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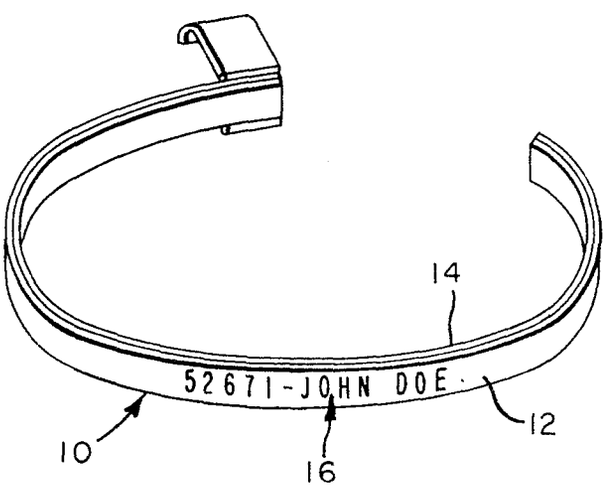
(54) Identification member.

(57) An identification bracelet for use in patient identification systems is described in which the bracelet is imprintable both by thermal techniques as well as conventional ink type printing. The characters formed thereby are readable by optical character recognition readers. The bracelet is a laminate of a first film coated with a thermally sensitive coating with an opaque backing of a spun-bonded polyester or like material having the spectral background reflectivity to facilitate OCR reading. The resulting laminate is resistant to abrasion, normal solvents used in hospitals and yet has sufficient strength to maintain the shape of the characters formed thereon.



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Title

Identification Member

Background of the Invention

This invention relates to an identification member. In hospitals, laboratories, warehouses and the like, it has become necessary and customary to attach identification information bearing labels or tags to patients, samples, or inventoried items, as the case may be. In hospitals, identification tags are used to control samples taken from the patient, medicaments given to the patient, and finally his bill upon discharge. This system is prone to error because of the human factor involved. Much work has been done to reduce these errors by automation in which the human factor is removed insofar as possible.

One method of reducing human error in reading and reproducing identification (I.D.) information is that described in U.S. Patent 4,268,179 issued May 19, 1981 to George R. Long et al. This method permits identification characters printed on an I.D. bracelet, for example, to be automatically read and reproduced in a form that is both man and machine readable. The method uses a dot matrix thermal printer and an optical character reader. According to this method, the characters printed on the patient I.D. bracelet are scanned with an optical character reader to obtain information as to the identity of the characters. Next, using this identity information to control the dot matrix thermal printer, apparent solid line characters of dots are formed that are readable by both a human and an optical character reader. The printer may be used to form the new characters on a label or other surface. Care must be taken that the label has optical characteristics compatible with optical character readers.

A problem exists in that most known I.D. members do not have the necessary optical and other characteristics suitable for this use. Desirably, the I.D. members should be capable of being either thermally imprinted or of being imprinted manually or by impact printing using conventional permanent ink techniques. In addition, where hospital usage is required, the I.D. member should be capable of resisting abrasion and the normal solvents used in a hospital such as water, alcohol and the like. The member should have a high enough strength to maintain the shape of the characters imprinted thereon and should be nonallergenic, nonirritating and nontoxic. Finally, it should be reasonably flexible, pleasing to the touch and have a reasonably good drape so as to form itself around the wrist of the patient without irritating or cutting the wrist because of sharp edges and the like.

Known I.D. members of the prior art include that described in U.S. Patent 3,656,473 issued April 18, 1972 to Sodickson and Rubin. In this patent a thermally sensitive label is described as being a laminate of a thermally sensitive paper secured to a test tube and overcovered by a protective layer of a transparent plasticized adhesive tape. It is doubtful this would be suitable for use as an I.D. bracelet in a hospital. The thermal paper would be totally unprotected and most certainly damaged by water and other common hospital solvents.

U.S. Patent 3,698,383 issued October 17, 1972 to Baxter Laboratories describes an I.D. bracelet in the form of a laminate of opposed outer plastic layers and an interposed layer of a paper impregnated with pressure sensitive capsules which

rupture when struck with an impact printer. Clearly, this label is not suitable. It is subject to inadvertent marking merely by the patient wearing the bracelet.

Summary of the Invention

According to this invention, an I.D. member, overcoming many of the deficiencies of the prior art, is adapted to be secured to an article. The member is a laminate of a first transparent sheet of a temperature sensitive material capable of having alphanumeric characters formed thereon by a thermal printer and a second opaque sheet adapted to be imprinted with ink. The print contrast ratio between the alphanumeric characters formed on the first sheet and the background provided by the second sheet facilitates recognition of the characters by an optical character reader.

In the preferred embodiment, the laminate is flexible and formed of a material substantially unaffected by water, alcohol and most hospital type solvents. Further, the laminate is sufficiently stretch resistant to maintain the shape of the characters formed therein when used as a patient I.D. bracelet. The first sheet may be a clear polyester film coated with a thermally sensitive coating and the second sheet a spun-bonded polyethylene or polyester. Alternatively, the second sheet may be an ink receptive white polyester film or an ink receptive matte coating on a plastic base.

The resulting I.D. member laminate is quite suitable for hospital usage. It resists abrasion, normal hospital solvents, is sufficiently stretch resistant to maintain the shape of the characters printed thereon, is nonallergenic and nonirritating, nontoxic, flexible, pleasing to the touch and has, in general, a good drape.

Brief Description of the Drawings

Further advantages and features of this invention will become apparent upon the following description in which the sole figure is a pictorial representation of an I.D. member constructed in accordance with this invention.

Detailed Description of the Preferred Embodiment

There may be seen in FIG. 1 an identification (I.D.) member 10 in the form of a patient I.D. bracelet adapted particularly for hospital use. The member 10 is a laminate of a first sheet 12 and a second sheet 14. The first sheet 12 is a transparent, flexible film, treated with a thermally sensitive coating, such as that described in U.S. Patent 3,795,532 issued to Newman et al. This permits information indicia or characters 16 to be thermally formed in the thermal coating of the first sheet 12. Many suitable plastic materials may be used as the flexible film base for the thermally sensitive coating. Included in these materials is polyester film. A product available commercially, and suitable for that use, is sold by Minnesota Mining and Manufacturing Company of Minneapolis, Minnesota as their type 166 thermal data output film. This film is designed for use in computer terminals equipped with a thermal printhead. Other films that may be used as a backing for a thermally sensitive coating include any known film having the desired characteristics, as set forth below, for a hospital bracelet. These include polystyrene, polypropylene, polyvinylfluoride, polyamide, and copolyester films, although in some cases, the drape of some films is not as desirable as polyester.

The second sheet 14 of the member 10 also is a flexible material, but in this instance one that is

capable of receiving permanent ink or being otherwise written upon using typical marking devices and at the same time one having the proper background spectral response characteristics needed to achieve the print contrast ratio required for reading thermally formed characters with optical character readers.

The criteria which affect the ability of an optical character reader (OCR) to read characters are known. Many known OCR readers such as the OCR Wand™ Reader produced by Recognition Products, operate in the near infrared spectral region. As is described in their manual, "OCR WAND™ Reader Media Manual", copyright 1977, the ability of the OCR to read a character is a function, inter alia, of the print contrast ratio (PCR) of the character. PCR is a term which describes a contrast between a printed character and the background on which it is printed. The character typically is printed using an ink having a PCR of 50% or greater as measured in the near infrared spectral response range. The PCR is measured using a Macbeth PCM-II("C" scale) with a silicon sensor spectral response in the near infrared 600 to 1200 nm range, i.e., the response range of the OCR. Hence, the characters 16, which are formed in the thermal coating of the first transparent sheet 12, must be absorbing of the radiation from the OCR and backed by the second sheet 14 having the appropriate spectral response characteristics to provide the required print contrast ratio.

Among the backing sheet materials that are suitable for this purpose, are spun-bonded polyethylene and polyester sheets such as those sold under the trademarks Tyvek and Remay by E. I. du Pont de Nemours and Company, Wilmington, Delaware. The Tyvek polyethylene sheet is particularly suitable for

this purpose because it meets all of the criteria necessary for use as a patient I.D. bracelet. These criteria include the ability to resist abrasion; not being harmed by normal hospital solvents such as water, alcohol and the like; and having a reasonably high strength so as to maintain the shape of the films and thereby not distort the characters formed in the first sheet 12. Additional criteria require that the film be nonallergenic, nonirritating and nontoxic as well as flexible, pleasing to touch and having a reasonably good drape, i.e., the quality which permits it to shape itself to the patient's wrist without undue discomfort. A preferred film having these characteristics is Tyvek spun-bonded polyethylene about 7 mils thick.

Alternative backing materials that may be used for the sheet 14 include white polyester films such as those sold under the trademark Mylar, types 92M580 or 200M580 by E. I. du Pont de Nemours and Company, Wilmington, Delaware. As still another alternative, white polyester computer printable label stock sold by Minnesota Mining and Manufacturing Company, Minneapolis, Minnesota designated as type T7880 has also been found useful for this purpose. This label stock has an ink receptive matte coat placed on a durable polyester temperature, solvent, and abrasion resistant sheet. An acrylic adhesive is affixed to the other side of the polyester sheet. A liner may be used to protect the adhesive prior to lamination.

Lamination of the sheets 12 and 14 may be effected using any of the known suitable adhesive systems. A pressure sensitive adhesive is preferred and any of those having a rubber or acrylic base may be used. For example, the number 300 high strength

acrylic adhesive sold by Minnesota Minning and Manufacturing Company may be used.

With the laminate member 10 thus formed, the thermally imprinted characters 16 may be read by an OCR or by a human. In the event the OCR fails or the thermal printing system fails, characters may be imprinted, using conventional ink type impact printing or manual marking on the layer 14. In normal usage, however, the layer 14 provides the appropriate spectral response characteristics for the optical character reader. The laminate member 10 thus has opposite major, flat faces, one capable of bearing a thermally imprinted character, the other an ink imprinted character.

The member 10 has the many desirable attributes noted above. It is imprintable with characters either by normal impact printing or manually on one side or layer and by a thermal printer on the other side or layer. It is formed of materials that resist abrasion and normal hospital solvents and is sufficiently unstretchable that the characters do not deform in normal usage. It is generally nonallergenic, nonirritating and nontoxic; is flexible, pleasing to the touch, and has a good drape.

In typical applications, when used in a patient I.D. system, the member 10 may be provided with a fastener 18 of any known, suitable type so that it may be secured about the wrist of a patient in a manner that prevents the patient from removing the bracelet. Since particular fasteners suitable for this purpose are of a known type and do not form a known part of this invention, they will not be described further.

CLAIMS

1. An identification member adapted to be secured to an article to be identified, said member being a laminate and having first and second opposite major, flat surfaces, the improvement wherein said laminate includes:

a first transparent sheet of a temperature sensitive material capable of having characters formed thereon by a thermal printer,

a second opaque sheet, adapted to be imprinted with ink, forming a print contrast ratio between the second sheet and characters formed on the first sheet that facilitates recognition by an optical character reader.

2. A member according to claim 1 wherein said laminate is flexible and substantially unaffected by water and alcohol.

3. A member according to claim 1 or 2 wherein said laminate is sufficiently stretch resistant to maintain the shape of said characters when used as a patient identification bracelet.

4. A member according to claim 1 wherein said first sheet is a polyester film coated with a thermally sensitive coating.

5. A member according to claim 1 or 4 wherein said second sheet is a spun-bonded polyester.

6. A member according to claim 1 or 4 wherein said second sheet is an ink receptive white polyester film.

7. A member according to claim 6 wherein said second sheet has an ink receptive matte coating.

8. A member according to claim 1 or 4 wherein said laminate is in the form of a strip adapted to be used as a patient identification bracelet.

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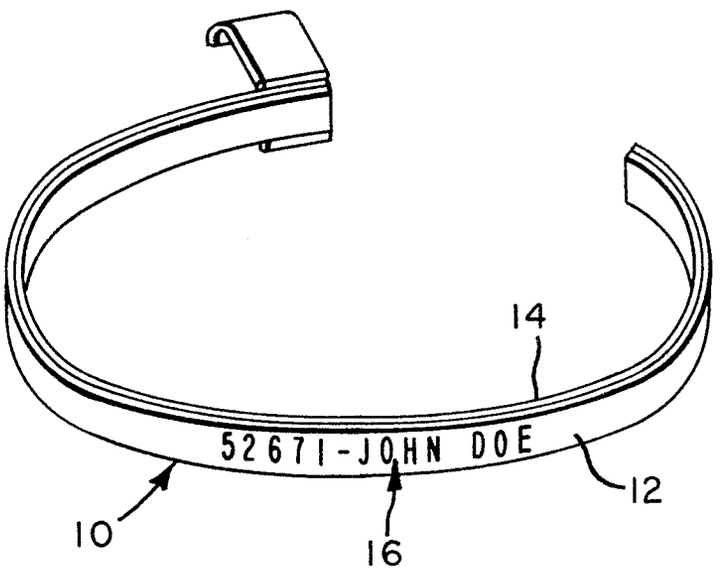
9. A member according to claim 1 or 4 wherein said second sheet is a spun-bonded polyethylene.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EUROPEAN SEARCH REPORT

0071933
Application number

EP 82 10 6951

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. ³)
Y	FR-A-1 258 457 (KALLE A.G.) *The whole document*	1,4,5	G 09 F 3/00
D,Y	EP-A-0 027 886 (E.I.DU PONT DE NEMOURS AND COMPANY) *Page 2, lines 13-34; page 3, lines 1-28; page 5, lines 16-33*	1	
Y	BE-A- 881 287 (E.I.DU PONT DE NEMOURS AND COMPANY) *Page 1, lines 1-6; page 2, lines 2-21; page 4, lines 8-34; page 13, lines 10-37; page 14, lines 1-30*	1	
A	US-A-3 147 134 (BRYCE L.CLARK) *Column 2, lines 3-11; figure 3*	1,7	TECHNICAL FIELDS SEARCHED (Int. Cl. ³)
A	FR-A-2 142 825 (WIENER ALBERT) *Page 1, lines 25-27; page 2, lines 4-29; figures*	2,3,8	G 09 F B 41 M
A	FR-A-2 344 919 (RACAL-ZONAL LIMITED) *Page 4, lines 2-23; figure*	1,7	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	12-11-1982	MIOT F.P.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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E : earlier patent document, but published on, or after the filing date
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