



(51) International Patent Classification:

A63B 71/06 (2006.01)

A63B 24/00 (2006.01)

A63B 22/00 (2006.01)

(21) International Application Number:

PCT/EP2019/085615

(22) International Filing Date:

17 December 2019 (17.12.2019)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

1820553.4

17 December 2018 (17.12.2018) GB

(72) Inventor; and

(71) **Applicant:** HAMILTON, Anthony Carl [GB/GB]; First Floor Offices, 99 Bancroft, Hitchin SG5 1NQ (GB).

(74) **Agent: ROBERTS, David, Glyn, Gruffydd;** PAGE WHITE & FARRER, Bedford House, John Street, London Greater London WC1N 2BF (GB).

(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP,

KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH,

kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

- with international search report (Art. 21(3))

(54) Title: ROWING MACHINE SYSTEM

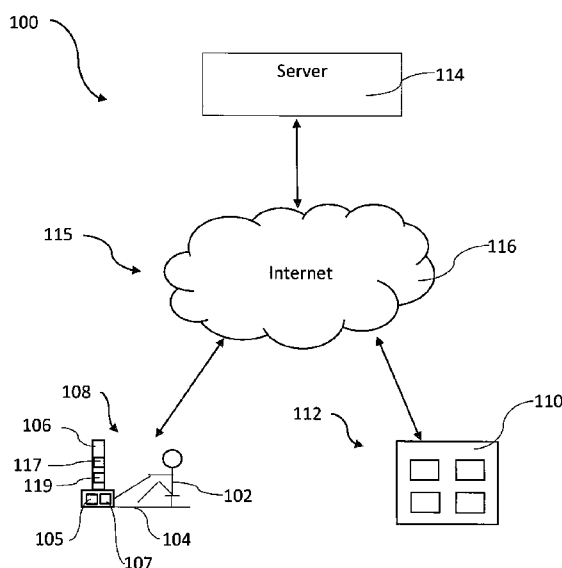


Fig. 1

(57) Abstract: There is disclosed a rowing machine. The rowing machine comprises a communication module enabling the rowing machine to communicate with a server in a communication network. The rowing machine further comprises a display for displaying visual information received from the server, the visual information enabling a user to remotely participate in a rowing activity.

Rowing machine system

This application relates to a rowing machine, a rowing machine system and associated method and computer program.

5

Background

Rowing machines are typically used in the home or gym to simulate the action of rowing a rowing-boat. Rowing machines are popular for fitness and strength training.
10 Rowing machines are also used by high-level rowers for conditioning, in addition to on-water training.

An example of a rowing machine is the Concept 2®. The Concept 2® rowing machine comprises a slidable seat portion, a footplate, and a handle portion connected to a
15 resistance mechanism by a cable. A user can simulate a rowing action on the rowing machine by pulling on the handle portion and pushing against the footplate, causing the seat portion to reciprocate back and forth. The resistance mechanism is intended to recreate the feeling of moving an oar through water during a rowing stroke.

20 Concept 2® rowing machines are also known to provide information feedback to a user during use, for example information such as speed, distance travelled, calories burned etc.

Rowing machines are a popular form of exercise, in particular as they provide an upper
25 body, lower body, and cardiovascular workout simultaneously.

Although rowing on a rowing machine can be carried out by a user in a solitary fashion, the present application identifies that the effectiveness and enjoyment of a workout can be improved if a user is provided with visual stimulation or motivation during a
30 rowing workout session. Moreover, the present application identifies that the experience of using the rowing machine should give an accurate sensation of being “on-the-water”.

Summary of invention

5 According to a first aspect there is disclosed a rowing machine comprising: a communication module enabling the rowing machine to communicate with a server in a communication network; and a display for displaying visual information received from the server, the visual information enabling a user to remotely participate in a rowing activity.

10 According to some examples, the rowing machine comprises one or more sensors for obtaining performance information of the user during the rowing activity.

According to some examples, the communication module is configured to communicate the performance information with the server.

15 According to some examples, the communicating the performance information with the server enables the user to participate with and/or compete against other users remotely participating in the rowing activity.

According to some examples, the performance information comprises information obtained from a resistance mechanism of the rowing machine.

20 According to some examples, the performance information is obtained from the resistance mechanism for determining a rowing speed of the user.

According to some examples, the resistance mechanism comprises independent left-hand and right-hand resistance mechanisms.

25 According to some examples, the communication module is configured to communicate performance information of the left-hand and right-hand resistance mechanisms to the server, for enabling the user to emulate steering during the rowing activity.

According to some examples, the rowing machine comprises a pitching mechanism for transferring a pitching motion to the user during use of the rowing machine, and the performance information comprises information of the pitching motion.

According to some examples, the rowing machine comprises a rolling mechanism for transferring a rolling motion to the user during use of the rowing machine, and the performance information comprises information of the rolling motion.

5 According to some examples, the rowing activity comprises emulating rowing at a location which is displayed on the display, the obtained performance information being usable for determining one or more parameters of a rowing performance at the emulated location.

According to some examples, the one or more parameters comprising a drag parameter.

10 According to some examples, the rowing activity being selectable via the display of the rowing machine.

According to some examples, the rowing activity comprising a rowing exercise class taking place at a location remote from the rowing machine.

15 According to some examples, the location of the rowing exercise class comprises a studio or a gym.

According to some examples, the rowing activity comprises a session with a personal trainer.

According to some examples, the visual information comprises a live video feed.

20 According to a second aspect there is provided a system comprising: a server within a communication network; a rowing machine communicatively connected to the server via the communication network; the server configured to provide visual information to be displayed on a display of the rowing machine; the visual information enabling a user of the rowing machine to remotely participate in a rowing activity.

25 According to some examples, the server is configured to receive performance information of the user during the rowing activity, the performance information obtained from one or more sensors of the rowing machine.

According to some examples, the performance information received at the server enables the user to participate with and/or compete against other users remotely participating in the rowing activity.

5 According to some examples, the performance information comprises information obtained from a resistance mechanism of the rowing machine.

According to some examples, the performance information obtained from the resistance mechanism for determining information of a rowing speed of the user.

10 According to some examples, the server is configured to receive performance information of independent left-hand and right-hand resistance mechanisms of the rowing machine, and the server configured to use the information of independent left-hand and right-hand resistance mechanisms for determining steering information, so as to enable the user to emulate steering during the rowing activity.

15 According to some examples, the rowing machine comprises a pitching mechanism for transferring a pitching motion to the user during use of the rowing machine, and the performance information comprises information of the pitching motion.

According to some examples, the rowing machine comprises a rolling mechanism for transferring a rolling motion to the user during use of the rowing machine, and the performance information comprises information of the rolling motion.

20 According to some examples, the rowing activity comprises emulating rowing at a location which is displayed on the display, the received performance information being used by the server for determining one or more parameters of a rowing performance at the emulated location.

According to some examples, the one or more parameters comprises a drag parameter.

25 According to some examples, the server is configured to use the drag parameter to adjust a determined speed of motion.

According to some examples, the server is configured to make the performance information available for use by other users.

According to some examples, the server is configured to make the performance information available such that a user can race or train against an earlier performance.

According to some examples, the server is configured such that, when making earlier performance information available for racing or training against, actual pace
5 information of the earlier performance is used.

According to some examples, the server configured to provide audio information to be played to the user of the rowing machine.

According to some examples, the rowing activity being selectable via the display of the rowing machine.

10 According to some examples, the rowing activity comprises a rowing exercise class taking place at a location remote from the rowing machine.

According to some examples, the location comprises a studio or a gym.

According to some examples, the rowing activity comprises a workout session or a race with another user.

15 According to some examples, the rowing activity comprises a session with a personal trainer.

According to some examples, the system enables a user to select a particular personal trainer from a plurality of available personal trainers via the display.

20 According to some examples, the server configured to cause a manner of display of the visual information in dependence on a determined speed of rowing on the rowing machine.

According to some examples, the visual information comprising a live video feed.

According to some examples, the visual information comprising stored and/or archived video information.

25 According to some examples, the audio information comprises live audio information or stored audio information.

According to some examples, the system comprises two or more rowing machines communicatively connected to emulate rowing as a crew.

According to some examples, the display comprises a virtual reality display.

According to a third aspect there is disclosed a method comprising: providing visual information to be displayed on a display of a rowing machine from a server, the rowing machine connected to the server via a communication network; the visual information enabling a user of the rowing machine to remotely participate in a rowing activity.

According to some examples, the method comprises providing audio information to the user.

According to a fourth aspect there is provided a computer program comprising instructions for causing an apparatus to perform at least the following: providing visual information to be displayed on a display of a rowing machine from a server, the rowing machine connected to the server via a communication network; the visual information enabling a user of the rowing machine to remotely participate in a rowing activity.

Brief description of Figures

Figure 1 schematically shows a system according to an example.

Figure 2 shows a rowing machine according to an example.

Figure 3 schematically shows a method according to an example.

Detailed description

As has been briefly discussed above, the present application identifies that although rowing on a rowing machine can be carried out by a user in a solitary fashion, the effectiveness and enjoyment of a workout can be improved if a user is provided with visual stimulation or motivation during a rowing workout session. Moreover, the present application identifies that the experience of using the rowing machine should give an accurate sensation of being “on-the-water”.

More particularly, the present application has identified that it would, in some examples, be beneficial to enable a user of a rowing machine to remotely connect to

a rowing exercise class and/or to a personal trainer from a location that is convenient for the user. For example, the user may have their rowing machine located at their home or their office, and be able to link to a studio or gym to participate in instructor-led and/or group activity. The rowing machine may be provided with a display screen for displaying visual information (e.g. video-feed) facilitating the remote access. Audio information may similarly be provided to the user via one or more speakers. In some examples the display screen and /or speakers may be integrated in to the rowing machine. In other examples the display screen and/or speakers are detachable from or separate items from the rowing machine. In some examples the rowing machine enables a user to row at a “virtual location”. In some examples the virtual location does also exist in reality, and is re-created on the display so that the user feels like they are at that location. For example, a virtual location provided on the display could be the river Thames in London, so that the user has a perception of rowing down the Thames. The virtual location could alternatively be a fictional location created for display on the rowing machine display. In some examples the rowing at the virtual location is combined with the aspects of the remote on-line class. For example, a coach or personal trainer could conduct a class with one or more users who “meet” at a virtual location.

In some examples, users may subscribe to a service providing the remote access. For example, a user may pay a monthly fee for access to one or more of the services that are explained in more detail below. Accordingly, a user does not have to suffer the inconvenience and higher expense of attending a gym or studio in order to take part in an engaging rowing activity, such as a class.

Figure 1 schematically shows a system 100 according to an example. A user 102 is schematically shown using a rowing machine 104. The rowing machine 104 comprises a visual display 106. The visual display 106 may comprise an integral display of the rowing machine 104, or may comprise a removable display such as a smart-phone or tablet. The user 102 may be located at a location 108 such as the user’s home or the user’s office. The user 102 may be considered a “remote user”. It will be understood that the system 100 may comprise many such remote users, but for the purposes of explanation only one is shown in Figure 1. By “remote user” is meant that the user 102 (and rowing machine 104) may be physically located remote from (i.e. at a

different location) to where an exercise class which the user is participating in is being hosted.

Aspects of a rowing machine suitable for operating in system 100 are described in more detail with respect to Figure 2. In brief, the rowing machine 104 comprises a communication module 105 which enables the rowing machine 104 to communicate with the server 114 in a communication network. The rowing machine 104 also comprises a display 106 for displaying visual information received from the server 114, the visual information enabling the user 102 to remotely participate in a rowing activity.

The location 108 of the user 102 may be considered a first location. A second location is shown at 112. The second location 112 is different from the first location 108. The second location may comprise a building 110. The building 110 may comprise, for example, a gym or exercise studio.

A server is schematically shown at 114. The server 114 may comprise, for example, a cloud server or the like. Server 114 may communicate wirelessly with rowing machine 104 via a communication network 115 which may include the Internet 116. To this end it will be understood that the rowing machine 104 comprises suitable software and hardware for Internet connection (whether directly or indirectly). The server 114 may also communicate with computing apparatus at building 110 via Internet 116. In some examples the server 114 is located remote from the rowing machine 104. For example, the server 114 may be located in the cloud. In some examples the server 114 may be located proximate to the rowing machine 104 e.g. at location 108. In some examples, the server 114 may be comprised in the rowing machine 104.

Thus, according to some examples, the system 100 comprises a server 114 within a communication network. For example, the communication network comprises Internet 116 and other known wireless and/or wired connections. A rowing machine 104 is communicatively connected to the server 114 via the communication network 115. The server 114 is configured to provide visual information to be displayed on a display 106 of the rowing machine 104. The visual information enables a user 102 of the rowing machine 104 to remotely participate in a rowing activity.

According to some examples the rowing activity is selectable via a user interface of the display 106 of the rowing machine 104. For example, the display 106 may comprise a touchscreen and the user can select their desired rowing activity by pressing a selected icon on the touchscreen.

According to some examples the rowing activity comprises a rowing exercise class taking place at a location remote from the rowing machine. For example, user 102 may “virtually” participate in a group rowing class taking place at building 110, whereby video information may be provided from building 110 to display 106 via server 114. The video information may be a live video-stream, or may alternatively be stored information of an earlier rowing class. This enables user 102 to take place in a class at a time that is suitable for user 102. In other words, it may be considered that examples enable internet-based connection to a gym or the like, whereby rowing instructions and/or fitness advice may be provided by qualified rowing instructors.

According to an example the rowing activity comprises a workout session or a race with another user. The other user may also be “remote”. That is the system 100 may enable remote users to connect with each other to enhance their training, and the system 100 is not limited to enabling a remote user to connect to a group activity at a gym or studio.

According to an example the rowing activity comprises a session with a personal trainer. This way a remote user 102 can have a personal training session without the user 102 or the personal trainer having to travel to each other. According to some examples, the system enables a user 102 to select a particular personal trainer from a plurality of available personal trainers via the display 106.

According to some examples, the rowing activity comprises using the visual information from the server 114 to emulate rowing at a real-world location. For example, the server 114 may provide visual information to be displayed on display 106 of the river Thames, enabling user 102 to virtually row down the Thames. In some examples, multiple users may also connect at the same time, so that the multiple users can virtually row together on the Thames. Of course, other selectable locations may

be provided. Via the Internet, user 102 may be able to see or discover other users who are online at the same time, and invite or be invited to row with them. This provides a social aspect to the system in order to make training more enjoyable and ultimately more effective. In some examples the display 106 may display other users to each other, so that all users have a feeling of rowing together. In addition to the social aspect this could additionally or alternatively provide a competitive aspect.

In some examples the display 106 may comprise a virtual reality (VR) display, such as a VR headset. This provides an immersive experience to the user. For example, while virtually rowing down the Thames, the VR headset may enable the user 102 to see other users and to view the sights on and surrounding the Thames.

In some examples a user of the rowing machine 104 can virtually “turn” the machine (or boat as displayed on the display 106). To this end in some examples the rowing machine comprises individual resistance mechanisms (for example flywheels). The individual resistance mechanisms may be connected to respective individual handle portions. In some examples the individual resistance mechanisms may comprise a left-hand resistance mechanism and a right-hand resistance mechanism. Therefore, in some examples a user can virtually turn the “boat” by pulling harder on one handle than on the other handle. When a location is shown on display 106 (e.g. Thames), the video output may change depending on which way the boat is facing in the water, and/or may be updated as the user steers through the water. According to some examples, a user can steer or turn by either taking a stronger/harder stroke on one side compared to the other, and/or by taking a longer stroke than on the other side. In some examples taking a stronger/harder stroke can be achieved by a user pushing harder with their legs. In some examples taking a stronger/harder stroke can be achieved by pulling harder on one arm than the other, on the required side. In some examples, taking a longer stroke on one side than the other can be achieved by reaching further forward on one side at the beginning of a stroke, or pulling through further into the body at the end of the stroke. Or, taking a longer stroke on one side can likewise be effectively achieved by shortening the length of the stroke on the other side.

According to some examples, a manner of display of the visual information is

dependent on a speed or pace of rowing on the rowing machine 104. Using the river Thames example again for the purposes of explanation, the scenery will move on the display 106 at a speed proportional to a speed the user 102 is rowing at e.g. the faster the user 102 is rowing then the faster the scenery will move past on the display. In some examples, data (e.g. performance information) obtained from the rowing machine will be used by the server 114 when causing the display of the “virtual river” or virtual location. For example, this may be achieved by the rowing machine communicating the data with the server 114, which server may store the information of the virtual location. The server 114 may then calculate boat speed, for example in mph or m/s, to control the speed of the display. In some examples, data (e.g. performance information) taken from left and right-hand independent resistance mechanisms and/or handles is used by the server 114 to determine a direction of the boat at the virtual location. The server 114 may then cause the display 106 to display a route taken by the user. This enables a user to explore a virtual location, in some examples. The route taken may in some examples be displayed with a line on a map. In some examples a virtual wake following the boat may also be displayed. In some examples the user can choose to view the boat and environment from different views. For example, the different views may include: within the boat; behind the boat; in front of the boat; on top of the boat.

As will be explained in more detail further below, the rowing machine 108 may comprise a pitching mechanism which enables a pitching motion to be transferred to the user during use of the rowing machine. In some examples, the rowing machine 108 may additionally or alternatively comprise a rolling mechanism enabling a rolling motion to be transferred to the user during use of the rowing machine. In some examples, data (e.g. performance information) pertaining to pitching and/or rolling may be obtained by the server 114 from the rowing machine 108, and then translated in to corresponding pitching and/or rolling motion on the display 106.

In some examples, the server may be considered to determine at least one parameter based on the performance information received from the rowing machine. For example, the at least one parameter may comprise speed, or direction of motion.

In some examples, the server 114 is configured to determine a drag effect caused by

the pitching and/or rolling. Thus, drag may also be considered one of the at least one parameters determined by the server 114. In some examples, the level of determined drag may be used by the server 114 to adjust a rowing speed displayed to the user. For example, the more drag, the slower the rowing speed. In some examples, the user's speed of movement on the display (e.g. at the virtual location) may be adjusted accordingly.

In some examples, performance information may be obtained by server 114 from multiple users who are rowing together as a virtual crew (e.g. in a two, a four or an eight). For example, pitching and/or rolling information may be obtained from the multiple users and combined at the server 114, for example to determine a combined drag effect. The server 114 can then determine how this will affect the crew boat, and cause information to be outputted to the users accordingly (e.g. speed information that is output; visual display of the environment on the display).

In some examples, multiple different users can interact at a virtual location. For example, different users can meet and row together at the virtual location.

According to some examples the server 114 is configured to receive user-performance information received from the rowing machine 104. The server 114 may also store such information. For example, information pertaining to any one or more of the following may be stored: stroke rate; resistance; workout duration; average speed; calories burned; pace; virtual location selected. This enables a "ghost" session to be saved. That is, it may be considered that user 102 is able to upload performance information for saving at server 114.

According to some examples the server 114 is configured to make the user-performance information available for use by other users (or indeed for re-use by a same user). This enables users to compete against such "ghost" performances.

According to some examples the server 114 is configured such that, when making earlier performance information available for racing or training against, actual pace information of the earlier performance is used. For example, when racing or training against an earlier ghost performance the pace is not simply an average of the earlier

performance, but varies in the same way as the earlier performance. In this way users can refine and improve on different sections within their workout or see where they are better or worse than another user at specific points during their workout.

5 According to some examples, the server 114 is configured to store the user-performance information for use in a league or championship. For example, the user 102 may be able to compete against other users and then see where this places them in the league or championship. For example, the user 102 may be able to view a league table on the display 106. Again, this may increase player engagement.

10

As discussed above, where video is played on the display 106 then this may comprise a live video feed from server 114 (e.g. originating from gym or studio 110). Alternatively, video displayed on display 106 may comprise stored and/or archived video. In some examples the stored and/or archived video may be streamed from
15 server 114 to display 106. In some examples the rowing machine may be configured to download and store video information for later use. This enables the user to engage with the video in an offline mode.

According to some examples the system enables two or more rowing machines 104
20 to be communicatively connected to emulate rowing as a crew. The two or more machines may be remote from each other, or in some examples the two or more machines may be locally based together (e.g. in the same building or room). In some examples the pace of a boat or crew is based on the performance of all individuals of the crew combined. For example this enables different gyms or teams to form crews
25 and then for the crews to row against each other. In some examples, an online community may be formed which enables different users to set-up groups, clubs or crews.

In some examples the rowing machine 104 comprises one or more sensors 107. In
30 some examples the sensors within the rowing machine can be used to control a user interface on the display 106. According to some examples the sensors can feed back performance information which can then be used for real time training and coaching, either with a remotely located coach or with a virtual software coach. The virtual software coach may be stored at the rowing machine 104 or at the server 114. For

example the sensors can be used to sense one or more of: speed of pulling on a handle or handles attached to the rowing machine's resistance mechanism; force of pulling on a handle or handles attached to the rowing machine's resistance mechanism; speed of flywheel rotation in the resistance mechanism; degree of pitch of the rowing machine; degree of roll of the rowing machine This is explained in more detail with respect to the rowing machine described in Figure 2.

As explained briefly above, according to some examples one or more users (e.g. user 102) can sign-up on a subscription basis for accessing functionality as described herein. A user can then log-on and choose a class, course, instructor etc. and join the workout online. According to some examples the subscription fee may be a fixed amount. According to some examples the subscription fee may vary dependent on the user or user requirements e.g. user location; amount of use; time of use; age of user etc. In some examples the user can pre-load a payment fee in advance, and then payments are deducted on a use basis.

It will of course be understood that in addition to visual information being provided to the user 102 via the display 106, that audio information may also be provided. The audio information may be played by one or more speakers on the display 106 or elsewhere on the rowing machine 104. In some examples the speakers may be separate from the rowing machine. Audio information may comprise, for example, verbal instructions (e.g. from an instructor) and/or sound from a group rowing class. This enables encouragement to be provided to the user 102.

Although in the main the description has described visual and audio information being provided to user 102 via server 114, in some examples visual and audio information may also be sent back in the other direction. To this end the display 106 and/or rowing machine 104 may comprise a camera 117 and/or microphone 119 for sending video and/or audio information to server 114. This information can then be passed on to e.g. a personal trainer and/or to a gym class etc. In other words, the system may enable two-way communication.

An example rowing machine 2600 is shown in Figure 2. Rowing machine 2600 may be considered an example of a rowing machine suitable for operation in system 100.

That is, rowing machine 2600 may be considered an example of rowing machine 104 schematically shown in Figure 1. Aspects of rowing machine 104 described in Figure 1 may be combined in any way with aspects of rowing machine 2600 described with respect to Figure 2, and vice versa.

5

The rowing machine 2600 comprises a main body portion 2602 which extends in a longitudinal direction i.e. in a direction parallel to the axis X-X in Figure 26. The rowing machine comprises a first or front end or portion 2604 and a second or rear end or portion 2606. In this example the main body portion 2602 comprises a chassis. In this example the chassis comprises a tubular chassis. For example the tubular chassis comprises one or more tube portions joined together, for example including tubular portion 2603. The tubular chassis may be formed from any number of portions. The separate portions may be joined together in any way. For example, the tubular portions may be a friction fit within each other. Alternatively, and/or additionally the tubular portions may be secured using different fixing means. For example, the further fixing means may include screws, nuts, bolts, adhesive, welding etc. In the example of Figure 2 the rowing machine chassis comprises a generally straight portion (e.g. portion 2603) positioned between tubular portions at the ends 2604 and 2606 which curve upwardly relative to portion 2603. The tubular chassis is lightweight and provides a relatively high strength to weight ratio. The tubular chassis is also easy to assemble and disassemble. In some embodiments one or more fairings or coverings can be provided to cover or partially cover the chassis. Such fairing(s) may be made of plastic, for example. Alternatively, and as shown in Figure 2, the chassis may be exposed.

A beam portion or rail portion 2645 is suspended between the first (front) end 2604 and the second (rear) end 2606 of the rowing machine 2600. A first mechanism shown generally at 2670 is provided at the front portion 2604 of the rowing machine, and a second mechanism shown generally at 2672 is shown at the rear portion 2606 of the rowing machine. The first mechanism 2670 may be considered a first suspension mechanism. The second mechanism 2672 may be considered a second suspension mechanism. The suspension mechanisms 2670 and 2672 enable a pitching and/or rolling movement to be experienced by a user while working-out on the rowing machine 2600. For example, each suspension mechanism can enable the rail 2645 to pitch and/or roll relative to the longitudinal axis X-X. By “pitch” is meant up-and-down

movement relative to longitudinal axis X-X. By “roll” is meant rotational movement about longitudinal axis X-X. Therefore, in some examples it may be considered that the rowing machine comprises a pitching mechanism for transferring a pitching motion to the user during use of the rowing machine. Furthermore, in some examples it may be considered that the rowing machine 2600 comprises a rolling mechanism for transferring a rolling motion to the user during use of the rowing machine. In this context, “use” of the rowing machine may be considered emulating a rowing motion on the rowing machine. For example, the first mechanism 2670 may be considered to comprise a pitching mechanism and/or a rolling mechanism, and the second mechanism 2672 may be considered to comprise a pitching mechanism and/or a rolling mechanism. The beam or rail 2645 is suspended between the front suspension mechanism 2670 and the rear suspension mechanism 2672. Each of the suspension mechanisms 2670 and 2672 enables pitching and/or rolling of the rail 2645 relative to the longitudinal axis X-X of the rowing machine, so as to give a user of the rowing machine a floating sensation. The suspension mechanism 2670 comprises a shock absorber portion shown generally at 2671. The suspension mechanism 2670 also comprises a rolling mechanism shown generally at 2673. The suspension mechanism 2672 comprises a shock absorber portion showed generally at 2675. Suspension mechanism 2672 also comprises a rolling mechanism shown generally at 2677. Generally speaking, the shock absorber portions enable the pitching motion of the rail 2645. The rolling mechanisms enable the rolling of the rail 2645.

The rowing machine 2600 further comprises a footplate assembly 2631 and a resistance mechanism 2629. In some examples the resistance mechanism 2629 is in the form of a flywheel assembly. In the example of Figure 2, the rowing machine 2600 comprises an integrated footplate and flywheel assembly shown generally at 2632. The footplate comprises first and second foot plates 2634 and 2636. Straps or some other form of clip means may be provided so that a user can securely attach their feet to the footplates 2634 and 2636. The combined footplate and flywheel assembly 2632 comprises a main body portion 2633. The main body portion 2633 is angled relative to the trough portion of the rail 2645. For example, the main body portion 2633 may be angled between 30° and 60° to the horizontal. Preferably this angle is 45° or is about 45°. As discussed further below, the main body portion 2633 encloses a chain take-up mechanism of the flywheel drive mechanism. In other examples, the drive

mechanism may comprise a different mechanism, such as a belt rather than a chain. Also, in some examples the resistance may be provided in a different manner than with a flywheel e.g. friction plates or a water wheel could be used. In the example of Figure 2, the footplate and flywheel assembly 2632 is slideably movable back and forth on rail 2645 in a direction parallel to axis X-X.

In Figure 2 the flywheel is shown generally at 2624. Handle portion 2612 is operatively connected to flywheel 2624.

In some examples the resistance mechanism 2629 comprises independent left and right-side resistance mechanisms shown at 2680 and 2682 respectively. Left-hand resistance mechanism 2680 may be connected to left-hand handle 2611 and right-hand resistance mechanism 2682 may be connected to right-hand handle 2613. In some examples, resistances of resistance mechanisms 2680 and 2682 may be independently adjusted.

Also shown is a display 2642. This may be similar to or the same as the display 106 shown in Figure 1.

A seat portion is shown generally at 2608. The seat portion 2608 is slidably mounted on a rail 2647. The rail 2647 is attached to rail assembly 2645 via stanchions 2651 and 2653, in this example. The seat portion 2608 can slide back and forth along rail 2647 in a direction parallel to longitudinal axis X-X. Therefore, in this embodiment the rail 2647 on which the seat portion 2608 slides is separate from the rails 2645 on which the footplate and flywheel assembly 2632 slides. That is the seat rail 2647 is mounted to the main rail or beam 2645. It will be understood that this arrangement may also be applied to any of the other embodiments described herein.

In examples, one or more sensors is provided on the rowing machine 2600. The one or more sensors 2600 may be analogous to the one or more sensors 107 of Figure 1.

For example, the resistance mechanism may comprise at least one sensor shown schematically at 2684. The at least one sensor 2684 may comprise a sensor for the left-hand resistance mechanism 2680 and a separate sensor for the right-hand

resistance mechanism 2682. The at least one sensor 2684 may comprise a force sensor for determining how hard the user is pulling on handle 2612 (or indeed for determining how hard the user is pulling on each of separate handles 2611 and 2612). For example, the force sensor(s) may comprise one or more force-sensitive resistors and/or torque sensors and/or one or more piezo-electric actuators.

The at least one sensor may also comprise a sensor 2686 for determining a degree of pitch and/or roll of the respective pitching mechanism and rolling mechanism. In some examples a single sensor may be used to determine pitch and roll. In some examples, there is provided a pitch sensor and a separate roll sensor. The sensor 2686 may for example comprise an accelerometer or gyroscope, or one or more piezo-electric actuators.

As previously described, information from the sensors may be provided from the rowing machine 2600 to server 114. In the Figures, the location of the at least one sensors is schematically shown, and the at least one sensor may be positioned elsewhere on the rowing machine.

It will be understood that the rowing machine shown in Figure 2 is one example of a rowing machine, and that variations to the rowing machine are possible whilst still remaining within the scope of the invention as claimed.

A method according to an example is schematically shown with respect to the flow chart of Figure 3.

At S1, the method comprises providing visual information to be displayed on a display of a rowing machine from a server, the rowing machine connected to the server via a communication network.

As shown at S2, the visual information enables a user of the rowing machine to remotely participate in a rowing activity.

It will be understood that the processor or processing system or circuitry referred to herein may in practice be provided by a single chip or integrated circuit or plural chips

or integrated circuits, optionally provided as a chipset, an application-specific integrated circuit (ASIC), field-programmable gate array (FPGA), digital signal processor (DSP), graphics processing units (GPUs), etc. The chip or chips may comprise circuitry (as well as possibly firmware) for embodying at least one or more of a data processor or processors, a digital signal processor or processors, baseband circuitry and radio frequency circuitry, which are configurable so as to operate in accordance with the exemplary embodiments. In this regard, the exemplary embodiments may be implemented at least in part by computer software stored in (non-transitory) memory and executable by the processor, or by hardware, or by a combination of tangibly stored software and hardware (and tangibly stored firmware).

Reference is made herein to data storage for storing data (e.g. memory). This may be provided by a single device or by plural devices. Suitable devices include for example a hard disk and non-volatile semiconductor memory (including for example a solid-state drive or SSD).

Although at least some aspects of the embodiments described herein with reference to the drawings comprise computer processes performed in processing systems or processors, the invention also extends to computer programs, particularly computer programs on or in a carrier, adapted for putting the invention into practice. The program may be in the form of non-transitory source code, object code, a code intermediate source and object code such as in partially compiled form, or in any other non-transitory form suitable for use in the implementation of processes according to the invention. The carrier may be any entity or device capable of carrying the program. For example, the carrier may comprise a storage medium, such as a solid-state drive (SSD) or other semiconductor-based RAM; a ROM, for example a CD ROM or a semiconductor ROM; a magnetic recording medium, for example a floppy disk or hard disk; optical memory devices in general; etc.

The examples described herein are to be understood as illustrative examples of embodiments of the invention. Further embodiments and examples are envisaged. Any feature described in relation to any one example or embodiment may be used alone or in combination with other features. In addition, any feature described in relation to any one example or embodiment may also be used in combination with one

or more features of any other of the examples or embodiments, or any combination of any other of the examples or embodiments. Furthermore, equivalents and modifications not described herein may also be employed within the scope of the invention, which is defined in the claims.

CLAIMS

1. A rowing machine comprising:

a communication module enabling the rowing machine to communicate with a
5 server in a communication network; and

a display for displaying visual information received from the server, the visual
information enabling a user to remotely participate in a rowing activity.

2. A rowing machine according to claim 1, comprising one or more sensors for
10 obtaining performance information of the user during the rowing activity.

3. A rowing machine according to claim 2, the communication module configured
to communicate the performance information with the server.

4. A rowing machine according to claim 3, wherein the communicating the
15 performance information with the server enables the user to participate with and/or
compete against other users remotely participating in the rowing activity.

5. A rowing machine according to any of claims 2 to 4, the performance
20 information comprising information obtained from a resistance mechanism of the
rowing machine.

6. A rowing machine according to claim 5, the performance information obtained
from the resistance mechanism for determining a rowing speed of the user.

7. A rowing machine according to claim 5 or claim 6, the resistance mechanism
25 comprising independent left-hand and right-hand resistance mechanisms.

8. A rowing machine according to claim 7, wherein the communication module is configured to communicate performance information of the left-hand and right-hand resistance mechanisms to the server, for enabling the user to emulate steering during the rowing activity.

9. A rowing machine according to any of claims 2 to 8, wherein the rowing machine comprises a pitching mechanism for transferring a pitching motion to the user during use of the rowing machine, and the performance information comprises information of the pitching motion.

10. A rowing machine according to any of claims 2 to 9, wherein the rowing machine comprises a rolling mechanism for transferring a rolling motion to the user during use of the rowing machine, and the performance information comprises information of the rolling motion.

11. A rowing machine according to any of claims 2 to 10, wherein the rowing activity comprises emulating rowing at a location which is displayed on the display, the obtained performance information being usable for determining one or more parameters of a rowing performance at the emulated location.

12. A rowing machine according to claim 11, the one or more parameters comprising a drag parameter.

13. A rowing machine according to any of claims 1 to 12, the rowing activity being selectable via the display of the rowing machine.

14. A rowing machine according to any of claims 1 to 13, the rowing activity comprising a rowing exercise class taking place at a location remote from the rowing machine.

5 15. A rowing machine according to claim 14, the location of the rowing exercise class comprising a studio or a gym.

16. A rowing machine according to any of claims 1 to 15, the rowing activity comprising a session with a personal trainer.

10

17. A rowing machine according to any of claims 1 to 16, the visual information comprising a live video feed.

18. A system comprising:

15 a server within a communication network;

a rowing machine communicatively connected to the server via the communication network;

the server configured to provide visual information to be displayed on a display of the rowing machine;

20 the visual information enabling a user of the rowing machine to remotely participate in a rowing activity.

19. A system according to claim 18, the server configured to receive performance information of the user during the rowing activity, the performance information
25 obtained from one or more sensors of the rowing machine.

20. A system according to claim 19, wherein the performance information received at the server enables the user to participate with and/or compete against other users remotely participating in the rowing activity.

5 21. A system according to claim 19 or claim 20, the performance information comprising information obtained from a resistance mechanism of the rowing machine.

22. A system according to claim 21, the performance information obtained from the resistance mechanism for determining information of a rowing speed of the user.

10

23. A system according to claim 21 or claim 22, the server configured to receive performance information of independent left-hand and right-hand resistance mechanisms of the rowing machine, and the server configured to use the information of independent left-hand and right-hand resistance mechanisms for determining steering information, so as to enable the user to emulate steering during the rowing activity.

15

24. A system according to any of claims 19 to 23, wherein the rowing machine comprises a pitching mechanism for transferring a pitching motion to the user during use of the rowing machine, and the performance information comprises information of the pitching motion.

20

25. A system according to any of claims 19 to 24, wherein the rowing machine comprises a rolling mechanism for transferring a rolling motion to the user during use of the rowing machine, and the performance information comprises information of the rolling motion.

25

26. A system according to any of claims 19 to 25, wherein the rowing activity comprises emulating rowing at a location which is displayed on the display, the

received performance information being used by the server for determining one or more parameters of a rowing performance at the emulated location.

27. A system according to any of claims 19 to 25, the one or more parameters
5 comprising a drag parameter.

28. A system according to claim 27, the server configured to use the drag parameter to adjust a determined speed of motion.

10 29. A system according to any of claims 19 to 28, the server configured to make the performance information available for use by other users.

30. A system according to claim 29, the server configured to make the performance information available such that a user can race or train against an earlier performance.
15

31. A system according to any of claims 29 to 30, the server configured such that, when making earlier performance information available for racing or training against, actual pace information of the earlier performance is used.

20 32. A system according to any of claims 18 to 31, the server configured to provide audio information to be played to the user of the rowing machine.

33. A system according to any of claims 18 to 32, the rowing activity being selectable via the display of the rowing machine.
25

34. A system according to any of claims 18 to 33, the rowing activity comprising a rowing exercise class taking place at a location remote from the rowing machine.

35. A system according to claim 34, the location comprising a studio or a gym.

36. A system according to any of claims 18 to 35, the rowing activity comprising a
5 workout session or a race with another user.

37. A system according to any of claims 18 to 36, the rowing activity comprising a session with a personal trainer.

10 38. A system according to claim 37, the system enabling a user to select a particular personal trainer from a plurality of available personal trainers via the display.

39. A system according to any of claims 18 to 38, the server configured to cause a manner of display of the visual information in dependence on a determined speed of
15 rowing on the rowing machine.

40. A system according to any of claims 18 to 39, the visual information comprising a live video feed.

20 41. A system according to any of claims 18 to 40, the visual information comprising stored and/or archived video information.

42. A system according to claim 32 or any claims dependent on claim 32, wherein the audio information comprises live audio information or stored audio information.

25

43. A system according to any of claims 18 to 42, the system comprising two or more rowing machines communicatively connected to emulate rowing as a crew.

44. A system according to any of claims 18 to 43, the display comprising a virtual reality display.

5 45. A method comprising:

providing visual information to be displayed on a display of a rowing machine from a server, the rowing machine connected to the server via a communication network;

10 the visual information enabling a user of the rowing machine to remotely participate in a rowing activity.

46. A method according to claim 45, comprising providing audio information to the user.

15 47. A computer program comprising instructions for causing an apparatus to perform at least the following:

providing visual information to be displayed on a display of a rowing machine from a server, the rowing machine connected to the server via a communication network;

20 the visual information enabling a user of the rowing machine to remotely participate in a rowing activity.

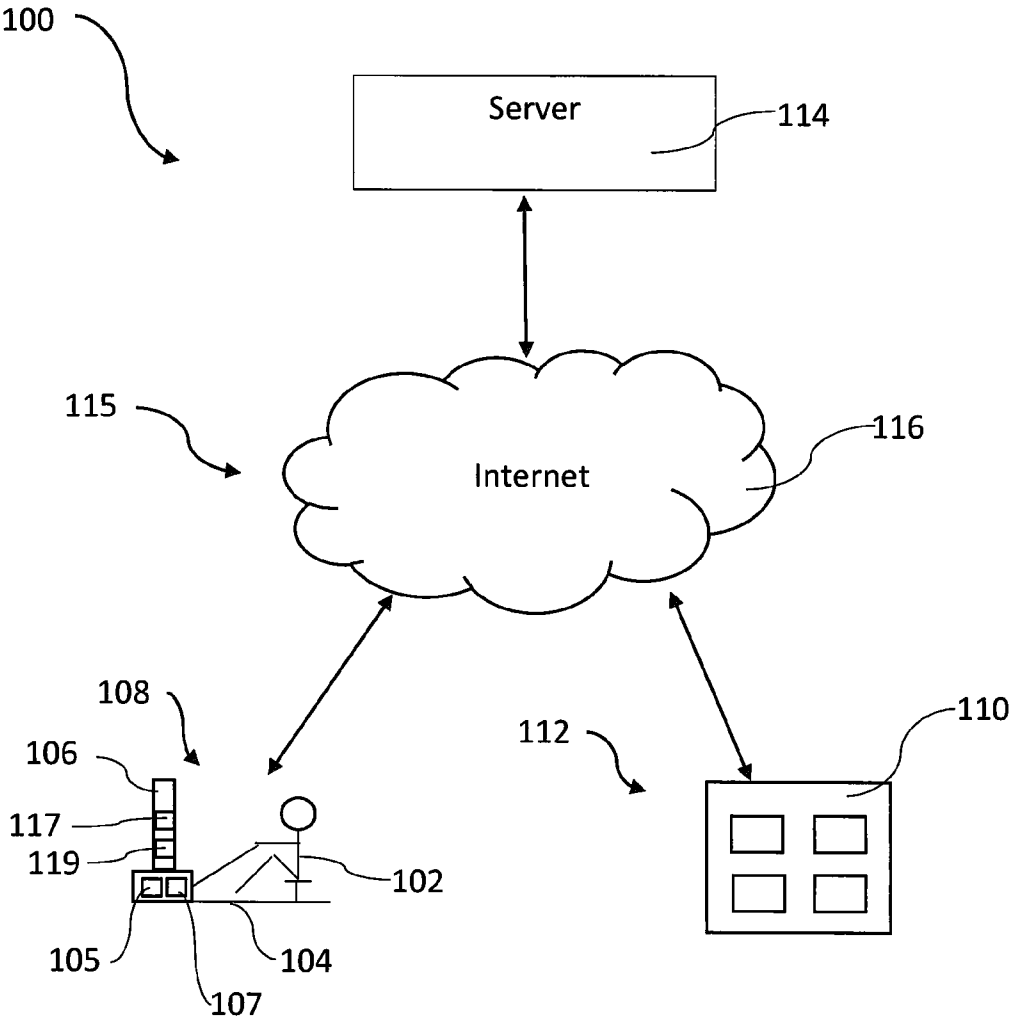


Fig. 1

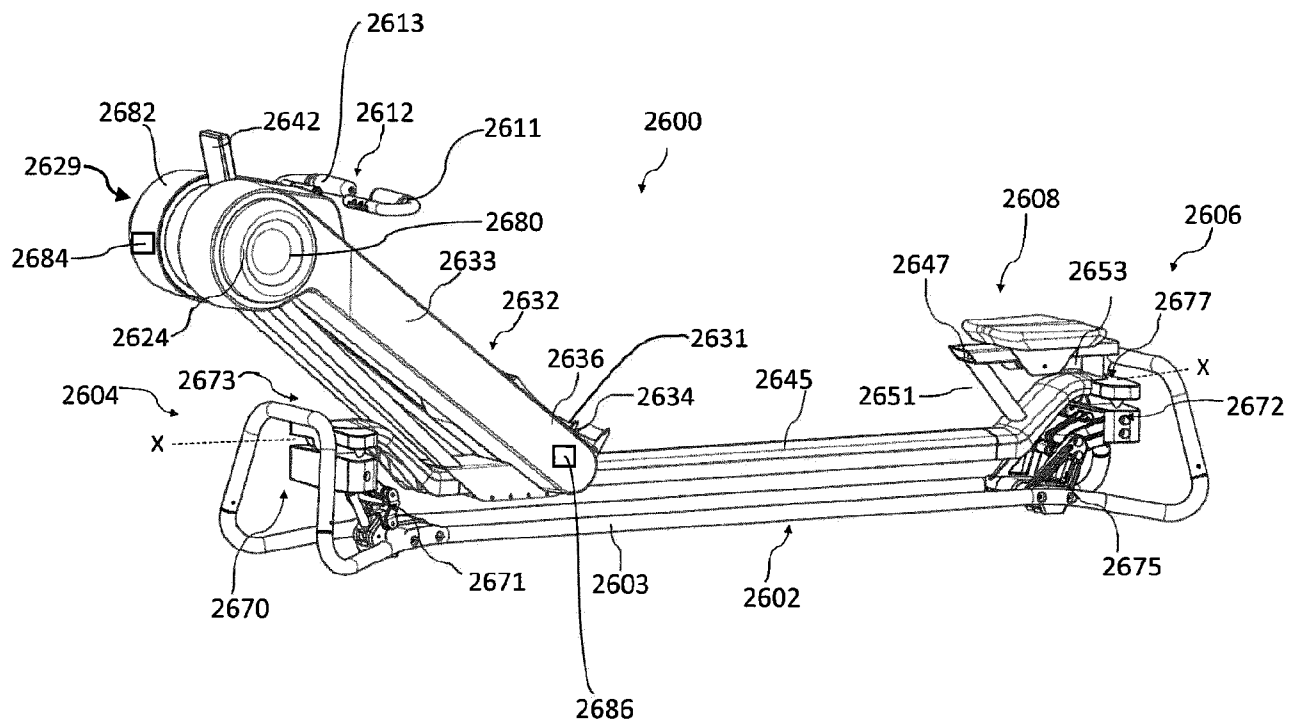


Fig. 2

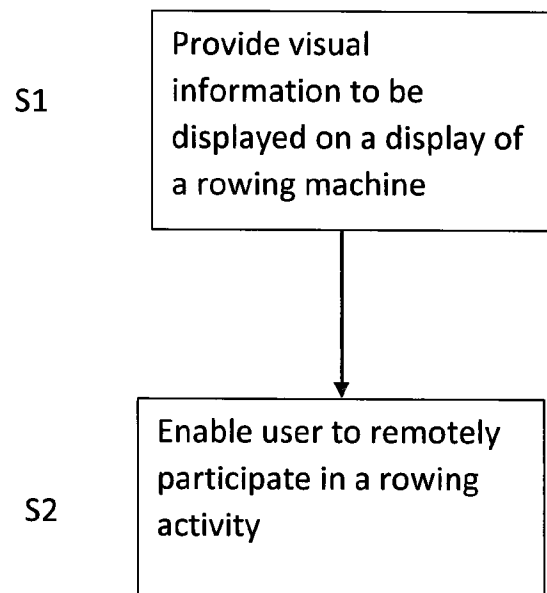


Fig. 3

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2019/085615

A. CLASSIFICATION OF SUBJECT MATTER

INV. A63B71/06 A63B22/00 A63B24/00
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)
A63B

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 2011/082008 A1 (CHEUNG ERIC [US] ET AL) 7 April 2011 (2011-04-07) paragraph [0014] - paragraph [0047]; figures 1-4	1-4, 7-30, 32-47
X	WO 2018/044721 A1 (PELTON INTERACTIVE INC [US]) 8 March 2018 (2018-03-08) paragraph [0046] - paragraph [00141]; figures 1-35 ----- -/-	1-6,11, 13-22, 26, 29-43, 45-47



Further documents are listed in the continuation of Box C.



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

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"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

5 March 2020

Date of mailing of the international search report

17/03/2020

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Jekabsons, Armands

INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2019/085615

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2018/339195 A1 (BERNOTAS ERIK A [US]) 29 November 2018 (2018-11-29) paragraph [0035] - paragraph [0060]; figures 1-7 -----	1-6, 11, 13-22, 26, 29-37, 39-47
A	WO 2016/146480 A1 (HAMILTON ANTHONY CARL [GB]) 22 September 2016 (2016-09-22) page 10, line 11 - page 37, line 7; figures 1-35 -----	1-47
A	US 8 192 332 B2 (BAKER DAVID GARDNER [US]; GUIDA PATRICK MICHAEL [US] ET AL.) 5 June 2012 (2012-06-05) column 3, line 47 - column 6, line 50; figures 1-3 -----	1-47

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2019/085615

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2011082008 A1	07-04-2011	US 2011082008 A1	07-04-2011
		US 2013125025 A1	16-05-2013

WO 2018044721 A1	08-03-2018	CA 3035238 A1	08-03-2018
		CN 110114123 A	09-08-2019
		EP 3503980 A1	03-07-2019
		TW 201812684 A	01-04-2018
		US 2018056132 A1	01-03-2018
		WO 2018044721 A1	08-03-2018

US 2018339195 A1	29-11-2018	NONE	

WO 2016146480 A1	22-09-2016	CN 107530578 A	02-01-2018
		EP 3261736 A1	03-01-2018
		GB 2538123 A	09-11-2016
		GB 2552272 A	17-01-2018
		GB 2567347 A	10-04-2019
		US 2018056117 A1	01-03-2018
		WO 2016146480 A1	22-09-2016

US 8192332 B2	05-06-2012	NONE	
