

Research on Innovation of Mechanical Structure of Intelligent Sports Equipment

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Abstract: The role of machinery in sports equipment can be said to be very important. With the continuous development and progress of modern communication and information technology, computer network technology, intelligent control technology and other technical fields, sports equipment has gradually realized intellectualization through the transformation and innovation of internal mechanical structure, which has greatly changed the outlook of the sports industry. Taking the mechanical structure innovation of intelligent football equipment as an example, this paper explores the innovative ideas of the mechanical structure of intelligent sports equipment, and further provides support for the development of machinery industry and the progress of sports undertakings.

1. Introduction

With the continuous development of information technology, intelligent home, intelligent car and so on have gradually entered our vision, greatly improving people's living standards. As an inevitable demand for people to strengthen physical exercise, sports equipment has naturally stepped into the era of intellectualization. At the same time, with the development of the times, the improvement of people's living standards and the sustained development of sports undertakings, people's demand for sports equipment is also increasing, which requires that the corresponding mechanical structure of sports equipment be innovated constantly, while the intelligent era is different from the traditional era. So how should the mechanical structure of sports equipment be innovated continuously in the intelligent era and what are the innovative ideas? This requires us to study, constantly promote the innovation of the mechanical structure of intelligent sports equipment, adapt to the development of the times, and promote the development of sports.

2. Mechanical Structure Innovation of Intelligent Football Equipment

Intelligent football equipment can be used in assistant football training. It consists of tracker, intelligent football with chip and intelligent workstation. It can collect real-time motion data, present 170 data indicators such as heart rate, exercise load, running distance and motion track, and automatically generate motion reports. Compared with the existing football equipment, the intelligent football equipment has two more devices, tracker and intelligent workstation, and chip is added in the football structure. This is the main feature of intelligent equipment, which transmits data in real time through chips and other mechanical equipment, and uses Internet information technology to transmit to workstations to form motion analysis reports. Through the analysis of relevant data and reports, the problems in football training and matches can be specially trained and improved, which provides strong equipment support for more targeted improvement of football players' level.

3. Innovative Ideas on the Mechanical Structure of Intelligent Sports Equipment

3.1 Innovation Based on Optimizing Demand of Sports Equipment

The foreign softball players drilled the end of the bat and replaced it with cork core, thus increasing the rebound force of the ball and hitting the ball which is difficult for ordinary people to receive; Heide, a famous mechanical engineer, widened the tennis racket, and then increased the polar moment of inertia of the tennis racket, thus making the batting effect better; Department of Mechanics, Virginia Technological University, through research, found that the traditional pair of ski boots. Athletes' calf burden is heavier, and then a new type of ski boot is developed. In structure, the lower end of the lever is mounted on the upper surface of the boot, the shape is in line with the tibia and fibula of the lower leg, and a ring is placed on the upper end to hoop the thigh, which reduces the load on the lower leg and saves more effort. It can be seen that the traditional sports equipment is also based on the actual needs of sports to constantly reform and innovate the mechanical structure, so as to achieve a better effect of sports and increase the burden of athletes.

In the process of innovation of intelligent sports equipment, we should also learn from this innovative idea, aiming at continually optimizing the mechanical structure of sports equipment by using big data and Internet information technology according to actual sports needs.

3.2 Innovation Based on Specific Field Demand of Sports Industry

Japan has developed a robot for judo training, which can be trained by a single person. This has achieved a new breakthrough in strengthening the training of athletes. When an athlete hugs a robot to roll, the machine connected with the athlete shows the relevant data of strength; including the intelligent football equipment we analyzed earlier, these are all innovations based on the needs of a certain area of the sports industry.

In the process of sports or training, we often need a large amount of data to master. However, traditional training equipment or sports equipment, often through manual recording or calculation, can not provide or timely transmit and provide training data. Sometimes, the equipment reflected and provided by traditional equipment is not accurate. True. Therefore, based on the training needs or sports needs of some sports fields, engineers continue to optimize and innovate. On the basis of traditional equipment, they use intelligent means to optimize the mechanical structure of the original equipment, such as intelligent football equipment, or create, such as the emergence of judo robots. These cases and innovative ideas provide innovative ideas for us to use intelligent means to promote the mechanical structure innovation of sports equipment.

4. Innovative thinking mode of mechanical structure of intelligent sports equipment

4.1 Open thinking

Open thinking and closed thinking are two corresponding aspects. It requires designers to look at the problems from all-round and multi-angle when carrying out mechanical innovation, which is conducive to breaking through the limitations of traditional thinking mode, in order to obtain new ideas and ideas, and guide people to practice. For example, taking the mechanical structure innovation of intelligent football equipment as an example, designers should not only consider the intelligence of football itself, but also consider athletes or sports equipment applicants, such as data acquisition, data transmission, intelligent workstation and so on. All kinds of factors should be considered comprehensively and the object of development should be regarded as an open system for innovation, which is conducive to exploring the law of product development and ensuring the efficiency of innovation.

4.2 Free Thinking

In recent years, China's machinery manufacturing industry has developed rapidly, and there are many mechanical products on the market. Many designers are deeply influenced by the previous design concepts. When they innovate, they are limited by the traditional design concepts. They can

only innovate some functions. They have not fundamentally changed the functions and performances of products, resulting in more similar products, and on the contrary, they have intensified the competition in the mechanical market. In this regard, designers should get rid of the limitations of the inherent framework and imagine freely on the basis of following the objective law, which is conducive to achieving twice the result with half the effort.

4.3 Multidirectional Thinking

In the process of mechanical innovation, designers should develop multi-directional thinking. They should not confine the concept of innovation to a certain thinking, which will lead to the misunderstanding of innovation and affect the efficiency of innovation. Therefore, when designers fall into the dilemma of innovation, they should consider the problem from multiple perspectives, which is conducive to more inspiration. At the same time, designers can also discuss and study with relevant experts or colleagues to get more opinions and ideas, and combine with their own views, so as to get rid of the current predicament.

5. Innovative Method of Mechanical Structure of Intelligent Sports Equipment

5.1 Bionic Innovation Method

Mechanical innovation is not free-wheeling and imaginative. Most of the machines have some connection with nature, and innovate on this basis. Bionic innovation method is one of the most commonly used methods at present. It is helpful for designers to analyze the similarities and differences between machinery and biological movement in order to obtain innovative inspiration, such as bionic manipulator, bionic walking machine, prosthesis, etc. These successful cases provide useful reference for designers to innovate mechanical products, and urge designers to analyze according to the sports needs of various industries, so as to carry out mechanical innovation.

5.2 Enumeration of Innovation Law

Enumeration innovation law can be roughly divided into two categories: (1) Advantage enumeration method. In the design of mechanical products, designers need to list the advantages of technology, ideas, product functions, product performance, product price, and compare with other mechanical products to determine their market advantages, which can guarantee the innovative value of machinery. (2) Disadvantage enumeration method. When the mechanical innovation scheme is determined, it is necessary to enumerate the existing defects one by one, and formulate specific measures to solve them, and constantly improve the design scheme to achieve the goal of innovation. The main reason for adopting this method is that some designers often neglect other problems when they think too much about the function of products in mechanical innovation, which leads to some defects in mechanical products, which affects the quality, safety and aesthetics of products, and is not conducive to the development of enterprises. And listing the advantages and disadvantages of the product is helpful for designers to know the actual situation of the innovation scheme in time, to control it and to make it play its due value.

5.3 Technology Transplantation Method

Technology transplantation is also one of the most commonly used innovative methods at present. In order to achieve the goal of innovation, it is necessary to analyze the innovative projects and integrate them with the existing advanced technology. For example, in the field of robotics, there are many robotic products on the market. Their internal structures are much the same, but there are obvious differences in their functions. Combining robotic technology with mechanical innovation can not only shorten the innovation cycle and reduce the cost of product development, but also improve the performance of robots and make them have comprehensive benefits. In addition to technology, advanced design ideas are also portable content. Although the cost of this innovation method is relatively high and the development cycle is relatively long, the innovation effect is better and has its unique value.

6. Conclusion

With the development of science and technology, China's machinery manufacturing level has been rapidly improved, making the function and performance of mechanical products have been fully developed, and can effectively improve the quality and efficiency of production. However, with the development of market diversification, there are higher requirements for machinery and equipment, requiring machinery manufacturing enterprises to innovate design concepts, continuously improve the quality and performance of machinery, in order to achieve its due benefits. Therefore, in the aspect of mechanical structure innovation of intelligent sports equipment, we should constantly change with the development and progress of the times. At the same time, we should innovate in the process of innovation based on the optimization needs of the original structure and the needs of the industry. There are many innovative methods. In the process of innovation, we should choose appropriate innovative means and innovative technology and innovative methods according to different projects, so as to make it better. It provides strong mechanical support for sports.

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