

Adjustable geometry swimming paddle and elastic deformation for recovery of energy



TYPE OF RESULT

New technology
 [**New product**]
 New service
 New knowledge or skill



COMMERCIAL MATURITY LEVEL

Conceptual idea
 [**Proof of concept (design)**]
 Validated in a controlled
 environment
 Validated in a real environment
 Successfully implanted



PROTECTION LEVEL

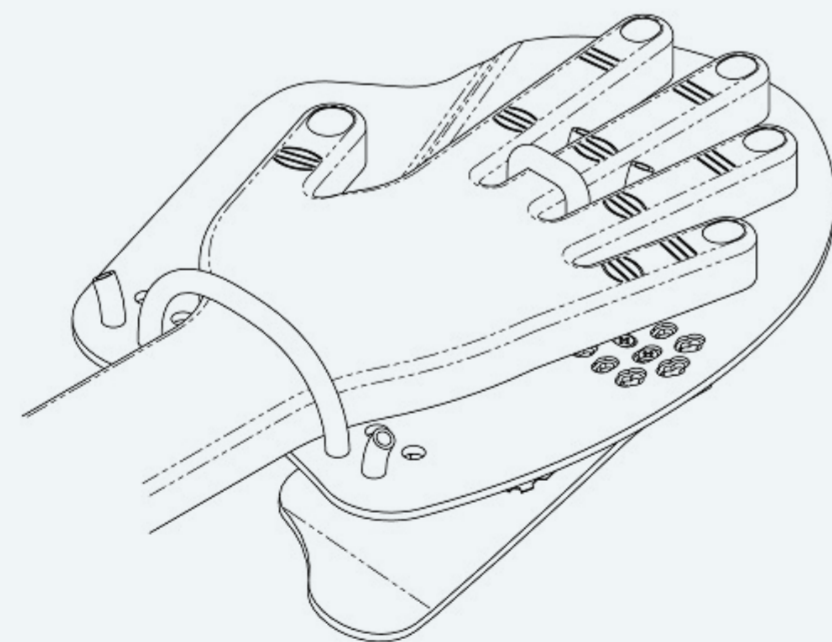
Non- applicable
 Patent
 Software
 Know - how
 [**Utility model**]

Name of the patent Ergonomic swimming paddle
File number ES1276835Y
Filing date 27/05/2021
Patent grant status Active
Places where the patent is granted Spain

Description of the solution. Problem solved

Swimming paddles are accessories, usually made from plastic. Depending on the model, they fit the swimmer's hands by different attachment methods, being placed on the palms of the hands. Reasons justifying their usefulness are mainly based on their effect on the technique refinement and enhancement of the strength applied in each stroke.

They can be found in the market in different shapes, materials and methods of use. Their features are defined by design factors decided by manufacturers, as well as by the target user's typology and muscle groups that they intend to work out. Larger paddles are usually used for strengthening upper extremities since the required effort for moving is much greater compared to swimming without paddles. On the other side, smaller paddles cause less resistance to strokes compared to larger paddles and they are used for improving swimmer's technique.



Due to the increase in the resistance of the stroke caused by the paddles, these must be selected, adjusted and used correctly in order to not cause injuries to users. Generally, this process may be considered as complex among swimmers; it may take considerable time and involve changes in typologies of paddles for achieving their objectives.

The solution proposed in this invention is an

ergonomic paddle, with modifiable geometry and behaviour. This is possible since it has a plate that deforms under hydrodynamic pressures, allowing their redistribution during the stroke cycle. This one-size-fits-all paddle can be used by swimmers of different levels, ages and morphology thanks to its adjustable geometry, as well as influence in the behaviour when using it. The deformable plate, or flexor plate, has been optimised together the structural plate and adjusted by an easy, simple and effective screw systems along numerous holes that allow vertical and horizontal movements and anticlockwise rotations, if seen from upper side of the paddle.

Movement ranges have been considered for adjusting to the higher number of users and a correct biomechanical range.

The paddle consists of a main structure to which a flexor plate is attached by using a system ranging from two to three screws, that are easy to remove and interchange positions by users. The deformable plate deforms depending on the stroke phase, allowing redistribution and homogenization of loads on the swimmer's upper limbs. This is caused when effort on the swimmer is increased during the initial phase, or attack phase, of the underwater part and demand decreases during the final phase, or exit phase, where impulse is generated towards the swimming direction due to the elastic recovery of the deformable plate.

Additionally, the deformable plate allows swimmer to sharpen their perception on the location of the hand due to its geometry and customisable nature, thereby penalising sudden direction changes of their hands, which also extrapolates to upper limbs. These corrections allow swimmers to improve their technique both in recreative and professional levels, as well as in other usage fields such as recovery and strengthening therapies.

Currently, the design of this innovative swimming paddle has been presented as a utility model in the Spanish Patent and Tra-

demark Office.

A working prototype has been made by additive manufacturing processes, commonly known as 3D printing. The manufacturing process of this paddle has been designed to be as efficient as possible in terms of cost, and currently it is being optimised for being made with recycled polymers, specifically with polypropylene.

Fields of commercial application

This product has direct application on general sport activity such as swimming schools, occasional and professional swimmers or even injury recovery and muscle strengthening therapies.

Market opportunity

For a deeper understanding of the possibilities of target market, it must be said that currently swimming is one of the most practised sports in the world and it has been proved how regular practise benefits health.

Only in Canary Islands there are more than 4,000 federated swimmers that regularly practise, and they usually have 2 pairs of paddles. In Spain, Canary Islands are on sixth position of number of federated swimmers, being Catalonia on top of the rank with more than 14,000. In addition to this, it must be taken into account that not only federated swimmers use this type of product, and thus market opportunity is bigger, but hard to quantify.

Competitive advantage

- Redistribution of stroke loads in subaquatic phase, according to features and goals of each swimmer.
- Alteration of the behaviour of the paddle during subaquatic phase thanks to the ad-

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justability of the position of the flexing plate related to the structural plate, providing technical correction effects.

- High degree of adaptation to users with different morphologies and goals, thanks to an easy-to-use system and wide adjustability and operational ranges.
- Modular design optimising production processes in terms of adaptability and costs, as well as in subsequent phases such as product recyclability.