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Interpatent,

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(54) **Portable electric light particularly for underwater use**

(57) A portable electric torch (1), particularly for underwater use, in which a plurality of LEDs (5) is used as light source, which LEDs are connected in parallel, are

arranged on the front parabola (3) of the torch and are fed by a suitable power source (13), such as a rechargeable or non-rechargeable battery set (13).

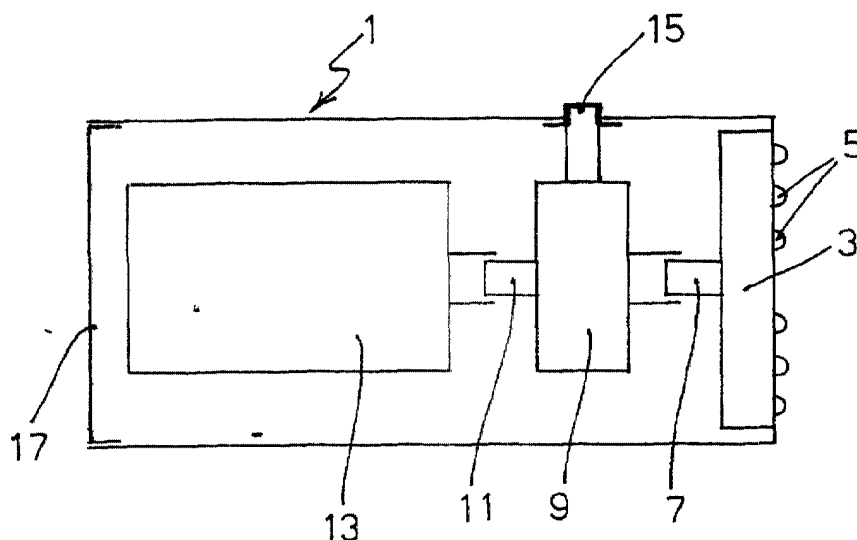


FIG. 1

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Description

[0001] The invention concerns a portable electric torch, particularly for underwater use.

[0002] Portable electric torches at present in use are generally fed by rechargeable or non rechargeable battery sets, which feed with current incandescent lamps, provided in a convenient number and arranged on a suitable reflecting parabola, depending on the kind of torch concerned.

[0003] The main problem with said torches is the operating life of said battery sets, even between consecutive rechargings if rechargeable batteries are concerned, said life being at present rather limited.

[0004] The reason for that limited life is that incandescent lamps, which absorb a high power amount, are used as the light sources.

[0005] Another aspect to be considered is that said incandescent lamps generally are mounted on a reflecting parabola in order to create an effective directional light beam.

[0006] The object of the present invention is to remedy said drawbacks, by providing a portable electric torch, particularly for underwater use, which has a substantially longer life, about three times longer, than the average life of a present portable electric torch, and in which mounting the light sources onto a parabola to create the light beam is not required.

[0007] The main feature of the portable electric torch concerned is that a plurality of LEDs (Light Emitting Diodes) are used as light source, said LEDs being connected in parallel, being arranged on the front parabola of the torch and being fed by a suitable power source, such as a rechargeable or non-rechargeable battery set.

[0008] Another feature of the torch concerned is that said LEDs are arranged in concentric arrays on the front parabola of the torch.

[0009] A further feature of the torch concerned is that said front parabola of the torch, on which the LEDs are mounted, may be a non-reflecting parabola since said LEDs emit by themselves directional light.

[0010] The invention will now be disclosed with particular reference to the accompanying drawings, given by way of non limiting example, in which:

- Fig. 1 is a longitudinal sectional view of a portable torch according to the invention; and
- Fig. 2 is a front view of said torch, showing the LED arrangement in the front parabola of the torch.

[0011] As it is clearly apparent, the portable electric torch 1 concerned is substantially similar to a portable torch presently in use, and comprises a cylindrical housing, provided in its front part with a parabola 3 bearing the LEDs 5 and connected through a male fitting 7 to the feeding circuit 9, which in turn is connected through another male fitting 11 to the battery set 13.

[0012] Said LEDs are connected in parallel and are

obviously fed by the battery set 13 through the feeding circuit 9, of course equipped with a spring push-button 15 for turning the torch 1 on.

[0013] Said LEDs 5 are arranged in concentric arrays on the front part of the parabola 3, and the number of said LEDs is greater or smaller depending on the LED type concerned.

[0014] A cap 17 that can be opened to allow removal and reinsertion of the battery set 13 is provided in the rear part of the cylindrical housing of the torch 1.

[0015] As mentioned above, the parabola 3, on which the plurality of LEDs is mounted, may even be a non-reflecting parabola, since said LEDs emit directional light.

[0016] The LEDs used have a total illumination life of 6 to 12 hours, of which 2 to 4 hours at maximum power, about 2 hours at 50% the maximum power, and 2 to 6 hours of further endurance at 10% the maximum power.

[0017] Moreover, said torch, at very low voltage, provides a minimum safety light that makes it a signalling instrument, thanks to the very slow self-discharge time (about 10 to 12 hours).

[0018] The torch according to the invention, besides the lower consumption (about 3 times lower) and the longer life (about 3 times longer) if compared to a conventional torch, has also the following advantages:

- resistance to mechanical vibrations;
- limited encumbrance;
- no maintenance required;
- short response time, of the order of some tens nanoseconds;
- light efficiency which may be above 25 lm/watt;
- the same operating temperature as the environment of use.

Claims

1. A portable electric torch (1), particularly for underwater use, the torch being similar to a portable electric torch at present in use and being **characterised in that** a plurality of LEDs (5) is used as light source, wherein said LEDs are connected in parallel, are arranged on the front parabola (3) of the torch and are fed by a suitable power source (13), such as a rechargeable or non-rechargeable battery set (13).
2. A portable electric torch according to claim 1, **characterised in that** said LEDs are arranged in concentric arrays on the front parabola (3) of the torch.
3. A portable electric torch according to claims 1 and 2, **characterised in that** said front parabola (3) of the torch may be a non-reflecting parabola, since said LEDs emit by themselves directional light.
4. A portable electric torch according to claim 1, **char-**

acterised in that it comprises a cylindrical housing, provided in its front part with a parabola (3) bearing the LEDs (5) and connected through a male fitting (7) to the feeding circuit (9), which in turn is connected through another male fitting (11) to the battery set (13). 5

5. A portable electric torch according to claim 4, **characterised in that** said LEDs (5) are connected in parallel and are fed by the battery set (13) through the feeding circuit (9), equipped with a spring push-button (15) for turning the torch on. 10

6. A portable electric torch according to claim 4, **characterised in that** a cap (17) that can be opened to allow removal and reinsertion of the battery set (13). is provided in the rear part of the cylindrical housing of the torch (1). 15

7. A portable electric torch according to any preceding claim, **characterised in that**, depending on the LEDs used, it has a total illumination life of 6 to 12 hours, of which 2 to 4 hours at maximum power, about 2 hours at 50% the maximum power, and 2 to 6 hours of further endurance at 10 the maximum power. 20 25

8. A portable electric torch according to claim 7, **characterised in that**, at very low voltage, provides a minimum safety light that makes the torch a signalling instrument, thanks to the very slow self-discharge time (about 10 to 12 hours). 30

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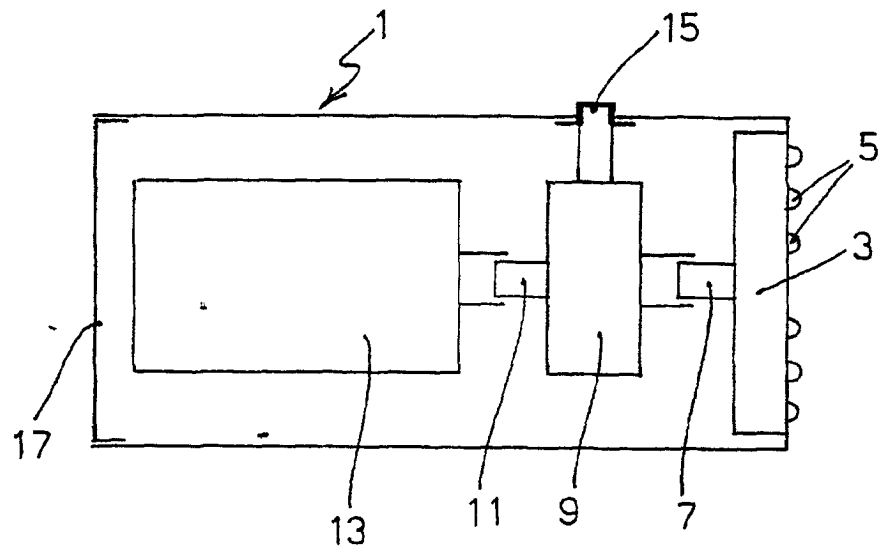


FIG. 1

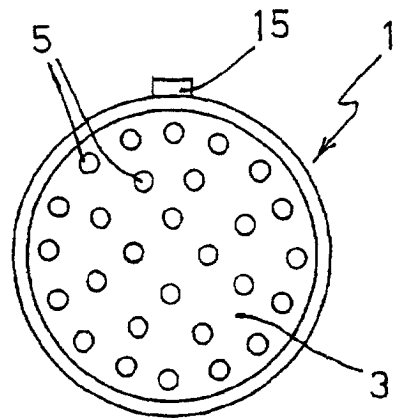


FIG. 2



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EUROPEAN SEARCH REPORT

Application Number
EP 00 83 0214

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	DE 299 13 930 U (STROBL THOMAS) 18 November 1999 (1999-11-18) * page 3, line 5 - line 15 * * page 4, line 5 - line 13 * * page 4, line 33 - page 5, line 34 * * page 6, line 13 - line 21 * * page 7, line 27 - page 8, line 5 * * page 10, line 24 - page 11, line 29 * * figures 1,2,4,5,7 * ---	1-3	F21L4/02 //F21W111:10, F21Y101:02
A	US 4 963 798 A (MCDERMOTT KEVIN) 16 October 1990 (1990-10-16) * column 2, line 14 - line 36 * * column 3, line 29 - column 4, line 37 * * figures 5,6,8-10 * ---	1	
A	US 5 161 879 A (MCDERMOTT KEVIN) 10 November 1992 (1992-11-10) * column 2, line 24 - line 56 * * column 5, line 65 - column 6, line 3 * * column 9, line 27 - line 42 * * column 11, line 9 - line 41 * * figures 1,3,8,9,17 * ---	1	
A	DE 297 00 991 U (HOMANN DIRK DR) 27 March 1997 (1997-03-27) * page 1, line 15 - line 25 * * page 2, line 30 - page 3, line 17 * * page 3, line 33 - page 4, line 3 * * page 4, line 28 - line 34 * * page 5, line 30 - line 35 * * page 6, line 25 - line 30 * * figures 1,2 * -----	1	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 11 July 2000	Examiner Cosnard, D
CATEGORY OF CITED DOCUMENTS 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 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 & : member of the same patent family, corresponding document			

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 00 83 0214

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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11-07-2000

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82