

(19)



Octrooi Centrum
Nederland

(11)

2010569

(12) C OCTROOI

(21) Aanvraagnummer: **2010569**

(51) Int.Cl.:

A61F 13/42 (2006.01)

A61B 5/00 (2006.01)

(22) Aanvraag ingediend: **04.04.2013**

(43) Aanvraag gepubliceerd:

-

(47) Octrooi verleend:
07.10.2014

(45) Octrooischrift uitgegeven:
15.10.2014

(73) Octrooihouder(s):

Salusion IP B.V. te Delft.

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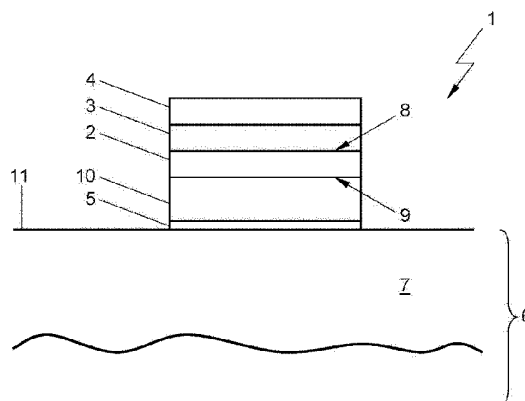
**Irene Martine van de Beld te Delft.
Benno Groosman te Delft.**

(74) Gemachtigde:

ir. C.M. Jansen c.s. te Den Haag.

(54) **A moisture sensing module and a napkin.**

(57) The invention relates to a moisture sensing module for monitoring an amount of moisture. The module comprises a tag layer including a passive electrical resonance circuit, a dielectric layer covering the tag layer, and an absorption layer on top of the dielectric layer for receiving the amount of moisture to be monitored. Preferably, the tag layer, the dielectric layer and the absorption form a sandwiched structure.



NL C 2010569

Dit octrooi is verleend ongeacht het bijgevoegde resultaat van het onderzoek naar de stand van de techniek en schriftelijke opinie. Het octrooischrift komt overeen met de oorspronkelijk ingediende stukken.

Title: A moisture sensing module and a napkin

The invention relates to a moisture sensing module for monitoring an amount of moisture, comprising a tag layer including an electrical passive resonance circuit.

Such a moisture sensing module is e.g. known from the
5 International patent publication WO 2011/005096, including a moisture sensitive sensor and a moisture non-permeable layer covering the sensor. The sensing module can e.g. be attached to a moisture absorbing section of a napkin.

The moisture sensitive sensor in WO '096 includes a passive
10 electrical resonance circuit generating a resonance signal when the module is impinged by an external magnetic field. Then, the resonance signal is wirelessly read by a reading device. Electrical characteristics of the resonance circuit, such as the amplitude of the resonance signal, are highly influenced by the presence of any moisture in the sensor. Discrimination
15 between a wet state and a dry state of the sensor is possible by checking whether resonance signal is received from the resonance circuit.

When moisture is detected in the napkin, the reading device may generate a warning signal so that a nursing or caring professional is made aware that the napkin of the person has to be replaced. Applying such
20 moisture sensing modules enables a more efficient treatment of people that wear a napkin due to incontinence problems, e.g. elderly people, especially if said people can not actively indicate that a current napkin has to be replaced, either because they do not realize that the napkin is wet or are less able to warn a nurse.

25 Although the moisture sensing module disclosed in WO '096 has proven that a significant improvement can be reached, in a reduction of unnecessary napkin replacements as well as in a reduction of leaking napkins, it appears that a further efficiency improvement could be reached if both the dry state and the wet state of the sensor are determined more

reliably. The design of the sensor disclosed in WO '096 is such that no differentiation is possible between a wet state of the sensor and a situation wherein no sensor at all is detected, e.g. when the reading device is not close enough to the moisture sensitive sensor. Differentiation between these two situations can be relevant in practice to avoid unnecessary napkin replacements.

It is an object of the invention to provide a moisture sensing module according to the preamble enabling differentiating between a dry state, a wet state and a state wherein no module is detected by a reading device. Thereto, the moisture detecting module also comprises a dielectric layer covering the tag layer, and an absorption layer on top of the dielectric layer for receiving the amount of moisture to be monitored.

By providing an absorption layer-dielectric layer-tag layer structure, a variable capacitive element is connected to the resonance circuit. The actual capacitive value of the variable capacitive element is directly related to a degree of moisture in the absorption layer. Then, the amplitude variation in the resonance signal due to moisture in the module is only moderate so that a resonance signal can be read both in the dry state and in the wet state of the module. The electrical properties of the resonance circuit components in the tag layer are not modified by the presence of any moisture in the module. Due to the variable capacitance of the structure, also the resonance frequency of the entire electrical system including the resonance circuit and the variable capacitive element varies, thus enabling that a reader can distinguish between the dry state and the wet state. Further, no resonance signal is read when no module is detected. Advantageously, the dry state, the wet state and the situation wherein no module is detected can reliably be distinguished by an external reading device, so that a further improvement in efficiency can be obtained.

The invention is also directed to a napkin comprising a moisture absorbing section and a moisture sensing module as above described.

Advantageous embodiments according to the invention are described in the following claims.

By way of example only, embodiments of the present invention will now be described with reference to the accompanying figures in which

5 Fig. 1 shows a schematic cross sectional side view of a first embodiment of a moisture detecting module according to the invention attached to a napkin;

 Fig. 2 shows an electrical equivalent of the moisture detecting module of Fig. 1;

10 Fig. 3 shows a schematic cross sectional side view of a second embodiment of a moisture detecting module according to the invention attached to a napkin; and

 Fig. 4 shows a diagram of the resonance frequency of a moisture detecting module as a function of moisture.

15 It is noted that the figures show merely a preferred embodiment according to the invention. In the figures, the same reference numbers refer to equal or corresponding parts.

 Figure 1 shows schematic cross sectional side view of a first embodiment of a moisture detecting module according to the invention. The
20 module 1 is arranged for monitoring an amount of moisture, and comprises a tag layer 2 including a passive electrical resonance circuit, a dielectric layer 3 covering the tag layer 2, and an absorption layer 4 on top of the dielectric layer 3 for receiving the amount of moisture to be monitored.

 The tag layer 2, the dielectric layer 3 and the absorption layer 4
25 form a sandwich structure. Further, the top surface 8 and the bottom surface 9 of the tag layer 2 are shielded against moisture particles, so that the electrical properties of the passive electrical resonance circuit components on the tag layer 2 remain unaffected when moisture particles are received by the module 1. However, the electric behavior of the
30 resonance circuit is influenced by the actual state of the absorption layer 4.

In the shown embodiment, the dielectric layer 3 forms a barrier shielding the tag layer 2 against moisture particles. Further, the dielectric layer 3 serves as an electric isolator forming a dielectric element of a capacitor, as described in more detail below. Alternatively, however, a separate barrier layer is applied, e.g. as an intermediate layer between the tag layer 2 and the dielectric layer 3.

Further, the module 1 comprises an additional dielectric layer 10 arranged below the tag layer 2 such that the tag layer 2 is sandwiched between the dielectric layer 3 and the additional dielectric layer 10. The additional dielectric layer 10 forms a barrier shielding the tag layer 2 against moisture particles. Similar to the dielectric layer 3 covering the tag layer 2, the additional dielectric layer 10 further serves as an electric isolator forming a dielectric element of a capacitor, as described below. It is noted that a separate barrier layer can be applied, e.g. as an intermediate layer between the tag layer 2 and the additional dielectric layer 10. The electrical properties of the dielectric layers 3, 10 are designed such that the electrical influence of any moisture in the absorbing layer 4 is dominant compared with the electrical influence of moisture in the moisture absorbing section 7 of the napkin 6.

In particular, the capacitance formed by the structure including the absorption layer 4, the dielectric layer 3 and the tag layer 2 is significantly larger than the capacitance formed via the additional dielectric layer 10, e.g. by selecting material such that the electrical permittivity of the dielectric layer 3 is larger than the electrical permittivity of the additional dielectric layer 10 and/or by choosing the thickness of the dielectric layer 3 significantly smaller than the thickness of the additional dielectric layer 10. As an example, the dielectric layer 3 is made from a plastic and/or the additional dielectric layer 10 is made from a foam.

The bottom surface of the module 1 is arranged for attachment to the skin facing surface 11 of a napkin 6 including a moisture absorbing

section 7. Therefore, the bottom surface of the module 1 is provided with an adhesive layer 5 attaching the module 1 to the skin facing surface moisture absorbing section 7 of the napkin 6.

Alternatively, the top surface of the module 1 is attached to the
5 moisture absorbing section 7 of the napkin 6.

Figure 2 shows an electrical equivalent of the moisture detecting module 1 of Fig. 1. The resonance circuit R includes an inductance L and a resonance capacitance C_{res} , thus forming a resonance LC-loop. Preferably, the resonance circuit R includes thin film technology components. More
10 preferably, the resonance circuit R is integrally formed using thin film technology. The resonance circuit R is tuned to a specific RF resonance frequency, e.g. circa 8.2 MHz. However, the sensor can also be set to another RF resonance frequency, e.g. 8.0 MHz. Apparently, the resonance frequency can be tuned to other frequencies as well. The resonance circuit R can be
15 implemented as a so-called EAS tag type. The dielectric layer 3 in combination with the absorption layer 4 represents a parasitic circuit PC including a variable electric capacitance C_{var} .

During use of the moisture sensing module 1 according to the invention, the passive resonance circuit interacts with an electromagnetic
20 interrogation field so as to transmit local moisture information in a non-contacting way to an external reading device.

The reading device generates an interrogating electromagnetic field, e.g. a signal having fixed RF frequency of e.g. circa 8.2 MHz, or a signal having a sweeping frequency ranging between circa 7.7 MHz and
25 circa 8.7 MHz, or between circa 7.45 MHz and circa 8.55 MHz. When the resonance circuit R, having a resonance characteristic, is activated, the circuit acts as a RF transmission element, also called RF tag, transmitting an electromagnetic response signal that is received by the reading device, thereby obtaining a wireless RF moisture detecting system for monitoring a
30 moisture state of the sensor.

Figure 3 shows a schematic cross sectional side view of a second embodiment of a moisture detecting module 1 according to the invention.

Here, the electrical properties of the dielectric layers 3, 10 have been interchanged compared with the embodiment shown in Fig. 1, so that moisture in the moisture absorbing section 7 of the napkin is now dominant with respect to moisture in the absorption layer 4. The capacitance resulting via the dielectric layer 3, arranged between the tag layer 2 and the absorption layer 4, is now significantly smaller than the capacitance resulting via the additional dielectric layer 10, e.g. by selecting material such that the electrical permittivity of the dielectric layer 3 is smaller than the electrical permittivity of the additional dielectric layer 10 and/or by choosing the thickness of the dielectric layer 3 significantly larger than the thickness of the additional dielectric layer 10.

Again, the module 1 can be attached upside-down to the napkin 6 such that the additional dielectric layer 10 is facing away from the napkin 6. Optionally, the surface of the module 1 facing away from the napkin 6 can be provided with a comfort layer to enhance comfort of wearing a napkin with a moisture sensing module 1, and to counteract undesired physiological reactions on the skin, such as irritation reactions.

Figure 4 shows a diagram of the resonance frequency of a moisture detecting module as a function of moisture. The diagram D indicates the actual resonance frequency Res [MHz] as a function of moisture [%] in the absorption layer 4 of the module 1. When no moisture is present in the absorption layer 4, the resonance frequency Res has a maximum at circa 8.2 MHz. When moisture has been received in the absorption layer 4, the variable capacitance C_{var} increases, thus lowering the resonance frequency Res . The permittivity of the dielectric layer 3 and the thickness of said layer 3 are chosen such that, on the one hand, variation in the resonance frequency is easily detectable by a reading device, while, on the other hand, the resonance frequency is still in a range that is detectable by the reading

device, e.g. higher than circa 7.65 MHz. In this context it is noted that the mentioned resonance frequencies are not limiting as other frequencies can be applied as well. It is further noted that the permittivity and the thickness of the dielectric layer 3 are chosen such that the amplitude of the resonance
5 signal is in a range that is detectable by the reader.

It is noted that the moisture sensing module can not only be used in combination with a napkin, but also with other nursing articles wherein a moisture state has to be monitored, e.g. a banding or dressing. In addition, the moisture sensing module can also be used in industrial processes, e.g.
10 for monitoring a sealing, such as a seam or joint of pipe segments, or seals between moisture impermeable plates. Especially, the moisture sensing module can be used in water impermeable plates, underground pipes, sewer drains, pipelines, etc. Advantageously, the moisture sensing module is mounted at a side of a structure that is shielded against ground water, thus
15 measuring the effectiveness of the sealing can be tested. As an example, a moisture sensing module is installed at the inner side of watertight pipes to monitor the water permeability of the pipes. Similarly, a moisture sensing module can be located at the side of a water impermeable plate that should be dry.

20 The invention is not restricted to the embodiments described herein. It will be understood that many variants are possible.

Optionally, also the additional dielectric layer can be provided with a covering moisture absorbing layer, thereby influencing the actual resonance frequency by a moisture content at both surfaces of the tag layer
25 2.

Further, an identification can be added to the moisture sensing module rendering a so-called RF-ID tag, enabling identification of the module upon reading it.

Instead of applying a passive resonance circuit, the moisture
30 detecting module can also be provided with an active resonance circuit.

Further, the module can be arranged with another transmission element type, such as an active strip antenna.

Further, if it is desired to switch off the resonance circuit externally, a local electromagnetic field may be applied having a relatively
5 high field strength, thereby irreversibly damaging the circuit structure of the coil.

Preferably, the moisture sensing module is reversible, i.e. the resonance characteristics of the sensor are not influenced by an earlier state of the sensor. In particular, when a wet absorption layer becomes dry, the
10 resonance signal is identical or similar to the situation before the absorption layer became wet.

Optionally, the components of the moisture sensing module are stable, so that the module is durable, meaning that its function is reliable during a relatively long period, e.g. more than circa a year or more than
15 circa 10 years.

Other such variants will be apparent for the person skilled in the art and are considered to fall within the scope of the invention as defined in the following claims.

Conclusies

1. Een module voor het meten van vocht voor het volgen van een hoeveelheid vocht, omvattende een tag laagje met een passieve elektrische resonantieschakeling, een dielektrische laag die het tag laagje bedekt, en een absorptielaag bovenop de dielektrische laag voor het ontvangen van de
5 hoeveelheid vocht die moet worden gevolgd.
2. Module voor het meten van vocht overeenkomstig conclusie 1, waarbij het tag laagje, de dielektrische laag en de absorptielaag een gestapelde structuur vormen.
3. Module voor het meten van vocht overeenkomstig conclusie 1 of 2,
10 waarbij de toplaag en de bodemlaag van het taglaagje zijn afgeschermd tegen vochtdeeltjes.
4. Module voor het meten van vocht overeenkomstig een der voorgaande conclusies, voorts omvattende een extra dielektrische laag die is opgesteld onder het tag laagje zodat het tag laagje zich bevindt tussen de dielektrische
15 laag en de extra dielektrische laag.
5. Module voor het meten van vocht overeenkomstig een der voorgaande conclusies, waarbij de dielektrische laag en/of de extra dielektrische laag een barrière vormt die het tag laagje afschermt tegen vochtdeeltjes.
6. Module voor het meten van vocht overeenkomstig conclusie 4 of 5,
20 waarbij de capaciteit via de dielektrische laag significant kleiner is dan de capaciteit via de extra dielektrische laag.
7. Module voor het meten van vocht overeenkomstig conclusie 4, 5 of 6, waarbij de elektrische permitiviteit van de dielektrische laag kleiner is dan de elektrische permitiviteit van de extra dielektrische laag.
- 25 8. Module voor het meten van vocht overeenkomstig een der voorgaande conclusies, waarbij de dielektrische laag is gemaakt van een kunststof en/of waarbij de extra dielektrische laag is gemaakt van schuim.

9. Module voor het meten van vocht overeenkomstig een der voorgaande conclusies, waarbij een bodemoppervlak of een topoppervlak van de module is ingericht om te worden aangebracht aan een vochtabsorberende sectie van een luier.
- 5 10. Module voor het meten van vocht overeenkomstig conclusie 9, waarbij het bodemoppervlak of het topoppervlak van de module is voorzien van een kleeflaag voor het aanbrengen aan de vochtabsorberende sectie van het luieroppervlak.
11. Module voor het meten van vocht overeenkomstig conclusie 9 of 10,
10 voorts omvattende een comfortlaag die een toplaag of een bodemlaag van de module vormt.
12. Module voor het meten van vocht overeenkomstig een der voorgaande conclusies, waarbij de resonantieschakeling een resonantie LC-loep omvat.
13. Module voor het meten van vocht overeenkomstig een der voorgaande
15 conclusies, waarbij de resonantieschakeling dunne film technologiecomponenten omvat.
14. Luier omvattende een vochtabsorberende sectie en een module voor het meten van vocht overeenkomstig een der voorgaande conclusies 1-13.

1/2

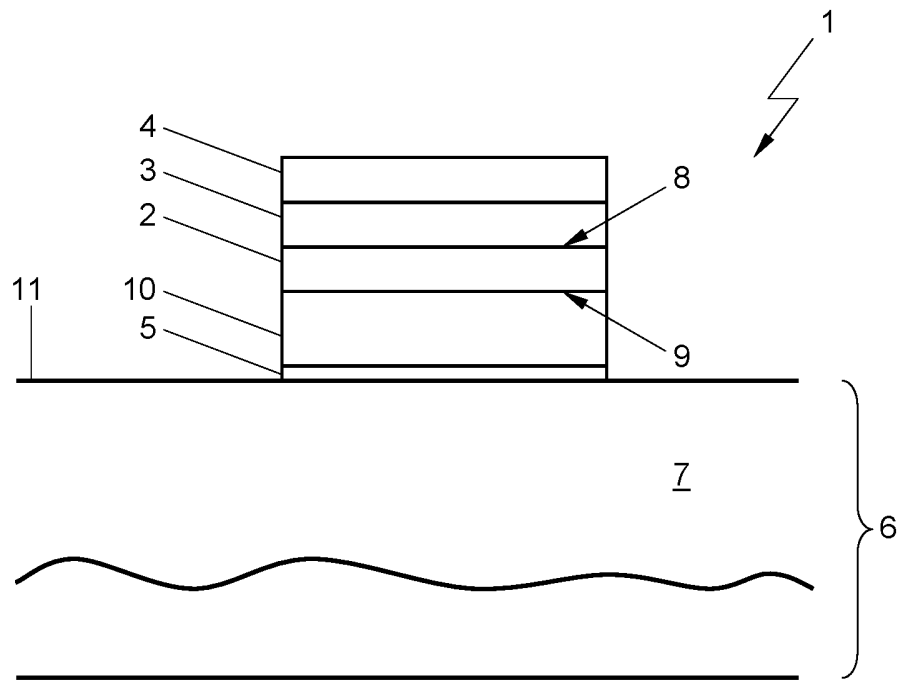


Fig. 1

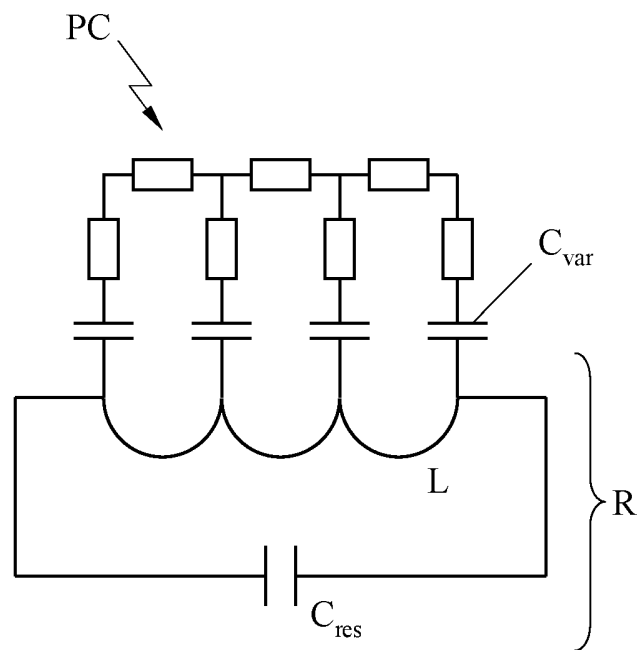


Fig. 2

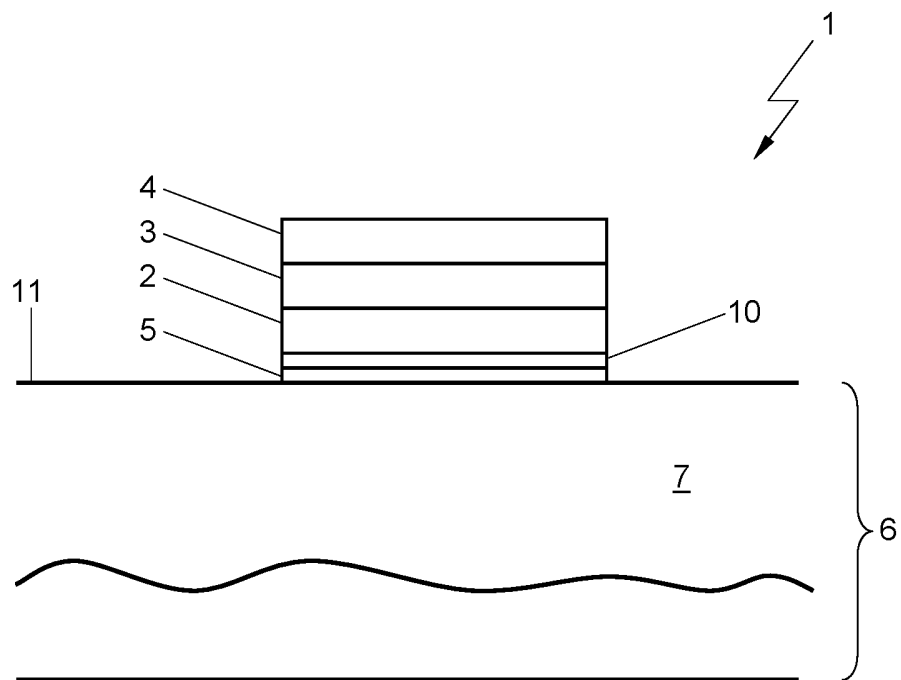


Fig. 3

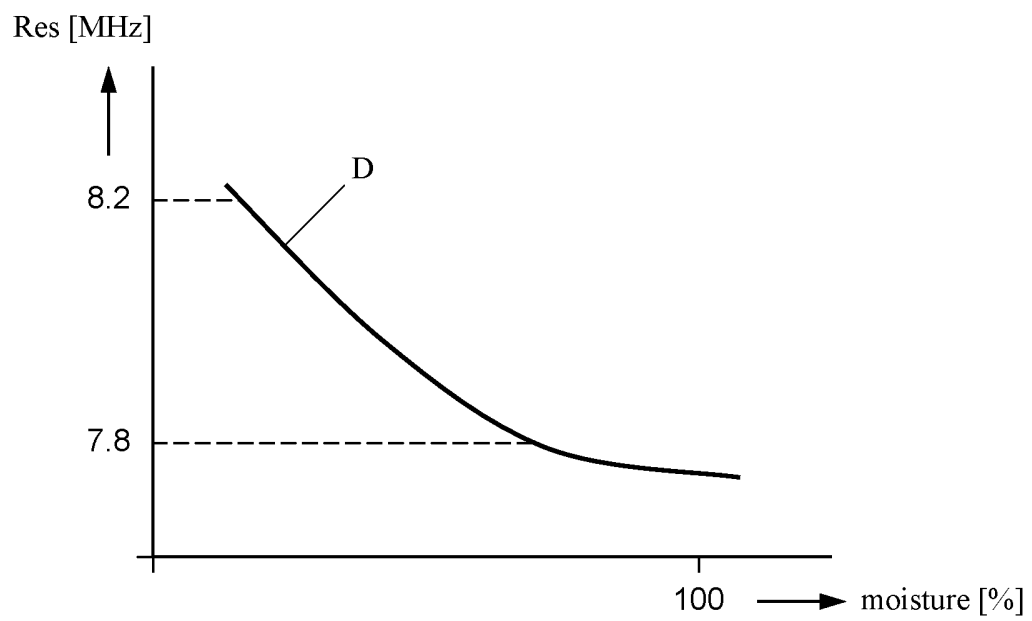


Fig. 4

SAMENWERKINGSVERDRAG (PCT)

RAPPORT BETREFFENDE NIEUWHEIDSONDERZOEK VAN INTERNATIONAAL TYPE

IDENTIFICATIE VAN DE NATIONALE AANVRAGE	KENMERK VAN DE AANVRAGER OF VAN DE GEMACHTIGDE P100313NL00
Nederlands aanvraag nr. 2010569	Indieningsdatum 04-04-2013
	Ingeroepen voorrangsdatum
Aanvrager (Naam) Salusion IP B.V.	
Datum van het verzoek voor een onderzoek van internationaal type 10-08-2013	Door de Instantie voor Internationaal Onderzoek aan het verzoek voor een onderzoek van internationaal type toegekend nr. SN 60489
I. CLASSIFICATIE VAN HET ONDERWERP (bij toepassing van verschillende classificaties, alle classificatiesymbolen opgeven)	
Volgens de internationale classificatie (IPC) A61F13/42 A61B5/00	
II. ONDERZOChte GEBIEDEN VAN DE TECHNIEK	
Onderzochte minimumdocumentatie	
Classificatiesysteem	Classificatiesymbolen
IPC	A61F A61B
Onderzochte andere documentatie dan de minimum documentatie, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen	
III. ☐	GEEN ONDERZOEK MOGELIJK VOOR BEPAALDE CONCLUSIES (opmerkingen op aanvullingsblad)
IV. ☐	GEBREK AAN EENHEID VAN UITVINDING (opmerkingen op aanvullingsblad)

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Nummer van het verzoek om een onderzoek naar
de stand van de techniek
NL 2010569

A. CLASSIFICATIE VAN HET ONDERWERP
INV. A61F13/42 A61B5/00
ADD.

Volgens de Internationale Classificatie van octrooien (IPC) of zowel volgens de nationale classificatie als volgens de IPC.

B. ONDERZOCHETE GEBIEDEN VAN DE TECHNIEK

Onderzochte minimum documentatie (classificatie gevolgd door classificatiesymbolen)
A61F A61B

Onderzochte andere documentatie dan de minimum documentatie, voor dergelijke documenten, voor zover dergelijke documenten in de onderzochte gebieden zijn opgenomen

Tijdens het onderzoek geraadpleegde elektronische gegevensbestanden (naam van de gegevensbestanden en, waar uitvoerbaar, gebruikte trefwoorden)
EP0-Internal, WPI Data

C. VAN BELANG GEACHTE DOCUMENTEN

Categorie °	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
X	DE 10 2011 076219 A1 (UNIV CHEMNITZ TECH [DE]) 22 november 2012 (2012-11-22)	1,5, 8-10,12, 14
Y	* figures; paragraphs 13, 17-19, 22, 25-28, 31, 38 *	2,3,11, 13
Y	US 2012/216607 A1 (SJOEHOLM JOHAN [SE] ET AL) 30 augustus 2012 (2012-08-30) * figures; paragraphs 15, 38, 39, 41, 42 *	2,3,11, 13
A	US 2004/036484 A1 (TAMAI SEIICHIRO [JP]) 26 februari 2004 (2004-02-26) * het gehele document *	1-14
A	US 5 903 222 A (KAWARIZADEH BEHROUZ [US] ET AL) 11 mei 1999 (1999-05-11) * het gehele document *	1-14
	----- -/-	

☒ Verdere documenten worden vermeld in het vervolg van vak C.

☒ Leden van dezelfde octrooifamilie zijn vermeld in een bijlage

° Speciale categorieën van aangehaalde documenten

A niet tot de categorie X of Y behorende literatuur die de stand van de techniek beschrijft

D in de octrooiaanvraag vermeld

E eerdere octrooi(aanvraag), gepubliceerd op of na de indieningsdatum, waarin dezelfde uitvinding wordt beschreven

L om andere redenen vermelde literatuur

O niet-schriftelijke stand van de techniek

P tussen de voorrangsdatum en de indieningsdatum gepubliceerde literatuur

T na de indieningsdatum of de voorrangsdatum gepubliceerde literatuur die niet bezwarend is voor de octrooiaanvraag, maar wordt vermeld ter verheldering van de theorie of het principe dat ten grondslag ligt aan de uitvinding

X de conclusie wordt als niet nieuw of niet inventief beschouwd ten opzichte van deze literatuur

Y de conclusie wordt als niet inventief beschouwd ten opzichte van de combinatie van deze literatuur met andere geciteerde literatuur van dezelfde categorie, waarbij de combinatie voor de vakman voor de hand liggend wordt geacht

Z lid van dezelfde octrooifamilie of overeenkomstige octrooipublicatie

Datum waarop het onderzoek naar de stand van de techniek van internationaal type werd voltooid

27 augustus 2013

Verzenddatum van het rapport van het onderzoek naar de stand van de techniek van internationaal type

Naam en adres van de instantie

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Fax: (+31-70) 340-3016

De bevoegde ambtenaar

Barenbrug, Theo

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Nummer van het verzoek om een onderzoek naar
de stand van de techniek
NL 2010569

C.(Vervolg). VAN BELANG GEACHTE DOCUMENTEN

Categorie °	Geciteerde documenten, eventueel met aanduiding van speciaal van belang zijnde passages	Van belang voor conclusie nr.
A	US 2012/109087 A1 (ABRAHAM JOSE K [US] ET AL) 3 mei 2012 (2012-05-03) * het gehele document *	1-14
A	----- US 2012/310190 A1 (LAVON GARY DEAN [US] ET AL) 6 december 2012 (2012-12-06) * het gehele document *	1-14
A	----- US 2010/168702 A1 (ALES III THOMAS MICHAEL [US] ET AL) 1 juli 2010 (2010-07-01) * het gehele document *	1-14
A	----- WO 2010/123425 A1 (SCA HYGIENE PROD AB [SE]; BIRRING MATS [SE]) 28 oktober 2010 (2010-10-28) * het gehele document *	1-14
A	----- US 2002/145526 A1 (FRIEDMAN MARK B [US] ET AL) 10 oktober 2002 (2002-10-10) * het gehele document *	1-14

**ONDERZOEKSRAPPORT BETREFFENDE HET
RESULTAAT VAN HET ONDERZOEK NAAR DE STAND
VAN DE TECHNIEK VAN HET INTERNATIONALE TYPE**

Informatie over leden van dezelfde octrooifamilie

Nummer van het verzoek om een onderzoek naar
de stand van de techniek

NL 2010569

In het rapport genoemd octrooi geschrift	Datum van publicatie	Overeenkomend(e) geschrift(en)	Datum van publicatie
DE 102011076219 A1	22-11-2012	GEEN	
US 2012216607 A1	30-08-2012	EP 2485694 A1 SE 0901286 A1 US 2012216607 A1 WO 2011043724 A1	15-08-2012 08-04-2011 30-08-2012 14-04-2011
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US 2002145526 A1	10-10-2002	AU 2002303198 A1 EP 1380020 A2 US 2002145525 A1 US 2002145526 A1 WO 02078513 A2	15-10-2002 14-01-2004 10-10-2002 10-10-2002 10-10-2002



OCTROOICENTRUM NEDERLAND

WRITTEN OPINION

File No. SN60489	Filing date (day/month/year) 04.04.2013	Priority date (day/month/year)	Application No. NL2010569
International Patent Classification (IPC) INV. A61F13/42 A61B5/00			
Applicant Salusion IP B.V.			

This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the application
- ☒ Box No. VIII Certain observations on the application

Examiner Barenbrug, Theo

WRITTEN OPINION

Application number
NL2010569

Box No. I Basis of this opinion

1. This opinion has been established on the basis of the latest set of claims filed before the start of the search.
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing:
 - ☐ contained in the application as filed.
 - ☐ filed together with the application in electronic form.
 - ☐ furnished subsequently for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. V Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty	Yes: Claims	2-4, 6, 7, 11, 13
	No: Claims	1, 5, 8-10, 12, 14
Inventive step	Yes: Claims	4, 6, 7
	No: Claims	1-3, 5, 8-14
Industrial applicability	Yes: Claims	1-14
	No: Claims	

2. Citations and explanations

see separate sheet

WRITTEN OPINION

Application number
NL2010569

Box No. VII Certain defects in the application

see separate sheet

Box No. VIII Certain observations on the application

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement:

1 PRIOR ART

1.1 The following documents are referred to in this communication:

- D1 DE 10 2011 076219 A1 (UNIV CHEMNITZ TECH [DE]) 22 november 2012 (2012-11-22)
- D2 US 2012/216607 A1 (SJOEHOLM JOHAN [SE] ET AL) 30 augustus 2012 (2012-08-30)

2 NOVELTY

2.1 The subject-matter of claims 1, 5, 8-10, 12, 14 is not new:

2.2 Document D1 discloses:

(see figures; paragraphs 13, 17-19, 22, 25-28, 31, 38)

Een module voor het meten van vocht (paragraph 17) voor het volgen van een hoeveelheid vocht (paragraph 31), omvattende een tag laagje met een passieve elektrische resonantieschakeling (paragraphs 17, 18, 22, 28), een dielektrische laag die het tag laagje bedekt (paragraphs 19, 25), en een absorptielaag bovenop de dielektrische laag (paragraphs 19, 25) voor het ontvangen van de hoeveelheid vocht die moet worden gevolgd (paragraphs 26, 31).

2.3 The subject-matter of independent claim 1 is therefore not new.

2.4 Document D1 also discloses the features of the dependent claims 5, 8-10, 12, 14 (see figures; paragraphs 13, 17-19, 22, 25-28, 31, 38).

3 INVENTIVE STEP

3.1 The dependent claims 2, 3, 11, 13 all relate to features well-known in the art and therefore no inventive step can be acknowledged for the subject matter of these claims:

claim 2: D1, par 22 and D2, par. 39

claim 3: D1, par. 19 and D2, par. 39-41

claim 11: D1, par. 25 and D2, par. 12, 42

claim 13: D1, par. 13, 18, 19 and D2, par. 39

4 INDUSTRIAL APPLICABILITY

4.1 The claims 1-14 are considered industrially applicable.

Re Item VII

The following defects in the form or contents of the international application have been noted:

- 1 The relevant background art disclosed in the cited documents is not mentioned in the description, nor are these documents identified therein.
- 2 The independent claims have not been properly cast in the two part form, with those features which in combination are part of the prior art being placed in the preamble.
- 3 The features of the claims are not provided with reference signs placed in parentheses.

Re Item VIII

The following observations on the clarity of the claims, description and drawings, or on the question whether the claims are fully supported by the description, are made:

1 CLARITY

- 1.1 Several claims are not clear:
- 1.2 From the description (page 3, line 26 and page 4, lines 7, 14) it appears that the shielding against moisture (e.g. claim 3) and the presence of the additional dielectric layer (claim 4) are essential features of the invention and should therefore be part of claim 1.
- 1.3 Claim 12 is not clear, the "LC-loep" appears to be a mix of Dutch and English.
- 1.4 Claim 13 is not clear, as "dunne film technologiecomponenten" appear not to be clearly defined.

- 1.5 The vague statement in the description on page 7, lines 20-21 implies that the subject-matter for which protection is sought may be different to that defined by the claims, supported by the description, thereby resulting in lack of clarity when used to interpret them.