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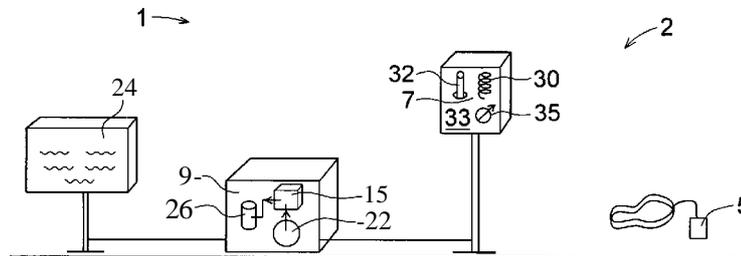


Fig. 1

(57) Abstract: System (1) and method for determining the movements of a user in a swimming pool (3). The system comprises a transmitter (5) adapted to be carried by the user and adapted to transmit an identification signal containing identification information, a receiver (7) adapted to detect an identification signal when the transmitter enters into a certain area (20) around the receiver. The receiver (7) is adapted to be located in vicinity of a swimming pool (3) and to detect identification signals each time the transmitter (5) enters into said area (20). The system further comprises a calculation unit (15) adapted to determine the number of times that the transmitter (5) has entered into said area (20).

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5     **SYSTEM AND METHOD FOR DETERMINING THE MOVE-  
MENT OF A USER IN A SWIMMING POOL**

TECHNICAL FIELD

10     The present invention relates to a system and a method for determining the movement of a user in a swimming pool.

PRIOR ART

15     While swimming in a swimming pool, when the swimmer swims a plurality of lengths or laps with associated turns or turning points, it is often difficult for the swimmer not to lose count of the number of lengths or laps that has been swum. It is accordingly a problem that the user loses count and thereby not reliable can evaluate the result of the training.

20     Furthermore it is difficult for the swimmer to extract statistics over his training. In particular, it is difficult to register the speed for each length or turns that has been swum. It requires usually that a trainer besides the swimming pool monitors the training  
25     and registers the results of the training of the swimmer.

30     Systems comprising a transmitter and a receiver, such as based on RFID-technique, are used in many different application, such as for bus cards, lift cards, passing through toll gates, pay stations, identity pass, theft protection in stores, booking systems, libraries, etc. These applications relates to registration of a user for paying or identification control. On ski competitions, such as Vasaloppet, a system based on RFID-technique for registering the times between the passing of the contestants between different control points on basis of one common starting time have  
35     been used. None of the above applications solves however the

problem of registering and providing statistics on the training of the results of a swimmer in the form of lengths/turns, aggregated distance, speed, etc.

## 5 SUMMARY OF THE INVENTION

The object of the present invention is to provide a system for determining the movements of a user in a swimming pool.

- 10 This object is achieved by a system according to claim 1, the system comprises:
- a transmitter adapted to be carried by the user and adapted to transmit an identification signal containing identification information,
  - 15 - a receiver adapted to detect the identification signal when the transmitter enters into a certain area around the receiver, wherein the receiver is arranged to be located in the immediate vicinity of the swimming pool and to detect the identification signal each time the transmitter enters into said area, and
  - 20 - a calculation unit adapted to determine the number of times the transmitter has entered into said area.

The calculation unit is adapted to determine the number of times that the transmitter and thereby the user has entered into the area around the receiver. The receiver is adapted to detect the  
25 identification signal from the transmitter within the area around the receiver and not to detect the identification signal from the transmitter outside the area.

30 The receiver is arranged to be located in the immediate vicinity of the swimming pool so that the area around the receiver comprises a part of the extension of the swimming pool.

The calculation unit is adapted to determine the number of times  
35 that the transmitter has entered into said area on basis of the detected identification signals.

The identification information comprises information that is connected to a certain user. Thereby, it is assured that the determination of the number of times that the transmitter enters into the area is connected to the user.

The system accordingly provides a determination on the aggregated lengths or turns of movement in the swimming pool by the user.

The system comprises a time unit adapted to determine a time between two on each other subsequent detected identification signals, wherein the calculation unit has an active state during which said determination is executed and a passive state during which said determination is not executed, the calculation unit is adapted to monitor whether the certain time exceeds a certain value and when exceeding said value switch from the active state to the passive state.

By monitoring whether the certain time exceeds the certain value, the system provides an automatic change from the active state to the passive state after that the user has left the swimming pool. Thereby, the user must not explicit instruct the system to terminate the determination.

According to an embodiment of the invention, the calculation unit is adapted, in the passive state, to monitor the detection of the identification signal and to switch from the passive state to the active state when receiving the identification signal.

By means of in the passive state monitoring the detection of the identification signal and to switch from the passive state to the active state at receipt of the identification signal, the system provides an automatic change from the passive state to the active state. Thereby, the user must not explicit instruct the system to start the determination.

According to an embodiment of the invention, the system comprises a plurality of transmitters, which are adapted to be carried by different users, each transmitter is designated to a certain user and is adapted to transmit an identification signal containing identification information connected to the certain user, wherein the calculation unit is adapted to determine the number of times that each transmitter has entered into said area. Thereby, the system provides the possibility to determine the movement of a plurality of users in the swimming pool.

According to an embodiment of the invention, the area around the receiver depends on the detection sensibility of the identification signal of the receiver and the signal strength of the identification signal. Accordingly, the area around the receiver is adapted to be adjusted by either the detection sensibility of the receiver or the signal strength of the identification signal.

According to an embodiment of the invention, the area around the receiver extends less than 5 meter, preferably less than 3 meter. Accordingly, the area around the receiver is adapted to extend so that the area extends over a part of extension of a swimming pool.

According to an embodiment of the invention, the calculation unit is adapted to determine the distance that the user has moved in the swimming pool based on the number of times that the transmitter has entered into said area and information on the length of the swimming pool. The system accordingly provides a determination of the aggregated distance of movement in the swimming pool by the user.

According to an embodiment of the invention, the system comprises a time unit adapted to determine a time between two on each other subsequent detected identification signals, wherein the calculation unit is adapted to determine the speed that the

user has moved in the swimming pool based on the determined time and information on the length of the swimming pool. The system accordingly provides a determination of the speed of the user for each length or turn of movement in the swimming pool.

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According to an embodiment of the invention, the system comprises a presentation unit adapted to present information based on the determination of the movement of the user. By means of the presentation unit the system provides information to the user on the movement of the user in the swimming pool. Preferably, the presentation unit is placed within sight of the user during movement in the swimming pool.

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By means of presentation of the movement of the user in the swimming pool, the user has the possibility to get results from the movement in the swimming pool in an easy manner without the active participation of the user in determining his movements.

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According to an embodiment of the invention, the calculation unit is adapted to perform statistical determination on the movement of the user in the swimming pool, wherein the statistical determination is adapted to be stored in a memory unit and to be presented by the presentation unit.

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According to an embodiment of the invention, the receiver is adapted to transmit a call signal that induces the identification signal of the transmitter when the transmitter is located in said area around the receiver. Thereby, the system allows the transmitter to be a passive unit that induces the identification signal on basis of the call signal. Preferably, the call signal is an alternating magnetic field that generates an electrical voltage of the transmitter that is used for inducing the identification signal.

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According to an embodiment of the invention, the receiver is an RFID-receiver and the transmitter is an RFID-transponder. The

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RFID-transponder is also denoted RFID-tag. An RFID-transponder is a cost effective transmitter that provides and identification signal adapted to be received by the RFID-receiver. Thereby, the RFID-transponder is allowed to be given out to a large number of users at a reasonable cost. According to an embodiment of the invention, the transmitter is a blue-tooth transmitter, ZigBee-transmitter or similar, and the receiver is adapted to detect the identification signal from the corresponding transmitter.

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According to an embodiment of the invention, the transmitter is adapted to transmit an identification signal containing identification information by means of ultra sound through the water in the swimming pool. By means of using water for conducting the signal, detection of the identification signal is facilitated. Furthermore, the use of ultra sound in water allows the user speed to be determined based on Doppler-effect, wherein a more accurate determination of the length/lap times is possible in comparison to if the signal was sent through the air.

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According to an embodiment of the invention, the system comprises a memory unit adapted to save information from said determination so that the information is accessible to the user by Internet. Thereby, the system provides the possibility for the user to evaluate the determination of the movement of the user in the swimming pool after termination of the swimming training and at a different location than at the swimming pool.

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According to an embodiment of the invention, the calculation unit is wireless connected to the Internet. The connection comprises for example WiFi, 3G, GPRS.

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According to an embodiment of the invention, the system comprises a plurality of receivers connected to one or more memory units, wherein each memory unit is in connection to the Internet for presentation of information from the determination. Prefera-

bly, the receiver is arranged at a plurality of swimming pools. Thereby, determination and presentation of results of determination from a plurality of different swimming pools are possible, which swimming pool can be arranged at different swimming facilities on different locations in the world.

According to an embodiment of the invention, the receiver comprises a receiver part adapted to be directed towards a first extension and a second extension of the swimming pool, which first and second extension has a first and a second length, and means of determining the direction of the receiver part, wherein the computing unit is adapted to receive information from the means for determining the direction and to monitor whether the receiver part is directed towards the first or the second extension, and on basis on the first or the second extension use the first length or the second length for determination of the aggregated length.

The first or the second extension of the receiver part relates to that the receiver part is directed towards either a long side or a short side of the swimming pool. By the means for determining the direction, it is determined whether the receiver part is directed in the first or the second extension, wherein the computing unit uses either the first length or the second length. Thereby, the system provides an automatic switch between the first and the second length on basis on the direction of the receiver part. According to an embodiment of the invention, the means for determining the direction comprises a compass, a gyro, etcetera.

The invention also relates to a method for determining the movement of a user in a swimming pool by means of a system according to any of claim 1-8. The method comprises the steps:  
a) a counter is set to zero at detection of an identification signal,

b) the value of the counter is added by one at detection of a subsequent identification signal and the value of a counter is stored, and

5 c) step b is repeated at detection of a further subsequent identification signal.

For each detection subsequent to a first detected identification signal, the counter is added by the value one. Thereby, the number of lengths or laps that the user has moved in the swimming  
10 pool is registered.

The method further comprises the steps:

- monitoring whether a time from the receipt of an identification signal exceeds a first value, and  
15 - if the time from the identification signal exceeds the first value the method is terminated, otherwise the determination is continued. By means of the monitoring, an automatic termination of the method is provided when the user departs from the swimming pool.  
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According to an embodiment of the invention, the method comprises:

- in a step a, a distance is set to zero, and  
- in a step b, the value of the distance is added by a certain  
25 value that depends on the length of the swimming pool and the value of the distance is stored.

For each detection subsequent to a first detection of the identification signal, the distance is added by a value that depends on  
30 the length of the swimming pool. The distance that the user moves between the detection and the identification signal is for example two times the length of the swimming pool or the circumference of the lap, or another alternative embodiment of the length. Thereby, the distance that the user has moved in the  
35 swimming pool is added.

According to an embodiment of the invention the method comprises:

- In a step b, the time is determined between two on each other subsequent identification signals, a speed is determined on basis of the determined time and length of the swimming pool, and the value of the time and the speed is stored.

For each length or lap that defines two on each other subsequent detection of the identifications signal, the length respectively lap speed is determined. Accordingly, the determination is based on the speed of each length or lap.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be explained by reference to the description of different embodiments of the invention and with reference to the appended figures.

Figure 1 discloses a system for determining the movement of a user in a swimming pool according to an embodiment of the invention.

Figure 2 discloses the system arranged for a first use.

Figure 3 discloses the system arranged for a second use.

Figure 4 discloses the system arranged for a third use.

Figure 5 discloses a method for determining the movement of a user in a swimming pool according to a first embodiment of the method.

Figure 6 discloses a method for determining the movement of a user in a swimming pool according to a second embodiment of the method.

#### DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

The invention will hereby be explained with reference to figure 1-6.

Figure 1 discloses a system 1 for determining the movement of a user in a swimming pool 3. The system 1 comprises a transmitter 5, a receiver 7 and a computer unit 9 comprising a calculation unit 15.

The transmitter 5 is arranged to be carried by the user and is adapted to transmit an identification signal that contains identification information that is connected to a certain user.

The receiver 7 is adapted to detect the identification signal when the transmitter 5 enters into a certain area 20 around the receiver 7. The receiver 7 is adapted to be placed in the immediate vicinity of the swimming pool, preferably at the edge of the swimming pool 3, and to detect the identification signal from the transmitter 5 each time the transmitter 5 enters into the area 20 around the receiver 7.

The calculation unit 15 is arranged to determine the number of times the transmitter 7 has entered into the area 20 around the receiver 7. The receiver 7 and the calculation unit 15 are in contact with each other for transmitting information at the receipt of the identification signal from the transmitter 5.

The calculation unit 15 contains information on the length L1, L2 of the swimming pool 3 and is adapted to determine the length that the user moves in the swimming pool 3 based on the number of times that the transmitter 5 has entered into the area 20 around the receiver 7.

The computer unit 9 comprises furthermore a time unit 22 adapted to determine a time between two on each other subsequent detected identification signals and to transmit the determined time to the computer unit 15. The computer unit 15 is adapted determine a speed that the user moves in the swimming pool 3 based on the time between two on each other subsequent

detected identification signals and information on the length L1, L2 of the swimming pool 3. Thereby, it is possible to register the speed for each lap or length of the movement of the user in the swimming pool 3.

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The stored information on the movement of the user in the swimming pool 3 can also be used for statistical calculation of the information. For example, an average speed, such as the speed per 100 meter, even though the length L1, L2 of the swimming pool is shorter than 100 meter, the top speed per length/lap, etcetera, can be determined.

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The calculating unit 15 comprises an active state during which determination of the movement of the user in the swimming pool 3 is executed and a passive state during which determination is not executed. The calculation unit 15 is adapted to monitor whether the time from a detected signal exceeds a certain value and at such exceeding of the certain value switch from the active state to the passive state.

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The calculation unit 15 is adapted, in the passive state, for each user, to monitor the detection of an identification signal and switch from the passive state to the active state at receiving of the identification signal. Accordingly, the computing unit 15 comprises a passive and an active state for each user, wherein the system 1 is adapted to execute determination of the movements of a plurality of users in the swimming pool 3.

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The system 1 comprises also a presentation unit 24 adapted to present information based on the determination of the movement of the user. Accordingly, the presentation of the presentation unit 24 for example involves the number of length, total length, speed of the last lap, etcetera, of the user.

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Preferably, the transmitter 5 is a passive unit that is activated by means of that the transmitter 7 transmits a call signal that in-

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duces the identification signal of the transmitter 5 when the transmitter 5 is located within the area 20 around the transmitter 7. Preferably, the receiver 7 is an RFID-receiver and the transmitter 5 is an RFID-transponder.

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According to an embodiment of the invention, the transmitter is a blue-tooth transmitter, ZigBee-transmitter or similar, and the receiver is adapted to detect the identification signal from the corresponding transmitter. According to an embodiment of the invention the transmitter is a blue-tooth-transmitter, ZigBee-transmitter or similar.

10

The computer unit 9 further comprises a memory unit 26 adapted to store information from the movement of the user in the swimming pool 3. Preferably the calculation unit is wireless connected to the Internet. The connection comprises for example WiFi, 3G, GPRS, wherein the information from the determination is stored so that the information is accessible for the user by Internet. Thereby, the memory unit 26 is accessible, for example by Internet after that the user has terminated the swim training.

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According to an embodiment of the invention, the call signal that is induced by the receiver 7 is an alternating magnetic field, wherein the receiver 7 comprises a coil 30 adapted to generate the alternating magnetic field. The receiver 7 comprises also an antenna 32 adapted to detect the identification signal from the transmitter 5, when the transmitter 5 is located within the area 20 around the transmitter 7.

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According to an embodiment of the invention, the receiver 7 comprises a receiver part 33 adapted to be directed towards a first extension and a second extension of the swimming pool 3, wherein the swimming pool 3 has a first length  $L_1$  and a second length  $L_2$ . The receiver 7 comprises means 35 for determining the direction of the receiver part 33 and to transmit information

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on the direction of the receiver part 33 to the calculation unit 15, wherein the calculation unit 15 is adapted to determine the distance and the speed of the movement of the user in the swimming pool 3 on basis on the first length L1 or the second length L2.

Preferably the means 35 for determining the direction of the receiver part 33 comprises a compass, a gyro, or similar devices.

Figure 2 discloses the system 1 according to a first embodiment of the invention. The system 1 is arranged for a first use. The system 1 comprises a receiver 7 at the short side of the swimming pool 3. By the means 35 for determining the direction of the receiver part 33, the orientation of the receiver part 33 that induces the calculation unit 15 to use length L1 for the determination is identified. Thereby, the calculation unit 15 uses a first length L1 of the swimming pool 3 for determining the movement of the user in the swimming pool 3, wherein the length of a lap/length relates to two times L1.

Figure 3 discloses the system 1 according to a first embodiment of the invention. The system 1 is arranged for a second use. The system 1 comprises two receivers 7, each receiver 7 is located at each short side of the swimming pool 3. Both receivers 7 are connected to a common computer unit 9 comprising the calculation unit 15. Thereby, the calculation unit 15 uses a first length L1 of the swimming pool 3 for determining the movement of the user in the swimming pool 3, wherein the length of a lap/length relates to L1.

Figure 4 discloses the system 1 according to a second embodiment of the invention. The system 1 is arranged for a third use. System 1 comprises a receiver 7 that is located at the long side of the swimming pool 3. Preferably, the direction of the receiver part 33 is identified by the means 35 for determining the direction of the receiver part 33 and information on the direction of

receiver part 33 induces the calculation unit 15 to use the second length L2 for determining the movements of the user in the swimming pool 3. Thereby, the calculation unit 15 uses the second length L2 of the swimming pool 3 for determining the movement of the user in the swimming pool 3, wherein the length of a lap/length relates to two times L2.

Figure 5 discloses a flow chart of a method for determining the movement of a user in a swimming pool 3. Preferably, the method is used for determining the movement of a plurality of users, wherein the method is used for each user.

Before the method is started, a connection is required between the transmitter 5 and a specific user. At the connection, information on the user, such as name parameters, user name, password, etcetera, is inserted.

The method is initiated in a step 110 in which a determination is executed on whether a detection signal from the transmitter 5 has been received by the transmitter 7. The determination of the receiving of the detection signal is executed continuously until a detection signal has received by the receiver 7.

At receiving of the detection signal, in a step 120, a counter is set to a value zero. Thereafter, in a step 130, a determination whether a subsequent detection signal from the transmitter 5 has been received by the receiver 7 is performed. The determination on whether the subsequent detection signal has been received by the receiver continues until the subsequent detection signal has been received. At receiving of the subsequent detection signal, in a step 140, the counter is added by one, and in a step 150 the value of the counter is stored. After step 150, the determination continues on receipt subsequent detection signal according to step 130.

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Figure 6 discloses a method for determining a movement of a user in a swimming pool according to a second embodiment of the method. Preferably, the method is used for determining the movement of a plurality of users, wherein the method is used for each user. The method differs from the method disclosed in figure 5 by means of the following:

In a step 120, the distance is set to zero. In a step 140, the distance is added on basis of the length L1, L2 of the swimming pool 3. In a step 150, the value of all determination is stored, that is the value of a counter, the distance and the speed, and possible further determinations.

The determination of the speed occurs by means of two further steps in method step 42 and 44. In step 42 the determination of the time between two on each other subsequent identification signal is executed. In step 144, the speed of the movement of the user in the swimming pool is determined on basis on the determined time and length L1, L2 of the swimming pool.

The in figure 6 disclosed embodiment also comprises a monitoring step 160, where a determination is performed on whether a time from the receiving of an identification signal exceeds a certain value. At exceeding of the time with a certain value, the method is restarted, otherwise the receiving of subsequent detection signal according to step 130 is monitored.

The invention also relates to a device 2 for determining the movement of a user in a swimming pool 3. The device 2 comprises the receiver 7 and a calculation unit 15. The invention also relates to a transmitter 5 that is adapted to be carried by the user and to transmit the identification signal to the receiver 7.

Preferably the information in above method is stored according to previous description for the system 1 according to figure 1.

Accordingly, the results from the determination are provided after that the user has finished swimming training.

5 The components in above system 1 and device 2 can be separated units or combined to a common unit.

The invention is not limited to the disclosed embodiments but can be modified within the frame work of the subsequent patent claims.

## CLAIMS

1. System (1) for determining the movement of a user in a swimming pool (3), the system (1) comprises
- 5 - a transmitter (5) adapted to be carried by the user and adapted to send an identification signal containing identification information,
- a receiver (7) adapted to detect the identification signal when the transmitter (5) enters into a certain area (20) around the receiver (7), wherein the receiver (7) is adapted to be located in the immediate vicinity of the swimming pool (3) and to detect the identification signal each time the transmitter (5) enters into said area (20), and
- 10 - a calculation unit (15) adapted to determine the number of times that the transmitter (5) has entered into said area (20), characterized in that
- the system (1) comprises a time unit (22) adapted to determine a time between two on each other subsequent detected identification signals, wherein the calculation unit (15) has an active state during which said determination is executed and a passive state during which said determination is not executed, the calculation unit (15) is adapted to monitor whether the certain time exceeds a certain value and at exceeding of said value switch from the active state to the passive state.
- 25
2. System (1) according to claim 1, wherein the calculation unit (15) is adapted to determine the distance that the user has moved in the swimming pool (3) based on the number of times that the transmitter (5) has entered into said area (20) and information on the length (L1 , L2) of the swimming pool (3).
- 30
3. System (1) according to any of claim 1 or 2, wherein the system (1) comprises a time unit (22) adapted to determine a time between two on each other subsequent detected identification signal, wherein the calculation unit (15) is adapted to determine the speed that the user has moved in the swimming pool (3)
- 35

based on the determined time and information on the length (L1 , L2) of the swimming pool (3).

4. System (1) according to claim 1, wherein the calculation unit  
5 (15) is adapted to in the passive state monitor the detection of the identification signal and to switch from the passive state to the active state at receipt of the identification signal.
5. System (1) according to any of the previous claims, wherein  
10 the system (1) comprises a presentation unit (24) adapted to present information based on the determination of the movement of the user.
6. System (1) according to any of the previous claims, wherein  
15 the receiver (7) is adapted to transmit a call signal that induces the identification signal from the transmitter (5) when the transmitter (5) is located within said area (20) around the receiver (7).
- 20 7. System (1) according to any of the previous claims, wherein the receiver (7) is an RFID-receiver and the transmitter (5) is an RFID-transponder.
8. System (1) according to any of the previous claims, wherein  
25 the system (1) comprises a memory unit (26) adapted to store information from said determination so that the information is accessible for the user by Internet.
9. Method for determining the movement of a user in a swim-  
30 ming pool (3) by means of a system (1) according to any of claim 1-9, wherein the method comprises the steps:
  - a) a counter is set to zero at detection of an identification signal,
  - b) the value of the counter is increased by one at detection of a subsequent identification signal and the value of the counter is  
35 stored, and

c) step b is repeated at detection of a further subsequent identification signal,

characterized in that the method further comprises:

- 5 - monitoring whether a time from the receiving of an identification signal exceeds a certain value, and
- terminating the method if the time from receiving the identification signal exceeds the certain value, otherwise continuing the determination.

10 10. Method according to claim 9, wherein the method comprises in a step a, a distance is set to zero, and  
In a step b, the value of the distance is added with a certain value that depends on the length (L1 , L2) of the swimming pool (3) and the value of the distance is stored.

15 11. Method according to any of claim 9 or 10, wherein the method comprises:  
In a step b, determining a time between two on each other subsequent identification signals, a speed is determined on basis of  
20 the determined time and the length (L1 , L2) of the swimming pool (3), and the value of the time and the speed is stored.

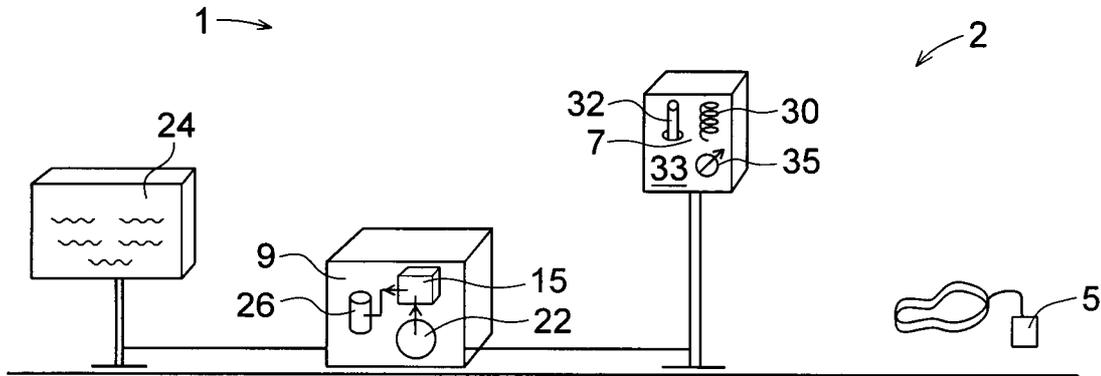


Fig. 1

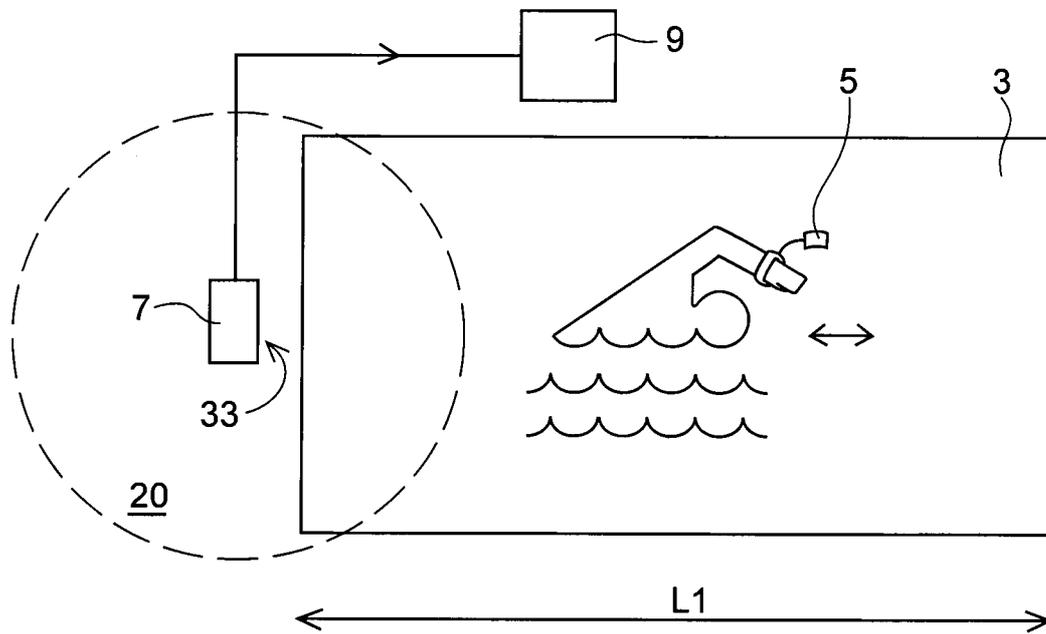


Fig. 2

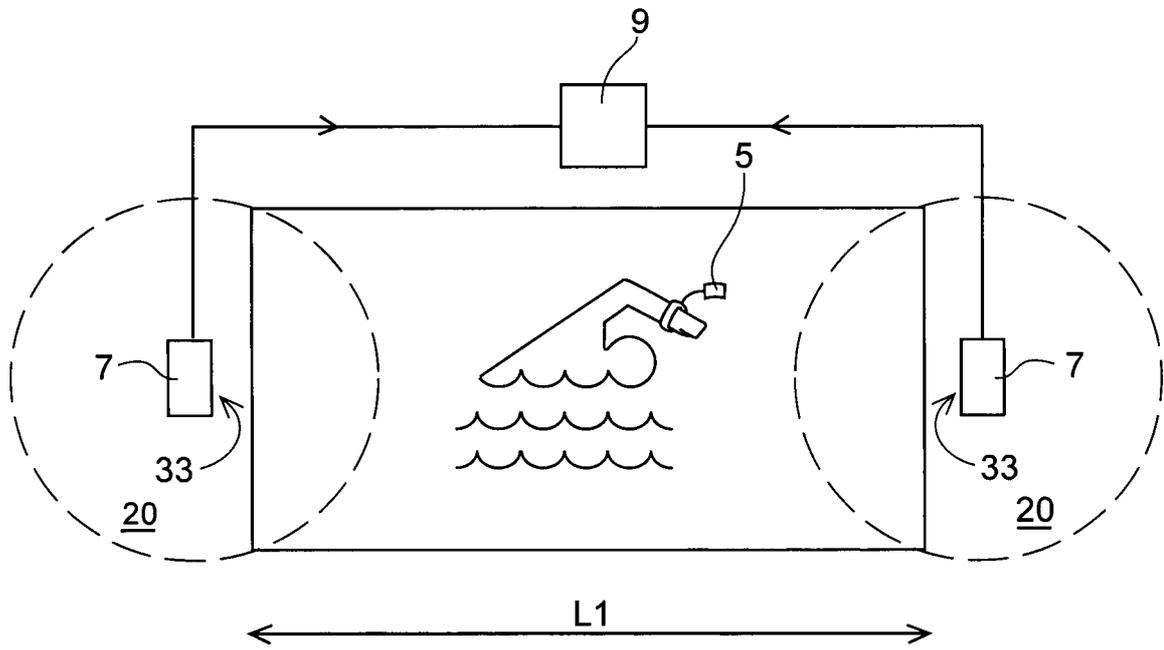


Fig. 3

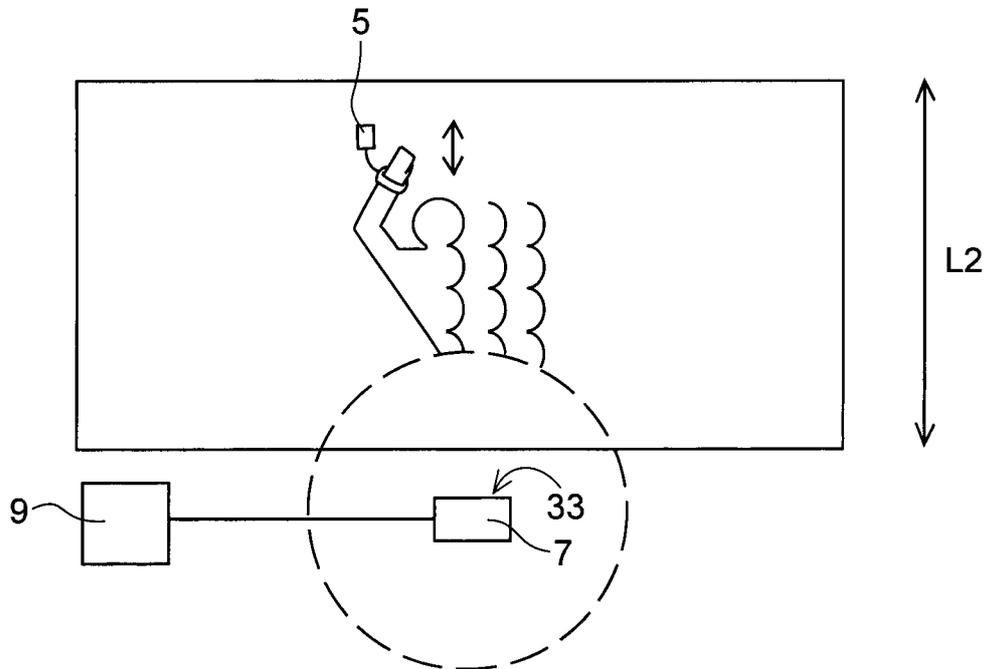


Fig. 4

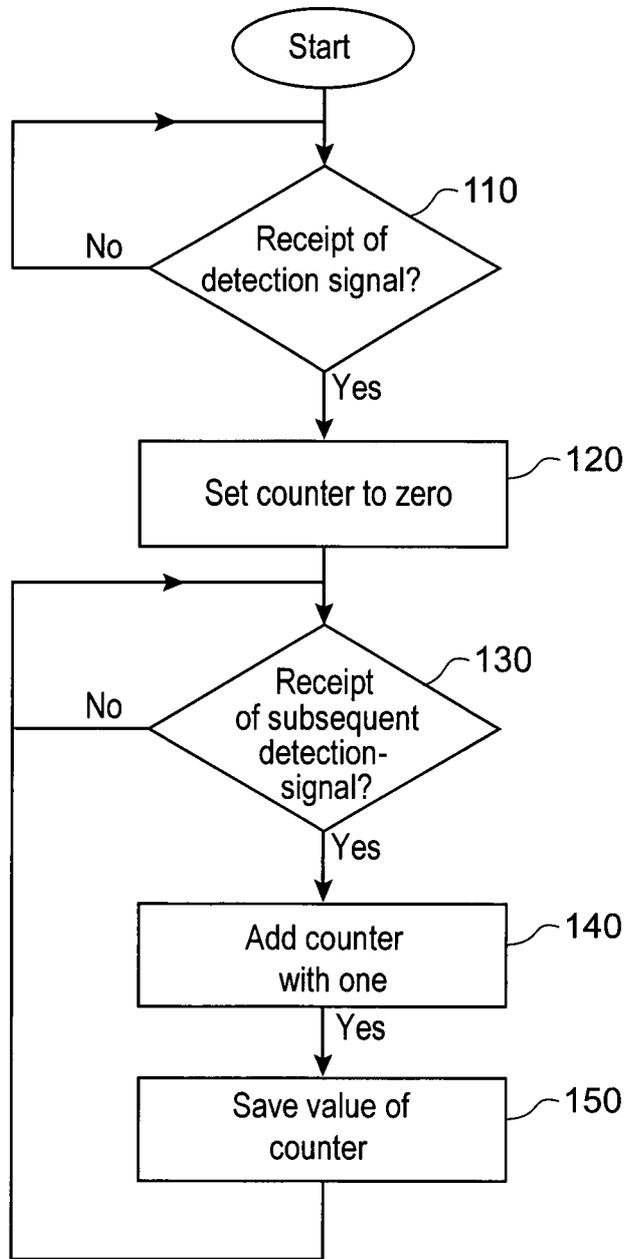


Fig. 5

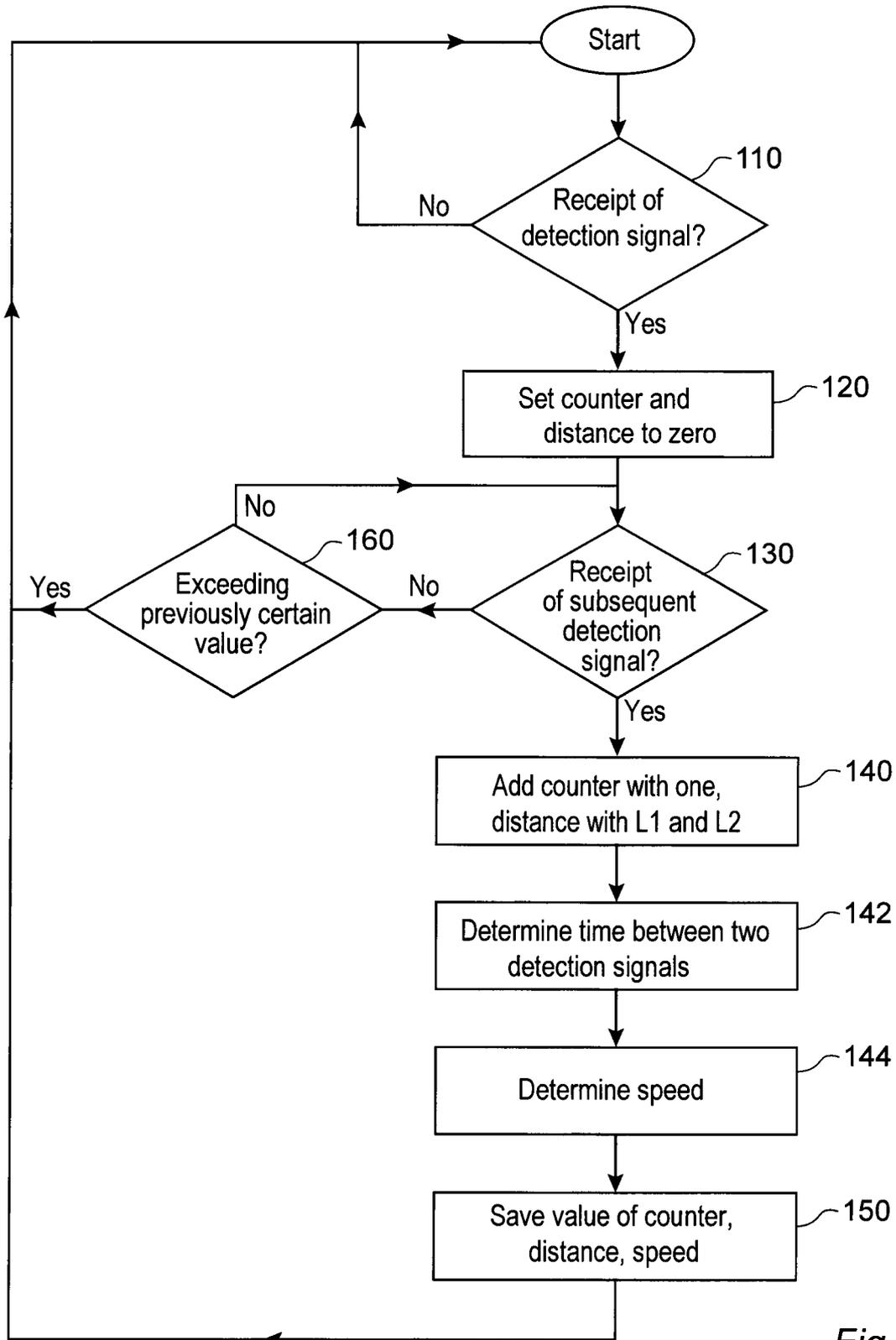


Fig. 6

**INTERNATIONAL SEARCH REPORT**

International application No.  
PCT/SE201 2/050280

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC: see extra sheet

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)

IPC: A63B, G01 C, G06M, G07C

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

SE, DK, FI, NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

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**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2468840 A (JOY NICHOLAS ET AL), 29 September 2010 (2010-09-29); whole document; figure 1 --	1-11
A	US 5 125 010 A (LEE LEWIS C ET AL), 23 June 1992 (1992-06-23); abstract; column 1, line 59 - column 2, line 2; column 2, line 30 - line 41; column 4, line 21 - line 31; column 6, line 1 - line 45; column 7, line 34 - column 8, line 41; figures 1,4 --	1-11
A	US 4823367 A (KREUTZFELD ROBERT J), 18 April 1989 (1989-04-18); abstract; column 4, line 42 - line 55; figures 1-3 --	1-11

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Date of the actual completion of the international search

29-06-2012

Date of mailing of the international search report

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## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/SE201 2/050280

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 20090221403 A 1 (CHAN RAYMOND ET AL), 3 September 2009 (2009-09-03); paragraphs [0038], [0042], [0061]; claim 8 --	1-11
A	WO 201 0 1 13 135 A 1 (DAYTON TECHNOLOGIES LTD ET AL), 7 October 201 0 (201 0-1 0-07); abstract; page 12, line 6 - line 13 --	1-11
A	US 201 00292050 A 1 (DIBENEDETTO CHRISTIAN ET AL), 18 November 201 0 (201 0-1 1-18); abstract; paragraphs [0029], [0056] --	1-11
A	US 581 2049 A (UZI MOSHE), 22 September 1998 (1998-09-22); abstract; column 10, line 54 - line 67; figures 1,2 -- -----	1-11

**Continuation of:** second sheet

**International Patent Classification (IPC)**

**A63B 69/12** (2006.01 )

**A63B 71/06** (2006.01 )

**G01C 22/02** (2006.01 )

**G07C 1/22** (2006.01 )

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Information on patent family members

International application No.

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