

## New Types of Rowing Sport Machinery And Related New Sports

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This work of sports engineering is dedicated to Bristol, the wonderful city in England

**ABSTRACT :** Physical education and sports have been an inseparable part of society and every person since ancient times. Sports engineering creates new types of sports equipment and devices and new types of sports related to them. Rowing in general, and academic rowing in particular, is one of the most spectacular and active sports requiring muscular exercise. The disadvantage is that this sport is tied to the aquatic environment. We propose new sport rowing hot air airships and „land galleys''. As for its use in sports recreational and entertaining purposes, the main problem lies in the oars - when moving the oars in opposite directions, it will be necessary to turn 90<sup>0</sup>, otherwise, they will simultaneously push the air forward and backward. We have developed several options for oars. The devices developed and proposed will enrich the arsenal of rowing sports devices as well as introduce new, spectacular, active types of rowing itself.

**KEYWORDS:** sport, rowing, hot air balloon, hot air airship, oar, spectacularity

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### I. INTRODUCTION

Physical education and sports have been an inseparable part of society and every person since ancient times(1). Sport is one of the most rewarding leisure and health activities for participants; and one of the most exciting and spectacular way to spend your leisure time as a spectator. Some of the most spectacular sports have great commercial potential and generate huge revenues. Sports engineering creates new types of sports equipment and devices and new types of sports related to them.

### II. OBJECTIVES

The purpose of this work is to creation of new types of sports devices and related new sports and sports competitions.

### III. MATERIALS AND METHODS

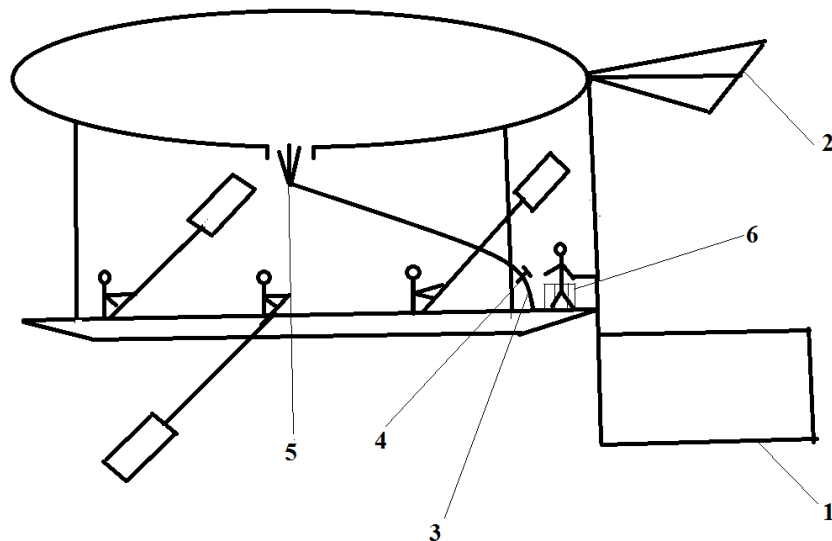
Reviewing existing sports equipment and devices, their advantages and disadvantages, creation of new types of sports devices for active, spectacular rowing.

Rowing in general, and academic rowing in particular, is one of the most spectacular and active sports requiring muscular exercise (2). The disadvantage is that this sport is tied to the aquatic environment.

Recently, new sports devices and related sports have appeared - hot air balloons and hot air airships (3,4). The sports associated with these sports devices are very spectacular, but not active - they are not associated with an active muscular load. Hot air balloons, in addition, are uncontrollable, moving in the direction of the wind.

Telavi State University has developed new types of sports equipment for rowing.

We propose to combine hot air airships and rowing machinery. In the proposed construction (Fig. 1), a light frame made of light and durable material (for example, duralumin) is suspended under the airship, on which seats for rowers and rowing machinery are installed. The oars are made of lightweight material, the blades are covered with light parachute fabric. At the end of the frame there is a steering wheel and a place for the Coxswain who can simultaneously regulate the intensity of the burner fire and the flight altitude of the hot air airship.



**Fig.1 Rowing Hot Air Airship** 1- vertical rudder, 2 - horizontal rudder, 3 - gas hose, 4 - gas supply regulator, 5 - hot air airship burner, 6 - round railing or micro gondola for Coxswain

The idea of a rowing airship has existed for a long time (Fig.2), but it is not suitable for industrial use.

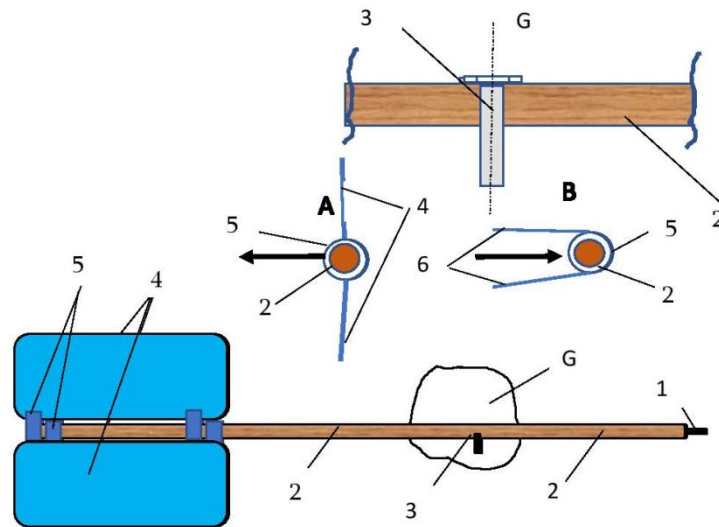


**Fig. 2 Rowing Airships in the view of early artists**

As for its use in sports recreational and entertaining purposes, the main problem lies in the oars - when moving the oars in opposite directions, it will be necessary to turn  $90^{\circ}$ , otherwise, they will simultaneously push the air forward and backward. When taking in air, the blades of the oars should be in a vertical position, while passively moving in the opposite direction - in a horizontal position. But in order for the oars to push back more air and create more thrust, the oars must be long and their blades must be large, which will make them difficult to turn.

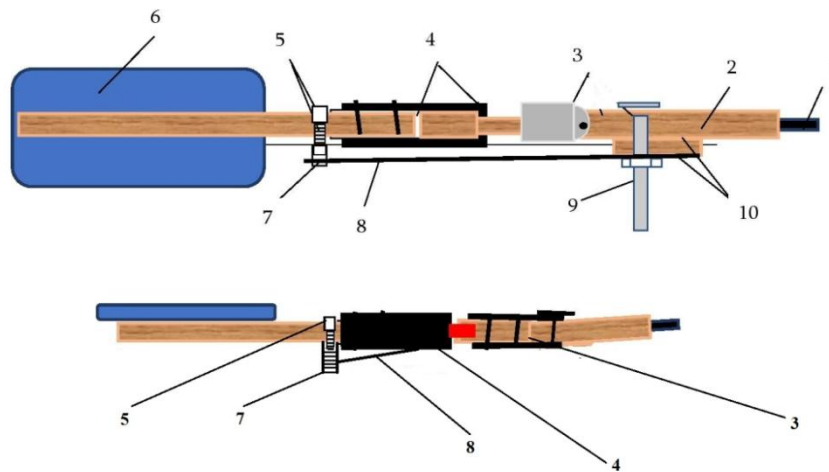
We have developed several options for oars.

In first option (Fig.3) the blades can consist of two halves, which fold under air pressure when the oars move in one direction, and open when the oars move in the opposite direction under the influence of the air.



**Fig. 3 Oars with two halves of blade, A – halves of the oar blades in the open position, B - halves of the oar blades in the folded position.**

In second option (Fig. 4), we have developed mechanisms that automatically rotate the oars by  $90^\circ$ , depending on which of the two horizontal opposite directions they move. These oars consist of two parts, while one part of the oar with a blade can rotate relative to the other part of the oar with a handle both in the horizontal plane and around its axis. A rod with a toothed plate is rigidly fixed to the part of the oar with a handle, and a sector of the toothed gear wheel is fixed to the part of the oar with a blade. In hinge 3, one part of the oar rotates around the other in a horizontal plane at a small angle of  $3^\circ-5^\circ$ , in hinge 4 one part of the oar rotates around the other and longitudinal axis of the oar by  $90^\circ$ . When the oar moves in opposite horizontal directions, the toothed plate turns the oar blade in opposite directions by  $90^\circ$  through the sector of toothed gear wheel.



A)

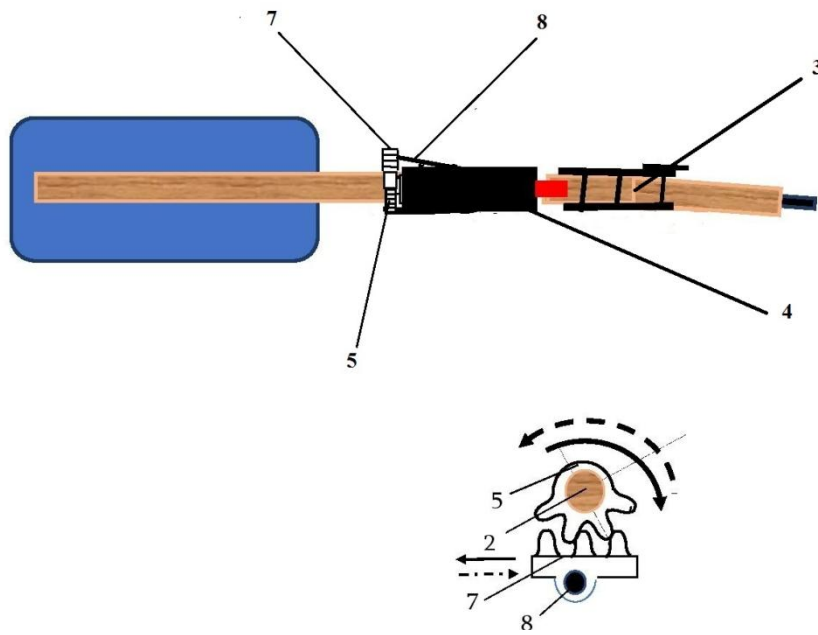


Fig. 4

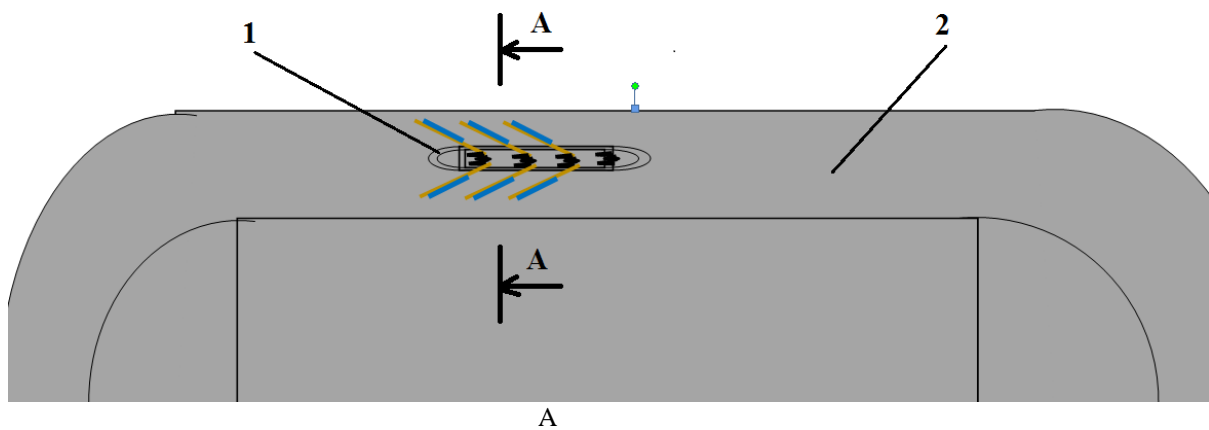
3 - the hinge, where one part of the oar rotates around the other in a horizontal plane at a small angle of  $3^{\circ}$ - $5^{\circ}$ , 4 - the hinge, where one part of the oar rotates around the other part and longitudinal axis of the oar by  $90^{\circ}$ , 5 - the sector of the toothed gear wheel which is fixed to the part of the oar with a blade, the toothed plate 7 with a rod 8 which is rigidly fixed to the part of the oar with a handle

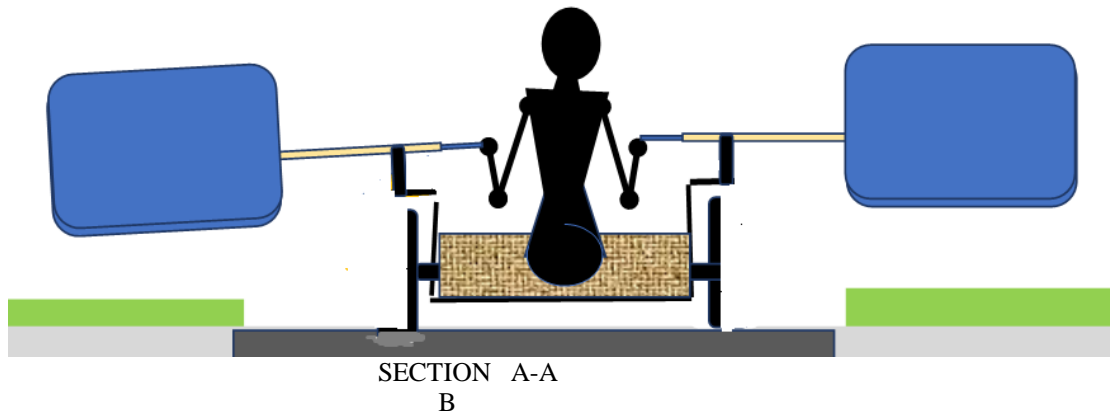
**A) The oar with a blade in the horizontal position, B) The oar with a blade in the vertical position**

In third option, the oars can be equipped with a hydraulic or electric system, which automatically, or by pressing a button on the oars, will turn the blades of the oars by  $90^{\circ}$  when changing the direction of movement.

Since, unlike water rowing, the oars do not need to be lowered and raised in a rowing hot air airship, they can be installed with the possibility of movement only in a horizontal plane.

In addition to airborne rowing, Telavi State University has developed sports equipment for land rowing (Fig. 5) for Motor Speedways. The frame with seats for rowers and rowing systems (machinery) is equipped with wheels, a steering wheel and a seat for the Coxswain are installed in the front of the frame.





**Fig. 5** 1 – land galley, 2 – Motor Speedway  
 A) The land galley on the Motor Speedway A) Section A-A

#### IV. RESULTS

As a result of these developments, we have received new land and air rowing sports equipment and related types of exciting spectacular sports with a high degree of muscle load.

#### V. DISCUSSION

Certainly, implementing new sports devices in practice requires financial investments. However, the entertainment, romanticism, activity (requiring muscular activity from the athlete) of the proposed types of rowing sports devices and related sports will ensure commercial success and will more than pay for the costs.

#### VI. CONCLUSION

The developing sports industry is constantly enriched with new sports equipment and new sports.

The developed and proposed airborne rowing apparatus - "air galley" will brighten up the fiestas of hot air balloons and hot air airships. It is possible to arrange a simultaneous flight - a speed contest - of several rowing hot airships - air galleys.

In addition, the air galleys can additionally be equipped with a gondola for tourists and touristic sightseeing trips can be arranged for them providing them with wonderful memories and unforgettable impressions.

Performances at racing motor tracks can be enriched with competitions of "land galleys" - ground-based sports rowing apparatus. True, it will not be possible to carry out a competition of several ground-based rowing vehicles simultaneously, since these vehicles have a large width due to large length of the oars. But arrange successive races of „ground galleys " with timing can be arranged.

The devices developed and proposed will enrich the arsenal of rowing sports devices as well as introduce new, spectacular, active types of rowing itself. Increasing entertainment will make this very expensive sport profitable and contribute to its wide distribution.

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