ISSN 2616-5767 Vol.5, Issue 7: 19-22, DOI: 10.25236/AJETS.2022.050704

Research on the Design of Modern Automata Wood Products

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Abstract: *Automata, with a history of more than 2,000 years, originated in Europe and means automatic mechanical devices, while Automata puppets use mechanical principles to give life and soul to wooden products, complete a series of actions and performances, and convey the designer's ideas to people at the same time. Emotions or ideas create a spiritual collision with the viewer. In addition, Automata puppets can have silent emotional communication with designers, which is also an emotional interaction. Wood material has the characteristics of warmth, simplicity and relaxation. Automata puppet products are more conducive to bringing spiritual comfort to high-pressure people in fast-paced life and relieving mental stress.*

Keywords: *Automata, woodwork, product design*

1. Introduction

In the context of high-tech intelligence era, people's life is simpler and more convenient. However, in the fast-paced life, people's mental health is worrying, and the number of depression patients is soaring, which is also accompanied by the characteristics of younger patients. High-tech products have shortened the distance between people, but they have turned people's communication into cold words, and relaxation and entertainment methods have also been transformed into rigid game buttons. People need more warm design, and the Hyundai Automata stands out like a new day. Born from the wood, a wooden mechanical device producer named Li Zhanlong, known as "Youth Luban", suffered from depression, he got out of the trough of his life by making the Automata puppet machine, and created a whimsical full of childishness. world. To realize freedom and new life is the charm of Automata's creation.

2. The Development Of Automata

The word "Automata" originated in Greek in the mid-18th century. "Automatas" is synonymous with moving mechanisms that existed at the time to demonstrate scientific principles. The steam-powered "flying pigeon" is the first Automata work in history. It can flap its wings and fly in the air. It was invented by Arkutas in 400 BC. The advent of mechanical clocks represented the level of sophistication of mechanical development in the 18th century, and handmade toys were gradually abandoned. In the 20th century, some British mechanical players such as Paul Spooner and Matt Smith did not lose their mechanical entertainment spirit and continued to create more artistic Automata. Persistent creators use wooden materials, expose the mechanical parts, show the working principle, use hand-cranked power, and use wooden mechanical structures for puppet performances that are the hallmarks of the modern Automata style. Modern Automata is a comprehensive technology, which perfectly combines mechanics, art and wood, which also makes it have the characteristics of small-scale spread, and the inheritor needs to have the limitation of comprehensive skills. The birthplace of Hyundai Automata is the United Kingdom, and a large number of Automata enthusiasts have gathered in the United Kingdom.

3. Research On Modern Automata Woodwork Design

Most of the modern Automata are made of wood, and the overall structure mainly includes three parts: performance parts, mechanical structural parts and manual rockers. Because each mechanical puppet creator wants to express different emotions and personal ideas, the intuitive performance components also have their own unique style. The normal operation of each mechanical puppet carries the personal ideal of the creator behind it. Through the transmission of the mechanical device, it can give the viewer

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a visual dynamic impact, or add a sound effect device, supplemented by auditory stimulation, so as to arouse the viewer. Personal interpretation of this design, arousing the emotional resonance of the viewer and realizing the emotional interaction at the spiritual level.

3.1. The performance parts

The performance part is a necessary part of the whole design. Most of them are puppet bionic elements, and various images of humans and animals can be used as design inspirations for performance components. The design of their expressions mainly depends on the emotions the creator wants to convey. In terms of the size of the performance parts, it can be divided into simple action series, that is, a single puppet. For example, Li Zhanlong's "Cloak", "Lu Youqi", Paul Spooner's "Cat and Rabbit" and other works, the performance parts are simple but It can attract more imagination; it can be divided into large-scale situational series, such as Li Zhanlong's "Sky Dreamer" and "Mother of Failure". In addition to the themed puppets, related plot aids are added. In "Sky Dreamer", in addition to the grandfather and the pet dog, a big fish boat is also added. The whole work has a stronger sense of plot, a more realistic sense of fantasy, and complex machinery. The structure makes the transmission components less fault-tolerant. From the perspective of performance structure, it can be divided into local type, upper and lower type and overall matching type. Partial type, whether it is a small action series or a large-scale scene series, most of the automata wood products are partial type, that is, the performance parts are on the frame, the mechanical structure and the manual rocker are at the bottom, such as Nishida Akio's "Frog Eating Bugs". Up and down, the performance parts are divided into upper and lower parts, such as Li Zhanlong's "Children's Paradise". The overall cooperation style, the overall sense of the work is strong, and the mechanical structure has also become a part of the performance components, such as Li Zhanlong's "Escape from Piranhas".

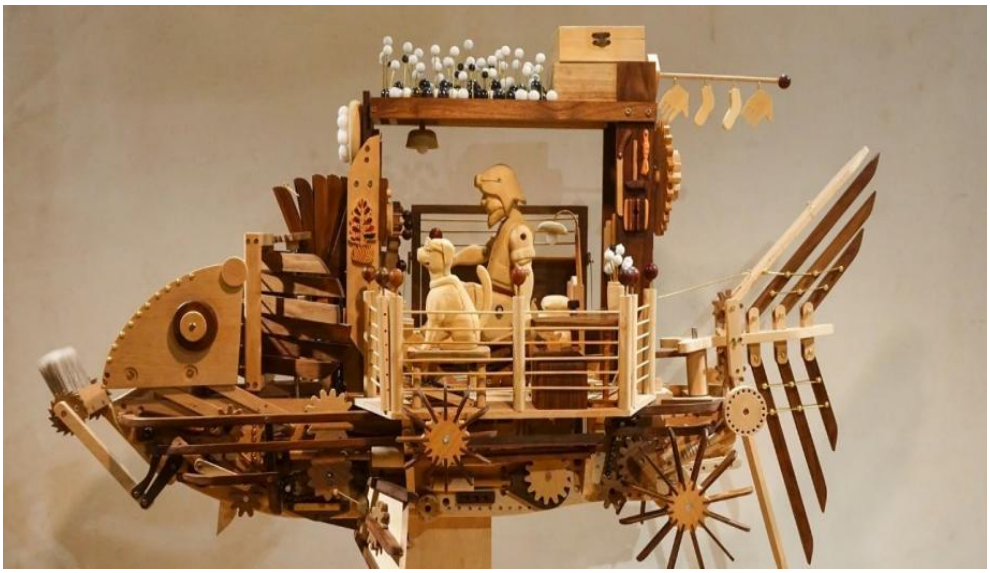

Figure 1: "Sky Dreamer" by Li Zhanlong

3.2. The Mechanical components

Mechanical structure, the key part of the whole design works, mainly covers the CAM, gear, pulley, crankshaft, lever and other structures. It is commonly used mainly gears and levers, is a simple and easy to understand, high implementation of the basic mechanical structure. "The soul of the machine is transformation," said Li Zhanlong. "We usually think about how to translate the circular movement into other movements to meet the needs of the puppet or mechanical movement." Material of mechanical structure, including wood, brass, aluminum, ceramic and other materials. The vast majority of mechanical structures are made of wood, but due to the large volume of wood, it is likely to be constrained by the activity space of mechanical parts in the process of design and production, so the same effect can be achieved through a certain modeling design with a smaller volume of copper wire. For example, in Li Zhanlong's "Lantern Fish", the swinging of fins and tails is realized by circular motion transformation in the copper wire enclosed chute through columns, which saves a lot of space and beautify the overall design sense. Dynamic model of the mechanical structure, mainly for the manual mode, if the designs for the big scene type can also be using both manual and electric power mode, the sky dream home ", the

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whole works is 140 cm long, wide and 60 cm, 100 cm tall, it adopted the hybrid mode, thus promote each parts, flexible operation, make the whole dynamic process more vivid and fluent.

The layout of mechanical structure is not immutable, but should consider the integrity of the design work, according to the specific design of reasonable selection and arrangement. The common arrangement pattern of mechanical structure in Automata wood design works is mainly the lower part, which is located at the lower part of the performing parts and separated from the performing parts by wooden boards. As for the proportion of performance parts to mechanical parts, there is no clear stipulation, the proportion depends on the mechanical transmission construction adopted by the designer. Li Zhanlong believes that the design of mechanical structure is not the more complex the better, nor the more exquisite the details of the appearance. The quality of an Automata work is judged by creativity and interest.

3.3. The manual rocker

The manual rocker, the source of life of the whole work, is generally located at the bottom of the work. In terms of material, wood is used because it is in direct contact with the human hand. Log can bring the warmth on person psychology and kind, lumber itself has specific grain again, no matter be in tactile respect or be in visual respect, can make the person feels comfortable and cure. In terms of color collocation, it is mostly wood color, and wood with different colors can also be used to achieve color collocation. In terms of design layout, the manual joystick can be located on the front and back as well as the side. Located on the front, the manual rocker covers some exposed mechanical parts, which can affect the fun effect of observing mechanical operation. Located on the back, it creates a wide field of vision for the viewer, and the performance part of the activity is more eye-catching, which can better convey the designer's creation emotion to the viewer and achieve better emotional interaction. First of all, most of the manual sticks are located on the right side of the work, because people are used to using the right hand, it is more convenient to move on the right side, which is more in line with people's use habits. Secondly, manual rocker in the right part can better display performance and activities of mechanical parts, the focus of people, in turn, as the performance parts, machinery parts, at last, through the bottom of the shaft extends to the manual rocker, and then turned back the whole works, the operation principle of the whole process every step can be fascinating.

3.4. The process of design creation

The whole creation and manufacturing process is mainly divided into seven steps. The first step, inspiration conception, draft drawing, inspiration source can be inspired by life, can be brainstorming. The second step is to design the mechanical structure. Transmission principle, mechanical parts, materials are the design factors that need to be considered in the design of mechanical structure. The third step is to make puppets, using soft wood that is not easily corroded. Step 4， Make wooden brackets and mechanical parts. When the performance part is heavy, spring buffer is added to reduce the impact of the movement, so as to ensure smooth and gentle operation of the work. Step 5，Assemble all parts for debugging. A miss is as good as a mile. When a number of small errors accumulate together, it will lead to the normal operation of the work, so the debugging link is necessary. Step 6: Disassemble the theme and color it. Step 7: Combine the work and fix it with glue.

4. The Connotation Of Automata' S Creation

In different historical periods, the carrier of Automata is different from its significance, and the functions and forms of expression are also varied. In ancient Greece, it was meant to demonstrate scientific principles; during the Renaissance, numerous palaces and buildings were built thanks to the precise structure of Automata; in the 17th century, it became the earliest barbed robot in human history and opened the era of ' automation '. After the 20th century, modern Automata shows its true appearance, showing its structure and working principle. Today in the 21st century, Automata puppet has become the heart of people, which can make people immersed in their own fairy tale world. In the process of creation, people can dialogue with themselves, sublimation of thought, self-cultivation and meet their creative desire. Pure creative space lets the high-pressure people relax and harvest happiness and success. Automata' s theme is unrestricted, with fairy tales, scenes of life, and skylines. Through a demonstration of an action or a scene, we can tell a story, convey a feeling, and conduct a dialogue to explore the truth. Humorous small scenes can bring simple happiness, simple actions can be thought-provoking, and complete plots can awaken the tenderness and innocence of people. Simple woodwork includes the

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expression of love, the pursuit of dreams, and the awe of nature.

5. Conclusion

Automata design integrates woodworking, machinery and art, which is its comprehensive technical requirements. Automata woodwork can also be combined with intangible cultural heritage to carry out cultural and creative design. For example, letting the Forbidden City characters ' ‘ live ' is also a major design highlight. Facing different people, it has a variety of practical performance. Can cultivate and improve children ' s practical ability, so that their creative thinking is inspired ; alleviate the mental stress of young people and prevent dementia. Because of its entire operation process to mobilize the hand, brain, heart. At present, the creation of domestic self-motor belongs to the minority culture, and is gradually entering the public view. The market development space is still large and the development prospect is good.

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