

An Exploration of the Early Styles of Kinetic Sculpture

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Abstract: Kinetic sculpture first appeared in the early twentieth century, gradually transitioning from cubism to the current "kinetic art", which is an important part of modern Western sculpture. The paper mainly collects and summarizes the kinetic sculpture works between the early twentieth century and the 1930s. The paper finally summarizes that there are three different styles in the early development of kinetic sculpture: mechanical structure, shadow and light interaction, and rhythm of movement, and uses a large number of cases to confirm the influence of the exploration and development of these three styles on the field of kinetic sculpture as well as on the thinking of today's kinetic art creation.

1. Introduction

In the continuous exploration and innovation of art, kinetic sculpture, as a dynamic and avant-garde art form, has gradually emerged and attracted widespread attention. Its unique characteristic lies in the fact that it breaks away from the static limitations of traditional sculpture and, through skilful design and craftsmanship, imbues the sculpture with a vivid sense of kinetic sculpture, enabling the audience to appreciate the multiple dimensions of time, space and form. The early development of kinetic sculpture has witnessed not only artists' bold experimentation with materials and forms, but also a profound exploration of human thought and emotion. This article takes the reader on an exploratory journey into the development of kinetic sculpture, examining its origins, evolution and far-reaching influence on contemporary art.

As one of the branches of kinetic art, the development process of kinetic sculpture is also the early foundation for kinetic art. In the early twentieth century, the second industrial revolution pushed forward the development of science and technology, and also pushed forward the development of the field of art, kinetic sculpture in the period of cubism has sprouted, Henri-Robert-Marcel Ducham's "Nude Descending a Staircase" adds the expression of movement and time to the simple division of forms in Cubism, with a sense of mechanics and a futuristic tendency [1]. With the concept of Albert Einstein's theory of relativity, creators in the cultural and artistic fields have taken an interest in the exploration of time and motion.

2. Mechanical Structure

The development of industry pushed artists to think about the possibility of combining sculpture and industry, thus creating a series of sculptures with mechanical structures, some of which expressed dynamic elements, which was the beginning of kinetic sculpture. During a visit to Pablo Picasso's studio in 1913, Vladimin Tatlin discovered the prototype of the work Bronze Bull's Head welded

together from bicycle pads and bicycle handlebars, a combination of off-the-shelf industrial products that was an entirely new type of material to experiment with for sculpture at that time. In the same year, Marcel Duchamp produced the installation. The Bicycle Wheel with a bicycle wheel mounted on a kitchen stool, opening up sculptural sessions to mechanical and kinetic. Marcel Duchamp's bicycle wheel is more like a toy with a special meaning than a sculpture. How long the wheel rotates each time is determined by the force of rotation, which greatly attracts the interest and participation of visitors. Since then, Marcel Duchamp has discovered a completely new form, initiating a dynamic change never before seen in the history of sculpture.

In 1920, Marcel Duchamp continued to delve into the dynamic sculptural style of mechanical structures, using different organic materials to assemble and combine to create the "Rotary Glass Plates", a classic work that retains the originality of various materials in a non-custom-made situation, and also creates fascinating visual effects through the combination of mechanical structures and rotating forms. Based on the element of movement, the use of readymade products as materials is the most distinctive feature of this work, which subversively changes the connection between "art" and "handmade" at that time, introducing the use of mechanical mechanisms and parts as sculptural structures.

Alexander Calder's works are all characterised by mechanical structures, such as Snow Flurry, Vertical out of Horizontal, Lily of Force, Poisson Volant (Flying Fish), etc. These works are based on the principle of leverage and the principle of linking of mechanical parts, which maintains a delicate physical balance between various materials. The works are based on the principle of leverage and the linking of mechanical parts, maintaining a delicate physical balance between materials. When the breeze blows, they tremble like leaves; or they move with the wind, constantly reassembling and forming new structures in the process of movement, so that a single work takes on many different faces [2]. In the early thirties, Duchamp formally put forward the name of "kinetic sculpture" after seeing Calder's series of works "Wind", and since then kinetic sculpture began to embark on a new journey. Among the modern artists, Ralfonso, the founder of the new kinetic sculpture of the 21st century, is also able to complete kinetic sculptures that are either ornate or novel and have a sense of fun, simply by carving mechanical structures.

3. Shadow And Light Interaction

While exploring mechanical structures, some artists have also turned their attention to the optical illusion, the interaction with light and shadow. Laszlo Moholy Nag is a pioneer in combining light and shadow with kinetic mechanics, and his own willingness to see technology as art, to use this medium as a way of art, has led him to explore sculpture as one of the fields related to technological art.

His 1922 Bauhaus work Light Prop for an Electric Stage (Light-Space Modulator) (Figure 1) is one of the more prominent of his practical explorations, in which he incorporated light and shadow as a variable factor in the composition and movement of the sculpture. Nagy describes his work in the following way: "This kinetic sculpture is designed for the automatic projection of light and dark contrasts and luminous effects. It produces large areas of projected penetration, while intercepting a series of patterns in a slow, flickering rhythm. The reflective surfaces of the installation include discs of polished metal with evenly spaced holes, sheets of glass, and films and screens of various media. It seems easy to envisage that in many cases such compositions will replace static works of art." [3].



Figure 1: Light Prop for an Electric Stage (Light-Space Modulator)

In the early 1930s, the Bauhaus theatre staged a different kind of ballet, "Mechanical Dance", in which the dancers, dressed in geometric costumes, moved as if they were geometrical bodies, moving and transforming, and in the centre of the stage, accompanied by changing light and shadow, which enriched the unique sense of art in this performance. This structuralist performance is a bold crossover that also explores the relationship between geometry, movement and time, and the interaction between geometric movement and light and shadow. The exploration of light, shadow and mechanical movement in the early days of kinetic sculpture (early twentieth century) can be seen as highly creative and ahead of its time, but it was not until Julia Roberts's 1996 film *Mary Reilly* that the beginning of true "virtual kinetic sculpture" was ushered in, fuelled by the use of technology.

4. Rhythm Of Movement

While other artists were pondering the presentation of kinetic sculpture, the Russian avant-garde sculptors were thinking and innovating, further expanding the boundaries of art by introducing a subversive concept - the fourth dimension of "time" - and thus exploring the rhythm and changes inherent in the "movement" of an object. The avant-garde sculptors further expanded the boundaries of art by introducing a subversive concept - the fourth dimension of "time" - and thus explored the rhythm and change inherent in the "movement" of objects. The avant-garde sculptors boldly used non-traditional materials and forms in their sculptural creations to seek new interpretations of time and space. They realised that sculpture was no longer limited to the representation of three-dimensional space, but could add layers of meaning through the passage of time. This unique way of thinking led them to create a series of thought-provoking kinetic sculptures. They sought to capture the changes in the objects over time and explored the rhythm of the "movement" of the objects themselves. This idea is particularly evident in the work of the Russian avant-garde sculptor Vladimir Tatlin. In his kinetic sculpture "Dissolution of the Statique", he creates an illusory and tense visual effect through dislocated geometric forms and rotating structures. This sense of movement does not come from the action of external forces, but is internalised within the work itself, revealing a unique dynamic rhythm through the passage of time.

1912, Umberto Boccioni published the "Technical Manifesto of Futurist Sculpture" as a futurist sculptor, calling for "the search for movement in sculpture" [4]. In 1912, Umberto Boccioni, in his capacity as a futurist sculptor, published "The Technical Manifesto of Futurist Sculpture", in which he put forward the concept of "sculpture as environment" and demanded that "movement be sought

in sculpture". Not only promoted the development of futurism, but also gave the sculpture profession a new direction of exploration, his sculpture *Unique Forms of Continuity in Space* (1913) is based on the theory he put forward, seeking to shape the rhythm of movement in a piece of static sculpture and show the method of time trajectory for the destination practice.

In 1913 Luigi Russolo published his *Manifesto, L'arte dei Rumori*, and his work *noise intoners* interprets the exploration of the theory. The work consists of wooden boxes of different sizes, and he designed a sound device inside each box that emits sound through collision. Through the rotation of the external handle, the sound is emitted in a rhythmic manner, and the different boxes of different sizes with different rhythms form a huge sound system. He conveyed the rhythm of movement to the viewer by means of sound, which was a creative way of incorporating "noise" as a medium into his artworks at that time.

In 1920, Naum Gabo published *The Realistic Manifesto*, which declared that the new art should adopt a new element, which he called "kinetic rhythms", to represent time and space. Naum Gabo's *Kinetic Construction (Standing Wave)* (Figure 2), one of the first truly kinetic sculptures in the history of modern sculpture, delves into the visual communication of the rhythm of movement; in another, he uses a motor to act on a gravitational spring to keep it bouncing uninterruptedly, and titled the work "Sculpture in Motion" [5]. Their works explore and practice the relationship between "rhythm of movement" and "time" through the use of auditory, visual and other means, expanding the thinking strategy of kinetic sculpture, expanding the expression methods of kinetic art.

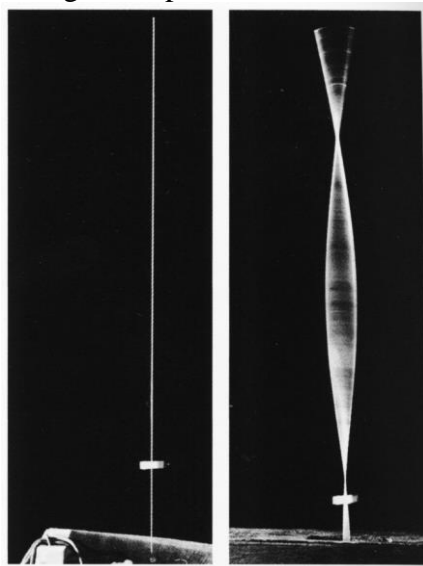


Figure 2: Kinetic Construction (Standing Wave), 1919

Swiss artist Zimoun, who has developed his work based on the theories of Luigi Russolo, has created a huge kinetic sculpture in the form of an acoustic. Using a cotton ball, a cardboard box and a DC motor, he uses the simple dynamics of the cotton ball to make a "humming" sound by constantly hitting the cardboard box. By repeating the rhythm of mechanical movement, he expresses the restlessness of an orderly pattern. The strong contrast between the simplicity of the formation and the complexity of the sound demonstrates the complexity of Zimoun's thinking underneath the appearance of minimalism. The "living" movement of the *Strandbeest* created on the beach by Theo Jansen, a physicist, through the use of lightweight materials such as PVC, is also a further interpretation of the rhythm of movement in a wind-powered system.

5. Conclusion

In the early development stage of kinetic sculpture, three completely different directions of exploration, the mechanical structure, the interaction of light and shadow, and the rhythm of movement, laid a solid foundation for the evolution of the entire field of kinetic sculpture. These unique and innovative elements not only enriched the language of sculpture art, but also gave the works a new life and meaning.

David Cerny's kinetic sculpture "Franz Kafka" is particularly noteworthy in this regard [6]. The sculpture, which stands in the streets of the Czech capital, rotates independently on each level by means of an ingenious internal mechanism. This innovative mechanical design allows the kinetic sculpture to present a layered variation that captivates the viewer's attention and inspires them to think about time and space.

At the same time, David Cerny used stainless steel to create this work, resulting in a strong reflective effect on the surface of the sculpture. This interaction of light and shadow not only makes the sculpture itself part of the environment, but also creates an ever-changing visual feast. Viewers are able to feel the subtle and marvellous interaction between the work and its surroundings at different angles and times, resulting in a deeper resonance.

In addition, the rhythm of movement is one of the distinguishing features of this sculpture. The different levels of rotation produce complex changes in form and position, as if telling a unique story. This three-dimensional dimension of the rhythm of movement makes the sculpture no longer a static work of art, but an existence full of vitality and vigour, triggering the viewer to think about movement and change.

In summary, David Cerny's kinetic sculpture "Franz Kafka" demonstrates the diversity and innovation of kinetic sculpture art by integrating the three early exploratory forms of mechanical structure, light and shadow interaction and movement rhythm. This case shows that in the creation of modern kinetic sculpture, integrating the three styles with each other or developing them separately can bring the audience a unique and profound artistic experience and create excellent kinetic art works.

From the first fragmented attempts to the later stylistic diversification, the vein of development of kinetic sculpture is rich and colourful, bringing infinite imagination to the art world and an entirely new art experience to the public. Whether in the use of materials, formal innovation or conceptual expression, kinetic sculpture has shown an unprecedented vitality, injecting a lasting vitality into artistic creation. The exploration of the three early types of kinetic sculpture, namely mechanical structure, light and shadow interaction and rhythm of movement, as the early styles of kinetic sculpture, is still influential in modern sculpture, and the emergence of the three styles makes an important contribution to the development of the whole field.

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