(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 857 789 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
08.04.2015 Bulletin 2015/15

(21) Application number: **13750088.0**

(22) Date of filing: **24.05.2013**

(51) Int Cl.:
F41A 17/08 *(2006.01)*

(86) International application number:
PCT/ES2013/070336

(87) International publication number:
WO 2013/178851 (05.12.2013 Gazette 2013/49)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **30.05.2012 ES 201230826**

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(54) HUNTING SAFETY DEVICE AND OPERATING METHOD THEREOF

(57) The invention relates to a hunting safety device and the operating method thereof, which can be used to enhance the personal safety of hunters (3), hunting dogs, escorts and anyone involved in a hunt or walking through a hunting reserve, minimising accidents caused by friendly fire, i.e. a hunter shooting another hunter (3, 3') located in the same line of fire, thereby saving a large number of lives.

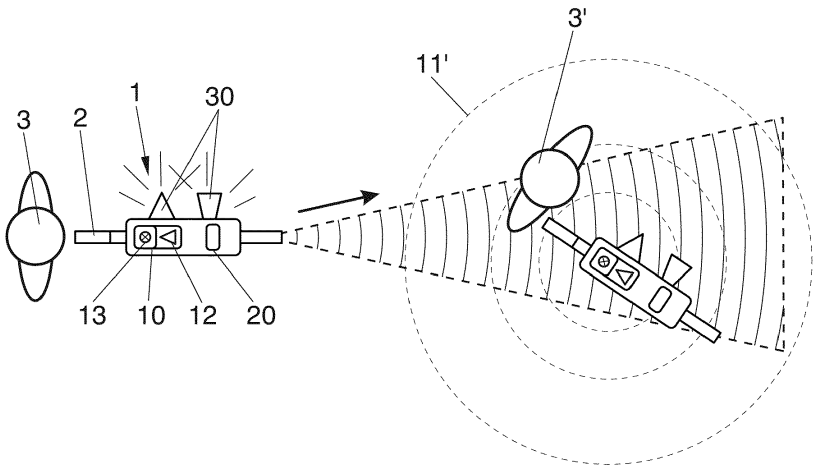

FIG. 2B

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Description

OBJECT OF THE INVENTION

[0001] The present invention relates to the field of firearms and, more specifically, to safety devices and mechanisms for hunters or persons participating in hunts or on hunting preserve grounds.

[0002] The main object of the present invention is hunting safety equipment and a hunting safety procedure that increase hunters' safety by reducing the number of accidents caused by "friendly fire" between hunters positioned in the same line of fire, thereby saving a large number lives.

BACKGROUND OF THE INVENTION

[0003] Numerous current studies confirm that ten million shots are fired annually during hunts and on hunting preserve grounds. Therefore, a hunter often has another hunter or stroller in the same line of fire as potential prey, with the associated grave dangers. Another frequent dangerous situation arises when a hunter, thinking he sees prey hiding behind some bushes, shoots and then realises that it was not an animal but rather a hunting companion, with the ensuing fatal consequences. We are constantly hearing in the media about hunting accidents that occur every year for this reason; as a result of these accidents, many hunters are injured in varying degrees, suffering serious after-effects or even losing their life.

[0004] At present, the only safety systems for hunting events and hunting preserves available on the market are of the optical type, based on the use of reflective vests, the use of which is already mandatory in some Spanish autonomous communities.

[0005] Therefore, the technical problem being raised herein is that current safety systems for hunters and persons participating in hunts or on hunting preserve grounds are ineffective and unsafe systems, as reflective vests, in addition to being useless in certain poor visibility situations, alert the animals of the hunter's presence, allowing them to escape quickly; not to mention the fact that said vests are bothersome and uncomfortable for hunters, who normally prefer not to wear them.

DESCRIPTION OF THE INVENTION

[0006] The present invention aims to solve the aforementioned technical problem by providing hunting safety equipment and an operating procedure for said equipment aimed at increasing the personal safety of hunters, persons who are working on and/or strolling through grounds where hunts are held or belonging to hunting preserves, and even of hunting dogs, and reduces "friendly fire" accidents to a minimum, i.e. fire between hunters in the same line of fire, thereby saving a large number of lives.

[0007] More specifically, the hunting safety equipment object of the invention is destined for being carried by hunters, hunting dogs and/or persons participating in hunts or on hunting preserve grounds, said hunting safety equipment comprising an emitter device configured to emit electromagnetic signals; a receiver adapted to detect electromagnetic signals emitted by other hunters, hunting dogs and/or persons participating in hunts or on hunting preserve grounds also carrying the hunting safety equipment described herein; and alarm means, preferably acoustic and/or luminous, associated with the receiver device and adapted to become activated and alert the hunter in the event that said receiver device detects an electromagnetic signal emitted by another hunter, warning him that there is another hunter in the direction in which he is pointing his gun, due to which he must abort the shot. The term "another hunter" shall be understood to be a secondary hunter, a person participating in a hunt or strolling through hunting preserve grounds, or even the hunting dogs.

[0008] In accordance with a first preferred embodiment, the hunting safety equipment also comprises a GPS global positioning device which allows the hunter to establish his geographic position at all times, while the aforementioned emitter device comprises wireless transmitter means that include the hunter's geographic position (latitude, longitude and altitude) in the electromagnetic signal emitted. Said wireless transmission means can be based on radio frequency (RF) transmission or on the use of the general packet radio service, better known as GPRS. At this point it is advisable to indicate that when reference is made herein to global positioning system (GPS), it should be understood that it can be based on American, Russian (GLONASS) or European (GALILEO) satellites or any other similar system.

[0009] Likewise, it has been envisaged that the hunting safety equipment object of the invention will also include a device for estimating the orientation of the hunter's gun, adapted to calculate the direction of the shot, i.e. the direction in which the hunter is pointing his gun at any given time, and preferably coupled to the gun barrel. More specifically, said device for estimating the orientation of the gun comprises at least one device selected from among: an electronic compass, an accelerometer and a gyroscope, in accordance with the requirements and needs of each application and wherethrough it is possible to obtain greater accuracy and precision. However, for the purpose of protecting the physical integrity of companions, strollers or even the dogs that frequently accompany hunters at hunts, it has been envisaged that another version of the hunting safety equipment will only include a GPS device, transmitter and receiver devices and alarm means, without an orientation estimation device.

[0010] In accordance with a second preferred embodiment, the emitter device comprises a directional transmitting antenna coupled to the hunter's gun barrel, adapted to emit electromagnetic signals only in the direction of fire, preferably at an angle comprised between $\pm 5°$

and ±10° with respect to the line of fire, depending on the reach and characteristics of the gun; said emitter device also comprising a multidirectional antenna adapted to emit electromagnetic signals in all directions in the event that the receiver device of a secondary hunter receives electromagnetic signals from a first hunter, indicating that the secondary hunter is being pointed at by the first hunter.

[0011] It has been envisaged that said electromagnetic signals emitted will be radio frequency (RF) signals that include information about the hunters and identification data such as their licence plate number, personal identifier, etc., in order to identify the emitter of said signals. However, in relation to said electromagnetic signals emitted, it has been envisaged that these can also be audible or luminous, such as a laser beam, where each hunter must be equipped in this specific case with a vest or fabric especially adapted to detect said light beams. Similarly, for the purpose of protecting companions, strollers and/or hunting dogs, it has been envisaged that a much simpler version of the hunting safety equipment will only include transmitter and receiver devices and alarm means, without a directional emitting antenna.

[0012] Further, in accordance with a third preferred embodiment, the emitter device comprises a multidirectional antenna adapted to emit electromagnetic signals in all directions, while the receiver device preferably comprises a directional receiving antenna coupled to the hunter's gun barrel, adapted to receive only electromagnetic signals in the gun's direction of fire so that the other signals received by the hunter do not affect his decision as to whether or not to fire the shot. Similarly, in order to protect companions, strollers and/or hunting dogs, it has been envisaged that a simpler version of the hunting safety equipment of the present invention will only include transmitter and receiver devices and alarm means, without a directional receiving antenna.

[0013] Additionally, it has been envisaged that the hunting safety device described herein can also comprise means for disabling a gun's trip function in the event that the alarm means become activated, indicating that there is another hunter in a hunter's line of fire.

[0014] Likewise, the hunting safety equipment can also comprise data storage means for saving and recording the hunters' identification data, positions, distances, dates, times or miscellaneous information that could aid a possible investigation in the event of an accident.

[0015] Lastly, it must be noted that the hunting safety equipment of the present invention is applicable both to hunts and hunting preserves and to State security forces (army, police, etc.), and even to leisure and recreational activities such as paintball.

DESCRIPTION OF THE DRAWINGS

[0016] In order to complement the description being made and with the object of helping to better understand the characteristics of the invention, in accordance with a preferred embodiment thereof, said description is accompanied, as an integral part thereof, by a set of drawings where, in an illustrative and non-limiting manner, the following has been represented:

Figures 1A and 1B show schematic views of a first preferred embodiment of the hunting safety equipment object of the invention.

Figures 2A and 2B show schematic views of a second preferred embodiment of the hunting safety equipment object of the invention.

Figures 3A and 3B show schematic views of a third preferred embodiment of the hunting safety equipment object of the invention.

PREFERRED EMBODIMENT OF THE INVENTION

[0017] Following are several examples of preferred embodiments making reference to the foregoing figures, without limiting the scope of protection of the present invention in any way.

[0018] In a first preferred embodiment, shown in figures 1A and 1B, the hunting safety equipment (1) destined for being carried by hunters (3, 3'), hunting dogs and/or persons participating in hunts or on hunting preserve grounds, comprises:

- a GPS global positioning device (40) configured to locate the geographic position of each hunter (3, 3');
- an emitter device (10) which in the present embodiment comprises wireless transmission means (14) whereby radio frequency electromagnetic signals (11) that include the GPS position of each hunter (3, 3') are sent;
- a receiver device (20) adapted to detect the GPS positions of other hunters (3'), hunting dogs and/or persons participating in the hunts or on hunting preserve grounds;
- a device for estimating the orientation (50) of the hunter's (3) gun (2) adapted to calculate the direction of fire; and
- acoustic and/or audible alarm means (30) associated with the receiver device (20), adapted to become activated and alert the hunter (3) in the event that said receiver device (20) detects the GPS position of another hunter (3') in the direction of fire calculated by the orientation estimation device (50).

[0019] In a second preferred embodiment of the hunting safety equipment (1) shown in figures 2A and 2B, the basic difference with respect to the first embodiment is that here the emitter device (10) comprises a directional emitting antenna (12) coupled to the hunter's (3) gun (2) barrel, adapted to emit RF electromagnetic signals (11) only in the gun's direction of fire (2), but no GPS device (40) or device for estimating the orientation (50) of the gun (2); and a multidirectional antenna (13) adapted to emit electromagnetic response signals (11') in all direc-

tions in the event that the receiver device (20) receives electromagnetic signals (11) from the first hunter (3).

[0020] Lastly, figures 3A and 3B show schematic views of the third preferred embodiment of the hunting safety equipment (1), where in this case the emitter device (10) comprises, in addition to the alarm means (30), a multidirectional antenna (13) adapted to emit electromagnetic signals (11) in all directions; and where the receiver device (20) comprises a directional receiving antenna (21) coupled to the hunter's (3) gun (2) barrel, adapted to detect electromagnetic signals (11) in the gun's (2) direction of fire.

[0021] In accordance with another object of the invention, following is a description of the operating procedures for each of the three embodiments of the previously described hunting safety equipment (1). According to the first preferred embodiment of the equipment, the operating procedure comprises:

a1) constant emission of the GPS geographic position by each hunter (3) to the other hunters (3'), as shown in figure 1A;
a2) determination of the orientation of the hunter's (3) gun (2); and
a3) emission of a warning signal to the hunter (3) in the event that his receiver device (20) detects the GPS position of another hunter (3') in his line of fire, as can be observed in figure 1B.

[0022] In accordance with the present embodiment, stage a1) is executed by means of a GPS global positioning device (40) and wireless transmission means (14). In turn, stage a2) is executed by at least one device for estimating the orientation (50) of the gun (2) selected from among: an electronic compass, an accelerometer and a gyroscope.

[0023] In turn, in accordance with the second preferred embodiment of the equipment, the operating procedure for the hunting safety equipment (1) comprises:

b1) emission of an electromagnetic signal (11) by a first hunter (3) in the direction of fire of his gun (2), as represented in figure 2A;
b2) instant emission by a second hunter (3') of an electromagnetic response signal (11') in all directions (omnidirectional), as can be observed in figure 2B), in the event that said second hunter (3') receives the signal emitted by the first hunter (3), indicating that the second hunter (3') is in the first hunter's (3) line of fire; and
b3) emission of a warning signal to the first hunter (3) upon detecting the electromagnetic response signal (11') emitted by the second hunter (3').

[0024] In the present embodiment, stage b1) is executed by means of a directional emitting antenna (12) coupled to the gun (2) barrel, said directional emitting antenna (12) emitting electromagnetic signals (11) at an angle of $\pm 5°$ with respect to the line of fire, as shown in figure 2B, said signals including the hunter's (3) identification data. However, it has been envisaged that said electromagnetic signal (11) emitted in said stage b1) will be a luminous signal by means of a laser beam.

[0025] Lastly, according to the previously described third preferred embodiment of the equipment, the operating procedure comprises:

c1) constant emission of an electromagnetic signal (11) in all directions by each hunter (3, 3') from the outset, as shown in figure 3A; and
c2) emission of a signal warning to the hunter (3) that he is pointing at with his gun (2), in the event that his receiver device (20), in this case the directional receiving antenna (21), detects the electromagnetic signal (11) emitted by another hunter (3') in his line of fire, as represented in figure 3B.

[0026] In the three aforementioned embodiments, stages a3), b3) and c2) are executed by means of acoustic and/or audible alarm means. Lastly, it should be noted that when reference is made to electromagnetic signals (11) in the three previously described embodiments, it has been envisaged that these can be radio frequency (RF) signals, GPRS signals, ultrasonic signals or a light source.

[0027] Also, as mentioned earlier, when the terms "another hunter (3')" or "second hunter (3')" are used, they shall be understood to be equally applicable to the "hunting dogs" that often accompany the hunters (3) and which can be visually confused with potential prey. Therefore, the physical integrity of the dogs is protected by simply coupling the hunting safety equipment (1) of the present invention to the dogs' collars.

Claims

1. Hunting safety equipment (1) destined for being carried by hunters (3), hunting dogs and/or persons participating in said hunts or on hunting preserve grounds, **characterised in that** it comprises:

   - an emitter device (10) configured to emit electromagnetic signals (11);
   - a receiver device (20) adapted to detect electromagnetic signals (11) from other hunters (3'), hunting dogs and/or persons participating in said hunts or on hunting preserve grounds also carrying the hunting safety equipment (1); and
   - alarm means (30) associated with the receiver device (20), adapted to become activated and alert the hunter (3) in the event that said receiver device (20) detects an electromagnetic signal (11) emitted by another hunter (3').

2. Hunting safety equipment (1), according to claim 1,

wherein the emitter device (10) comprises a directional emitting antenna (12) coupled to the hunter's (3) gun (2) barrel, adapted to emit electromagnetic signals (11) only in the direction of fire of the gun (2).

3. Hunting safety equipment (1), according to any one of claims 1 or 2, wherein the emitter device (10) also comprises a multidirectional antenna (13) adapted to emit electromagnetic signals (11) in all directions.

4. Hunting safety equipment (1), according to claims 1 and 3, wherein the receiver device (20) comprises a directional receiving antenna (21) coupled to the hunter's (3) gun (2) barrel, adapted to detect electromagnetic signals (11) only in the direction of the gun (2) shot.

5. Hunting safety equipment (1), according to claim 1, also comprising a GPS global positioning device (40) and the emitter device (10) comprises wireless transmission means (14) for including the geographic position of each hunter (3, 3') in the electromagnetic signal (11) emitted.

6. Hunting safety equipment (1), according to claim 5, also comprising a device for estimating the orientation (50) of the hunter's (3) gun (2), adapted to calculate the direction of fire.

7. Hunting safety equipment (1), according to claim 6, wherein the device for estimating the orientation (50) of the gun (2) is coupled to the hunter's (3) gun (2) barrel.

8. Hunting safety equipment (1), according to any one of claims 6 or 7, wherein the device for estimating the orientation (50) of the gun (2) comprises at least one device selected from among:

- an electronic compass;
- an accelerometer; and
- a gyroscope.

9. Hunting safety equipment (1), according to any one of the preceding claims, also comprising data storage means (70) for saving and recording the hunters' (3, 3') identification data, positions, distances, dates, times or miscellaneous data that could aid a possible investigation in the event of an accident.

10. Operating procedure for the hunting safety equipment (1), described in any one of preceding claims 1 to 9, comprising the following stages:

a1) constant emission by each hunter (3) of their geographic position to the other hunters (3');
a2) determination of the orientation of the hunter's (3) gun (2); and
a3) emission of a warning signal to the hunter (3) in the event that his receiver device (20) detects the geographic position of another hunter (3') in his line of fire.

11. Operating procedure, according to claim 10, wherein stage a1) is executed by means of a GPS global positioning device (40) and wireless transmission means (14).

12. Operating procedure, according to claim 10, wherein stage a2) is executed by means of at least one device for estimating the orientation (50) of the gun (2), selected from among:

- an electronic compass;
- an accelerometer; and
- a gyroscope.

13. Operating procedure for the hunting safety equipment (1), described in any one of preceding claims 1 to 9, comprising the following stages:

b1) emission of an electromagnetic signal (11) in the direction of fire of the first hunter's (3) gun (2);
b2) instant emission by a second hunter (3') of an electromagnetic response signal (11') in all directions (omnidirectional) in the event that said second hunter (3') receives the signal emitted by the first hunter (3), indicating that the second hunter (3') is in the first hunter's (3) line of fire; and
b3) emission of a warning signal to the first hunter (3) upon detecting the electromagnetic response signal (11') emitted by the second hunter (3').

14. Operating procedure, according to claim 13, wherein stage b1) is executed by means of a directional emitting antenna (12) coupled to the hunter's (3) gun (2) barrel.

15. Operating procedure, according to claim 13, wherein the electromagnetic signal emitted in said stage b1) is a radio frequency (RF) signal.

16. Operating procedure, according to claim 15, wherein the radio frequency signal includes the hunter's (3) identification data.

17. Operating procedure, according to claim 15, wherein the electromagnetic signal emitted in said stage b1) is a luminous signal by means of a laser beam.

18. Operating procedure for hunting safety equipment (1), described in any one of preceding claims 1 to 9, comprising the following stages:

c1) constant emission of an electromagnetic signal (11) in all directions by each hunter (3, 3'); and

c2) emission of a warning signal to the hunter (3) alerting him that he is pointing at another hunter (3') with his gun (2), in the event that his receiver device (20) detects the electromagnetic signal (11) emitted by another hunter (3') in his line of fire.

19. Operating procedure, according to claims 10, 13 and 18, wherein stages a3), b3) and c2) are executed by means of acoustic and/or audible alarm means (30).

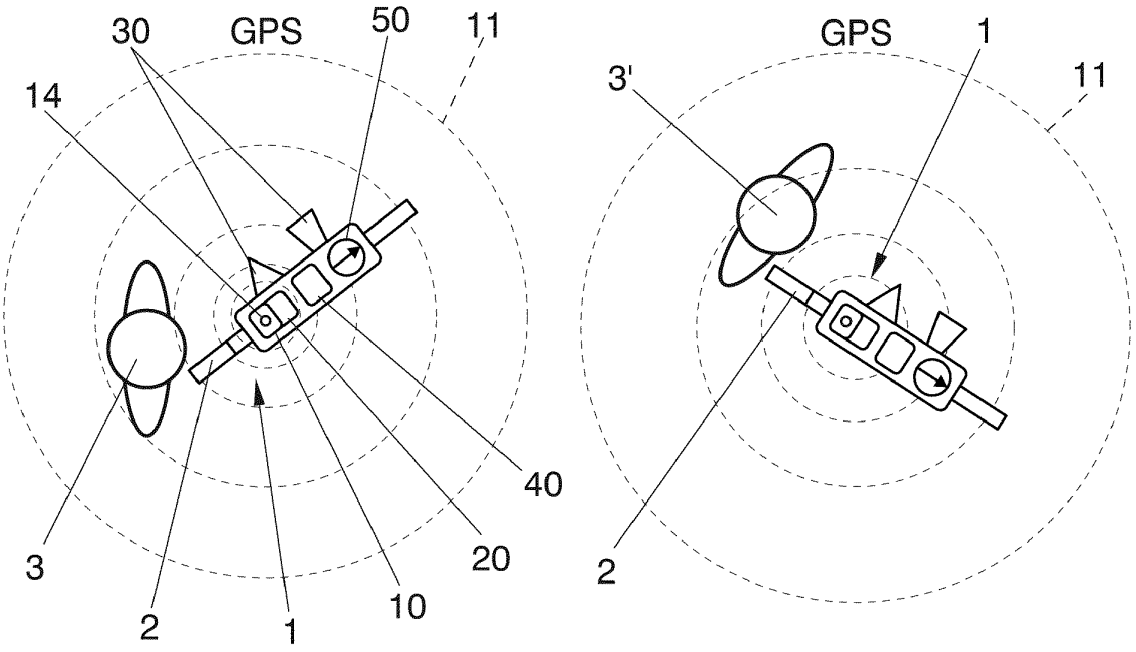

FIG. 1A

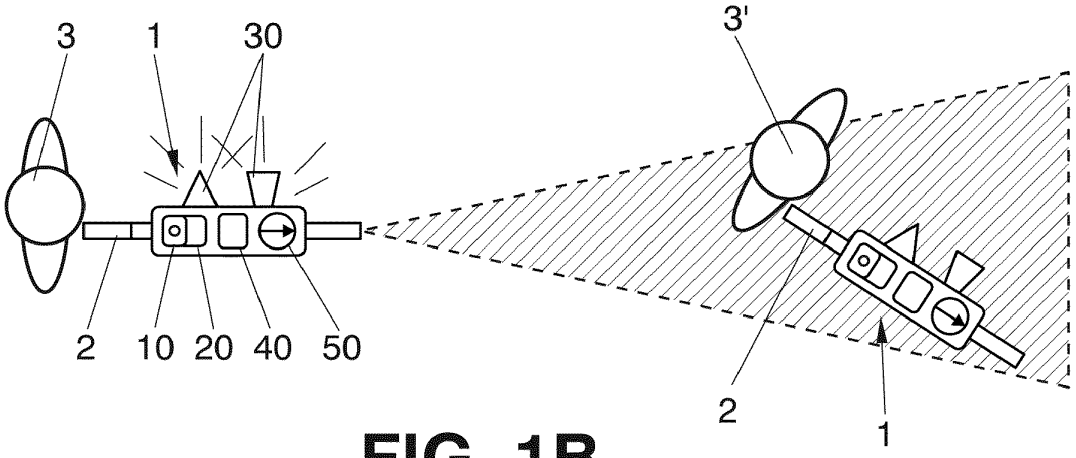

FIG. 1B

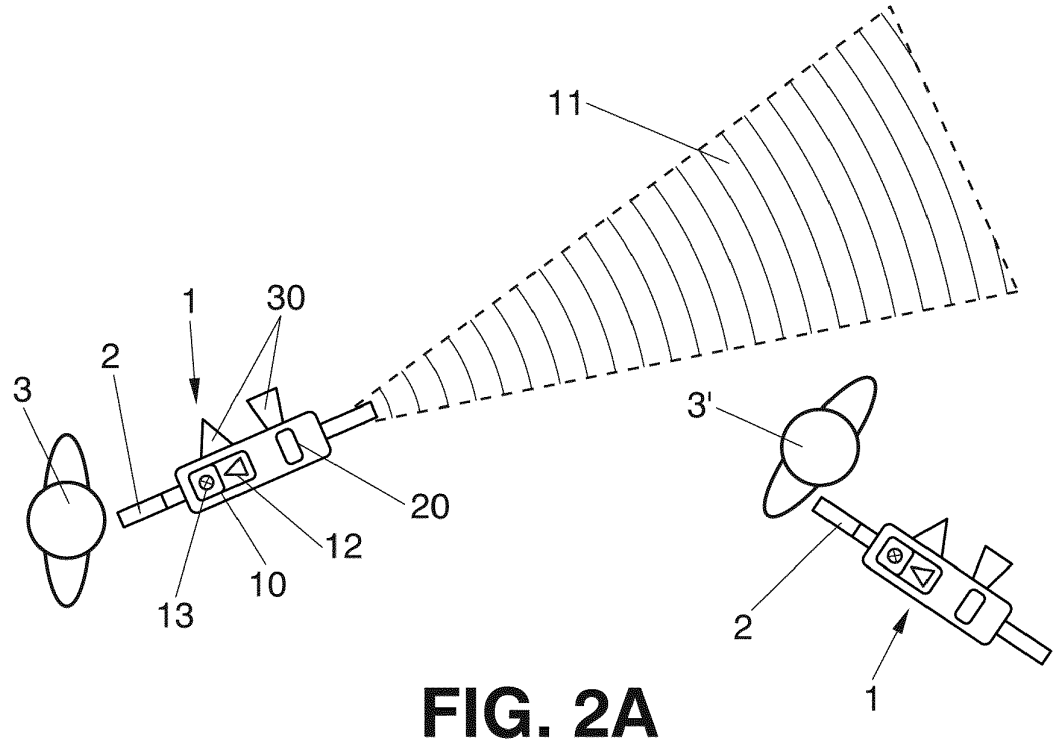

FIG. 2A

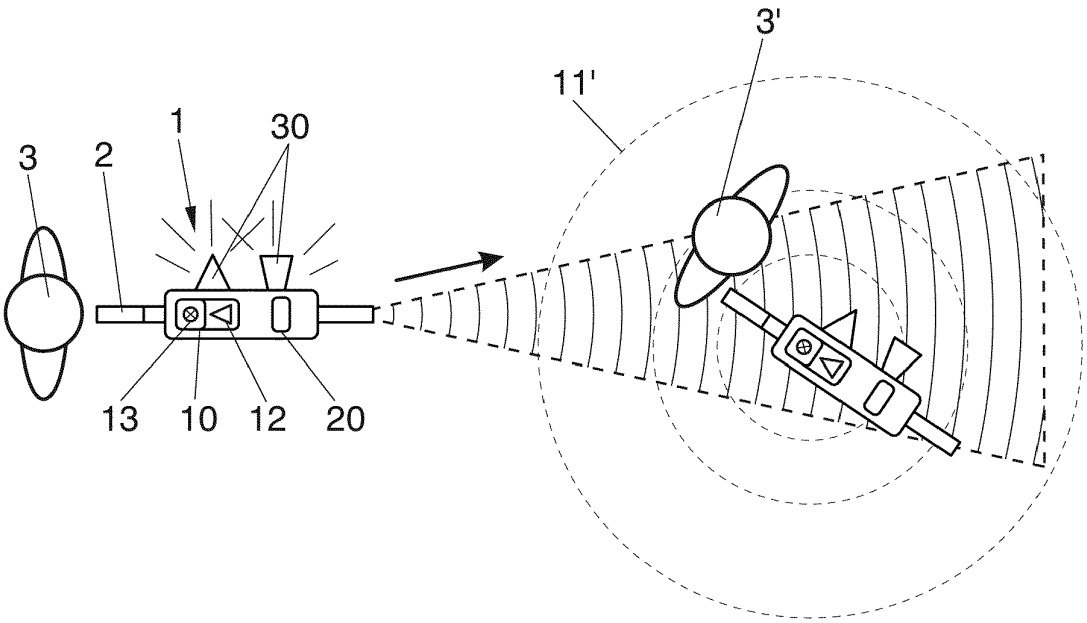

FIG. 2B

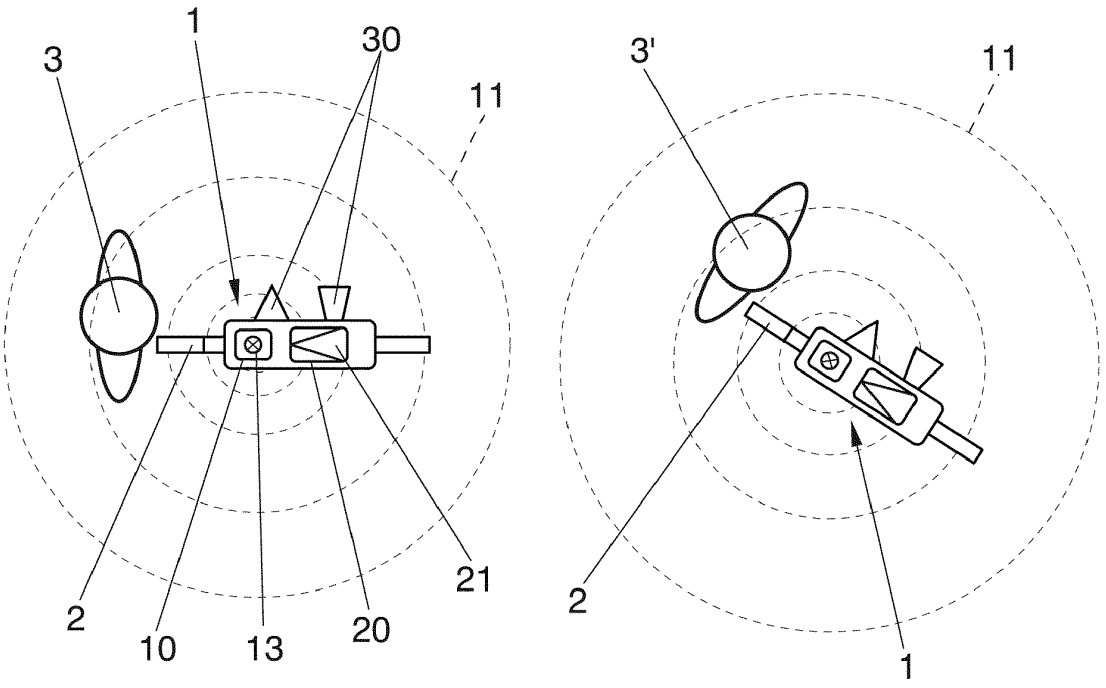

FIG. 3A

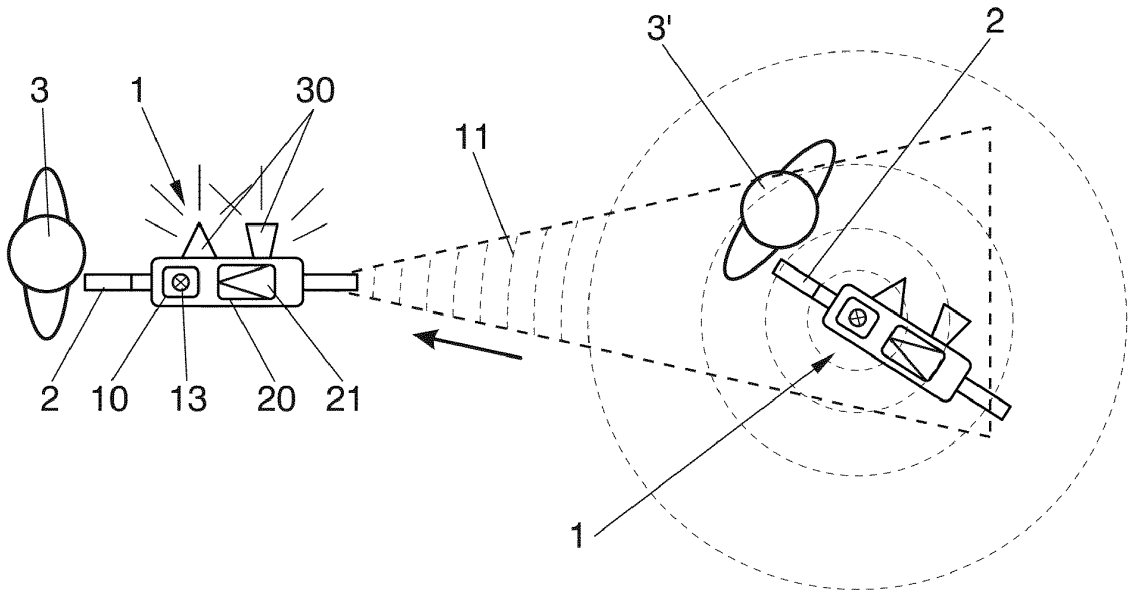

FIG. 3B

INTERNATIONAL SEARCH REPORT

International application No
PCT/ES2013/070336

A. CLASSIFICATION OF SUBJECT MATTER
INV. F41A17/08
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)
F41A

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 practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2012/073178 A1 (IVTSENKOV GENNADII [CA] ET AL) 29 March 2012 (2012-03-29) abstract paragraphs [0005], [0039] - [0046], [0049], [0055] - [0056], [0060], [0062], [0066], [0067] figures 1,2,13,14	1-4,9, 13-17
X	EP 2 151 657 A2 (HONEYWELL INT INC [US]) 10 February 2010 (2010-02-10) abstract paragraphs [0011], [0012], [0019] - [0022], [0024], [0027], [0028], [0037], [0040], [0041]	1,5-12

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[X] Further documents are listed in the continuation of Box C.

[X] 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 application or patent but published on or after the international filing date

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"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
14 October 2013	21/10/2013

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Menier, Renan

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INTERNATIONAL SEARCH REPORT

International application No
PCT/ES2013/070336

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 790 547 A1 (HUMBERT GEORGES [FR]) 8 September 2000 (2000-09-08) abstract page 1, line 9 page 2, lines 3-14 page 4, line 7 - page 9, line 25 figures 1-5	1,3,4,9, 18,19
X	US 2007/069886 A1 (HAYLES JR RALPH E [US] ET AL) 29 March 2007 (2007-03-29) abstract paragraphs [0008], [0018] - [0023], [0041] - [0043] figures 1-4	1-4,9, 13-19
X	US 5 307 053 A (WILLS GEORGE W [US] ET AL) 26 April 1994 (1994-04-26) abstract column 4, line 29 - column 6, line 40 column 6, line 58 column 9, line 28	1,3,9
X,P	WO 2012/172182 A1 (SAKO LTD [FI]; KUPARINEN KARI [FI]) 20 December 2012 (2012-12-20) abstract page 1 page 7, line 17 - page 19, line 26	1,5-12

Form PCT/ISA/210 (continuation of second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/ES2013/070336

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US 5307053 A	26-04-1994	NONE	
WO 2012172182 A1	20-12-2012	NONE	

Form PCT/ISA/210 (patent family annex) (April 2005)