

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SMART SOLUTIONS TECHNOLOGIES, S.L.
Petitioner

v.

KONINKLIJKE PHILIPS ELECTRONICS N.V.
Patent Owner

Patent No. 7,522,951
Issued: April 21, 2009
Filed: June 23, 2005
Inventors: Paul A. Gough et al.
Title: Electrode Arrangement

CASE IPR: Unassigned

**DECLARATION OF AGUSTÍN MACIÁ BARBER
IN SUPPORT OF PETITIONER, SMART SOLUTIONS
TECHNOLOGIES, S.L.
IN THE INTER PARTES REVIEW OF U.S. PATENT NO. 7,522,951**

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I. INTRODUCTION

A. Engagement

1. I have been retained by counsel for Smart Solutions Technologies, S.L., doing business as Nuubo, as an expert witness in the above-captioned proceeding. I have been asked to conduct experiments that may bear on the validity of claims 1-4 of U.S. Patent No. 7,522,951 to Gough et al. (hereinafter “the ‘951 Patent”) (Ex. SS 1001). The following is my written declaration that sets forth the experiments I personally conducted and related facts and conclusions.

2. This declaration explains, based on facts and information available to me to date, the design, conduction, and results of experiments I personally ran demonstrating that the one or more prior art electrode constructions evaluated clearly and unequivocally in practice or actuality have at least a portion of the protective or moisture impermeable layer of the electrode embedded in or “located on said first surface” or skin-facing surface of the electrode as disclosed and claimed in the ‘951 Patent. As such, I am prepared to provide expert testimony regarding these experiments and conclusions reached as set forth in this declaration if asked about those issues by the Board or by the private parties’ attorneys.

B. Background and Qualifications

3. I have over eighteen years’ experience in leadership in connection with entrepreneurship and product innovation, including working in the field of

sensors and electrodes for approximately ten years. I have extensive management experience in global medtech, software and telecommunications companies.

Currently I serve as Strategy Director and Chief Technology Officer as well as being on the Board of Directors of Nuubo, a wearable sensors technology company that I co-founded in 2005. My responsibilities include product conception and development, strategic planning, clinical/regulatory oversight, and development of related business and marketing plans. Several of the wearable sensor technologies we developed and I am a named co-inventor on are now patented. I am also currently on the Board of Directors of Asana Weartech, a wearable 3D posture trainer company, and serve as an Associate Member of the Wearable Biomedical Sensors and Systems (“WBSS”) Committee of the IEEE Engineering in Medicine and Biology Society, as an Innovation Advisor and Mentor to startups through the Madrid-MIT M+ Visión Consortium, a multi-institutional venture in biomedical technology innovation, and as a Panel of Experts Judge of the “Innovators Under 35” contest sponsored by MIT Technology Review.

4. I received a degree in Computer Science from the Polytechnic University of Madrid (UPM), was certified as a Technical Specialist in Computing Systems from the San Pablo CEU University of Madrid and as an Industrial Designer by CDC Madrid, and also have a NETI Certificate (Entrepreneur Program) from IE Business School.

5. Prior to forming and working with Nuubo, my experience has ranged from co-founding SIP25, an Internet start-up company, to senior management positions in technology companies such as Ono, Meta4, and Visual Gis Engineering and Robotics. In short, I have been around and excelled in technology development and commercialization for many years, with extensive experience in design and development of innovative products and solutions for global markets.

6. My efforts and excellence have been often rewarded, from receiving recognition as a “Young Entrepreneur” to more recently in connection with Nuubo being the IDEA Silver Winner in the “Medical & Scientific Products” category of the US-based IDSA Awards (2012) and being named by Actualidad Económica in Spain as “The Best Start-Up” (2014).

7. In connection with wearable sensors and the like, I have led or been involved in significantly-funded R&D projects such as CDTI NEOTEC1-IDI-20080151 directed to a wireless biomonitoring platform based on electronic-textile sensors (2007-09), TSI-020302-2008-57 AVANZA PLAN-2009 “LOBIN” directed to a hospital wireless monitoring platform using Zig-Bee™ wireless technology in conjunction with an e-textile sensor (2008-09), TSI-020100-2011-354 AVANZA PLAN-2011 “Si4TE” directed to the generation of electrical energy from human body emitted heat and based on electronic-textile wearable technology (2011-13), and IPT-2011-0824-900000 INNPACTO-2011 “INTEGNEO” directed

to monitoring of neonates in order to prevent cardiac diseases and sepsis diagnosis based on HRV innovative algorithms and wireless wearable e-textile garments.

8. I have also been published or presented at numerous conferences in connection with wearable sensors and the like, most recently presenting “Nuubo Wearable Medical Technologies: from smart textile sensor to intelligent diagnosis decision” at the September 2015 Cardiovascular Mobile Health Conference in Tabarz, Germany and “Medical Wearable Technologies” at the ICEMD-ESIC 2nd Wearable Technology and Internet-of-Things Conference in Madrid, Spain in June 2015.

9. My Curriculum Vitae (Ex. SS 1015), including representative publications and patents, is submitted herewith as Attachment A, which details my education, experience, and publications as briefly summarized above as an overview of some of my experience that is relevant to the matters set forth in this declaration.

C. Compensation and Prior Testimony

10. I am not being compensated for my study and testimony in this matter, other than as part of my duties and compensation as an employee of Smart Solutions Technologies, S.L., doing business as Nuubo. I may be reimbursed for reasonable and customary expenses associated with my work and testimony in this

matter. My compensation is not contingent on the outcome of this matter or the specifics of my testimony.

D. Information Considered

11. My opinions and the design and conduction of the noted experiments are based on my years of education, research and experience, as well as my investigation and study of relevant materials. In forming my opinions, I have considered the materials referred to herein, including my review of the '951 Patent and various prior art references as well as any other references referred to or cited in this declaration, including but not limited to International Patent Application No. PCT/FI02/00132 to Reho et al. (hereinafter "Reho") (Ex. SS 1003). I may rely upon these materials and/or additional materials to rebut arguments raised by Patent Owner. I reserve my right to alter or supplement my analysis in response to any criticisms or alternative opinions or experiments offered by Patent Owner or any other matter that might cause me to alter my opinion.

12. I understand that discovery may occur in this proceeding. I thus may also consider additional documents and information in forming any necessary opinions, including documents that may not yet have been provided to me, on which basis I reserve the right to modify or supplement my opinions and the bases therefor in light of any documents, testimony, or other evidence that may emerge

during the course of this proceeding, including depositions that have yet to be taken.

13. Additionally, I may discuss my own work, teachings, research, experiments, and knowledge of the state of the art in the relevant time period as well as retrospectively as appropriate in forming my opinions as set forth herein. I may rely on handbooks, textbooks, technical literature, and the like to demonstrate the state of the art in the relevant time period and the evolution of relevant technologies.

14. Throughout this declaration, I refer to specific pages of patents and other technical documents. The citations are intended to be exemplary and not intended to convey that the citations are the only source of evidence to support the propositions for which they are cited.

15. All of the opinions stated in this declaration are based on my own personal knowledge and professional judgment. I am over 18 years of age, and if called as a witness during any proceeding in this matter I am prepared to testify competently about my opinions and the reasons therefor.

II. PRIOR ART ELECTRODE CONSTRUCTION

A. International Patent Application No. PCT/FI02/00132 entitled “A sensor arrangeable on the skin” to Reho, *et al.* (“Reho”) (Ex. SS 1003)

16. Reho is directed to “a sensor placed on the skin.” Ex. SS 1003 at p. 1.

It is specifically disclosed that “the sensor of the invention can be an electrode.”

Id. at p. 4. Thus, the invention disclosed by Reho relates to the disclosure of the ‘951 Patent.

17. Reho discloses, as shown in Fig. 1 reproduced below, that “[t]he sensor in accordance with the invention comprises a contact layer including conductive fibres” *Id.* at p. 1. “The contact layer may consist e.g. of a fabric-like layer” *Id.* at p. 2. “The sensor 1 shown in figure 1 has a contact layer 2 made of conductive fibres 4 e.g. by weaving, knitting, twining, pressing, gluing or sewing.” *Id.* at p. 5.

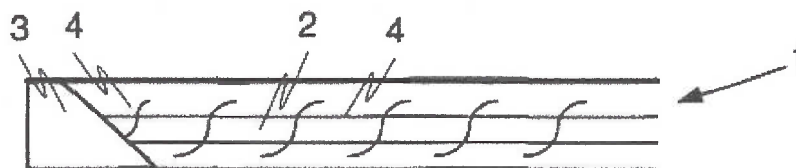
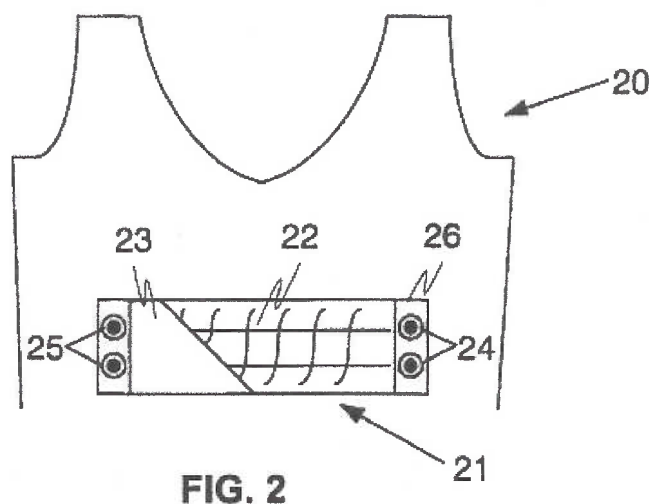


FIG. 1

18. It is further disclosed that “[t]he invention relates to a sensor placed on the skin” and that there is to be “contact between the skin and the contact layer” of the sensor. *Id.* at pp. 1 and 2. Thus, it is inherent that the sensor 1 has a “first

surface,” namely, the bottom side of the contact layer, that “faces or is oriented toward the skin of the wearer.”

19. Reho discloses that “[t]he sensor can be integrated in a garment [with] the conductive fibres in the contact layer... sewn into the fabric surface or ... knitted or woven directly in the fabric texture.” *Id.* at p. 2. Figure 2 below provides a schematic view of “a sensor [according to Reho] connected to a fabric by sewing or weaving.” *Id.* at p. 4.

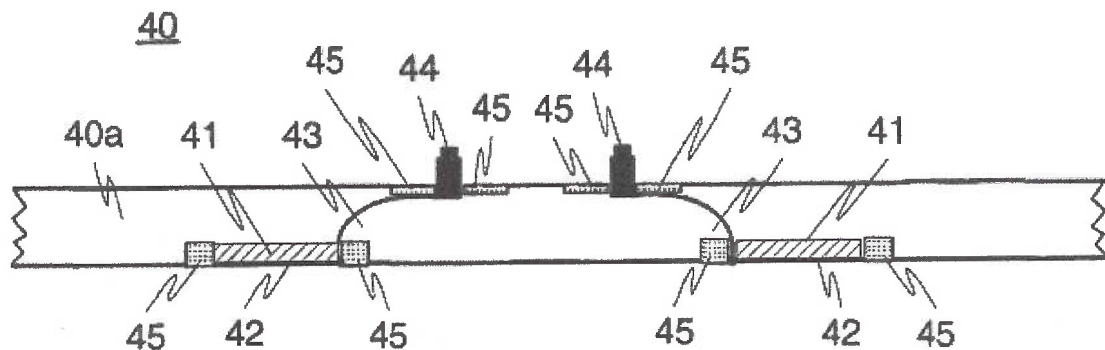


20. Reho further discloses “a moisture layer for retaining moisture on top of the contact layer” that may take the form of “an impervious, substantially moisture proof seal layer.” *See, e.g., Id.* at p. 2. It is disclosed that the function and purpose of the “moisture layer” is to “retain secretory products from the skin, [which] enhances the contact between the skin and the contact layer and increases the electrical conductivity of the contact layer.” *Id.* In the context of the “seal

layer” version of the “moisture layer,” Reho discloses that “[t]he seal layer may be made e.g. of a waterproof or non-respiring fabric, or a film-like material, such as suitable plastic, e.g. silicone plastic or rubber or a laminate layer.” *Id.*

21. In fact, regarding the basic sensor **1** as shown in Figure 1 reproduced above, Reho indicates that “[a]s the sensor **1** is placed on the skin, the seal layer **3** of the sensor **1** starts collecting moisture from the skin on its lower surface.” *Id.* at p. 4. As such, the seal layer **3** is adjacent the skin and the contact layer **2** of the sensor **1** so as to together function to trap moisture such that “the skin contact and the conductive properties of the contact layer are substantially improved.” *Id.*

22. Notably, Reho discloses in connection with the various cross-sectional views of the sensor arrangement of Figures 4-6 that the sensor **42**, and thus the fabric-like contact layer, is “integrated in the surface of the garment **40a** with [the] seal layer **41** provided on the side opposite to the sensor part **42** placed in contact with the skin.” *Id.* at p. 5; Fig. 4. Thus, as shown and is inherent, the sensor **42** itself is quite thin, being composed of a weave of conductive fibers backed by the seal layer **41**. *See, e.g., Id.* at Fig. 4. In one prior art example, such a seal layer over a conductive fabric electrode is on the order of 0.1 to 5.0 mm thick. *See, e.g.,* U.S. Patent No. 4,941,961 to Noguchi, *et al.* (hereinafter “Noguchi”) (Ex. SS 1004) at 3:18-20.

**FIG. 4**

23. As is generally known in the related art, the conductive fibers or yarns typically employed in fabric or textile electrodes are often stainless steel fibers of an alloy such as AISI 316L having a diameter preferably on the order of only six to fifteen microns ($6\text{-}15\ \mu\text{m}$) blended with polyester yarns or the like at a ratio of 20% steel and 80% polyester to form the completed conductive yarn. *See, e.g.*, International Patent Application No. PCT/EP00/05235 to Demeyere et al. (hereinafter, “Demeyere”) (Ex. SS 1009) at pp. 12-13; U.S. Patent No. 4,867,166 to Axelgaard et al. (hereinafter, “Axelgaard”) (Ex. SS 1010) at 4:51-59. Such conductive fibers or yarns are then woven together at a relatively low count of on the order of 60 tex or with a relatively “loose knit” to produce a fabric or textile electrode having the required conductivity as well as flexibility and stretch. *See, e.g.*, SS 1009 at pp. 12-14; SS 1010 at 4:35-63 and 5:8-12. It is further known in the art to use a variety of other conductive metallic fibers, to use non-conductive fibers such as polyester polyamide or aromatic polyamide “coated ... with

conductive material, such as nickel, copper, zinc, etc.” or to use “electrically conductive elements” blended into the yarn. *See, e.g.*, SS 1004 at 3:21-29; SS 1009 at pp. 12-13. Accordingly, such resulting electrically conductive fabrics inherently have openings or interstitial spaces within the weave as a byproduct of the yarns selected and the weaving or knitting process.

24. It follows in connection with the disclosed sensor arrangement of Reho, which is in one or more embodiments a fabric construction generally as described above or even a mesh, that it is inherent that portions of the seal layer **41** formed of a material such as silicone rubber when applied to the back of the relatively thin, woven or somewhat porous contact layer of the sensor **42** will naturally flow into and fill at least some of the openings or interstitial spaces between the individual fibers of the fabric-like, woven sensor **42** and thus be embedded in and to some extent present on the “first surface” or front or skin-facing surface of the sensor **42** in actual construction and use.

25. Moreover, to confirm the inherency of at least a portion of the seal layer of the sensor being embedded in or “located on said first surface” or skin-facing surface of the sensor, I personally conducted experiments wherein an electrode according to Reho was constructed and its skin-facing surface evaluated, which confirmed that indeed there is moisture impermeable material in and at the surface of the fabric electrode. The details of my experiments are discussed herein.

III. THE '951 PATENT

A. Description of the Background Technology Relevant to the '951 Patent

26. The '951 Patent is directed to “performance improvements in substantially fabric based electrodes.” Ex. SS 1001 at 1:3-4. A stated object of the invention is thus “to provide a substantially fabric based electrode arrangement with improved performance in comparison with a fabric based electrode not benefitting from the ... invention.” *Id.* at 1:35-38.

27. Shortcomings of a “textile based electrode” as taught by Demeyere were identified as employing “an electro-conductive gel ... between the zone containing the electrically conductive yarns and the skin to assist the electrical contact between yarn and skin” or potentially having to use a higher percentage of electrically conductive material or yarns in the fabric electrode, in either case the '951 Patent asserting that such approaches to solving the fundamental problem “that the electrical resistance between the conductive portion of the textile based electrode and the skin of a wearer to which the electrode is applied is high enough to render detection of electrical signals corresponding to the wearer’s heartbeat very difficult” were inferior, impractical, or undesirable. *Id.* at 1:12-34.

28. In sum, the '951 Patent asserts that in certain uses the disclosed “electrode arrangement ... provides detection of user signals when the basic

knitted electrode of the type generally described by [Demeyere] may not.” *Id.* at 2:17-21.

29. Accordingly, aspects of the invention of the ‘951 Patent are recited as:

- “a fabric electrode arrangement exhibiting a first surface for application to the skin of a mammal, wherein said fabric electrode arrangement comprises at least one portion of material being substantially impermeable to moisture, said material being located on said first surface”;
- “a substantially textile article comprising the fabric electrode arrangement”;
- “a wearable article comprising the fabric electrode arrangement”; and
- “a garment comprising a fabric electrode arrangement exhibiting a first surface for application to the skin of a mammal, wherein said fabric electrode arrangement comprises at least one portion of material being substantially impermeable to moisture, said material being located on said first surface.”

Id. at 1:39-44 and 3:15-27.

30. Thus, it can be seen that the “problem” described in the ‘951 Patent is to provide a “textile based electrode” or “fabric electrode arrangement” that has improved electrical signal detection capabilities as by lowering the resistance and thereby increasing the conductivity between the electrode and the skin of a wearer without compromising wearer comfort. **The “solution” presented in the ‘951**

Patent for improving fabric electrode conductivity is essentially to provide a moisture impermeable material on, adjacent to, or embedded in the skin-facing surface of the fabric electrode, with such electrode then incorporated in “a textile article,” “a wearable article,” or “a garment.”

B. Technical Overview of the ‘951 Patent

31. The ‘951 Patent generally discloses an electrode arrangement **10** comprising a knitted electrically conductive fabric electrode portion **12** and at least one portion **14** of moisture impermeable electrically conductive material attached to the electrode portion **12**. Ex. SS 1001 at Abstract. During use the electrode arrangement **10** is applied to a wearer’s skin, with the moisture impermeable portion **14** encouraging perspiration of a user and trapping the perspiration between the skin and the moisture impermeable portion **14** to reduce skin to electrode contact resistance and thereby increase the efficiency of detection of a user’s heart rate or other electrical signals generated by a user. *Id.*

32. In the ‘951 Patent, the “at least one portion of material [**14**] which is substantially impermeable to moisture” is disclosed as being a silicone rubber material **14** that causes “the reduction of resistance over time ... due to moisture forming between material portion **14** and the wearer’s skin.” *See, e.g., Id.* at 3:55-58 and 5:26-30.

33. The '951 Patent further discloses that “the attachment [of the moisture impermeable material **14** to the conductive electrode portion **12**] does not need to be direct and ... is not mandatory because mere appropriate location of [the] material **14**, such that during use [the] material **14** electrically contacts [the electrode] portion **12**, either directly or indirectly, is sufficient to allow operation in accordance with the ... invention.” *Id.* at 6:13-23.

34. All embodiments described in the '951 Patent are directed to a moisture impermeable portion **14** that is “conductive” or “electrically conductive.” *See, e.g., Id.* at 3:49-62, 4:38-64, 5:31-39 and 6:1-43. In an exemplary embodiment, this is accomplished by loading the silicone rubber material **14** with carbon black and attaching it to the electrode portion **12** by “suitable electrically conductive adhesive.” *Id.* at 3:57-58 and 4:38-40.

35. The '951 Patent further discloses that the fabric electrode arrangement **10** is located on a textile article **11** or is essentially “integral with a garment.” *Id.* at 3:10-27 and 49-50. It is specifically disclosed in the illustrated embodiment that the “garment [is] in the form of a fabric band **11**” that is to be worn around the chest. *Id.* at 4:48-49. In any such garment, the electrode arrangement **10** is positioned to face or be against the wearer’s skin. *See, e.g., Id.* at 4:46-64.

IV. EXPERIMENTS

A. Experimental Design

36. The objective of these experiments was to determine whether or demonstrate that the substantially impermeable layer, in this case, silicone rubber loaded with carbon black, when applied to the “top” or back side of the fabric electrode, or the side of the electrode opposite the skin in normal use, is able to “leach” or pass through the pores in the electrically conductive fabric (the electrode) and is thus found to be present on the skin-facing surface of the electrode (the “first surface” as defined by the ‘951 Patent).

37. Four specimens (conductive fabric electrodes) were prepared as follows:

Specimen	Description
A	<i>Conductive polymer-coated polyester net</i> <i>EEONTEX™ FABRIC N-PI-400</i> Eeonyx, Corp. Resistance: 400 Ω /inch ² Fabric thickness: 360 μ m Color: Black
B	<i>Polyamide polyester (non-conductive fibers)</i> <i>Silver coated nylon: X-STATIC®</i> Noble Biomaterials, SAUQUOIT INDUSTRIES, LLC Resistance: 2 Ω /inch ² Fabric thickness: 210 μ m Color: Grey, Silver

Specimen	Description
C	<i>Polyamide polyester (non-conductive fibers)</i> <i>Silver coated nylon: X-STATIC®</i> Noble Biomaterials, SAUQUOIT INDUSTRIES, LLC Resistance: 5 Ω/inch^2 Fabric thickness: 240 μm Color: White, Silver
D	<i>Silver Metalized Cerex: X-STATIC®</i> Noble Biomaterials, SAUQUOIT INDUSTRIES, LLC Resistance: Less than 1 Ω/inch^2 Fabric thickness: 100 μm Color: Grey, Silver, and/ or Silver-gold

38. Regarding the conductive silicone loaded with carbon black for the fabric electrode coating, the silicone rubber loaded with electrically conductive material (carbon black in this case) employed is a room temperature curing silicone known as RTV-2 silicone comprised of two components which must be thoroughly mixed with one another and which are able to vulcanize (crosslink) at room temperature. The particulars of the RTV-2 silicone are as follows:

Description: Addition crosslinking two-component silicone rubber, which vulcanizes at room temperature, having electro-conductive properties (Köraform 97065 A/B)

Manufacturer: CHT R. BEITLICH, GMBH

Appearance: Viscous liquid (Black)

Hardness Shore A*: 30

Shrinkage*: < 0.1%

(*) Vulcanizate after 24h (DIN 53 505)

39. The process for preparation of the flexible electrically conductive area integrated into the conductive fabric comprised a step of applying pressure when applying the silicone rubber directly to the fabric in order to eliminate any air bubble that might break the conductivity. For this purpose, a screen-printing process using low speed and high pressure was employed. The pressure applied by such a press is typically in the range of 0.2 to 0.8 kg/m², with a pressure of 0.45 kg/m² employed here in forming the four specimens.

40. The low speed of the press allows the high-viscosity silicone rubber to flow somewhat evenly onto the fabric as the pressure is increased. An important aspect is the thickness of the coating, with a thicker conductive silicone coating exhibiting better mechanical and conductive properties when stretched or flexed after curing or in use. Regarding the four specimens of the present experiments, the thickness of the moisture impermeable material layer (silicone rubber loaded with carbon black) in each was as follows: 1,307 µm for Specimen A; 1,051 µm for Specimen B; 1,064 µm for Specimen C; and 955 µm for Specimen D.

41. The process for the preparation of the specimens further comprised a step of curing the silicone rubber at room temperature. In the present experiments, the silicone rubber was cured onto the fabric. In order to reduce the cure time required, a step of pre-curing the silicone through the application of an elevated

temperature in the range of 90 °C to 165 °C was employed; here, a temperature of 165 °C for one minute.

B. Experimental Results

42. The results of these experiments are best shown pictorially in the photographs shown in Exhibit 1 taken of the specimens in their final assembled and cured configurations, first from the back of the electrode, or the side of the fabric away from the skin to which the silicone rubber was applied, and then from the front of the electrode, or the side of the fabric toward the skin opposite which the silicone rubber was applied.

43. Notably, in each case, the silicone rubber with carbon black as applied through a conventional silk-screening process to the back side of the fabric electrode, or side away from the skin, was found to have in part passed through the pores or interstitial spaces within the woven fabric and be present and visible on the front side of the fabric electrode, or the side of the electrode toward or against the skin during use.

44. Specifically, the specimens were measured as to the degree of silicone rubber extending from the front side of the fabric electrode and the results were found to be: 7 µm for Specimen A; 11 µm for Specimen B; 14 µm for Specimen C; and 5 µm for Specimen D. While these thicknesses are relatively small, the fact of the presence of silicone rubber in the pores or interstitial spaces of the fabric

electrode and even extending slightly from the skin-facing surface of the fabric electrode was confirmed as irrefutable.

45. Further evidence of the presence of silicone rubber in the pores or interstitial spaces of the fabric electrode and effectively throughout the fabric from its front to back surfaces is found in the further photos of Exhibits 2-6 showing enlarged surface views and cross-sectional views of Specimen B.

B. Conclusions

46. It has been confirmed through the conducted experiments based on fabric electrodes constructed according to and consistent with the teachings of Reho that at least a portion of the substantially impermeable seal layer of the sensor, here silicone rubber with carbon black, is embedded in or “located directly on said first surface” or skin-facing surface of the sensor.

47. In conclusion, based on four (4) different specimens (A, B, C and D) as defined in this experiment, it has been confirmed in all cases that the moisture impermeable material when applied to an electrode construct of as in the prior art is located on the first surface, or the surface that is applied to the skin (i.e., the “skin-facing surface”).

V. RIGHT TO SUPPLEMENT

48. I reserve the right to supplement this declaration, if appropriate, should additional information come to light that bears on my conclusions and

opinions contained in this declaration. I also reserve the right to consider and comment on additional evidence that may be presented by Patent Owner or its experts.

49. At any trial or hearing in which I testify in this matter, I may provide demonstrative aids, such as computer animations, excerpts and figures from relevant exhibits and prior art references, and physical examples to assist in explaining the subject matter discussed in this declaration.

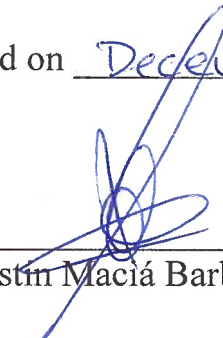
50. I expect to continue my study and evaluation of related issues as this case proceeds, at least up until the end of any period prescribed for discovery. In the event that further issues arise that concern the subject matter of this declaration, I expressly reserve the right to supplement, modify, or amend the conclusions and opinions stated in this declaration as well as the bases supporting my conclusions and opinions. I further reserve the right to supplement and/or amend this declaration or submit a reply declaration based on any information or contentions expressed by Patent Owner or its experts attempting to rebut my conclusions and opinions as expressed in this declaration. Additionally, I reserve the right to use demonstratives or other exhibits at trial in support of my conclusions and opinions in any of my expert declarations or supplements thereto.

VI. CONCLUSION







51. For the reasons set forth above, it is my opinion based on the experiments that I conducted and the observations made and conclusions reached that prior art electrodes such as disclosed in International Patent Application No. PCT/FI02/00132 inherently and in actuality have a moisture impermeable material in and at the surface of the fabric electrode.

52. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.



Executed on December 23, 2015 at Valencia (Spain)

By: 
Agustín Maciá Barber

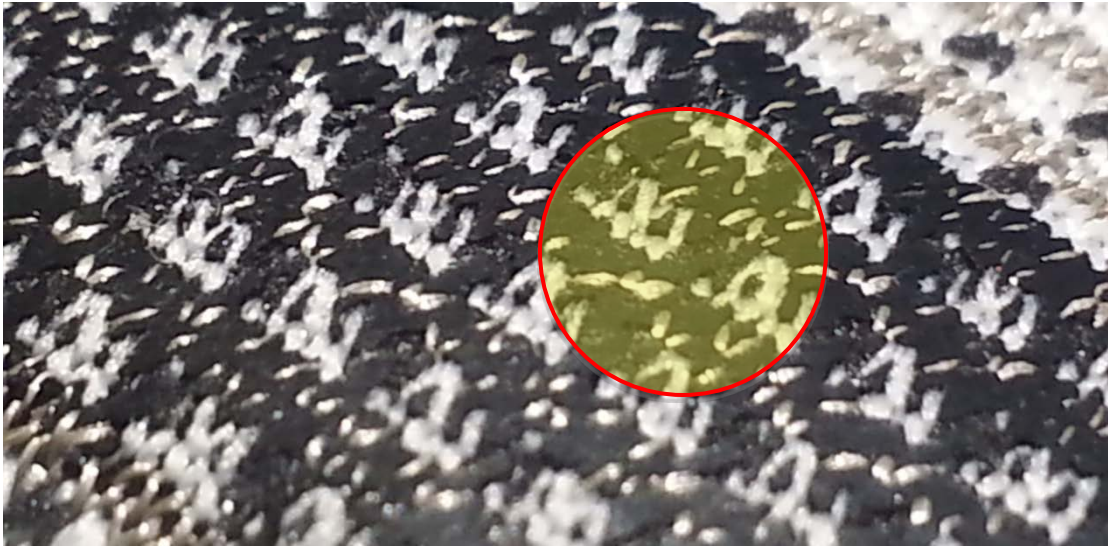
DECLARATION OF AGUSTÍN MACIÁ BARBER
EXHIBIT 1

Specimen	Back Side of Electrode (side away from skin)	Front Side of Electrode (side toward skin)
A “Black”		
B “Grey/ Silver”		
C “White/ Silver”		

DECLARATION OF AGUSTÍN MACIÁ BARBER
EXHIBIT 1

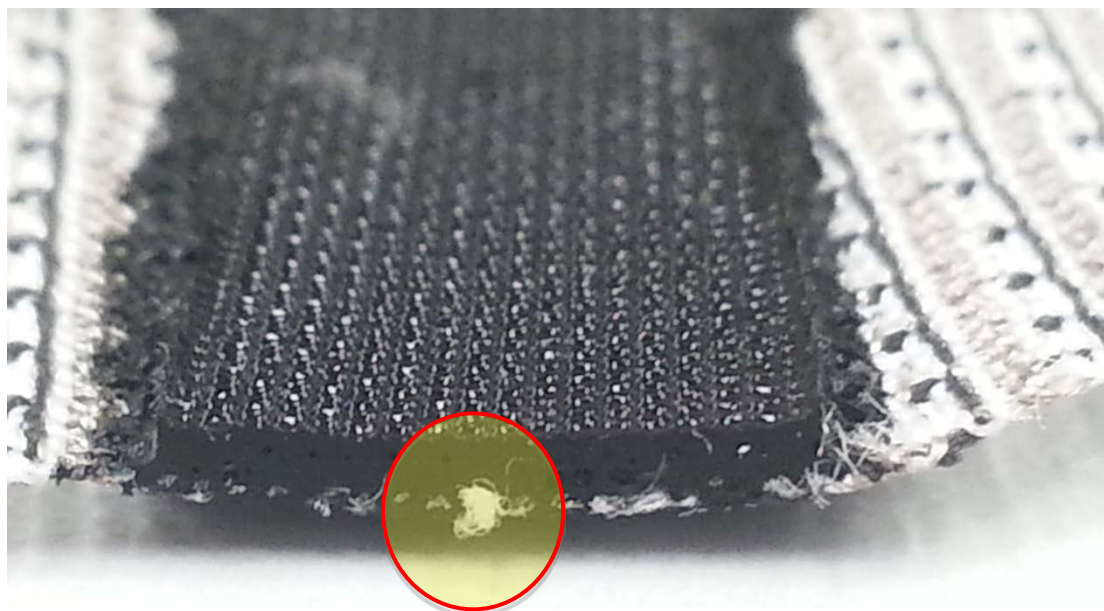
Specimen	Back Side of Electrode (side away from skin)	Front Side of Electrode (side toward skin)
D “Grey/ Silver- Gold”		

DECLARATION OF AGUSTÍN MACIÁ BARBER
EXHIBIT 2



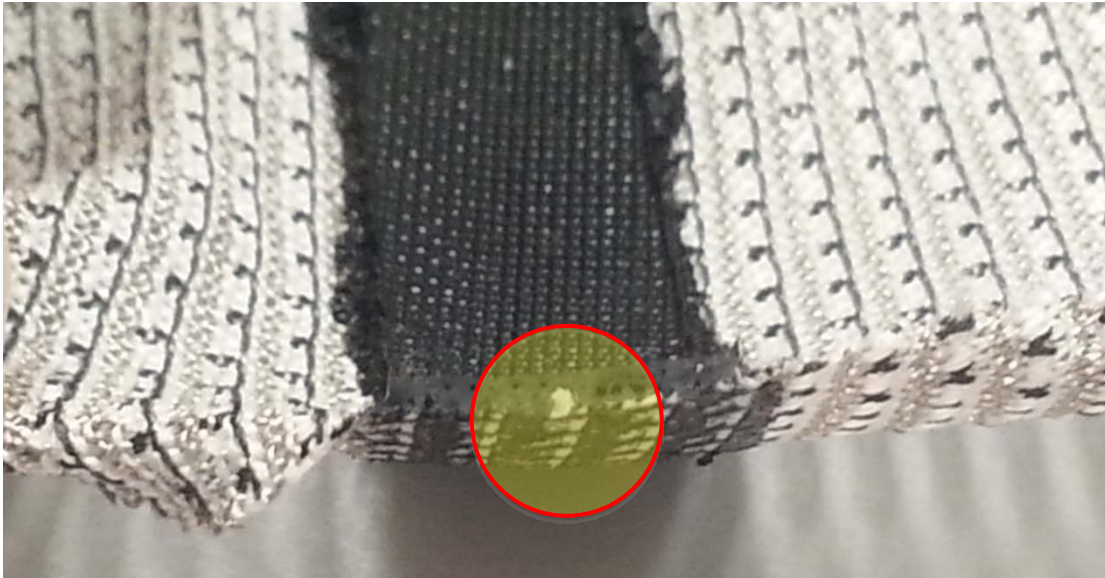
Enlarged image of skin-facing surface of Specimen B

DECLARATION OF AGUSTÍN MACIÁ BARBER
EXHIBIT 3



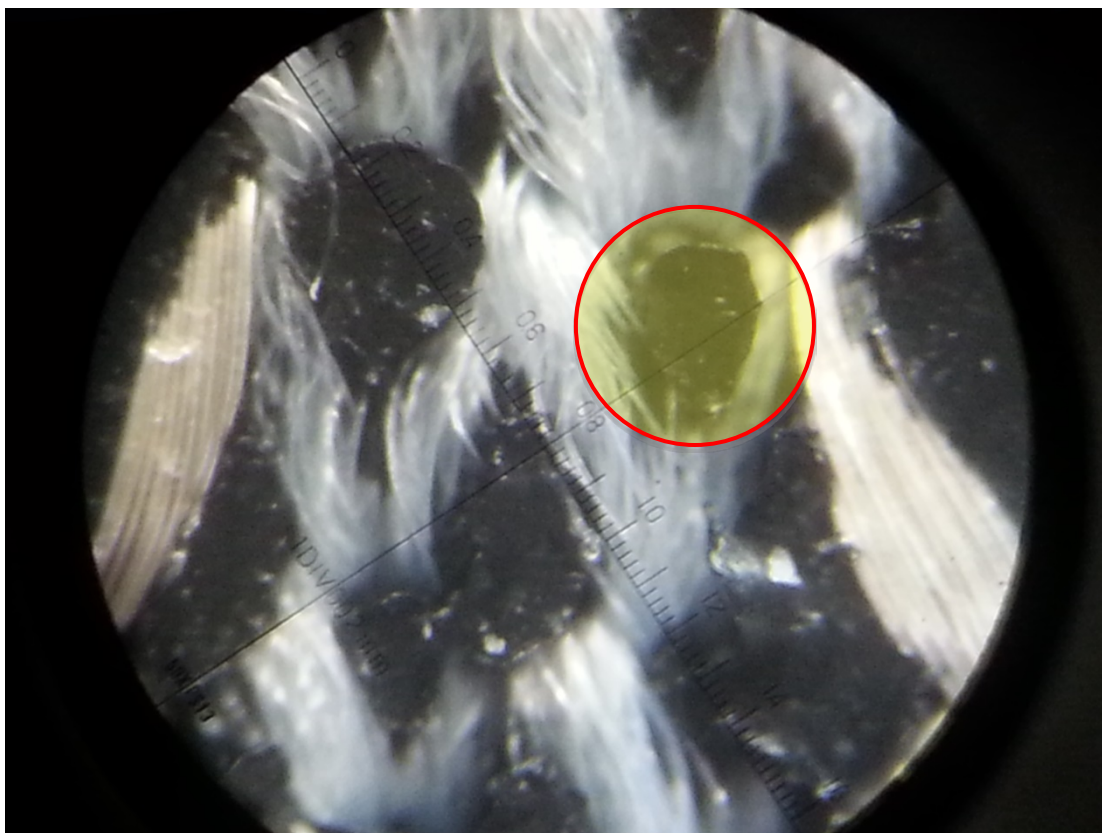
Enlarged sectional view of Specimen B

DECLARATION OF AGUSTÍN MACIÁ BARBER
EXHIBIT 4



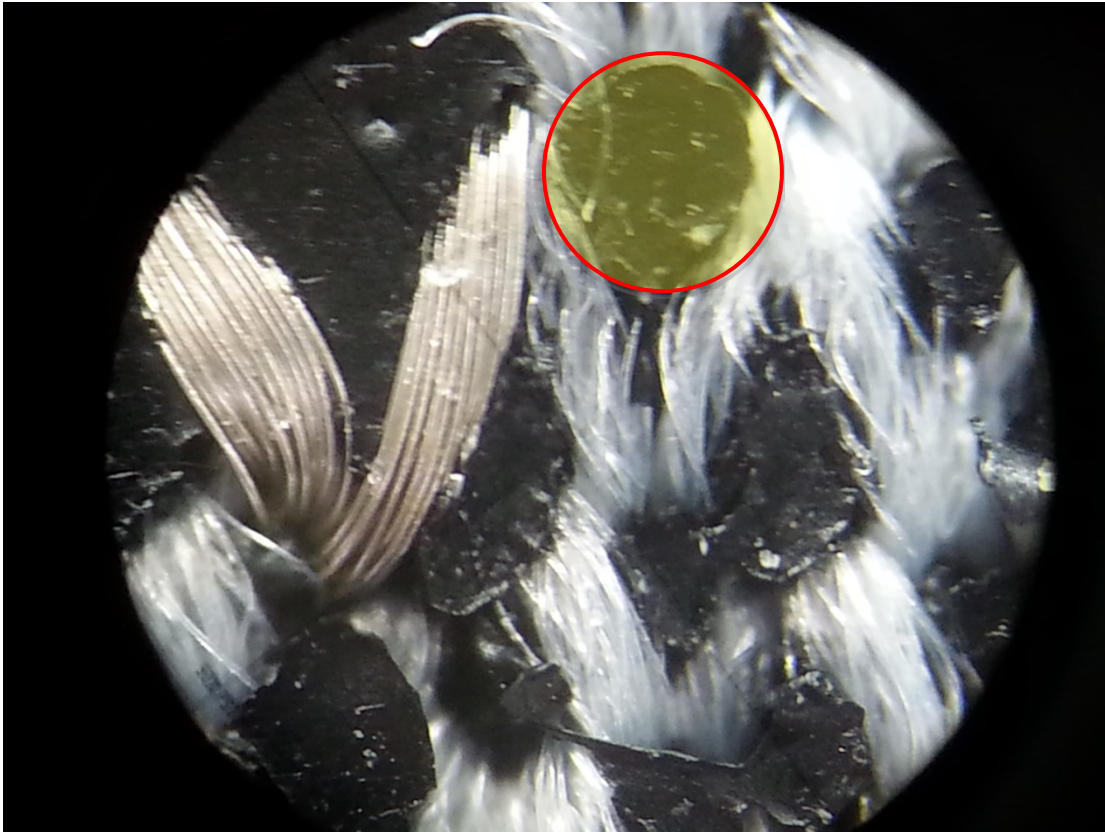
Enlarged sectional view of Specimen B with edge turned up so that front and back sides of electrode are visible

DECLARATION OF AGUSTÍN MACIÁ BARBER
EXHIBIT 5



Higher magnification image of skin-facing surface of Specimen B

DECLARATION OF AGUSTÍN MACIÁ BARBER
EXHIBIT 6



Higher magnification image of skin-facing surface of Specimen B