Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).
Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates broadly to time-based alarm devices. More specifically, the present invention relates to cards, labels and other indicia carrying devices that provide perceptible signals at a predetermined date and time.

[0002] In many industries tracking time intervals is an important function of manufacturing, or other areas where the shelf life of materials may be a concern. Often, critical dates and times are tracked on a periodic basis by individuals over long time intervals. In industries like the pharmaceutical industry, the employees may be charged with monitoring the due dates for recalibration of critical instruments or machinery. This is also true in service providing industries. For example, doctors or dentists often want their patients to make a return visit after a specific interval has passed. The patient is charged with keeping track of the appointment date.

[0003] The tracking of critical dates and times is typically accomplished through periodic, manual comparison of the critical date to the current date. This is often assisted by affixing or printing of the critical date in a location that facilitates visual inspection. Food and drug products, for example, have expiration dates printed on their containers that should be examined before use to determine if their expiration dates have passed. In another area, information regarding an appointment is typically provided to a patient in the form of a business card with a handwritten date and time printed on its face. The patient must post this information in a way that will allow him to remember the appointment after months have passed. In the pharmaceutical industry, it is common practice to attach stickers to instruments requiring periodic recalibration. These stickers typically show the date of the last calibration along with the due date of the next calibration. Such instruments may number in the thousands and must be constantly tracked through manual or computerized reminder systems.

[0004] These methods all place reliance on individuals to regularly check the date and mentally compare it to the current date. If these individuals are insufficiently diligent, the critical date may be missed. Recalibration dates, in particular, are likely to be missed because of the number of instruments involved. The potential consequences of the use of instruments that are out of calibration include high scrap rates, product recalls and even product liability claims.

[0005] It is therefore desirable to provide a simple device that provides a perceptible alert on the arrival or approach of a critical date, time or both, that is configured as a replacement for cards and labels. Previous attempts to provide signaling devices for attachment to equipment or perishable goods have resulted in relatively bulky devices that potentially interfere with the use of the instrument or product to which they are attached. In addition, these devices have been inaccurate or unable to function over a long periods of time and have been too costly to provide a viable alternative to regular human inspection.

[0006] There is accordingly a need for an improved device for tracking critical dates. In one form, the device would provide an improved way for businesses to provide customers with reminders to return goods or to come in for appointments. In another form, the device would alert users of time-critical goods or hardware that an expiration date or other critical date has been reached. Ideally, the improvement could be easily and cheaply incorporated without significant change to product packaging or inspection/recalibration procedures.

[0007] DE 91 11 380 U discloses a programmable electronic label for use with vehicles comprising a flexible card, a timer attached to said card, a display and buttons for programming the timer. The electronic label is not intended for directly printing information on the card after manufacturing.

[0008] FR 2 650 059 discloses a programmable indicia carrying device for use as a boarding pass for an aircraft journey comprising a timer, a display and an acoustic alarm generator. No area for an printed indicia is provided. The time difference between the current time and the departure time anticipated for the flight is programmed onto the ticket with the aid of an input device. When the clock being started when programming the time difference into the register becomes equal to the time difference, an audible signal is generated for warning the passenger that his aircraft will soon take-off.

SUMMARY OF THE INVENTION

[0009] It is therefore an object of the present invention to provide an improved programmable electronic indicia carrying device.

[0010] It is further object of the present invention to provide an electronic labeling system for providing electronic labels for signaling that a predetermined date and time has been reached where the system includes a supply of the above programmable electronic labels, a programming device such as a computer, and a label printer.

[0011] The object is achieved by the programmable electronic indicia carrying device according to claim 1.

[0012] The object is further achieved by the electronic labeling system according to claim 14 for providing selectively individually programmable electronic indicia carrying devices that each provide a signal at a selectively predetermined expiration date and time, said system comprising a plurality of programmable electronic indicia devices as described above.

[0013] The above embodiments achieve the objective of providing a small, programmable indicia carrying reminder device in the form of a card or label.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014]
Figure 1 is a perspective view of a programmable electronic indicia carrying device according to the preferred embodiment of the present invention; Figure 2 is an exploded perspective view of a programmable electronic indicia carrying device according to the preferred embodiment of the present invention; Figure 3 is a perspective view of a 1 mm flexible programming connector; Figure 4 is a schematic representation of the electrical circuit of the electronic label according to the preferred embodiment of the present invention; Figure 5 is a perspective view of a programmable electronic label according to the preferred embodiment of the present invention wherein the electronic label has been applied to an instrument; Figure 6 is a perspective view of a plurality of programmable electronic labels arranged on a printing and dispensing roll; and Figure 7 is a schematic representation of a system according to the present invention for programming programmable electronic labels.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0015] Turning now to the drawings and more particularly to Figure 1, a programmable electronic indicia carrying reminder device according to the present invention is illustrated generally at 10. The reminder device 10 is generally configured in the nature of a card or label that provides a reminder or warning that a particular date and time of interest—hereinafter referred to as the critical date or expiration date—is approaching or has been reached. When the critical date is reached, the reminder device 10 provides a perceptible alert.

[0016] The electronic reminder device 10 includes a programmable real time clock circuit illustrated schematically at 12, a programming interface 14, an illuminable visual indicator 16 having a predetermined alert message 18, and a printing surface 20 upon which informative indicia 22 may be printed. The date and time of interest are programmed into the real time clock circuit 12 through the programming interface 14. When the date and time are reached, the real time clock circuit 12 causes alert indicator 16 to illuminate the predetermined alert message 18.

[0017] As shown in Figure 2, the reminder device 10 is designed as a thin, flexible laminate and is formed using Republic Technologies' flexible process. To this end, flexible, low profile components are mounted to a generally pliant polymer substrate 11. These components include the real time clock circuit 12, the programming interface 14, an arrangement of electrical connection traces 24 and the alert indicator 16. An ultrathin sheet-like battery 28 and a printing surface 20 are bonded to a portion of the substrate 11 leaving the programming interface 14 and the alert indicator exposed.

[0018] The real time clock circuit 12 includes a crystal controlled integrated circuit real time clock 13 that maintains the absolute date and time. The real time clock 13 is programmable to provide an alarm signal when a particular absolute date and time are reached. The real time clock 13 is a conventionally mounted and packaged chip that is surface mounted to the substrate 11. One commercially available example of a real time clock of this type is Epson's RTC 8593, which provides the accuracy required by the invention with a current draw of only one microampere. The 14-pin RTC 8593 has a thickness of approximately 3.5 mm. Alternatively, the real time clock 13 may be configured as a chip scale package (CSP) mounted to the substrate 11 using solder bumps. A CSP packaged in a durable film, such as those available from Dallas Semiconductor, may be less than 1 mm thick.

[0019] In one embodiment of the present invention, the real time clock circuit 12 includes a single-chip microprocessor that includes a real time clock as a feature. The microprocessor contains an operating system based on the Java programming language, thereby allowing high-end Java applets to support a variety of data processing applications. This would permit, in addition to the storage of expiration date and time information, storage of calibration data, patient historical data, or other vital information that can be retrieved and processed by a personal computer.

[0020] The programming interface 14 includes electrical conductor pads 26 affixed to one surface of the substrate. These electrical conductor pads 26 are electrically connected to the real time clock circuit 12 by the arrangement of electrical connection traces 24 printed on the substrate 11. The electrical conductor pads 26 are arranged so that the programming interface 14 may be operatively connected to a programming arrangement through a flex programming connector 30 such as that illustrated in Figure 3. Alternatively, other programming interface arrangements may be used. For example, the programming interface 14 could include an Infrared Data Association compliant infrared data link or an electromagnetic data link having a laminated metal antenna.

[0021] The alert indicator or annunciator 16 is formed as a light emitting polymer sheet 32. Light emitting polymers are plastics developed by Cambridge Display Technology that are electroluminescent; that is, plastics that produce light when subjected to an electric potential. In the present invention, illumination of the light emitting polymer sheet 32 is triggered by the alarm signal produced by the real time clock 13. The thin light-emitting polymer sheet measures approximately 0.6 cm by 1.2 cm and requires current consumption of less than one milliampere for illumination.

[0022] As illustrated schematically in Figure 4, the light emitting polymer sheet 32 is electrically connected to the real time clock 13 and a battery 28. The low current consumption of the light emitting polymer sheet 32 allows for direct drive by the real time clock 13 with an approximately three k-ohm resistor 34 providing current limiting. The real time clock 13 may be programmed to cause the
light emitting polymer sheet 32 to be intermittently illuminated. This has the dual advantage of making the signal more conspicuous and enhancing battery life. It will be understood by those skilled in the art that other components such as panels woven from light emitting plastic fibers may also be used as an illumination source for the alert indicator. Other components, such as light-emitting diodes, are usable but have size and current draw disadvantages not presented by the light-emitting polymer sheet 32.

[0023] The alert indicator 16 includes a predetermined alert message 18 that is substantially concealed until the light emitting polymer sheet 32 is illuminated. As shown in Figures 1 and 2, the predetermined alert message is simply "DUE," to indicate that the critical date has been reached. It should be apparent that many variations on the content of this message are possible depending on the particular use of the reminder device and the present invention is not intended to be limited to any particular use or message. The alert indicator 16 may include an audible signal generator (not shown) such as a piezoelectric buzzer that would produce an audible warning signal in addition to or instead of the visually perceptible signal.

[0024] The battery 28 is a three volt lithium battery formed as a flexible laminate having layers of anode and cathode materials separated by sheets of electrolyte. Commercially available batteries of this type having thicknesses on the order of 0.50 millimeters or less are suitable for the present invention. Such batteries are available through Battery Engineering. It will be understood by those skilled in the art that other types of batteries may be used without departing from the scope and spirit of the invention. For example, thin button-type batteries may be used. Also, all-plastic batteries such as those developed by researchers at Johns Hopkins University may be suitable. As shown in Figure 4, the battery 28 is electrically interconnected to the real time clock 13 and the alert indicator 16 by the electrical connector trace arrangement 24.

[0025] The electronic reminder device 10 includes a cover layer 20 having a printing surface 21 upon which information indicia 22 may be printed. This information indicia 22 may include pre-printed material that is present when the device is supplied to the user. It may also include material printed on the surface by the user. Typically, the information supplied by information indicia 22 would be related to the particular use of the reminder device. For example, a card including the reminder device 10 that is intended to be a reminder of an appointment may include pre-printed business identification information along with a handwritten printed reminder of the time and date of the appointment. The latter information would be written on the printing surface 20 of the reminder device 10 at the time the appointment is made. The cover layer 20 may be pre-applied to the reminder device 10 or provided separately for adhesive application by the user. Alternatively, the printing surface 20 may be printed directly to a visible portion of the substrate 11 or the battery 28.

[0026] The real time clock 13 of the electronic reminder device 10 is programmed using a user friendly software routine installed in a personal computer. It will be understood by those skilled in the art that less complex programming devices may also be used. Any device capable of generating clock and alarm setup data using the communication protocol of the real time clock 13 may be used. Clock and alarm data are downloaded from the computer and entered into the real time clock circuit 12 through the programming interface 14. For the Epson RTC 8593 real time clock, this is accomplished using an industry standard I2C communication protocol. Other real time clocks use a one-wire protocol or serial protocols. At the time of programming, the current date and time are entered along with a critical date and time of interest that may be up to a year from the date of programming. Periods of longer than one year are also possible depending on the real time clock chip used. Human readable verbiage will also typically be applied to the printing surface 21 at the time of programming to provide a visual reference to the user.

[0027] Operation of the real time clock 13 is initiated at the time of programming. When the critical date and time have been reached, the alarm function of the real time clock 13 causes the light-emitting polymer sheet 32 to be energized thus illuminating the predetermined alert message 18.

[0028] Measured though the printing surface 21, the reminder device 10 has a thickness on the order of one-half to two millimeters, depending on the components used. The maximum thickness of the reminder device 10 is measured through the real time clock 13. Depending on the device used for the real time clock 13, this maximum thickness may vary from approximately one-half millimeter to approximately five millimeters. The combination of flexibility and a thin profile allows the printing of the information indicia 22 directly to the printing surface 21 of the reminder device 10 using a conventional printer or typewriter. Alternatively, the information indicia 22 may be printed to the cover layer 20 before the cover layer is attached to the reminder device 10.

[0029] In one embodiment of reminder device 10, an adhesive layer 36 may be added to create a programmable electronic label. The electronic label according to the present invention is sufficiently thin and flexible to permit application to significantly contoured surfaces such as the curved casing of the instrument 38 illustrated in Figure 5. The low profile of the reminder device 10 minimizes the potential for damage to the reminder device 10 or interference by the reminder device 10 with operation of instruments or machinery to which it is applied. This is of particular value when the purpose of the reminder device 10 is to signal when an instrument or machine is due for inspection or recalibration.

[0030] There are many instances where a large number of labels are needed by a single user. Accord-
ingly, as shown in Figure 7, the present invention includes a label programming system 50 for providing a large number of programmed electronic labels. The label programming system 50 uses a programming arrangement 52 that includes a personal computer 54 operatively attached to a printer 46 capable of receiving a continuous feed of reminder devices 10 having an adhesive backing sheet 42. The label programming system 50 includes a printing interface 14 of a reminder device 10 need not be substantially simultaneous with the programming of the real time clock 13 in order to be within the spirit of the present invention as defined by the appended claims. For example, the programming connector through which the programming instructions are downloaded from the computer 54 to the real time clock 13 of the reminder device 10 via the computer's RS232C COM port and the printer 46. Substantially simultaneously, the printer 46 is commanded by the computer 54 to print human readable indicia to the printing surface 21 of the reminder device 10. In this way, a large number of reminder devices 10 may be rapidly and efficiently programmed with assurance that the human readable indicia corresponds to the programmed critical date and time. The reminder devices 10 may then be individually removed from the adhesive backing sheet 42 as needed.

It will be appreciated by those skilled in the art that many variations of the label programming system 50 are possible without departing from the scope of the present invention as defined by the appended claims. For example, the programming connector through which the computer 54 is operatively connected to the programming interface 14 of a reminder device 10 need not be an integral part of the printer 46. Furthermore, the visual printing of human readable information on the printing surface 21 of the reminder device 10 need not be substantially simultaneous with the programming of the real time clock 13 in order to be within the spirit of the present invention. The printer 46 may, in fact, be manually operated rather than interconnected with the computer 54.

Claims

1. A programmable electronic indicia carrying device (10) for providing a signal at a selectively predetermined date and time, said indicia carrying device (10) comprising:

- a pliant substrate (11) comprising a flexible sheet;
- a real time clock circuit (12) comprising a real time clock (13) attached to said pliant substrate (11) adjacent to a printing surface (21) upon which information indicia (22) may be printed, said real time clock circuit (12) being selectively programmable to provide an alarm signal substantially coincident with the predetermined date and time, said real time clock circuit (12) being powered by a sheet-like, generally pliant battery (28) operatively connected to said real time clock (13);
- an annunciator (16) comprising a generally pliant light emitting polymer sheet (32) operatively connected to said real time clock circuit (12), said annunciator (16) providing a perceptible indication in response to said alarm signal; and
a programming interface (14) operatively connected to said real time clock circuit (12) whereby the predetermined date and time may be programmed into said real time clock circuit (13), characterized in that said pliant substrate (11), said pliant battery (28), and said pliant light emitting polymer sheet (32) are laminated together to form a single sheet having a top surface for printed indicia (22) in said printing surface (21), wherein, when measured through the printing surface (21), the indicia carrying device (10) has a thickness of the order of 0.5 to 2 mm and wherein, when measured through the real time clock (13), the indicia carrying device (10) has a thickness which is maximum and is different from the thickness measured through the printing surface (21).

2. A programmable electronic indicia carrying device (10) according to claim 1, wherein said generally pliant light emitting polymer sheet (32) forms a visual indicator that provides a visually perceptible indication in response to said alarm signal.

3. A programmable electronic indicia carrying device (10) according to claim 2, wherein said visually perceptible indication is a predetermined message.

4. A programmable electronic indicia carrying device (10) according to claim 1, wherein said real time clock circuit (12) includes an integrated circuit microprocessor.

5. A programmable electronic indicia carrying device (10) according to claim 1, wherein said annunciator (16) includes an audio generator that provides an audible alarm in response to said alarm signal.

6. A programmable electronic indicia carrying device (10) according to claim 1 wherein said programming interface (14) is selectively connectable to a computer (54) for input of date and time data to program said real time clock circuit (12) to emit said alarm signal at the predetermined date and time.

7. A programmable electronic indicia carrying device (10) according to claim 1, further comprising means for attaching said programmable electronic indicia (22) carrying device (10) to a surface.

8. A programmable electronic indicia carrying device according to claim 7 further comprising a surface (21) for carrying visually perceptible indicia.

9. A programmable electronic indicia carrying device (10) according to claim 1, wherein said printed indicia (22) may be printed at the same time as said real time clock circuit (12) is programmed.

10. A programmable electronic indicia carrying device (10) according to claim 1, wherein said programming interface (14) comprises a wireless data link.

11. A programmable electronic indicia carrying device (10) according to claim 1, wherein said programming interface (14) comprises a laminated antenna.

12. A programmable electronic indicia carrying device (10) according to claim 1, wherein said programming interface (14) comprises an infrared data link.

13. A programmable electronic indicia carrying device (10) according to claim 1, wherein said audio generator comprises a sound emitting piezoelectric buzzer.

14. An electronic labeling system for providing selectively individually programmable electronic indicia carrying devices (10) that each provide a signal at a selectively predetermined expiration date and time, said electronic labeling system comprising:

   a plurality of programmable electronic indicia devices (10) according to one of the preceding claims;
   a communication interface connectable to said programming interface (14) of each of said programmable electronic indicia devices (10);
   means for programming said real time clock circuit (12) to emit said alarm signal at the predetermined time and date operatively connected with said communication interface; and
   a printer (46) for printing visually perceptible indicia (22) on each of said programmable electronic indicia carrying devices (10) to said electronic labeling system comprising:

15. An electronic labeling system according to claim 14 wherein each of said plurality of programmable electronic indicia carrying devices (10) is removably attached to an elongate backing sheet and said printer (46) is capable of accepting a continuous feed of said backing sheet for individual printing of each of said electronic indicia carrying devices (10).

16. An electronic labeling system according to claim 14, wherein said means for programming includes a per-
sonal computer (54).

Patentansprüche

1. Programmierbare elektronische Kennzeichen-Trägereinheit (10) zum Bereitstellen eines Signals zu einem selektiv vorbestimmten Datum und unbekannter Zeit, wobei die Kennzeichenträgereinheit (10) hat:
   - ein biegsames Substrat (11) mit einem flexiblen Blatt;
   - eine Echtzeituhrschaltung (12) mit einer Echtzeituhr (13), die an das biegsame Substrat (11) angrenzend an eine Druckfläche (21), auf die eine Informationskennzeichen (22) aufgedruckt werden kann, angebracht ist, wobei die Echtzeituhrschaltung (12) selektiv programmierbar ist, um ein Alarmsignal zu liefern, das im Wesentlichen koinzident mit dem vorbestimmten Datum und der Zeit ist, wobei die Echtzeituhrschaltung (12) durch eine plattenartige, im Wesentlichen biegsame Batterie (28) angetrieben ist, die operativ mit der Echtzeituhr (13) verbunden ist;
   - einen Signalgeber (16) mit einem im Wesentlichen biegsamen lichtemitierenden Kunststoff (32), der operativ mit der Echtzeituhrschaltung (12) verbunden ist, wobei der Signalgeber (16) eine wahrnehmbare Anzeige als Antwort auf das Alarmsignal liefert und;
   - ein Programminterface (14), das operativ mit der Echtzeituhrschaltung (12) verbunden ist, wobei das vorbestimmte Datum und die Zeit in die Echtzeituhrschaltung (13) einprogrammiert werden können,

dadurch gekennzeichnet, dass
   das biegsame Substrat (11), die biegsame Batterie (28) und das biegsame lichtemitierende Kunststoffblatt (32) zusammenlaminiert sind, um ein einzelnes Blatt mit einer oberen Fläche für ein gedrucktes Kennzeichen (22) auf der Druckfläche (21) zu bilden, wobei gemessen durch die Druckfläche (21) die Kennzeichenträgereinheit (10) eine Dicke in der Größenordnung von 0,5 bis 2 mm hat und wobei gemessen durch die Echtzeituhr (13) die Kennzeichenträgereinheit (10) eine Dicke hat, die maximal und verschieden von der durch die Druckfläche (21) gemessenen Dicke ist.

2. Programmierbare elektronische Kennzeichen-Trägereinheit (10) und Anspruch 1, wobei das im Wesentlichen biegsame lichtemitierende Kunststoffblatt (32) eine sichtbare Anzeige bildet, die eine visuell wahrnehmbare Anzeige als Antwort auf den Mann liefert.

3. Programmierbare elektronische Kennzeichen-Trägereinheit (10) nach Anspruch 2, wobei die visuell wahrnehmbare Anzeige eine vorbestimmte Nachricht ist.

4. Programmierbare elektronische Kennzeichen-Trägereinheit (10) nach Anspruch 1, wobei die Echtzeituhrschaltung (12) einen als integrierte Schaltung ausgeführten Mikroprozessor hat.

5. Programmierbare elektronische Kennzeichen-Trägereinheit (10) nach Anspruch 1, wobei der Signalgeber (16) einen Audiogenerator hat, der einen hörbaren Alarm als Antwort auf das Alarmsignal liefert.

6. Programmierbare elektronische Kennzeichen-Trägereinheit (10) nach Anspruch 1, wobei das Programminterface (14) selektiv mit einem Computer (54) zur Eingabe von Datums- und Zeitdaten verbunden ist, um die Echtzeituhrschaltung (12) für die Ausgabe des Alarmsignals zu einem vorbestimmten Datum und einer vorbestimmten Zeit zu programmieren.

7. Programmierbare elektronische Kennzeichen-Trägereinheit (10) nach Anspruch 1, weiterhin mit Mitteln zum Anbringen des programmierbaren, die elektronische Kennzeichen (22) tragende Einheit (10) auf eine Oberfläche.


9. Programmierbare elektronische Kennzeichen-Trägereinheit (10) nach Anspruch 1, wobei das Programminterface (14) eine drahtlose Datenverbindung hat.

10. Programmierbare elektronische Kennzeichen-Trägereinheit (10) nach Anspruch 1, wobei das Programminterface (14) eine laminierte Antenne hat.

11. Programmierbare elektronische Kennzeichen-Trägereinheit (10) nach Anspruch 1, wobei das Programminterface (14) eine Infrarot-Datenverbindung hat.

12. Programmierbare elektronische Kennzeichen-Trägereinheit (10) nach Anspruch 5, wobei der Audiogenerator einen tonemittierenden piezoelektrischen...
14. Elektronisches Kennzeichensystem zum Bereitstellen selektiv individuell programmierbarer elektronischer Kennzeichen-Trägereinheiten (10), die jeweils ein Signal bei einem selektiv vorbestimmten Ablaufdatum und vorbestimmter Zeit liefern, wobei das elektronische Kennzeichnungssystem hat:

a. eine Mehrzahl von programmierbaren elektronischen Kennzeichnungseinheiten (10) nach einem der vorhergehenden Ansprüche;  
b. ein Kommunikationsinterface, das mit dem Programmiererinterface (14) jedes der programmierbaren elektronischen Kennzeichnungseinheiten (10) verbindbar ist;  
c. Mittel zum Programmieren der Echtzeitschaltung (12) zum Ausgeben des Alarmsignals zu einer vorbestimten Zeit und einem vorbestimten Datum, die operativ mit dem Kommunikationsinterface verbunden sind; und  
d. einem Drucker (46) zum Drucken visuell wahrnehmbaren Kennzeichen (22) auf jeder der programmierbaren elektronischen Kennzeichen-Trägereinheiten (10), wobei der Drucker (46) operativ mit dem Kommunikationsinterface und den Mitteln zum Programmieren so verbunden ist, dass das visuell wahrnehmbare Kennzeichen (22) auf jedem der programmierbaren elektronischen Kennzeichen-Trägereinheiten (10) im Wesentlichen gleichzeitig mit der Programmierung jedes der programmierbaren elektronischen Kennzeichen-Trägereinheiten (10) durch den Programmiermittel bedruckt werden können.

15. Elektronisches Kennzeichensystem nach Anspruch 14, wobei jedes der Mehrzahl von programmierbaren elektronischen Kennzeichen-Trägereinheiten (10) entfernbar an ein längliches Trägerblatt angebracht ist und der Drucker (46) geeignet ist, eine kontinuierliche Zufuhr des Trägerblatts zum individuellen Bedrucken jedes der elektronischen Kennzeichen-Trägereinheiten (10) zuzulassen.

16. Elektronisches Kennzeichensystem nach Anspruch 14, wobei die Mittel zum Programmieren einen Personalcomputer (54) haben.

Revendications

1. Dispositif (10) support d’élément visuel électronique programmable pour fournir un signal à une date et une heure sélectives prédéterminées, ce dispositif (10) support d’élément visuel comprenant:

un substrat souple (11) comprenant une feuille flexible ;
un circuit d’horloge temps-réel (12) comprenant une horloge temps-réel (13) attachée à ce substrat souple (11) et adjacent à une surface d’impression (21) sur laquelle un élément visuel d’information (22) peut être imprimé, ce circuit d’horloge temps-réel (12) étant sélectivement programmable pour fournir un signal d’alarme qui coïncide sensiblement avec la date et l’heure prédéterminées, ce circuit d’horloge temps-réel (12) étant alimenté par une batterie (28) généralement souple de type feuille et reliée fonctionnellement à cette horloge temps-réel (13) ; un avertisseur (16) comprenant une feuille de polymère électroluminescente (32) généralement souple fonctionnellement reliée à ce circuit d’horloge temps-réel (12), cet avertisseur (16) fournissant une indication perceptible en réponse à ce signal d’alarme ; et une interface de programmation (14) fonctionnellement reliée à ce circuit d’horloge temps-réel (12) par lequel la date et l’heure prédéterminées peuvent être programmées dans ce circuit d’horloge temps-réel (13), caractérisé en ce que ce substrat souple (11), cette batterie souple (28), et cette feuille de polymère électroluminescente (32) sont stratifiés ensemble de façon à former une unique feuille ayant une surface supérieure pour des éléments visuels imprimés (22) sur cette surface d’impression (21), dans lequel, lorsque mesuré à travers la surface d’impression (21), le dispositif (10) support d’élément visuel possède une épaisseur de l’ordre de 0.5 à 0.2 mm et dans lequel, lorsque mesuré à travers l’horloge temps-réel (13), le dispositif (10) support d’élément visuel possède une épaisseur qui est maximum et est différent de l’épaisseur mesurée à travers la surface d’impression.

2. Dispositif (10) support d’élément visuel électronique programmable selon la revendication 1, dans lequel la feuille de polymère électroluminescente (32) généralement souple forme un indicateur visuel qui fournit une indication visuellement perceptible en réponse audit signal d’alarme.

3. Dispositif (10) support d’élément visuel électronique programmable selon la revendication 2, dans lequel ladite indication visuellement perceptible est un message prédéterminé.

4. Dispositif (10) support d’élément visuel électronique programmable selon la revendication 1, dans lequel ledit circuit d’horloge temps-réel (12) comprend un circuit intégré microprocesseur.
5. Dispositif (10) support d’élément visuel électronique programmable selon la revendication 1, dans lequel ledit avertisseur (16) comprend un générateur audio qui fournit une alarme audible en réponse à un signal d’alarme.

6. Dispositif (10) support d’élément visuel électronique programmable selon la revendication 1, dans lequel ladite interface de programmation (14) peut sélectivement être reliée à un ordinateur (54) pour la saisie de données relatives à la date et l’heure pour programmer le circuit d’horloge temps-réel (12) de façon à émettre le signal d’alarme à la date et l’heure prédéterminées.

7. Dispositif (10) support d’élément visuel électronique programmable selon la revendication 1, comprenant en outre des moyens pour attacher ledit dispositif (10) support d’élément visuel électronique programmable (22) à la surface.

8. Dispositif (10) support d’élément visuel électronique programmable selon la revendication 7, comprenant en outre une surface (21) pour supporter des éléments visuellement perceptibles.

9. Dispositif (10) support d’élément visuel électronique programmable selon la revendication 1, dans lequel ledit élément visuel imprimé (22) peut être imprimé en même temps que le circuit d’horloge temps-réel (12) est programmé.

10. Dispositif (10) support d’élément visuel électronique programmable selon la revendication 1, dans lequel l’interface de programmation (14) comprend une liaison de données sans fil.

11. Dispositif (10) support d’élément visuel électronique programmable selon la revendication 1, dans lequel ladite interface de programmation (14) comprend une antenne stratifiée.

12. Dispositif (10) support d’élément visuel électronique programmable selon la revendication 1, dans lequel ladite interface de programmation (14) comprend une liaison de données infrarouge.

13. Dispositif (10) support d’élément visuel électronique programmable selon la revendication 5, dans lequel ledit générateur audio comprend un vibreur sonore piézoélectrique.

14. Système d’étiquetage électronique pour fournir individuellement et de façon sélective des dispositifs (10) supports d’élément visuel électronique programmable fournissant chacun un signal à une date et heure d’expiration prédéterminées de façon sélective, ce système d’étiquetage électronique comprenant :

- une pluralité de dispositifs (10) d’élément visuel électronique programmable selon l’une des revendications précédentes ;
- une interface de communication qui peut être reliée à ladite interface de programmation (14) de chacun desdits dispositifs (10) d’élément visuel électronique programmable ;
- des moyens pour programmer ledit circuit d’horloge temps-réel (12) pour émettre le signal d’alarme à l’heure et date prédéterminées, ces moyens étant fonctionnellement reliés à ladite interface de communication ; et
- une imprimante (46) pour imprimer des éléments visuellement perceptibles (22) sur chacun desdits dispositifs (10) d’élément visuel électronique programmable, cette imprimante (46) étant fonctionnellement interconnectée avec ladite interface de communication et lesdits moyens pour programmer de telle sorte que lesdits éléments visuellement perceptibles (22) peuvent être imprimés par les moyens de programmation sur chacun desdits dispositifs (10) d’élément visuel électronique programmable sensiblement de façon simultanée avec la programmation de chacun desdits dispositifs (10) supports d’élément visuel électronique programmable.

15. Système d’étiquetage électronique selon la revendication 14 dans lequel chacun de la pluralité des dispositifs (10) supports d’élément visuel électronique programmable est attaché de façon amovible à une feuille d’appui allongée et une imprimante (46) est capable d’accepter une alimentation continue de ladite feuille d’appui pour une impression individuelle de chacun desdits dispositifs (10) supports d’élément visuel électronique.

16. Système d’étiquetage électronique selon la revendication 14 dans lequel les moyens de programmation comprennent un ordinateur personnel (54).
REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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