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Rajagopal et al.(10) **Pub. No.: US 2015/0021401 A1**(43) **Pub. Date: Jan. 22, 2015**(54) **ERASABLE BARCODE****Related U.S. Application Data**

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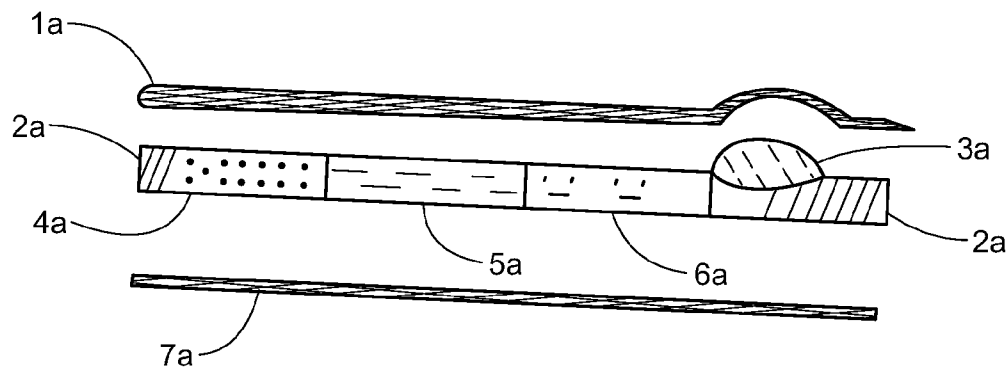
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(57) **ABSTRACT**

The Erasable Barcode prevents the sale of products by invalidating the barcode. The invalidation can be based on shelf life, or improper temperature maintenance. The invalidation is also visible to humans so that the consumer knows if the exposure occurs after purchase. Activation brings liquid from the first reservoir in contact with the migration medium. The liquid progressively produces a change in color over time in the migration medium. When the liquid has crossed the migration medium, it will come in contact with the absorptive medium. The absorptive medium will then rapidly change color. The absorptive layer is the substrate for a machine readable barcode such that the color change renders the barcode unreadable

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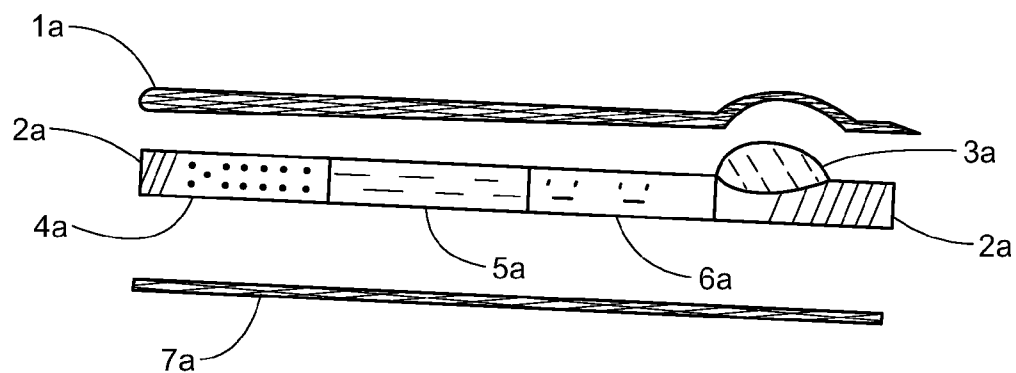


FIG. 1

ERASABLE BARCODE**PRIORITY**

[0001] This application claims the benefit of provisional application, Ser. No. 61/687911, that was filed on May 3, 2012 by the inventors Rajagopal, et al., and the application, Ser. No. 13/870,968, that was filed on Apr. 25, 2013 by the same inventors.

BACKGROUND

[0002] There are many current solutions to indicate the expiration of the shelf life of a product. Most require humans to locate and read the date, know the current date, and decide if the shelf life has past. In the same way, there are few solutions that can measure the amount of time a product is above a set point (usually around 40F). These also require human interpretation and decision making. By creating a mechanism that invalidates the barcode, the automation provided by checkout scanners are brought into the process. This removes the source of human error. This protects the consumer from potentially harmful products. The seller is also protected from law suits resulting from being the source of a product that caused harm. Since some products are packaged in the store, integrating this into a label which can be printed using a thermal printer allows protection of a larger range of products.

[0003] Shelf life (or in some cases, used by dates) are typically a printed date based on when the product was packaged. A few, such as Timestrip (U.S. Pat. No. 7,232,253), simplify the process by having an "Expired" or similar indication. The temperature monitoring versions of these exist (some also from Timestrip). But as mentioned before a human must locate and interpret these indications. Other systems, such as System And Method For Quality Management Utilizing Barcode Indicators (U.S. patent application Ser. No. 12/469309) by Nemet, require two different barcodes so that when a change in condition is detected, one barcode becomes unreadable while the other barcode becomes readable. Other systems, such as Temperature Sensitive Label For Detecting Temperature Changes To A Temperature Sensitive Item (U.S. patent application Ser. No. 11/688620) by Leute, use a material for the barcode or message, or a material underneath the barcode, that changes in reaction to a change in temperature, rather than using the migration of an ink to change the appearance of a printed and stable barcode.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] FIG. 1 is a side view and cross section of the erasable barcode.

DETAILED DESCRIPTION

[0005] Referring to FIG. 1, a liquid, such as ink, starts in the pre-activation chamber (3a). Referring to FIG. 1, when activated it will flow into the reservoir (6a). Referring to FIG. 1, this liquid cannot leave the label because of the leak stops (2a) that are located at the edges of the label. Referring to FIG. 1, over time the liquid will advance into the controlled migration medium (5a). Referring to FIG. 1, after the length of time determined by the migration medium, the liquid will flow into the area containing the highly absorptive material (4a) and will fill in very rapidly. Referring to FIG. 1, all of the previously mentioned components are located underneath a printable surface (1a). This is the surface on to which the barcode

is printed. This printable surface (1a) can be limited to a size such that only one barcode may fit on the printable surface (1a), or it may be larger than a single barcode. Sufficient portions of barcode to invalidate it must be over a region through which the absorptive medium is visible. Other sections may be visible as well. The label will optionally have an adhesive backing (7a).

[0006] The liquid is stored in the pre-activation chamber (3a) until it is read for use. The invention is activated when the liquid is released from the pre-activation chamber (3a) and flows into the reservoir (6a). This release can happen many ways. The preferred embodiment envisions the pre-activation chamber (3a) releasing the liquid in response to pressure, such as the use of pressure to break a barrier that allows the liquid to flow out of the pre-activation chamber (3a). In applications such as items sold by individual weight where a label is likely to be applied thermal printers are common. In this application pressure of the print head should be sufficient to automatically activate the label.

[0007] The printable surface (1a) will have at least one barcode printed on the printable surface (1a). Optionally, the printable surface (1a) may also have words, symbols or phrases. The printable surface (1a) is sufficiently transparent that when the liquid enters the absorptive material (5a) that is proximal to the printable surface (1a), the color of the liquid will obscure or render unreadable the barcode. Optionally, the words, symbols, or phrases may be also rendered unreadable.

[0008] The liquid is a colored substance that will render the barcode on the printable surface (1a) unreadable when the liquid reaches the absorptive material (5a). The preferred embodiment envisions a liquid that does not react, change, or modify during the operating of the invention so that a food or medicine safe liquid can be placed in the reservoir (6a) and remain food or medicine safe during the operation of the invention. The preferred embodiment envisions the liquid as ink, dye or other colored fluid. The liquid can be any color that will render the barcode on the printable surface (1a) unreadable.

[0009] Some products are affected by temperature over time. In these situations a combination of liquid and migration medium (5a) would be tailored to the behavior over temperature that is desired. In the case of a product that will require refrigeration, but still will deteriorate after a certain time, a combination that would only allow migration when both the temperature is over a set amount, such as 40F for example, and a specific amount of time has passed, 1 hour for example. For frozen products the temperature point would be lower than 32F. Other applications could have a trigger for the migration medium where either an increase in temperature or a specific duration of time would allow migration of the liquid. Other products are affected by temperature changes only. In these situations a combination of liquid and migration medium (5a) would be tailored to the behavior to respond when the temperature is over the desired threshold. Still other products are affected by the passage of a duration of time only. In these situations a combination of liquid and migration medium (5a) would be tailored to the behavior to migrate only once that duration of time has been reached.

[0010] The invention requires that the printable surface (1a) be located near or proximal to the absorptive material (4a). Once the absorptive material (4a) absorbs the liquid from the reservoir (6a), the absorptive material (4a) changes color to a color that will obscure the barcode on the printable

surface (1a). In the preferred version, the color of the printable surface (1a) and the color of the absorptive material (4a) after the absorption of the liquid are identical or substantially identical.

[0011] Placing the reservoir (6a) in close proximity to the absorptive material (4a) allows for construction of dynamic wording to reinforce the reason the product is no longer sellable. For example, if the word “SAFE” was written above the initial reservoir (6a) in a manner that is readable by a human person and the absorptive region was to the left, then its color change could reveal the word “UN”. The word “UN” would be initially transparent, but would become opaque and thus readable by a human person when the liquid migrates into the absorptive material (4a). When the product is sellable and the device is active it will read “SAFE”. Once the barcode becomes invalidated it will read “UNSAFE”. Depending on the application this wording is flexible. Any word accepting “UN”, “IM”, or similar negative prefixes can be used. If the color change is selected to hide the printing (as with the barcode) positive prefixes can be hidden. This additionally protects the consumer by indicating an unusable condition created after purchase.

[0012] An example of a use of the thermally sensitive version of this is for meat products in the grocery store. The Erasable Barcode, prevents the sale of meat stored at improper temperatures, and lets the consumer also know the result of the exposure after the food has left the grocery store. When the Erasable Barcode is activated, the word “SAFE” appears. As the package is exposed to temperatures over 40F, the liquid migrates closer to the barcode. After two hours of exposure, the liquid will migrate into the absorptive medium. The color change in this medium prevents the barcode from being able to be scanned. When this happens, the prefix “UN” will appear next to the word “SAFE”, making it “UNSAFE”. This works at home too, because if the meat has been stored at improper temperatures at home, the word “UNSAFE” will still appear, so the consumer will read the word and know that the product is not safe for consumption or use. For packages of meat produced at a central location, the protection begins at the point of production. This allows the store to verify the meat was properly handled prior to arriving at the store.

[0013] Since most dairy products are produced centrally, applying the implementation above to dairy products covers more of the supply chain than just the store.

[0014] The Erasable Barcode also can help doctors and pharmacists in hospitals and other clinics where many patients get treated. This includes giving them medicine and injections to treat diseases. Many of these locations use barcodes to track medical supplies for both billing and inventory purposes. However, these medicines can also go bad, this can cause the patients to become sicker and even the disease to get stronger. For example, if liquid medicines go past their expiry date, the formulation is no longer as expected which can cause reactions that make the patient very ill. If the expiration date is based on diminished efficacy, the disease exposed to the weakened treatment could potentially become immune to it. (In much the same way some of our inoculations work) If our solution is implemented into the medical system, then many of the previously mentioned risks can be avoided.

[0015] Another possible medical use in tracking blood from a blood bank. The blood has both a limited overall useful span (typically 21 to 35 days depending on treatment process) and temperature storage requirements. By having both a temperature sensitive and duration only device a violation of

either constraint results in the container being rendered unscannable and therefore unusable.

[0016] The Erasable Barcode can also help beauty specialists tell when their beauty products go bad. If these products go bad and a customer uses the expired products, the consumer could develop rashes or allergies to these products. As a result, the consumer or their families may end up suing the company for thousands of dollars. If the Erasable Barcode is implemented onto this system, then the companies will know if their products have gotten bad and the consumer can tell if a beauty product has gone bad in their homes.

[0017] Chemicals such as paints and pesticides frequently have shelf lives based on their formulations. Integrating the tracking of this expiration and the barcode used to make the purchase prevents products that may not behave in the way they were intended from impacting the environment.

[0018] The liquid in the reservoir (6a) can be any colored liquid. The liquid can have any opacity or viscosity. The preferred embodiment envisions the use of ink as the liquid, but any colored liquid, such as paint or dye may be used. The preferred embodiment envisions a liquid with low viscosity and high opacity.

[0019] The biggest difference with the Erasable Barcode and other products on the market, is that not only will the Erasable Barcode notify the consumer if the product had been improperly stored prior to purchase, but it will also prevent the sale of improperly stored or old products. It also continues to let consumers know if the product has been improperly stored after sale. Since this solution is part of the label for the barcode, there is no chance that this important informational tool is left off the product.

[0020] Although this invention has been illustrated by reference to specific embodiments, it will be apparent to those skilled in the art that various changes and modification may be made which clearly fall within the scope of the invention. The invention is intended to be protected broadly within the spirit and scope of the appended claims.

What is claimed is:

1. An erasable barcode comprising:

- a reservoir;
- an amount of liquid in the reservoir;
- a rate controlled migration medium;
- an absorptive medium;
- a single machine readable barcode proximal to the absorptive medium;
- the first reservoir passing the liquid to the migration medium wherein the liquid migrates across the migration medium and comes into contact with the absorptive medium, and the absorptive medium rapidly changes color in response to the contact rendering the barcode unreadable, and wherein the absorptive layer is a substrate upon which the barcode is formed.

2. The erasable barcode according to claim 1 with the migration limited by both a temperature threshold and specific duration of time.

3. The erasable barcode according to claim 1 with the migration limited by only a temperature threshold.

4. The erasable barcode according to claim 1 with the migration limited by only specific duration of time.

5. The erasable barcode according to claim 1 where the color of the machine readable barcode is similar to the color of the absorptive medium after the absorptive medium comes into contact with the liquid.

6. The erasable barcode according to claim 1 where as the machine readable barcode becomes unreadable a message appears.

7. The erasable barcode according to claim 1 where the liquid is substantially the same color as the machine readable barcode.

8. The erasable barcode according to claim 1 where the printable surface contains a first message placed proximal to the machine readable barcode so that when the liquid enters the absorptive medium and a transparent second message that is not readable by a human person so that when the liquid migrates across the migration medium and comes into contact with the absorptive medium, and the absorptive medium rapidly changes color in response to the contact rendering the barcode unreadable, the second message is rendered opaque by the liquid and the second message is revealed in such a manner that is readable by a human person that negates the meaning of the first message.

9. The erasable barcode according to claim 1 where the single barcode is not proximal to any other barcode.

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