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(54) **EQUIPMENT FOR FLIP TURN LEARNING IN SWIMMING LESSONS**

AUSRÜSTUNG ZUM ERLERNEN DER ROLLWENDE IM SCHWIMMUNTERRICHT

ÉQUIPEMENT POUR L'APPRENTISSAGE DU VIRAGE DANS LES COURS DE NATATION

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Description

[0001] The invention relates to a system used in swimming training to practice and learn correctly the procedure of flip turn to the end of the pool, made on the basis of an immersed panel containing sensors and optical stimuli. Document US2016077660 A1 discloses an equipment according to the preamble of claim 1.

[0002] For the purpose of practicing and learning correctly the return procedures at the end of the pool is used direct observation of the trainer who based on experience gives tips for correcting the technique and are known a number of devices used in learning swimming but which are ineffective in the procedure of returning to the end of the pool (D. E. RYLAND. Systems and methods for developing correct mechanics of a swimming flip turn. Patent no. US7377784 B2, 27.05.2008), which consists mainly of a device that optimizes the teaching and learning of the return procedure by tactile feedback and spatial orientation during exercises.

[0003] The disadvantages of the existing solution are that the equipment cannot be adjusted according to the configuration and performance of the swimmer and does not provide measured data to provide information on the performance obtained after learning and repeating movements.

[0004] The technical problem solved by the invention by the technical features of claim 1, consisting in the use of an equipment that gives the athlete information on the moment when the return procedure should be started and on the place where the propulsion stroke should be performed, and on the other hand it provides information about the correctness of movement and the evolution of learning through data related to strength and speed, simultaneously with the possibility of adjusting and configuring the position of the equipment depending on the configuration and performance of the learner.

[0005] The equipment for flip turn learning in swimming lessons, according to the invention, removes the disadvantages presented by the fact that it consists mainly of a panel immersed in the pool connected to a sensor system and which controls an optical stimulus, calculating the dynamic parameters corresponding to the athlete's activity.

[0006] The invention has the following advantages:

- the equipment is mobile, easy to transport and mounted in the return area;
- the equipment can be easily adjusted according to the configuration and performance of the learner;
- the equipment allows learning the flip turn procedure by indicating the optimal moment to start the movement, indicating the optimal place to achieve the impact for propulsion and indicating the dynamic parameters of the movement at the end of the procedure.

[0007] The following is an embodiment of the invention in connection with Figure 1 and Figure 2, which are as follows:

- fig. 1 - overview of the equipment and the location;
- fig. 2 - the component elements of the immersed panel

[0008] Equipment for flip turn learning in swimming lessons, according to the invention, consists mainly of a parallel-pipedic panel 1, which is immersed in the pool at the end of the athlete's flip turn zone and which contains at the bottom the impact area 2, internally equipped with a sensor force 3, and a light source 4, connected to a command and control microsystem 5, together with the presence sensor 6, mounted on the side of the pool lane and the impact force 7 and speed 8 indicators, the panel having a graduated ruler 9 to determine the immersion depth and an adjustable gripping device 10.

[0009] The panel 1 is internally powered by batteries, immersed in water and fixed with the device 10 on the edge of the pool so that the impact area 2 corresponds to the configuration of the tested athlete and the presence sensor 6 is placed on the side of the swimming lane at a distance x depending of the athlete's configuration to detect the presence of the swimmer and trigger the light stimulus - light source 4, which visibly illuminates the impact area 2. When the presence sensor 6 detects the athlete's swimming arrival, it commands the command and control microsystem 5 which illuminates the impact area 2 through the internal light source 4 so that the athlete begins the return procedure and at the same time identifies the optimal area for the impact. At the moment of impact, the pushing force of the athlete is measured with the internal force sensor 3 and the supply of the light source 4 is stopped, calculating the speed by the time elapsed between the moment when the signal from the presence sensor 6 is emitted and the signal from force sensor 3, the impact force is displayed and implicitly the correct impact area on indicator 7 and the athlete's speed on indicator 8, information that describes the correct execution of the return procedure and sports performance and which can be stored by the command and control microsystem 5 to be able to analyze a history of the athlete's attempts.

[0010] Equipment for flip turn learning in swimming lessons, according to the invention, can be reproduced with the same performance and characteristics whenever necessary, which is an argument in favor of compliance with the criterion of industrial applicability.

References

[0011]

- 5 [1]. D. E. RYLAND. Systems and methods for developing correct mechanics of a swimming flip turn. Patent no. US7377784 B2, 27.05.2008.

Claims

- 10 1. Equipment for flip turn learning in swimming lessons, comprising a parallelepiped panel (1), which is immersed in the pool at the end of the athlete's flip turn zone and which contains at the bottom one impact area (2), **characterised**
 15 **in that** the panel (1) is equipped internally with a force sensor (3), and a light source (4), connected to a command and control microsystem (5), together with a presence sensor (6), mounted on the side of the swimming lane and impact force indicators (7) and speed indicators (8), wherein the panel (1) is battery-powered and provided with a
 20 graduated ruler (9) to determine the immersion depth and to be immersed in water and fasten with a device (10) on the edge of the pool so that the impact area (2) corresponds to the configuration of the tested athlete, wherein the presence sensor (6) is configured to be placed on the side of the swimming lane at a distance x from the turn end, depending on the height the athlete to detect the presence of the swimmer by sending a signal to the microcontroller
 25 (5) which triggers a light stimulus on the light source (4), which visibly illuminates the impact area (2), such that when the presence sensor (6) detects the athlete's swimming arrival, it commands the command and control microsystem (5) which illuminates the impact area (2) through the internal light source (4) for the athlete to begin the return procedure and at the same time to identify the optimal area for impact, and at the moment of impact the pushing force of the athlete is measured with the internal force sensor (3) and the power supply is stopped for the
 30 light source (4), calculating the speed by the time elapsed between the moment when the signal from the presence sensor (6) is emitted and the signal from the force sensor (3), the impact force is displayed and implicitly the correct impact area on the indicator (7) and the speed of the athlete on the indicator (8), information that describes the correct execution of the return procedure and sports performance and which can be stored by the command and control microsystem (5) in order to be able to analyze a history of the athlete's tests.

Patentansprüche

- 35 1. Gerät zum Wendenlernen im Schwimmunterricht, bestehend aus einer quaderförmigen Platte (1), die am Ende der Wendezone des Sportlers in das Becken eintaucht und die unten eine Schlagfläche (2) enthält, **dadurch gekennzeichnet** das Paneel (1) ist innen mit einem Kraftsensor (3) und einer Lichtquelle (4) ausgestattet, die mit einem Befehls- und Steuermikrosystem (5) verbunden ist, zusammen mit einem Anwesenheitssensor (6), der an der Seite
 40 angebracht ist Schwimmbahn- und Aufprallkraftanzeiger (7) und Geschwindigkeitsanzeiger (8), wobei die Tafel (1) batteriebetrieben ist und mit einem Messlineal (9) versehen ist, um die Eintauchtiefe zu bestimmen und in Wasser einzutauchen und mit einem zu befestigen Vorrichtung (10) am Beckenrand, so dass die Aufprallfläche (2) der Konfiguration des getesteten Sportlers entspricht, wobei der Anwesenheitssensor (6) so konfiguriert ist, dass er auf der Seite der Schwimmbahn in einem Abstand x von platziert wird am Wendeende, abhängig von der Körpergröße
 45 des Athleten, um die Anwesenheit des Schwimmers zu erkennen Senden eines Signals an den Mikrocontroller (5), der einen Lichtreiz an der Lichtquelle (4) auslöst, die den Aufprallbereich (2) sichtbar beleuchtet, so dass, wenn der Anwesenheitssensor (6) die Schwimmankunft des Athleten erfasst, er dies befiehlt Befehls- und Steuermikrosystem (5), das den Aufprallbereich (2) durch die interne Lichtquelle (4) beleuchtet, damit der Athlet mit dem Rückkehrvorgang beginnen und gleichzeitig den optimalen Bereich für den Aufprall und im Moment des Aufpralls identifizieren kann die Schubkraft des Athleten wird mit dem internen Kraftsensor (3) gemessen und die Stromversorgung für die
 50 Lichtquelle (4) gestoppt, wobei die Geschwindigkeit anhand der Zeit berechnet wird, die zwischen dem Moment verstrichen ist, an dem das Signal vom Anwesenheitssensor (6) ausgegeben wird und das Signal vom Kraftsensor (3) die Aufprallkraft angezeigt wird und implizit die richtige Aufprallfläche auf der Anzeige (7) und die Geschwindigkeit des Sportlers auf der Anzeige (8), Informationen, die die korrekte Ausführung beschreiben das Rücksendeverfahren über sportliche und sportliche Leistung und die vom Befehls- und Kontrollmikrosystem (5) gespeichert werden können, um eine Historie der Tests des Athleten analysieren zu können.

Revendications

1. Equipement pour l'apprentissage du virage dans les cours de natation, **caractérisé par le fait qu'il** est constitué principalement d'un panneau parallélépipédique (1), qui est immergé dans le bassin à la fin du virage de l'athlète et qui contient la zone d'impact en partie basse (2), bien défini, équipé dans l'intérieur avec un capteur de force (3), et d'une source lumineuse (4), relié à un microsystème de commande et de contrôle (5), ensemble avec le capteur de présence (6), monté sur la côté de la voie de circulation et les indicateurs de force d'impact (7) et de vitesse (8), le panneau (1), alimenté par des batteries, ayant une règle graduée (9) pour établir la profondeur d'immersion et il s'immerge dans l'eau et il est fixée avec le dispositif (10) sur le bord du bassin pour que la zone d'impact (2) corresponde à la configuration de l'athlète testé, ainsi que le capteur de présence (6) soit placé du côté du couloir de nage à une distance x, du extrémité de retour, selon la taille de l'athlète pour détecter la présence du nageur qui transmettant un signal au microcontrôleur (5) qui déclenche le stimulus lumineux - la source lumineuse (4), qui éclaire visiblement la zone d'impact (2). Lorsque le capteur de présence (6) détecte l'arrivée de l'athlète en train de nager, il commande le microsystème de commande et de contrôle (5) qui illumine la zone d'impact (2) à travers la source de lumière interne (4) pour que l'athlète commence le retour procédure et identifie en même temps la zone optimale pour l'impact, et au moment de l'impact, la force de poussée de l'athlète est mesurée avec le capteur de force interne (3) et la source lumineuse est éteinte (4), en calculant la vitesse au moyen du temps écoulé entre le moment où le signal est émis par le capteur de présence (6) et le signal du capteur de force (3), la force d'impact et implicitement la zone d'impact correcte sont affichées sur l'indicateur (7) et la vitesse de l'athlète sur l'indicateur (8), information décrivant la justesse de l'exécution de la procédure de virage et de la performance sportive et pouvant être stockée dans le microsystème de commande et de contrôle (5) pour pouvoir analyser un historique des activités du sportif.

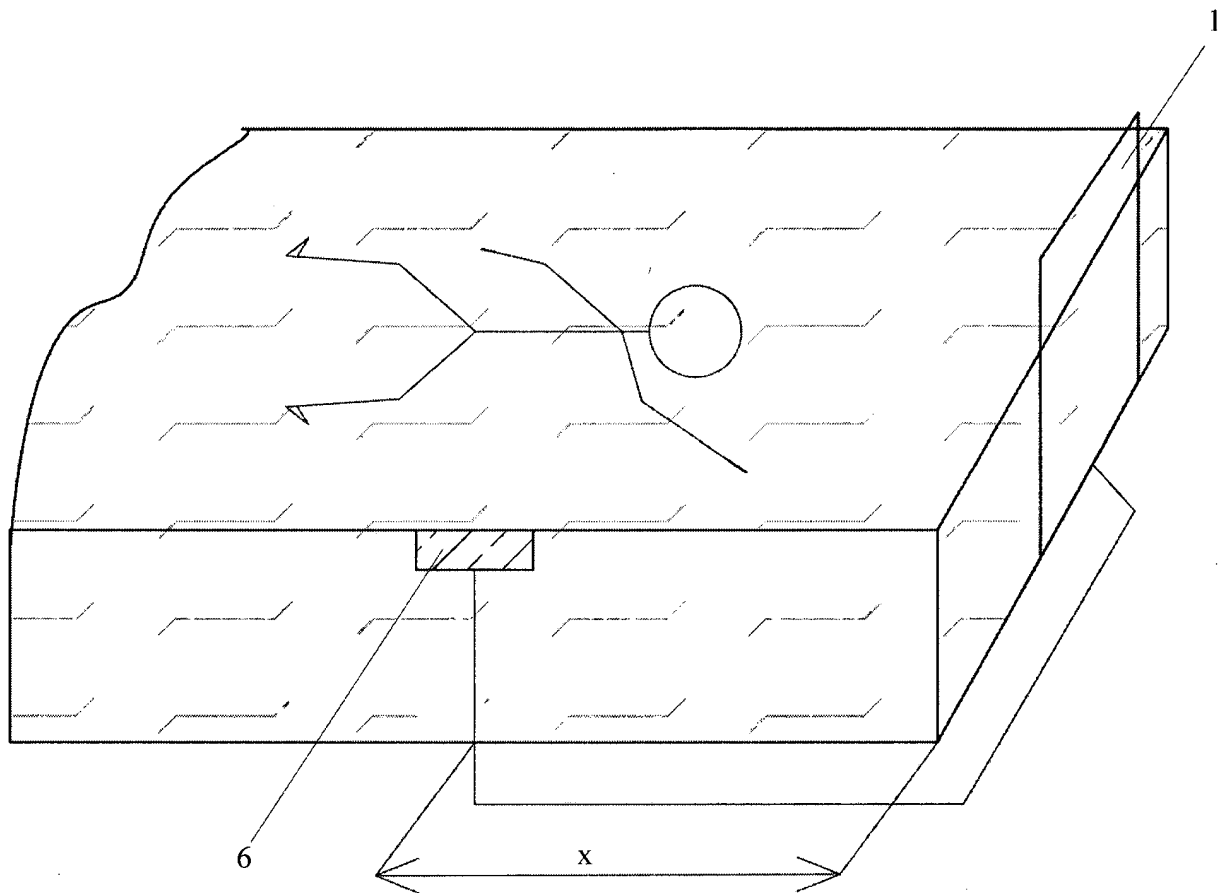


Fig. 1

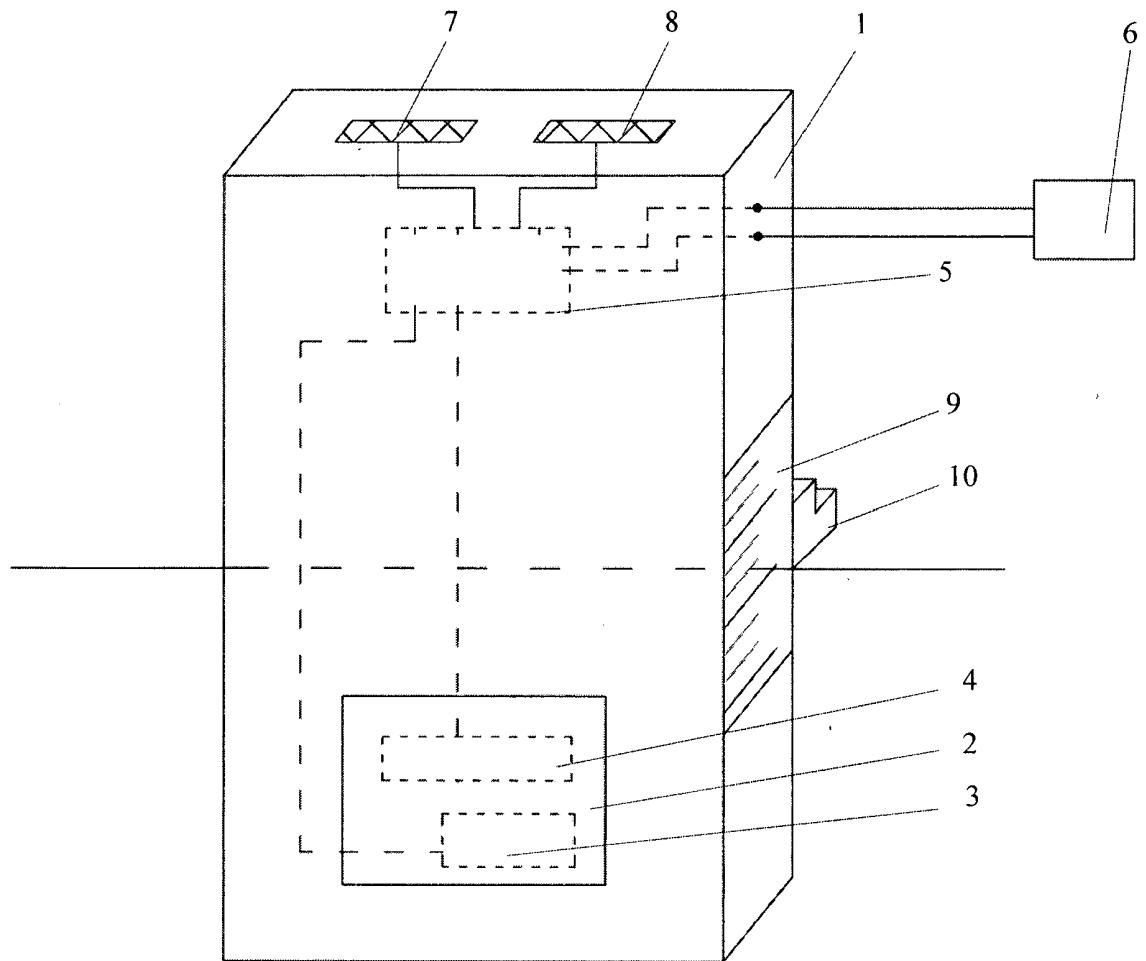


Fig. 2

REFERENCES CITED IN THE DESCRIPTION

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