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(54) An alarm for generating flash events

(57) An alarm generates repeated pairs of primary and secondary light flash events when triggered. One light source produces primary flash events of visible light with a wide bandwidth of e.g. 200 nm. Another light source produces secondary flash events of visible light with a narrow bandwidth e.g. less than a third of the primary flash event. The primary and secondary flash events overlap wholly or partially or are consecutive.

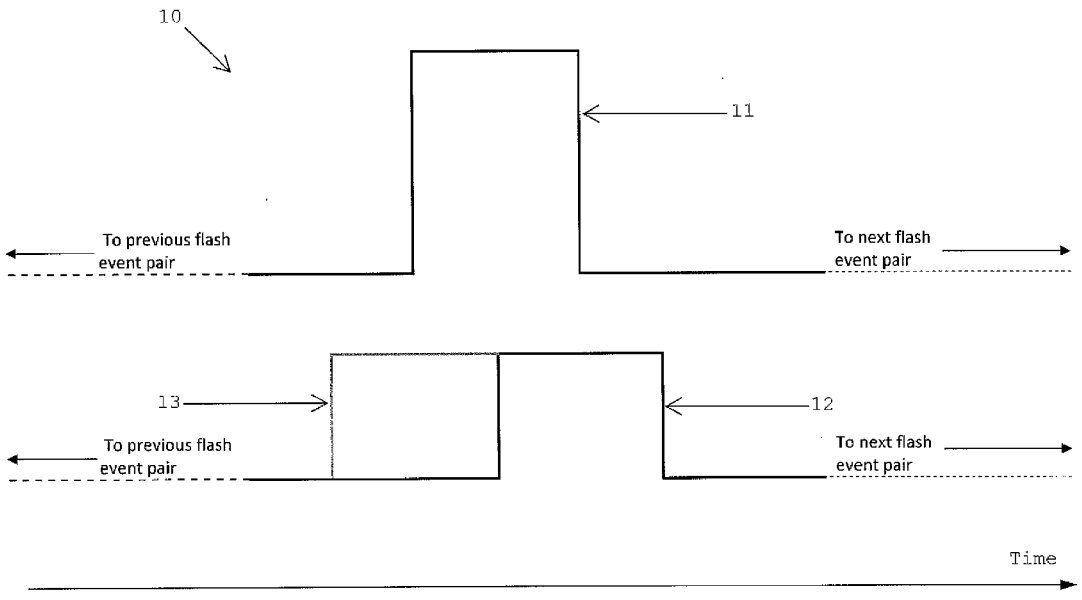

Fig. 1

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Description

[0001] The present invention relates to an alarm for generating flash events, such alarms may be used, for example, in a network of alarms which flash when triggered.

[0002] Alarms frequently have a light that repeatedly flashes as a part of the response to the alarm being triggered. The use of the light is to attract attention. In order to fulfil this purpose the flash of light must be bright. The brightness level required for such a flash is high.

[0003] There is a market demand that a flashing light on a triggered alarm be coloured and therefore be of a narrow bandwidth. Most frequently the demand is for the colour to be red with a central bandwidth frequency in the range of 430THz to 480THz.

[0004] Alarms are often devices operating within a system, network or loop of alarms. Due to the requirements of such systems, an alarm can only draw a small amount of current for operation.

[0005] Narrow bandwidth light, such as a bandwidth of approximately a quarter or less of the visible spectrum, is not as effective at attracting attention as wide bandwidth light, such as a bandwidth of approximately two thirds or more of the visible spectrum or white light, especially if reflected light is being relied upon or if the light is reflected from a surface. If there is more than one flash bandwidth used as the primary flash, by using different light sources, lens design can become difficult and complex.

[0006] The use of a narrow bandwidth flash, such as that described above, of the needed brightness level draws a larger current from an alarm loop. A large draw of current in an alarm loop is difficult and impractical as such loops are not set up to function with large current draws. The greater bandwidth of a wide bandwidth flash, such as that described above, causes a lower brightness level to be required to attract attention than a narrow bandwidth due to the increased power output of each flash given by the extra bandwidth, and to the fact that the eye is generally less sensitive to narrow band light than it is to wider band light. Thus, a lower current is drawn from the loop.

[0007] However, if a wide bandwidth flash is used for the improved ability to attract attention and lower draw of current, the market demand for a coloured flash is not met.

[0008] At its most general, the present invention proposes a wide bandwidth flash event coloured by a narrow bandwidth flash event.

[0009] According to the invention, there may be provided an alarm for generating repeated pairs of primary and secondary light flash events when triggered, comprising: a first light source arranged to produce the primary flash events of visible light with a bandwidth of at least 200nm (nanometres); a second light source arranged to produce the secondary flash events of visible light with a bandwidth of less than a third of the primary flash events, wherein the primary and the secondary flash event within each pair wholly overlap in duration, or the primary and the secondary flash event within each pair partially overlap in duration, or the primary and the secondary flash event within each pair are consecutive in duration. In use, the wide bandwidth primary flash events attract attention due to the brightness and effectiveness of the wider bandwidth. The use of the secondary flash event is to give the observable flash a coloured appearance. The secondary flash may precede or be preceded by the primary flash whilst maintaining the relationship between the durations.

[0010] In this case, consecutive is taken to mean one after the other with a limited intermediary gap such that there are not two discernable events. Therefore for this invention two flash events are consecutive if one flash event of a pair is followed by the other flash event with the gap between the end of the preceding flash event and the beginning of the following flash event being not more than 200ms; preferably not more than 100ms

[0011] The duration of the primary flash events may be 500ms (milliseconds) or less, and separately the duration of the secondary flash events may be 500ms or less.

[0012] The bandwidth of the secondary flash event may be less than 30nm.

[0013] There may be a timer element programmed to send out pulse events to cause the primary and the secondary flash events. Note that each pulse event may single pulse, with one pulse event for each flash event, or may be a plurality of trigger pulses in short succession, which results in the corresponding light source appearing to illuminate continuously during the pulse event. Use of pulse events involving a plurality of trigger pulse is known per se to drive light sources such as LEDs.

[0014] When there is a partial overlap between the two flash events of each pair of flash events, the overlap in the durations may be 50% or less, preferably 20% or less.

[0015] The primary flash events and the secondary flash events may each have a plurality of sources.

[0016] According to the invention, there may also be provided a method for an alarm generating a repeated pair of primary and secondary light flash events; wherein when triggered the alarm executes the steps comprising: primary flash events of visible light with a bandwidth of at least 200nm; secondary flash events of visible light with a bandwidth of less than a third of the primary flash events, wherein the primary and the secondary flash event within each pair wholly overlap in duration, or the primary and the secondary flash event within each pair partially overlap in duration, or the primary and the secondary flash event within each pair are consecutive in duration.

[0017] An embodiment of the invention is discussed in detail below, by way of example with reference to the accompanying drawings, in which:

Fig. 1 shows an embodiment of the timing relation-

ship of the flash events of each pair of flash events;
Fig. 2 shows an embodiment of an alarm containing a first and a second flash source;
Fig. 3 shows an embodiment of the timing device programmed to send out a pulse to create the primary and secondary flash events.

[0018] An embodiment of the invention comprises an alarm that generates repeated pairs of flash events when it is triggered. One flash event of the pair has a wide bandwidth of extending through 200nm of the visible spectrum, which gives approximately white light. The other flash event of the pair has a narrow bandwidth limiting it to a third of the bandwidth of the wide bandwidth flash event, which limits the narrow bandwidth flash event to approximately one colour region of the visible spectrum.

[0019] The wide bandwidth flash event is emitted by one source and the narrow bandwidth flash event is emitted by a second source. When the flashes are emitted by the respective sources, they are controlled by a timing element that is programmed to activate the flash event sources at the correct timings.

[0020] In this embodiment of the invention, within a pair of flash events the two flash events have an overlapping timing relationship. The wide bandwidth primary light flash event is followed by the narrow bandwidth secondary light flash event that starts before the primary flash event has ended.

[0021] Fig. 1 shows a timing relationship of the flash events of a pair of flash events (10) of an embodiment of the invention. The pair of flash events (10) is made up of a primary light flash event (11), and a secondary light flash event (12) as an embodiment of the invention. In this embodiment of the invention, the primary light flash event (11) starts, and is followed by a secondary light flash event (12) that starts before the primary light flash event (11) finishes. The flash events occur when the alarm is triggered

[0022] Fig.1 also shows a variation of the embodiment of the invention. The variation is of a secondary light flash event (13) that starts and is followed by a primary light flash event (11) that starts before the secondary light flash event finishes.

[0023] In another embodiment of the invention in each pair of flash events (10) a primary light flash event (11) starts, and at the same time as the primary light flash event (11) finishes a secondary light flash event starts, or as a variation, a secondary light flash event starts and at the same time as the secondary light flash event finishes a primary light flash event (11) starts.

[0024] In another variation of this embodiment there is a gap between the end of a preceding flash event and the beginning of a following flash event in a pair of flash events of a maximum gap of 200ms,

[0025] In one of the variations of an embodiment of the invention the primary light flash events have a bandwidth of 200nm and the secondary light flash events have a bandwidth of a third of the bandwidth of the primary light flash events such that the flash events produce visible light.

[0026] Returning to Fig. 1, the primary and secondary light flash events ((11) and (12)) of a pair of flash events (10) form one combined flash event due to their corresponding timings. The different primary and secondary light flash events enables the alarm to draw a lower current and to achieve the needed brightness to attract attention. The combined flash is coloured as the secondary light flash events colour the primary light flash events due to the relationship between the timings.

Fig. 1 also shows that the pair of primary and secondary light flash events (10) is repeated when the alarm is triggered.
Fig. 2 shows an embodiment of the invention. This embodiment shows an alarm (20) that has a first light source (22) and a second light source (23) embedded within an alarm module (21).

[0027] In a variation of this embodiment of the invention there is a plurality of first and/or second light sources.

[0028] Moreover, it is possible that the light sources are formed by two LEDs integrated together into a single integrated circuit device. Whilst appearing as a single component, the LEDs of such a component may be driven to generate the different light flash events used in the present invention.

[0029] Fig. 3 shows an embodiment of the timing element (30) of the invention which is connected to the first light source (22) and the second light source (23) to enable the timing element (30) to activate the light sources.

[0030] When there are a plurality of first light sources and/or second light sources, the timing element (30) is connected to all the light sources to enable their activation.

Claims

1. An alarm for generating repeated pairs of primary and secondary light flash events when triggered, comprising:

   a first light source arranged to produce the primary flash events of visible light with a bandwidth of at least 200nm;
   a second light source arranged to produce the secondary flash events of visible light with a bandwidth of less than a third of the primary flash events, wherein
   the primary and the secondary flash event within each pair wholly overlap in duration, or
   the primary and the secondary flash event within each pair partially overlap in duration, or
   the primary and the secondary flash event within each pair are consecutive in duration.

2. An alarm for generating repeated pairs of primary and secondary light flash events when triggered according to claim 1, wherein
the flash events have durations of 500ms or less.

3. An alarm for generating repeated pairs of primary and secondary light flash events when triggered according to any one of the preceding claims, wherein the bandwidth of the secondary flash event is less than 30nm.

4. An alarm for generating repeated pairs of primary and secondary light flash events when triggered having a timer element programmed to send out a pulse event to cause the primary and the secondary flash events.

5. An alarm for generating repeated pairs of primary and secondary light flash events when triggered according to any one of the preceding claims, wherein the primary and the secondary flash event of each pair overlap in duration, and
the overlap is 50% or less.

6. An alarm for generating repeated pairs of primary and secondary light flash events when triggered according to any one of the preceding claims, wherein the primary light flash event has a plurality of sources.

7. An alarm for generating repeated pairs of primary and secondary light flash events when triggered according to any one of the preceding claims, wherein the secondary light flash event has a plurality of sources.

8. A method for an alarm generating a repeated pair of primary and secondary light flash events; wherein when triggered the alarm executes the steps comprising:

primary flash events of visible light with a bandwidth of at least 200nm;
secondary flash events of visible light with a bandwidth of less than a third of the primary flash events, wherein
the primary and the secondary flash event within each pair wholly overlap in duration, or
the primary and the secondary flash event within each pair partially overlap in duration, or
the primary and the secondary flash event within each pair are consecutive in duration.

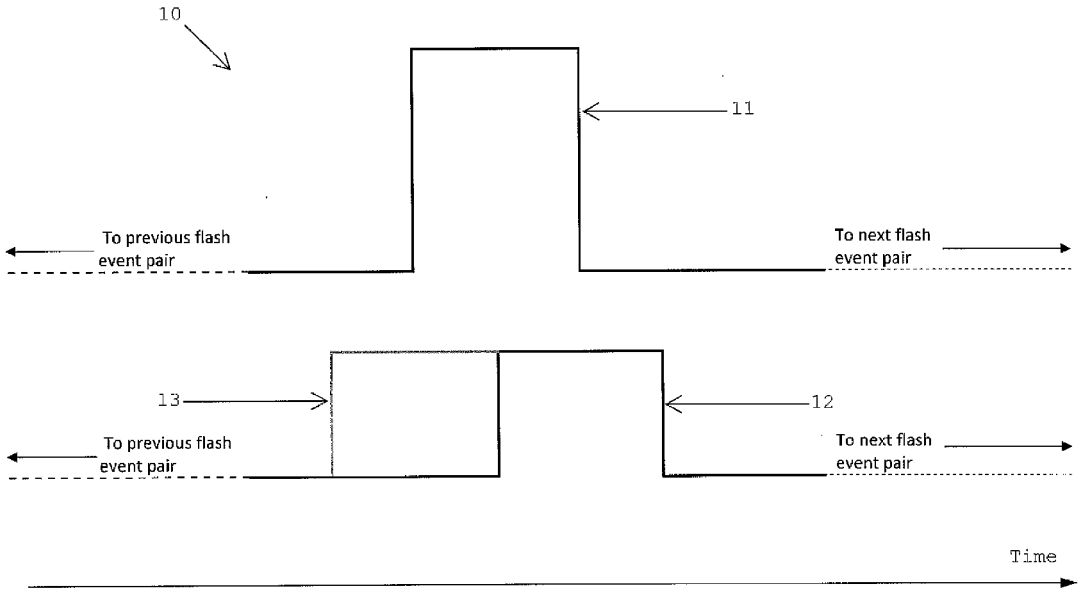
10
11
To previous flash event pair
To next flash event pair
13
12
To previous flash event pair
To next flash event pair
Time

Fig. 1

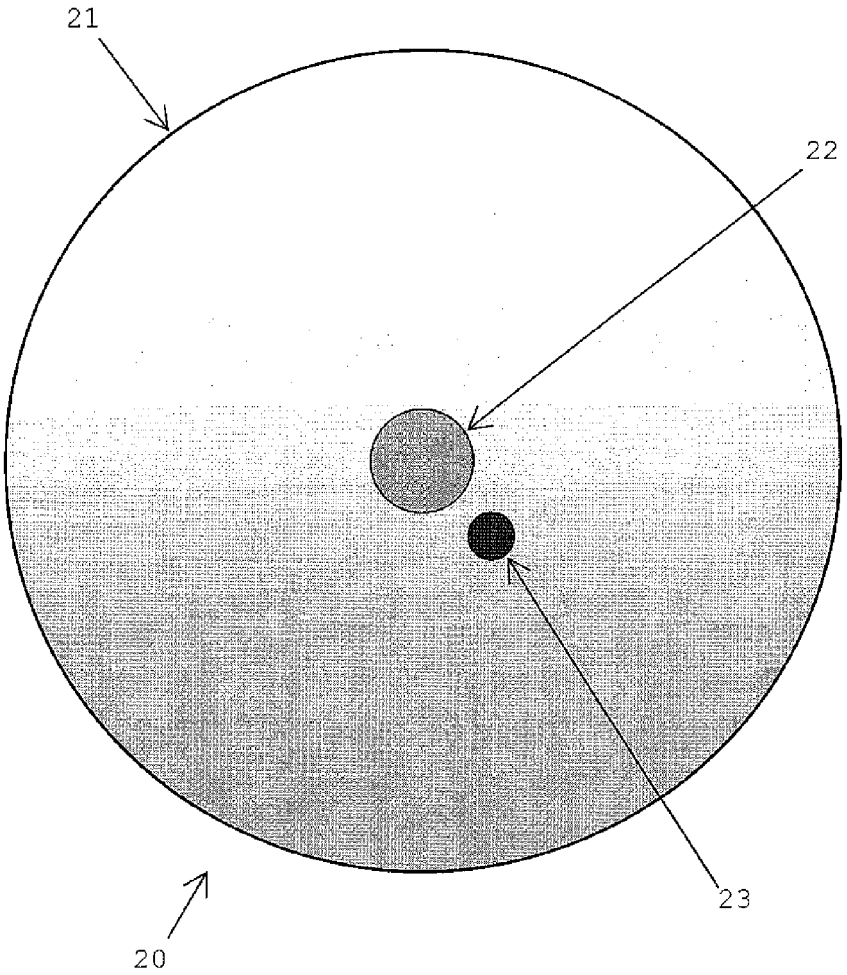

Fig. 2

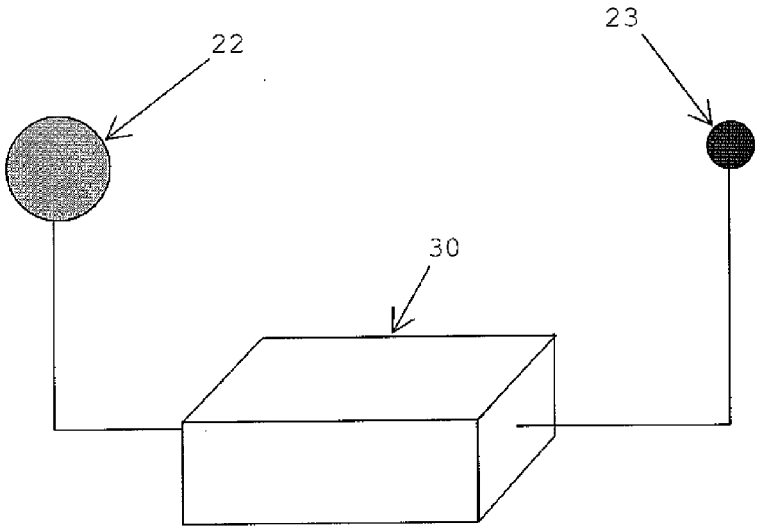

Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 12 19 5078

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	US 2004/095253 A1 (TANGUAY WILLIAM P [US]) 20 May 2004 (2004-05-20) * paragraph [0060] - paragraph [0064]; figures 4-6 *	1,2,4, 6-8 3,5	INV. G08B5/38 H05B37/02 H05B41/34
Y	US 2011/012746 A1 (FISH JR RICHARD T [US] ET AL) 20 January 2011 (2011-01-20) * paragraph [0064] - paragraph [0065] * * paragraph [0067] * * paragraph [0094] *	1-8	
Y	WO 2006/012649 A1 (RUNCIMAN DUNSTAN WALTER [ZA]; ATTWELL COLIN WILLIAM PETER [ZA]) 2 February 2006 (2006-02-02) * abstract * * page 4, line 5 - page 6, line 7; figures 1-3 *	1-8	
Y	US 5 355 119 A (PEARLMAN BARRY S [US]) 11 October 1994 (1994-10-11) * column 3, line 62 - column 5, line 35; figures 1,3-8 * * column 12, line 20 - column 14, line 14 *	1-8	TECHNICAL FIELDS SEARCHED (IPC) G08B H05B
Y A	US 5 175 528 A (CHOI ROBERT S [US] ET AL) 29 December 1992 (1992-12-29) * column 9, line 57 - column 10, line 2 * * column 13, line 7 - line 51 *	3 1,8	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	2 May 2013	La Gioia, Cosimo

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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02-05-2013

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2004095253 A1	20-05-2004	US 2004095253 A1	20-05-2004
		US 2005151663 A1	14-07-2005
US 2011012746 A1	20-01-2011	NONE	
WO 2006012649 A1	02-02-2006	NONE	
US 5355119 A	11-10-1994	GB 2222919 A	21-03-1990
		US 5355119 A	11-10-1994
US 5175528 A	29-12-1992	US 5175528 A	29-12-1992
		US 5313188 A	17-05-1994

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