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(71) Applicant(s):  
**Boaz Mina**  
**Tzipori 1, Beer Sheva 84779, Israel**  
  
**Yoash Idy Mina**  
**Etrog 25, Neve Monoson 60910, Israel**

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**GB 2417811 A** **GB 2237579 A**  
**GB 2208028 A** **EP 0240591 A2**  
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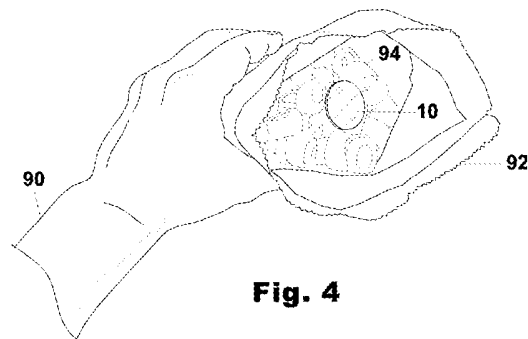
(72) Inventor(s):  
**Boaz Mina**  
**Yoash Idy Mina**

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(74) Agent and/or Address for Service:  
**BRAL Ltd**  
**12 York Gate, Regent's Park, LONDON, NW1 4QS,**  
**United Kingdom**

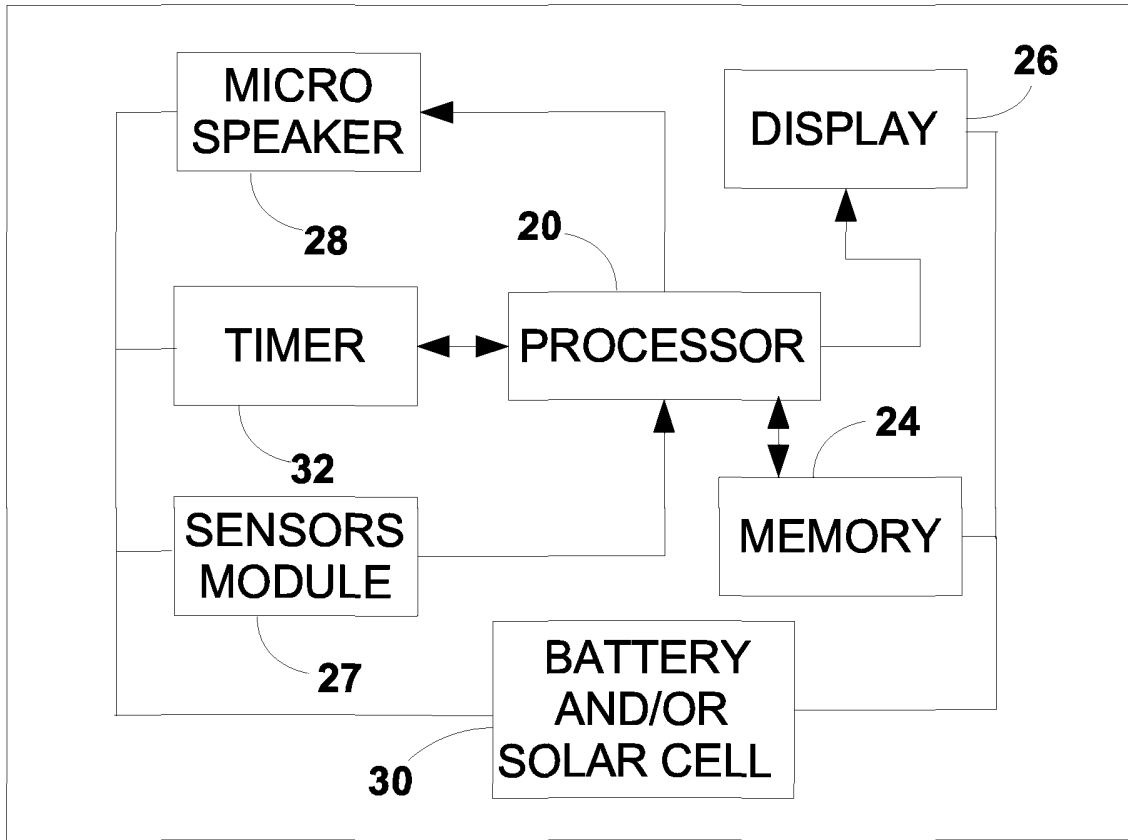
(54) Title of the Invention: **Stimulus reactive announcer**  
Abstract Title: **Integrated circuit comprising a stimulus reactive audible announcer**

(57) A unitary integrated circuit (UIC) 10 comprises: a memory (24) for storing announcing data, a sensor module (27) for detecting a physical quantity such as temperature, light or a chemical; a timer (32); and at least one announcing module which includes a speaker (28). The UIC 10 further includes a processor (20) which is used for at least controlling the sensor module (27), announcing module, timer (32) and memory (24). An electric energy supply means, such as a battery or solar cell (30), is used for supplying energy to the UIC 10. When the sensor module (27) detects a physical quantity the speaker (28) produces an announcement. The UIC may be attached to the inner side of items such as newspapers, books, toys, food packets 92, bottles, jars or other packaging such that when the item is opened to reveal the UIC the sensor (27) activates the announcing module.

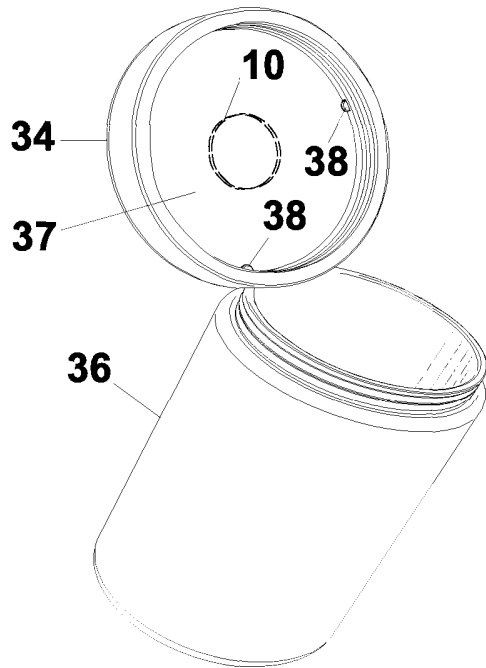


**Fig. 4**

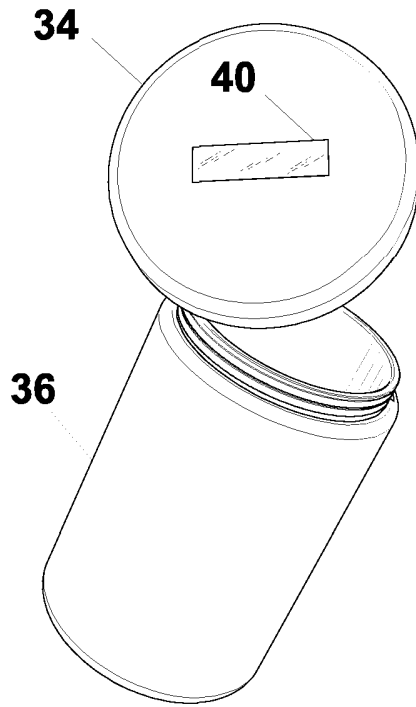
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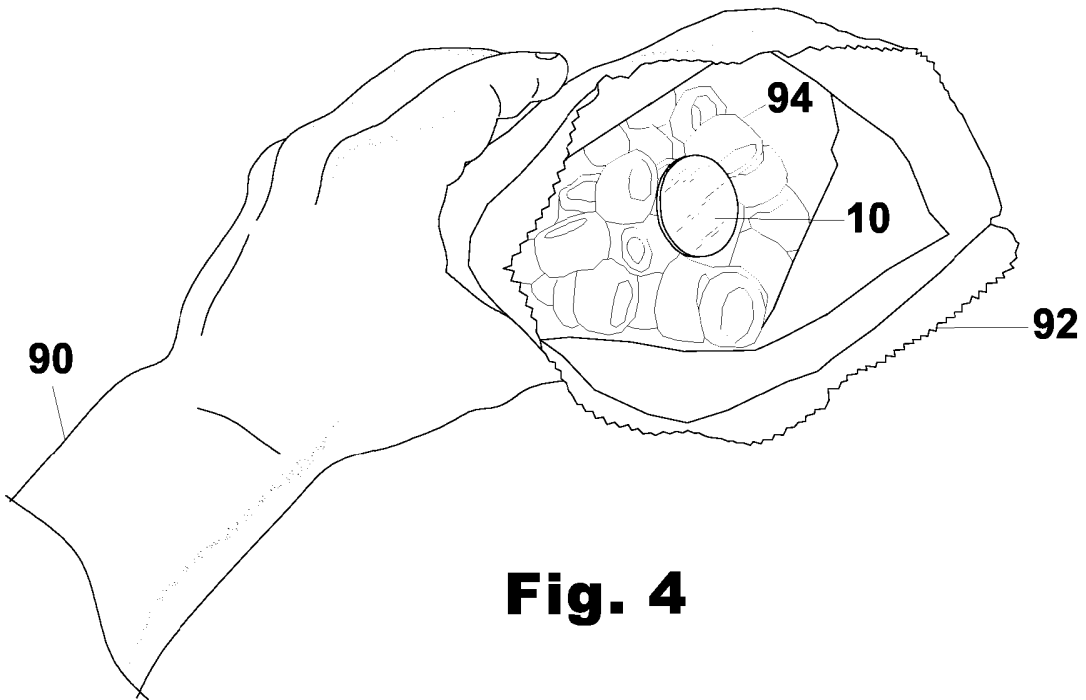
10 **Fig. 1**



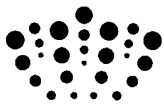
**Fig. 2**



**Fig. 3**



**Fig. 4**



The following terms are registered trademarks and should be read as such wherever they occur in this document:

Panasonic

Kinder

Ferrero

Sony

## STIMULUS REACTIVE ANNOUNCER

### 5 FIELD OF THE INVENTION

The present invention relates to announcing electronic devices, in particular the present invention relates to light and chemical reacting electronic announcing devices.

10

### BACKGROUND OF THE INVENTION

Devices which include an integrated circuit and various other electric components employed as sound-generating and light detector are well known. Such devices are addressed for example in WO2008/404375 and US20010011495. International application, WO2008/404375 describes a flame-producing device, particularly a candle having a body of combustible material and a wick further includes an optical fiber which extends along the wick to a sensor and carries light from the flame for detection by the sensor. The sensor activates a sound-generator embodied in an integrated circuit (chip) to produce a series of signals which are converted by a speaker into an audible melody, so that the lighting of the candle will result in operation of the sound-generating device operating continuously until the candle is extinguished. The chip and various other components of the electric circuitry of the sound-generating device are situated in a casing which is located at the lower region of the candle. The optical fiber is of a material which melts when exposed to the heat

of the flame and forms a lenticulate end portion that concentrates the light emitted by the flame into the optical fiber.

US patent application US20010011495 describes a music box that plays music or another sound only when the lid is opened. The music is stored in a memory device. This can allow for a selection of various songs or sounds, as well as selections of longer duration than typically found in standard mechanical music boxes. Likewise, the output from this memory device is triggered by a light sensitive sensor. The sensor can be located on either the box or its lid, but it is located so that it is obscured from light when the lid is closed.

10 Devices which include a chip and various other electric circuitry components capable of generating sound, as well as a light detector arrangement as described above are used for a specific implementation.

It is thus at least one of the objects of the present invention to provide a unitary integrated circuit which includes an integrated light / chemical detector(s) and integrated sound generator.

## **SUMMARY OF THE INVENTION**

The present invention relates to announcing electronic devices, in particular the present invention relates to light and chemical reacting electronic announcing devices.

In accordance with an embodiment of the present invention there is provided a unitary integrated circuit (UIC) for providing announcements. The UIC includes, a memory for storing announcing data, a sensor module reactive to physical and chemical stimuli , a timer; at least one announcing module. The UIC further includes a processor which is used for at least controlling the sensor module,

announcing module, timer and memory. An electric energy supply means is used for supplying energy to the UIC. Whereupon detecting physical quantity, by the sensor module, a speaker of said at least one announcing module produces an announcement.

5

## **BRIEF DESCRIPTION OF THE DRAWINGS**

The invention may be understood upon reading of the following detailed description of non-limiting exemplary embodiments thereof, with reference to  
10 the following drawings, in which:

**Fig. 1** is a schematic block diagram showing the main components of a unitary integrated circuit of the present invention;

**Fig. 2** is an isometric view, showing one embodiment of the present  
15 invention;

**Fig. 3** is an isometric view, showing another embodiment of the present invention;

**Fig. 4** is an isometric view, showing of the unitary integrated circuit of the invention positioned within a bag of food snack;

20

The following detailed description of the invention refers to the accompanying drawings referred to above. Dimensions of components and features shown in the figures are chosen for convenience or clarity of presentation and are not necessarily shown to scale. Wherever possible, the

same reference numbers will be used throughout the drawings and the following description to refer to the same and like parts.

## 5 DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

Referring first to **Fig. 1** there is shown a schematic block diagram showing the main components of physical and/or chemical reactive announcing unitary integrated circuit (UIC) **10** of the present invention. UIC **10** includes processor **20**, which controls memory **24**, announcing module (e.g. display **26** and/or speaker **28**) sensor modules **27** (e.g light, temperature and chemical sensor modules), and timer **32**. An analogue to digital converter, not shown, is used to convert the analogue out put signal of sensor modules **27** to digital data to be further processed by processor **20**. A digital to analogue converter, not shown is used to convert processor's **20** audible digital data to analogue data to be received by speaker **28** for producing audible sound. Electric energy supply means for example battery and/or solar cell **30** provide electrical energy to the components of integrated circuit **10** of the present invention. In situations in which the solar cell is not exposed to light, battery **30** can provide energy to UIC **10**.

Memory **24** stores announcing data which can be modified for example by introducing new announcing multimedia data to memory **24**. Sensor modules **27** (light and chemical sensor modules) when exposed to light and/or a specific chemical respectively, processor **20** implements a procedure for controlling timing the announcing data to be sent to speaker **28** and/or display **26**. Examples of data announcing timing and control scenarios are described below:



- A. Upon detecting physical quantity such as light and/or a specific chemical, by the sensor module, speaker **28** produces an audible announcement and/or display **26** displays a displayable announcement.
- 5 B. Upon detecting light and/or a specific chemical, by the sensor module, speaker **28** produces a different audible announcement and/or display **26** displays a different displayable announcing for every exposure in a sequence of exposures.
- 10 C. Timer 32 enables to play audible and/or displayable announcements at pre-defined time periods after sensor module responsiveness e.g. to light exposure.
- D. Upon detecting light and/or a specific chemical, by the sensor module, during the exposure to light and/or specific chemical, several different displayable and/or audible announcements are played as predetermined and implemented by processor **20**.
- 15 E. a different audible announcement is produced for every exposure to a different physical quantity.

Preferably, UIC **10** is small and thin owing to the miniature components employed in the make-up of the device. For example micro speaker Panasonic  
20 electronic device (PED) which is a thin-type electrostatics micro speaker with measures 2 cm x 1 cm and 1.5mm thick is used. In some embodiments of the present invention UIC **10** uses instead of memory **24** and processor **20** or in addition to, a miniature RFID chip which is typically manufactured using a Silicon-on-Insulator process. In other embodiments of the present invention,  
25 optical RFID (ORFID) chip are used and with such implementation the antenna

of an RFID can be replaced with photovoltaic components and IR-LEDs on the ORFID. Typical optical RFID operates in the electromagnetic spectrum between the frequencies of 333 THz ( $3.33 \times 10^{14}$  hertz, 900 nm wavelength), 380 THz (788 nm) and 750 THz (400 nm wavelength).

5           The light and/or chemical reactive announcing unitary integrated circuit  
10 of the present invention can be used in various implementations. Below, a description of some selected examples of such implementations is given.

**Example 1:**

In accordance with some embodiments of the present invention UIC10 is  
10 attached to the inner side, normally concealed sector of a newspaper, a magazine or a book. In operation, when a user opens for example a book or a newspaper, if the page on which the unitary integrated circuit is attached is exposed, sensor module 27 being exposed to light intensity and as a result processor 20 controls memory 24, micro-speaker 28, timer 32 and display 26 to  
15 produce an audible and/or a displayable announcement. The aforementioned examples of data announcing timing and control scenarios can be applied also to the book/magazine/newspaper applications. The announcing data could be for example audible advertisements, sound of a particular character in the book etc.

20

**Example 2:**

In accordance with some other embodiments of the present invention UIC 10 is attached to the inner side of a toy or a package of toys such as a kinder egg and package of cards respectively. A kinder egg (also known as a kinder  
25 surprise) is a confection manufactured by Italian company named Ferrero. It

has the form of a hollow chocolate egg containing a small toy in the lumen, usually to be assembled. In operation, when the inner side of a toy or package of a toy is exposed to light, an audible and/or displayable announcing is produced for example as described in example 1.

5 **Example 3:**

In accordance with some embodiments of the present invention UIC **10** is attached to the inner side of pack of solid food (e.g. corn flakes) or liquid (e.g. milk, juice etc.). In other embodiments of the present invention the UIC **10** is attached to the inner sidewall of a lid of a bottle, jar or a can.

10 In operation, when the inner sidewall of such pack or the inner side wall of the lid is exposed to light, an audible and/or displayable announcement is produced for example as described in example 1. In some other embodiments of the present invention chemical sensor **27**, for example a pH meter which measures the level of acidity is used to sense the smell of a specific food to  
15 determine if the food (or other perishable items such as medicine) is suitable for consumption or not. If the food is not suitable for consumption an appropriate audible and/or displayable announcing will be announced. In cases in which UIC **10** is installed within a lumen of a pack which includes liquid, UIC **10** is covered with transparent material such as silicon which seals integrated circuit  
20 **10** hermetically, preventing access of liquid. In some other embodiments of the present invention liquid - resistant micro speaker is used. Referring now to **Fig. 2** there is shown one embodiment of the present invention in which UIC **10** is attached to the inner sidewall of lid **34** of jar **36** by glue for example. Another attaching means of UIC **10** to the inner side of lid **34** is transparent disc **37**  
25 typically made of plastic that is secured by plurality of prongs **38** protruding from

the inner side wall of lid **34**. When the inner sidewall of lid **34** is exposed to light above some threshold of intensity, an audible and/or displayable announcement is made. Referring now to **Fig. 3** there is shown another embodiment of the present invention in which a solar cell **42** is attached to the outer surface of an object, e.g. lid **34** and is used for supplying electrical energy to UIC **10**.

In accordance with some embodiments of the present invention UIC **10** is attached to the inner sidewall of a package for example of cigarettes, medicines, electronic products, cosmetics, ice cream, perfumes etc. When UIC **10** is exposed to light, micro speaker can produce special sound alerts, audible warnings, audible guidance (e.g. guidance as to how to assemble parts stored within a package and usage instructions) and audible statement which states that a purchased product is an original product (e.g. "thank you for purchasing Sony's original product").

Referring now to **Fig. 4** a realistic view, showing a hand **90** holding torn – open bag **92** of food snack particles **94** among which particles is located discoid UIC **10** within the bag. In operation, when the inner side of bag **92** is opened and exposed to light, an audible and/or displayable announcement is produced by UIC **10**.

In some embodiments of the present invention UIC **10** is normally exposed to light, for example as a result of attaching it to the outer surface of an object and not to the inner side of the object's surface for example as described in the aforementioned exemplary embodiments. Upon UIC **10** non-exposure to light for example by a cover which block light from reaching to the UIC , announcing data is introduced to display **26** and/or speaker **28**. In some

embodiments of the present invention the UIC's light sensor is covered with a detachable cover, not shown. When the detachable cover is detached from UIC **10** the light sensor is exposed to light and announcing data is introduced to display **26** and/or speaker **28**.

5           It should be understood that the above description is merely exemplary and that there are various embodiments of the present invention that may be devised, mutatis mutandis, and that the features described in the above-described embodiments, and those not described herein, may be used separately or in any suitable combination; and the invention can be devised in  
10 accordance with embodiments not necessarily described above.

## CLAIMS

1. A unitary integrated circuit (UIC) for providing announcements, comprising:

- 5
- a memory for storing announcing data;
  - a sensor module;
  - a timer;
  - at least one announcing module ;
  - a processor for at least controlling said sensor module, announcing
- 10 module, timer and memory;
- an electric energy supply means for supplying energy to said UIC;
- and, whereupon detecting physical quantity, by said sensor module, a speaker of said at least one announcing module produces an announcement.

15 2. The unitary integrated circuit according to claim 1, wherein said sensor module is selected from the group consisting at least one of temperature sensor, chemical sensor and light sensor.

3. The unitary integrated circuit according to claim 2, wherein said chemical sensor is a pH meter.

20 4. The unitary integrated circuit according to claim 1, wherein said speaker is a micro-speaker type.

5. The unitary integrated circuit according to claim 1, wherein said announcing module comprises a display for displaying said announcing data.

6. The unitary integrated circuit according to claim 1, wherein said UIC is  
25 attached to the inner side, normally concealed sector of a newspaper, a

magazine or a book , whereupon opening of said newspaper, magazine or a book and exposing said UIC, an announcement is produced.

7. The unitary integrated circuit according to claim 1, wherein said electric energy supply means is a battery.

5 8. The unitary integrated circuit according to claim 1, wherein said electric energy supply means is a solar cell.

9. The unitary integrated circuit according to claim 1, wherein said UIC is attached to the inner side of a pack of solid food or liquid.

10 10. The unitary integrated circuit according to claim 1, wherein said UIC is attached to the inner sidewall of a lid of a bottle, jar or a can.

11. The unitary integrated circuit according to claim 1, wherein upon said non-exposure to light of said UIC, an announcing data is introduced to said display and/or said speaker.

12. The unitary integrated circuit according to claim 1, wherein said UIC is covered with a transparent material which seals said UIC hermetically, preventing access of liquid.

13. The unitary integrated circuit according to claim 4, wherein said micro-speaker is a liquid - resistant micro speaker.

14. The unitary integrated circuit according to claim 1 wherein said timer enables to play audible and/or displayable announcements at pre-defined time periods after sensor module responsiveness to said sensor module exposure.

15. The unitary integrated circuit according to claim 1 wherein said UIC further comprises optical RFID.

**16.** The unitary integrated circuit according to claim 1, wherein a different audible announcement is produced for every exposure in a sequence of exposures, upon detecting physical quantity by said sensor module.

**17.** The unitary integrated circuit according to claim 1, wherein a different  
5 audible announcement is produced for every exposure to a different physical quantity.

**18.** The unitary integrated circuit according to claim 1, wherein said UIC is attached to the inner side of a toy and/or the package of said toy.

**19.** The unitary integrated circuit according to claim 1, wherein said UIC is  
10 attached to the inner side of a package of an electronic product.

**20.** The unitary integrated circuit according to claim 1, wherein said UIC light sensor is covered with a detachable cover.



Amended claims have been filed as follows:-

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## STIMULUS REACTIVE ANNOUNCER

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### CLAIMS

1. A method for providing announcements regarding the properties of material packaged in a pack, in which at least a light sensitive sensor associated with a processor, said method comprising the steps of:

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- exposing said light sensitive sensor to light; said processor receiving data of said sensor ;

a speaker associated with said processor producing an audible sound, related to the time of a clock associated with a timing of a timer;

15

and wherein said announcement is different than an announcement produced before, at a previous exposure, and wherein said material is any type of material selected from a group consisting of: medicine, cosmetics and food.

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2. A method for providing announcements regarding the properties of material packaged in a pack as in claim 1 and wherein said announcement produced at a previous exposure was an announcement relating to the originality of a product within said pack.

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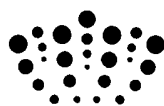
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3. A method for providing announcements regarding the properties of material packaged in a pack as in claim 2, and wherein said material packaged in said pack is a medicine.

5 4. A method for providing announcements regarding the properties of material packaged in a pack as in claim 1 and wherein for a given exposure an audible warning is produced relating to a time within a predefined time period.

10 5. A method for providing announcements regarding the properties of material packaged in a pack as in claim 1 and wherein in addition to said light sensitive sensor, a sensor of pH detects a certain pH quantity.

15 6. A method for providing announcements regarding the properties of material packaged in a pack as in claim 1 and wherein in addition to said light sensitive sensor, a sensor of temperature detects a certain temperature quantity



**Application No:** GB0913105.3

**Examiner:** Rhiannon Jenkins

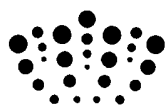
**Claims searched:** 1-20

**Date of search:** 26 November 2009

**Patents Act 1977: Search Report under Section 17**

**Documents considered to be relevant:**

Category	Relevant to claims	Identity of document and passage or figure of particular relevance
X	1-5, 7 & 12-15	GB 2417811 A (KEENAN) - See figures and pages 6 to 14
X	1, 2, 7, 8, 16, 18 & 20	US 5973250 A (ZIRELLE) - See figures 1 & 2 and columns 6 to 10
X	1, 2, 4, 7, 10, 12 & 13	US 5130696 A (PEPSICO INC) - See figures and columns 4 & 5
X	1, 2, 7, 14 & 20	GB 2208028 A (FRESHFORD LTD) - See figures and pages 2 & 3
X	1, 2, 4, 7 & 18	US 2001/0011495 A1 (SONG) - See figures and paragraphs [0014] to [0017]
X	1, 2, 4, 6 & 7	EP 0034024 A1 (SWAZTRAUBER) - See figures and pages 3 to 7
X	1, 4, 7, 16 & 18	US 5288069 A (MATSUMOTO) - See figures and columns 3 to 5
X	1, 2, 4, 8 & 9	WO 00/10259 A1 (GOLANT) - See figures and pages 4 to 7
X	1, 2, 4, 7 & 20	WO 93/04874 A1 (BRAINY TOYS INC) - See figures and pages 2 to 4
X	1, 2, 7, 14 & 16	GB 2237579 A (HANN TRADING INTERNATIONAL ET AL) - See figures and pages 3 to 6
X	1, 2, 6 & 7	EP 0240591 A2 (ORIGIN CO LTD) - See figures and pages 2 to 6



**Categories:**

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

**Field of Search:**

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC<sup>X</sup> :

Worldwide search of patent documents classified in the following areas of the IPC

G08B; G10H; G10K

The following online and other databases have been used in the preparation of this search report

WPI, EPODOC

**International Classification:**

Subclass	Subgroup	Valid From
G10H	0001/26	01/01/2006
G08B	0003/00	01/01/2006
A63H	0005/00	01/01/2006