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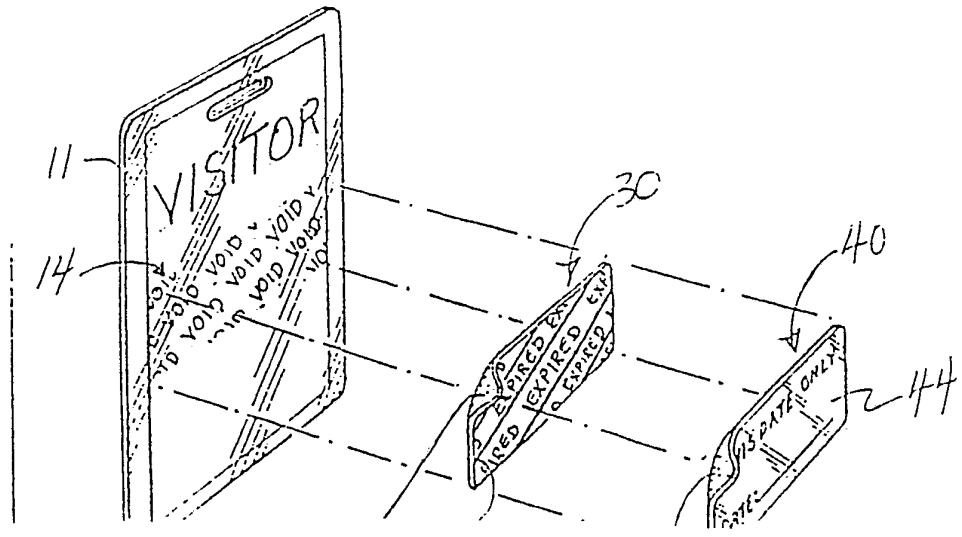
(54) Title: SECURITY IDENTIFICATION BADGE



(57) Abstract

A self-expiring Security Identification Badge is provided. The badge includes a base substrate (11) having a void indicia area (14). Also included is an ink substrate (30) having an expired indicia area (34) of a soluble ink and an adhesive surface (32). Also included is an overlay substrate (40) having an ink dissolver (42) and a display surface (44). When the I.D. Badge is issued, the inked substrate (30) is attached to the base substrate (11), with the inked substrate (30) covering the void indicia area (14). The overlay substrate (40) is then placed over and attached to the inked substrate (30), with the ink dissolver (42) in contact with the soluble ink (34) of the inked substrate (30). The ink dissolver (42) of the overlay substrate (40) contacts and coats with the soluble ink (34) of the inked substrate (30) to dissolve the ink and allow the ink to migrate through the overlay substrate (40) to the display surface (44), where it can be visually perceived, in a preselected time interval.

Title: SECURITY IDENTIFICATION BADGE

S P E C I F I C A T I O N

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

This invention relates to a time indicator, and in particular to a FAIL-SAFE SECURITY ID BADGE which uses a time indicator and which provides a clear indication of expiration of the badge and which acts to prevent unauthorized use of the badge.

RELATED ART

A related time indicator is described in U.S. Patent No. 4,212,153 to Kydonieus et al.. Other related patents include: U.S. Patent No. 2,337,534 to Barber; U.S. Patent No. 3,078,182 to Krone, Jr. et al.; U.S. Patent No.

3,520,124 to Myers; U.S. Patent No. 3,999,946 to Patel; U.S. Patent No. 4,643,122 to Seybold; U.S. Patent No. 4,646,066 to Baughman; U.S. Patent No. 4,737,463 to Bhattacharjee et al.; and, U.S. Patent No. 4,903,254 to Haas et al..

U. S. Patent No. 4,212,153 to Kydonieus et al. describes a laminated time indicator including a two-layer front indicator and a two-layer rear reservoir part. The front indicator part has an indicator layer with an outer display surface and an inner surface having an adhesive layer thereon, e.g., a pressure sensitive adhesive coated onto an opaque barrier layer such as vinyl. The rear reservoir part has a dye or ink film layer and a support card layer.

When assembled, the front part is placed on the rear part with the ink layer forming an assembly joint with the adhesive layer. The dye or ink dissolves in the adhesive. After a period of time the ink migrates from the inner film layer through the adhesive layer and

indicator layer to be displayed on the outer surface. In one day, typically, the dye or ink may reach only 20% to 30% of its potential color capacity due to the gradual migration (or absorption) of the dye into the opaque indicator layer and due to the fact that as the concentration of dye increases at the surface, the rate at which the process progresses decreases. Thus, there is no clear indication of when the indicator expired. It is believed that this device has such deficiencies because the opaque indicator layer must be relatively thick to provide mechanical strength to the indicator, creating an extended distance across which the dye or ink must migrate. Also, the opaque indicator layer must have a relatively large quantity of filler, e.g., titanium dioxide, to confer opaqueness to it, and such fillers intermix and absorb with the dye as the dye migrates through the indicator layer, thus diluting or decreasing the intensity of the dye.

U.S. Patent No. 2,337,534 to Barber, describes a magazine page exposure time indicator including a photosensitive paper sheet mounted on a magazine page, and a developed photographic film sheet having a series of adjacent portions of varying density mounted over the photosensitive paper sheet.

U.S. Patent No. 3,078,182 to Krone, Jr., describes a heat-sensing, color-changing adhesive tape for a device to be sterilized in a hospital autoclave including an adhesive layer for attachment, a backing web over the adhesive layer and a visible colored layer over the backing web wherein the colored layer comprises a selected pigment disbursed in a resin binder.

U.S. Patent No. 3,520,124 to Myers, describes a parked car time indicator which includes a first sheet having a first reactant and a second sheet having a second reactant and a release sheet which is peeled away to permit contact of the first sheet with the second sheet to begin a reaction which extends over a selected

time interval and terminates with a color change of the reactants.

U.S. Patent No. 3,999,946 to Patel, describes a perishable product time-temperature history indicator which includes a substrate for attachment of the indicator to a product. The indicator shows changes in temperature along a Y-coordinate, over time plotted along the X-coordinate.

U.S. Patent No. 4,643,122 to Seybold, describes a tamper-indicating security tag which includes a carrier material impregnated with a solution selective compound. The solution is used as a solvent in connection with a sealed enveloping container which controls the rate of diffusion of the solvent.

U.S. Patent No. 4,646,066 to Baughman, describes an environmental exposure indicator device which includes a target having a tuned circuit and a selective element which receives an interrogation signal in a radio or microwave frequency range, and which also includes an

antenna. The antenna receives the signal and the circuit converts the signal to an electrical current. The selective element has an electrical property that changes and responds to the electrical current. The electrical current is dependent upon such environmental factors as temperature, the combination of time and temperature, humidity, radiation, particular fluids and/or mechanical shock.

U.S. Patent No. 4,737,463 to Bhattacharjee et al., describes a perishable product photoactivitable time-temperature indicator comprising a mixture of a thermally unreactive diacetylenic compound, a photosensitive compound which, on exposure to actinic radiation, forms an acid that converts the diacetylene to a thermally reactive product and an aqueous polymeric medium.

U.S. Patent No. 4,903,254 to Haas et al., discloses a time indicator comprising: a front portion which includes a transparent layer, an ink display layer, a

white barrier layer, an adhesive and ink dissolver layer; and a rear portion which includes a migrating ink pattern layer and a support part. When the time indicator is issued the front portion is placed onto the rear portion and the ink pattern layer is dissolved by the adhesive and ink dissolver layer. The ink pattern then migrates through the adhesive and ink dissolver layer, the white barrier layer, and the ink display layer to the ink display surface layer where it can be visually perceived.

OBJECTS AND SUMMARY OF THE INVENTION

It is an object of this invention to provide a Security I.D. Badge which provides a clear indication of expiration.

It is a further object of this invention to provide a reusable Security I.D. Badge which provides a relatively clear indication of expiration over a relatively short period of time.

It is an even further object of this invention to provide a Security I.D. Badge which acts to prevent unauthorized use of the badge.

It is another object of this invention to provide a Security I.D. Badge that is fail-safe.

It is still another object of this invention to provide a Security I.D. Badge which is tamper resistant.

Even another object of this invention is to provide a Security I.D. Badge that may be used only on the date it is issued.

Still a further object of this invention is to provide a Security I.D. Badge which is simple to use, yet effective.

Yet another object of this invention is to provide a Security I.D. Badge which may be easily and inexpensively manufactured.

It is even another object of the invention to provide a Security I.D. Badge that expires after a predetermined time interval.

Another object of this invention is to provide a Security I.D. Badge, the expiration of which may be visually observed.

Yet another object of this invention is to provide a Security I.D. Badge which may be reused.

The foregoing objects, as well as others, are achieved by the Security I.D. Badge of this invention. The badge includes a base substrate that may be formed of a paper or plastic card that may be encased in a transparent laminate. The card includes a void indicia

area. Also included is an ink substrate having an expired indicia area, typically an inked surface, of a soluble ink, and a surface attachable to the base substrate, typically an adhesive surface. The inked substrate is of a size similar to the size of the void indicia area of the card. Also, included is an overlay substrate having on one surface an ink dissolver, typically an ink dissolving adhesive surface and a display surface.

When the Security I.D. Badge is issued, the inked substrate is attached to the base substrate, the inked substrate covering the void indicia area of the card. The overlay substrate is then placed over the inked substrate, the ink dissolver of the overlay substrate in contact with the inked surface of the inked substrate.

Typically, the date of issuance is written on the display surface of the overlay substrate. The ink dissolver of the overlay substrate contacts and coacts with the inked surface of the inked substrate to dissolve

the ink and allow the ink to migrate through the overlay substrate to the display surface, where it can be visually perceived, in a selected time interval.

The foregoing and other objects, features and advantages of this invention will be apparent from the following description of the preferred embodiment of the invention as illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a front plan view of the Security I.D. Badge of the present invention immediately after it has been issued.

Figure 2 is a front plan view of the Security I.D. Badge of the present invention after expiration thereof.

Figure 3 is an exploded perspective view of the Security I.D. Badge of the present invention, corresponding to Figure 1, prior to adhesive engagement of the substrates.

DESCRIPTION OF THE PREFERRED EMBODIMENT

As shown in **Figures 1** through **3**, a Security I.D. Badge **10** is provided. The term "Security I.D. Badge", as used herein, is intended to encompass not only a badge issued to a visitor at a facility, but is also meant to include, without being limited to, such things as: passes, tickets, permits, control documents, photo-identification badges, etc. The badge **10** is constructed from three substrates **11**, **30** and **40**.

The base substrate **11** typically comprises a card **12** encased in a transparent laminate **16**. The base substrate may, however, be comprised of a plastic or paper card. The base substrate **11** is attachable to the clothes of a person. In the preferred embodiment, the attachment means includes a support means **18** comprised of an elongated oval aperture extending through the base substrate.

The card **12** is typically of a prominent color to provide ease of visibility. Generally, at the top of the card **12**, is the word "visitor". Also on the card **12** is a void indicia area **14**. Within the void indicia area **14** is typically a voided pattern comprising the word "void" printed repeatedly along horizontal lines extending across the void indicia area.

The inked substrate **30** is generally of a size similar to that of the void indicia area **14** of card **12**. The inked substrate **30** is attachable to the base substrate. Typically, the inked substrate **30** comprises an adhesive surface **32** and an expired indicia area **34**, typically an inked surface. The inked surface **34** carries a soluble ink, typically in the pattern of the word "expired" appearing repeatedly along lines extending horizontally across the inked substrate **30**. In another embodiment, the Security I.D. Badge is constructed without the inked substrate **30**, and the soluble ink may be applied directly to the base substrate.

The overlay substrate **40** comprises an ink dissolver typically in the form of an ink dissolving adhesive on an ink dissolving adhesive surface **42** and a display surface **44**. The overlay substrate **40** is typically similar in size to the inked substrate **30** and the void indicia area **14** of card **12**. The display surface **44** typically contains the phrase: **"VALID ON THIS DATE ONLY"** or a phrase similar thereto. Further, a date line is generally provided so that the date on which the Security I.D. Badge **10** is valid may be written on display surface **44** prior to issuance of the badge.

The display surface **44** of the overlay substrate **40** in the preferred embodiment is divided into a transparent front layer with a front print display surface, an ink display layer, and an optical barrier layer. While not shown in the drawings, this construction is described in detail in U.S. Patent No. 4,903,254 entitled "Time Indicator Enhancement Method" to David J. Haas, the entire disclosure of which is incorporated herein by

reference.

Generally the Security I.D. Badge **10** is assembled and activated by a security person, issued to a visitor at a facility, and expires after a specified time interval. When the Security I.D. Badge **10** is issued, the inked substrate **30** is adhesively secured to the base substrate **11** in a position so as to cover the void indicia area **14** of card **12**. Then, the overlay substrate **40** is adhesively positioned over the inked substrate **30**. Finally, the date of issue is completed on the display surface **44** of overlay substrate **40**. The Security I.D. Badge **10** may then be secured by means of pin support **18** to a pin fastened to the visitor's clothing.

As time progresses, the ink dissolving adhesive on the ink dissolving adhesive surface **42** of overlay substrate **40** contacts and coacts with the soluble ink on inked surface **34** of inked substrate **30**, to dissolve the ink and allow the ink to migrate through the ink dissolving adhesive surface **42**, through the optical

barrier layer of the overlay substrate **40**, to the ink display layer of display surface **44** where it can be visually perceived through the transparent front layer. The migration of ink takes place at a rate such that it can be visibly perceived through the transparent front layer of display surface **44** of overlay substrate **40** upon the passage of a specified time interval.

The time periods for which the Security I.D. Badge **10** is valid may be varied and are controlled by the use of different inks applied to the inked surface **34** of inked substrate **30**. Inks of more or less solubility or greater or lessor concentration will result in varying time periods.

Time periods may also be varied by varying the strength and concentration of the ink dissolving adhesive on the ink dissolving adhesive surface **42** of overlay substrate **40**. Further, the time periods may be varied by increasing or decreasing the size of the optical barrier layer, and/or doping the optical barrier layer. Thus,

this invention contemplates Security I.D. Badges with validation times of many different time periods, even extending from one day to one week to one month.

Upon expiration of the Security I.D. Badge **10** a visible indication is provided. This indication cannot be overcome by the visitor through tampering. For example, if the visitor attempts to remove the overlay substrate **40** from the inked substrate **30** it is likely that both will be removed from the base substrate **11** thereby uncovering the void indicia area **14** of card **12** and revealing the "void" message. Another possibility is that the visitor removes the overlay substrate **40** from the ink substrate **30** which is likely to tear the ink substrate **30** leaving it in disrepair, and alerting security to both the expiration of the Security I.D. Badge **10** and the visitor's tampering therewith. Alternatively, the overlay substrate could be neatly removed from the ink substrate which would only result in the inked surface **34** of the ink substrate **30** being

visible, again alerting security to the expiration of the Security I.D. Badge **10** and to the visitor's tampering therewith.

Importantly, the base substrate **11** may be reused with new inked substrates and overlay substrates. Thus, this badge presents a significant economical savings over conventional badges which are typically discarded by the purchaser after expiration. Further savings arise because the expiration indicator components of the badge, which must be issued with each issuance of the badge, are generally relatively small in size with respect to the badge. Areas of use of the Security I.D. Badge of the present invention include facilities where there are visitors, use by contractors, use by temporary employees, etc.

Importantly, lost and/or unreturned Security I.D. Badges automatically self expire and thus prohibit unauthorized use.

While the invention has been described in its preferred embodiment, it is to be understood that the words which have been used are words of description rather than limitation and that changes may be made within the purview of the appended claims without departing from the true scope and spirit of the invention in its broader aspects.

CLAIMS

What is claimed is:

1. A security identification badge comprising:

a base substrate having a void indicia area, indicating that the badge is void;

a removable inked substrate attached to and overlaying the void indicia area comprising an expired indicia area which includes a soluble ink; and

an overlay substrate attached to and overlaying the inked substrate, which overlay substrate includes an ink dissolver and a display surface;

wherein, the ink dissolver contacts and coacts with the soluble ink of the inked substrate to dissolve the ink, the ink migrating through the overlay substrate to the display surface, where it can be visually perceived, in a selected time interval, to indicate the expiration of the badge, and when the inked substrate and

the overlay substrate are removed from the base substrate, the void indicia area is exposed.

2. The security identification badge of claim 1 wherein the base substrate further comprises a card having a void indicia area, the card encased in a transparent laminate.

3. The security identification badge of claim 1, wherein the base substrate includes an attachment means.

4. The security identification badge of claim 3, wherein the attachment means comprises an aperture in the base substrate.

5. The security identification badge of claim 2, wherein the display surface of the overlay substrate includes an area wherein the expiration date of the security identification badge may be written.

6. The security identification badge of claim 2, wherein the void indicia area of the card is printed with the word "void".

7. The security identification badge of claim 2, wherein the expired indicia area of the inked substrate is printed with the word "expired".

8. The security identification badge of claim 2, wherein the inked substrate is of a size similar to the size of the void indicia area of the card.

9. The security identification badge of claim 1 wherein the base substrate has attached thereto a photograph of the user of the badge.

10. A security identification badge comprising:

a base substrate comprising a card, the card including a void indicia area, the base substrate including attachment means;

an inked substrate having an expired indicia area of a soluble ink, the inked substrate attachable to the base substrate, the inked substrate of a size sufficient to cover the void indicia area of the card;

an overlay substrate having an ink dissolver and a display surface;

wherein, when the security identification badge is issued, the inked substrate is attached to the base substrate to cover the void indicia area of the card, such that if the inked substrate is removed from the base substrate, the void indicia area of the card is made

visible; and the overlay substrate is attached to and covers the expired indicia area of the inked substrate; and the ink dissolver contacts and coacts with the soluble ink of the inked substrate to dissolve the ink and allow the ink to migrate through the overlay substrate to the display surface, where it can be visually perceived, in a selected time interval.

11. The security identification badge of claim 10, wherein the attachment means comprises an aperture in the base substrate for attachment to a visitor's clothing.

12. The security identification badge of claim 10, wherein the display surface of the overlay substrate includes an area wherein the expiration date of the security identification badge may be written.

13. The security identification badge of claim 10, wherein the void indicia area of the card is printed with the word "void".

14. The security identification badge of claim 10, wherein the expired indicia area of the inked substrate is printed with the word "expired".

15. A security identification badge comprising:

a base substrate comprising:

a card having a void indicia area;

a transparent laminate encasing the card; and

attachment means;

an inked substrate comprising:

an expired indicia area of a soluble ink; and

an adhesive surface, the inked substrate of a size similar to the size of the void indicia area;

an overlay substrate comprising:

an ink dissolving adhesive surface having an ink dissolving adhesive thereon;

an optical barrier layer overlaying the ink dissolving adhesive surface;

an ink display layer overlaying the optical barrier layer; and

a transparent display layer, with a front print display surface, overlaying the ink display layer;

wherein, when the security identification badge is issued, the inked substrate is adhesively positioned on the base substrate to cover the void indicia area of the card, such that if the inked substrate is removed from the base substrate, the void indicia area of the card is exposed; and the overlay substrate is adhesively positioned on the expired indicia area of the inked substrate; and the ink dissolving adhesive contacts and coacts with the soluble ink of the inked substrate to dissolve the ink and allow the ink to migrate through the optical barrier layer to the ink display layer, where it can be visually perceived through the transparent display layer, in a selected time interval.

16. The security identification badge of claim 15, wherein the attachment means comprises an aperture in the base substrate for attachment to a visitor's clothing.

17. The security identification badge of claim 15, wherein the front print display surface of the overlay substrate includes an area wherein the expiration date of the security identification badge may be written.

18. The security identification badge of claim 15, wherein the void indicia area of the card is printed with the word "void".

19. The security identification badge of claim 15, wherein the expired indicia area of the inked substrate is printed with the word "expired".

20. A tamper-resistant reusable base substrate for a security identification badge comprising:

a card having a void indicia area;

means for permitting the void indicia area to be covered; and

attachment means for attachment of the security identification badge to a visitor's clothing;

wherein, the void indicia area of the base substrate is covered when the security identification badge is issued, and removal of the cover reveals the void indicia area of the base substrate to indicate the expiration of the security identification badge and/or tampering therewith.

21. The reusable base substrate of claim 20 wherein the means for permitting the void indicia area to be covered includes a surface capable of receiving and supporting a substrate having an adhesive surface.

22. The reusable base substrate of claim 21 further comprising an inked substrate adhesively attached to and overlaying the void indicia area comprising an expired indicia area which includes a soluble ink, and an overlay substrate attached to and overlaying the inked substrate, which overlay substrate includes an ink dissolver and a display surface.

23. A method for assembly and activation of a security identification badge comprising the steps of:

providing a reusable base substrate having a void indicia area and an attachment means;

attaching an inked substrate having an expired indicia area of a soluble ink, to the base substrate, to cover the void indicia area;

attaching an overlay substrate, having an ink dissolver, and a display surface, to the inked substrate to cover the expired indicia area; and

attachment of the base substrate to a visitor's

clothing;

wherein the ink dissolver of the overlay substrate contacts and coacts with soluble ink of the inked substrate to dissolve the ink, the ink migrating through the overlay substrate to the display surface, where it can be visually perceived in a selected time interval, to indicate the expiration of the badge, and when the inked substrate and the overlay substrate are removed from the base substrate, the void indicia area is exposed.

24. The method of claim 23 wherein the attachment of the inked substrate to the base substrate is accomplished by adhesive means.

25. The method of claim 24 wherein the attachment of the overlay substrate to the inked substrate is accomplished by adhesive means.

26. The method of claim 23 further comprising the step of recording the date on which the security identification badge is valid by writing the date on the overlay substrate.

FIG-1

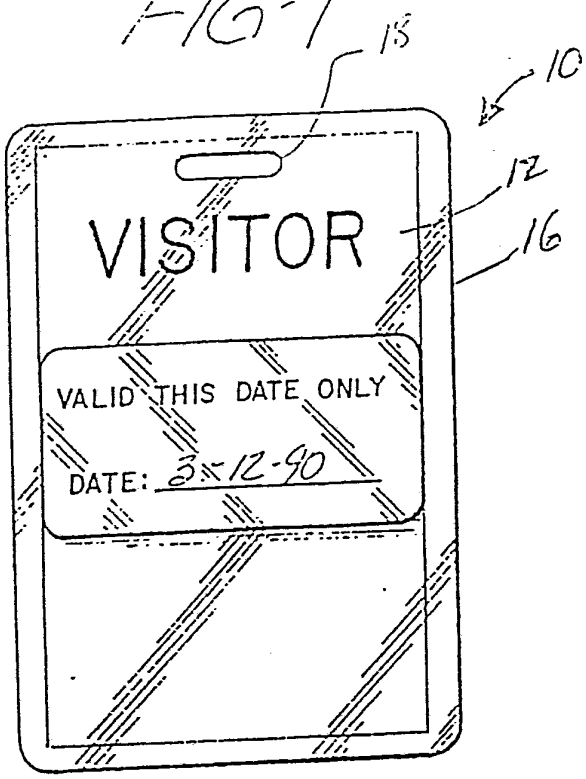


FIG-2

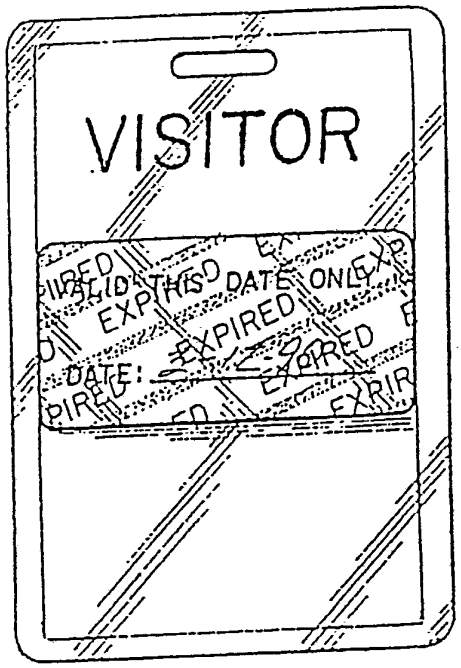
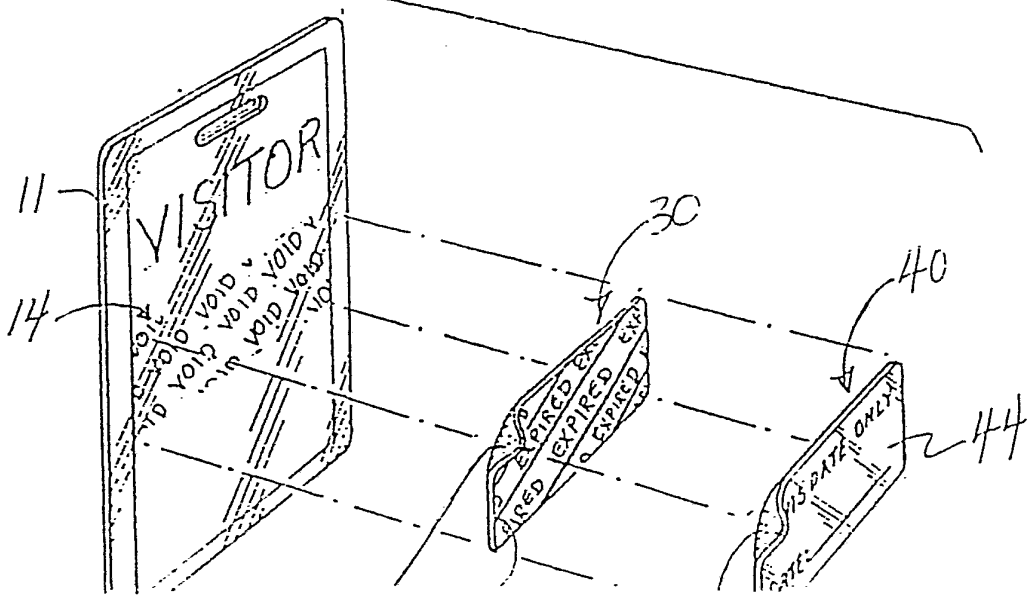


FIG-3



INTERNATIONAL SEARCH REPORT

International Application No. PCT/US92/00897

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC(5) B42D 15/00
US CL 283/096

II FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
US CL	116/200,207 // 283/096,112,114

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [8]

III DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category *	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
X	US, A, 4,903,254 HAAS, 20 February 1990 (See whole document).	1-26
Y		1-26
Y	US, A, 4,822,990 TAMADA, 18 April 1989 (Note the unnumbered aperture for hanging the card 1 shown in figure 1).	2-9,11,13, & 15-22
A	US, A, 4,432,630 HAAS 21 February 1984	1-26
A	US, A, 4,643,122 SEYBOLD 17 February 1987	1-26
A	US, A, 4,812,053 BHATTACHARJEE, 14 March 1989	1-26
A	US, A, 4,987,849 SAERMAN, 29 January 1991	

* Special categories of cited documents: [10]

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
04 May 1992	10 JUN 1992

International Searching Authority	Signature of Authorized Officer
ISA/US	Paul A. Bell

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE [1]

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers because they relate to subject matter [2] not required to be searched by this Authority, namely:

2. ☐ Claim numbers , because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out [3], specifically:

3. ☐ Claim numbers_____, because they are dependent claims not drafted in accordance with the second and third sentences of PCT Rule 6.4(a).

VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING [4]

This International Searching Authority found multiple inventions in this international application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.

2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest

☐ The additional search fees were accompanied by applicant's protest.

☐ No protest accompanied the payment of additional search fees.