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(54) **Flashlight**

(57) A flashlight applicable directly onto the top of a battery_by a snap fitting connection so that the flashlight may be snapped directly onto the top of a battery having both the positive and negative terminals on one end, the flashlight comprising: a housing (10), a circuit board (2), a light source (3) and a switch, and connectors connecting to the connectors on the top of the battery (4), wherein the circuit board has a control circuit board (22) and illumination circuit board (20) arranged in T-form so that the control circuit board is arranged perpendicular to the illumination circuit board (20), a light source (3) is arranged on the top of the illumination circuit board that is parallel with the battery top, and the switch is a touch switch (7) located on the control circuit board (20).

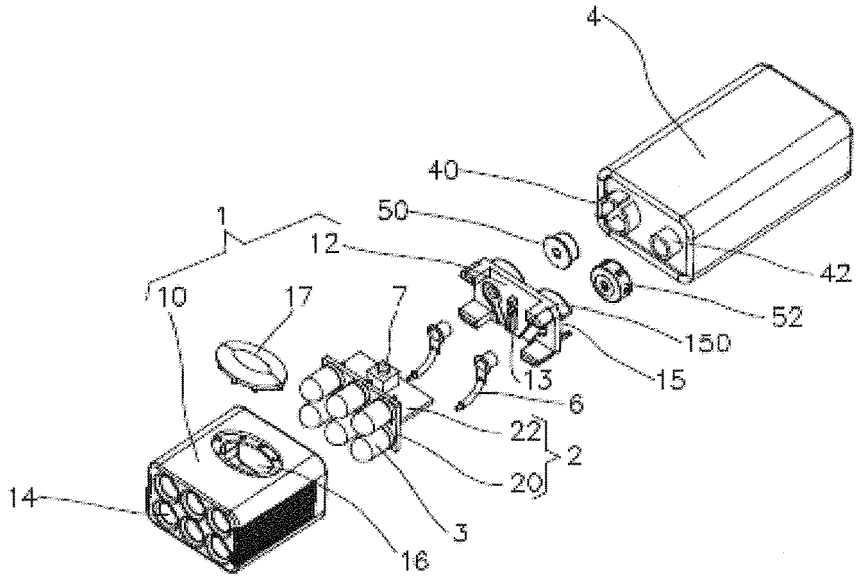

Fig. 1

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Description

Technical field

[0001] The present invention relates to flashlights.

[0002] Especially the present invention relates to flashlights that can be applied directly onto the top of a battery.

Technical background

[0003] Known flashlights have typically a lamp holder and a tube body into which the battery is inserted. To guarantee the stability as well as the durability of the flashlight's power supply and, taking into account the limited voltage and current capacity of the battery, the tube body often has two or more batteries connected in series which makes the known flashlights bulky and heavy.

[0004] As battery technology has developed, the voltage and current of single node batteries had improved and the size has become smaller, resulting in more efficient batteries, for example a 9 V battery.

[0005] A nine-volt (9 V) battery, also called a PP3 battery, is shaped as a rounded rectangular prism and has a nominal output of nine volts. Its nominal dimensions are 48 mm x 25 mm x 15 mm. A 9 V battery has both the positive and negative terminals on one end. The connection is a snap fitting connection that consists of two connectors arranged on the top of the battery: one smaller circular (male) and one larger, typically either hexagonal or octagonal (female).

[0006] Some manufacturers have designed flashlights for this kind of batteries. They are provided with a push button switch installed on the side of circuit board and it has no support when pressed; the support is only based on a soldering part on the circuit board. If the flashlight is used a long time, the soldering may lose causing a short circuit.

Summary of the invention

[0007] To solve the above-mentioned disadvantages the present invention discloses a new type of a flashlight. The flashlight may be snapped directly onto the top of a standard battery, such as 9V battery. The flashlight has a touch switch and a circuit board with IC control circuit capable of different illumination modes.

[0008] The flashlight comprises a housing, a driving circuit board having control circuit board and illumination board, a light source on the front of illumination board, a touch switch located on driving circuit board, a through hole for the switch and a conducting part separately to the battery's positive and negative pole through the corresponding wire coupling on the conduction parts of the driving circuit board. The touch switch makes control circuit board more stable and convenient for the operation.

[0009] The novel and inventive features that are considered as characteristic of the flashlight are set forth with the enclosed claims.

[0010] In a preferred embodiment the control circuit board includes the control LED chip connected to the touch switch.

[0011] In another preferred embodiment the exterior of hole has the pressing covering to cover the touch switch.

[0012] In another preferred embodiment the illumination lamp includes a LED array with a plurality of LEDs.

[0013] In another preferred embodiment the LED array includes 6 LEDs connected in 2 lines and 3 rows.

[0014] In another preferred embodiment the housing comprise the front housing, the bottom housing, and the light transmittance and the conduction parts on the bottom cover.

[0015] In another preferred embodiment the light transmittance is arranged through a hole or a transparent window.

[0016] In another preferred embodiment the protrusion of side surface on bottom cover has two slot buckles having the conduction part embodied. In another preferred embodiment each slot buckle is composed of two curved cleats. In another preferred embodiment the inner side of bottom cover has the slot to fix the control circuit board.

[0017] In another preferred embodiment protective dams around the metal clips on the flashlight will ensure the fitting onto the battery more tightly.

[0018] The disclosed device is easy to operate and the switch is stable.

[0019] A further advantage of this flashlight is that it sis easy to operate by a touch switch. The circuit board has a T shape configuration between illumination board and controlled circuit board through driving circuit board, installing touch switch on the bottom of controlled circuit board and supporting by controlled circuit board

Short description of the drawings

[0020] The foregoing, and additional objects, features and advantages of the present invention will be more clearly understood from the following detailed description of preferred embodiments of the present invention, taken in conjunction with accompanying drawings, in which:

FIG 1 is a front side view of embodiment of the flashlight

FIG 2 is a back view of this invention

FIG 3 is the circuit schematic of the flashlight

Description of preferred embodiments

[0021] Figs. 1 and 2 present a flashlight that can be applied directly onto the top of a 9 V battery 4 by a snap fitting connection so that the flashlight may be snapped directly onto the top of a standard 9 V battery.

[0022] The flashlight comprises a rectangular housing 1, a driving circuit board 2 and a light source 3. The housing 1 has a front housing 10 having light transmittance 14 from light 3 and bottom housing 12. Referring to Fig.

1, the part 14 is a through hole. The exterior of bottom housing 12 comprises two conducting connector parts 50, 52 that can be coupled on positive 40 and negative pole 42 separately on the top of the battery 4. The inner side of bottom housing 12 has a slot buckle 13 to fix circuit board 2 and the exterior of 12 have two slot buckles 15 which includes two curving cleats 150. Slot buckle 15 embodied in a conducting part 50 (52) which is connected to circuit board 2 by a conducting wire 6.

[0023] The circuit board 2 comprises a rectangular illumination circuit board 20 in front of the housing 1 parallel with the top of the battery and a rectangular control circuit board 22 arranged in T shape with the illumination circuit board 20 ie. they are arranged perpendicular to each other so that the bottom edge of the board 22 is arranged on the centre line of the illumination board 20. The bottom of circuit board 22 is fixed into a center line slot 13 on the illumination board 20 to make the driving circuit board 2 stable. A light source 3 is arranged on the front side of illumination board 20, which comprises a LED array with many LEDs.

[0024] Referring to Fig. 1, the light source 3 is a LED array including 6 LEDs, arranged in 2 lines of 3 rows.

[0025] The control circuit board 22 has a touch switch 7, and the front housing 10 has a hole 16 and a pressing covering 17. The hole 16 is located on the front housing 10 parallel with circuit board 2 and exterior of 16 has pressing covering 17 to cover touch switch 7.

[0026] Fig. 3 presents a circuit diagram including the LEDs L1 - L6 two in a series coupling and in three branches, totally 6 LEDs and resistors R2 - R4 in series with the LEds in each branch.

[0027] Referring to Fig. 3 presenting the circuit diagram, the flashlight has a LED control chip 8. Through this mode, it can archive the light modes of many light sources, mainly including normal bright, flash bright and LED in the lamp array part to be bright, but other LED lamp not bright and so on patterns. Through the touch switch 7, we can change to different lighting mode, for example, show bright after first touch, flashing bright after second touch, some LED bright and some not bright after the third touch and the closing after the fourth touch, like this, we can control the LEDs. The battery 4 is coupled to the flashlight through a resistor R1 and a diode D1.

[0028] It is obvious to the person skilled in the art that different embodiments of the invention are not limited to the example described above, but that they may be varied within the scope of the enclosed claims.

Claims

1. A flashlight applicable directly onto the top of a battery by a snap fitting connection so that the flashlight may be snapped directly onto the top of a battery having both the positive and negative terminals on one end, the flashlight comprising: a housing (10), a circuit board (2), a light source (3) and a switch, and connectors connecting to the connectors on the top of the battery (4),
characterized in
that the circuit board has a control circuit board (22) and illumination circuit board (20) arranged in T-form so that the control circuit board is arranged perpendicular to the illumination circuit board (20),
a light source (3) is arranged on the top of the illumination circuit board that is parallel with the battery top, and
the switch is a touch switch (7) located on the control circuit board (20).

2. The flashlight according to claim 1, wherein the control circuit board includes a LED control chip connected to the touch switch.

3. The flashlight according to one of the preceding claims, wherein the exterior of hole has a pressing covering to cover the touch switch.

4. The flashlight according to one of the preceding claims, wherein the light includes at least one LED, for example a LED array with a plurality of LEDs, preferably including six LEDs connected in two lines and three rows.

5. The flashlight according to one of the preceding claims, wherein the housing comprises a front housing, the bottom housing, and the light transmittance and the conduction parts on the bottom cover.

6. The flashlight according to one of the preceding claims, wherein the light transmittance is arranged through a hole or a transparent window.

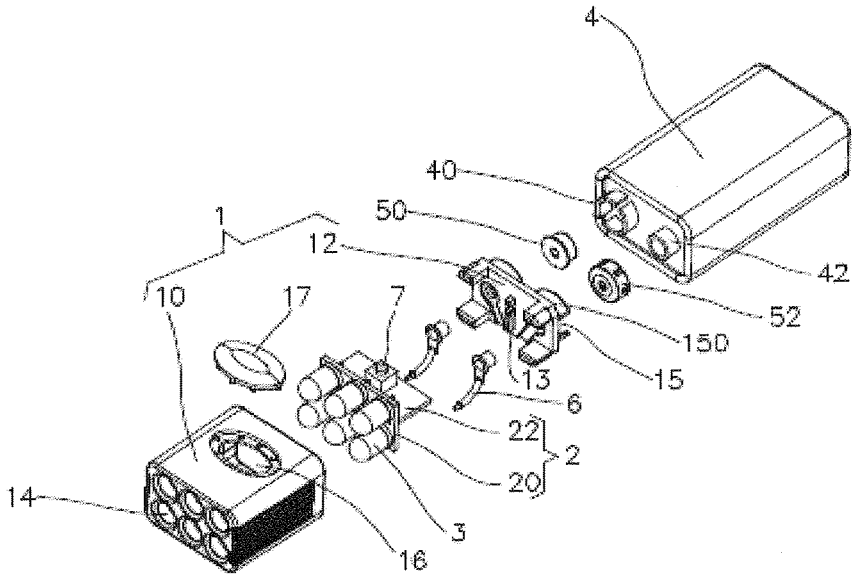
7. The flashlight according to one of the preceding claims, wherein the protrusion of side surface on bottom cover has two slot buckles having the conduction part embodied, wherein each slot buckle is composed of two curved cleats, and wherein the inner side of bottom cover has a slot to fix the control circuit board.

8. The flashlight according to one of the preceding claims, wherein protective dams around the metal clips on the flashlight will ensure the fitting onto the battery more tightly.

9. The flashlight according to one of the preceding claims, wherein the flashlight has a light control chip 8.

10. The flashlight according to one of the preceding claims, wherein the light control chip 8 is configured to have a plurality of light modes of many light sources, mainly including normal bright, flash bright and LED in the lamp array part to be bright, but other

LED lamp not bright and so on patterns, and wherein the touch switch (7) is applied to control the LEDs in order to change to different lighting mode, for example, show bright after first touch, flashing bright after second touch, some LED bright and some not bright after the third touch and the closing after the fourth touch.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40
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16

Fig. 1

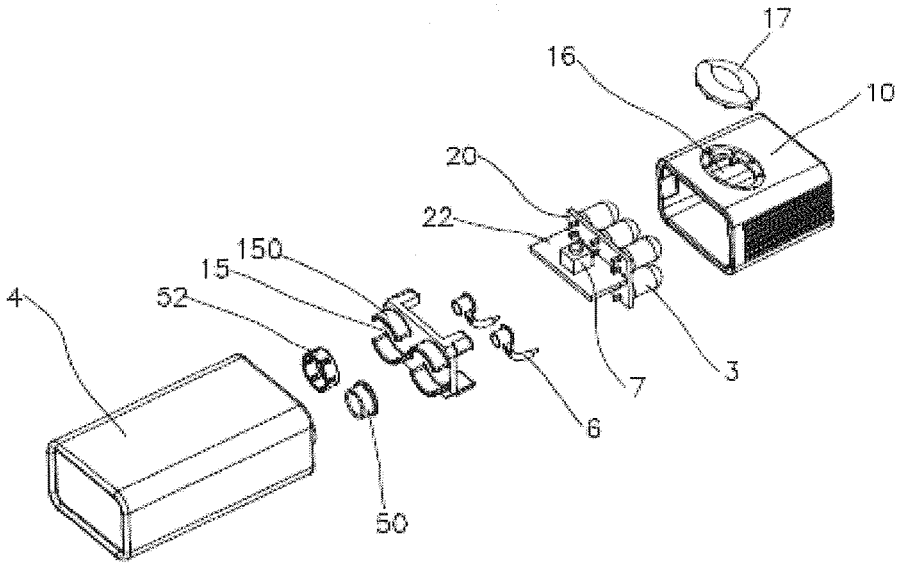
17
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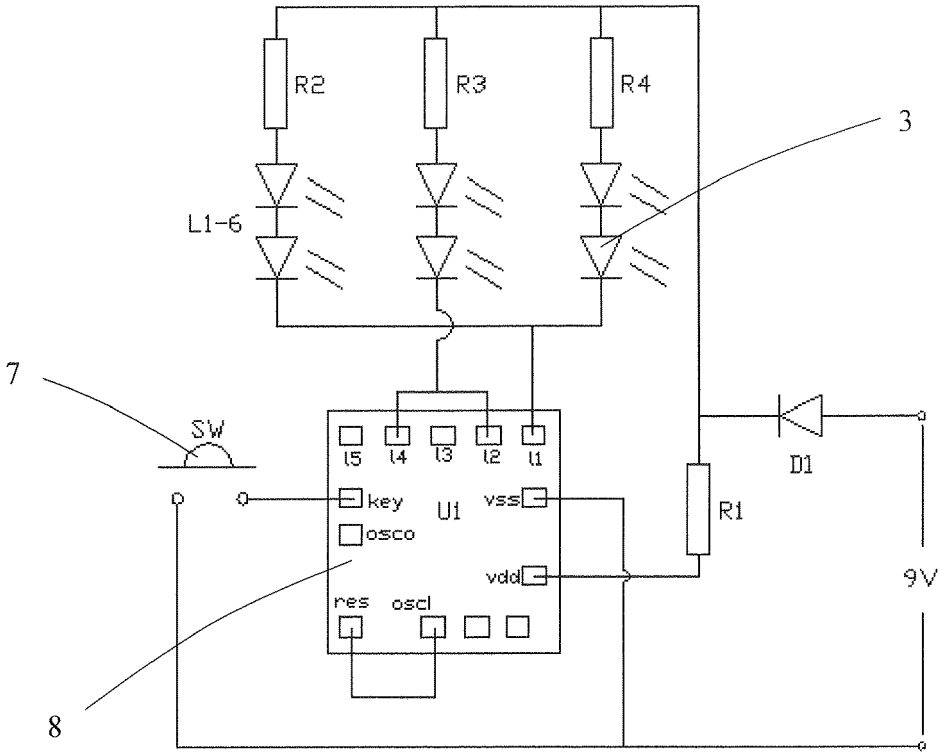
Fig. 2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R3
R4
3
L1-6
7
SW
l5
l4
l3
l2
l1
key
U1
vss
osco
vdd
res
oscl
D1
R1
9V
8

Fig. 3