



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
01.05.2024 Bulletin 2024/18

(21) Application number: **23205164.9**

(22) Date of filing: **23.10.2023**

(51) International Patent Classification (IPC):
B63H 16/08 (2006.01) **B63H 16/20** (2006.01)
B63H 21/17 (2006.01) **B63H 23/14** (2006.01)
B63H 23/16 (2006.01) **B63B 34/20** (2020.01)

(52) Cooperative Patent Classification (CPC):
B63H 16/12; B63B 34/20; B63H 16/14;
B63H 16/20; B63H 23/14; B63H 2016/202;
B63H 2021/202; B63H 2023/0233; B63H 2023/025;
B63H 2023/0258; B63H 2023/0283

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

(30) Priority: **24.10.2022 ES 202231750 U**

(71) Applicant: **7Seas Kayak, S.L.**
48950 Erandio Vizcaya (ES)

(72) Inventors:
• **OTEGUI MARTÍNEZ, Pedro José**
48950 Erandio (Vizcaya) (ES)
• **OURO BEASCOECHEA, Alejandro**
48950 Erandio (Vizcaya) (ES)
• **MESA CUEVAS, Unai**
48950 Erandio (Vizcaya) (ES)

(74) Representative: **Ungria López, Javier**
Avda. Ramón y Cajal, 78
28043 Madrid (ES)

(54) **KAYAK PEDAL DRIVE**

(57) The present invention comprises a first rotating shaft (20) with pedal cranks (10) attached to it and to respective pedals (22) such that pedaling rotates the first rotating shaft (20); a motor (1) configured to rotate the first shaft (20) when said shaft is rotating by pedaling; a plate (15) attached to the first shaft (20) that transmits the rotation generated by the cranks (10) and/or the motor (1) to a first cog wheel (17) attached to a second rotating shaft (21); and a gear shift (5) interposed between the first cog wheel (17) and a second cog wheel (4) that variably regulates the gear ratio between both. The second cog wheel (4) is connected to second transmission means (6, 8) that transmit the rotation of the second shaft (21) to a propeller (7).

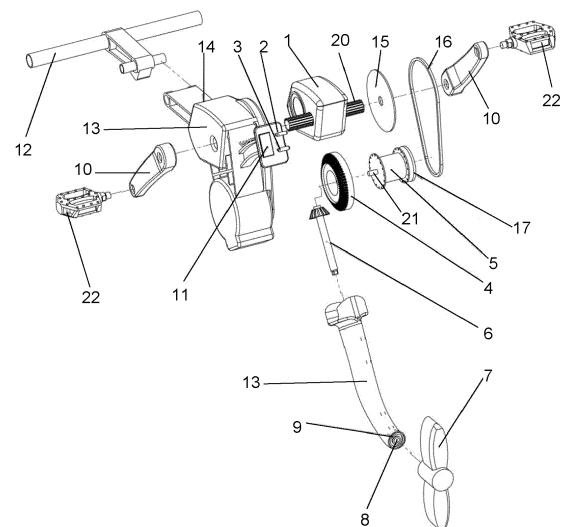


Fig. 1A

Description

Object of the invention

[0001] The present invention belongs to the technical field of sporting goods.

[0002] More particularly, said invention relates to a kayak pedal drive, the configuration and design of which, among other advantages, optimizes the space in the kayak and provides the user with pedaling assistance.

Background of the invention

[0003] Two different types of kayaks are currently commercially available: kayaks designed to be propelled by paddle and kayaks designed to be propelled by means of a pedal drive.

[0004] Pedal drive-propelled kayaks offer important advantages, as they allow the hands to be free while said kayak is being propelled. This fact is especially important, for example, for fishing as it allows users to simultaneously handle rods, tackle, probes or other accessories.

[0005] On the other hand, pedal kayaks tend to be less tiring for most users, since the muscles in the legs are much stronger than those in the arms, so greater distances can be covered.

[0006] Within pedal-driven kayaks, there are two main sub-groups: propeller kayaks and fin kayaks.

[0007] In those with propellers, the movement of the legs is circular (similar to that of a bicycle), while in those with fins the movement is back and forth horizontal translation.

[0008] Propeller pedal drives offer the advantage that it is possible to move forwards and also backwards by simply reversing the direction of rotation of the legs. On the other hand, fins require a tie rod drive to reverse the direction of travel, thus using one hand.

[0009] Furthermore, in propeller pedal drives, the vertical shaft that transfers the rotation from the pedals to the propeller and the gear box located at the bottom of said shaft generate a keel that is very efficient in increasing the stability of the kayak.

[0010] This is why most pedal drive kayaks are propeller pedal drive kayaks.

[0011] Kayaks with a propeller pedal drive have a series of reduction gears (cog wheel type) in such a way that one complete turn of the pedals generates several complete turns of the propeller.

[0012] The gear ratio of the reduction gear is designed to maximize the speed of the kayak without causing great resistance to pedaling.

[0013] Generally, most kayaks on the market have a reduction gear ratio of 1:10 or 1:12 (1 pedal turn = 10 or 12 propeller turns). There are currently no kayaks on the market that allow this reduction ratio to be modified, probably because it does not provide any significant advantage, while it does introduce an element of possible failure.

[0014] With gear ratios of 1:10 or 1:12, it is possible to achieve sustained speeds close to 5 km/h.

[0015] These speeds are usually insufficient for many fishermen, who seek to reach their fishing spot in the shortest time possible (especially in the early hours of the morning).

[0016] This is why many fishermen choose to install an electric motor in the kayak, which allows speed to be increased up to 10 km/h. In addition, this motor is a safety element in case of user fatigue.

[0017] With few exceptions, the motor is placed at the rear end of the kayak (the stern), behind the rudder.

[0018] Said motor is similar to that of outboard boats, that is, it has its own propeller independent of that of the pedal drive.

[0019] The motor propeller is fixed to a vertical shaft so that it is underwater, with the battery located at the rear of the kayak.

[0020] On the other hand, motor speed is controlled by means of a control that is also wired to the battery, which has a lever to regulate speed and direction (it can also go backwards). This control also incorporates basic information, such as travel speed, battery charge and the distance remaining to be completed at the current speed.

[0021] When the motor is not to be used, it is necessary to pull on a tie rod to raise it up, as otherwise it generates significant drag for navigation and turning.

[0022] On the other hand, when reverse travel is desired, it is necessary to pull on another tie rod to prevent the motor from lifting up, as there is no resistance in that direction (otherwise it could not be lowered).

[0023] With all this, in addition to the two electrical cables from the battery, it is necessary to incorporate two other tie rods from the motor (rear area) to the front area, where they can be actuated.

[0024] All this leads to a loss of space in the kayak that could be used for uses of another types.

[0025] On the other hand, since the motor propeller is located behind the rudder, it is no longer operational when the motor is started. Therefore, it is necessary for the motor to be able to turn left and right so that the kayak can turn.

[0026] This requires incorporating two other tie rods, so that by actuating one or the other, the kayak turns left or right. Actuation can be with the feet (typically in paddle kayaks) or with the hands. This set of cables, in addition to being a very cumbersome system, takes up a large part of the useful area of a kayak.

[0027] It is important to note that it is not always possible to get up in a kayak (especially in areas of waves or currents), so the area accessible with the hands from the seat is of fundamental importance to locate the essential elements (rods, tackle, probes, radio, safety elements, etc.).

[0028] Therefore, eliminating this entire set of accessories would be a great advantage.

[0029] Currently there is a pedal drive on the market that integrates a motor on the pedal drive block, in such

a way that the motor can be coupled or detached as desired by the user.

[0030] This solution solves the problem of the cables indicated above, in addition to reducing the cost and weight of the kayak, since the propeller and shaft are not duplicated.

[0031] However, the operation of the motor is independent of pedaling. That is, the motor is operated with a control, whereby regulating the speed and direction of forward/reverse travel is regulated and there is no pedaling during use.

[0032] Therefore, in order to install this pedal drive in a kayak, it is still necessary to incorporate a "man overboard" system, since otherwise, if the user falls into the water, said kayak would continue to travel, powered by the motor.

[0033] On the other hand, the fact that the pedaling and the operation of the motor are independent continues to represent a major safety issue, since in swell areas it is necessary to modify the forward travel speed according to how the waves approach, and it is important to be tactful and agile with the forward travel, which is not always easy or intuitive with a control.

[0034] Likewise, it is important to point out that there are two important difficulties that must be overcome when implementing a new pedal drive in a kayak: on the one hand, ensuring that said pedal drive is sufficiently robust and watertight and, on the other, ensuring that the axis of symmetry of the pedals and the propeller coincide, because otherwise the kayak would not travel straight.

[0035] Finally, it should be noted that for some users, the use of a motor is undesirable, because they consider that the kayak must move due to the user's action since, otherwise, it would lose its "essence" or "magic".

Description of the invention

[0036] The present invention aims to address the drawbacks and disadvantages of prior art devices, noted above.

[0037] To this end, an object of the present invention relates to a kayak pedal drive characterized in that it comprises:

- a first rotating shaft,
- pedal cranks integrally attached to said first rotating shaft, each crank being attached to a respective pedal, so that a pedaling action induces the rotation of the first rotating shaft;
- a pedal assist motor, co-linear with the first rotating shaft and configured to rotate, in its operational state, the first rotating shaft when said first shaft rotates, in addition, as a result of a pedaling action;
- a plate integrally attached to said first rotating shaft and intended to transmit the rotation generated by the pedal cranks and/or the pedaling assistance motor on the first rotating shaft, by means of first transmission means, to a first cog wheel integrally at-

tached to a second rotating shaft, said second rotating shaft being arranged below the first rotating shaft and parallel to same; and

- a gear shift, integrally attached to the second rotating shaft and interposed between the first cog wheel and a second cog wheel, the gear shift being intended to variably regulate the gear ratio between the first cog wheel and the second cog wheel and said second cog wheel furthermore being connected to second transmission means, intended to transmit the rotation of the second rotating shaft to a propeller.

[0038] According to the present invention, the pedal assist motor only rotates the first rotating shaft, when in addition to being in the operating state (on), pedaling is simultaneously occurring that induces an additional rotation to the first rotating shaft. In this way, it is possible to integrate the motor into the pedal drive, increasing its safety and ease of use and also avoiding the need to provide the pedal drive with a "man overboard" type control.

[0039] Preferably, the first transmission means comprise a transmission belt or chain that simultaneously engages the plate and the first cog wheel.

[0040] In a preferred embodiment of the invention, the gear shift is of the internal hub gear type and is provided with planetary bearings. This type of gearbox is preferred over others, such as multi-pinion gearboxes, since, being a sealed gearbox, it is more robust, making it considerably more difficult for water or impurities to enter that could damage the internal elements of the gearbox. In addition, it allows the change to be made when the kayak is stopped and said change is smoother, since the start could already occur with the new gear engaged. In addition, the risk of the chain coming off is also avoided.

[0041] The pedal drive is preferably provided with a double articulated arm. Said arm allows the pedal drive to be raised by making it pivot on the shafts of each of the joints. This fact is advantageous since it prevents possible damage to the propeller when introducing and removing the kayak from the water, since before completing these operations it is possible to raise the pedal drive.

[0042] Likewise, the pedal assist motor is preferably provided with a power supply socket, a potentiometer intended to regulate the delivery of the motor and a screen configured to display the operating parameters of the motor such as, for example and without limitation, the delivery percentage, remaining battery time and/or revolutions per minute (rpm).

[0043] The kayak pedal drive of the invention preferably comprises an outer casing at least partially covering the pedal assist motor, said outer casing being provided with a part that comes into contact with the water when sailing and acts as a keel.

[0044] The second transmission means preferably comprise a pinion configured to mesh with the second cog wheel, said pinion further being attached to a trans-

mission shaft connected to the propeller.

[0045] In one embodiment of said second transmission means, the transmission shaft is a straight shaft provided with a first bevel gear, said first bevel gear being configured to mesh with a second bevel gear integrally attached to the propeller and arranged perpendicularly to the first bevel gear. This embodiment of the invention would allow an additional gear ratio (between the first bevel gear and the second bevel gear) to be included, with respect to the other embodiment of the invention, which is explained in the paragraph that follows. It would also allow the use of a more compact casing.

[0046] In another different embodiment of the invention, the transmission shaft of the second transmission means is a flexible transmission shaft attached to the propeller and running through the casing of the pedal drive forming an angle of 55° - 65° with the horizontal plane when the pedal drive is in its operating position (i.e., when it is in the seaworthy position).

[0047] The flexible drive shaft preferably describes the angle indicated above because this maximizes transmission performance. In fact, when the transmission shaft forms an angle of 55° - 65° with the horizontal plane, transmission performance is about 30% greater than in the case of the straight shaft, which forms 90° with the horizontal plane when the pedal drive is in its operating position.

[0048] Preferably, the radii of the plate and the first cog wheel are sized so that the gear ratio between them is 1:2. Likewise, the gear shift is preferably configured so that the gear ratio between the first cog wheel and the second cog wheel is between 1:0.5 and 1:4.1 and the radii of the second cog wheel and the pinion are sized so that the gear ratio between them is in the range of 1:4 - 1:5. Even more preferably, the gear shift is configured so that the gear ratio between the first cog wheel and the second cog wheel is between 1:1 and 1:2.6, with a gear ratio between the plate and the first cog wheel of 1:2 and a gear ratio between the second cog wheel and the pinion furthermore being kept between 1:4 and 1:5.

[0049] In this way, the user can be in a gear with a total gear ratio (between the plate and the pinion) of about 1:10 when not using the pedal assist motor and change to about 1:20 by operating the gear when the motor is to be used, increasing the speed from about 5 km/h to 10 km/h without having to increase the pedaling cadence to an excessive pace.

[0050] Furthermore, thanks to the incorporation of the pedal assist motor, the effort to perform pedaling is low, even when the kayak's travel speed has a value similar to that obtained with the use of an external motor of those already known in the art, about 10 km/h, or even more.

Description of the figures

[0051] To complete the description, and for the purpose of helping to make the features of the invention more readily understandable, this description is accom-

panied by a set of figures constituting an integral part of the same, which by way of illustration and not limitation represents the following:

- 5 Figures 1A and 1B are exploded and lateral perspective views, respectively, of a first embodiment of the kayak pedal drive according to the present invention, provided with a flexible and inclined transmission shaft;
- 10 Figure 1C is a cross-section view of the kayak pedal drive shown in Figures 1A and 1B;
- Figure 1D is another cross-section view of the kayak pedal drive shown in Figures 1A and 1B, mounted on a kayak;
- 15 Figure 2A is a perspective view of a second embodiment of the kayak pedal drive according to the present invention, provided with a straight drive shaft;
- Figure 2B is cross-section view of the kayak pedal drive shown in Figure 2A, mounted on a kayak;
- 20 Figure 2C is another cross-section view of the kayak pedal drive shown in Figure 2A, mounted on a kayak; and
- 25 Figure 2D is an enlarged detail of the portion of Figure 2C indicated with a dashed circle.

References of the figures

[0052]

- 30 1) Pedal assist motor;
- 2) Gear shift control;
- 3) Potentiometer;
- 4) Second cog wheel;
- 35 5) Gearshift;
- 6) Pinion;
- 7) Propeller;
- 8) Drive shaft;
- 9) Drive shaft support bearings;
- 40 10) Pedal cranks;
- 11) Display screen (for motor parameters);
- 12) Double jointed arm;
- 13) Casing;
- 14) Electrical power input;
- 45 15) Plate;
- 16) First transmission means;
- 17) First cog wheel;
- 18) First bevel gear;
- 19) Second bevel gear;
- 50 20) First rotating shaft;
- 21) Second rotating shaft;
- 22) Pedal.

Preferred embodiment of the invention

55

[0053] Throughout this description, as well as in the attached figures, the elements that have the same or similar function will be denoted with the same numerical

references.

[0054] Figures 1A, 1B, 1C and 1D show a first embodiment of a kayak pedal drive according to the present invention comprising two pedal cranks (10) integrally connected to a first rotating shaft (20). Each of the cranks (10) is attached to a respective pedal (22), so that a pedaling action induces the rotation of the first rotating shaft (20).

[0055] The pedal drive also comprises a pedal assist motor (1), connected to the first rotating shaft (20) and co-linear therewith. The motor (1) is configured to rotate, in its operating state, the first rotating shaft (20) when said first shaft is also subjected to a pedaling action.

[0056] Likewise, the pedal drive is attached to a double articulated arm (12) that allows the pedal drive to be raised by pivoting on the shafts of each of the joints. In addition, the motor (1) is provided with a power supply socket (14), a control (2) that operates a gear shift (5), a potentiometer (3) intended to regulate the delivery of the motor and a screen (11) displaying the operating parameters.

[0057] The first rotating shaft (20) is integrally attached to a plate (15). First transmission means (16) mesh on the plate (15), which means in this particular embodiment of the invention are formed by a transmission chain (16) also meshing with a first cog wheel (17), integrally attached to a second rotating shaft (21).

[0058] In this way, the rotation of the first shaft (20) can be transmitted to the second rotating shaft (21). The second shaft in turn will induce a rotation to all the elements (second cog wheel (4), gear shift (5), etc.), which are integrally attached thereto and will be described below.

[0059] Also arranged on the second rotating shaft (21), integral therewith, is the gear shift (5), interposed between the first cog wheel (17) and the second cog wheel (4). The gear shift (5) is of the internal hub gear type with planetary bearings and allows for variable regulation of the gear ratio between the first cog wheel (17) and the second cog wheel (4) in order to thereby adjust the speed imparted to the kayak by the pedal drive.

[0060] In this embodiment of the invention, the pedal drive is provided with a housing (13) formed by two different parts: an upper part covering, among other elements, the pedal assist motor (1) and the plate (15), as well as a lower part intended to cover the transmission shaft (8), which will be described in more detail below.

[0061] The second cog wheel (4) in turn meshes with the second transmission means, which comprise, in this particular embodiment of the invention, a pinion (6) attached to a flexible transmission shaft (8). The transmission shaft (8) is attached to the propeller (7) and further runs through the lower part of the casing (13) forming an angle of 55° - 65° with the horizontal plane (when the pedal drive is in its operational position). In addition, support bearings (9) are arranged between the lower part of the housing (13) and the transmission shaft (8).

[0062] Figures 2A, 2B, 2C and 2D show a second embodiment of the kayak pedal drive according to the

present invention, which is identical to the first embodiment illustrated in Figures 1A-1D, with the exception that on this occasion the transmission shaft (8) is a straight shaft.

[0063] As shown in Figure 2D, the straight shaft (8) is provided at its lower end (that is, the end closest to the water when the pedal drive is in its operating position) with a first bevel gear (18) that meshes, in turn, with a second bevel gear (19) integrally attached to the propeller (7) and arranged perpendicularly to the first bevel gear (18). Two bearings (9) are also provided that facilitate the rotation of the gears (18) and (19).

[0064] The present invention is in no way limited to the embodiments herein disclosed. For a person skilled in the art, other possible different embodiments of this invention will be evident in light of the present description. As a result, the scope of protection of the present invention is exclusively defined by the claims that follow.

Claims

1. A kayak pedal drive, **characterized in that** it includes:

- a first rotating shaft (20),
- pedal cranks (10) integrally attached to said first rotating shaft (20), each crank (10) being attached to a respective pedal (22), so that a pedaling action induces the rotation of the first rotating shaft (20);
- a pedal assist motor (1), co-linear with the first rotating shaft (20) and configured to rotate, in its operational state, the first rotating shaft (20) when said first shaft (20) rotates, in addition, as a result of a pedaling action;
- a plate (15) integrally attached to said first rotating shaft (20) and intended to transmit the rotation generated by the pedal cranks (10) and/or the pedal assist motor (1) on the first rotating shaft (20), by means of first transmission means (16), to a first cog wheel (17) integrally attached to a second rotating shaft (21), said second rotating shaft (21) being arranged below the first rotating shaft (20) and parallel to same; and
- a gear shift (5), integrally attached to the second rotating shaft (21) and interposed between the first cog wheel (17) and a second cog wheel (4), the gear shift (5) being intended to variably regulate the gear ratio between the first cog wheel (17) and the second cog wheel (4) and said second cog wheel (4) furthermore being connected to second transmission means (6, 8), intended to transmit the rotation of the second rotating shaft (21) to a propeller (7).

2. The kayak pedal drive according to claim 1, wherein the first transmission means (16) comprise a trans-

mission belt or chain that simultaneously engages the plate (15) and the first cog wheel (17).

3. The kayak pedal drive according to any of the preceding claims, wherein the gear shift (5) is of the internal hub gear type and is provided with planetary bearings. 5
4. The kayak pedal drive according to any of the preceding claims, and further being provided with a double articulated arm (12). 10
5. The kayak pedal drive according to any of the preceding claims, wherein the pedal assist motor (1) is provided with a power supply socket (14), a potentiometer (3) intended to regulate the delivery of the motor (1) and a screen (11) configured to display the operating parameters of the motor. 15
6. The kayak pedal drive according to any of the preceding claims, wherein the second transmission means comprise a pinion (6) configured to mesh with the second cog wheel (4), said pinion (6) further being attached to a transmission shaft (8) connected to the propeller (7). 20
25
7. The kayak pedal drive according to any of the preceding claims, wherein there is provided an outer casing (13) at least partially covering the pedal assist motor (1), said outer casing (13) being provided with a part intended to come into contact with the water and act as a keel. 30
8. The kayak pedal drive according to claim 6, wherein the transmission shaft (8) is a straight shaft provided with a first bevel gear (18), said first bevel gear (18) being configured to mesh with a second bevel gear (19), said second bevel gear (19) being integrally attached to the propeller (7) and arranged perpendicularly to the first bevel gear (18). 35
40
9. The kayak pedal drive according to claims 6 and 7, wherein the transmission shaft (8) is a flexible transmission shaft attached to the propeller (7) and running through the casing (13) of the pedal drive forming an angle of 55° - 65° with the horizontal plane when the pedal drive is in the seaworthy position. 45
10. The kayak pedal drive according to claim 6, wherein: 50
 - the radii of the plate (15) and the first cog wheel (17) are sized so that the gear ratio between them is 1:2,
 - the gear shift (5) is configured so that the gear ratio between the first cog wheel (17) and the second cog wheel (4) is between 1:0.5 and 1:4.1; and 55
 - the radii of the second cog wheel (4) and the

pinion (6) are sized so that the gear ratio between them is in the range of 1:4 -1:5.

11. The kayak pedal drive according to claim 10, wherein the gear shift (5) is configured so that the gear ratio between the first cog wheel (17) and the second cog wheel (4) is between 1:1 and 1:2.6, with the gear ratio between the plate (15) and the first cog wheel (17) being 1:2 and the gear ratio between the second cog wheel (4) and the pinion (6) between 1:4 and 1:5.

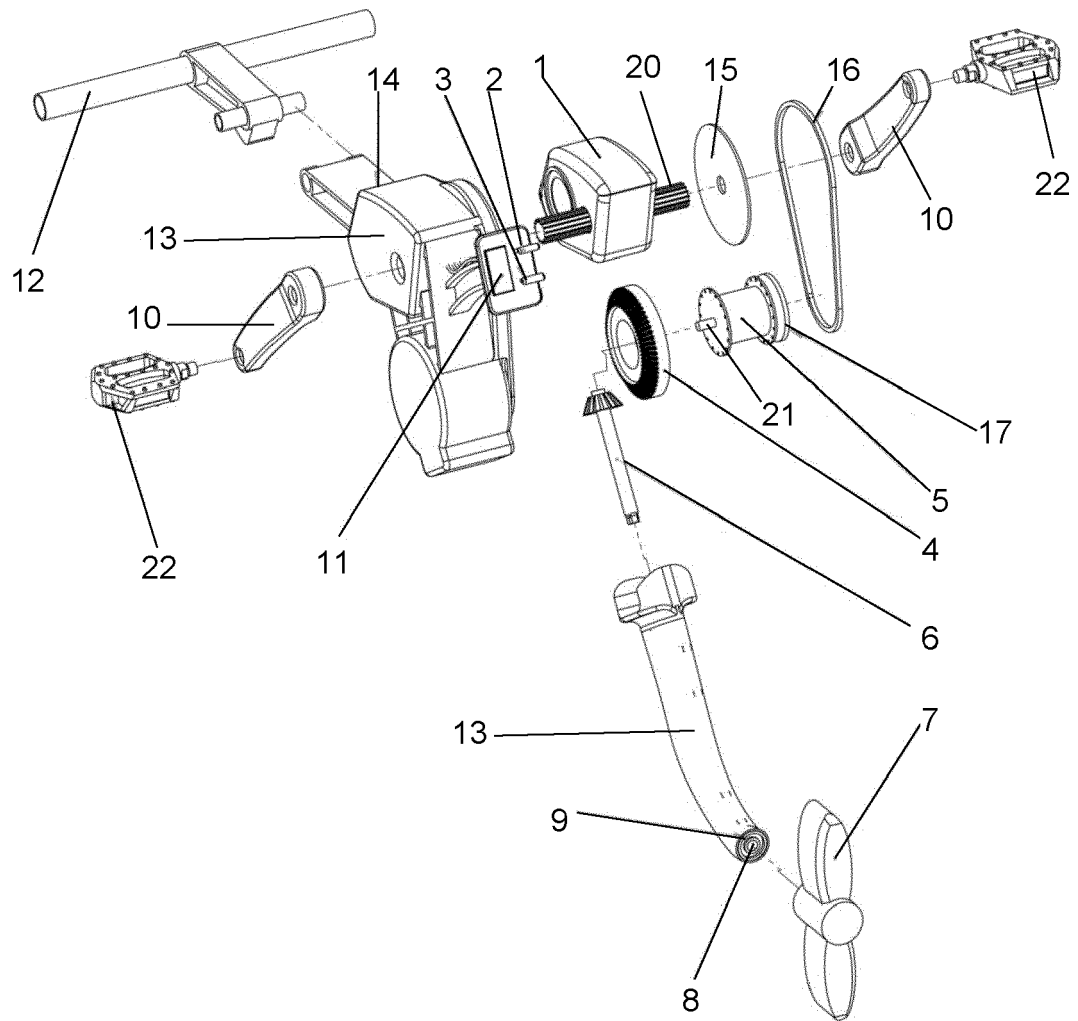


Fig. 1A

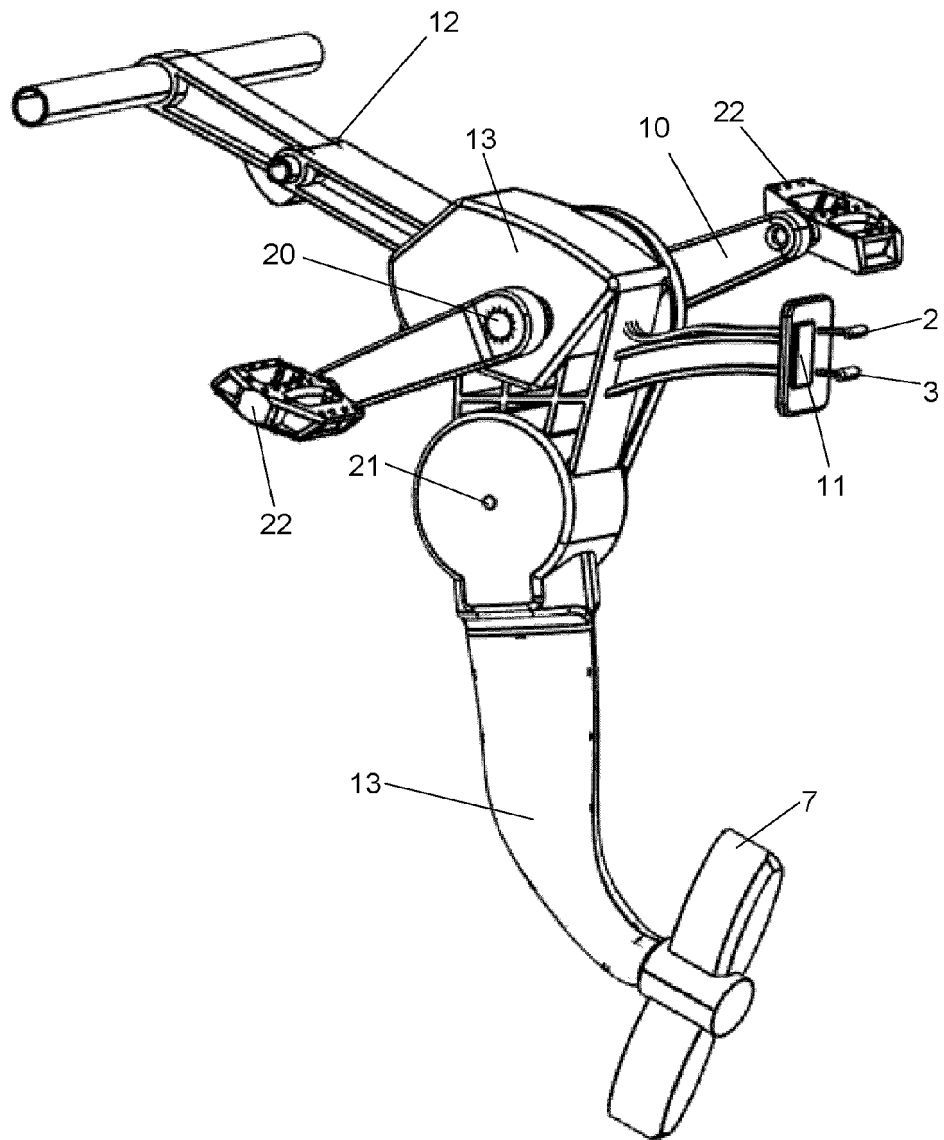


Fig. 1B

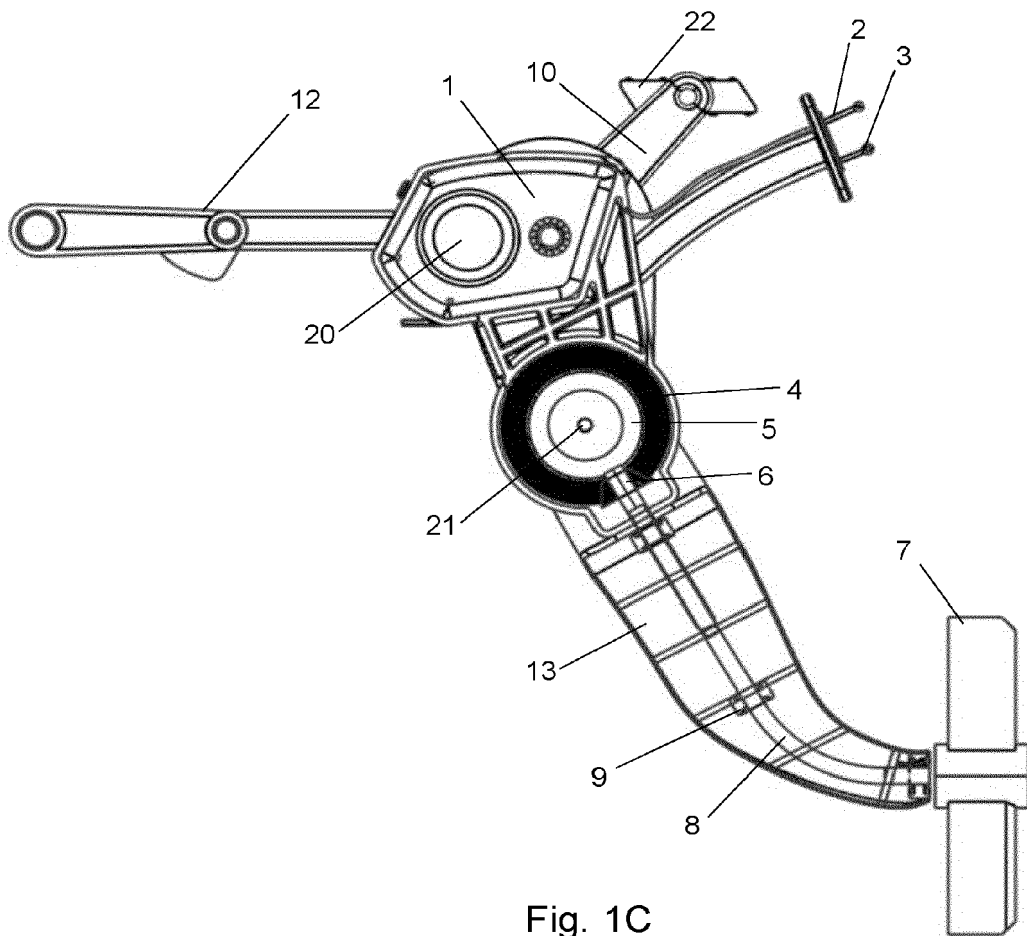


Fig. 1C

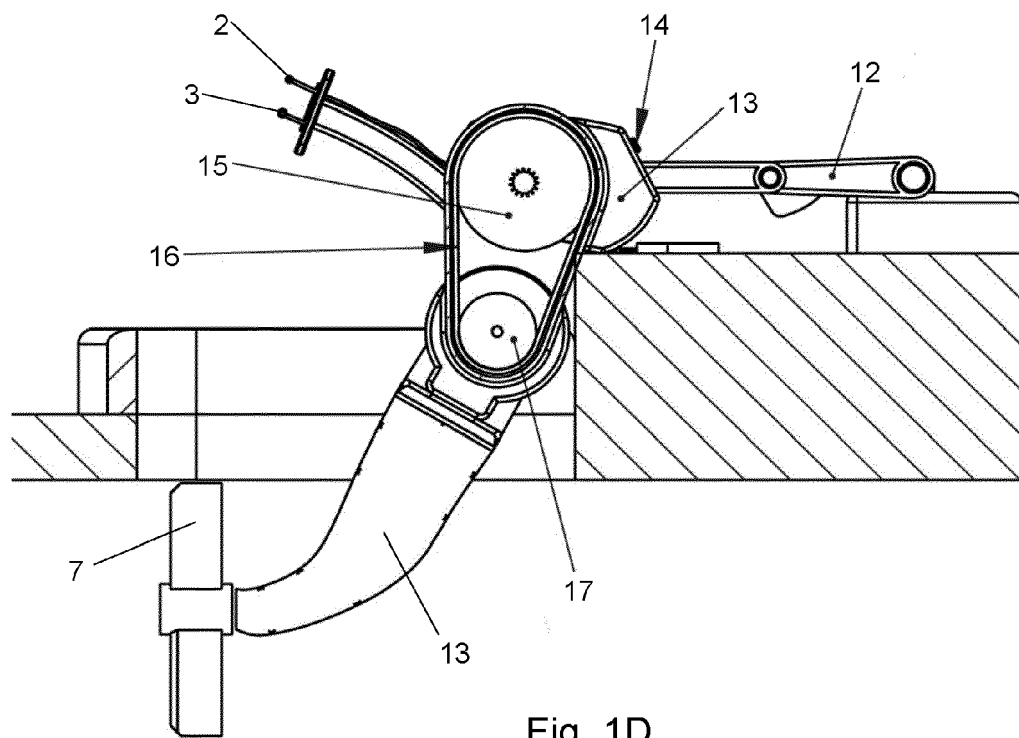


Fig. 1D

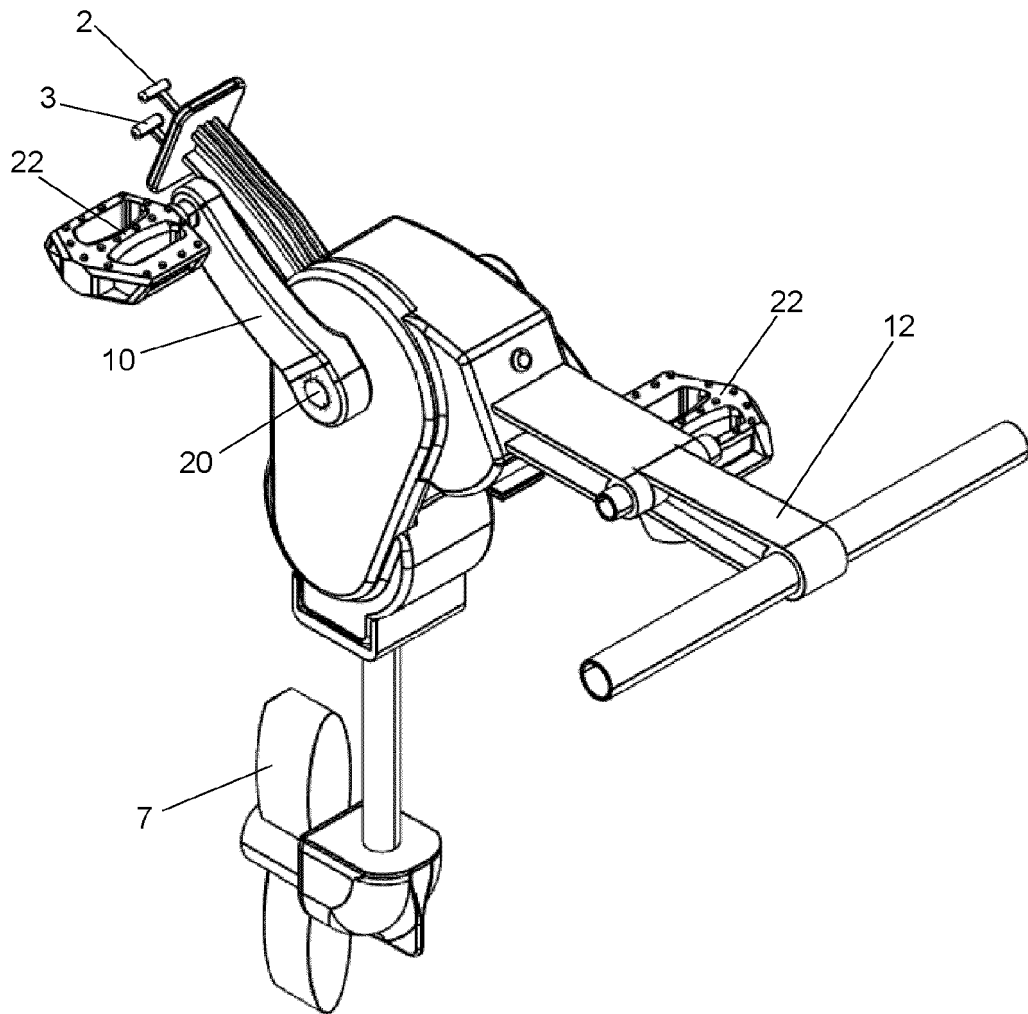


Fig. 2A

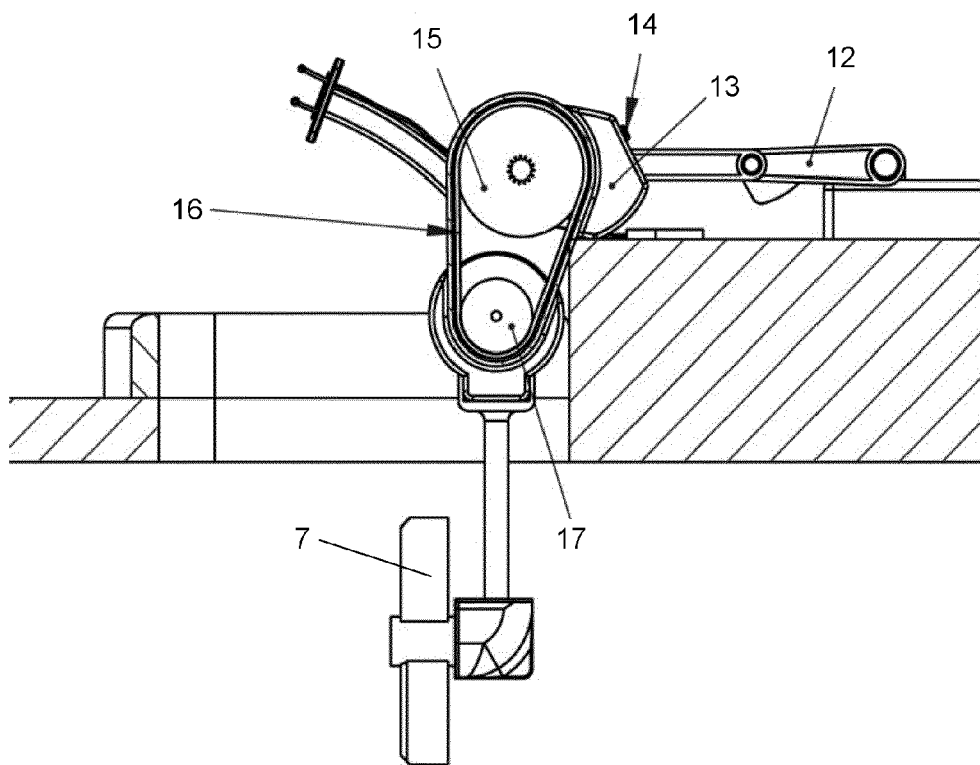


Fig. 2B

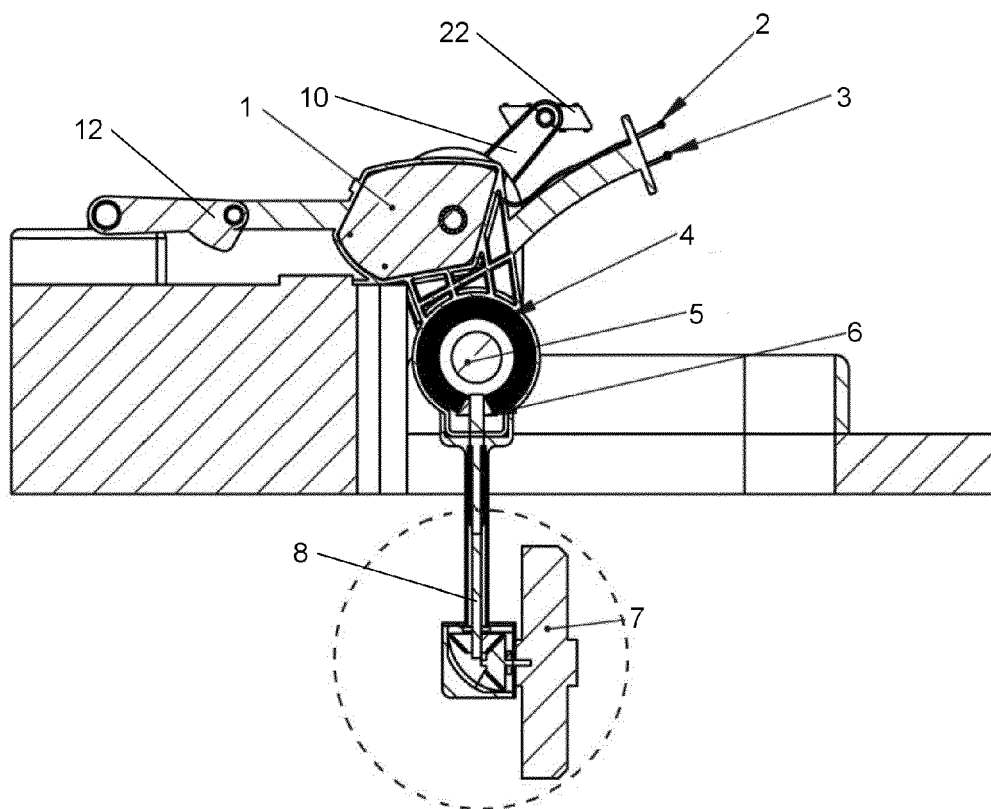


Fig. 2C

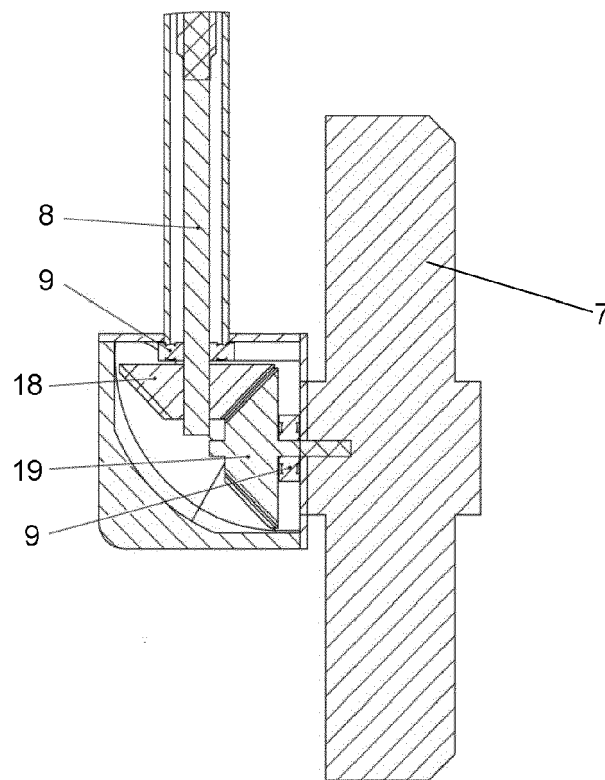


Fig. 2D



EUROPEAN SEARCH REPORT

Application Number

EP 23 20 5164

5

10

15

20

25

30

35

40

45

50

55

1

EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2021/107603 A1 (HOWARD-WILLIS GUY [NZ] ET AL) 15 April 2021 (2021-04-15) * figure 6E * * paragraphs [0162], [0171], [0271], [0273], [0274] * -----	1-11	INV. B63H16/08 B63H16/20 B63H21/17 B63H23/14 B63H23/16 B63B34/20
X	WO 2010/027202 A2 (KIM JONG-LEE [KR]) 11 March 2010 (2010-03-11) * figures 2, 9, 10 * -----	1-11	
A	US 11 148 775 B2 (KUEHMICHEL BLAINE G [US]; JOHNSON OUTDOORS INC [US]) 19 October 2021 (2021-10-19) * the whole document * -----	1-11	
			TECHNICAL FIELDS SEARCHED (IPC)
			B63H B63B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 8 March 2024	Examiner Freire Gomez, Jon
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.

EP 23 20 5164

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

08-03-2024

10

15

20

25

30

35

40

45

50

55

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2021107603 A1	15-04-2021	AU 2017402770 A1	17-10-2019
		BR 112019018419 A2	14-04-2020
		CA 3055059 A1	13-09-2018
		CN 110382342 A	25-10-2019
		EP 3592639 A1	15-01-2020
		US D969052 S	08-11-2022
		US 2021107603 A1	15-04-2021
		US 2022324536 A1	13-10-2022
WO 2010027202 A2	11-03-2010	WO 2018162962 A1	13-09-2018
		-----	-----
		KR 20100027911 A	11-03-2010
US 11148775 B2	19-10-2021	WO 2010027202 A2	11-03-2010
		-----	-----
		CA 3135475 A1	12-04-2023
		US 2021061429 A1	04-03-2021
		US 2022033045 A1	03-02-2022
		-----	-----