owing to the pressure

difference which becomes established in relation to the external environment, they can jump towards the closest molecule, giving rise to a negative ion. By selecting appropriately the value of the voltage applied, the shape
5 of the needle and the materials, the process can be rendered more efficient in terms of radius of action or distance at which the ionising circuit 20 can maintain a specific concentration of ions: an average reference value consists of 1000 ions per cubic centimetre of air.

10 The negative ions in the air have a beneficial effect on health if they are inhaled and/or absorbed directly. In addition, they are very efficient air purifiers, in particular as far as the smallest-sized and most dangerous particles are concerned.

15 The ions which leave the ionising circuit 20 and are diffused in the environment are very small, and assume high speeds; thus, if they collide with pollutant particles or particles of smoke, they become electrically neutral. These particles are then attracted by the
20 closest surfaces.

The ionising circuit 20 thus makes it possible to remove the harmful microscopic particles which are present in the air, and simultaneously it restores to the air of an environment, vitality which our body needs in everyday
25 life.

The device 10 according to the present invention additionally has two switches 22, 23, which are disposed

on the front surface of the outer casing 14, and can be actuated manually by the user in order to switch on and off respectively the lamp 12 and the ionising electronic circuit 20.

5 Finally, according to a non-limiting embodiment of the invention, on the outer surface of the parabola 15, there is provided a light-sensor device 24, in order to pilot automatic switching on of the lamp 12 in incipient conditions of poor visibility, or to modify the flow of
10 light output from the lamp 12 itself, by means of activation of known electronic "dimmer" circuits.

In this case, the aforementioned "dimmer" circuits are incorporated in the ionising circuit 20 itself.

The description provided makes apparent the
15 characteristics of the integrated lighting device which is the subject of the present invention, and can be used in particular in working environments, and also makes apparent the advantages of the device.

In particular, these consist of:

- 20 - satisfactory lighting of work places, and simultaneous application of general health measures relating to the healthiness of working environments;
- multiplicity of functions combined in a single device, and compliance with the Standards in force; and
- 25 - ease of use, portability, ease of handling, and limited cost, compared with the known art, by means of the advantages achieved and functionality which can be

obtained.

Finally, it is apparent that many variants can be applied to the integrated lighting device which is the subject of the present invention, without departing from the principles of novelty inherent in the inventive concept. It is also apparent that in practical implementation of the invention, any materials, shapes and dimensions can be used for the details illustrated, according to requirements, and these can be replaced by others which are technically equivalent.



CLAIMS

1. Integrated lighting device (10), which can be used in particular in working environments, of the type
5 comprising an external structure or casing (14), containing a lighting body (13), which can emit diffused and/or indirect light radiation in the direction of a work place or surface, in order to obtain satisfactory lighting and/or to supplement appropriately a pre-
10 existing level of lighting of the said environment, characterised in that the said structure (14) also comprises at least one device (20) for generation of ions, which can ionise and diffuse in the said environment a flow of air admitted into the device (10).
- 15 2. Integrated lighting device (10) according to claim 1, characterised in that the said lighting body (13) comprises at least one light source (12), which is disposed substantially in the position of focussing of a reflective parabolic element (15), designed such as to
20 obtain satisfactory lighting of the said environment.
3. Integrated lighting device (10) according to claim 2, characterised in that at least one transparent protective element (18) is provided in the position of the top of the said lighting body (13).
- 25 4. Integrated lighting device (10) according to claim 2, characterised in that the said light source (12) can be actuated manually by means of a first selector means



(22).

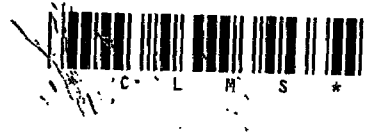
5. Integrated lighting device (10) according to claim 2, characterised in that the said light source (12) can be actuated automatically in insufficient conditions of
5 visibility, by means of a light sensor device (24), the flow of the said light source (12) being adjustable by means of electronic adjustment circuits.

6. Integrated lighting device (10) according to claim 1, characterised in that the said ion generator device
10 (20) consists of a known ionising electronic circuit, which is disposed in the position of at least one first air intake grid (21).

7. Integrated lighting device (10) according to claim 1, characterised in that the said ion generator device
15 (20) can be actuated manually by means of a second selector means (23).

8. Integrated lighting device (10) according to claim 1, characterised in that, in the position of a rear portion of the said casing (13), there is provided at
20 least one second grid (31), for the output of ionised air obtained from the said ion generator device (20), the said ionised air being conveyed towards the said second grid (31) by means of at least one fan (30).

9. Integrated lighting device (10) according to claim 3
25 and claim 8, characterised in that at least one third grid (19) is provided, for output of non-ionised air, which rises upwards by means of convection motion, as a



result of the heat produced by the said light source
(12), the said third grid (19) being disposed above and
laterally relative to the said reflective parabolic
element (15), and opposite the said transparent
5 protective element (18) of the light source (12).