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— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

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(54) Title: METHOD FOR DETERMINING ABSENCE OF A COMPONENT FROM A DISPOSABLE ABSORBENT ARTICLE

(57) Abstract: A method for determining the absence of a component from an article and particularly from one or more interconnected articles during movement of the collection of articles, is described. The methods are especially well suited for detecting a diaper missing one or more tape closure assemblies during a manufacturing operation.

Atty. Reference No.: 4809-PC

METHOD FOR DETERMINING ABSENCE OF A COMPONENT FROM A DISPOSABLE ABSORBENT ARTICLE

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims priority upon US provisional patent application serial No. 61/330,412 filed May 3, 2010, which is incorporated herein by reference in it entirety.

FIELD OF THE INVENTION

[0002] The present invention relates to methods for determining whether one or more articles such as disposable absorbent articles, lack a component such as a tape closure assembly. The invention is particularly directed to detection of missing component(s) during high speed manufacturing or packaging operations in which a collection of articles are moving at high speed.

BACKGROUND OF THE INVENTION

[0003] A wide variety of consumer items use adhesive or mechanical tape closure assemblies. For example, many disposable absorbent products for collecting and retaining liquids such as diapers utilize tape closure assemblies to provide selective fitting of the diaper about a user. During manufacture of diapers or other consumer items using such tape-based closure assemblies, the closure assembly is attached or otherwise permanently mated with a corresponding diaper panel at one or more predetermined locations on the diaper panel. Although modern manufacturing processes for diaper assemblies exhibit relatively low defect rates, occurrences such as missing tape closures still periodically occur for a variety of reasons.

[0004] It is particularly undesirable for a diaper missing a tape closure assembly to reach an end-user. The absence of such a closure renders the diaper practically useless and results in an aggravated and disgruntled consumer. For at least this reason, it would be advantageous to identify diapers lacking closure assemblies during their manufacture and/or packaging and thereby prevent their introduction into the market.

[0005] Identifying a diaper or other article lacking a required closure assembly is particularly difficult during manufacturing and/or packaging of the diapers due to the operations typically being performed at high speeds. Furthermore, the difficulty in identifying

a missing closure assembly is increased for products in which the closure assembly has the same or a similar color, appearance, or otherwise resembles adjacent or surrounding regions of its associated diaper panel. Problems in such identification can also arise if the closure assembly or a portion thereof is transparent. Moreover, the difficulty in identifying missing closure assemblies from collections of diapers is further compounded when the collection of diapers is interconnected such as when in a web form during most manufacturing processes. Interconnected articles are more densely arranged thereby increasing the difficulty in assessing whether a particular component associated with an article is absent.

[0006] Various methods are known in the art for controlling placement, registration, and assembly of items in absorbent articles. For example, JP 10263010; US Patents 4,837,715 and 5,359,525; and US Patent Application Publication 2003/0229325 are generally directed to detecting placement and orientation of components such as closure tabs in absorbent articles. Although satisfactory in many regards, these detection and assembly control strategies are relatively sophisticated and necessitate costly equipment, sensitive computer controls and significant operator training and/or experience to implement and maintain. Moreover, these techniques are concerned with proper placement and affixment of components to their corresponding articles.

[0007] Accordingly, a need exists for an economical and relatively simple strategy specifically for detecting the absence of a component in an absorbent article, and particularly during high speed manufacturing of such articles. Furthermore, a need exists for a strategy by which a missing component such as a tape closure assembly could be readily determined, and particularly, determined in the context of a high speed manufacturing and/or packaging environment.

SUMMARY OF THE INVENTION

[0008] The difficulties and drawbacks associated with previous systems and methods are overcome in the present methods for various detection and determination techniques by which articles such as diapers that are lacking a tape closure assembly, can be readily identified, and if desired, subsequent actions can then be taken.

[0009] In a first aspect, the present invention provides a method for determining the absence of a component from a corresponding article in a moving collection of articles. The method comprises incorporating an effective amount of an optical brightener into at least a portion of the component. The method also comprises emitting light to a region of the article at which the component is located. And, the method comprises evaluating the light from the article to determine whether the component is absent from the corresponding article.

[0010] In yet another aspect, the present invention provides a method for determining the absence of a component associated with a corresponding article in a moving collection of articles. The method comprises including an effective amount of an optical brightener into at least a portion of the components associated with the moving collection of articles. The method also comprises emitting light toward the components associated with the moving collection of articles, whereby the optical brightener in the components re-emits light. And, the method further comprises evaluating the light from the components to determine whether one or more components are absent.

[0011] As will be realized, the invention is capable of other and different embodiments and its several details are capable of modifications in various respects, all without departing from the invention. Accordingly, the description is to be regarded as illustrative and not restrictive.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0012] Generally, the present invention provides methods for detecting the absence of one or more components such as tape closure assemblies associated with an article such as a disposable absorbent article, and preferably which is a diaper. The present invention methods are particularly well suited for such detection and absence determinations in situations in which a collection of articles are moving such as on a conveyor or a belt during manufacturing and/or packaging. Furthermore, the inventive methods are also particularly applicable for determining such missing components from collections of interconnected articles, and for combinations of articles and components having the same or similar visual characteristics such as color.

[0013] Preferably, the present invention methods involve incorporating one or more optical brighteners or similar agents in a component of interest such as a tape closure assembly. At a phase or process location subsequent to affixment or association of the closure assembly to the article such as a diaper, emission of light toward the component containing the optical brightener results in a second emission of light which can then be detected by known means. Analysis of whether such light is detected, and/or the characteristics of the light, enables determination of whether the component of interest is absent from an associated article. Preferably, the determination is a direct determination so that if such re-emitted light is not detected, a reliable and accurate conclusion can be reached that the component of interest is not present. Additional operations can be performed to indicate a condition in which the component is missing and/or to separate the article that is missing the component of interest. Each of these aspects is described in greater detail as follows.

Optical Brighteners

[0014] A wide array of optical brighteners or related agents can be used in the present invention. Generally, the term "optical brightener" as used herein refers to one or more agents that are incorporated into a component such as a diaper tape closure assembly, also known as a tab, or a coating or other layer or region of the component, in which the agent(s) exhibit measurable or identifiable light emitting characteristics resulting from irradiation by a particular light source. Preferably, the term refers to agents that absorb light in the ultraviolet and violet region of the electromagnetic spectrum, and re-emit light, typically in the blue region. However, it will be appreciated that the invention is not limited to the use of agents that absorb light in these noted ultraviolet and violet regions and/or which re-emit light in the noted blue region. Preferably, the term does not include agents that emit light after a substantial time period following irradiation or which emit light for a substantial time period following irradiation. Instead, it is preferred that the optical brighteners used in the invention emit light having a wavelength different than that of the initial irradiating light, generally concurrently with the initial irradiation.

[0015] Generally, the one or more optical brighteners are selected from triazine -stilbenes including di-, tetra-, and/or hexa-sulfonated versions of these compounds; coumarins; imidazolines; diazoles; triazoles; benzoxazolines; biphenyl-stilbenes; and combinations thereof. The invention also includes the use of one or more agents that increase the brightening effect of the brightening agent(s) such as for example certain polyols such as high molecular weight polyethylene glycol or polyvinyl alcohol.

[0016] Examples of preferred optical brighteners include, but are not limited to Fluorescent Brightener KS-N, also known as 5-Methyl-2,2'-(vinylenedi-p-phenylene)bis-benzoxazole; 4-(2-Benzoxazolyl)-4'-(5-methyl-2-benzoxazolyl)stilbene; or 2-[4-[4-(2-Benzoxazolyl)styryl]phenyl]-5-methylbenzoxazole (CAS Registry Number 5242-49-9); Fluorescent Brightener 184, also known as 2,5-Bis(5'-tert-butyl-2-benzoxazol-2-yl)thiophene; 2,5-Di(5-tert-butylbenzoxazol-2-yl)thiophene; or BBOT (CAS Registry Number 7128-64-5); and combinations of these agents and potentially with other agents. It will be appreciated that in no way is the invention limited to these particular optical brighteners.

Component(s) and Article(s) to be Detected

[0017] As noted, the present invention is particularly directed to determining the absence of a component of an article, and most particularly the absence of component(s) in a plurality of interconnected articles, moving in a manufacturing, packaging, or other industrial

environment. As previously noted, the methods described herein are preferably directed to disposable absorbent articles such as diapers having component tape closure assemblies.

[0018] It will be understood that the features of the present invention methods are equally adaptable for other types of absorbent articles such as adult incontinence pads, adult incontinence garments, training pants, disposable swim pants, feminine hygiene pads and prefastened or refastenable diaper pants.

[0019] The preferred component to be detected or otherwise evaluated as to its absence, is a closure assembly for a diaper or other multi-layered liquid-absorbing consumer product. Typical closure assemblies are in the form of a tape assembly having one or more film layers, and a corresponding release layer. Generally, such tape assemblies are provided in conjunction with a diaper such that a region of the tape is exposed and in view. Upon placement of the diaper about a user, the release layer is removed from a face of the film to thereby expose an adhesive layer or other closure component, which then retains the tape in a desired location elsewhere on the diaper thereby securing the diaper about the user.

[0020] Film(s) used in closure assemblies for diapers are typically formed from one or more polymeric materials. A preferred example of such material is polypropylene. One or more optical brighteners are incorporated in the component of interest by including the brighteners in the polymeric material during film formation. It may also be preferred to incorporate one or more coloring agents such as a white masterbatch in the film material to impart a desired color to the resulting film. Coatings containing the optical brightener can also be used which are applied to the component of interest. Details as to the incorporation of the optical brighteners into the component of interest are as follows.

Incorporation of Optical Brightener(s)

[0021] In accordance with a preferred aspect of the invention, one or more optical brighteners are incorporated into one or more material(s) forming the component of interest, which for a tape closure assembly can be a film. The optical brighteners are incorporated into the component of interest such as a film material used in a tape closure assembly, in an effective amount. The optical brighteners can also be incorporated into a coating formulation that is applied onto all or a portion of the component of interest. The term "effective amount" as used herein refers to an amount that enables the absence of the component to be evaluated and/or determined. Generally, for a polymeric film material, the optical brightener is used at a concentration of from about 0.01% to about 1.99% by weight, with a concentration of from about 0.1% to about 0.5% by weight being preferred. All percentages noted herein are percentages by weight unless indicated otherwise. It will be understood that these weight percent concentrations are based upon the weight of the particular material

within which the brightener is incorporated. It is surprising that such low concentrations of optical brightener can be utilized. It is believed that these low concentrations are possible since the methods described herein are based solely upon detecting the presence of such agents. This is in contrast to a method in which a pattern, arrangement, or location of such agents is of concern, as would likely otherwise be required for determining the position and/or registration of a component relative to its corresponding article. It will however, be understood that in no way is the invention limited to these particular concentrations.

[0022] For tape closure assemblies including a fastening tape, a release tape, and an optional finger lift component typically located at an end of the assembly to assist in the separation of the fastening tape and the release tape, it is most preferred to incorporate the optical brightener in the fastening tape. Most preferably, the material used for forming the fastening tape is 99.5% cast polypropylene film and up to 0.5% optical brightener. It will be appreciated that in no way is the present invention limited to this particular material or film. For example, the film can be formed from other materials besides or in addition to polypropylene. A wide array of additives, agents, and additional components can be included in the film material.

[0023] It will be understood that the region, coating, or portion of the component to be assessed, which receives the optical brighteners as described herein, is located or otherwise exposed for viewing at the particular stage of the process at which the component is to be detected. Thus, if for example, during manufacturing of diapers each designed to feature a tape closure assembly, in which the exposed face of the tape closure assembly is that of the release layer, then the release layer would contain the optical brightener so that the absence of the tape assembly could then be determined. If instead, the exposed face of the tape closure assembly is that of a backing layer for example, then the backing layer would contain the optical brightener.

Determination of Absence of Component

[0024] As noted, the present invention provides methods for directly detecting or determining the absence of one or more components associated with an article and preferably in a collection of interconnected articles. Preferably, the methods determine the absence of tape closure assemblies from disposable absorbent articles such as diapers. The methods of the invention are well suited for use in high speed manufacturing or packaging operations in which the articles and their associated components are moving at relatively high speed. Also, as noted the inventive methods are applicable for applications in which the component of interest is the same or similar color or otherwise resembles adjacent regions of its corresponding article. For example, it is particularly difficult to detect the absence of a white diaper tab that is disposed upon a white outer layer of a diaper panel.

[0025] Preferably, detecting or otherwise determining the absence of the components of interest is achieved by emitting light toward the component(s) and most preferably to a region of the article at which the component is located. For articles in which the component is missing, the light is emitted toward a region of the article at which the component would be located if present. The emitted light is preferably ultraviolet light or a spectrum of light including ultraviolet light. Ultraviolet light is electromagnetic radiation having a wavelength shorter than that of visible light, but longer than x-rays. Typically, ultraviolet light is light having a wavelength in the range of from about 10 nm to about 400 nm. Preferably, the ultraviolet light emitted to the component(s) of interest has a wavelength of from about 340 nm to about 370 nm. However, it is to be understood that the invention is not limited to the use of these particular wavelengths.

[0026] As explained herein, the optical brighteners in the component(s) of interest absorb the emitted ultraviolet light and then re-emit light. Generally, the re-emitted light is in the blue region, and has a wavelength in the range of from about 420 nm to about 470 nm. Again, it will be understood that the invention is not limited to the re-emitting of these particular wavelengths of light.

[0027] The methods further include an operation in which the re-emitted light is then detected or otherwise assessed. Upon detection of such light at the re-emitted wavelength(s), the absence of the component of interest can then be directly determined. A wide array of technologies are known for detecting and if desired, measuring, the re-emitted light. For example, various silicon detectors are widely used for detection of light in the wavelength range noted herein. Additional examples of suitable types of devices include but are not limited to photodiodes and photocathodes which can be tailored to be sensitive in different ranges of the spectrum of interest. Also known are various photomultipliers which can be used for such detection.

[0028] In one version of the invention, upon re-emitting of light from the optical brightener(s) contained in the component of interest, the light or rather its spectrum and/or intensity is measured and preferably compared against a reference or standard. The reference or standard is based upon re-emitted light from a component known to be present with its corresponding article. Alternatively, the reference or standard can be based upon light from an article missing the component of interest. By comparing a measured or detected characteristic of re-emitted light to such a reference or standard, a reliable evaluation and determination as to the absence of the component can then be readily made. As will be understood, light from an article that is lacking a component of interest would merely be light reflected from that article. The term "reflected" is periodically used herein to generally refer to a spectrum of light that is reflected from an article. If the article includes a component of interest, the spectrum of light will include light that is re-emitted from the

optical brightener(s) in the component. If the article is missing the component of interest, the spectrum of light will not include such re-emitted light. As previously explained, light that has been re-emitted from the optical brightener(s) can be characterized by its wavelength, range of wavelengths, and/or intensity.

[0029] The noted evaluation and/or comparison can be implemented and performed using widely available software and/or programmable microprocessor-based devices. A variety of programmable electronic equipment can be obtained from numerous commercial sources and readily adapted to perform these operations. In fact, many electronic light detection systems can be configured to compare a detected light spectrum against one or more spectra or stored references.

[0030] Upon detecting the absence of the component(s) of interest relative to one or more corresponding articles, it is also contemplated to issue a status indicator and/or take one or more additional steps. Generally, detection of the absence of a component such as a tape closure assembly of an article such as a diaper is in many aspects more significant than detection of the presence of such closure assembly. Therefore, for certain applications, determination of the absence of the component(s) of interest will be important. And upon determination of such missing component(s), an indicator signal may be issued to warn an operator as to the determination. The signal may activate a visual indicator such as a warning light or result in a message logo or symbol on control equipment screens. The signal may also activate an audible warning such as a horn or audible message. In addition to or instead of a warning light or other signal being activated, an article ejecting or marking operation could be initiated. That operation could appropriately mark the article(s) lacking the component of interest for subsequent attention or repair. Alternatively, the affected article(s) lacking the component of interest could be removed or separated from the manufacturing or packaging operation. It will be understood that the present invention is contemplated to have wide application in a variety of processes.

[0031] As noted herein, a prime application of the present invention is for the detection of missing tape closure assemblies from diapers or more particularly, a collection of diapers moving in a manufacturing and/or packaging operation. Various details as to diapers, tape closure assemblies, and manufacturing or other processing thereof are provided in one or more of the following documents: US Patents 5,843,260; 5,462,540; 6,419,667; 5,599,620; 6,524,294; 5,860,964; 6,146,369; 5,690,628; 5,660,659; 6,645,338; 6,669,887; 5,085,655; 5,057,097; 6,017,621; 5,080,973; and 5,888,649 for example.

[0032] Many other benefits will no doubt become apparent from future application and development of this technology.

[0033] All patents, published applications, and articles noted herein are hereby incorporated by reference in their entirety.

[0034] It will be understood that any one or more feature or component of one embodiment described herein can be combined with one or more other features or components of another embodiment. Thus, the present invention includes any and all combinations of components or features of the embodiments described herein.

[0035] As described hereinabove, the present invention solves many problems associated with previous practices and methods. However, it will be appreciated that various changes in the details, materials and arrangements of various details, which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the art without departing from the principle and scope of the invention, as expressed in the appended claims.

Claims

What is claimed is:

1. A method for determining the absence of a component from a corresponding article in a moving collection of articles, the method comprising:

incorporating an effective amount of an optical brightener into at least a portion of the component;

emitting light to a region of the article at which the component is located;

evaluating the light from the article to determine whether the component is absent from the corresponding article.

2. The method of claim 1 wherein at least a portion of the collection of articles are interconnected.

3. The method of claims 1-2 wherein the component and a region of the corresponding article proximate the component are the same color.

4. The method of claim 3 wherein the color is white or transparent or a combination of both.

5. The method of claims 3-4 wherein the component and the region of the corresponding article proximate the component are white.

6. The method of claims 3-4 wherein the component and the region of the corresponding article proximate the component are transparent.

7. The method of claims 3-6 wherein the component and the region of the corresponding article proximate the component are a combination of white and transparent.

8. The method of claims 1-7 wherein the article is a diaper assembly.

9. The method of claims 1-8 wherein the component is a diaper tape closure assembly.

10. The method of claims 1-9 wherein the optical brightener is incorporated in the component in a concentration of from about 0.01% to about 1.99%.

11. The method of claims 1-10 wherein the optical brightener is incorporated in the component in a concentration of from about 0.1% to about 1.99%.

12. The method of claims 1-11 wherein the optical brightener is selected from the group consisting of Fluorescent Brightener KS-N, Fluorescent Brightener 184, and combinations thereof.

13. The method of claims 1-12 wherein the evaluating operation is performed by comparing the light from the article to a reference standard.

14. The method of claim 13 wherein the reference standard includes a spectrum of light reflected from an article including the component.

15. The method of claim 13 wherein the reference standard includes a spectrum of light reflected from an article lacking the component.

16. The method of claims 1-15 wherein the emitting operation is performed by emitting ultraviolet light to the region of the article at which the component is located.

17. The method of claim 16 wherein the ultraviolet light has a wavelength of from about 10 nm to about 400 nm.

18. The method of claims 16-17 wherein the ultraviolet light has a wavelength of from about 340 nm to about 370 nm.

19. The method of claims 1-18 wherein the light from the article is re-emitted from the optical brightener.

20. The method of claim 19 wherein the re-emitted light has a wavelength of from about 420 nm to about 470 nm.

21. The method of claims 1-20 further comprising:
if, after determining whether the component is absent, issuing a signal.

22. The method of claim 21 wherein upon issuing the signal, an indicator is actuated.

23. The method of claim 22 wherein the indicator is selected from the group consisting of a visual indicator, an audible indicator, and combinations thereof.

24. The method of claims 21-23 wherein upon issuing the signal, the article from which the component is absent, is separated from the collection of articles.

25. A method for determining the absence of a component associated with a corresponding article in a moving collection of articles, the method comprising:

including an effective amount of an optical brightener into at least a portion of the components associated with the moving collection of articles;

emitting light toward the components associated with the moving collection of articles, whereby the optical brightener in the components re-emits light;

evaluating the light from the components to determine whether one or more components are absent.

26. The method of claim 25 wherein at least a portion of the collection of articles are interconnected.

27. The method of claims 25-26 wherein the component and a region of the corresponding article proximate the component are the same color.

28. The method of claim 27 wherein the color is white or transparent or a combination of both.

29. The method of claims 27-28 wherein the component and the region of the corresponding article proximate the component are white.

30. The method of claims 27-28 wherein the component and the region of the corresponding article proximate the component are transparent.

31. The method of claims 27-30 wherein the component and the region of the corresponding article proximate the component are a combination of white and transparent.

32. The method of claims 25-31 wherein the article is a diaper assembly.

33. The method of claims 25-32 wherein the component is a diaper tape closure assembly.

34. The method of claims 25-33 wherein the optical brightener is incorporated in the component in a concentration of from about 0.01% to about 1.99%.

35. The method of claims 25-34 wherein the optical brightener is incorporated in the component in a concentration of from about 0.1% to about 1.99%.

36. The method of claims 25-35 wherein the optical brightener is selected from the group consisting of Fluorescent Brightener KS-N, Fluorescent Brightener 184, and combinations thereof.

37. The method of claims 25-36 wherein the evaluating operation is performed by comparing the light from the article to a reference standard.

38. The method of claim 37 wherein the reference standard includes a spectrum of light reflected from an article including the component.

39. The method of claim 37 wherein the reference standard includes a spectrum of light reflected from an article lacking the component.

40. The method of claims 25-39 wherein the emitting operation is performed by directing ultraviolet light to the region of the article at which the component is located.

41. The method of claim 40 wherein the ultraviolet light has a wavelength of from about 10 nm to about 400 nm.

42. The method of claims 40-41 wherein the ultraviolet light has a wavelength of from about 340 nm to about 370 nm.

43. The method of claims 25-42 wherein the re-emitted light has a wavelength of from about 420 nm to about 470 nm.

44. The method of claims 25-43, further comprising;
if, after confirming the component is absent, issuing a signal.

45. The method of claim 44 wherein upon issuing the signal, an indicator is actuated.

46. The method of claim 45 wherein the indicator is selected from the group consisting of a visual indicator, an audible indicator, and combinations thereof.

47. The method of claims 44-46 wherein upon issuing the signal, the article from which the component is absent, is separated from the collection of articles.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2011/034735

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61F13/15
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A61F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/229325 A1 (BELAU TOM RUSSELL [US] ET AL) 11 December 2003 (2003-12-11)	1-3, 8-23, 25-28, 32-46
A	paragraph [0061] - paragraph [0079]	4-7,24, 29-31,47

X	WO 96/29966 A1 (PROCTER & GAMBLE [US]) 3 October 1996 (1996-10-03)	1,2,8,9, 13-26, 32,33, 37-47
	claims 9,10	

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"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 when the document is taken alone

"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

Date of the actual completion of the international search	Date of mailing of the international search report
17 June 2011	29/06/2011

Name and mailing address of the ISA/	Authorized officer
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INTERNATIONAL SEARCH REPORT

Information on patent family members

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