

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(PCT Rule 71.1)

To: TEMIÑO CENICEROS, Ignacio C/Amador de los Rios, 1-1° 28010 Madrid ESPAGNE		Date of mailing (day/month/year) 07.05.2018	
Applicant's or agent's file reference 10/PCT/S001		IMPORTANT NOTIFICATION	
International application No. PCT/EP2017/050197	International filing date (day/month/year) 05.01.2017	Priority date (day/month/year) 05.01.2016	
Applicant Tisular Safety, S.L.U.			

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Fax: +49 89 2399 - 4465	Authorized Officer Ghilini, Marie Tel. +49 89 2399-6121
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PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 10/PCT/S001		FOR FURTHER ACTION		See Form PCT/PEA/416
International application No. PCT/EP2017/050197		International filing date (day/month/year) 05.01.2017		Priority date (day/month/year) 05.01.2016
International Patent Classification (IPC) or national classification and IPC INV. G06Q10/08				
Applicant Tisular Safety, S.L.U.				
1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of <u>4</u> sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising: a. ☒ (sent to the applicant and to the International Bureau) a total of <u>8</u> sheets, as follows: ☒ sheets of the description, claims and/or drawings which have been amended and/or sheets containing rectifications authorized by this Authority, unless those sheets were superseded or cancelled, and any accompanying letters (see Rules 46.5, 66.8, 70.16, 91.2, and Section 607 of the Administrative Instructions). ☐ sheets containing rectifications, where the decision was made by this Authority not to take them into account because they were not authorized by or notified to this Authority at the time when this Authority began to draw up this report, and any accompanying letters (Rules 66.4bis, 70.2(e), 70.16 and 91.2). ☐ superseded sheets and any accompanying letters, where this Authority either considers that the superseding sheets contain an amendment that goes beyond the disclosure in the international application as filed, or the superseding sheets were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in item 4 of Box No. I and the Supplemental Box (see Rule 70.16(b)). b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing, in the form of an Annex C/ST.25 text file, as indicated in the Supplemental Box Relating to Sequence Listing (see paragraph 3ter of Annex C of the Administrative Instructions).				
4. This report contains indications relating to the following items: ☒ Box No. I Basis of the report ☐ 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 under Article 35(2) 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 international application ☐ Box No. VIII Certain observations on the international application				
Date of submission of the demand 14.09.2017		Date of completion of this report 07.05.2018		
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Fax: +49 89 2399 - 4465		Authorized officer Nicolle, Elsa Telephone No. +49 89 2399-7940		



**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/EP2017/050197

Box No. I Basis of the report

1. With regard to the **language**, this report is based on
- ☒ the international application in the language in which it was filed
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of:
 - ☐ international search (under Rules 12.3(a) and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4(a))
 - ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a) and (b))
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-10 as originally filed

Claims, Numbers

1-12 filed in electronic form on 19-02-2018

Drawings, Sheets

1/1 as originally filed

- ☐ a sequence listing - see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since either they are considered to go beyond the disclosure as filed, or they were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in the Supplemental Box (Rules 70.2(c) and (c-bis)):
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
5. ☐ This report has been established:
- ☐ taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rules 66.1(d-bis) and 70.2(e)).
 - ☐ without taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91(Rules 66.4bis and 70.2(e)).

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/EP2017/050197

6. ☒ With regard to top-up searches (Rules 66.1 *ter* and 70.2(f)):
- ☒ A top-up search was carried out by this Authority on 05.12.2017 (all discovered documents are listed in the Supplemental Box Relating to Top-up Search).
 - ☐ Additional relevant documents have been discovered during the top-up search.
 - ☐ No top-up search was carried out by this Authority because it would serve no useful purpose.
7. ☐ Supplementary international search report(s) from Authority(ies) has/have been received and taken into account in establishing this report (Rule 45bis.8(b) and (c)).

* If item 4 applies, some or all of those sheets may be marked "superseded".

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	<u>1-12</u>
	No: Claims	
Inventive step (IS)	Yes: Claims	<u>1-12</u>
	No: Claims	
Industrial applicability (IA)	Yes: Claims	<u>1-12</u>
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Re Item V

Reference is made to the following documents:

- D1 WO 2014/182701 A1 (UNIV JOHNS HOPKINS [US]) 13 November 2014 (2014-11-13)
- D2 WO 2005/045745 A1 (BATTELLE MEMORIAL INSTITUTE [US]; CARRENDER CURTIS LEE [US]) 19 May 2005 (2005-05-19)
- D3 US 2010/271187 A1 (UYSAL DILEK DAGDELEN [US] ET AL) 28 October 2010 (2010-10-28)

Document D3 is regarded as being the prior art closest to the subject-matter of claim 1, and discloses a wearable RFID control system for recording the activity of a worker comprising a portable reader in order to communicate with tags attached to objects and a server to wirelessly manage and store the data exchanged, the reader or the object may also comprise an accelerometer in order to detect a movement of the reader or the object.

The subject-matter of claim 1 therefore differs from this known RFID control system in that it is suitable for the control of safety protocols at work and for the investigation of events in case of an accident and the accelerometers are comprised in the RFID tags placed on the objects or tools and is therefore new (Article 33(2) PCT).

The problem to be solved by the present invention may be regarded as how to adapt an RFID control system for monitoring a worker and its interactions with tools and objects to control the respect of safety protocols or investigate work accidents.

The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) because none of the documents cited addresses the problem of using an RFID control system for monitoring in order to control or investigate work accidents. There is no incentive in the documents to change or use the systems for another purpose than improving work efficiency.

Claims 2-12 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.



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February 19, 2018
EUROPEAN PATENT OFFICE
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By electronic filing

Re: International Application No. PCT/EP2017/050197, "RADIO FREQUENCY BASED CONTROL SYSTEM FOR PREVENTING OCCUPATIONAL HAZARDS"

Applicant: TISULAR SAFETY, SLU.

Amendments and arguments filed under Article 34 PCT

Dear Sirs,

With reference to the communication of the International Preliminary Examining Authority issued on the above-identified application under Rule 66 PCT, dated 15.12.2017, the applicant hereby submits replacement sheets of amended claims (See Annex to this reply) in response to the objections raised in the written opinion of the International Search Report. Throughout this document, the previously filed claims submitted on 14.09.2017 will be referred as 'former claims', while the claims submitted along with this reply shall be designated as 'amended claims'.

1. Claim amendments and support:

The applicant submits an amended claim set comprising the following modifications (the amendments are highlighted by underlining for addition or strikethrough for deletion):

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Amended claim 1:

1.- Radio frequency based control system for the control of safety protocols at work and for the investigation of events in case of an accident ~~for preventing occupational hazards~~ caused to one or more workers (1) , comprising a communication network that connects said workers (1) with one or more managers (2) via the Internet or a mobile network (3), and one or more servers (4) and databases (5) connected to that communication network;

further comprising:

- a plurality of RF tags (6) attached to objects or tools used by workers (1) during their work activity, said RF tags (6) comprising means for data transmission through radio frequency;

- one or more portable mobile terminals (7), configured for being equipped by workers (1) and for receiving data transmitted by the RF tags (6), said mobile terminals (7) comprising Internet connectivity and/or mobile network (3) connectivity;

- one or more management devices (9, 9', 9'') connected to the Internet and/or to a mobile network (3) for receiving transmitted data by mobile terminals (7) and/or recorded or analysed by the servers (4);

***characterised in that** the RF tags (6) comprise one or more accelerometers configured for generating data associated to the workers' (1) activities and the objects or tools used by said workers (1).*

Support for amendments:

Support for amended claim 1 is found in the description: page 2, lines 37-38: "allows control of safety protocols at work"; page 7, lines 14-16: "In case of an accident or incident, the data collected by the system of the invention facilitates the investigation of the events, providing a preventive tool that adds value when defining preventive actions, operating instructions or procedures to be applied".

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2. Reply to the written opinion from the International Searching Authority:**- Novelty – Art. 33(1) and 33(2) PCT**

As it is understood by point 1 of Item V from the Examiner's opinion, the Examiner rejects former claim 1 under Art. 33 PCT as being anticipated by US 2010/271187 A1 (**D3**). However the applicant respectfully considers that claims 1-12 should also be regarded as novel over D3 in view of at least the following technical feature present in claim 1 of the application:

- *Radio frequency based control system for the control of safety protocols at work and for the investigation of events in case of an accident related to the tasks of workers (1)*

Also, note that document **D3** does not refer to a system for the control of safety protocols at work and for the investigation of events in case of an accident related to the tasks of workers (i.e. suffering self-harm or injury at work), but to a system for inventory and logistics management. It is respectfully submitted that **D3** can no longer be considered as closest prior art reference, since they do not share the same purpose as the present invention (that is, **reducing the risk of suffering an accident for the workers and to provide with relevant information related to an incident or accident**).

In addition to the above considerations, and in reply to the objections related to Art. 33 PCT, amended claim 1 further includes the following technical feature:

the RF tags (6) comprise one or more accelerometers configured for generating data associated to the workers' (1) activities and the objects or tools used by said workers (1).

D3 does not disclose accelerometers attached to the RF tags themselves.

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In view of the above, it is submitted that amended claim 1 is novel over document D3. Also, due to the dependence of amended claims 2-12 on amended claim 1, it is also submitted that amended claims 2-12 are also novel over D3.

- Inventive step – Art. 33(3) PCT

D3 is regarded by the Examiner as the closest prior art and discloses a radio frequency based identification system. As discussed, amended claim 1 differs technically from D3 at least in that the current system comprises the using of 'accelerometers attached to the tags' in the sense that they add 'characteristic information' **of the object (being moved by a worker or not)** attached to a RF tag that is to be interrogated, as now claimed in amended claim 1.

The technical effect associated to the above feature is that the information provided regarding the activities of the worker can be unambiguously related to the specific position under the same RF interrogation, compared to measurements obtained when using a single RF tag **without the presence of accelerometers attached to the tags, but merely to objects**.

The objective technical problem/s to be solved by the present invention is/are to achieve the ability to provide information about:

- Specific activities with machinery, equipment or garment which are performed in several steps by the workers, for example, for time optimization and monitoring.
- In case of accident, to reconstruct the circumstances that gave place to such accident with the final purpose to be able to correct the situations that originated the accident and to improve the prevention plan, procedures and/or operating instructions.
- When there is a need to determine legal and/or economic liabilities, to enlighten the direct or indirect responsible of an incident.
- Several specific components or elements of a tool used by a worker, or his/her garment.

A solution to the latter problem is provided by amended claim 1 of the present application, wherein the system presents the ability to collect information about the movement of a tagged

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object in a specific position or point of interest, by means of an RF tag and an **accelerometer attached thereto**.

In order to clarify the solution of the problem that the present invention provides, let us give an example that differentiates the present invention from the prior art and where **D3** would not be able to fulfill the same information and thus, **would not obtain the same solution**.

In the case that a first worker performing activities with heavy machinery such as a crane, and a second worker performing activities in the surrounding area of the first worker and said crane (assuming that he/she is supposed to wear a helmet, gloves, etc.), according to the present invention RF tags can be located in the helmet, gloves, in the crane in several locations (as in the lift arm of the crane and also in the cabin of the crane) and the tags comprise accelerometers. In case of accident, such as: a part of the crane cracks and falls, separating the cabin from the lift arm, hitting the second worker or another object; the problem to be solved could be to enlighten the circumstances of the incident and give as much useful information as possible for an insurance resolution or determination of liability.

With the present invention, as now claimed by amended claim 1, it is possible to identify: if the second worker was wearing the protective equipment at the moment of the incident or if the crane cracked by accident or because of a bad use; the record of movements that both parts of the crane made, being moved by the first worker or not and the relative position and velocity between all the elements tagged at any time, including the position of the lift arm of the crane and the cabin separately, even if they are far away from each other. To sum up, it would be possible to correct the situation for the control of safety protocols at work and for the investigation of events in case of an accident related to the tasks of workers and to detect the true responsible of the accident if any.

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D3 discloses the use of sensors like accelerometers for **triggering** the RF interrogation but **there is no motivation to attach such sensors to the RF tags or to interrogate the RF tags without a triggering event or without an interaction of the worker by moving an object or being close to it.**

In the aforementioned example of the worker in the crane that breaks apart in two pieces, cabin and lift arm, as the accelerometers are not attached to the tags, it could happen that the accelerometer is located in the cabin and the tag is located in the lift arm. Thus, **D3** would fail to provide information about the acceleration of the lift arm of the crane if the accelerometer is far away from the tag in the crane, even if there is a triggering event, as required in **D3**. That is, the system disclosed in amended claim 1 would provide with wider information about such accident than the system in D3, because it would provide with information about the position at any moment of the lift arm, while D3 would not be able to do so. As a consequence, D3 would fail to provide the solution for the proposed technical problem.

Given the above, it is submitted that an expert would not arrive to the claimed solution of the objective technical problem proposed by the present invention (as recited in amended claim 1) from the disclosed system in **D3**. In consequence, it is thus submitted that amended claim 1 should be regarded as inventive over D3 and, therefore, the applicant respectfully requests the withdrawal of the objections raised by the International Searching Authority.

Respectfully submitted,

Ignacio Termino Ceniceros

Off. Representative 159.230



CLAIMS

1.- Radio frequency based control system for the control of safety protocols at work and for the investigation of events in case of an accident caused to one or more workers (1), comprising a communication network that connects said workers (1) with one or more managers (2) via the Internet or a mobile network (3), and one or more servers (4) and databases (5) connected to that communication network; further comprising:

- a plurality of RF tags (6) attached to objects or tools used by workers (1) during their work activity, said RF tags (6) comprising means for data transmission through radio frequency;

- one or more portable mobile terminals (7), configured for being equipped by workers (1) and for receiving data transmitted by the RF tags (6), said mobile terminals (7) comprising Internet connectivity and/or mobile network (3) connectivity;

- one or more management devices (9, 9', 9'') connected to the Internet and/or to a mobile network (3) for receiving transmitted data by mobile terminals (7) and/or recorded or analysed by the servers (4);

characterised in that the RF tags (6) comprise one or more accelerometers configured for generating data associated to the workers' (1) activities and the objects or tools used by said workers (1).

2.- System according to the preceding claim, further comprising one or more portable RF readers (8) configured for being equipped by workers and for reading and recording data associated to the RF tags (6), said RF readers (8) comprising means for data transmission through radio frequency to the RF tags (6) and to the portable mobile terminals (7).

3.- System according to the preceding claim, wherein the means for data transmission between the RF tags (6) and the mobile terminals (7) comprises Bluetooth and/or RFID communication technology.

4.- System according to any of the preceding claims, wherein the frequency band of operation for reading the RF tags (6) is between 800-1000 MHz, between 2400-2483.5 MHz or between 2402-2480 MHz.

5.- System according to any of the preceding claims, wherein the mobile terminals (7) are mobile phones.

6.- System according to any of the preceding claims, wherein the RF tags (6) comprise long-lasting or rechargeable batteries.

5 7.- System according to any of the preceding claims, wherein the RF tags (6) and/or the RF readers (8) comprise means of insulation or protection from humidity, temperature, shock and/or dust.

10 8.- System according to any of the preceding claims, wherein the management devices (9, 9', 9'') comprise computers (9), tablets (9') and/or mobile phones (9'').

9.- System according to any of the preceding claims, wherein the mobile terminals (8) comprise a medium for transmitting geolocation information to the servers (4) through the Internet or through a mobile network (3).

15 10.- System according to any of the preceding claims, wherein the mobile terminals (8) and/or the servers (4) are configured with one or more software applications for generating management data reports associated with RF tags (6), or for generating safety alarms to managers (2) and/or workers (1).

20 11.- System according to any of the preceding claims, wherein the mobile terminals (7) comprise means for transmitting the information generated by the RF tags (6) or by said mobile terminals (7) either synchronously or asynchronously to the servers (4).

25 12.- System according to any of the preceding claims, wherein the RF tags (6) comprise reinforcing means against degradation produced by the use or maintenance of equipment or tools used by workers (1) during their work activity.

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